



memo

to **Freeman Anthony, City of Bellingham**

from **Nathan Polanski, PE, MIG**
Maika Nicholson, PE, MIG

re **City of Bellingham**
Holly Street Bike Facility Study and Design
(MIG 15315)
Cover Letter

date **April 30, 2026**

MIG is pleased to present the following documentation package, which brings together the body of work completed by MIG and DKS Associates for the Holly Street Bike Facility Study. This deliverable includes the following five documents:

Evaluation of Design Alternatives Memorandum

Prepared by MIG, April 28th, 2026.

The purpose of this memorandum is to describe the evaluation methodology and results, and to identify the key issues that distinguish the preferred design alternative for each of the corridor's six segments defined in Appendix A. The evaluation focuses on identifying a preferred alternative for each segment that supports the long-term vision of a continuous, separated bike facility along the full Holly Street corridor. This study also identifies a near-term project that builds toward that vision and can be delivered within an established budget and construction timeline. As described in *Next Steps*, this near-term project will focus on providing bike facilities where no bike facilities exist today to provide network continuity, improve safety at key locations, and allow for phased upgrades over time.

Appendix A: Evaluation of Design Alternatives

Prepared by MIG, April 28th, 2026.

This document supports the *Evaluation of Design Alternatives Memorandum* and includes two evaluation summary pages for each of the corridor's six segments:

- (1) The first page includes a summary of key segment characteristics, the refinement process that led to the evaluated set of design alternatives, and the selected preferred alternative.
- (2) The second page includes an evaluation matrix and rationale for selecting the preferred alternative by examining how each option performed across the evaluation criteria (defined on page 3 of the document).

- **Appendix B: Preliminary Design Alternatives**

Prepared by MIG, February 19th, updated April 28th, 2026.

This appendix presents the design alternatives that were developed and evaluated, as well as those considered but not advanced for further evaluation. The preliminary alternatives were developed and refined through a series of workshops with key City of Bellingham staff and leadership. The attached version incorporates feedback on the initial Preliminary Design Alternatives distributed to City staff (dated February 19, 2026), the addition of the Prospect to Champion Alternative Route in Segment 3 (Bay to Champion), and updates to the traffic analysis methodology and results.

- **Appendix C: Traffic Analysis Memorandum**

Prepared by DKS, April 28th, 2026.

This technical memorandum provides an overview of the traffic analysis methodology and results that were used to inform the design alternatives development and evaluation. Traffic analysis of the Holly Street corridor focused on four intersections along Holly Street (Bay Street, West Champion Street, F Street and Broadway Street), and the adjacent intersection of Champion Street and Prospect Street.

- **Appendix D: Parking Evaluation Memorandum**

Prepared by DKS, July 24th, 2025.

This memorandum documents the existing on-street public parking utilization during midday and evening periods, both weekdays and Saturdays, on Holly Street, from Ellis Street to Broadway and on side streets, one block off Holly Street.

Next Steps

Based on feedback received from Public Works staff, the near-term improvements that will advance to engineering design will consist of improvements from West Champion Avenue to Broadway Street (Segments 4, 5, and 6). Improvements between Ellis St and W Champion Ave (Segments 1 through 3) may move forward in the future, but the scope and timing will be informed by additional study (Downtown Connections Study) and funding. Next steps include developing a 10% Design roll plot for near-term improvements to Segments 4, 5, and 6 and preparing a construction cost to support project implementation.



memo

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from **Nathan Polanski, PE, MIG**
Maika Nicholson, PE, MIG

re **City of Bellingham**
Holly Street Bike Facility Study and Design
(MIG 15315)
Evaluation of Design Alternatives

date **April 28, 2026**

This memorandum and accompanying Appendix A present the findings from the project team's evaluation of design alternatives. The purpose of this memorandum is to describe the evaluation methodology and results, and to identify the key issues that distinguish the preferred design alternative for each of the corridor's six segments defined in Appendix A.

The evaluation addresses:

- The defining characteristics in each segment that guided the development and evaluation of the design alternatives;
- Key outcomes from the traffic analysis that drove decision-making at Bay, Champion and F-Street intersections;
- The extent to which each alternative aligns with the project goals; and
- The evaluation criteria that serve as primary differentiators among the alternatives in each segment.

The evaluation will inform relative trade-offs between design alternatives and support the selection and refinement of a preferred design for the corridor.

Project Background and Objective

The 2024 Bicycle Master Plan (BMP) identifies Holly Street—from Ellis Street to Broadway—as a high-priority corridor for bicycle improvements. This project seeks to address a critical gap in the City's bicycle network by providing a continuous **separated bicycle facility** along Holly Street, while also offering opportunities to enhance bicyclist and pedestrian safety and comfort throughout the corridor.

The BMP defines a separated facility by the following elements:

- First, **horizontal separation** with physical space (e.g., a landscape buffer) between the street and the bicycle lane (this may include a change in elevation from the street surface).
- Second, a **continuous vertical element** like a jersey barrier or pylons separating the bicycle lane from the vehicle travel lane and from the pedestrian facility (this may include a change in elevation, or a change in surface material).

Characteristics that differentiate the existing buffered bike lanes installed with the Holly Street Pilot Bike Lane Project, which do not have a continuous vertical element separating the bike lane from the adjacent travel lane, from a separated bicycle facility are provided on page 4 of Appendix B – Preliminary Design Alternatives.

Near-term Improvements vs. Long-term Vision

The Holly Corridor’s long-term vision is different than what can be built in the near term due to funding limits. While the evaluation of design alternatives presented in this memorandum focuses on the long-term vision of providing a continuous, separated bike facility for the full corridor, this study also identifies a near-term project that can be delivered within an established budget and construction timeline. As described in *Next Steps*, this near-term project will focus on providing bike facilities where no bike facilities exist today to provide network continuity, improve safety at key locations, and allow for phased upgrades over time.

Project Goals and Criteria

Creating a vibrant and inclusive Holly Street Corridor requires balancing a range of needs and weighing competing priorities—including bicycle facility integration, traffic operations, placemaking opportunities, and parking availability. While the primary objective of this project is to deliver a high-quality bicycle facility, the project goals and associated evaluation criteria reflect the diverse users and functions that define the Holly Street Corridor.

Goal 1: Provide a safe, comfortable, and continuous separated bicycle facility that supports riders of all ages and abilities.

Goal 2: Enhance pedestrian safety, comfort, and universal accessibility.

Goal 3: Accommodate vehicular traffic flow while incorporating traffic-calming measures that promote safe speeds and turning movements.

Goal 4: Preserve and promote vibrant streetscapes that are thoughtfully integrated with the corridor’s land-use context and broader vision for Downtown and Old Town.

For each project goal, a corresponding set of criteria have been established to evaluate how well each design alternative functions. In addition, a separate set of **Feasibility Criteria** evaluate factors to ground the selection process in practical considerations, including cost and funding, maintenance needs, and adaptability or phaseability. Evaluation criteria associated with each project goal are included on Page 3 of Appendix A.

Evaluation Methods and Results

Preliminary Design Alternatives Development and Refinement

Preliminary design alternatives were developed in segments and refined through a series of workshops with key City of Bellingham staff and leadership. Each segment has distinct characteristics that inform both the development of alternatives and the resulting evaluation takeaways, including:

- Presence or absence of an existing bike facility
- Right-of-way and curb-to-curb width
- Intersection geometry and operational/signal considerations
- Land-use, zoning, and planned developments
- Existing on-street parking demand and utilization

For example, in Segment 5 (Old Town), removing parking on only one side of the street does not provide sufficient space to accommodate eastbound and westbound separated bike facilities. Therefore, the design alternatives evaluated include only options that remove parking from both sides of the street.

Evaluation Approach

The preliminary design alternatives for each segment were then evaluated against the project goals and criteria. Evaluation results, by segment, are presented in Appendix A. Each segment includes two evaluation summary pages:

- The first page summarizes key segment characteristics, the refinement process that led to the evaluated set of design alternatives, and the selected preferred alternative.
- The second page presents an evaluation matrix and rationale for selecting the preferred alternative by examining how each option performed across the evaluation criteria. The evaluation matrix uses the following rating system across all criteria, including implementation feasibility.

Table 1 – Evaluation Rating System

	Better than existing / very good alignment with Project Goals
	Better than existing / good alignment with Project Goals
	Neutral (no change from existing condition)
	Worse than existing / poor alignment with Project Goals
	Worse than existing / very poor alignment with Project Goals

Each colored square in the matrix corresponds to a rating for a design alternative. Each row of colored squares represents the ratings for a single criterion across all alternatives. For each segment, the graphic highlights the criteria (rows) with a wider range of color coding from left to right. These “differentiators” help identify key advantages of one alternative over another and support the rationale for selecting a preferred alternative.

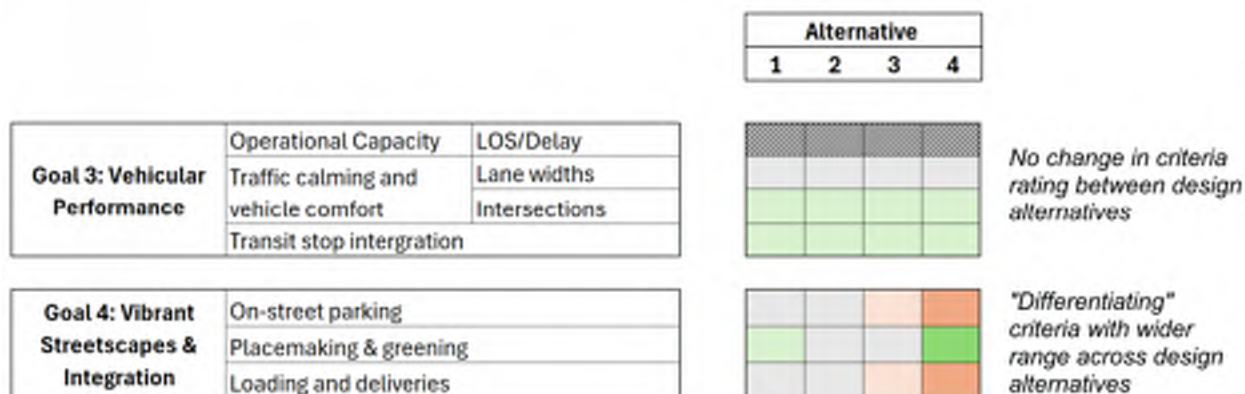


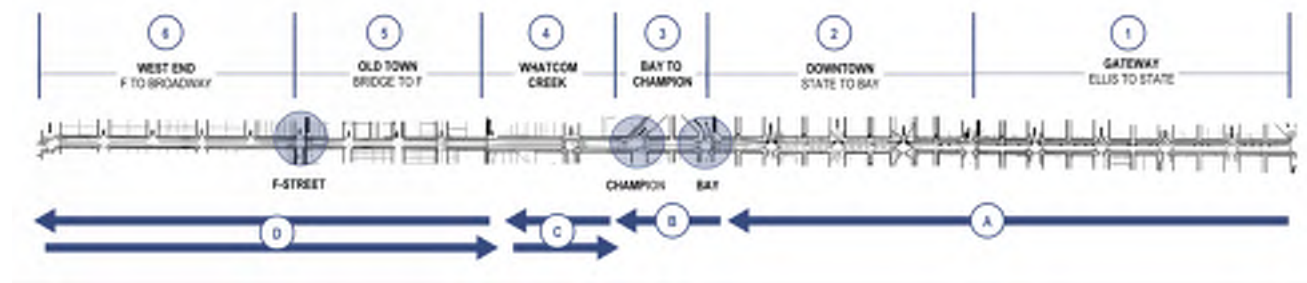
Figure 1 – Evaluation Matrix Example

In general, alternatives that provide higher levels of physical separation within each segment tend to receive light and dark green ratings for the criteria associated with Goal 1 (bicycle safety and comfort) and Goal 2 (pedestrian safety and comfort). However, these increases in separation and corresponding improvements in safety and comfort typically come at the expense of on-street parking. As a result, the selection of a preferred alternative in any given segment is influenced by the unique context and key drivers present—primarily parking considerations and implementation constraints—which may lead to choosing an option with lower separation and a higher Level of Traffic Stress (LTS).

Bike lane continuity and predictability along the corridor is also an important factor in selecting among alternatives. For example, maintaining bicycle travel along the curb—whether through a parking-protected facility or vertical separation where parking is not present—is prioritized over transitioning between lane types along the corridor.

Results

Figure 2 summarizes the preferred corridor design for the long-term vision, which includes four distinct bicycle facility types (Typical Sections A through D) that provide a continuous, separated bike facility in alignment with the project objectives. The corridor design maintains cyclist positioning along the curb for the full length of the corridor in the westbound direction and from Broadway to Champion in the eastbound direction. Evaluation drivers and key differentiating criteria that informed the selection of the preferred design for each segment are provided in Appendix A – Evaluation of Design Alternatives.

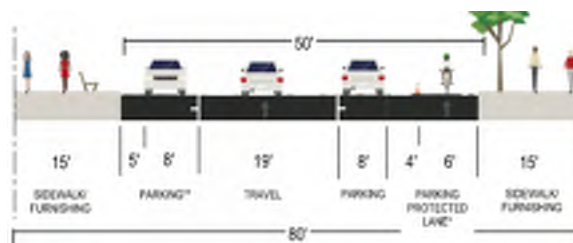


Typical Section A (Segments 1 and 2):
Parking protected bike lane (westbound only)

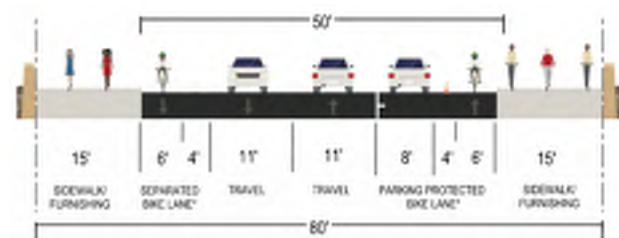


Typical Section B (Segment 3):
Parking protected bike lane (westbound only) *

**Channelization between Bay and Champion and operational changes at the Holly/Bay intersection needed to support this alternative require further evaluation within the broader Downtown Bellingham network, to be further evaluated as part of the upcoming Downtown Connections Study.*



Typical Section C (Segment 4):
Parking protected bike lane westbound
Separated bike lane eastbound (no parking)



Typical Section D (Segment 5 and 6):
Separated bike lane eastbound and
westbound (no parking)

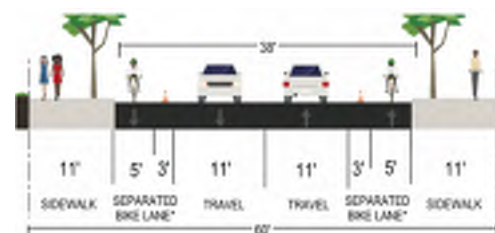


Figure 2-Preferred Corridor Design Summary

In addition to the bicycle facility types and typical street sections shown in Figure 2, traffic modeling analysis (Appendix C) informed intersection recommendations at Bay Street, Champion Street, and F Street. Recommendations for operational updates at these intersections—including changes to intersection channelization to accommodate the proposed bike facilities—are summarized below. Detailed traffic modeling results, including the operational configurations tested and the resulting levels of service, queue lengths, and delays, are provided in Appendix C.

A key finding of this study is that additional analysis is needed to determine how to provide a separated bike facility from Commercial Street to Champion Street without causing peak-period traffic delays. The forthcoming Downtown Connections Study will evaluate overall downtown traffic circulation, which is expected to help inform considerations such as one-way versus two-way operations from Bay to Champion Street, the feasibility of a dedicated bike signal at the Holly/Bay intersection, and operational changes at the Holly/Champion intersection.

Bay Street

- A dedicated bicycle signal with a separate phase for cyclists is recommended to provide a continuous separated bike facility that meets project goals while accommodating standard intersection geometry.
- Extend one-way westbound traffic from Bay to Champion to provide a dedicated right-turn lane and a shared through/left-turn lane for westbound Holly Street traffic. This configuration improves intersection performance (over the shared through/right-turn option described in Appendix C) by allowing the dedicated bicycle signal phase to operate concurrently with the left-turn movement.

Champion Street

- Provide two-way stop control in the near term, with consideration for a signalized intersection in the long term. The two-way stop would control eastbound traffic on Holly Street and a southbound traffic on Champion Street, allowing free operations for westbound Holly Street.
- Restrict right turns onto Champion for westbound Holly street vehicles to eliminate conflicts with bicycles; westbound vehicles would instead turn right at Bay.
- Intersection concepts for the Holly/Champion intersection are included in Appendix B, and focus on incorporating traffic-calming measures that improve safety for crossing bicyclists and pedestrians while maintaining traffic flow and intersection level of service.

F Street:

- Modify signal operations to allow permissive left turns onto F Street for vehicles traveling eastbound and westbound on Holly Street.
- Consider implementing bicycle video detection (e.g., Miovision or similar) that detects bicyclist presence and triggers a left-turn blank-out phase to reduce conflicts between left turning vehicles and bicyclists traveling through the intersection. In the future, a similar change to permissive left turns from F Street onto Holly Street will be required if the planned separated bicycle facilities on F Street (outside the scope of this project) are implemented.

Next Steps

Based on feedback received from Public Works staff, the near-term improvements that will advance to engineering design will consist of improvements to Segments 4, 5, and 6 (West Champion Avenue to Broadway Street). Improvements to Segments 1, 2 and 3 may move forward in the future, but the scope and timing will be informed by additional study (Downtown Connections Study) and funding. Next steps include developing a 10% design roll plot for near-term improvements to Segments 4, 5, and 6, as well as preparing a construction cost estimate and project budget to support project implementation.

Attached:

Appendix A: Design Alternatives Evaluation (April 28, 2026)

Appendix B: Preliminary Design Alternatives (April 28, 2026)

Appendix C: Traffic Analysis Memorandum (April 21, 2026)

Appendix D: Parking Evaluation Memorandum (July 24, 2025)

Appendix A

Holly Street Corridor Bicycle Facility Study Evaluation of Design Alternatives

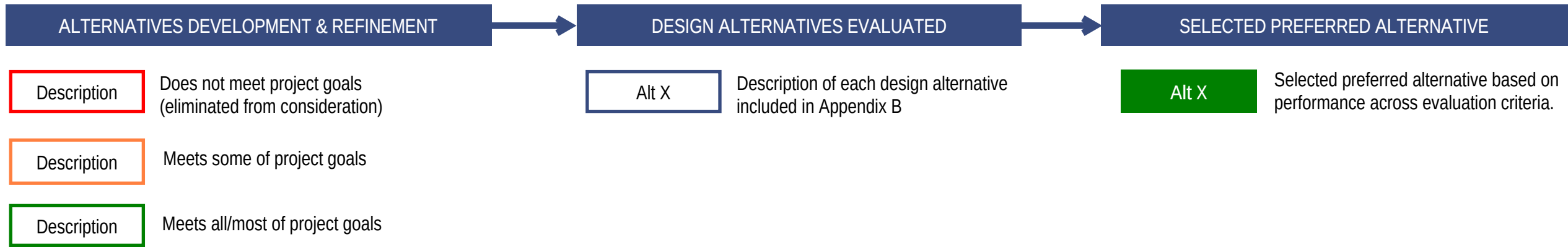
April 28, 2026

EVALUATION OF ALTERNATIVES SUMMARY

The evaluation of alternatives presented on the following pages includes two pages for each segment:

- 1. The first page summarizes key segment characteristics, the refinement process that led to the evaluated set of design alternatives, and the selected preferred alternative.

Evaluation Process Legend



- 2. The second page presents an evaluation matrix and rationale for selecting the preferred alternative by examining how each option performed across the evaluation criteria. The evaluation matrix uses the following rating system across all project criteria, including implementation feasibility (see page 3).

Evaluation Rating System

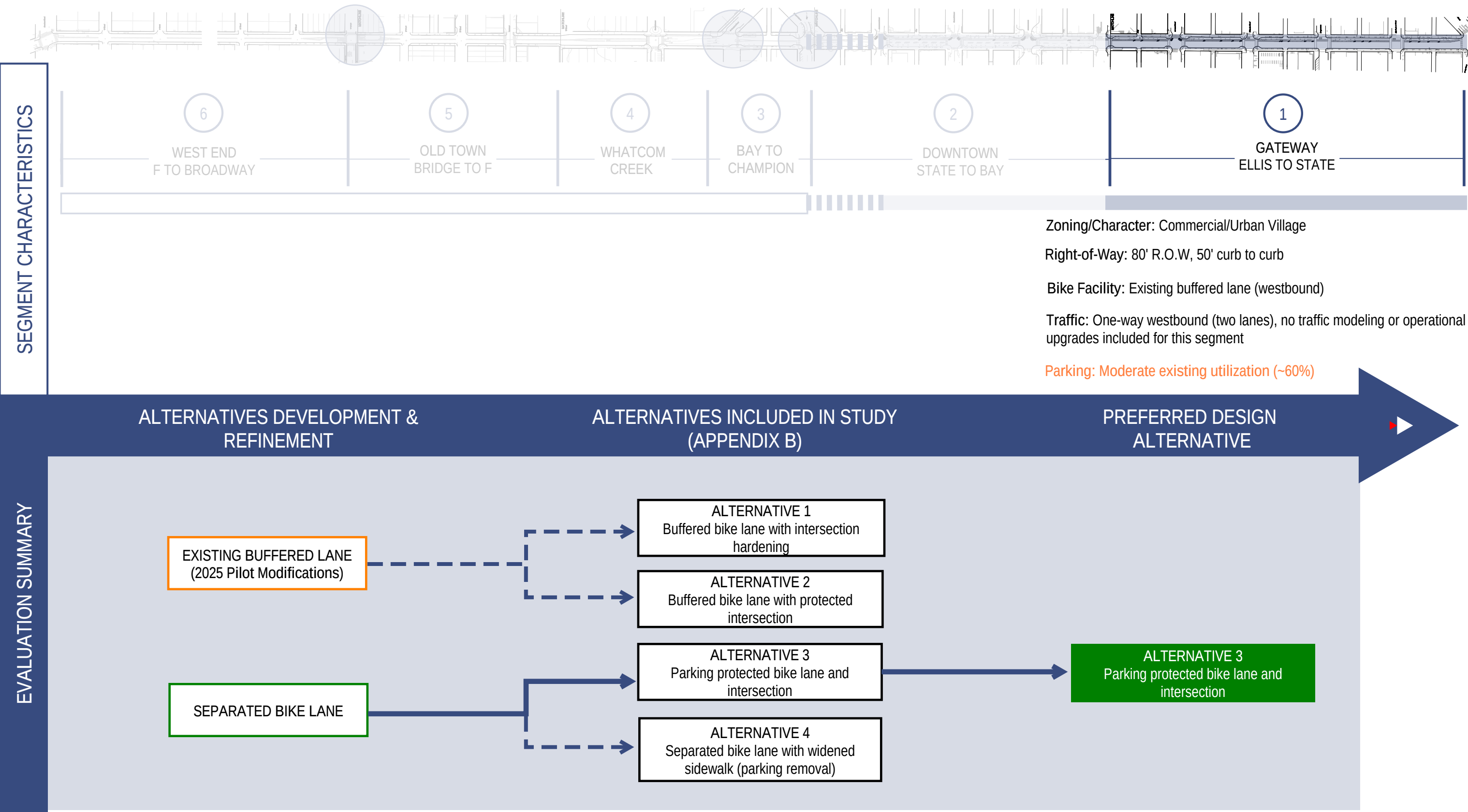
	Better than existing / very good alignment with Project Goals
	Better than existing / good alignment with Project Goals
	Neutral (no change from existing condition)
	Worse than existing / poor alignment with Project Goals
	Worse than existing / very poor alignment with Project Goals

PROJECT GOALS AND CRITERIA

This table presents the project goals and evaluation criteria used to evaluate each design alternative.

PROJECT GOALS		CRITERIA
Goal 1: Provide a safe, comfortable, and continuous separated bicycle facility that supports riders of all ages and abilities.	Bicycle safety from vehicle conflicts at:	Driveway and alley crossings
		Intersections
		Parking (parking movements and door zone conflicts)
		Transit Stops
	Level of Separation/LTS promotes use by riders of "all ages and abilities"	
Goal 2: Enhance pedestrian safety, comfort, and universal accessibility.	Pedestrian safety from bicycle and vehicle conflicts at:	Driveway and alley crossings
		Intersections
		Parking (people moving between parked vehicles and sidewalk)
	Increases sidewalk zone travel width and/or separation from traffic and people biking	
Goal 3: Accommodate vehicular traffic flow while incorporating traffic-calming measures that promote safe speeds and turning movements.	Operational capacity (level of service, queue lengths)	
	Street sections and lane widths reinforce target speeds (20-25), while meeting the needs of emergency and transit vehicles	
	Intersection design accommodates curb return radii that meet City standards	
	Design promotes integration of transit stops	
Goal 4: Preserve and promote vibrant streetscapes that are thoughtfully integrated with the corridor’s land-use context and broader vision for Downtown and Old Town.	Preserves an appropriate amount of on-street parking considering existing parking utilization and segment-specific considerations	
	Enhances opportunities for placemaking and urban greening (LID, street trees, furnishing, bike parking, plaza/gathering spaces)	
	Accommodates loading zones and deliveries to local businesses	
IMPLEMENTATION CRITERIA		
Cost	Construction cost, including all impacts (utility relocation, etc.)	
Maintenance	Ease of maintenance / need for specific maintenance activities or equipment	
Phaseability / Adaptability	Ability to phase implementation and progress over time from lower cost/temporary (e.g. paint) to higher cost improvements (e.g. curbs/medians)	

EVALUATION SUMMARY | Gateway



EVALUATION SUMMARY | Gateway

Evaluation Results and Implementation Considerations

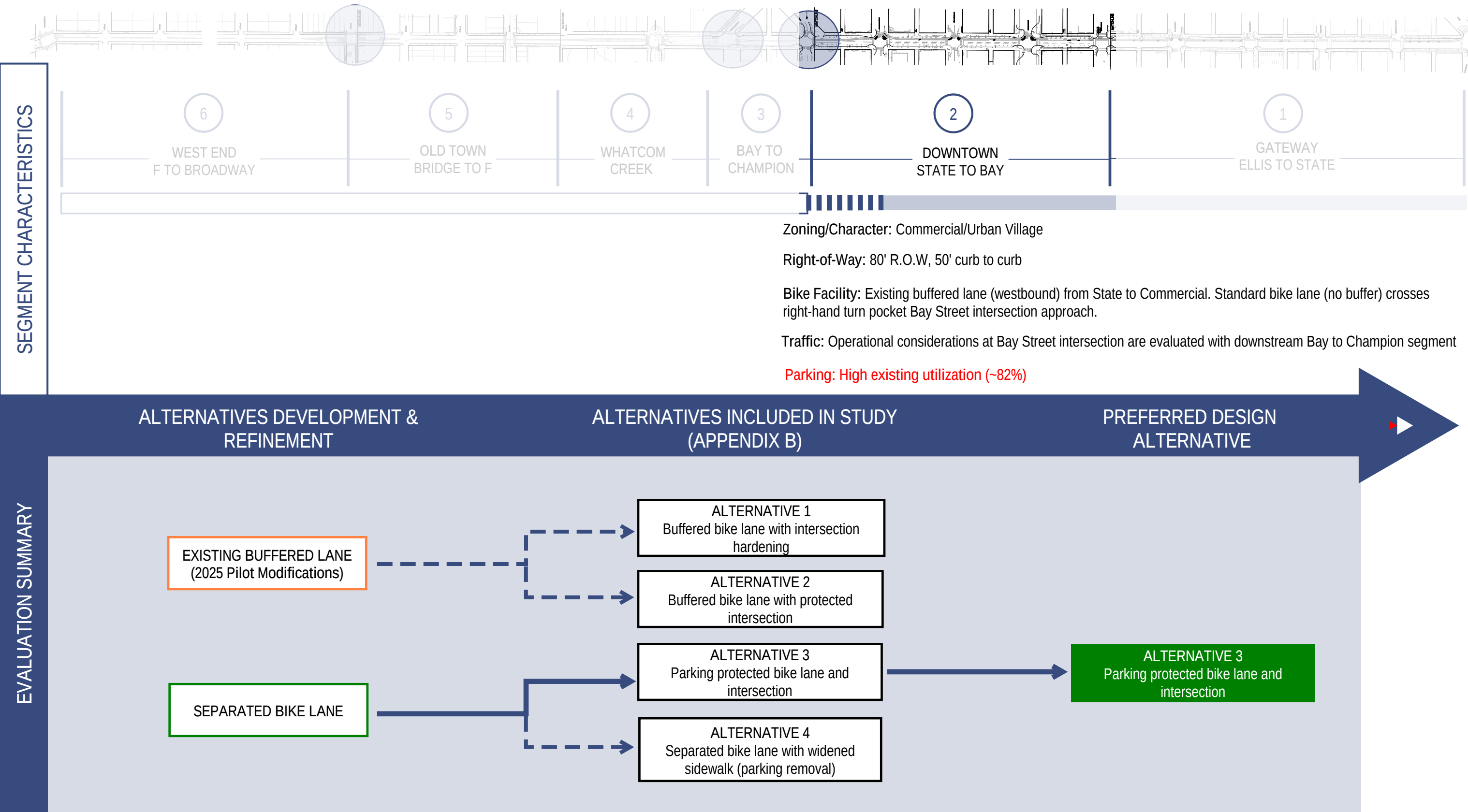
Alternative 3 (Parking Protected) provides a low-stress, separated bike lane that offers safety and comfort improvements for cyclists and pedestrians compared to the buffered Alternatives 1 and 2, while still accommodating on-street parking within this commercial area.

Implementation Considerations: A key implementation consideration for a parking-protected facility in the Gateway segment is the high number of existing alleys and driveways. To facilitate a safe and comfortable parking protected bike facility, the City could consider measures to limit or consolidate new driveway access points as parcels redevelop. Because this segment already includes a buffered bike facility and recently installed intersection safety improvements, near-term implementation is likely to focus on targeted upgrades such as hardening intersection safety measures and enhancing transit stops at the Billy Frank Jr. intersection.

GOALS		CRITERIA	
Goal 1: Bicyclist Safety and Comfort	Safety from vehicle Conflicts	Alleys and driveways	
		Intersections	
		Parking	
		Transit	
	Comfort for all ages and abilities		
Goal 2: Pedestrian Safety and Comfort	Safety from bicycle and vehicle conflicts	Alleys and driveways	
		Intersections	
		Parking	
	Pedestrian Comfort		
Goal 3: Vehicular Performance	Operational Capacity		
	Street section design and lane widths		
	Intersection design and turning movements		
	Transit stop intergration		
Goal 4: Vibrant Streetscapes & Integration	On-street parking		
	Placemaking & greening		
	Loading and deliveries		
Implementation Criteria	Cost		
	Maintenance		
	Phaseability/adaptability		

Alternative			
1	2	3	4

EVALUATION SUMMARY | Downtown



EVALUATION SUMMARY | Downtown

Evaluation Results and Implementation Considerations

The differentiating criteria and evaluation takeaways for the Downtown segment are similar to those for the Gateway segment, with demand for on-street parking and commercial activity increasing within Downtown. Addressing feedback from the original Downtown parking-protected pilot project through elements such as a protected intersection design and enhanced visibility at mid-block alley crossings will enhance cyclist visibility and reduce the potential for right-hook conflicts. Another key distinction in the Downtown segment is the high value of expanding pedestrian spaces. Within Bellingham’s Downtown, opportunities for wider sidewalks, seating, street trees, and other placemaking amenities may outweigh the need to preserve on-street parking along Holly Street. If funding opportunities arise—and future studies indicate that reducing on-street parking is feasible within the broader Downtown parking system—Alternative 4 could be considered a higher-cost, high-benefit option to pursue.

Implementation Considerations: As in the Gateway segment, near-term implementation is likely to focus on targeted upgrades such as hardening intersection improvements installed with the recent pilot project modifications.

GOALS		Alternative			
CRITERIA		1	2	3	4
Goal 1: Bicyclist Safety and Comfort	Safety from vehicle Conflicts				
	Comfort for all ages and abilities				
Goal 2: Pedestrian Safety and Comfort	Safety from bicycle and vehicle conflicts				
	Pedestrian Comfort				
Goal 3: Vehicular Performance	Operational Capacity				
	Street section design and lane widths				
	Intersection design and turning movements				
	Transit stop intergration				
Goal 4: Vibrant Streetscapes & Integration	On-street parking				
	Placemaking & greening				
	Loading and deliveries				
Implementation Criteria	Cost				
	Maintenance				
	Phaseability/adaptability				

Key Differentiating Criteria

Alternatives 3 and 4 provide a separated bicycle facility and improve safety and comfort over the existing buffered bike lane (Alternatives 1 and 2).

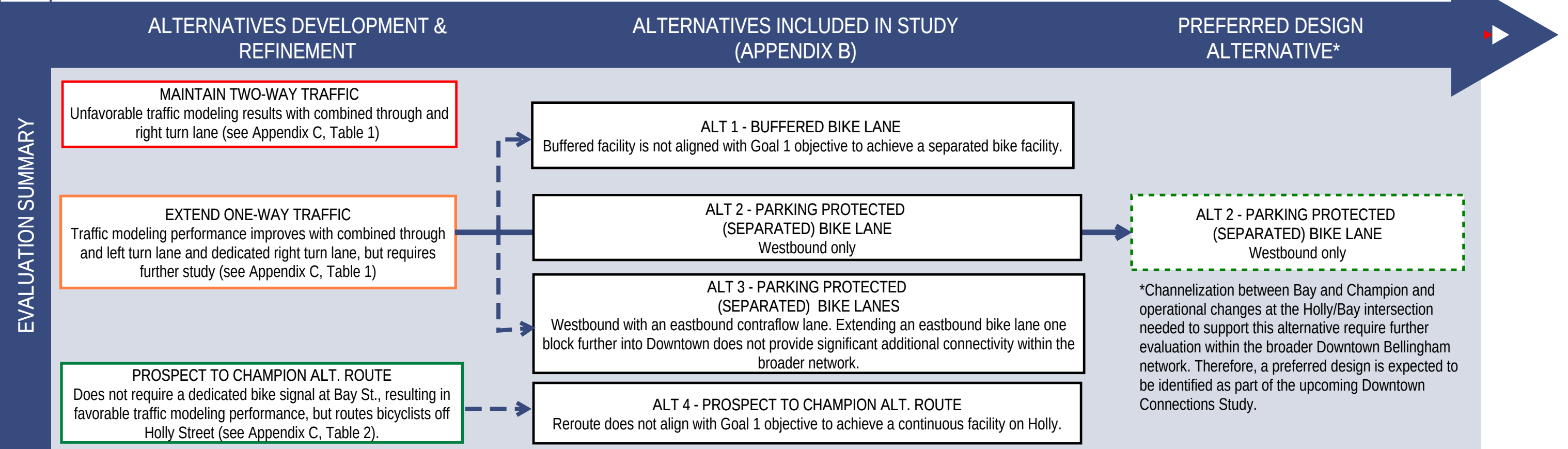
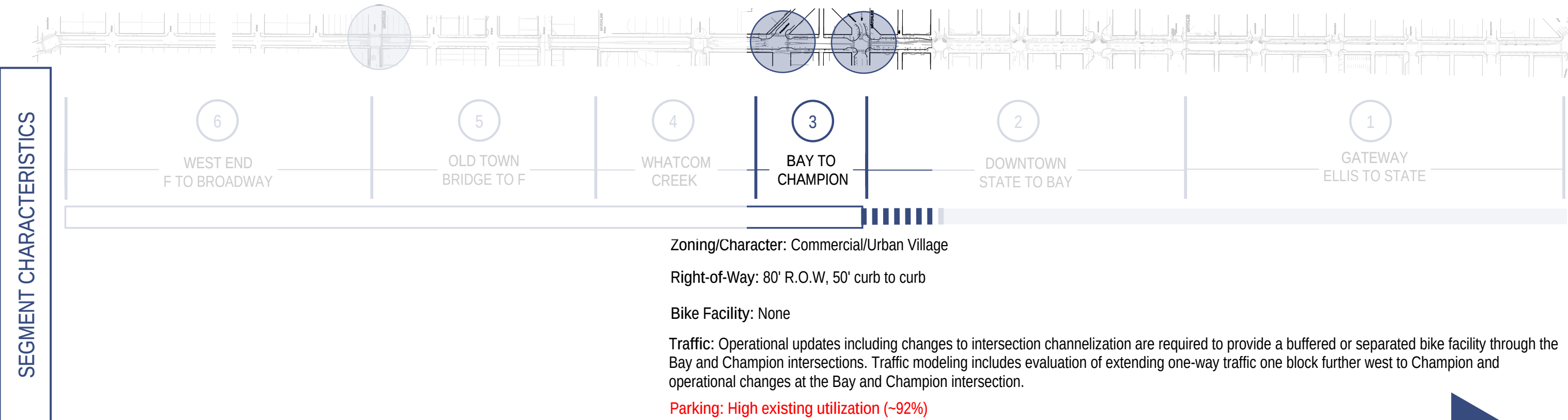
Alternatives 2 and 3 allow for a protected intersection design which provides pedestrian refuge islands at crosswalks.

Alternatives 4 widens the sidewalk, contributing to improved pedestrian safety and comfort.

Alternative 4 provides significant placemaking and greening opportunities, but at the expense of on-street parking and curbside loading and deliveries.

Alternatives 3 and 4 (separated facilities) are higher cost and may require additional maintenance activities.

EVALUATION SUMMARY | Bay to Champion



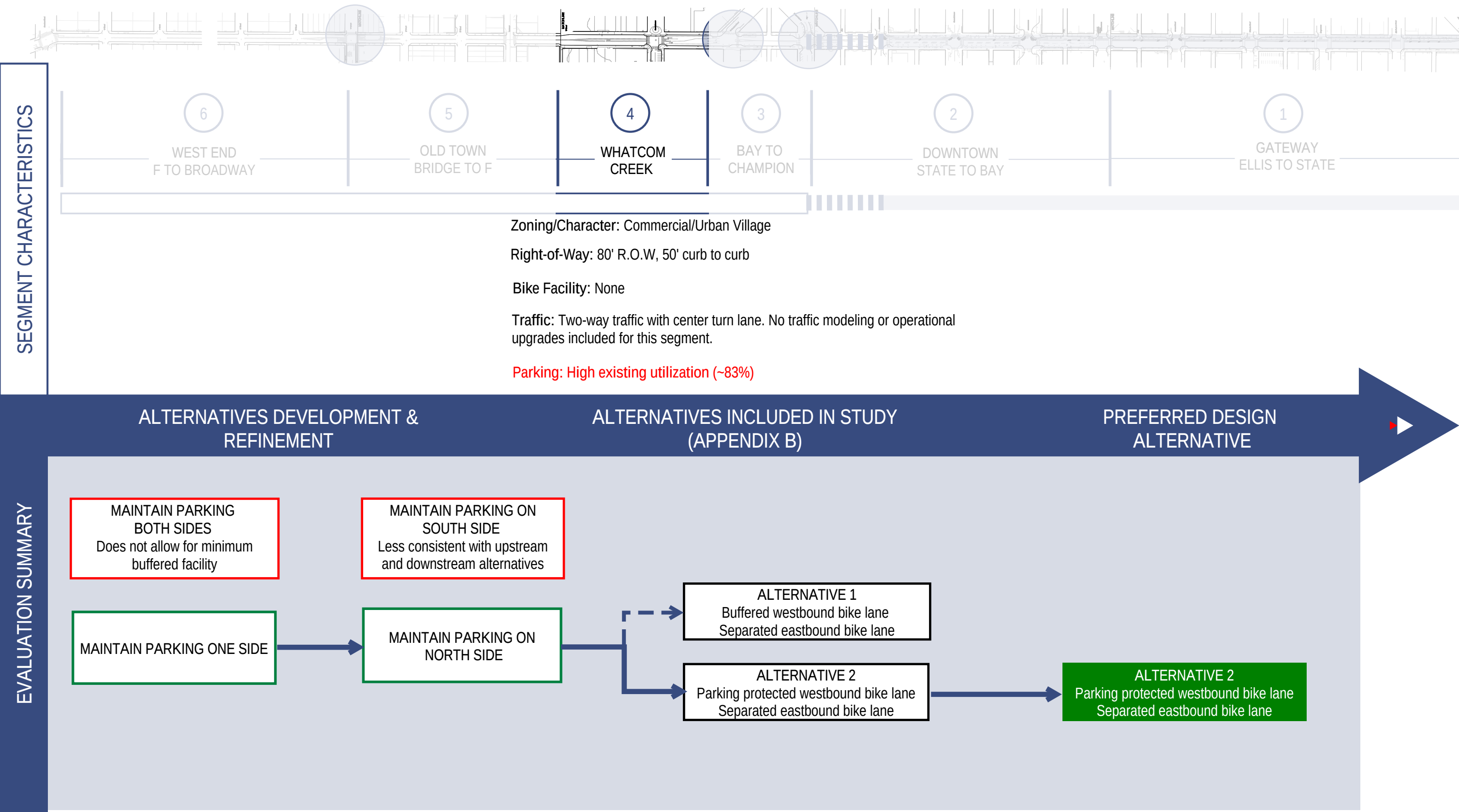
EVALUATION SUMMARY | Bay to Champion

Evaluation Results and Implementation Considerations

The Bay to Champion segment serves as a key connector and transition point within the Holly Street Corridor. Development of design alternatives for this segment were shaped primarily by intersection considerations and traffic modeling results. All alternatives require a dedicated bike signal at Bay St. along with channelization changes from Bay to Champion to facilitate a protected bike lane configuration from Bay to Champion. These channelization and operational changes require further evaluation within the broader Downtown Bellingham network, which will be addressed through the upcoming Downtown Connections Study. As such, this study does not include an evaluation or selection of a preferred alternative for this segment. However, it is important to note that a parking-protected configuration (Alternative 2) between Bay and Champion would provide continuity with adjacent segments while supporting the corridor's overall goals.

Implementation Considerations: Near-term implementation could consider low-cost interim improvements, such as extending the existing standard bike lane from Bay to Champion to provide a continuous bike lane through the full corridor.

EVALUATION SUMMARY | Whatcom Creek



EVALUATION SUMMARY | Whatcom Creek

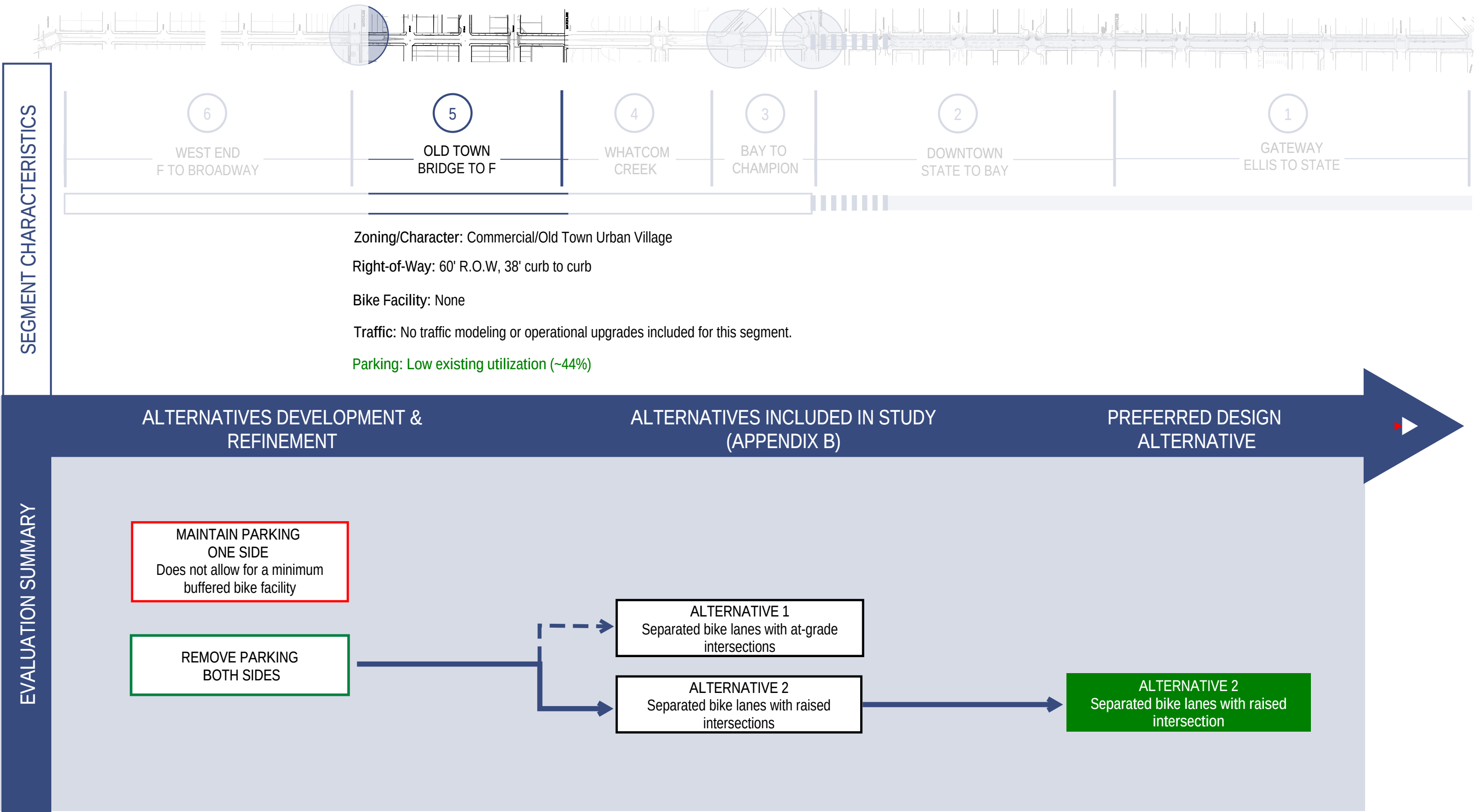
Evaluation Results and Implementation Considerations

Alternative 2 (Parking Protected) provides a low-stress, separated bike facility that delivers safety and comfort improvements for cyclists and pedestrians compared to the buffered Alternative 1, while maximizing on-street parking on the north side of Holly. A parking-protected configuration is well-suited to this segment given its frontage along Maritime Heritage Park, the limited number of driveway crossings, and the absence of intersecting streets to the north—conditions that result in minimal right-turn movements across the westbound (downhill) bike lane. Alternative 2 also presents opportunities to integrate transit stops located west of the Central Avenue intersection with the intersection design and proposed enhancements at the Park entrance.

Implementation Considerations: This segment currently has no bicycle facilities and is a priority to provide network continuity. Near-term implementation at the Whatcom Creek Bridge should focus on low-cost treatments—such as striping and stanchions—given the planned bridge replacement project.

GOALS		CRITERIA	Alt.		Key Differentiating Criteria
			1	2	
Goal 1: Bicyclist Safety and Comfort	Safety from vehicle Conflicts	Alleys and driveways			Alternatives 2 provides a separated bicycle facility and improve safety and comfort over the buffered bike lane option (Alternative 1).
		Intersections			
		Parking			
		Transit			
	Comfort for all ages and abilities				
Goal 2: Pedestrian Safety and Comfort	Safety from bicycle and vehicle conflicts	Alleys and driveways			Alternatives 2 shortens the effective crossing distance across Holly at the Central Avenue intersection.
		Intersections			
		Parking			
	Pedestrian Comfort				
Goal 3: Vehicular Performance	Operational Capacity				Alternative 2 allows for more on-street parking on the north side of the street and provides placemaking and greening opportunities at the Maritime Heritage Park entrance.
	Street section design and lane widths				
	Intersection design and turning movements				
	Transit stop intergration				
Goal 4: Vibrant Streetscapes & Integration	On-street parking				Alternative 2 allows for more on-street parking on the north side of the street and provides placemaking and greening opportunities at the Maritime Heritage Park entrance.
	Placemaking & greening				
	Loading and deliveries				
Implementation Criteria	Cost				Alternatives 2 is higher cost and may require additional maintenance activities.
	Maintenance				
	Phaseability/adaptability				

EVALUATION SUMMARY | Old Town



EVALUATION SUMMARY | Old Town

Evaluation Results and Implementation Considerations

Alternative 2 includes raised intersections, which provide additional safety, comfort, and traffic-calming benefits over separated bike facilities with at-grade intersection (Alternative 1). With the redevelopment and growth occurring in Old Town—and the upcoming Old Town Streetscape projects—there is a strong driver and opportunity to integrate and reinforce traffic-calming measures that slow vehicles turning from Holly onto crossing streets within Old Town.

Implementation Considerations: This segment currently has no bicycle facilities and is a priority to provide network continuity. Intersection improvements should be coordinated with the adjacent Old Town Streetscape Improvement Project.

GOALS		CRITERIA	Alt.	
			1	2
Goal 1: Bicyclist Safety and Comfort	Safety from vehicle Conflicts	Alleys and driveways		
		Intersections		
		Parking		
		Transit		
	Comfort for all ages and abilities			
Goal 2: Pedestrian Safety and Comfort	Safety from bicycle and vehicle conflicts	Alleys and driveways		
		Intersections		
		Parking		
	Pedestrian Comfort			
Goal 3: Vehicular Performance	Operational Capacity			
	Street section design and lane widths			
	Intersection design and turning movements			
	Transit stop intergration			
Goal 4: Vibrant Streetscapes & Integration	On-street parking			
	Placemaking & greening			
	Loading and deliveries			
Implementation Criteria	Cost			
	Maintenance			
	Phaseability/adaptability			

Differentiating Criteria

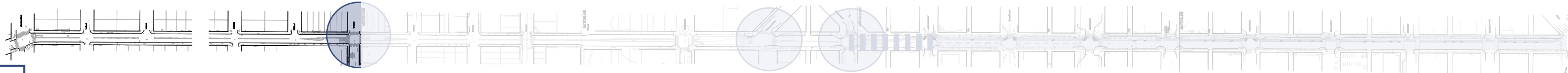
Alternatives 2 enhances cyclist safety at intersections by widening crossing zones and slowing traffic turning movements through the intersection.

Alternative 2 enhances pedestrian safety and comfort at intersections by widening crossing zones and slowing traffic turning movements through the intersection.

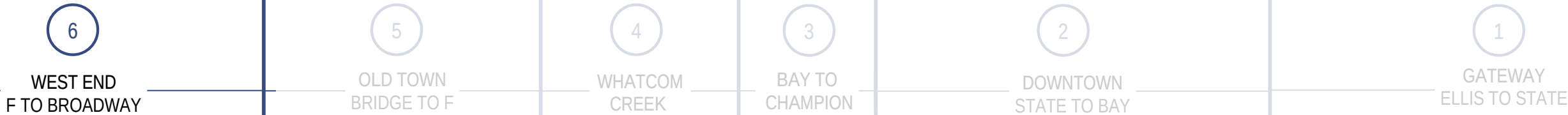
Alternative 2 creates additional opportunities for placemaking and green improvements through an expanded sidewalk zone at intersections.

Alternative 2 is higher cost and would require coordinated implementation with Old Town Streetscape Project.

EVALUATION SUMMARY | West End



SEGMENT CHARACTERISTICS



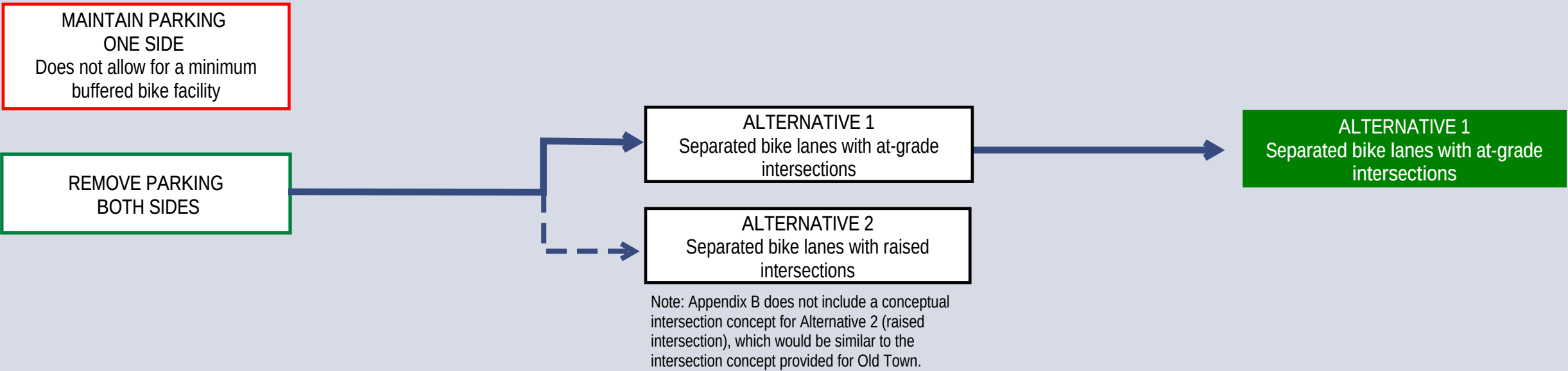
Zoning/Character: Commercial/Residential Multi (west of G Street)
 Right-of-Way: 60' R.O.W, 38' curb to curb
 Bike Facility: None
 Traffic: Operational updates at F-Street with elimination of turn pockets and consideration of planned bike facilities on F-Street
 Parking: Low existing utilization (~33%)

EVALUATION SUMMARY

ALTERNATIVES DEVELOPMENT & REFINEMENT

ALTERNATIVES INCLUDED IN STUDY (APPENDIX B)

PREFERRED DESIGN ALTERNATIVE



EVALUATION SUMMARY | West End

Evaluation Results and Implementation Considerations

While the West End segment shares many of the same evaluation considerations as Old Town, it is lower density and has a higher proportion of residential properties. These characteristics, combined with limited near-term redevelopment potential, reduce the priority for higher-cost raised intersection treatments compared to Old Town.

Implementation Considerations: This segment currently has no bicycle facilities and is a priority to provide network continuity.

GOALS		CRITERIA	Alt.	
			1	2
Goal 1: Bicyclist Safety and Comfort	Safety from vehicle Conflicts	Alleys and driveways		
		Intersections		
		Parking		
		Transit		
	Comfort for all ages and abilities			
Goal 2: Pedestrian Safety and Comfort	Safety from bicycle and vehicle conflicts	Alleys and driveways		
		Intersections		
		Parking		
	Pedestrian Comfort			
Goal 3: Vehicular Performance	Operational Capacity			
	Street section design and lane widths			
	Intersection design and turning movements			
	Transit stop intergration			
Goal 4: Vibrant Streetscapes & Integration	On-street parking			
	Placemaking & greening			
	Loading and deliveries			
Implementation Criteria	Cost			
	Maintenance			
	Phaseability/adaptability			

Differentiating Criteria

Alternatives 2 enhances cyclist safety at intersections by widening crossing zones and slowing traffic turning movements through the intersection.

Alternative 2 enhances pedestrian safety and comfort at intersections by widening crossing zones and slowing traffic turning movements through the intersection.

Alternative 2 creates additional opportunities for placemaking and green improvements through an expanded sidewalk zone at intersections.

Alternative 2 is higher cost and does not allow for phased implementation.

Appendix B

Holly Street Corridor Bicycle Facility Study

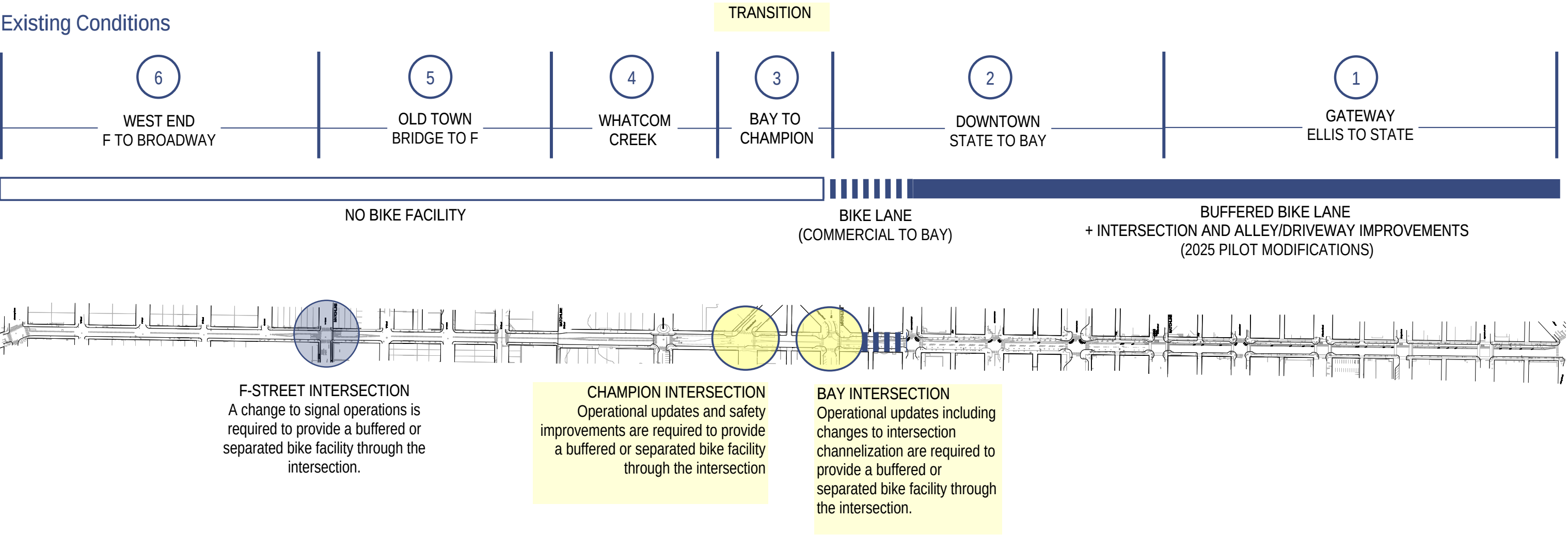
Preliminary Design Alternatives

April 28, 2026

SCOPE AND OBJECTIVE

Design and execute a safe, comfortable, and continuous separated bike lane throughout the Holly Street corridor that is thoughtfully integrated into the broader plan for the Downtown and Old Town

Existing Conditions

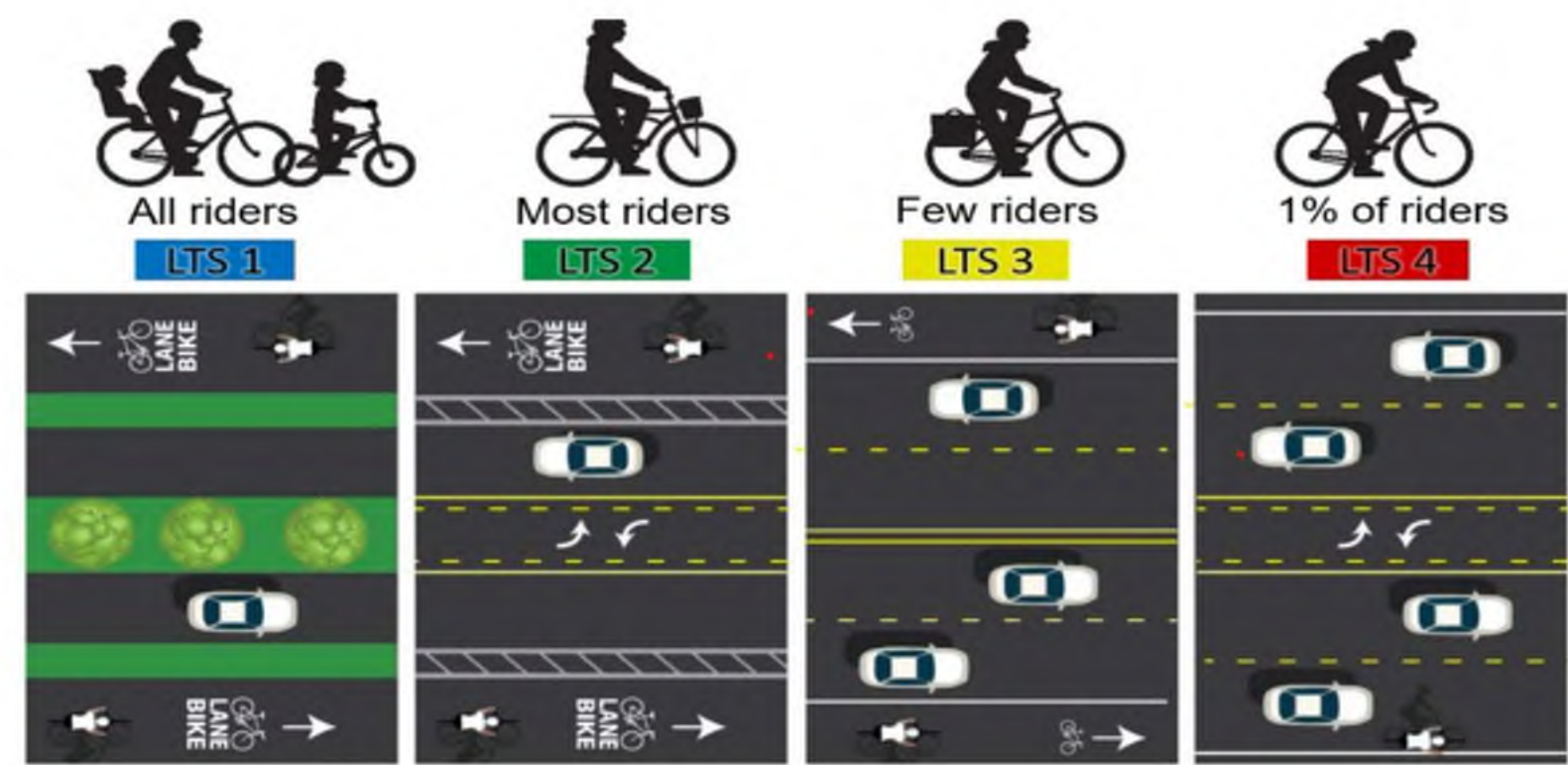


SCOPE AND OBJECTIVE | Level of Traffic Stress

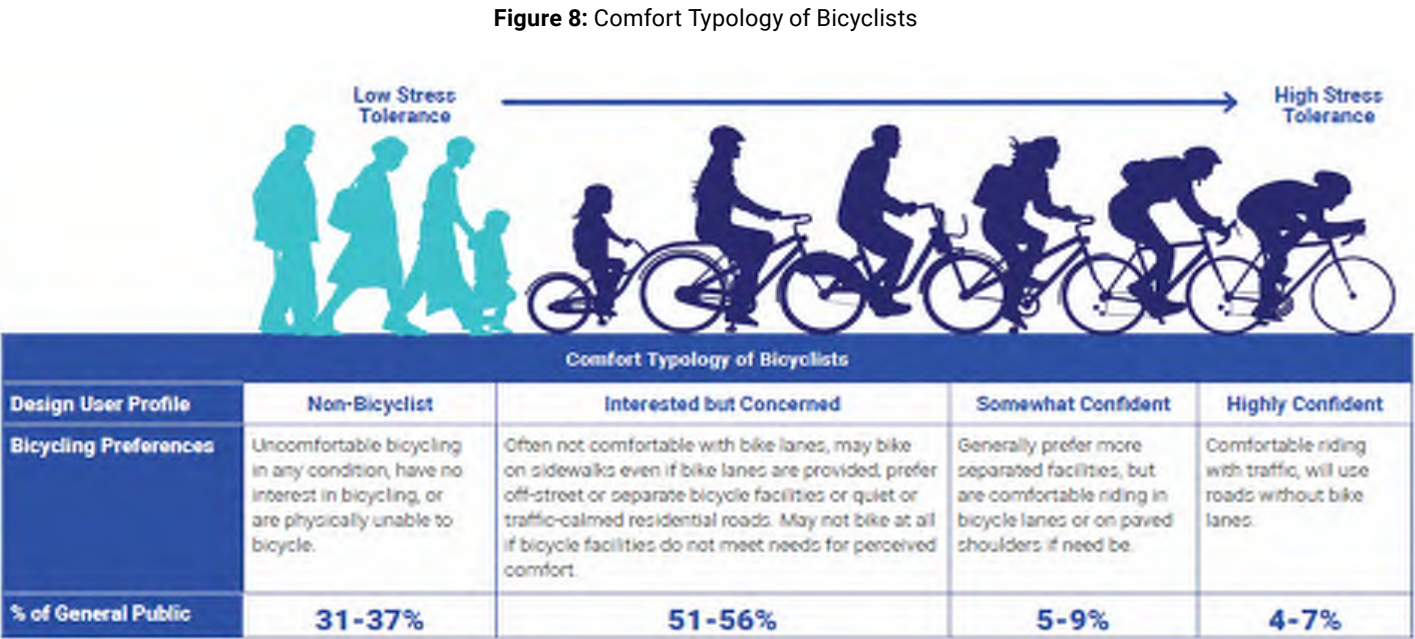
Level of Traffic Stress (LTS) is a metric to evaluate the safety and comfort of a bicycle facility, based on a variety of roadway factors, including:

- Posted speed limit
- Number of traffic lanes
- Traffic volumes
- Presence and type of bike facility.

Level of Traffic Stress (LTS) scores range from 1 (lowest stress) to 4 (highest stress). Consistent with the Bellingham Bicycle Master Plan, the objective for the Holly Street Corridor is to achieve a "Low Stress" facility that meets the needs of all comfort typologies (Interested but Concerned through Highly Confident). A "Low Stress" facility is define by an LTS score of 1 or 2.



WSDOT Level of Traffic Stress (August 2023)



Bellingham Bicycle Master Plan (v7 April 2024)

SCOPE AND OBJECTIVE | Bicycle Facility Definitions



1. BUFFERED BIKE LANE

Parking at curbside does not allow for continuous vertical separation.

Higher LTS due to vehicles crossing bike lane to park.



Existing buffered lane on Holly Street (Gateway segment)

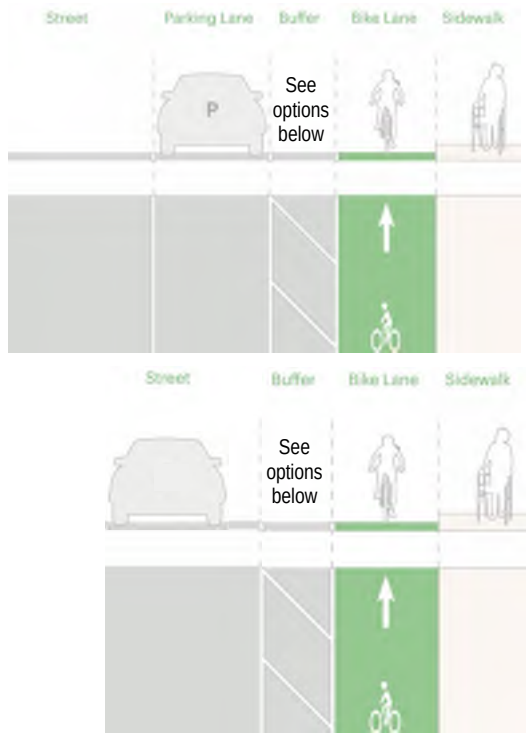
2. SEPARATED BIKE LANE (REQUIRES VERTICAL SEPARATION)

Parking Protected (Separated) Bike Lane

Where parking remains adjacent to a bike facility, the facility is considered separated if the bike lane is located along the curb, which eliminates vehicles crossing the bike lane to park and allows for continuous vertical separation (options A-C, below).

Separated Bike Lane (without Parking)

Where there is no on-street parking, continuous vertical separation between the travel lane and bike lane can be included (options A-C, below).



Source: NACTO

VERTICAL SEPARATION OPTIONS

Street-level Separation with Flexible Delineator Posts



N 92nd St (Seattle, WA)

Street-level Lane with Constructed Median



8th Ave (Eugene, OR)

Raised Separated Bike Lane

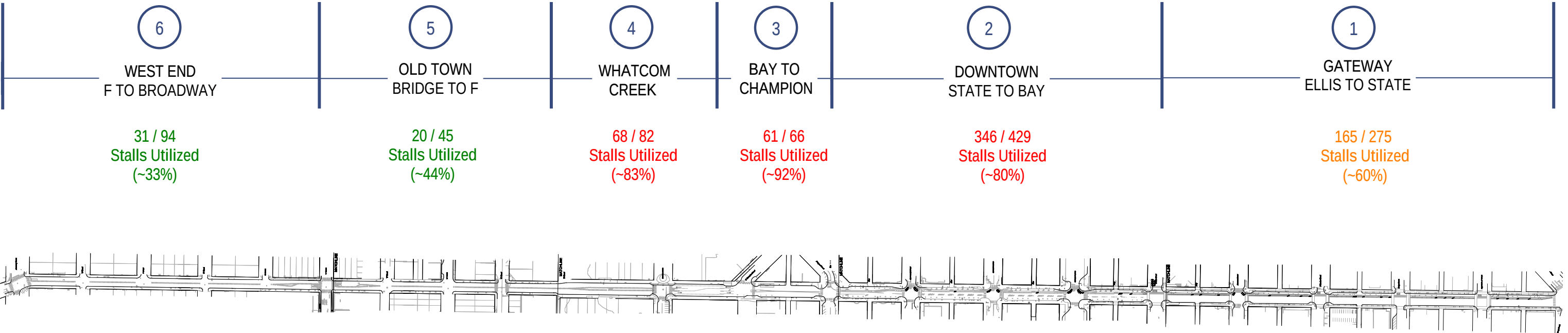


7th Street, Blanchard to Bell (Seattle, WA)

EXISTING PARKING UTILIZATION

Parking Study Summary

Occupancy data was collected during two weekdays (6/18 and 6/25) and two Saturdays (6/21 and 6/28) in late June for two time periods (2-3pm and 6-7pm).



ALT. # AND NAME

| Segment Name

Technical Feasibility Rating
The title color of each alternative reflects a preliminary assessment of how well it meets the project's technical objectives, including providing a separated bike lane, maintaining functional roadway and intersection geometry, and achieving desired traffic modeling performance.

ALT	MEETS ALL/MOST OF PROJECT OBJECTIVES
ALT	MEETS SOME PROJECT OBJECTIVES
ALT	DOES NOT MEET PROJECT OBJECTIVES *Included in Appendix only

Cost Rating
The number of dollar signs (ranging from one to four) indicates the relative order-of-magnitude cost for each alternative.

Parking Impact Rating
The color of the symbol represents the impact to existing on-street parking along Holly Street.

P	POSITIVE OR MINIMAL IMPACT
P	MODERATE IMPACT
P	HIGH IMPACT

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P

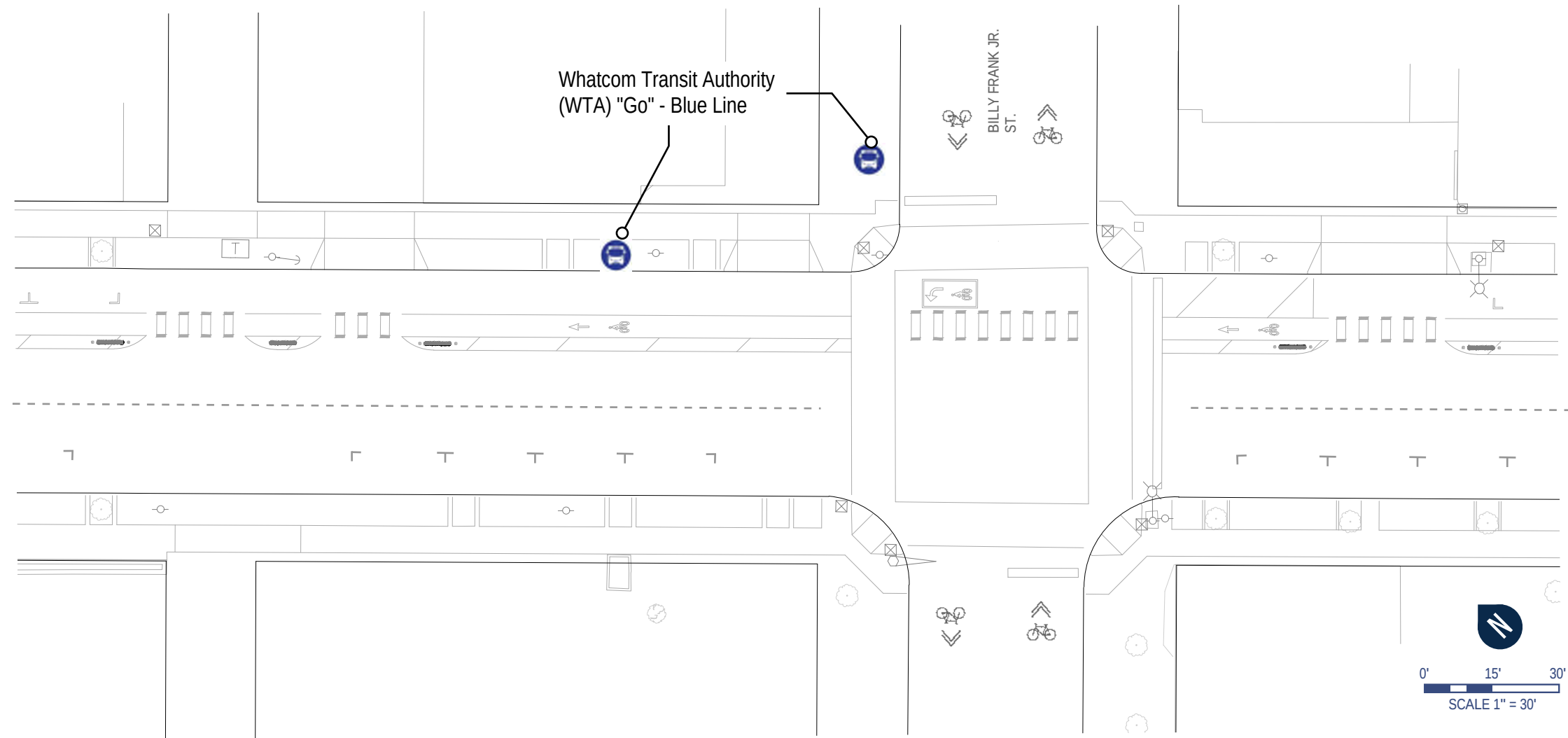
Evaluation of Preliminary Alternatives

A preliminary assessment of each alternative is provided based on technical feasibility, cost, and parking impacts, as indicated in the legend above. This high-level assessment is provided to inform preliminary recommendations for each segment, pending completion of a full alternatives evaluation. The full evaluation, to be conducted prior to selecting a preferred alternative, will assess corridor performance goals—such as safety, comfort, and integration—for all user groups, including:

- Bicyclists
- Pedestrians
- Vehicles
- Transit
- BNSF
- Delivery Vehicles
- Urban Design
- Parking
- Maintenance
- Implementation

1. GATEWAY | Ellis Street to State Street

EXISTING - TRANSIT STOP AT BILLY FRANK JR. STREET | Gateway



Billy Frank Jr. Street Intersection



TRANSIT ISLAND

| Gateway

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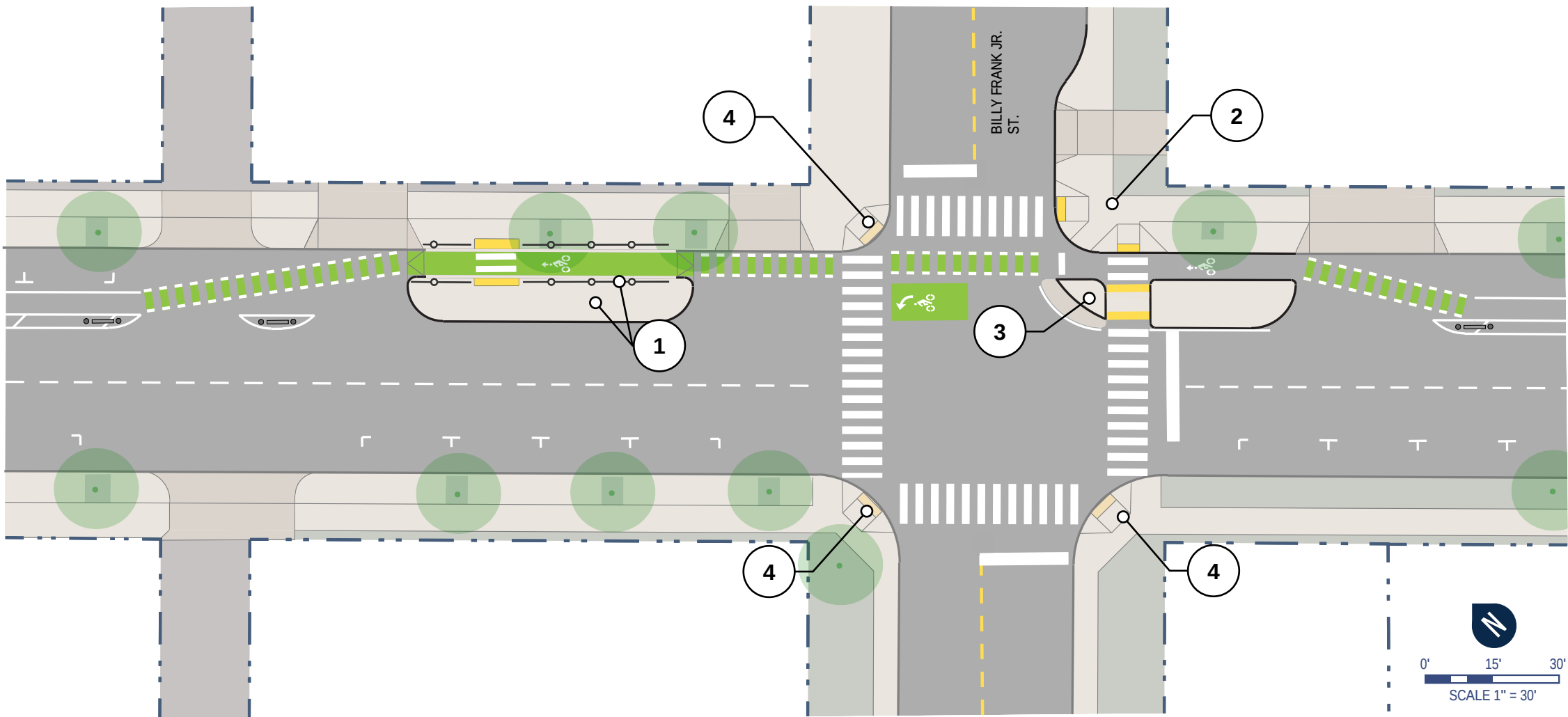
P

Design Features

Install a transit boarding island at the existing Whatcom Transit Authority (WTA) "Go Line" bus stop at the intersection of Billy Frank Jr. Street to allow buses to stop without crossing the bike lane or merging in and out of traffic.

- 1 **Transit Boarding Island**
Raised bike lane with accessible at-grade crossing and protective pedestrian fencing. Railings can help channel pedestrian crossings, improve comfort, and provide a continuous detectable edge when installed along the bikeway side of boarding
- 2 **Curb Extension (Bulb-out)**
New curb extension on this corner allows dedicated curb ramps for each crosswalk.
- 3 **Dual Radius Island**
Replace existing paint and speed bump turn wedges with dual radius island.

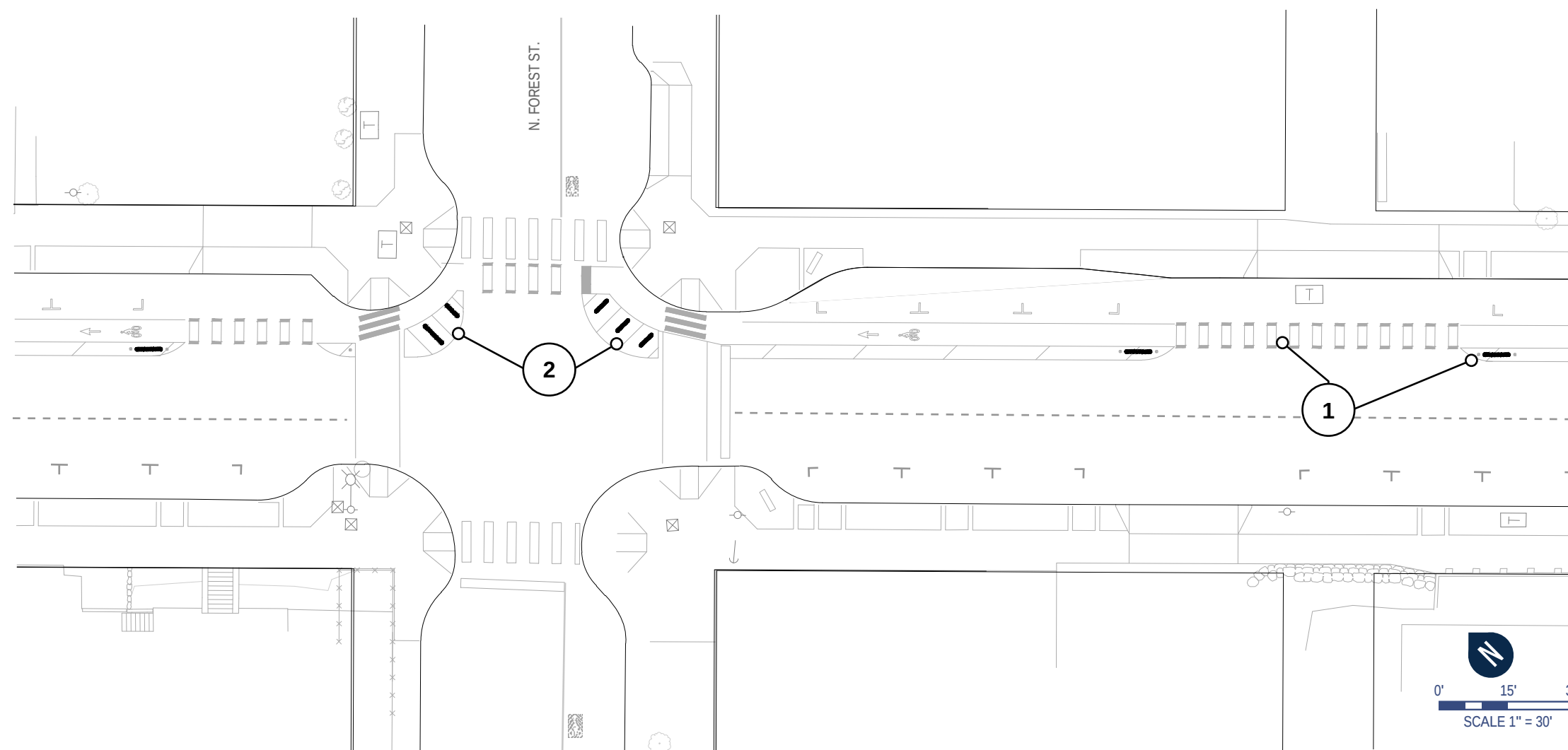
Curb radius = 15'
Mountable apron radius = 25'
- 4 **ADA Ramp Upgrades**
Update non-compliant curb ramps



Transit boarding island (left) and protected approach (right), Weidler Ave and NE 103rd Place (Portland, OR)

EXISTING - FOREST ST. INTERSECTION

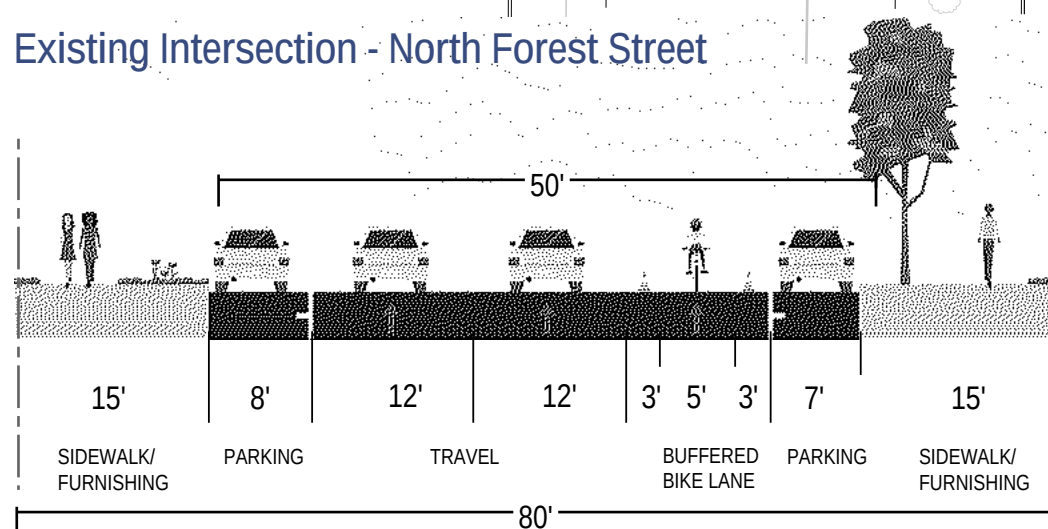
| Gateway



Existing Features

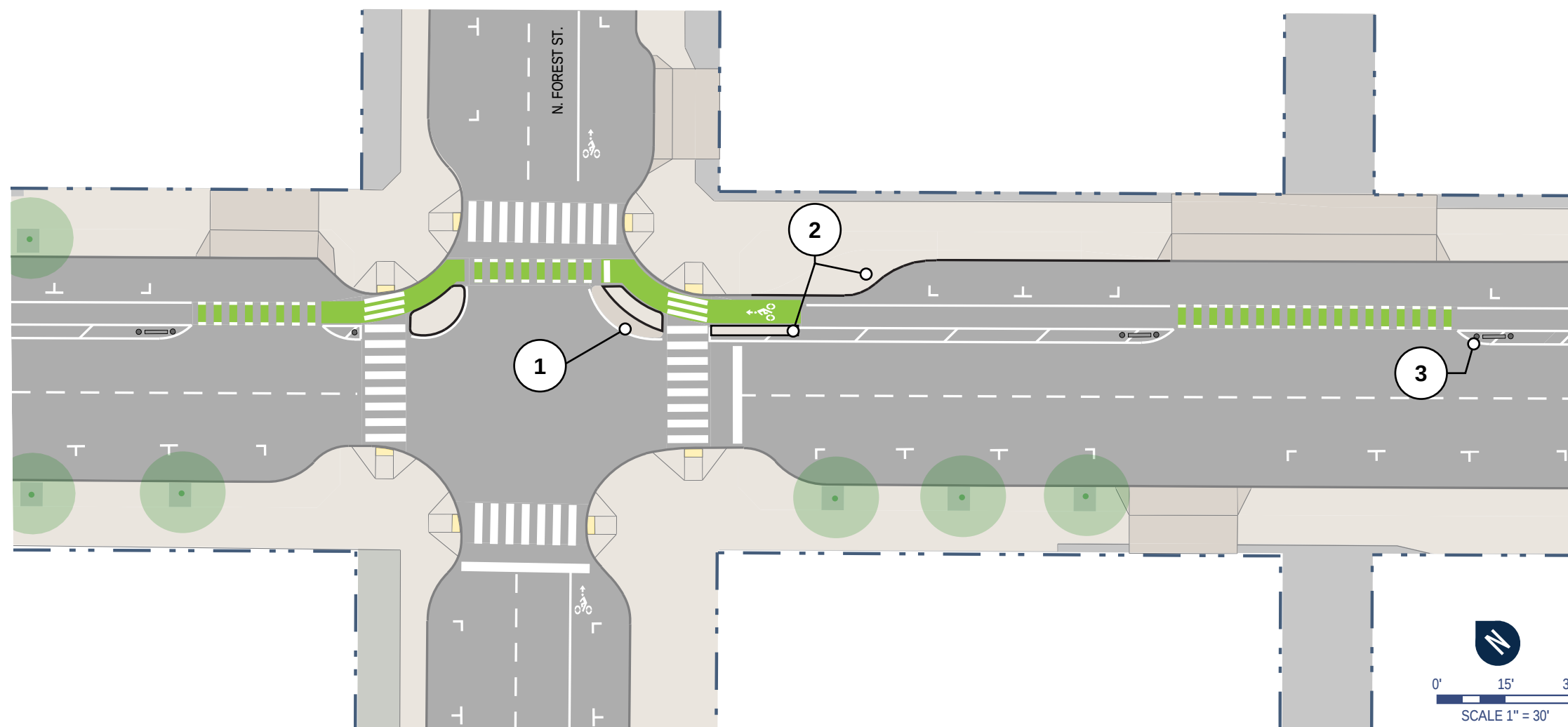
- 1** Alley and Driveway Crossings
Crossbike markings and speed bumps with flex posts installed with 2025 Pilot Modifications.
- 2** Turn Wedges
Paint and speed bump installed with 2025 Pilot Modifications.

Existing Intersection - North Forest Street



Existing Section (2025 Pilot Modifications)

ALT 1: BUFFERED LANE - HARDEN PILOT MODIFICATIONS | Gateway



Design Features

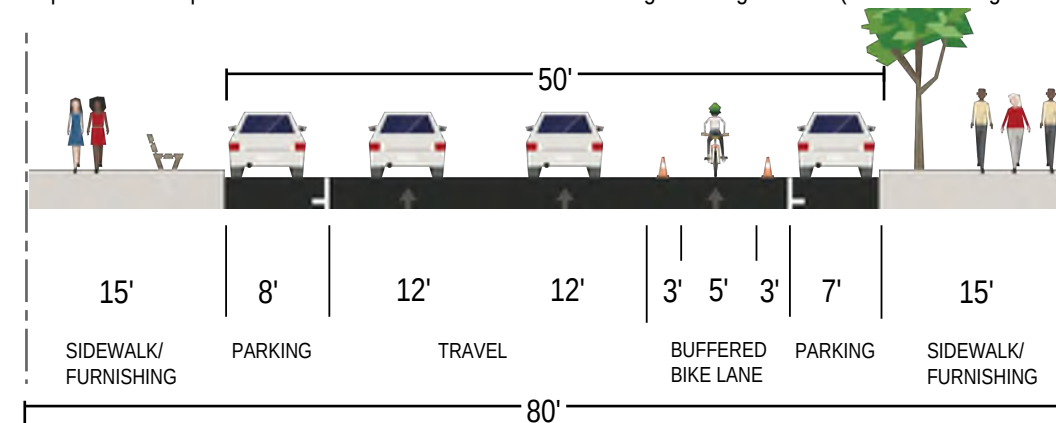
Maintain existing buffered bike lane with parking along curb. Make permanent the turn wedges and maintain alley approach speed bumps installed in 2025 as part of the Holly Street Pilot Bike Lane Project modifications.

- 1 Dual Radius Island**
Replace existing paint and speed bump turn wedges with dual radius island.

Curb radius = 15'
Mountable apron radius = 25'
- 2 Curb Extension**
Remove one parking stall to reduce potential conflicts between parked vehicles, bicyclists, and pedestrians at the intersection approach. Extend the curb bulb-out and protect the bike lane approaching the intersection. The curb extension could include planting, stormwater management, or other amenities.
- 3 Driveway and Alley Approaches**
Maintain speed bumps and flex posts to slow right-turning vehicles across bike lane

Typical Intersection - North Forest Street

*Option to install protection features at other intersections with right-turning vehicles (Garden and High Streets).



Typical Street Section

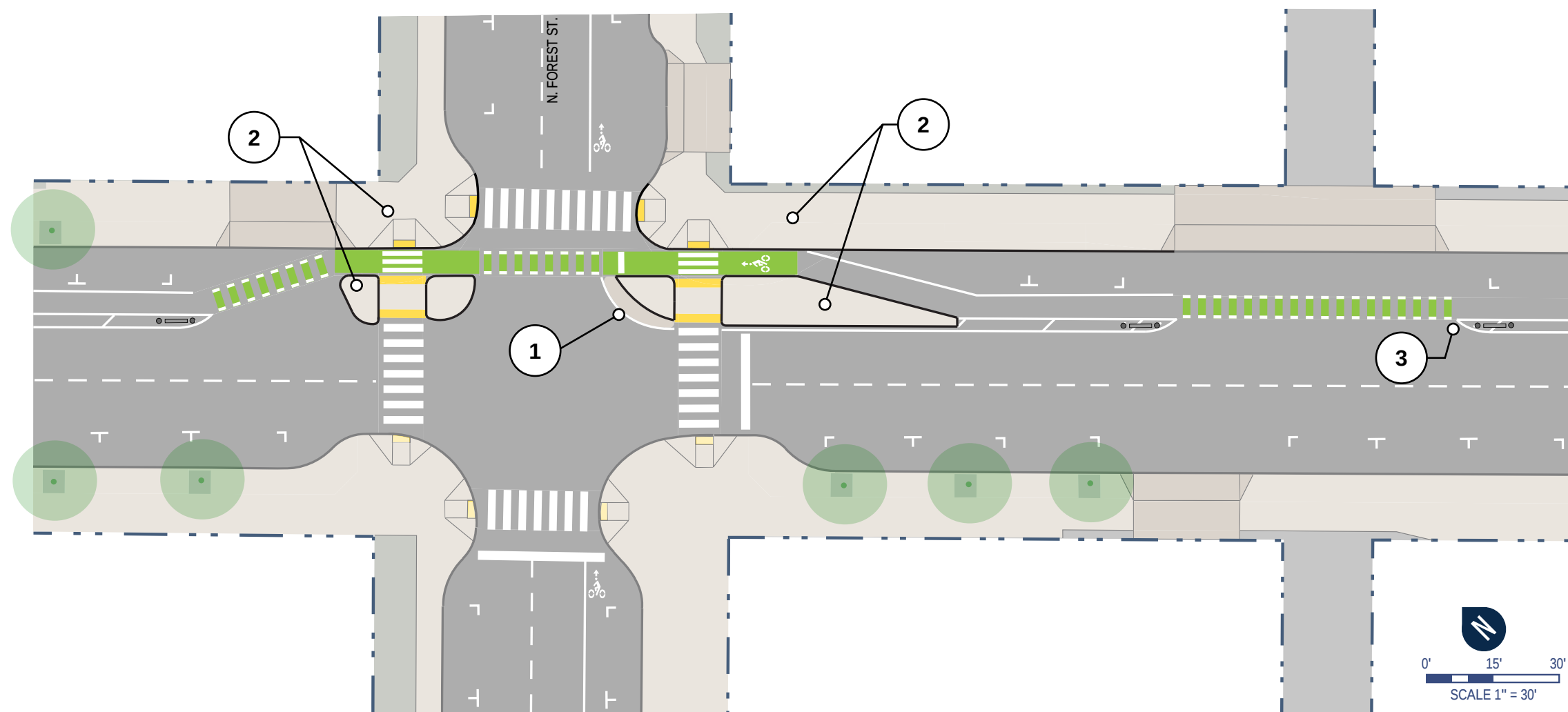


ALT 2: BUFFERED LANE - PROTECTED INTERSECTION

| Gateway

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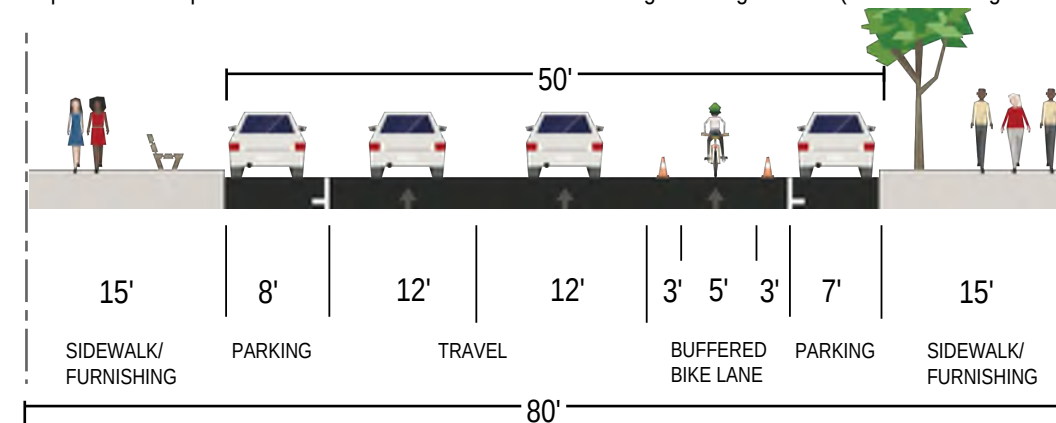
Design Features

Maintain the existing buffered bike lane with curbside parking. Remove existing bulb-outs and “bend out” the bike lane at the intersection to provide additional protection for crossing bicyclists and pedestrians.

- 1 Dual Radius Island**
Replace existing paint and speed bump turn wedges with dual radius island.
Curb radius = 15'
Mountable apron radius = 25'
- 2 Protected Intersection**
Remove curb bulb-outs and install refuge islands to provide additional protection for bicycles and pedestrians at intersection.
- 3 Driveway and Alley Approaches**
Maintain speed bumps and flex posts to slow right-turning vehicles across bike lane.

Typical Intersection - North Forest Street

*Option to install protection features at other intersections with right-turning vehicles (Garden and High Streets).



Typical Street Section

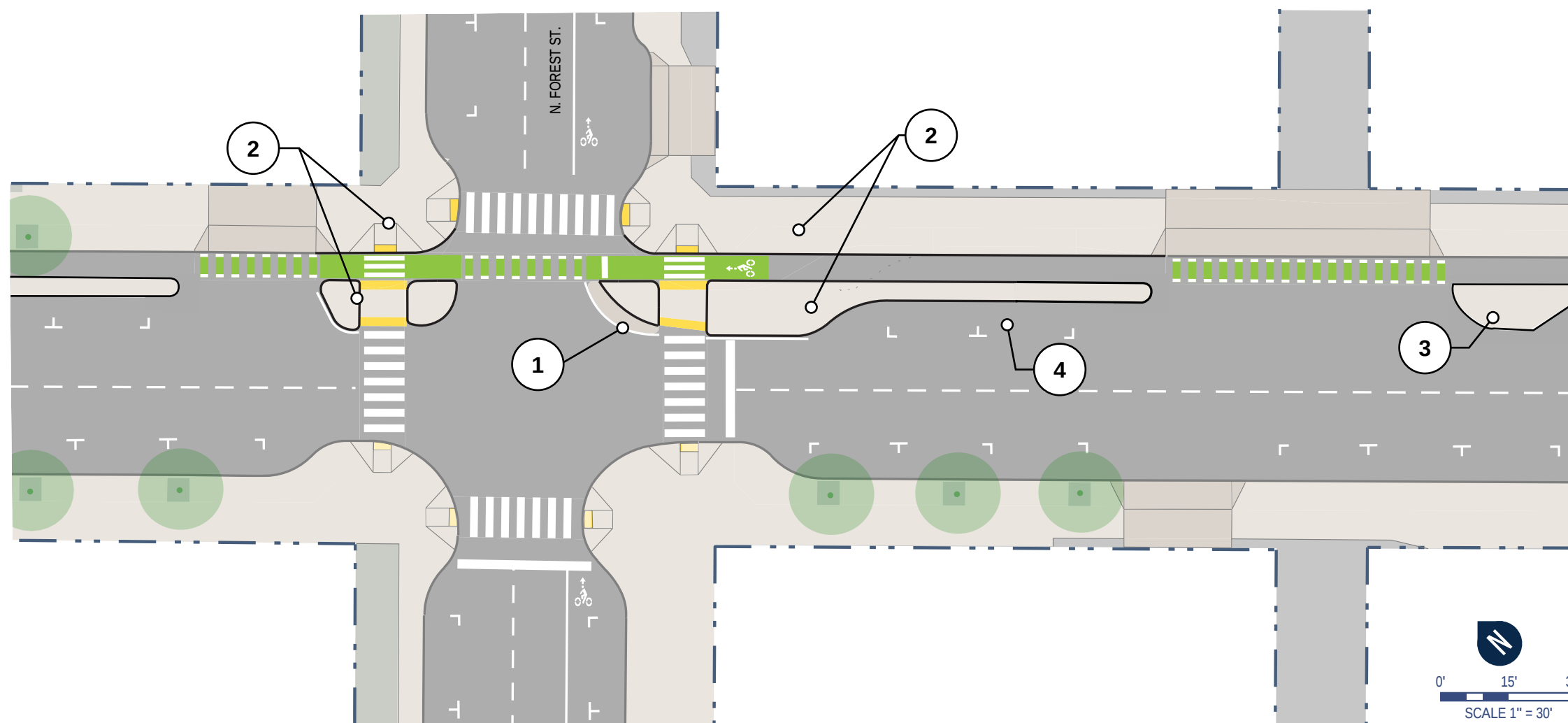


ALT 3: PARKING PROTECTED LANE AND INTERSECTION | Gateway



Design Features

Relocate parking to create a parking-protected (separated) bike lane positioned along the curb. Remove existing bulb-outs at intersections to maintain continuous bike lane alignment through the intersection and accommodate protected intersection improvements.

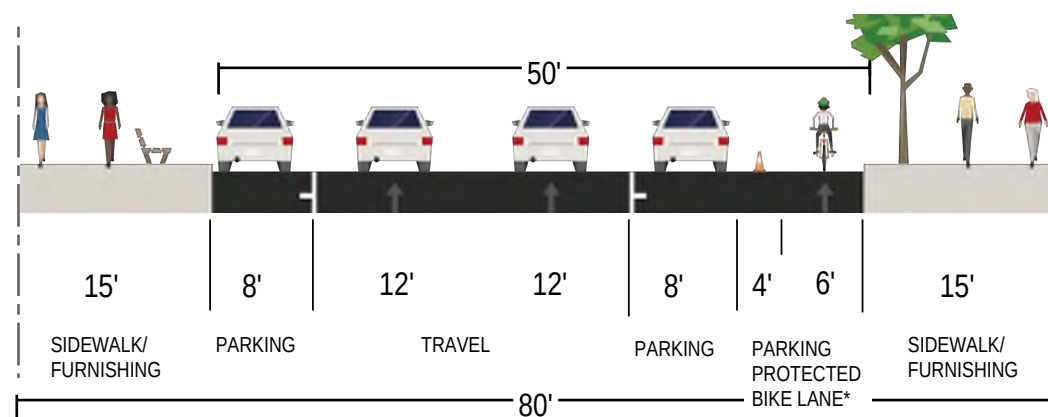


- 1** **Dual Radius Island**
Replace existing paint and speed bump turn wedges with dual radius island.

Curb radius = 15'
Mountable apron radius = 25'
- 2** **Protected Intersection**
Remove curb bulb-outs and install refuge islands to provide additional protection for bicycles and pedestrians at intersection.
- 3** **Protect Driveway and Alley Approaches**
Remove the last parking stall upstream of driveways and alleys to improve visibility of bicyclists for drivers turning left.
- 4** **Parking Protected Configuration**
Allows for a separated bike facility with continuous vertical separation.

Typical Intersection - North Forest Street

*Option to install protection features at other intersections with right-turning vehicles (Garden and High Streets).



Typical Street Section

*Vertical separation options are shown on page 4.



ALT 4: SEPARATED LANE WITH WIDENED SIDEWALK | Gateway

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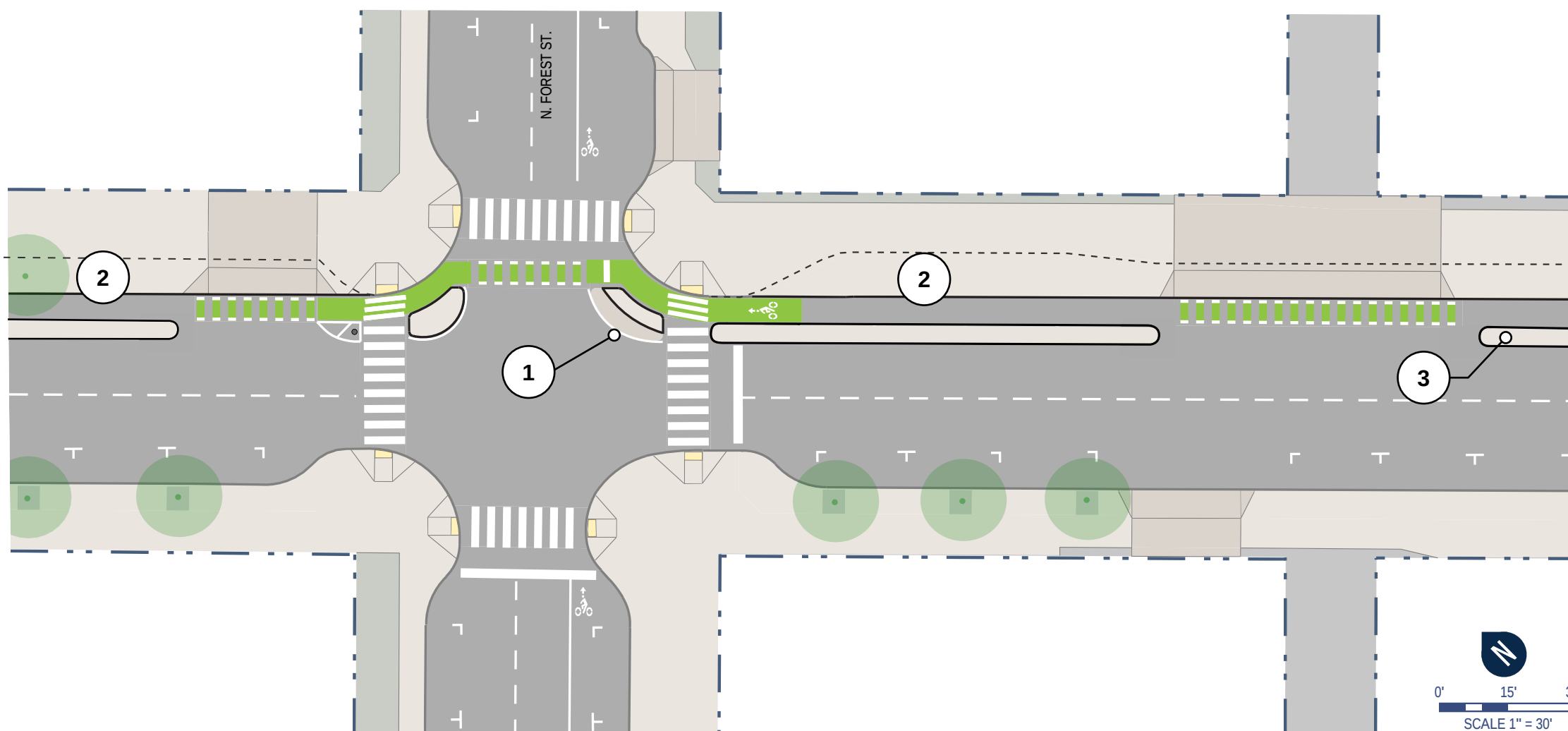
P

Design Features

Remove parking and widen sidewalk on north side of Holly to provide separated bike lane along curb. Existing curb line is shown dashed for reference.

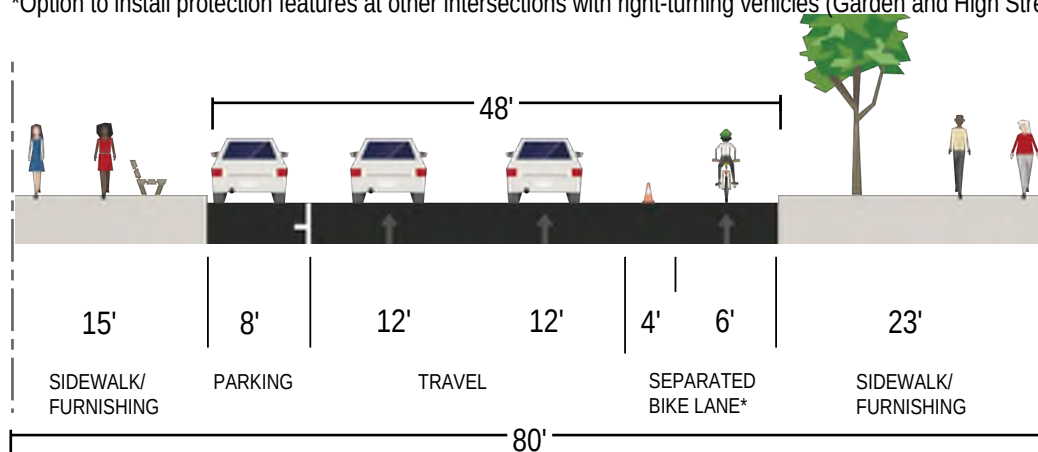
- 1 Dual Radius Island**
Replace existing paint and speed bump turn wedges with dual radius island.

Curb radius = 15'
Mountable apron radius = 25'
- 2 Remove Parking and Widen Sidewalk**
Expanded sidewalk zone provides opportunity for urban greening and placemaking.
- 3 Driveway and Alley Approaches**
Maintain speed bumps and flex posts to slow right-turning vehicles across bike lane.



Typical Intersection - North Forest Street

*Option to install protection features at other intersections with right-turning vehicles (Garden and High Streets).

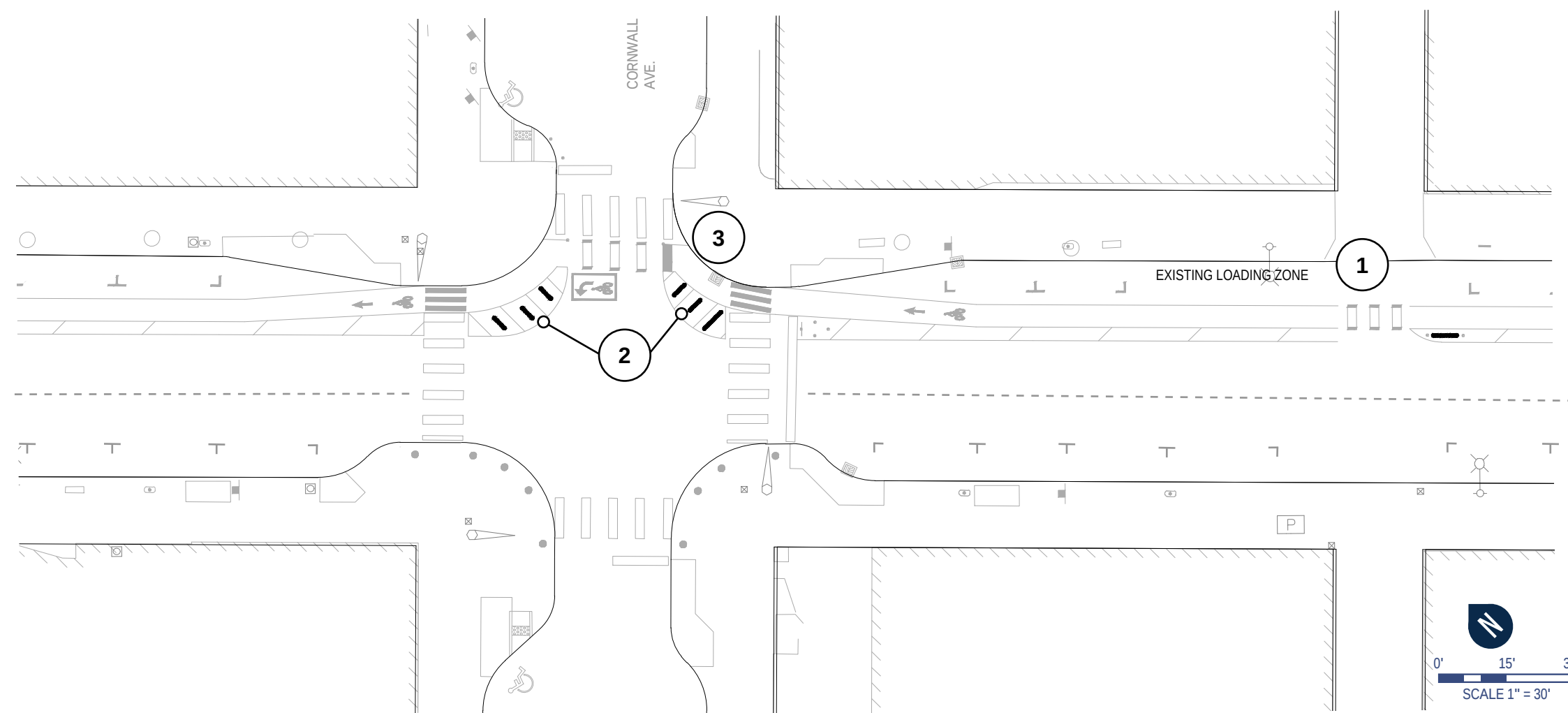


Typical Street Section

*Vertical separation options are described on page 4.

2. DOWNTOWN | State Street to Bay Street

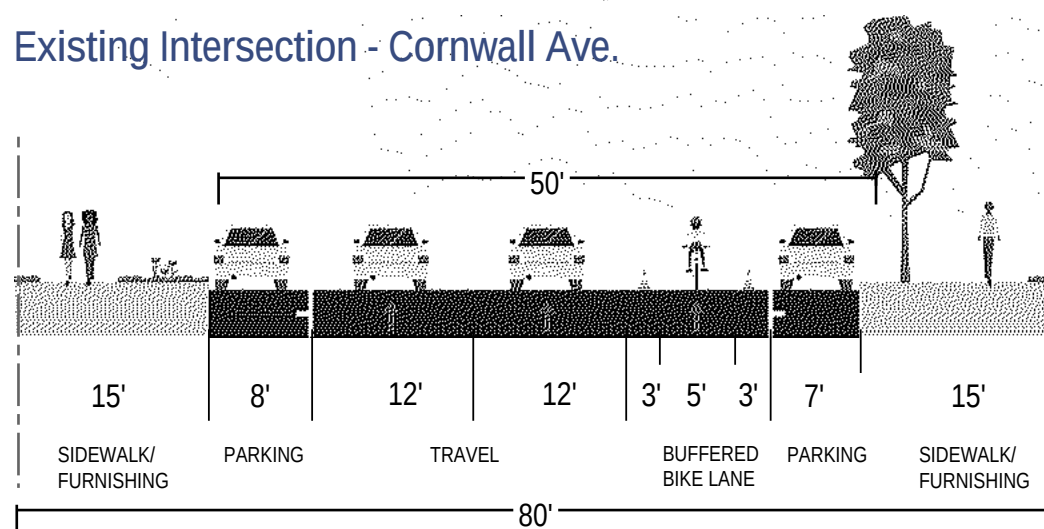
CORNWALL AVE. INTERSECTION - EXISTING | Downtown



Existing Features

- 1 Alley and Driveway Crossings
Crossbike markings and speed bumps with flex posts installed with 2025 Pilot Modifications.
- 2 Turn Wedges
Paint and speed bump installed with 2025 Pilot Modifications.
- 3 Flush Brick and Bollard Intersection
At downtown intersections Commercial Street, Cornwall Avenue and Railroad Avenue

Existing Intersection - Cornwall Ave.



Existing Section (2025 Pilot Modifications)



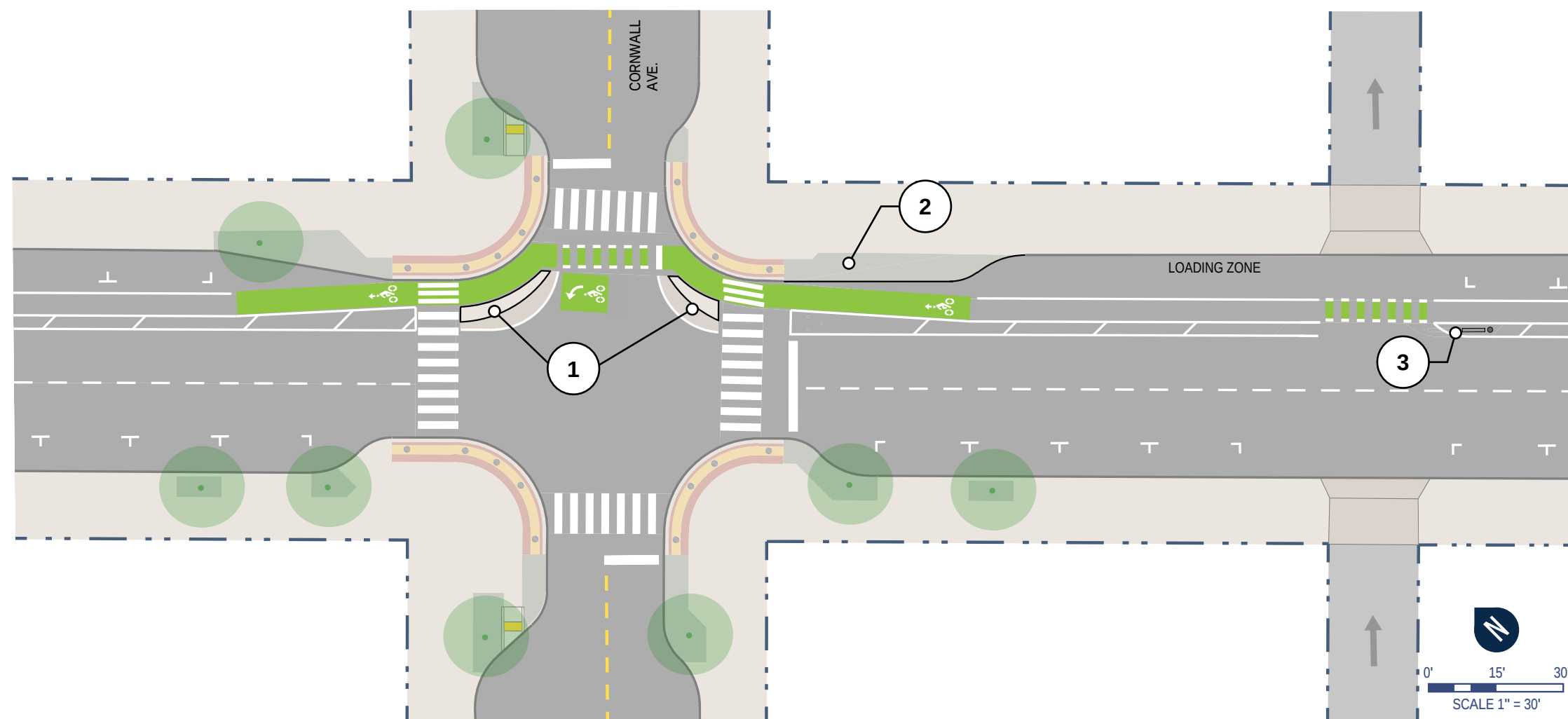
Existing flush brick and bollard configuration at intersections

ALT 1: BUFFERED LANE - HARDEN PILOT MODIFICATIONS | Downtown



Design Features

Maintain existing buffered bike lane with parking along curb. Make permanent the turn wedges and maintain alley approach speed bumps installed in 2025 as part of the Holly Street Pilot Bike Lane Project modifications.



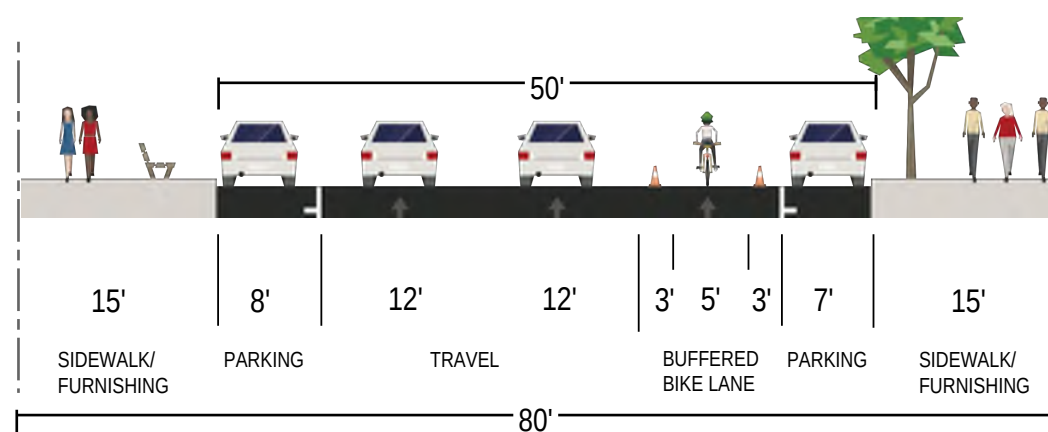
- 1 Dual Radius Island**
Replace existing paint and speed bump turn wedges with dual radius island.

Curb radius = 15'
Mountable apron radius = 25'

- 2 Curb Extension**
Remove one parking stall to reduce potential conflicts between parked vehicles, bicyclists, and pedestrians at the intersection approach. Extend the curb bulb-out and protect the bike lane approaching the intersection. The curb extension could include planting, stormwater management, or other amenities.

- 3 Driveway and Alley Approaches**
Maintain speed bumps and flex posts to slow right-turning vehicles across bike lane

Typical Intersection - Cornwall Ave.



Typical Street Section



ALT 2: BUFFERED LANE - PROTECTED INTERSECTION

| Downtown

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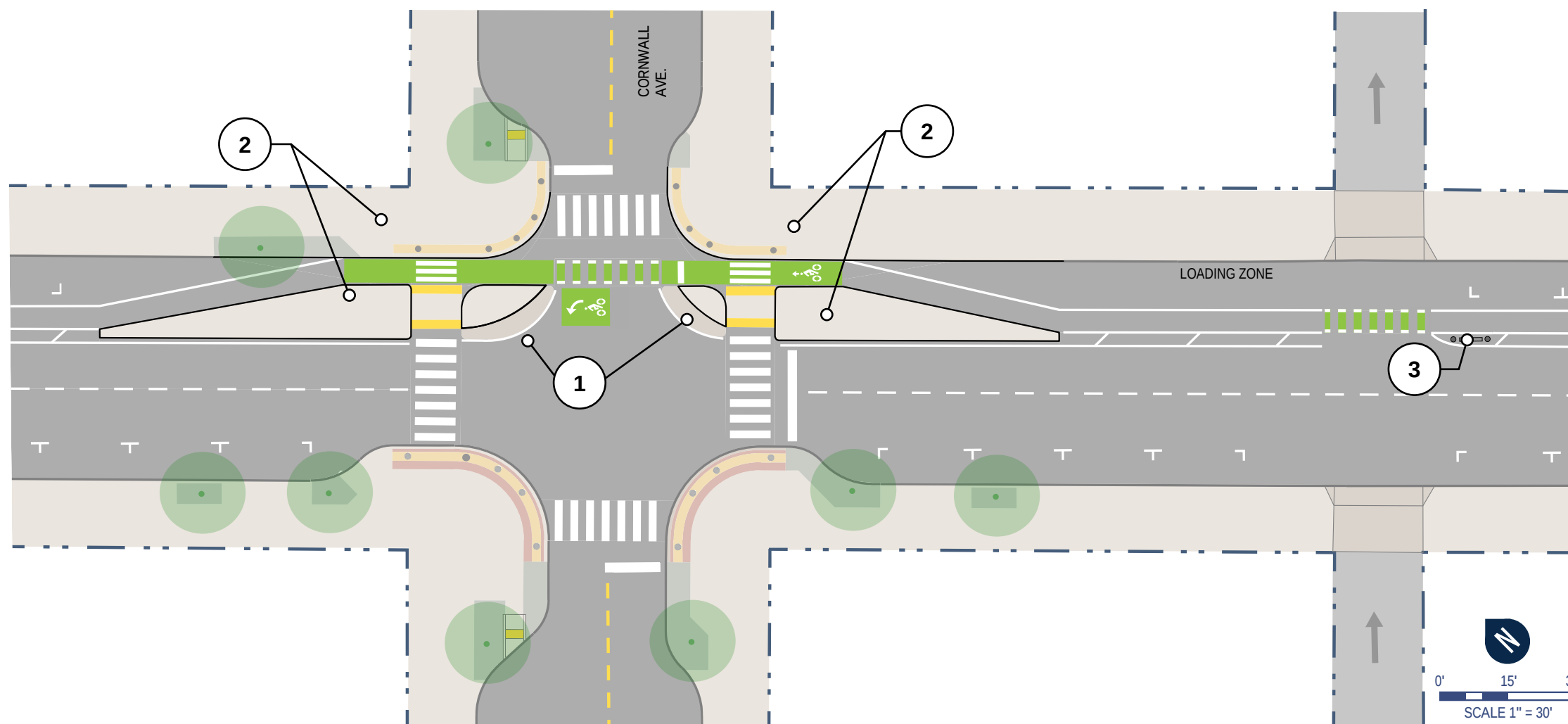
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Design Features

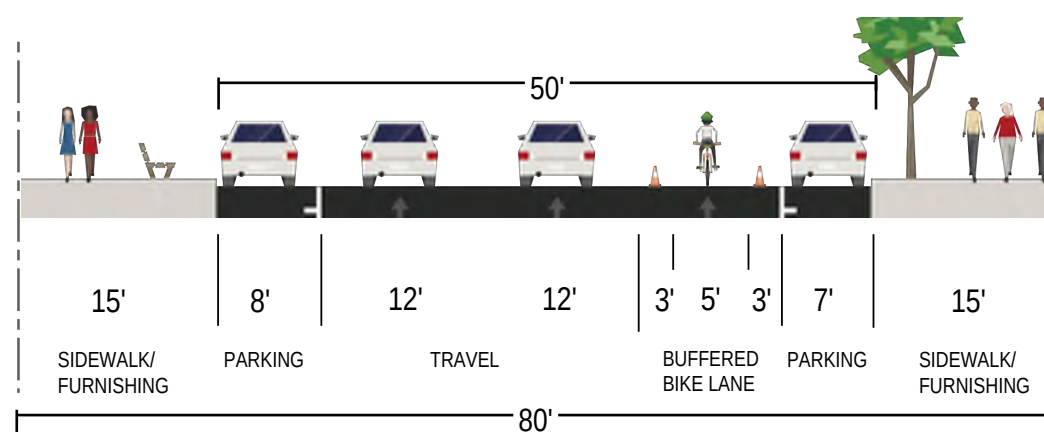
Maintain the existing buffered bike lanes with curbside parking. Remove existing bulb-outs and “bend out” the bike lane at the intersection to provide additional protection for crossing bicyclists and pedestrians.

- 1 **Dual Radius Island**
Replace existing paint and speed bump turn wedges with dual radius island.

Curb radius = 15'
Mountable apron radius = 25'
- 2 **Protected Intersection**
Remove curb bulb-outs and install refuge islands to provide additional protection for bicycles and pedestrians at intersection.
- 3 **Driveway and Alley Approaches**
Maintain speed bumps and flex posts to slow right-turning vehicles across bike lane.



Typical Intersection - Cornwall Ave.



Typical Street Section



ALT 3: PARKING PROTECTED LANE AND INTERSECTION

| Downtown

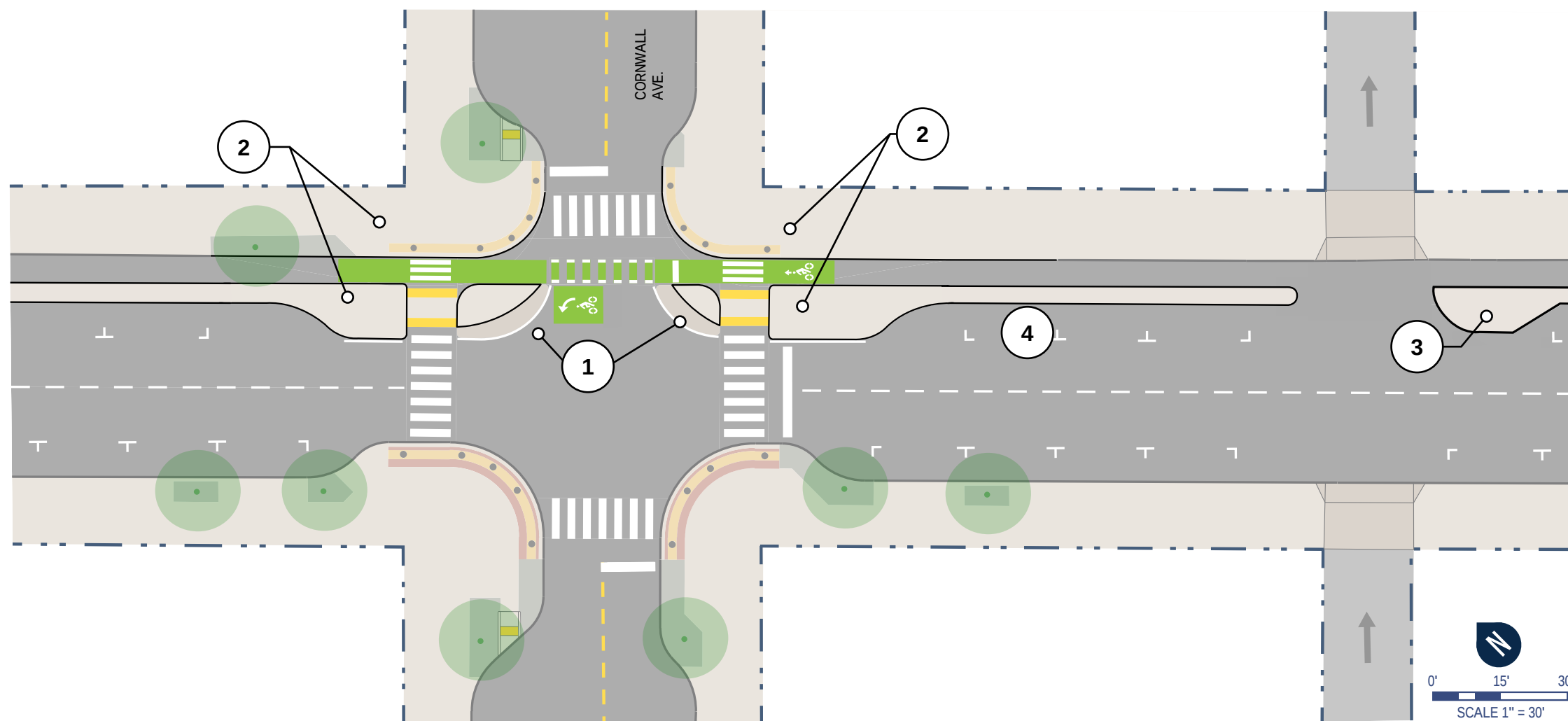
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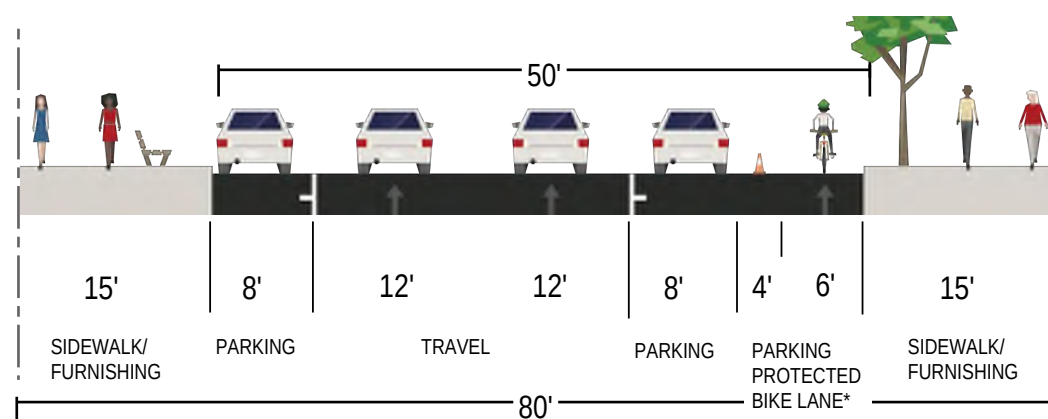
Design Features

Relocate parking to create a parking-protected (separated) bike lane positioned along the curb. Remove existing bulb-outs at intersections to maintain continuous bike lane alignment through the intersection and accommodate protected intersection improvements.

- 1 Dual Radius Island**
Replace existing paint and speed bump turn wedges with dual radius island.
- 2 Protected Intersection**
Remove curb bulb-outs and install refuge islands to provide additional protection for bicycles and pedestrians at intersection.
- 3 Protect Driveway and Alley Approaches**
Remove the last parking stall upstream of driveways and alleys to improve visibility of bicyclists for drivers turning left.
- 4 Parking Protected Configuration**
Allows for a separated bike facility with continuous vertical separation.



Typical Intersection - Cornwall Ave.



Typical Street Section

*Vertical separation options are shown on page 4.



ALT 4: SEPARATED LANE WITH WIDENED SIDEWALK

| Downtown

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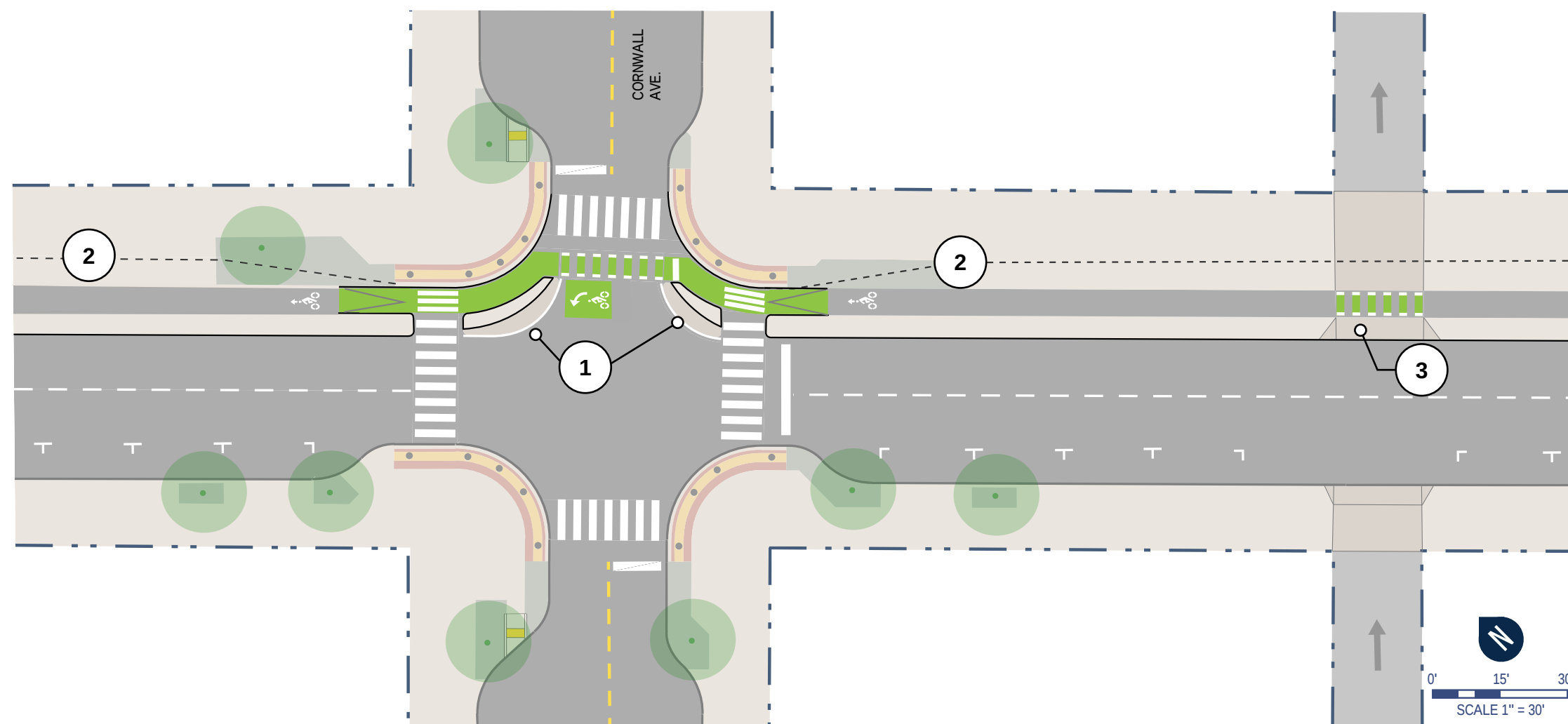


Design Features

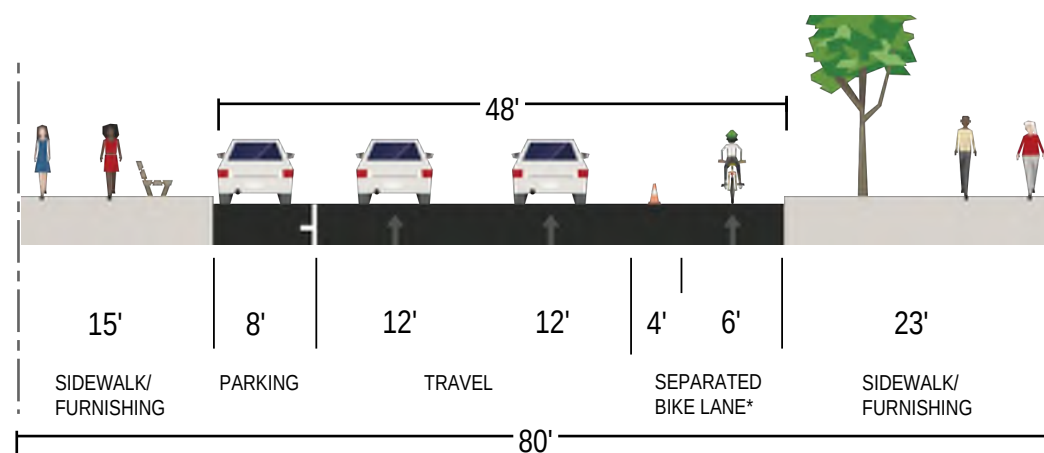
Remove parking and widen sidewalk on north side of Holly to provide separated bike lane along curb. Existing curb line is shown dashed for reference.

- 1 Dual Radius Island
Replace existing paint and speed bump turn wedges with dual radius island.

Curb radius = 15'
Mountable apron radius = 25'
- 2 Remove Parking and Widen Sidewalk
Expanded sidewalk zone provides opportunity for urban greening and placemaking.
- 3 Driveway and Alleys at Raised Bike Lane
Curb cut and apron at driveway and alley crossings slow right turning vehicles.



Typical Intersection - Cornwall Ave.



Typical Street Section

*Shown as a raised separated lane. Vertical separation options are described on Page 4



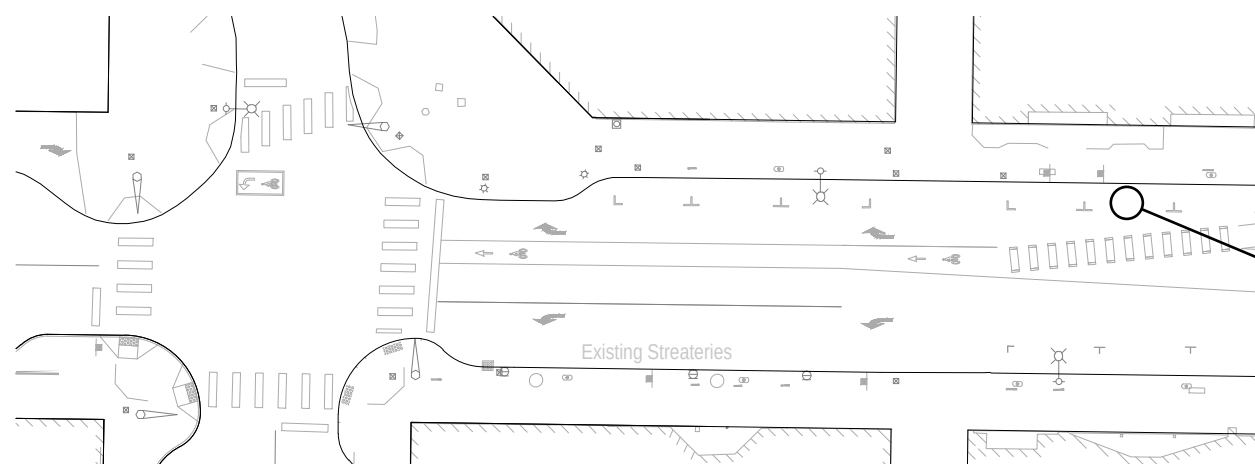
3. TRANSITION | Bay Street to W. Champion Street

BAY INTERSECTION | Preliminary Traffic Analysis

Operational updates including changes to intersection channelization are required to provide a low stress (LTS 1 or 2) bike facility through the intersection. Key recommendations, informed by preliminary traffic modeling and upstream and downstream channelization at Bay Street include:

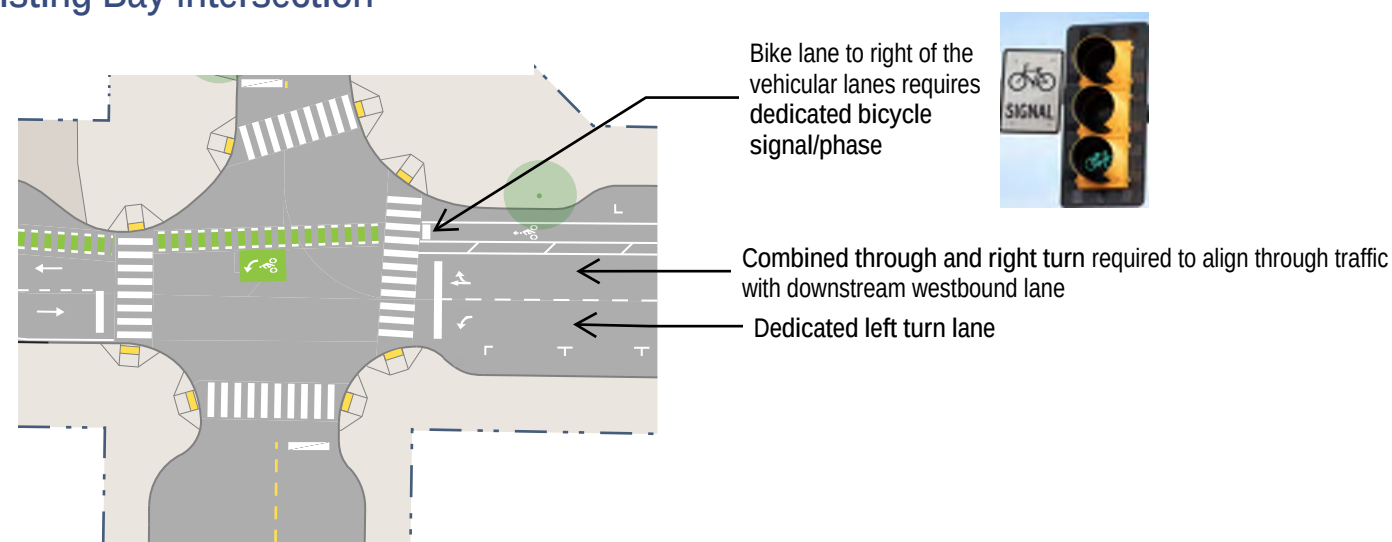
1. **Dedicated bicycle signal:** To support a continuous bike facility that meets project goals and accommodates standard intersection geometry, a bicycle signal with a separate phase for cyclists is recommended.
2. **Extend one-way traffic from Bay to Champion:** One-way configuration from Bay to Champion allows for a dedicated right-turn lane and a shared through/left-turn lane for westbound Holly Street traffic. This operational configuration improves intersection performance by allowing the bicycle signal phase to run concurrently with the left-turn movement.

Further evaluation of one-way vs. two-way operations from Bay to Champion Street, and the feasibility of a dedicated bike signal at the Holly/Bay intersection, will be conducted as part of the forthcoming Downtown Connections Study.



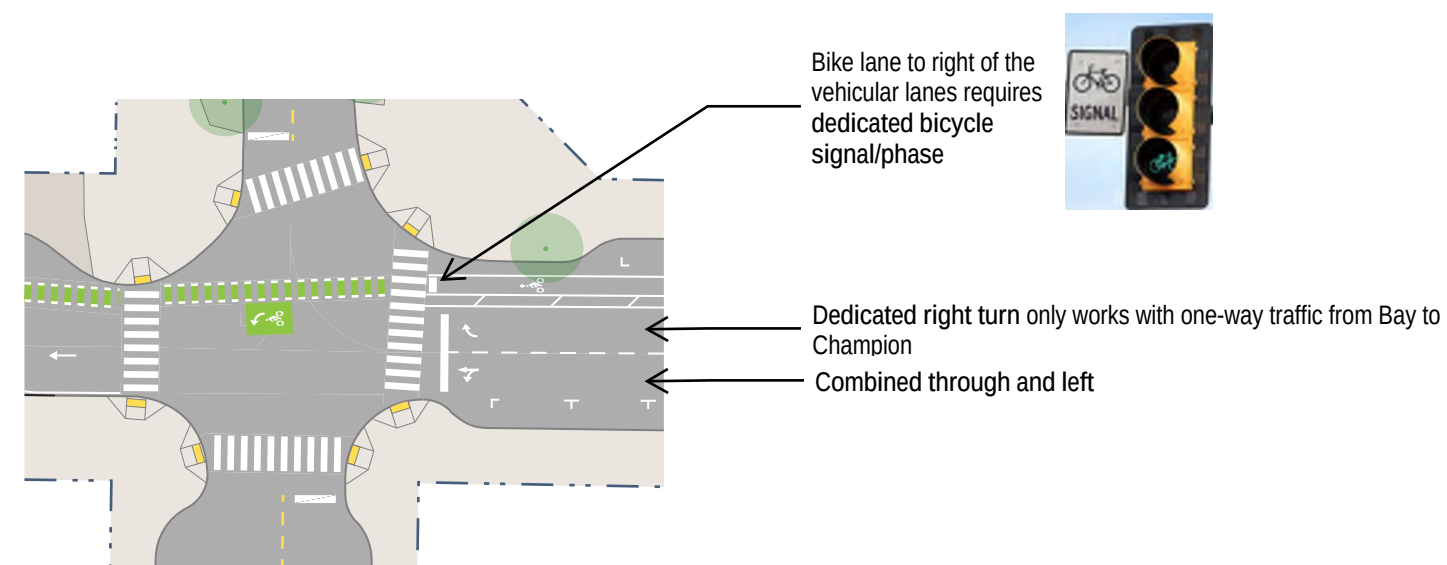
Bike lane crosses traffic lane to allow for right turn pocket to the right of the bike lane

Existing Bay Intersection



Traffic Model Results: Performs Poorly
EXISTING: LOS F, >2600' westbound queue length

Maintain two-way traffic from Bay to Champion

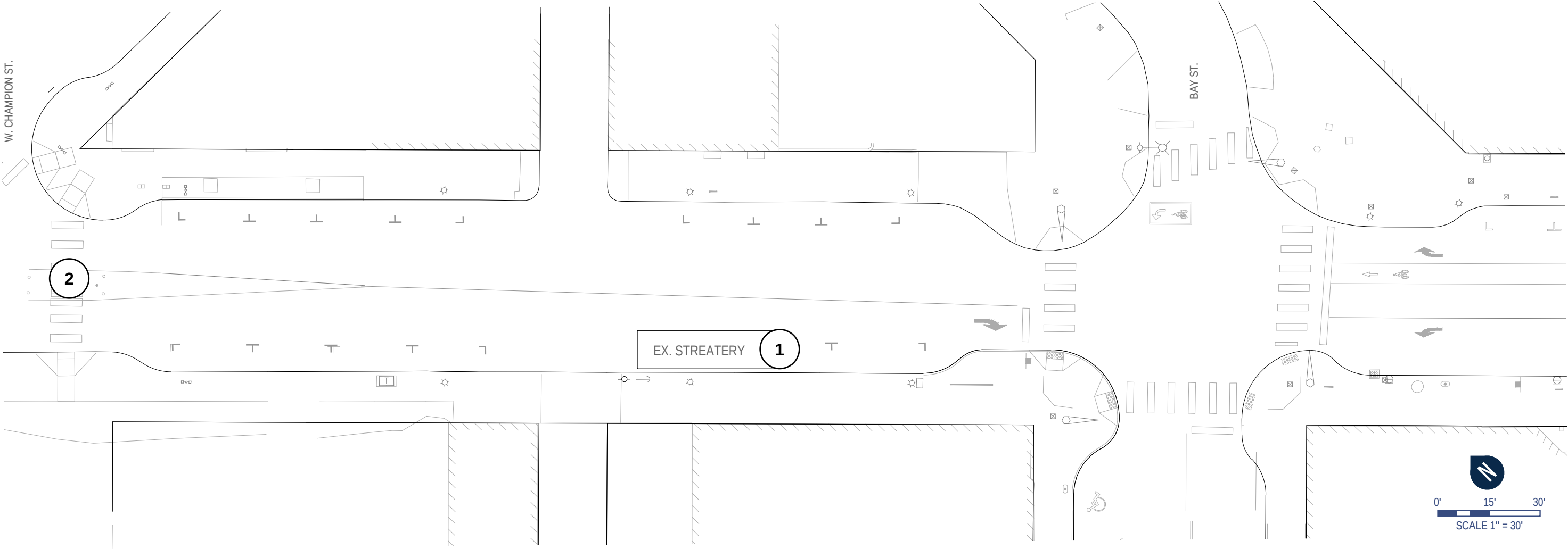


Traffic Model Results: Performs Moderately
EXISTING: LOS C, 204' westbound queue length

Extend one-way traffic from Bay to Champion

EXISTING CONDITIONS

| Bay to Champion



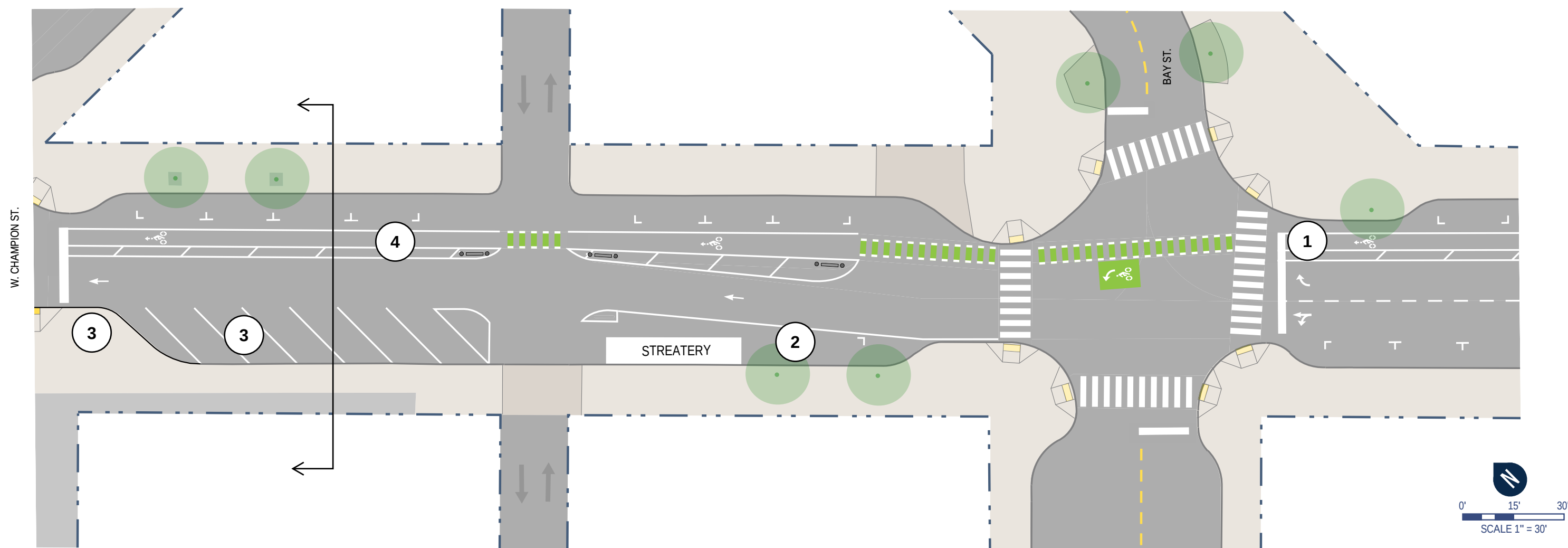
Bay to Champion



ALT 1: BUFFERED BIKE LANE

| Bay to Champion

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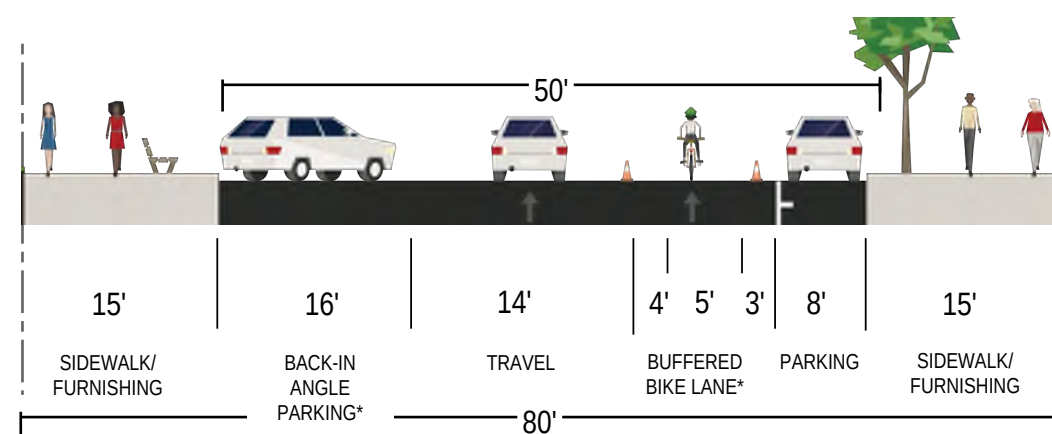


Bay to Champion

Design Features

Extend one-way westbound traffic from Bay to Champion and install a buffered* bike lane with parking at the curb. Increase on-street parking on highly utilized block with back-in angle parking on the west half of the block.

- 1 Dedicated Bike Signal: Bike lane is located to the right of the vehicular right turn lane, requiring separate signal phases for vehicles and bikes. See Bay intersection preliminary traffic analysis (page 22)
- 2 Lane Shift: Westbound travel lane alignment shifts through the east half of the block, from Bay intersection through the mid-block alley. The south side of the street can be utilized for the existing Streater, additional parallel parking, or an expanded sidewalk zone.
- 3 Back-in Angle Parking: Increases on-street parking by two stalls. Opportunity for accessible parking stall adjacent to downtown landing zone curb extension (see Champion intersection alternatives, pages 29-31).
- 4 Westbound Bike Lane: Shown as buffered but can be configured as a parking protected lane (as shown in Alternative 1)



Typical Section (East Half)

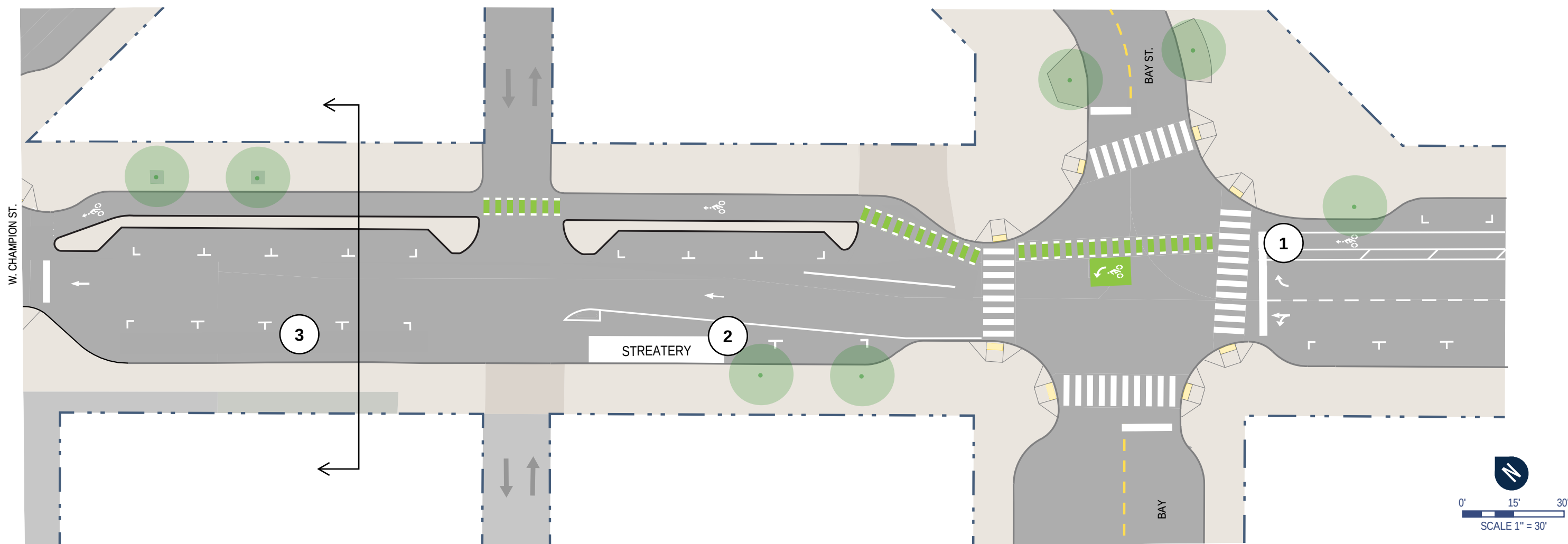
*Parking configuration can be angle or parallel (as shown in Alternative 2)

ALT 2: PARKING PROTECTED BIKE LANE

| Bay to Champion

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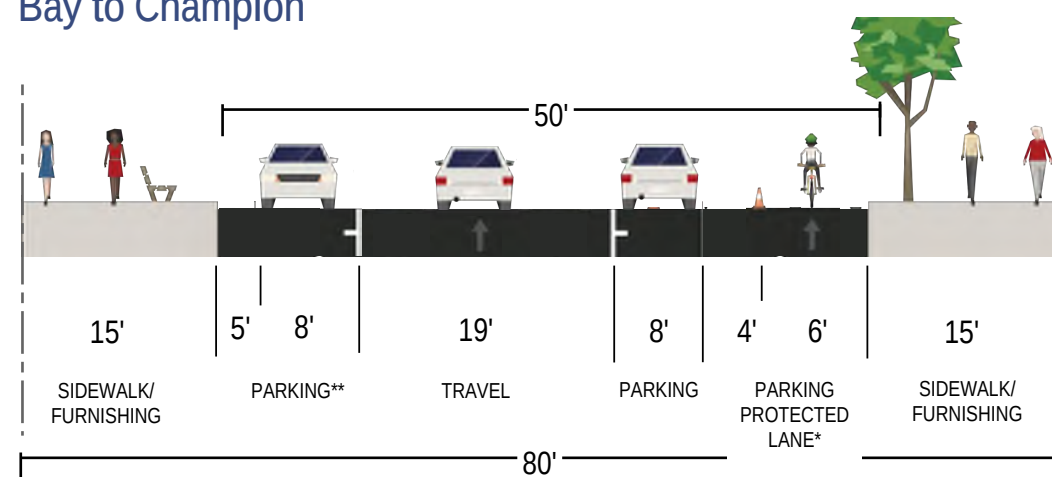


Bay to Champion

Design Features

Extend one-way westbound traffic from Bay to Champion and install a parking protected bike lane. Maintain existing on-street parking (parallel parking on both sides).

- 1** Dedicated Bike Signal: Bike lane is located to the right of the vehicular right turn lane, requiring separate signal phases for vehicles and bikes. See Bay Intersection preliminary traffic analysis (page 22).
- 2** Lane Shift: Westbound travel lane alignment shifts through the east half of the block, from Bay intersection through the mid-block alley. The south side of the street can be utilized for the existing Streatery, additional parallel parking, or an expanded sidewalk zone.
- 3** Parallel Parking: West half of block includes wider parallel parking and vehicular lane.
- 4** Parking Protected Configuration: Achieves a separated bike facility while maintaining on-street parking counts.



Typical Section (East Half)

*Vertical separation options are shown on page 4.

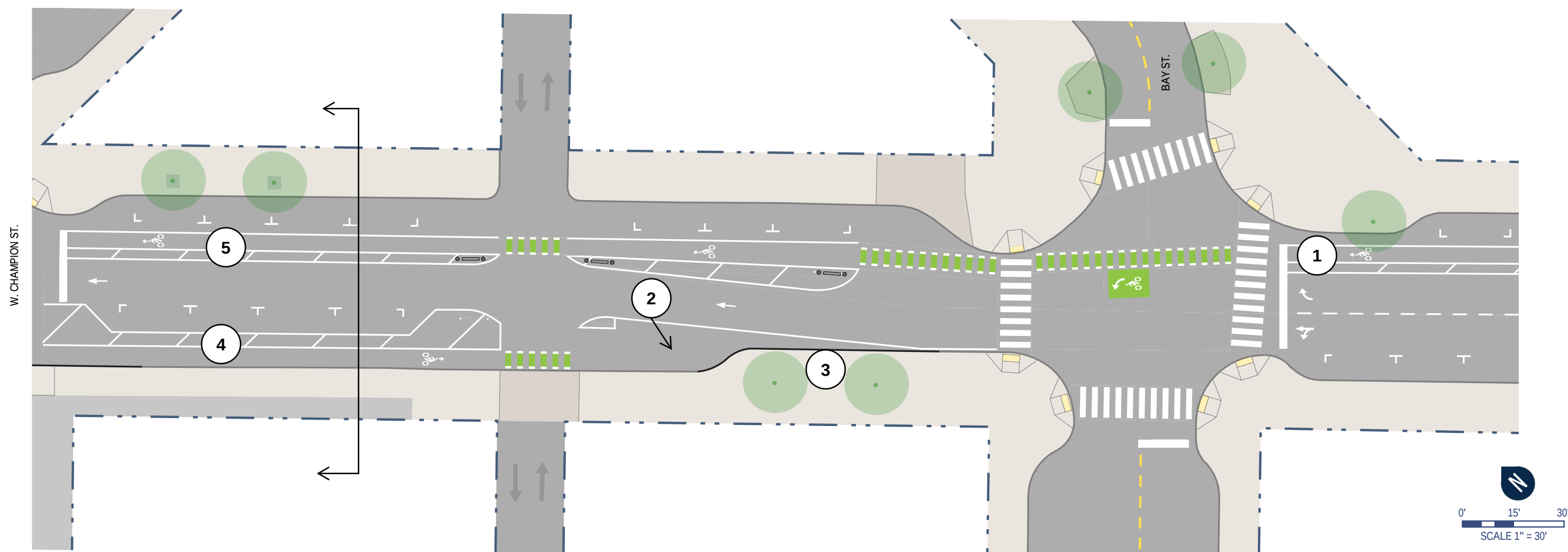
**Parking configuration can be angle (as shown in Alternative 1) or parallel.

ALT 3: CONTRAFLOW LANE (EASTBOUND)

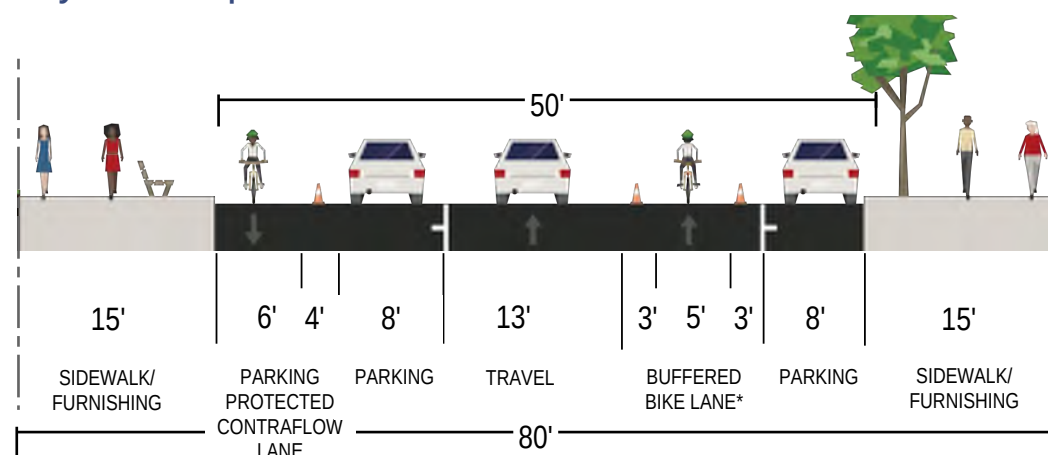
| Bay to Champion

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Bay to Champion



Typical Section (East Half)

*Westbound bike lane can be configured as a buffered lane (Alternative 1) or parking protected facility (Alternative 2)

Design Features

Extend one-way westbound traffic from Bay to Champion and install westbound buffered* bike lane. Extend eastbound bike lane as a parking protected contraflow lane to allow cyclists to get closer to the downtown core.

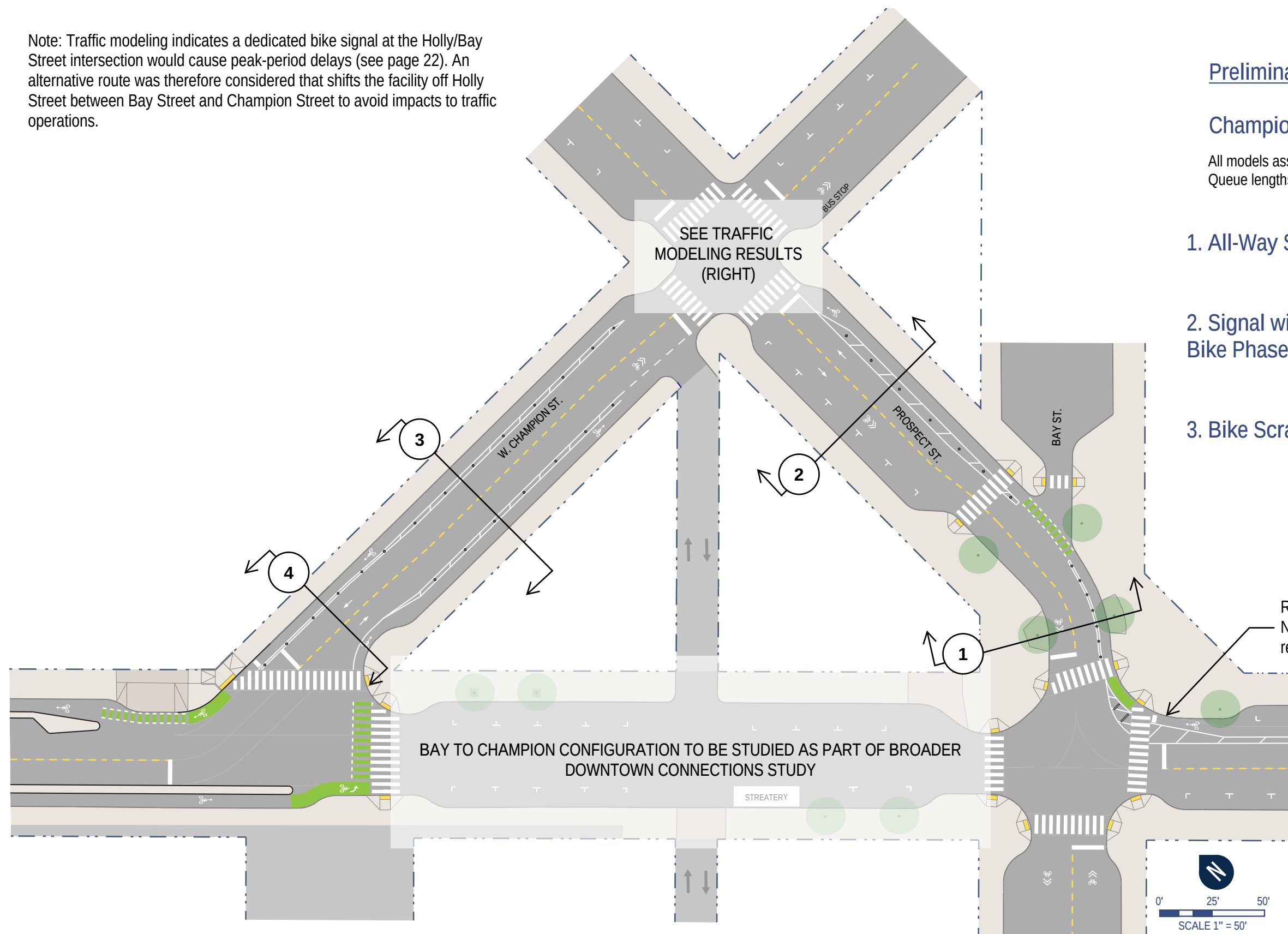
- 1 Dedicated Bike Signal: Bike lane is located to the right of the vehicular right turn lane, requiring separate signal phases for vehicles and bikes. See Bay intersection preliminary traffic analysis (page 22)
- 2 Lane Shift: Westbound travel lane alignment shifts through the east half of the block, from Bay intersection through the mid-block alley. The south side of the street can be utilized for a bike parking at the terminus of the contraflow bike lane.
- 3 Downtown Landing Zone: Expanded bulb-out provides space for amenities such as wayfinding signage and art at terminus of eastbound bike lane.
- 4 Parking Protected Contraflow Bike Lane
- 5 Westbound Bike Lane: Shown as buffered but can be configured as a parking protected lane (as shown in Alternative 1)

ALT 4: PROSPECT TO CHAMPION ALTERNATIVE ROUTE

Bay to Champion



Note: Traffic modeling indicates a dedicated bike signal at the Holly/Bay Street intersection would cause peak-period delays (see page 22). An alternative route was therefore considered that shifts the facility off Holly Street between Bay Street and Champion Street to avoid impacts to traffic operations.



Preliminary Traffic Model Results

Champion/Prospect Intersection

All models assume one-way traffic from Bay to Champion
Queue lengths reported for: EB/WB (Champion), NB/SB (Prospect)

1. All-Way Stop

LOS B
Queues (Champion): ~115' (EB), ~70' (WB)
Queues (Prospect): ~105' (NB), ~130' (SB)

2. Signal with Bike Phase

LOS D
Queues (Champion): ~260' (EB), ~80' (WB)
Queues (Prospect): ~150' (NB), ~300' (SB)

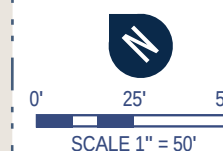
3. Bike Scramble

LOS F

Right turn only (bicycles)
No dedicated bike signal phase required.

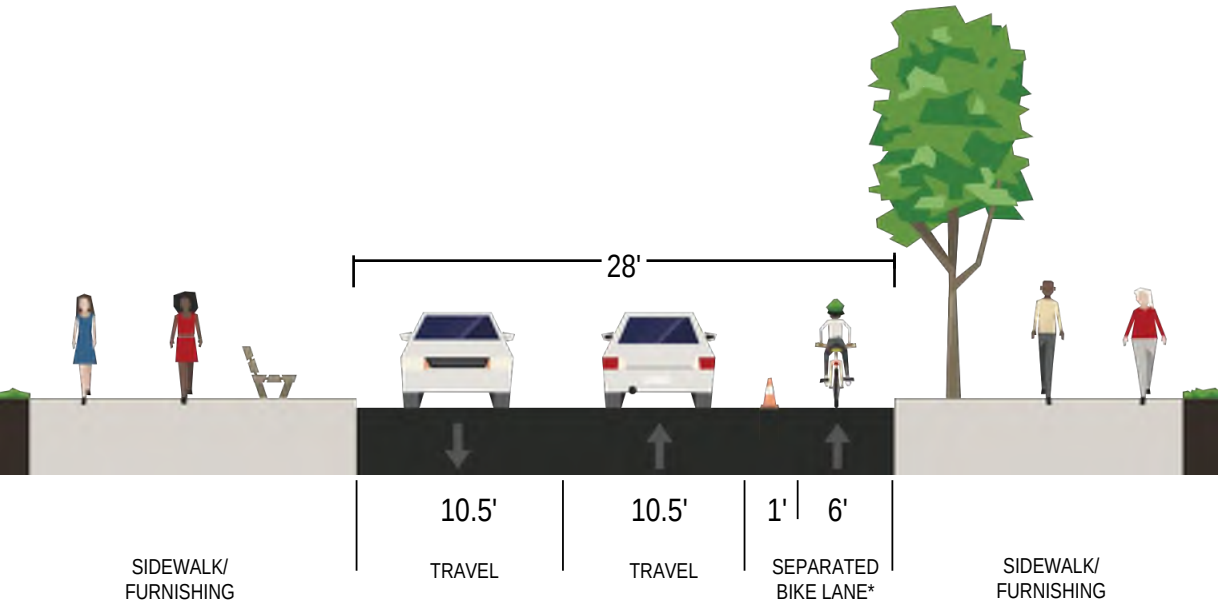
BAY TO CHAMPION CONFIGURATION TO BE STUDIED AS PART OF BROADER DOWNTOWN CONNECTIONS STUDY

STREATERY

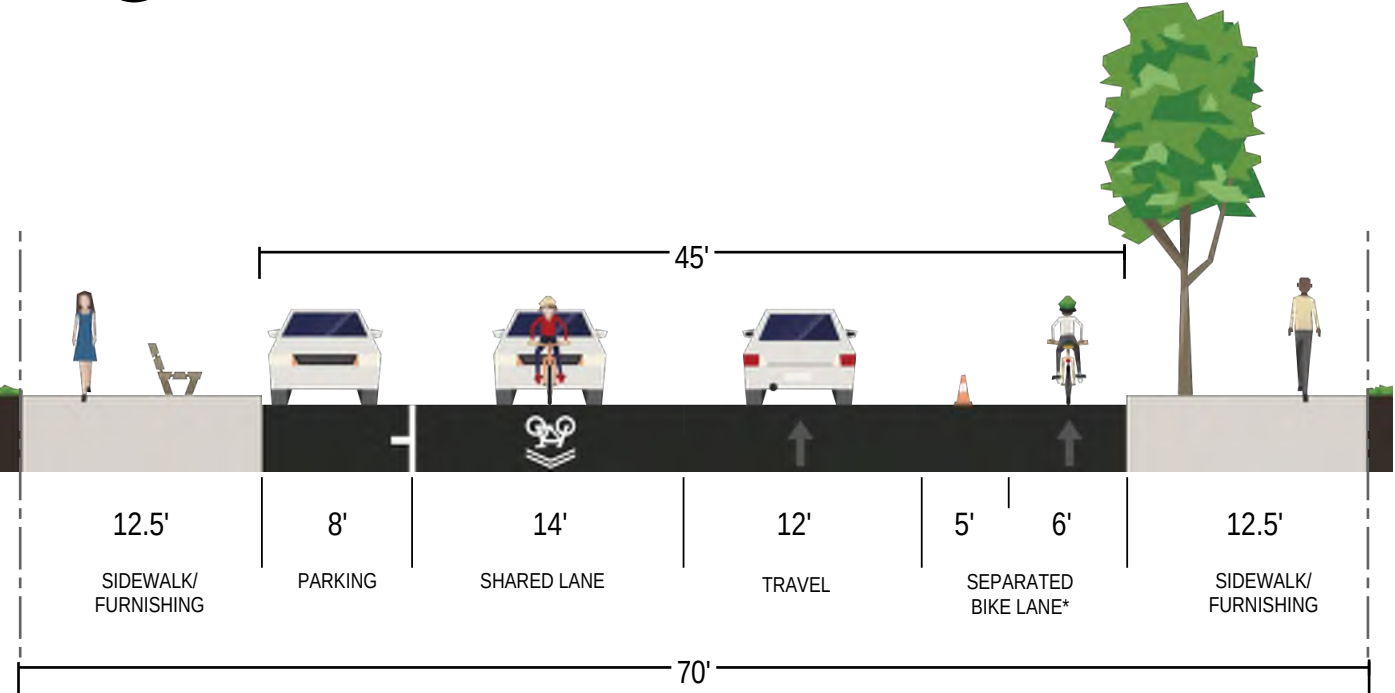


PROSPECT TO CHAMPION ALTERNATIVE ROUTE

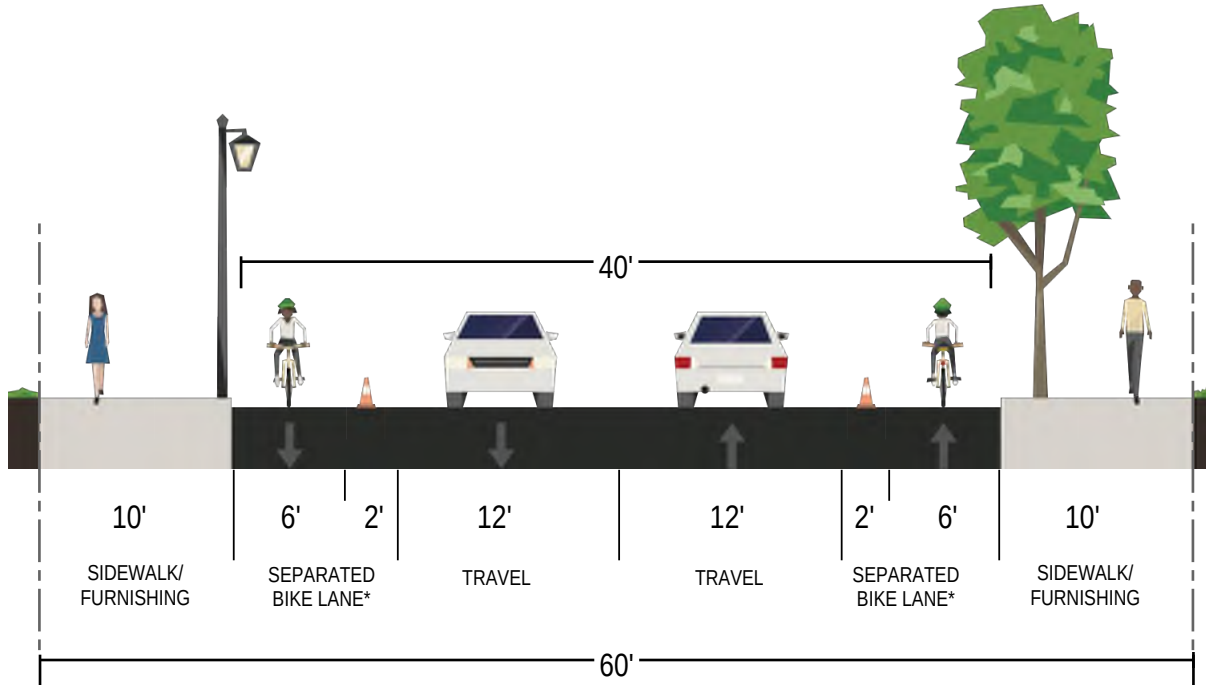
| Bay to Champion



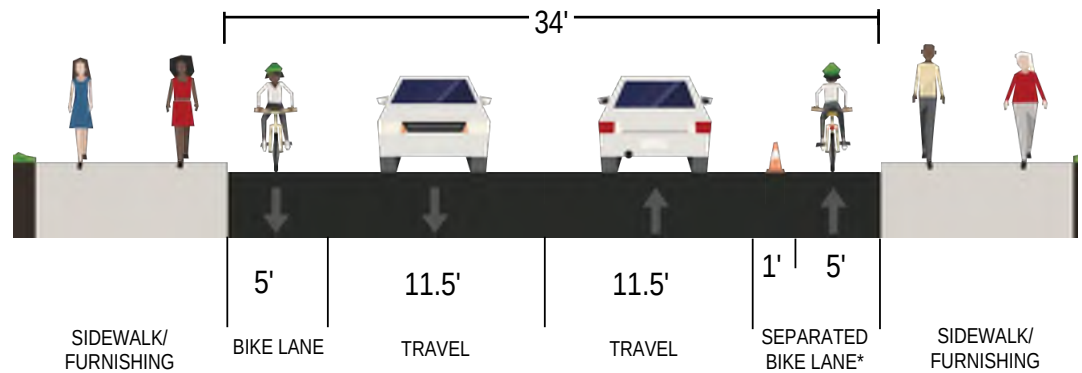
1 SECTION 1 - BAY ST. (APPROACHING PROSPECT)



2 SECTION 2 - PROSPECT ST. (TYPICAL SECTION)



3 SECTION 3 - W. CHAMPION ST. (TYPICAL SECTION)



4 SECTION 4 - W. CHAMPION ST. (AT CURB EXTENSION)

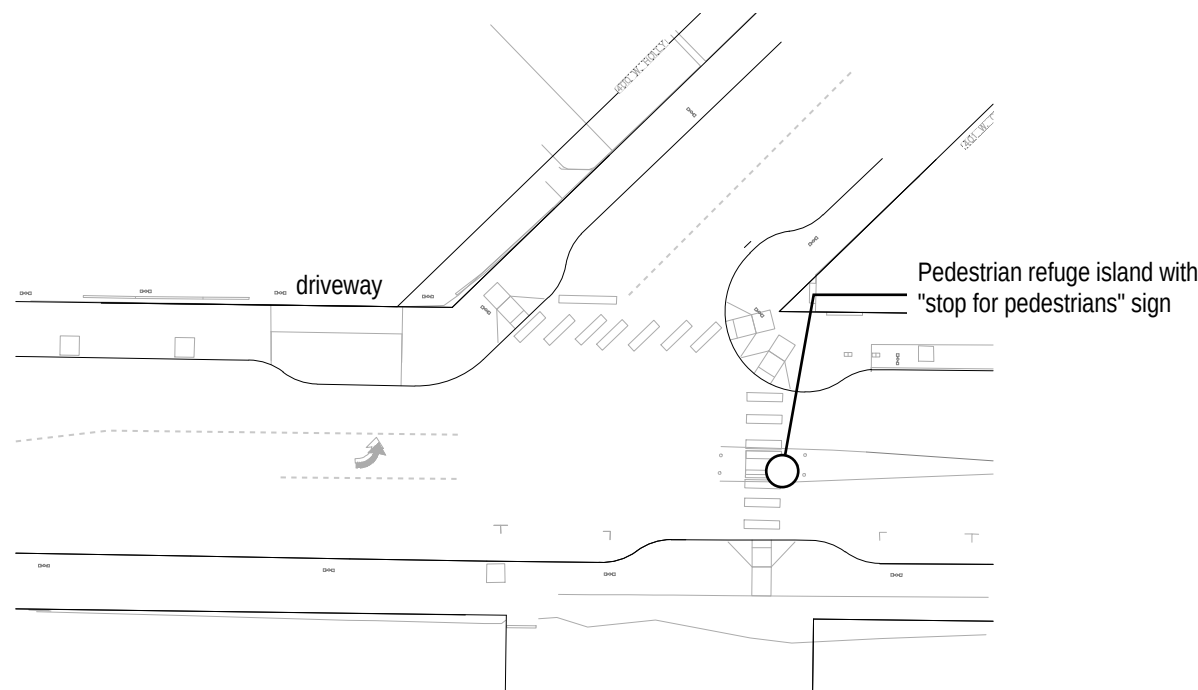
*Vertical separation options are shown on page 4.

HOLLY/CHAMPION INTERSECTION | Traffic Analysis

Operational updates and safety improvements are required to accommodate a bike facility through the intersection. Key recommendations, informed by the traffic modeling and upstream and downstream channelization at Champion include:

- 1. Consider restricting right turns onto Champion for westbound vehicles on Holly: Restricting right turns eliminates the conflict between bicycles and right-turning vehicles. Westbound vehicles turn right at Bay instead of Champion.
- 2. Implement two-way stop control: Introducing stop control for eastbound vehicles on Holly is anticipated to improve safety by reducing conflicts between westbound bicyclists traveling downhill through the intersection and vehicles turning left from Holly onto Champion.
- 3. Consider intersection geometry modifications to improve safety for crossing bicycles and pedestrians: Lower cost near-term improvements could be phased in ahead of longer-term permanent improvements (see Champion Intersection alternatives, pages 29-31).

Further evaluation of one-way vs. two-way operations from Bay to Champion Street, and operational upgrades at the Holly/Champion intersection, will be conducted as part of the forthcoming Downtown Connections Study.



Existing Champion Intersection

- Two-way traffic from Bay to Champion in existing condition.
- Unrestricted both westbound and eastbound travel on Holly.
- Stop control for southbound vehicles on Champion.

Preliminary Traffic Model Results

All models assume one-way traffic from Bay to Champion
Queue lengths (EB= eastbound vehicles on Holly, WB= westbound vehicles on Holly)

	Existing	2045
1. One-Way Stop Control (on WB approach on Holly)	LOS F Queues: ~1520' (WB), ~10' (EB)	LOS F Queues: >2600' (WB), ~2321' (EB)
2. Two-Way Stop Control* (on EB approach on Holly and SB approach on Champion)	LOS F* Queues: ~0' (WB), ~200' (EB)	LOS F Queues: ~0' (WB), ~2430' (EB)
3. All Way Stop Control**	LOS C Queues: ~300' (WB), ~150' (EB)	LOS E Queues: > 2600' (WB), ~2000' (EB)
4. Signalized Intersection	LOS C Queues: ~210' (WB), ~240' (EB)	LOS C Queues: ~210' (WB), ~2210' (EB)
5. Compact Roundabout***	LOS A, Queues: ~120' (WB), 0' (EB)	LOS A, Queues: ~250' (WB), 0' (EB)

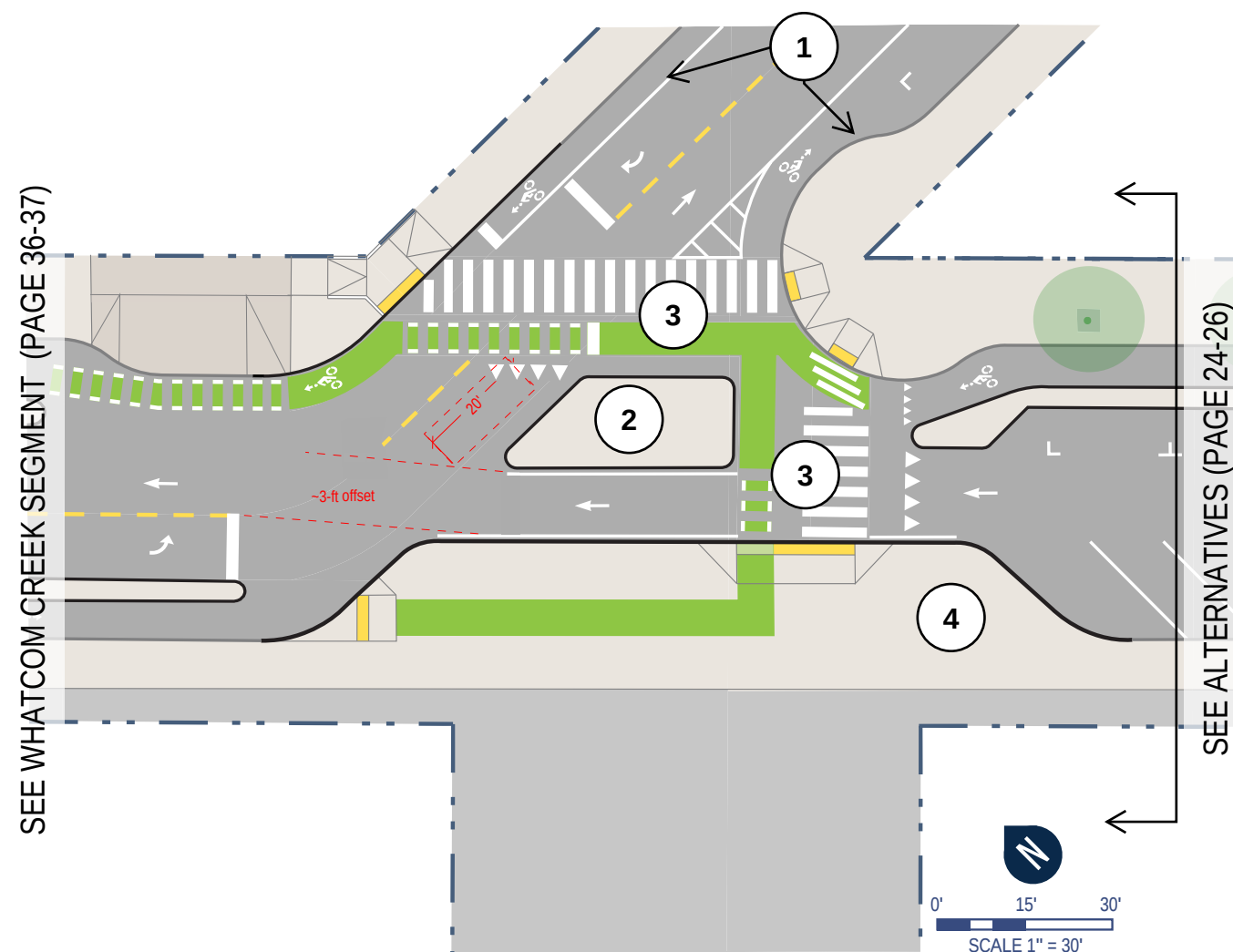
* The two-way stop control alternative shows very high intersection delay values under both existing and 2045 conditions when evaluated using Synchro. However, these delay results are not considered representative of expected operations at this location (the Synchro model does not accurately account for platooning created by the upstream signal). The SimTraffic modeling, which captures platooning and upstream signal coordination indicates acceptable queue lengths and performance for the existing conditions model.

**All-way stop control balances queue lengths across all approaches, improving overall traffic flow and minimizing delays for travelers entering and existing downtown in existing conditions. However, 95th percentile queues extend to Bay St., a concern for westbound traffic leaving downtown.

***The roundabout scenario demonstrates the best operational performance among the modeled alternatives; however, it cannot be accommodated within the existing right-of-way while providing for bicycle facilities through the intersection.

MAINTAIN Y-INTERSECTION AT CHAMPION

| Champion Intersection Concepts



Champion Intersection Features

Shown as two-way stop control; however, near- and long-term operational recommendations for the Holly/Champion intersection will be evaluated as part of the broader Downtown Connections Study.

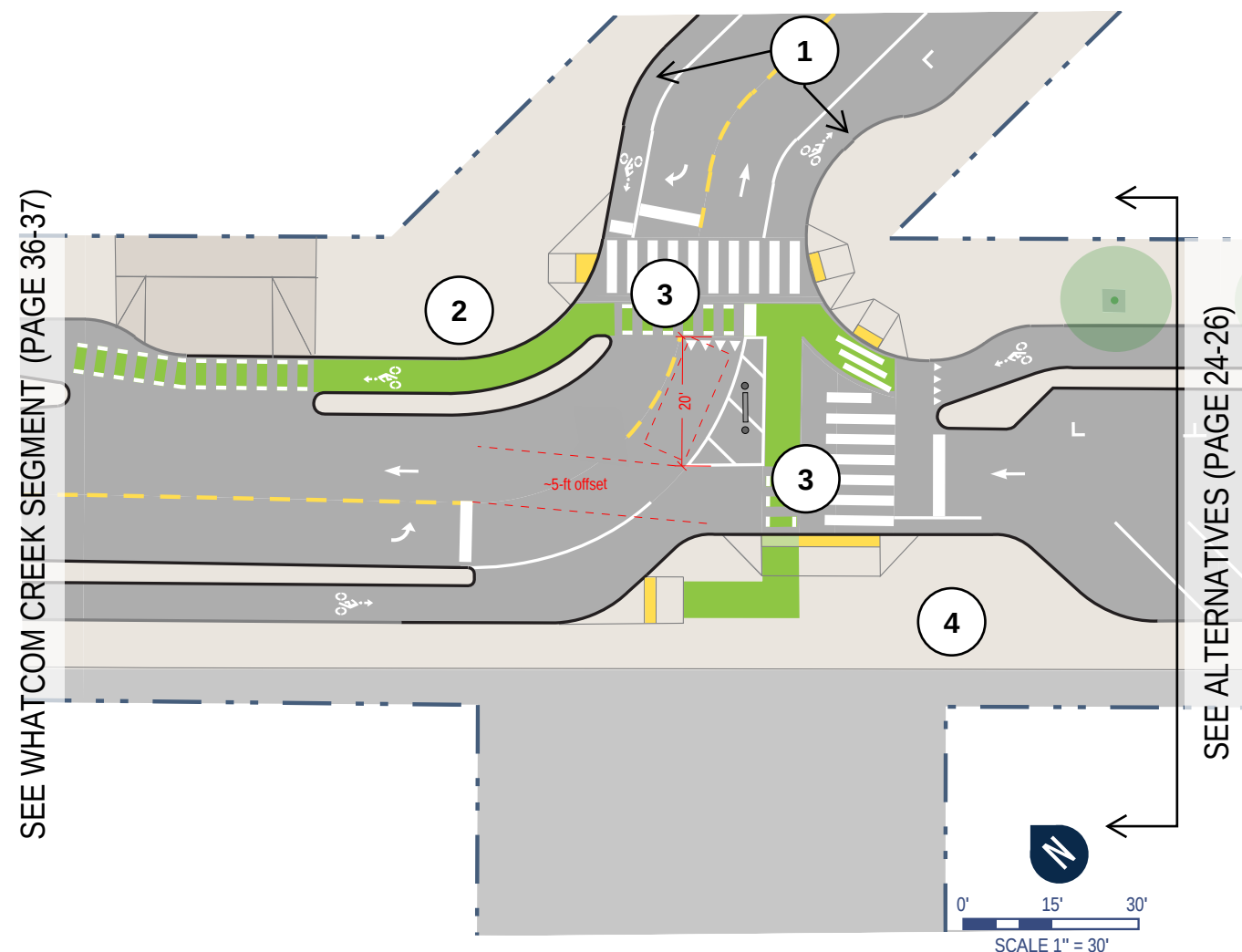
Install refuge island to shorten effective bicycle and pedestrian crossing distances and slow turning movements through the intersection. Westbound vehicles on Holly yield to bikes and pedestrians before stopping for vehicle traffic at the far side of the refuge island.

- 1 Future bike lanes on Champion
- 2 Refuge island (shown): This area could be planted or incorporated into an expanded sidewalk/curb extension at the NE corner.
- 3 Combined bike/pedestrian crossing with RRFB: Vehicle traffic to yield at crosswalk before proceeding to the stop bar.
- 4 Downtown Landing Zone: Expand bulb-out to provide space for amenities such as signage, greening, seating and bike parking.



REALIGN CHAMPION TO HOLLY

| Champion Intersection Concepts



Champion Intersection Features

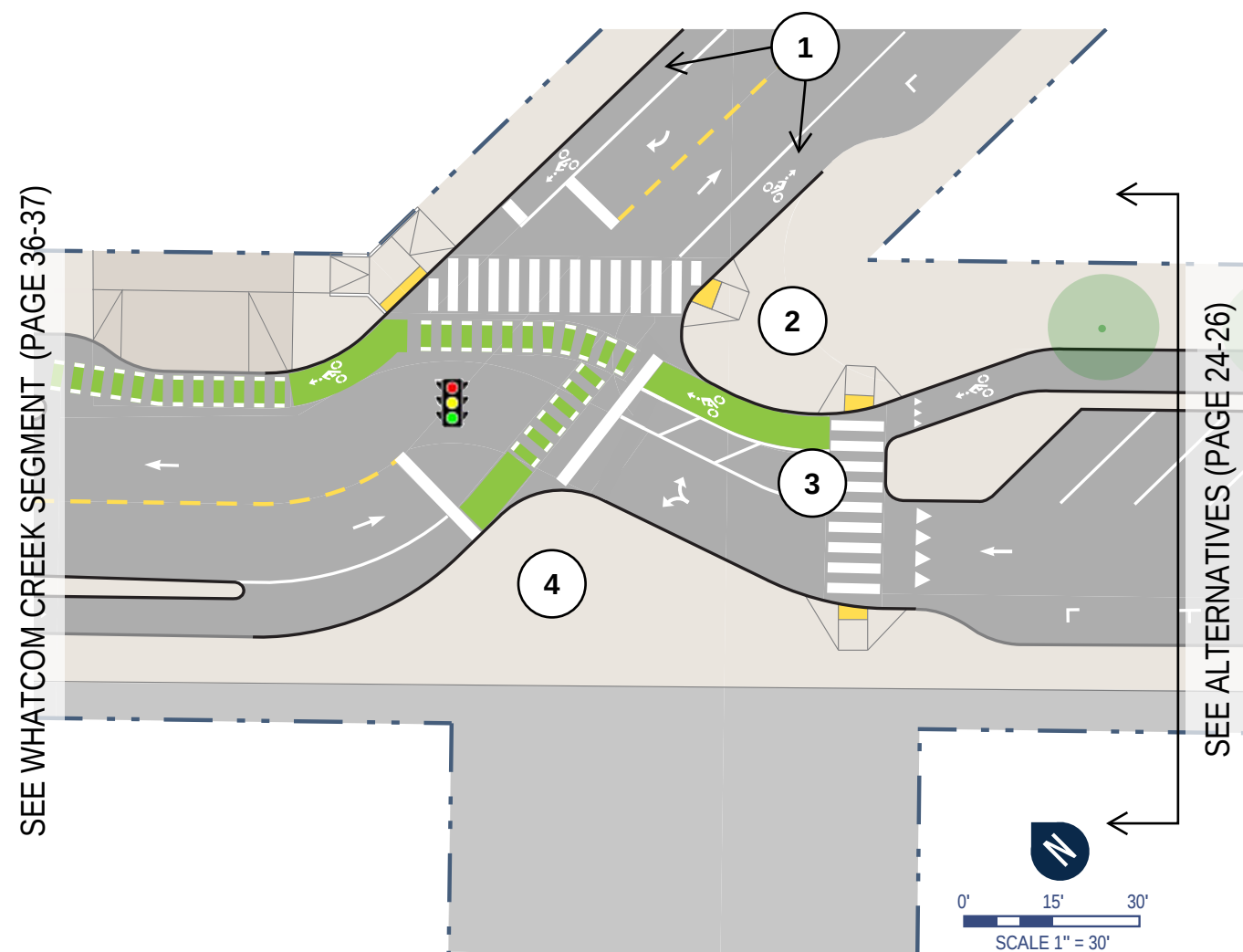
Shown as two-way stop control; however, near- and long-term operational recommendations for the Holly/Champion intersection will be evaluated as part of the broader Downtown Connections Study.

- 1 Future bike lanes on Champion
- 2 Expand bulb-out to square up intersection and slow vehicular turning movements
- 3 Consolidate bike/pedestrian crossings
- 4 Downtown Landing Zone: Expanded bulb-out provides space for amenities such as signage, greening, seating and bike parking.



REALIGN HOLLY AT CHAMPION

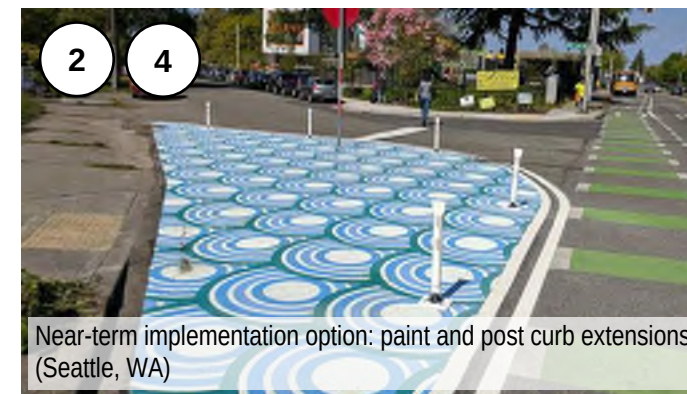
| Champion Intersection Concepts



Champion Intersection Features

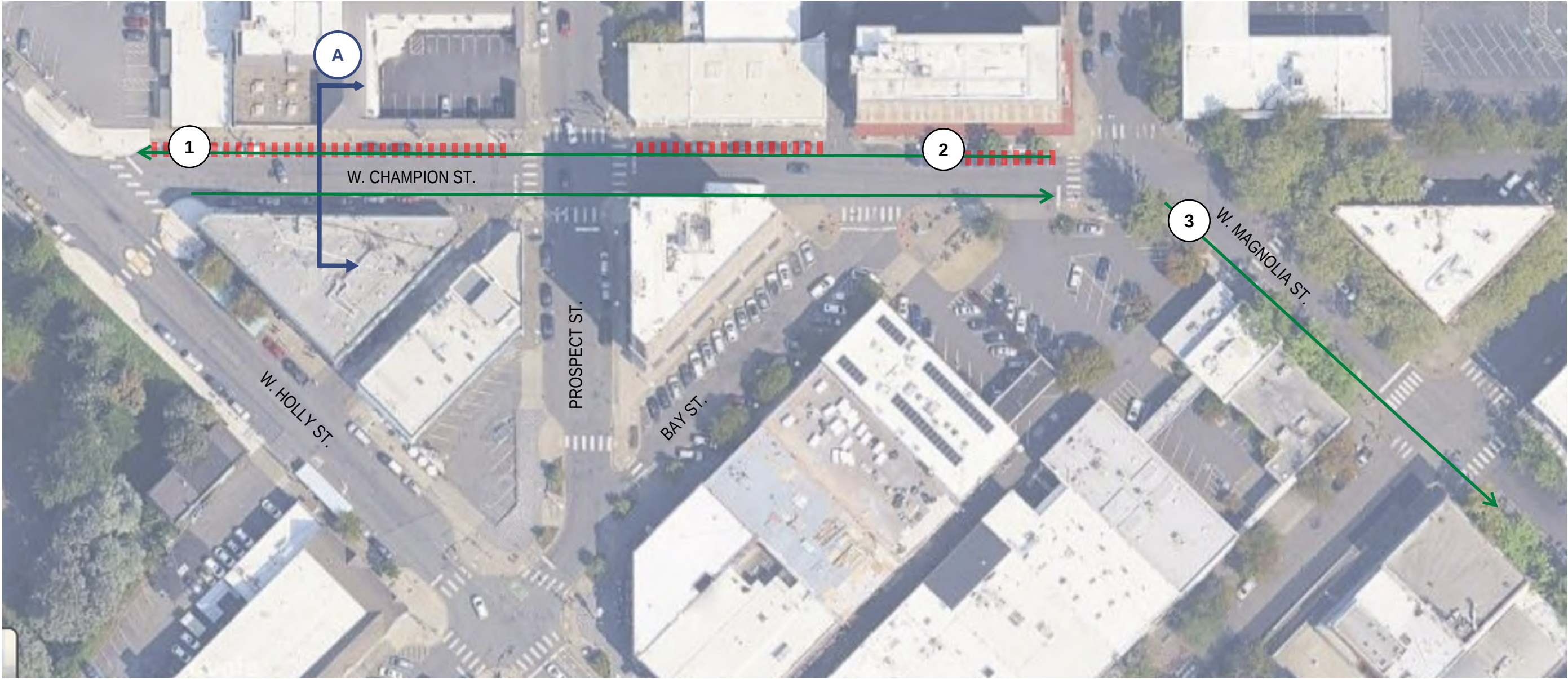
 Shown as a future signalized intersection; however, near- and long-term operational recommendations for the Holly/Champion intersection will be evaluated as part of the broader Downtown Connections Study.

- 1 Future bike lanes on Champion
- 2 Expand bulb-out to square up intersection and slow vehicular turning movements
- 3 Pedestrian crossing with RRFB: Vehicle traffic to yield at crosswalk before proceeding to the stop bar.
- 4 Downtown Landing Zone: Expanded bulb-out provides space for amenities such as signage, greening, seating and bike parking.



CHAMPION INTERSECTION | Future Bike Lane Connection

Proposed bike facilities on Holly and improvements at the Holly/Champion intersection should consider future bike lane connections proposed in the Bicycle Master Plan, including bike lanes on West Champion Street connecting to a recommended protected eastbound bike lane on Magnolia Street.



1 REMOVE PARKING ON NORTH SIDE OF WEST CHAMPION ST. TO PROVIDE SPACE FOR BIKE LANES ON BOTH SIDES OF THE STREET)



3 ONE-WAY BIKE LANE ON W MAGNOLIA ST. (EAST BOUND) IS RECOMMENDED IN BELLINGHAM BICYCLE MASTER PLAN.

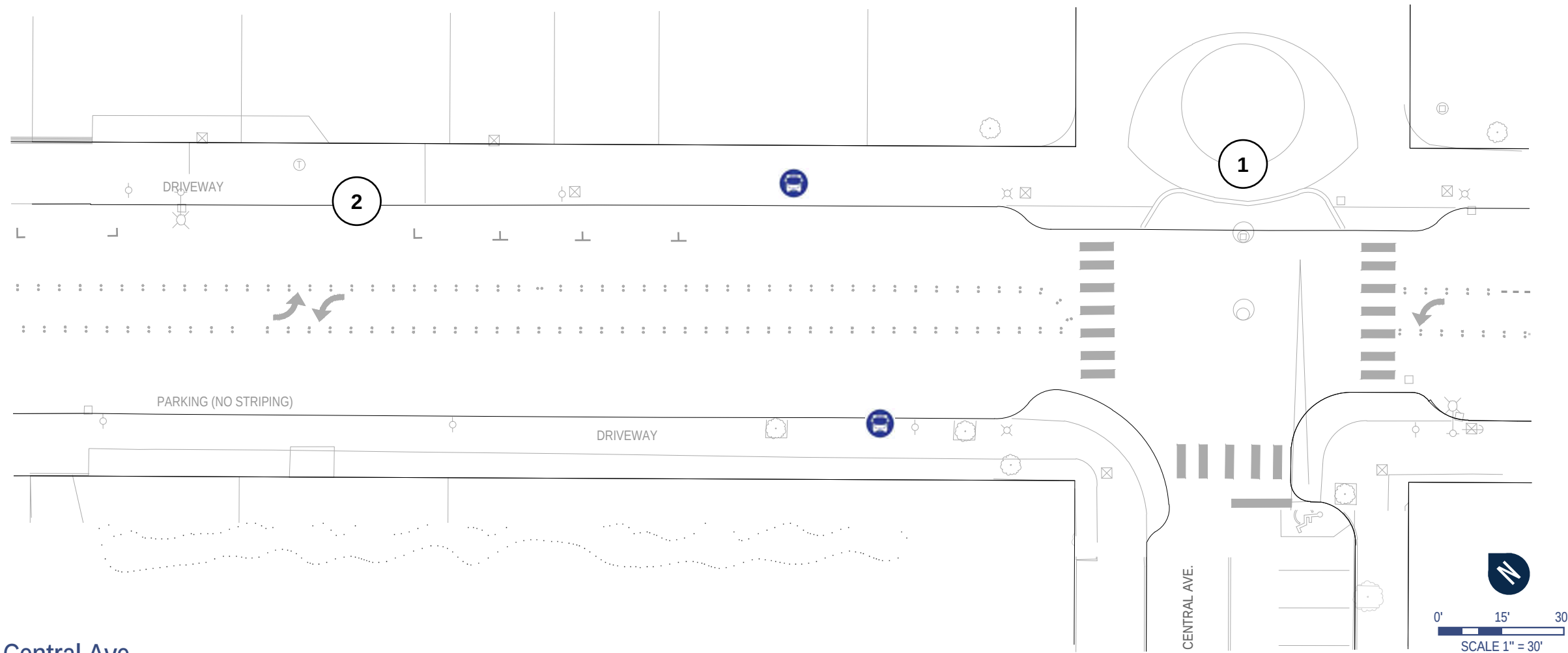
SECTION A-A (CHAMPION)

60' ROW							
40' CURB TO CURB							
10'	8'	12'	12'	8'	10'	Existing	
WALK	PARK	TRAVEL	TRAVEL	PARK	WALK		
10'	5'	11'	11'	5'	8'	Future	
WALK	BIKE	TRAVEL	TRAVEL	BIKE	PARK		

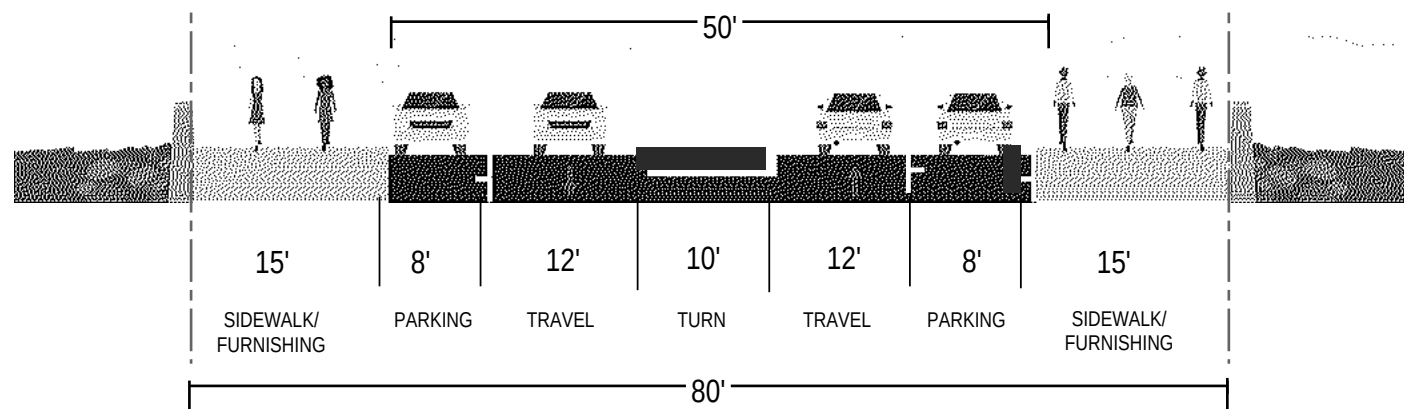
4. WHATCOM CREEK | Champion Street through Bridge

EXISTING CONDITIONS

| Whatcom Creek



Central Ave.



Existing Street Section



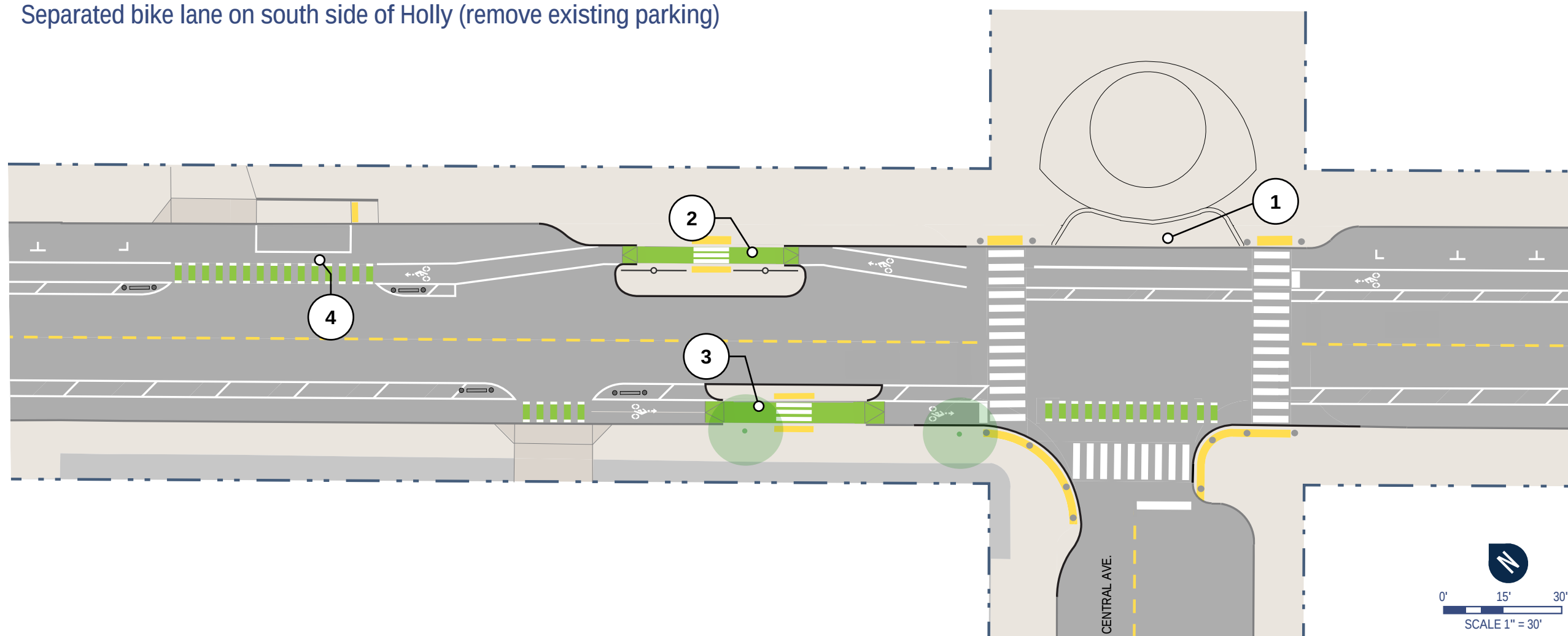
ALT 1: BUFFERED BIKE LANE (NORTH SIDE)

| Whatcom Creek

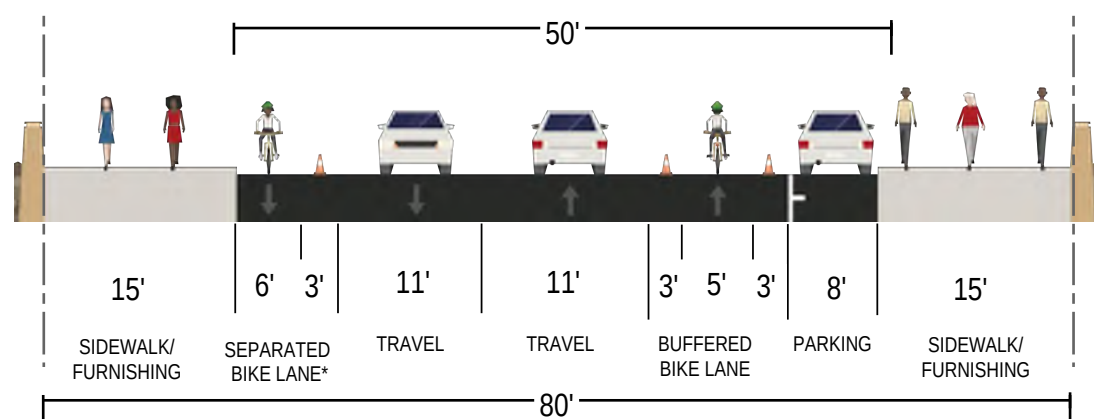
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Separated bike lane on south side of Holly (remove existing parking)



Plan - Central Ave. Intersection and Maritime Heritage Park



Typical Street Section

*Vertical separation options are shown on page 4.

Design Features

Remove parking on the south side of Holly Street and remove existing center turn lane. Install a parking protected bike lane on north side of Holly and protected bike lane on the south side of Holly.

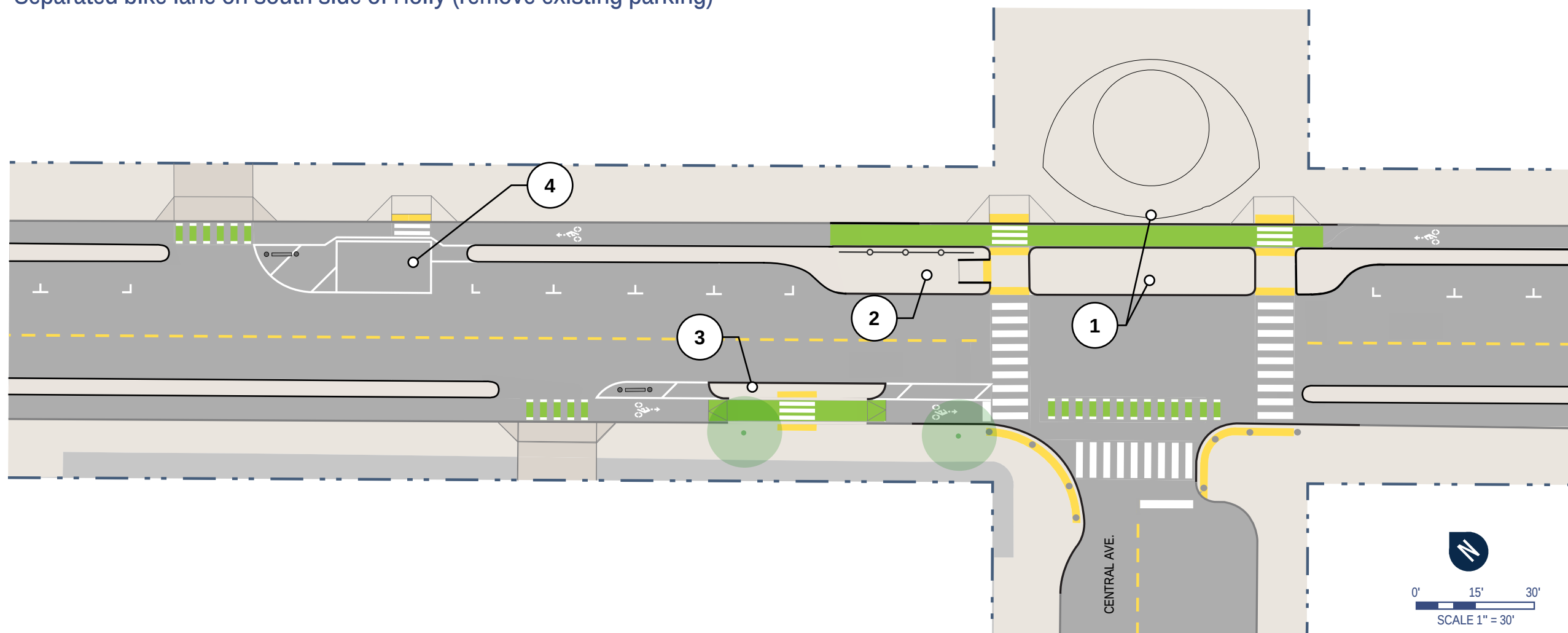
- 1 Pedestrian Crossing: Maintain existing bulb-out and planter adjacent to fountain at park entrance.
- 2 Transit Boarding Island: Extend bulb-out for transit boarding island. Bend out bike lane at transit stop.
- 3 Shared Transit Boarding Island: Shared bike lane and boarding area configuration at constrained locations.
- 4 ADA Parking Stall: Maintain existing curbside ADA parking stall and ramp configuration at park

ALT 2: PARKING PROTECTED BIKE LANE (NORTH SIDE) | Whatcom Creek

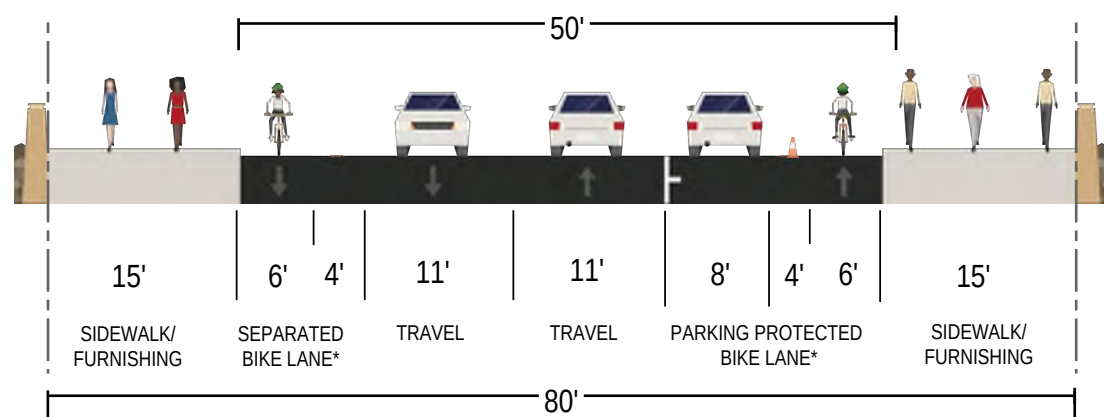
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Separated bike lane on south side of Holly (remove existing parking)



Plan - Central Ave. Intersection and Maritime Heritage Park



Design Features

Remove parking on the south side of Holly Street and remove existing center turn lane. Install a parking protected bike lane on north side of Holly and protected bike lane on the south side of Holly.

- 1 Pedestrian Refuge: Maintain existing fountain and donor bricks. Remove existing curb extension and planter and replace with refuge island to shorten pedestrian crossing across Holly.
- 2 Transit Boarding Island: Co-locate with pedestrian refuge island at intersection.
- 3 Shared Transit Boarding Island: Shared bike lane and boarding area configuration at constrained locations.
- 4 ADA Parking Stall: Accessible crossing at bike lane and new ADA ramp.

Typical Street Section

*Vertical separation options are shown on page 4.

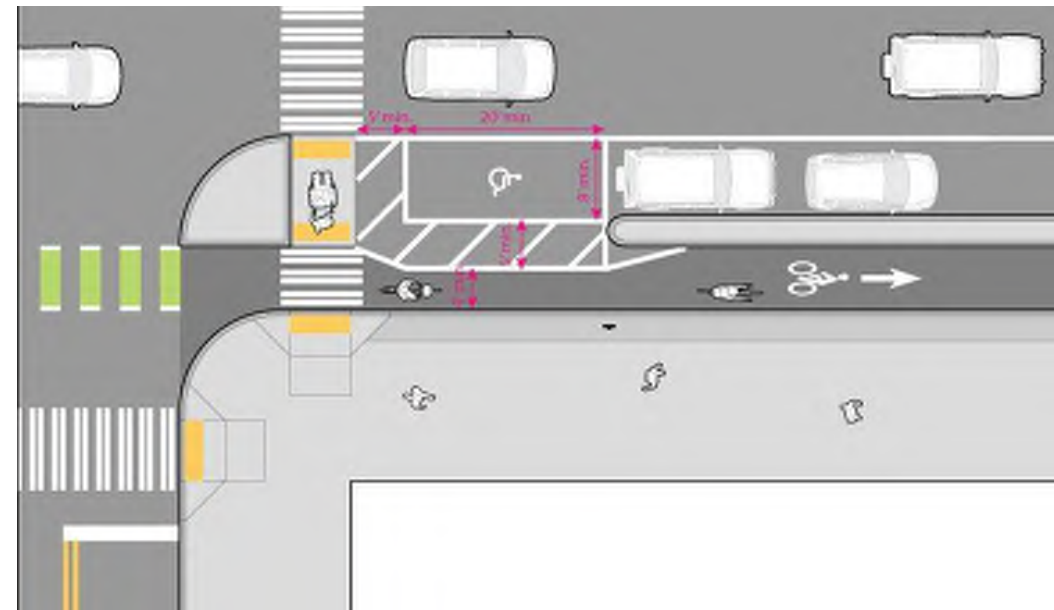
DESIGN FEATURES

| Whatcom Creek

2 Transit Boarding Island with at-grade bike lane



4 ADA Ramp configuration with parking protected bike lane



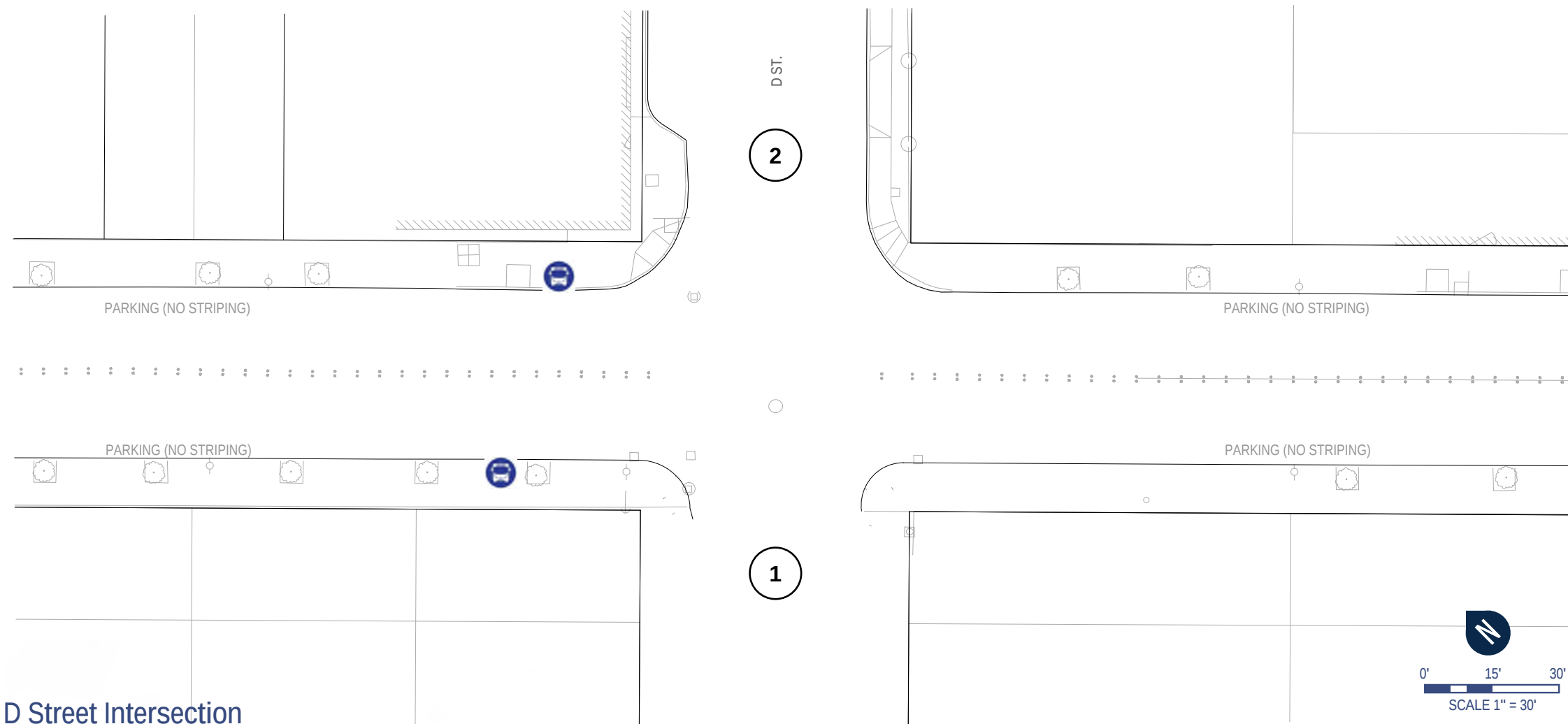
Streets Illustrated (City of Seattle)

3 Shared Transit Boarding Island with raised bike lane

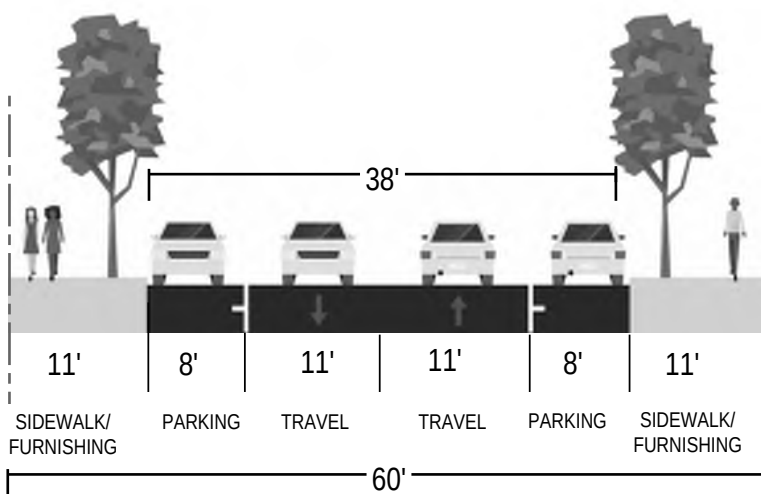


5. OLD TOWN | Bridge to F Street

EXISTING CONDITIONS | Old Town



D Street Intersection



Existing Street Section



Unimproved right-of-way south of Holly Street

- 2** Old Town Urban Village Streetscape Improvements
- Design is underway for streetscape improvements on C, D, and E Streets between Holly and Bancroft and along Astor Street between C and F Streets. Underground overhead power lines where feasible. Construction is anticipated to begin in Spring of 2026.

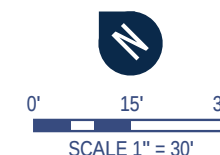
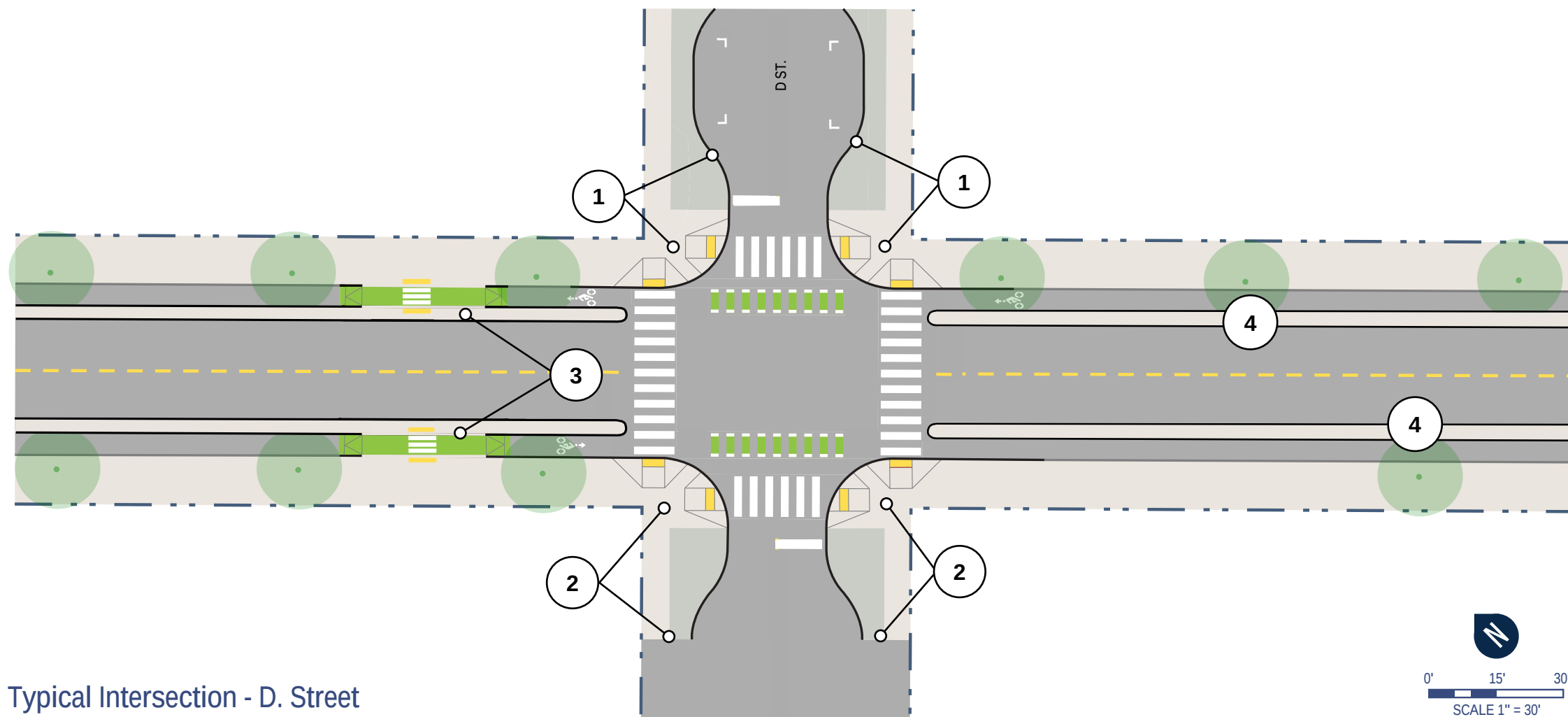
ALT 1: SEPARATED LANE WITH AT-GRADE INTERSECTION

| Old Town

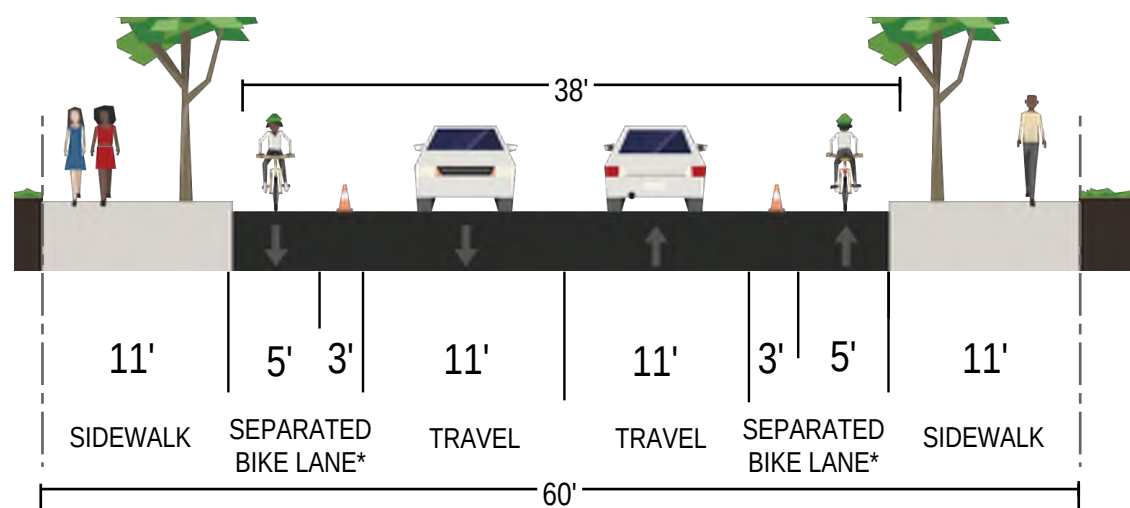


Design Features

Remove parking on both sides of Holly and replace with separated bike lanes.



Typical Intersection - D. Street



Typical Street Section

*Vertical separation options are shown on page 4.



Shared boarding area (Portland, OR)

ALT 2: SEPARATED LANE WITH RAISED INTERSECTION

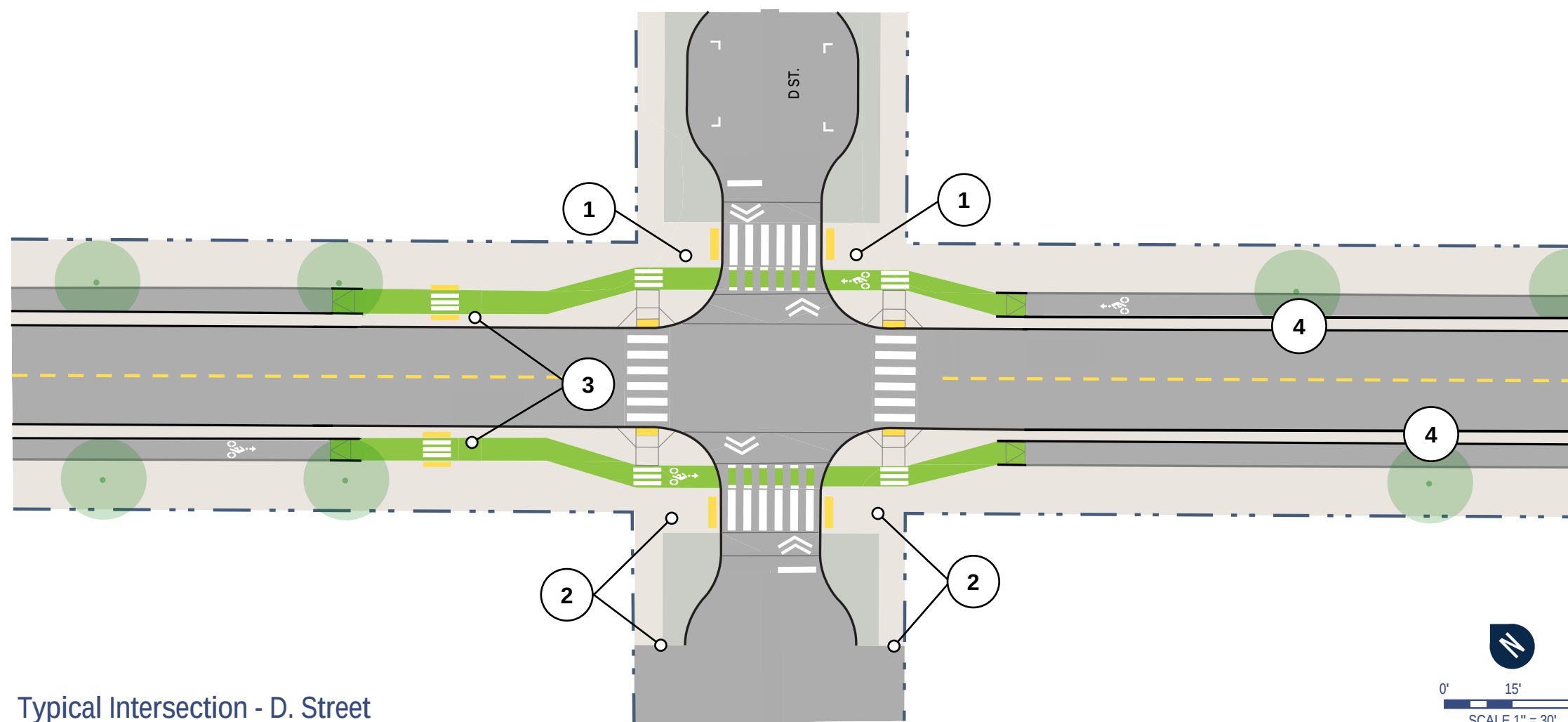
| Old Town

\$\$\$\$

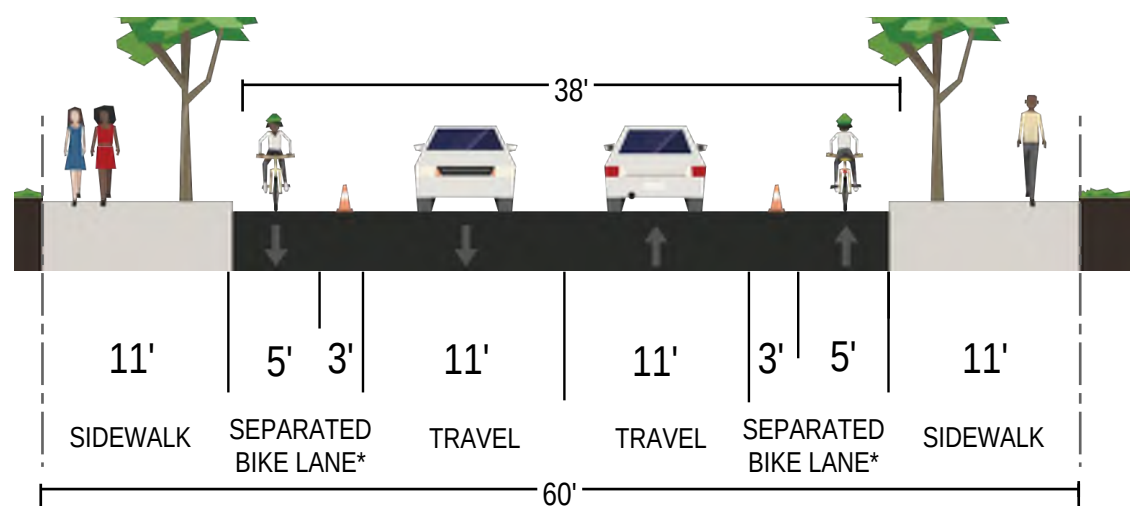
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Design Features

Remove parking on both sides of Holly and replace with separated bike lanes.



Typical Intersection - D. Street



Typical Street Section

*Vertical separation options are shown on page 4.



Raised crossbike and crosswalk (San Francisco, CA)

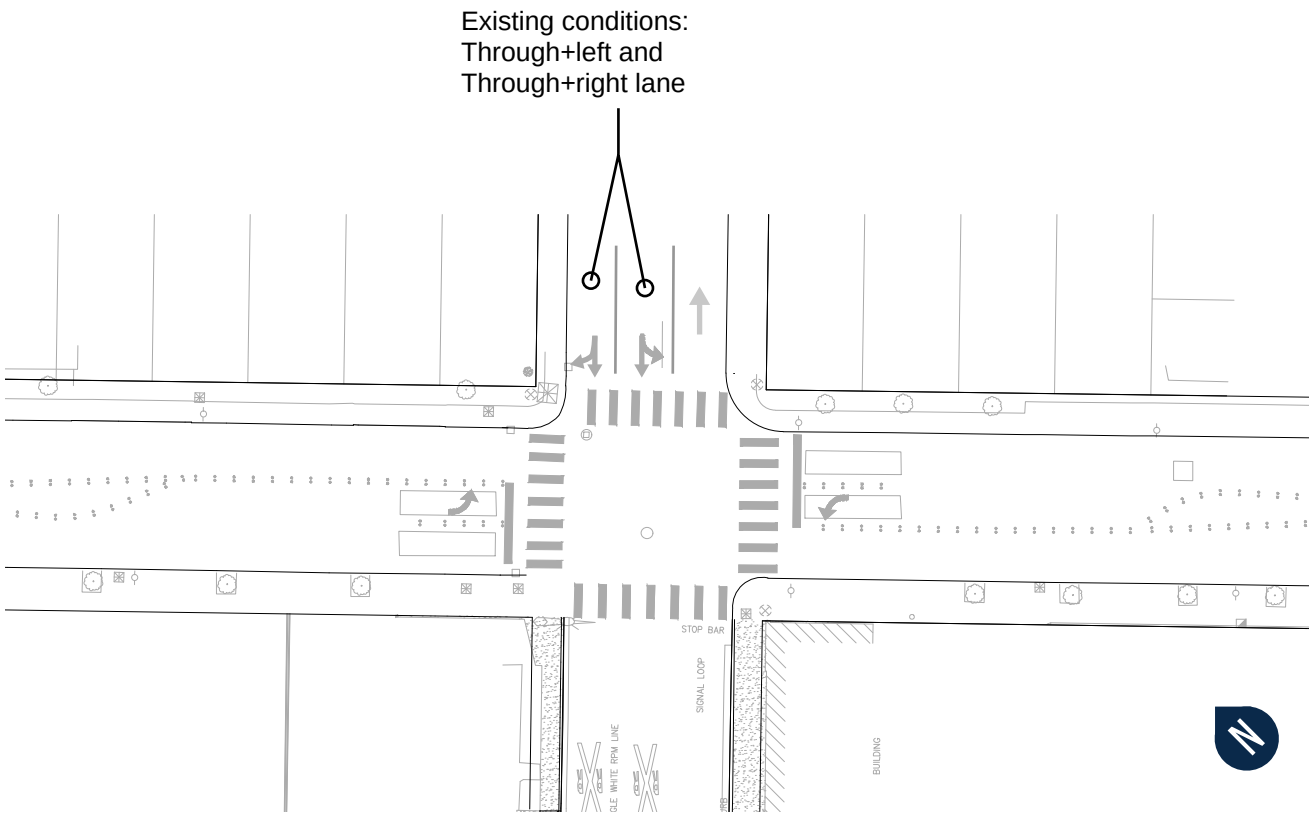
- 1 Raised Crossing (North side of intersection) Coordinate design with Old Town Streetscape Improvements .
- 2 Raised Crossing (South side of intersection) Similar to north side of street but transition from improvements to match existing unimproved right of way.
- 3 Shared Transit Boarding Island: Shared bike lane and boarding area configuration.
- 4 Separated Bike Lane: Eight-foot width for separated bike lane and buffer meets practical minimum but does not provide recommended width per 2024 AASHTO Bike Guide

6. WEST END | F Street to Broadway

F Street Intersection | Traffic Analysis

A change to signal operations is required to provide a bike facility through the intersection. Key recommendations, informed by the traffic modeling include:

- 1. Operational change to permissive lefts: for vehicles traveling eastbound and westbound on Holly.
- 2. Future operational change for adding bike facilities to F Street: Provide permissive lefts vehicles for traveling southwest on F Street, which will remove the through/left lane on F street.
- 3. Consider implementing bicycle video detection (e.g., Miovision or similar) that detects bicyclist presence and triggers a left-turn blank-out phase to improve bicyclists' comfort and safety through the intersection. In the future, a similar change to permissive left turns from F Street onto Holly Street will be required if the planned separated bicycle facilities on F Street (outside the scope of this project) are implemented.



Existing F Street Intersection

- Signalized with left turn pockets in both directions on Holly
- Through+left and through+right lane on SW approach on F Street

Preliminary Traffic Model Results

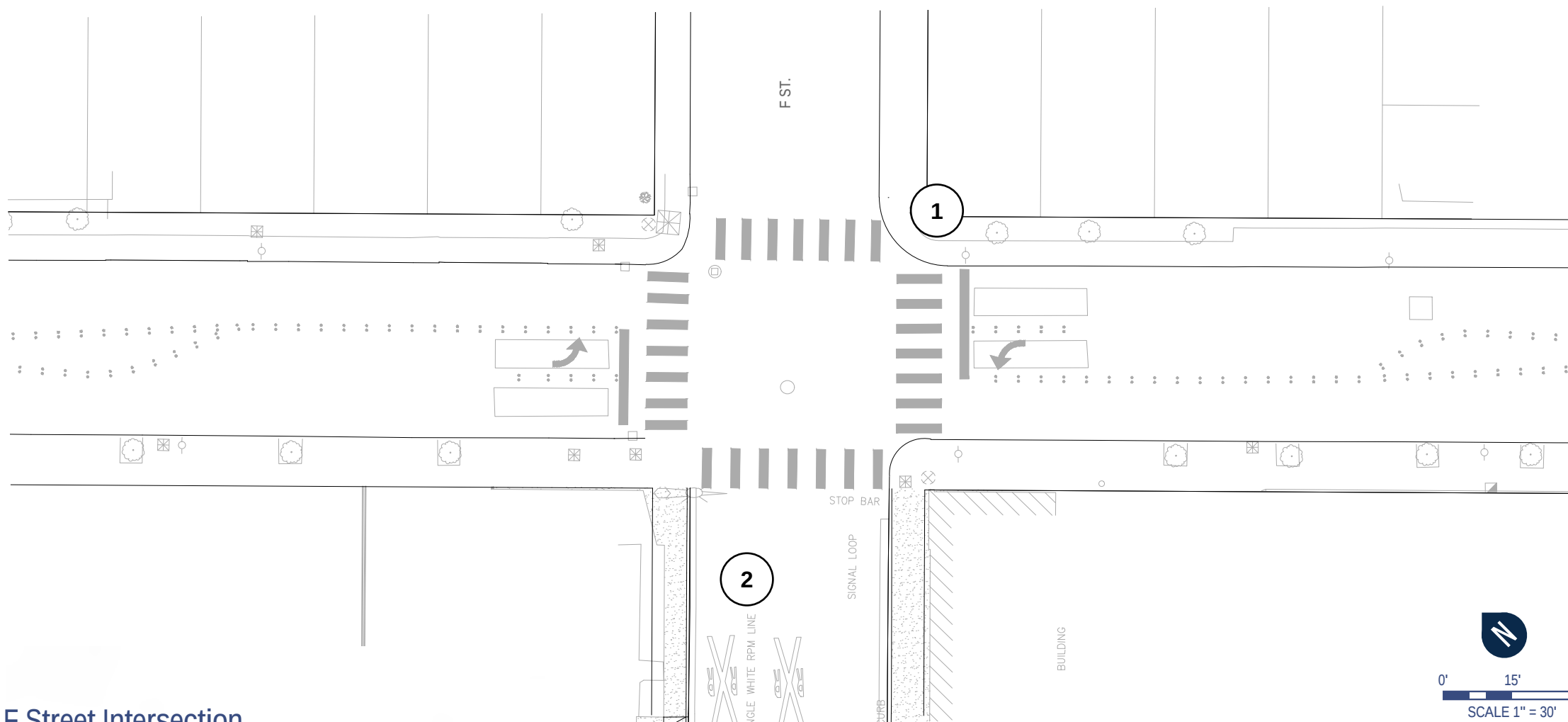
Queue lengths reported for Holly
(EB= eastbound vehicles, WB= westbound vehicles)

Note: Models 1 - 3 consider existing conditions on F Street. Modeling results 1-3 consider existing conditions on F Street. Results 4 and 5 include future bike facilities on F Street and the removal of the existing turn lane.

	Existing	2045
1. Restricted Left Turns Moves all lefts to through movement	LOS B Queues: ~330' (EB), ~290' (WB)	LOS B Queues: ~420' (EB), ~1630' (WB)
2. Permissive Lefts on Holly	LOS B Queues: ~440' (EB), ~480' (WB)	LOS C Queues: 1160' (EB), >2600' (WB)
3. Split Phasing on Holly	LOS E Queues: ~1970' (EB), ~1180 (WB)	LOS F Queues: >2600' (EB), >2600' (WB)
4. Restricted Left Turns on Holly, Permissive Lefts on F	LOS B Queues: ~430 (EB), ~300 (WB)	LOS B Queues: ~1200' (EB), ~1740' (WB)
5. Permissive Lefts on both Holly and F	LOS B Queues: ~740 (EB), ~620 (WB)	LOS C Queues: >2600' (EB), >2600' (WB)
6. Permissive Lefts on F, Split Phasing on Holly	LOS E Queues: 2380' (EB), ~1800' (WB)	LOS F Queues: >2600' (EB), >2600' (WB)

EXISTING CONDITIONS

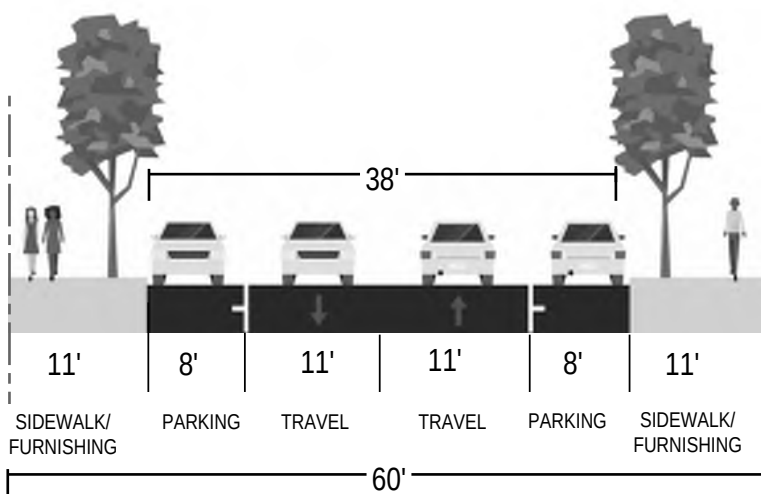
| West End



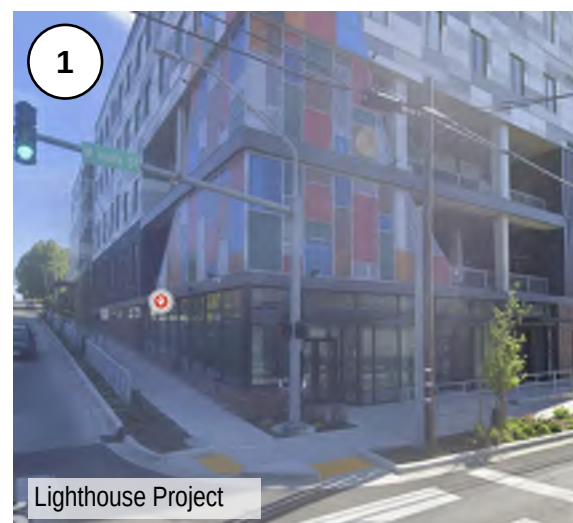
Existing Features

- 1 Lighthouse Mission Building
Recently constructed frontage and ADA ramp improvements
- 2 Queuing lanes for BNSF Railroad Crossing

F Street Intersection



Existing Street Section



ALT 1 - SEPARATED LANES WITH AT-GRADE INTERSECTION

| West End

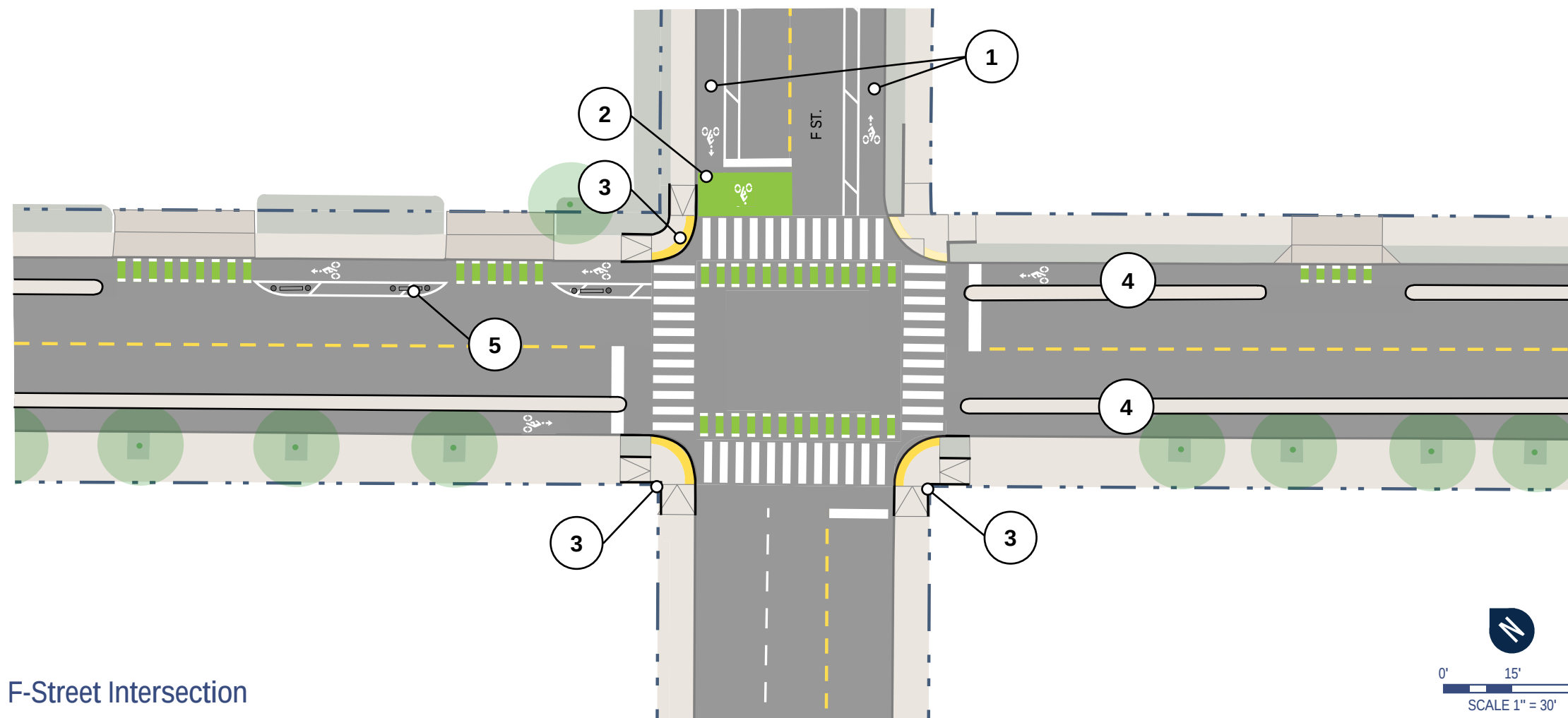
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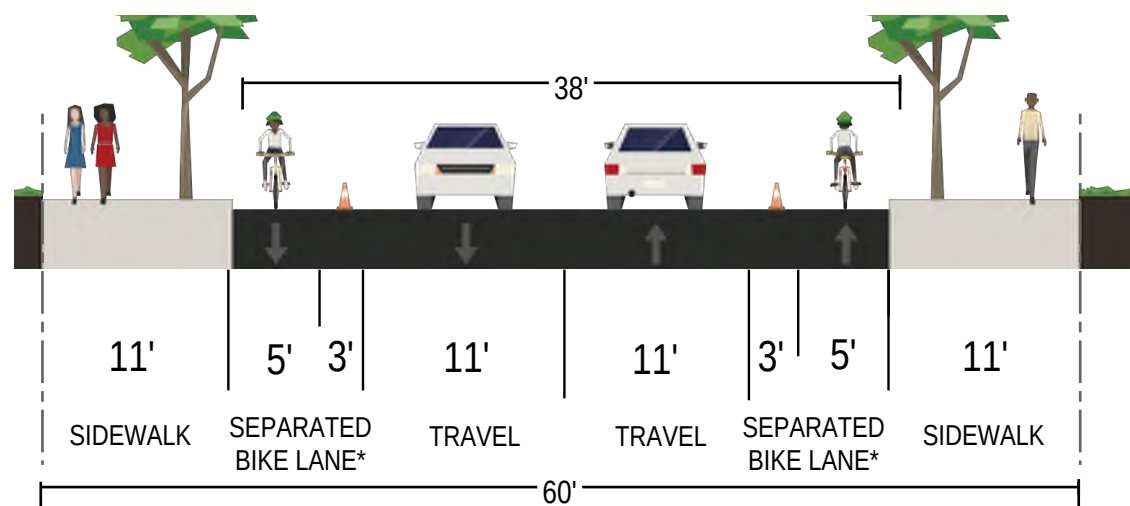
Design Features

Remove parking on both sides of Holly and replace with separated bike lanes.

- 1 Future separated bike lanes on F-Street
Plan for bike facilities, which eliminates turn lane on F-Street.
- 2 Bike Box
For southbound cyclists turning left or merging with through lanes across Holly.
- 3 ADA ramps
Parallel curb ramps on constrained corners
- 4 Separated Bike Lane: Eight-foot width for separated bike lane and buffer meets practical minimum but does not provide recommended width per 2024 AASHTO Bike Guide
- 5 Driveway and Alley Approaches
Maintain speed bumps and flex posts to slow right-turning vehicles across bike lane.



F-Street Intersection



Bike box on Ohio and Cornwall (Bellingham, WA)

Typical Street Section

*Vertical separation options are shown on page 4.



HOLLY STREET CORRIDOR BICYCLE FACILITY STUDY TRAFFIC ANALYSIS MEMORANDUM

DATE: April 21, 2026

TO: Maika Nicholson, Nathan Polanski | MIG

FROM: Nikki Davis, Wintana Miller, Ilana Burstein | DKS Associates

SUBJECT: Holly Street Corridor Bicycle Facility Study Project # P25597-000

INTRODUCTION

The purpose of this memorandum is to provide an overview of the traffic analysis performed along the Holly St corridor in support of the Holly St Bicycle Facility Study project. Traffic analysis of the Holly St corridor focused on four intersections along Holly St (Bay St, Champion St, F St, and Broadway) and the adjacent intersection of Champion St and Prospect St. Findings from these intersections will inform the design alternative of the following five segments from State St to Broadway:

- **Downtown** | State St to Bay St
- **Transition** | Bay St to Champion St
- **Whatcom Creek** | Champion St to Whatcom Creek bridge
- **Old Town** | Whatcom Creek bridge to F St
- **West End** | F St to Broadway

This analysis is centered on traffic operations during the PM peak period only, reflecting intersection conditions during the highest evening activity. Existing and future (2045) PM peak traffic conditions were analyzed using established growth rates of 1.5% based on the Whatcom Council of Governments (WCOG) travel demand model. Synchro and SimTraffic¹ were used to model multiple scenarios at each intersection, while SIDRA² was used for roundabout analysis. This memo is organized by intersection analyzed, presenting existing and projected future conditions for each.

¹ <https://www.cubic.com/transportation/products/intelligent-transportation-solutions/intersection-optimization/synchro-studio>

² <https://www.sidrasolutions.com/>

PROJECT BACKGROUND

The City of Bellingham and the consultant team developed and evaluated preliminary design alternatives to provide a safe, comfortable, and continuous bicycle lane along the Holly St corridor. In review of bicycle facility alternatives, roadway modifications and reconfigurations at key intersections were also reviewed. The following summarizes the traffic analysis results for each reviewed intersection and associated alternatives.

METHODOLOGY

EXISTING CONDITIONS

The consultant team utilized the City of Bellingham's existing downtown Synchro model and expanded it along Holly St and Roeder Ave for the PM peak period. The City provided signal timings and traffic counts for the additional intersections. This data was collected on either Wednesday, June 25, 2025 or Tuesday, July 1, 2025.

FUTURE CONDITIONS

The selection of 2045 as the future conditions target year aligns with Washington's Growth Management Act (GMA). The GMA requires jurisdictions to plan for a minimum 20-year growth horizon within their comprehensive plans, and the 2045 horizon year satisfies this statutory planning timeframe.

The Whatcom Council of Governments (WCOG) provided directional link volumes along Holly St for the 2023 baseline and the 2045 future travel demand models to develop the future forecast. A 1.5% compound annual growth rate was calculated using the models and confirmed with the City. Existing volumes were grown using this rate to forecast 2045 conditions.

ANALYSIS METHODOLOGY

To model traffic operations, the traffic modeling program Synchro 12 and SimTraffic 12 were used to determine traffic operations at signalized and stop-controlled intersections. Synchro results were reported based on HCM 7 methodologies for delay and level of service (LOS) where possible, and HCM 2000 methodology was used where HCM 7 could not be applied. For two-way stop-controlled intersections, intersection delay is reported as the movement with the highest delay.

Queue length results were reported using SimTraffic due to the interconnected network, closely spaced intersections, and to reflect the effects of queue spillbacks. SimTraffic simulations are stochastic, and the output of each simulation run will vary from run to run. For this analysis, a total of ten simulation runs were recorded for each scenario. Each simulation run included 10 minutes of seeding time to populate the model (not recorded), and one hour of recorded simulation output. Outputs from the ten runs were then combined to report the 95th percentile queue length.

The traffic modeling program SIDRA 10, using WSDOT model settings, was used to determine roundabout intersection future operations.



For the 2045 future conditions analysis, SimTraffic models were developed to isolate each study intersection by alternative, including the immediately adjacent intersections, to allow the full forecasted traffic demand to pass through the study area while still capturing signal platooning. This approach differs from the existing conditions analysis, which is based on the full downtown network model. Accordingly, the reported 95th percentile queue lengths for 2045 conditions are provided for completeness only and were not a primary factor in alternative selection, given the uncertainty in long-term growth rate assumptions and the potential for changes in traffic routing patterns. For decision-making purposes, greater emphasis is placed on existing conditions performance (delays and queues) with consideration of forecasted 2045 delay to inform potential phasing of improvements.

ALTERNATIVES ANALYSIS

This section summarizes the alternatives evaluated for key intersections along Holly St from Bay St to Broadway and presents modeling results for both existing and future 2045 conditions.

DOWNTOWN AND TRANSITION

To ensure acceptable travel times and maintain safe and efficient corridor operations, key intersections and roadway reconfiguration concepts were evaluated. Alternatives were developed to address projected operational constraints, ensure acceptable existing condition operations, and evaluate potential delay impacts under future 2045 traffic conditions, while enhancing overall multimodal safety and performance.

Currently, Holly St operates as a one-way westbound corridor from Ellis St to Bay St and transitions to a two-way corridor at Bay St, including the segment between Bay St and Champion St. The traffic analysis evaluated multiple scenarios with different operational assumptions for this Bay St to Champion St segment, including both one-way and two-way configurations.

Scenarios involving Holly St one-way westbound operations to Champion St require rerouting existing eastbound & westbound traffic.

Eastbound through vehicles (186 in existing conditions and 250 in 2045 conditions) are assumed to follow a looped route via Champion St, Prospect St, and Bay St to reach their destination. Figure 1 illustrates these movements, with solid lines representing existing routes and dashed lines representing rerouted paths.

To mitigate right-hook conflicts at the Holly St / Champion St intersection, the affected movements have been eliminated, as illustrated in Figure 2. Solid lines denote existing routes, and dashed lines denote rerouted paths.

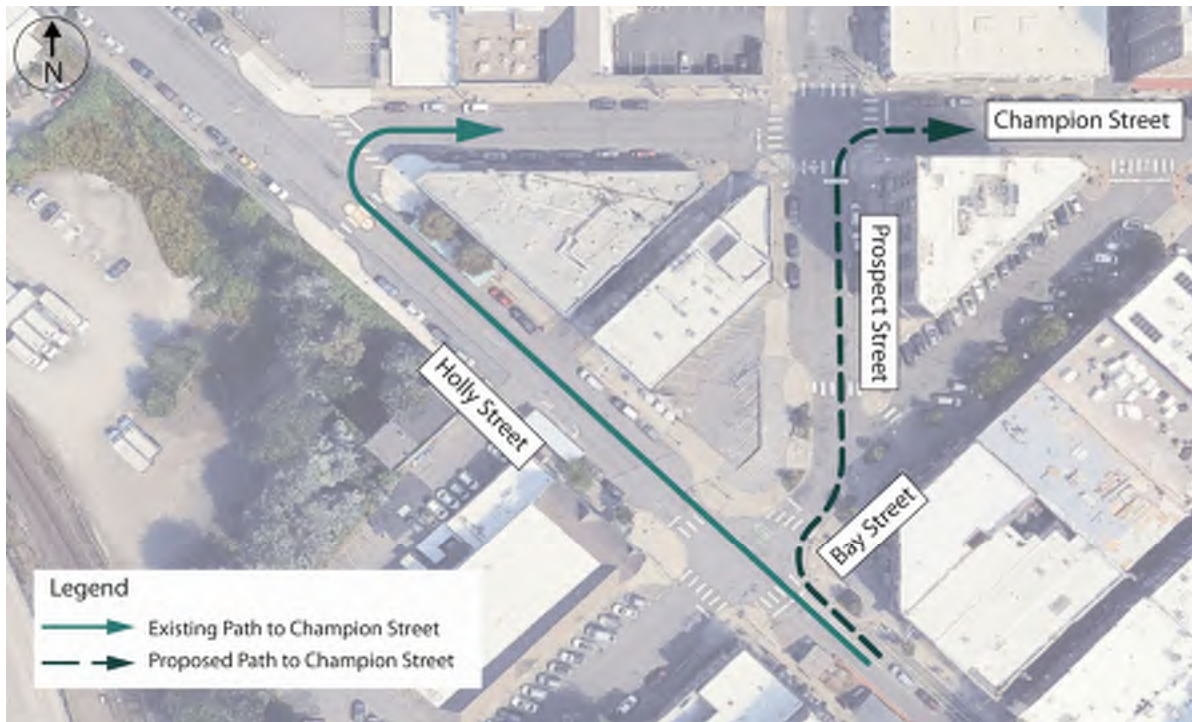


FIGURE 1. REROUTED WESTBOUND VEHICLE PATH DUE TO RIGHT TURN RESTRICTION AT CHAMPION ST



FIGURE 2. REROUTED EASTBOUND VEHICLE PATH DUE TO ONE-WAY WESTBOUND OPERATIONS ON HOLLY ST

Under both the two-way and one-way operations scenarios, westbound right turns at Holly St / Champion St were prohibited as a conservative modeling assumption to eliminate potential right-hook conflicts. These vehicles (7 vehicles in existing conditions and 9 vehicles in future conditions) were rerouted to make their westbound right turn at Holly St / Bay St instead.

HOLLY ST / BAY ST

Model scenarios at this intersection are driven by the need to accommodate a westbound bicycle signal phase and remove a westbound turn pocket along Holly St in order to continue the separated bike facility through the Holly St / Bay St intersection. The existing Holly St / Bay St intersection includes a westbound left-turn pocket, a westbound through lane, and a westbound right-turn lane, an eastbound right-turn lane, a northbound shared left / through lane and a southbound shared through / right lane. The two- phase signal operates with permissive left turns on all approaches, while the eastbound right turn is stop-controlled. On-street parking exists on both sides of Holly St.

Two alternatives were evaluated to accommodate buffered or separated bicycle lanes, each incorporating a westbound bicycle signal phase due to heavy westbound right-turn vehicle volumes. The addition of this phase required an increase in the signal cycle length from the existing 64 seconds to 72 seconds to meet minimum phase timing requirements. The downtown corridor operates as a coordinated pretimed network with the same cycle length; therefore, all pretimed intersections within the network were adjusted to a 72-second cycle length to maintain coordination and progression.

Alternatives Considered

1. Shared westbound left / through lane and right-turn lane: This alternative evaluates adding a westbound bicycle signal phase for a three-phase signal, where the bicycle phase runs concurrently with the westbound left and through movements:



- Phase 1: Bicycle movement runs concurrently with westbound left and through vehicles.
- Phase 2: Westbound right-turn movement receives a protected phase and runs concurrently with westbound left and through vehicles.
- Phase 3: Northbound and southbound movements operate together.

Due to lane alignment associated with this channelization alternative, only one-way traffic between Champion St and Bay St was analyzed.



2. Westbound left-turn lane and shared through / right lane: This alternative evaluates adding a westbound bicycle signal phase for a three-phase signal, where the bicycle phase cannot run concurrently with any westbound vehicle movements:

- Phase 1: All westbound vehicle movements operate together in a protected phase.
- Phase 2: Bicycle movements operate alone in a protected phase.
- Phase 3: Northbound and southbound movements operate together.

This phasing is necessary because through and right-turn movements share a lane and cannot run concurrently with the bicycle phase. This alternative was analyzed for both two-way traffic and one-way traffic between Champion St and Bay St.

Modeling Results

The results show that the shared westbound left / through lane and right-turn lane alternative, assuming one-way operations to Champion St, provides better operations than the alternatives with a westbound left-turn lane and shared through / right lane. However, the City has expressed concern that the projected queue lengths would be longer than those observed under existing conditions. In the shared through / right lane scenarios, the bicycle phase must operate separately with all vehicles stopped, leading to high delays and queues over 2,600 feet long in existing conditions, extending past the Ellis St intersection.

Combining the westbound left and through movements enables the highest-demand movements to operate concurrently with the bicycle phase, improving overall intersection efficiency. Because the bicycle phase only conflicts with right-turning vehicles in this configuration, it can run longer without increasing delays.

Table 1 shows the intersection level of service and queue lengths approaching Holly St (the movement with the highest queue length) for both alternatives in the existing and 2045 models.

TABLE 1: HOLLY ST / BAY ST MODELING RESULTS

	INTERSECTION CONTROL ALTERNATIVE	
	SHARED WESTBOUND LEFT / THROUGH LANE AND RIGHT-TURN LANE *	
HOLLY ST ONE WAY TRAVEL LANES TO CHAMPION ST		
EXISTING CONDITIONS MODEL		
INTERSECTION DELAY (SEC) / LOS 26.0 / C	EASTBOUND QUEUE LENGTH (FT) N/A	WESTBOUND QUEUE LENGTH (FT) 204
2045 MODEL		
INTERSECTION DELAY (SEC) / LOS 59.3 / E	EASTBOUND QUEUE LENGTH (FT) N/A	WESTBOUND QUEUE LENGTH (FT) >2600

* Values = HCM 2000 Methodology

	INTERSECTION CONTROL ALTERNATIVE	
	WESTBOUND LEFT-TURN LANE AND SHARED THROUGH / RIGHT LANE *	
HOLLY ST ONE WAY TRAVEL LANES TO CHAMPION ST		
EXISTING CONDITIONS MODEL		
INTERSECTION DELAY (SEC) / LOS 277.4 / F	EASTBOUND QUEUE LENGTH (FT) N/A	WESTBOUND QUEUE LENGTH (FT) >2600
2045 MODEL		
INTERSECTION DELAY (SEC) / LOS 458.7 / F	EASTBOUND QUEUE LENGTH (FT) N/A	WESTBOUND QUEUE LENGTH (FT) >2600

* Values = HCM 2000 Methodology

 INTERSECTION CONTROL ALTERNATIVE WESTBOUND LEFT-TURN LANE AND SHARED THROUGH / RIGHT LANE *		
HOLLY ST TWO-WAY TRAVEL LANES MAINTAINED TO CHAMPION ST		
EXISTING CONDITIONS MODEL		
INTERSECTION DELAY (SEC) / LOS 269.3 / F	EASTBOUND QUEUE LENGTH (FT) 146	WESTBOUND QUEUE LENGTH (FT) >2600
2045 MODEL		
INTERSECTION DELAY (SEC) / LOS 426.7 / F	EASTBOUND QUEUE LENGTH (FT) 317	WESTBOUND QUEUE LENGTH (FT) >2600

* Values = HCM 2000 Methodology

PROSPECT ST / CHAMPION ST



Model scenarios at this intersection evaluate diverting the bicycle route from Holly St to Champion St via Prospect St to avoid the need for a bicycle-only signal phase at Holly St / Bay St. The existing Prospect St / Champion St intersection is a four-legged signalized intersection, with each approach providing a single shared lane for through, left-turn, and right-turn movements.

Alternatives evaluated at this intersection include all-way stop control, signalization with bicycle phasing, and a bicycle scramble to improve safety in response to the proposed separated or shared bicycle lanes on Holly St.

While Holly St currently operates as a two-way street, this analysis assumes one-way westbound operation to Champion St as a more conservative modeling approach; therefore, all eastbound through vehicles are rerouted to an eastbound left turn at Champion St, as shown in Figure 2.

All alternatives assume a shared westbound left/through lane and right-turn lane configuration, Holly St one-way operation to Champion St, and no bicycle phase at the adjacent Holly St / Bay St intersection.

The signalized alternatives were analyzed using a 72-second cycle length across the pre-timed downtown network to accommodate bicycle phasing.

Alternative Considerations:



1. All-Way Stop Control (AWSC): This alternative converts the signalized intersection control to an all-way stop intersection control.



2. Signalization with Bicycle Phasing: This alternative adds a dedicated bicycle phase to accommodate north / south bound and left-turn bicycle movements through the intersection.



3. Bicycle Scramble: This alternative evaluates a signal phase during which all motor vehicle movements are stopped, allowing bicyclists (as well as pedestrians) to cross the intersection in any direction.

Modeling Results

Table 2 presents the intersection level of service and queue lengths for the three alternatives at Prospect St / Champion St under existing and 2045 conditions. Table 3 presents level of service and queue lengths results for the adjacent Holly St / Bay St intersection.

The Prospect St / Champion St AWSC alternative operates well with relatively short queue lengths across all approaches under existing conditions. Under 2045 conditions, operations are expected to degrade, resulting in higher delays.

The signalized alternative with a bicycle phase results in increased intersection delay under existing conditions compared to the AWSC condition, with longer eastbound and southbound queue lengths. While operations remain acceptable under existing conditions, this alternative performs poorly under 2045 conditions.

The bicycle scramble alternative results in the highest delay under existing conditions and therefore, was not analyzed further.

The Holly St / Bay St intersection operates adequately under both existing and 2045 conditions, with reasonable queue lengths under existing conditions assuming a 72-second signal cycle and no bicycle phase.

TABLE 2: PROSPECT ST / CHAMPION ST MODELING RESULTS

 INTERSECTION CONTROL ALTERNATIVE ALL-WAY STOP CONTROL (AWSC) *				
HOLLY ST ONE WAY TRAVEL LANES TO CHAMPION ST				
EXISTING CONDITIONS MODEL				
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)	NORTHBOUND QUEUE LENGTH (FT)	SOUTHBOUND QUEUE LENGTH (FT)
15.0 / B	115	68	105	126
2045 MODEL				
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)	NORTHBOUND QUEUE LENGTH (FT)	SOUTHBOUND QUEUE LENGTH (FT)
39.0 / E	5273	96	1317	3805

* Values = HCM 2000 Methodology

 INTERSECTION CONTROL ALTERNATIVE BICYCLE PHASE (72 SEC CYCLE) *				
HOLLY ST ONE WAY TRAVEL LANES TO CHAMPION ST				
EXISTING CONDITIONS MODEL				
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)	NORTHBOUND QUEUE LENGTH (FT)	SOUTHBOUND QUEUE LENGTH (FT)
37.1 / D	261	78	144	293
2045 MODEL				
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)	NORTHBOUND QUEUE LENGTH (FT)	SOUTHBOUND QUEUE LENGTH (FT)
96.6 / F	5787	137	1122	3827

* Values = HCM 2000 Methodology

 INTERSECTION CONTROL ALTERNATIVE BICYCLE SCRAMBLE (72 SEC CYCLE) *				
HOLLY ST ONE WAY TRAVEL LANES TO CHAMPION ST				
EXISTING CONDITIONS MODEL				
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)	NORTHBOUND QUEUE LENGTH (FT)	SOUTHBOUND QUEUE LENGTH (FT)
108.9 / F	N/A	N/A	N/A	N/A

* Values = HCM 2000 Methodology

TABLE 3: HOLLY ST / BAY ST | 72 SECOND CYCLE MODELING RESULTS (NO BIKE PHASE)

 INTERSECTION CONTROL ALTERNATIVE LEFT/THROUGH & RIGHT (72 SEC CYCLE) *			
HOLLY ST ONE WAY TRAVEL LANES TO CHAMPION ST			
EXISTING CONDITIONS MODEL			
INTERSECTION DELAY (SEC) / LOS	WESTBOUND QUEUE LENGTH (FT)	NORTHBOUND QUEUE LENGTH (FT)	SOUTHBOUND QUEUE LENGTH (FT)
16.2 / B	105	116	89
2045 MODEL			
INTERSECTION DELAY (SEC) / LOS	WESTBOUND QUEUE LENGTH (FT)	NORTHBOUND QUEUE LENGTH (FT)	SOUTHBOUND QUEUE LENGTH (FT)
44.7 / D	926	100	4023

* Values = HCM 2000 Methodology

HOLLY ST / CHAMPION ST

Model scenarios at this intersection focus on evaluating stop control, signalization, and roundabout options to improve safety in response to the proposed separated or buffered bicycle lanes.



The existing Holly St / Champion St intersection is a three-legged, two-way intersection with a westbound shared through / right lane, an eastbound left-turn pocket and through lane, and a southbound shared left / right-turn lane. It

currently operates as one-way stop-controlled intersection, with a southbound stop on Champion St. On-street parking exists on both sides of Holly St.

Based on the evaluation of Holly St / Bay St, only one-way operations from Bay St to Champion St were evaluated at this intersection. These alternatives assume westbound right turns are prohibited, with all right-turning vehicles rerouted to the Holly St / Bay St intersection. All westbound through vehicles are rerouted to a westbound left turn at Champion St as shown in Table 1.

Alternatives Considered



1. One-Way Stop-Control Southbound on Champion St: This alternative maintains the one-way stop on Champion St, allowing free operations for eastbound and westbound Holly St.



2. One-Way Stop-Control Westbound on Holly St: This alternative moves the one-way stop onto westbound Holly St, allowing free operations for the eastbound left from Holly St and the southbound right from Champion St.



3. Two-Way Stop-Control: This alternative converts the intersection to a two-way stop with an eastbound stop on Holly St and a southbound stop on Champion St, allowing free operations for westbound Holly St.



4. All-Way Stop-Control (AWSC): This alternative converts the intersection to an all-way stop.



5. Signal Control: This alternative converts the intersection to a two-phase signal, with westbound Holly St as one phase and eastbound Holly St and southbound Champion St running concurrently as the other phase.



6. Roundabout: This alternative converts the intersection to a roundabout.
Note: The traffic modeling analysis assumes a 90-foot diameter roundabout per City Standards and does not account for existing right-of-way constraints.

Modeling Results

Table 4 shows the intersection level of service and queue lengths approaching Holly St (the movement with the highest queue length) for the six alternatives under existing and 2045 conditions.

The results show that the one-way stop control on Champion St performs adequately in existing and future 2045 conditions with acceptable queues in existing conditions. However, the one-way stop control on westbound Holly St experiences high delays with long westbound queue lengths in existing conditions and higher delays in future 2045 conditions.

The two-way stop-control alternative shows very high intersection delay values under both existing and 2045 conditions when evaluated using Synchro. However, these delay results are not considered representative of expected operations at this location. Synchro's HCM-based delay methodology does not account for platooning created by the upstream Bay St signal, which influences gap availability on Holly St.

SimTraffic modeling, which captures platooning and upstream signal coordination, indicates that the Bay St signal breaks up westbound vehicle platoons and provides gaps for stop-controlled movements to enter the intersection. Under existing conditions, this results in short and acceptable queue lengths on Holly St, suggesting acceptable operational performance for the two-way stop control alternative despite the inflated Synchro delay values. Because this limitation affects both existing and 2045 Synchro delay outputs for the two-way stop control alternative, existing condition queue lengths from SimTraffic are considered the most reliable performance measure for this specific alternative.

An all-way stop balances queue lengths across all approaches, improving overall traffic flow and minimizing delays for travelers entering and exiting downtown in existing conditions. However, 95th percentile queues do extend to Bay St and by 2045, conditions degrade, resulting in higher delays.

A signalized intersection performs well in existing and future 2045 conditions with balanced queues in existing conditions. The signal helps reduce blockage of side-street traffic by breaking up vehicle platoons that otherwise form under stop control.

The 90-foot inscribed diameter roundabout performs well under both existing and 2045 conditions. The roundabout operates below capacity (a volume-to-capacity ratio of 0.60 in existing conditions and 0.70 in future conditions), with low delays and LOS A for all approaches. Under 2045 volumes, queues approach but remain short of the Bay St intersection during peak times.

TABLE 4: HOLLY ST / CHAMPION ST MODELING RESULTS FOR ONE-WAY TRAFFIC

	INTERSECTION CONTROL ALTERNATIVE	
ONE-WAY STOP CONTROL SOUTHBOUND ON CHAMPION ST		
HOLLY ST ONE-WAY TRAVEL LANES TO CHAMPION ST		
EXISTING CONDITIONS MODEL		
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
13.5 / B	161	7
2045 MODEL		
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
17.4 / C	2037	16

	INTERSECTION CONTROL ALTERNATIVE	
ONE-WAY STOP CONTROL WESTBOUND ON HOLLY ST*		
HOLLY ST ONE-WAY TRAVEL LANES TO CHAMPION ST		
EXISTING CONDITIONS MODEL		
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
64.2 / F	9	1523
2045 MODEL		
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
272.6 / F	2321	>2600

* Values = HCM 2000 Methodology

	INTERSECTION CONTROL ALTERNATIVE	
	TWO-WAY STOP CONTROL*¹	
HOLLY ST ONE-WAY TRAVEL LANES TO CHAMPION ST		
EXISTING CONDITIONS MODEL		
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
797.4 / F	202	0
2045 MODEL		
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
>800 / F (Synchro shows an error)	2432	0

* Values = HCM 2000 Methodology

¹ Synchro delay for the two-way stop-control alternative is not representative of expected operations because Synchro's HCM methodology does not capture upstream signal platooning. Existing condition SimTraffic queue lengths are considered the most reliable performance measure for this alternative.

	INTERSECTION CONTROL ALTERNATIVE	
	ALL-WAY STOP CONTROL	
HOLLY ST ONE-WAY TRAVEL LANES TO CHAMPION ST		
EXISTING CONDITIONS MODEL		
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
15.8 / C	149	300
2045 MODEL		
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
39.8 / E	2004	>2600



INTERSECTION CONTROL ALTERNATIVE

SIGNAL CONTROL*

HOLLY ST ONE-WAY TRAVEL LANES TO CHAMPION ST

EXISTING CONDITIONS MODEL

INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
20.0 / C	236	209

2045 MODEL

INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
29.7 / C	2209	208

* Values = HCM 2000 Methodology



INTERSECTION CONTROL ALTERNATIVE

ROUNDAABOUT

HOLLY ST ONE-WAY TRAVEL LANES TO CHAMPION ST

EXISTING CONDITIONS MODEL

INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
5.4 / A	0	121

2045 MODEL

INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
7.8 / A	0	247

WHATCOM CREEK

Pairing C St and Central Ave as a one-way couplet between Holly St and Roeder Ave was discussed, with C St becoming one-way southbound and Central Ave one-way northbound and rerouting respective traffic. This concept was not modeled because it was determined to offer no traffic operations advantage and did not help in achieving project goals.

OLD TOWN

HOLLY ST / F ST

Model scenarios at this intersection are driven by the proposed removal of left-turn lanes along Holly St to provide a bicycle facility through the intersection and the resulting changes to signal operations required. The existing intersection includes a left-turn pocket and a shared through / right lane for the eastbound, westbound, and southbound approaches. The northbound approach has a shared left / through / right lane. The signal operates with permissive left turns on all approaches and includes on-street parking along both sides of the street.

Three alternatives were evaluated to accommodate separated bicycle lanes. In addition, future conditions assume removal of left-turn lanes on F St associated with future bicycle facilities. Each alternative was modeled with both current and future F St configurations.

Alternatives Considered



1. Prohibited left turns: This alternative removes Holly St left-turn pockets and reroutes left-turning traffic through the through lanes.



2. Permissive left turns: This alternative removes Holly St left-turn pockets and allows permissive left-turn operations from the shared through / left lane.



3. Split phasing: This alternative removes Holly St left-turn pockets and provides split phase operations.

Modeling Results

Table 5 shows the intersection level of service and queue lengths approaching Holly St (the movement with the highest queue length) for the three alternatives under existing and 2045 conditions, with and without the left turn lane on F St.

Both the prohibited left-turn and permissive left-turn alternatives operate well under existing and future conditions. These alternatives maintain balanced traffic operations in both existing and 2045

conditions, with reasonable queues under existing conditions despite the removal of the designated left-turn lanes on F St. However, the prohibited left-turn alternative may redistribute traffic and affect operations at adjacent intersections. The split phasing alternative results in high delays and long queues. Results are similar between current and future F St configurations assuming signal timing remains the same, indicating that removal of the left-turn lane on F St does not degrade future intersection performance.

TABLE 5: HOLLY ST / F ST MODELING RESULTS

	INTERSECTION CONTROL ALTERNATIVE	
	PROHIBITED LEFT TURNS ON HOLLY ST	
EXISTING LEFT TURN LANE ON F ST		
EXISTING CONDITIONS MODEL		
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
14.7 / B	326	290
2045 MODEL		
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
19.7 / B	413	1623

	INTERSECTION CONTROL ALTERNATIVE PERMISSIVE LEFT TURNS ON HOLLY ST	
EXISTING LEFT TURN LANE ON F ST		
EXISTING CONDITIONS MODEL		
INTERSECTION DELAY (SEC) / LOS 14.7 / B	EASTBOUND QUEUE LENGTH (FT) 437	WESTBOUND QUEUE LENGTH (FT) 482
2045 MODEL		
INTERSECTION DELAY (SEC) / LOS 21.0 / C	EASTBOUND QUEUE LENGTH (FT) 1162	WESTBOUND QUEUE LENGTH (FT) >2600

	INTERSECTION CONTROL ALTERNATIVE SPLIT PHASING ON HOLLY ST	
EXISTING LEFT TURN LANE ON F ST		
EXISTING CONDITIONS MODEL		
INTERSECTION DELAY (SEC) / LOS 64.4 / E	EASTBOUND QUEUE LENGTH (FT) 1969	WESTBOUND QUEUE LENGTH (FT) 1176
2045 MODEL		
INTERSECTION DELAY (SEC) / LOS 162.7 / F	EASTBOUND QUEUE LENGTH (FT) >2600	WESTBOUND QUEUE LENGTH (FT) >2600

	INTERSECTION CONTROL ALTERNATIVE	
	PROHIBITED LEFT TURNS ON HOLLY ST	
REMOVAL OF LEFT TURN LANE ON F ST		
EXISTING CONDITIONS MODEL		
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
15.0 / B	431	294
2045 MODEL		
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
19.7 / B	1202	1744

	INTERSECTION CONTROL ALTERNATIVE	
	PERMISSIVE LEFT TURNS ON HOLLY ST	
REMOVAL OF LEFT TURN LANE ON F ST		
EXISTING CONDITIONS MODEL		
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
15.0 / B	741	619
2045 MODEL		
INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
21.2 / C	>2600	>2600

 INTERSECTION CONTROL ALTERNATIVE SPLIT PHASING ON HOLLY ST		
REMOVAL OF LEFT TURN LANE ON F ST		
EXISTING CONDITIONS MODEL		
INTERSECTION DELAY (SEC) / LOS 63.9 / E	EASTBOUND QUEUE LENGTH (FT) 2374	WESTBOUND QUEUE LENGTH (FT) 1805
2045 MODEL		
INTERSECTION DELAY (SEC) / LOS 168.9 / F	EASTBOUND QUEUE LENGTH (FT) >2600	WESTBOUND QUEUE LENGTH (FT) >2600

WEST END

HOLLY ST / BROADWAY

The existing intersection has a shared left / through / right lane for all approaches except southbound, which has a left-turn pocket and a shared through / right lane. The signal operates with permissive left turns on all approaches, and on-street parking exists east of the intersection.

Two alternatives were evaluated to accommodate separated bicycle lanes.

Alternatives Considered



1. Permissive left turns: This alternative maintains existing channelization and signal operations, keeping permissive left turns on Holly St.



2. Split phasing: This alternative applies split phasing operations on Holly St with no changes to channelization.

Modeling Results

Table 6 shows the intersection level of service and queue lengths approaching Holly St (the movement with the highest queue length) for both alternatives under existing and 2045 conditions. The permissive left-turn alternative performs well under both existing and 2045 conditions with relatively short queue lengths in existing conditions. The split-phasing alternative performs poorly, with high delays and long queues under both scenarios.

TABLE 6: HOLLY ST / BROADWAY MODELING RESULTS

	INTERSECTION CONTROL ALTERNATIVE PERMISSIVE LEFT TURNS *	
EXISTING CONDITIONS MODEL		
INTERSECTION DELAY (SEC) / LOS 9.5 / A	EASTBOUND QUEUE LENGTH (FT) 618	WESTBOUND QUEUE LENGTH (FT) 291
2045 MODEL		
INTERSECTION DELAY (SEC) / LOS 15.8 / B	EASTBOUND QUEUE LENGTH (FT) >2600	WESTBOUND QUEUE LENGTH (FT) 591

* Values = HCM 2000 Methodology



INTERSECTION CONTROL ALTERNATIVE

SPLIT PHASING *

EXISTING CONDITIONS MODEL

INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
47.3 / D	532	852

2045 MODEL

INTERSECTION DELAY (SEC) / LOS	EASTBOUND QUEUE LENGTH (FT)	WESTBOUND QUEUE LENGTH (FT)
109.9 / F	2275	>2600

* Values = HCM 2000 Methodology

KEY FINDINGS

The traffic analysis summarized intersection operations along the Holly St corridor at key study locations, including Bay St, Champion St, F St, and Broadway, as well as the adjacent intersection of Prospects St / Champion St. Multiple alternatives were evaluated to accommodate separated or buffered bicycle lanes, including adjustments to turn lanes, channelization, intersection control, and signalized operations. These findings will inform the evaluation of the preliminary alternatives for the Holly St Bicycle Facility Study and are summarized in Table 7.

TABLE 7: SUMMARY OF MODELING RESULTS

INTERSECTION	BETTER-PERFORMING ALTERNATIVES	LOWER-PERFORMING ALTERNATIVES	SUMMARY
Holly St / Bay St	One-way with shared left / through and separate right turn lane	Two-way or one-way with westbound left-turn lane and shared through / right lane	Shared through / right lane results in high delays and long queues, while the shared left / through lane improves overall efficiency.
<i>Note: The City noted that incorporating a dedicated bicycle phase under the better-performing Holly St / Bay St configuration increases queue lengths, raising concerns for westbound traffic exiting downtown.</i>			
Prospect St / Champion St	- All-Way Stop - Bicycle Phase (existing only)	- Bicycle Scramble - Bicycle Phase (2045)	All-way stop control performed best, while the signal with a bike phase also operated acceptably under existing conditions.
Holly St / Champion St	- Signal - Roundabout - Two-way stop - All-Way Stop (existing only)	- One-way stop - All-way stop (2045)	Stop-control alternatives result in high Synchro-reported delays, however existing conditions, SimTraffic queues, indicate acceptable two-way stop control operations. The roundabout and signal alternatives result in low delay and acceptable queues.
Holly St / F St	- Prohibited left turns - Permissive left turns	Split phasing	Split phasing results in high delays and long queues, while the other alternatives result in low delays and acceptable queues.
Holly St / Broadway	Permissive left turns	Split phasing	Split phasing results in high delays and long queues under existing and 2045 conditions.

APPENDIX

CONTENTS

SYNCHRO AND SIDRA OUTPUTS

SIMTRAFFIC REPORTS



SYNCHRO AND SIDRA OUTPUTS

HCM Signalized Intersection Capacity Analysis

520: Bay St & W Holly St

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	34	527	261	15	36	0	0	324	3
Future Volume (vph)	0	0	0	34	527	261	15	36	0	0	324	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					8.0	5.0		8.0			8.0	
Lane Util. Factor					1.00	1.00		1.00			1.00	
Frpb, ped/bikes					1.00	1.00		1.00			1.00	
Flpb, ped/bikes					0.99	1.00		0.99			1.00	
Frt					1.00	0.85		1.00			1.00	
Flt Protected					1.00	1.00		0.99			1.00	
Satd. Flow (prot)					1471	1265		1451			1485	
Flt Permitted					1.00	1.00		0.74			1.00	
Satd. Flow (perm)					1471	1265		1094			1485	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	35	549	272	16	38	0	0	338	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	584	272	0	54	0	0	341	0
Confl. Peds. (#/hr)			58	58		50	30		44	44		30
Confl. Bikes (#/hr)						25			3			5
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type				Perm	NA	custom	Perm	NA			NA	
Protected Phases					2 3	3		4			4	
Permitted Phases				2 3			4					
Actuated Green, G (s)					42.0	19.0		17.0			17.0	
Effective Green, g (s)					42.0	19.0		17.0			17.0	
Actuated g/C Ratio					0.58	0.26		0.24			0.24	
Clearance Time (s)						5.0		8.0			8.0	
Lane Grp Cap (vph)					858	333		258			350	
v/s Ratio Prot						c0.22					c0.23	
v/s Ratio Perm					0.40			0.05				
v/c Ratio					0.68	0.82		0.21			0.97	
Uniform Delay, d1					10.4	24.9		22.1			27.3	
Progression Factor					0.21	0.47		0.59			1.03	
Incremental Delay, d2					3.1	14.4		1.8			35.3	
Delay (s)					5.3	26.0		14.7			63.4	
Level of Service					A	C		B			E	
Approach Delay (s/veh)		0.0			11.9			14.7			63.4	
Approach LOS		A			B			B			E	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			26.0		HCM 2000 Level of Service						C	
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			72.0		Sum of lost time (s)					21.0		
Intersection Capacity Utilization			72.1%		ICU Level of Service						C	
Analysis Period (min)			15									
c Critical Lane Group												

Existing Conditions

One Way - Shared Westbound Left Through Lane and Right-Turn Lane

Synchro 12 Report

HCM Signalized Intersection Capacity Analysis

520: Bay St & W Holly St

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	34	527	261	15	36	0	0	324	3
Future Volume (vph)	0	0	0	34	527	261	15	36	0	0	324	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				8.0	8.0			8.0			8.0	
Lane Util. Factor				1.00	1.00			1.00			1.00	
Frpb, ped/bikes				1.00	0.95			1.00			1.00	
Flpb, ped/bikes				0.86	1.00			0.99			1.00	
Frt				1.00	0.95			1.00			1.00	
Flt Protected				0.95	1.00			0.99			1.00	
Satd. Flow (prot)				1217	1338			1451			1485	
Flt Permitted				0.95	1.00			0.74			1.00	
Satd. Flow (perm)				1217	1338			1094			1485	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	35	549	272	16	38	0	0	338	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	35	821	0	0	54	0	0	341	0
Confl. Peds. (#/hr)			58	58		50	30		44	44		30
Confl. Bikes (#/hr)						25			3			5
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					2			4			4	
Permitted Phases				2			4					
Actuated Green, G (s)				24.0	24.0			17.0			17.0	
Effective Green, g (s)				24.0	24.0			17.0			17.0	
Actuated g/C Ratio				0.33	0.33			0.24			0.24	
Clearance Time (s)				8.0	8.0			8.0			8.0	
Lane Grp Cap (vph)				405	446			258			350	
v/s Ratio Prot					c0.61						c0.23	
v/s Ratio Perm				0.03				0.05				
v/c Ratio				0.09	1.84			0.21			0.97	
Uniform Delay, d1				16.5	24.0			22.1			27.3	
Progression Factor				0.44	0.52			1.01			0.81	
Incremental Delay, d2				0.3	384.5			1.8			35.3	
Delay (s)				7.6	396.9			24.2			57.2	
Level of Service				A	F			C			E	
Approach Delay (s/veh)		0.0			381.0			24.2			57.2	
Approach LOS		A			F			C			E	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			277.4			HCM 2000 Level of Service					F	
HCM 2000 Volume to Capacity ratio			1.19									
Actuated Cycle Length (s)			72.0			Sum of lost time (s)				21.0		
Intersection Capacity Utilization			82.3%			ICU Level of Service				E		
Analysis Period (min)			15									

c Critical Lane Group

Existing Conditions

One Way - Westbound Left-Turn Lane and Shared Through Right Lane

Synchro 12 Report

HCM Signalized Intersection Capacity Analysis

520: Bay St & W Holly St

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	0	194	34	534	261	15	36	0	0	138	3
Future Volume (vph)	0	0	194	34	534	261	15	36	0	0	138	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			8.0	8.0	8.0			8.0			8.0	
Lane Util. Factor			1.00	1.00	1.00			1.00			1.00	
Frpb, ped/bikes			0.84	1.00	0.95			1.00			1.00	
Flpb, ped/bikes			1.00	0.86	1.00			0.98			1.00	
Frt			0.87	1.00	0.95			1.00			1.00	
Flt Protected			1.00	0.95	1.00			0.99			1.00	
Satd. Flow (prot)			1086	1217	1339			1443			1481	
Flt Permitted			1.00	0.95	1.00			0.88			1.00	
Satd. Flow (perm)			1086	1217	1339			1283			1481	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	202	35	556	272	16	38	0	0	144	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	202	35	828	0	0	54	0	0	147	0
Confl. Peds. (#/hr)			58	58		50	30		44	44		30
Confl. Bikes (#/hr)						25			3			5
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type			Perm	Perm	NA		Perm	NA			NA	
Protected Phases					2			4			4	
Permitted Phases			2 3 4	2			4					
Actuated Green, G (s)			72.0	24.0	24.0			17.0			17.0	
Effective Green, g (s)			67.0	24.0	24.0			17.0			17.0	
Actuated g/C Ratio			0.93	0.33	0.33			0.24			0.24	
Clearance Time (s)				8.0	8.0			8.0			8.0	
Lane Grp Cap (vph)			1010	405	446			302			349	
v/s Ratio Prot					c0.62						c0.10	
v/s Ratio Perm			c0.19	0.03				0.04				
v/c Ratio			0.20	0.09	1.86			0.18			0.42	
Uniform Delay, d1			0.2	16.5	24.0			21.9			23.3	
Progression Factor			1.00	0.45	0.52			1.01			1.25	
Incremental Delay, d2			0.4	0.3	391.5			1.2			2.7	
Delay (s)			0.7	7.7	404.1			23.4			31.9	
Level of Service			A	A	F			C			C	
Approach Delay (s/veh)		0.7			388.0			23.4			31.9	
Approach LOS		A			F			C			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			269.3			HCM 2000 Level of Service					F	
HCM 2000 Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			72.0			Sum of lost time (s)				21.0		
Intersection Capacity Utilization			80.3%			ICU Level of Service				D		
Analysis Period (min)			15									

c Critical Lane Group

Existing Conditions

Two Way - Westbound Left-Turn Lane and Shared Through Right Lane

Synchro 12 Report

HCM 7th AWSC
538: Champion St & Prospect St

04/04/2026

Intersection

Intersection Delay, s/veh	15
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	27	124	189	4	55	55	2	281	3	136	134	44
Future Vol, veh/h	27	124	189	4	55	55	2	281	3	136	134	44
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	28	129	197	4	57	57	2	293	3	142	140	46
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	15.8	11	14.7	15.7
HCM LOS	C	B	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	8%	4%	43%
Vol Thru, %	98%	36%	48%	43%
Vol Right, %	1%	56%	48%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	286	340	114	314
LT Vol	2	27	4	136
Through Vol	281	124	55	134
RT Vol	3	189	55	44
Lane Flow Rate	298	354	119	327
Geometry Grp	1	1	1	1
Degree of Util (X)	0.494	0.561	0.207	0.539
Departure Headway (Hd)	5.975	5.703	6.261	5.928
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	605	634	572	608
Service Time	4.01	3.735	4.314	3.96
HCM Lane V/C Ratio	0.493	0.558	0.208	0.538
HCM Control Delay, s/veh	14.7	15.8	11	15.7
HCM Lane LOS	B	C	B	C
HCM 95th-tile Q	2.7	3.5	0.8	3.2

HCM Signalized Intersection Capacity Analysis

538: Champion St & Prospect St

04/04/2026

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	124	189	4	55	55	2	281	3	136	134	44
Future Volume (vph)	27	124	189	4	55	55	2	281	3	136	134	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.97			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.92			0.93			1.00			0.98	
Flt Protected		1.00			1.00			1.00			0.98	
Satd. Flow (prot)		1332			1344			1484			1398	
Flt Permitted		0.97			0.99			1.00			0.66	
Satd. Flow (perm)		1300			1331			1481			943	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	28	129	197	4	57	57	2	293	3	142	140	46
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	354	0	0	118	0	0	298	0	0	328	0
Confl. Peds. (#/hr)	20		11	11		20	18		31	31		18
Confl. Bikes (#/hr)			3			3			16			7
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)		24.0			24.0			26.0			26.0	
Effective Green, g (s)		24.0			24.0			26.0			26.0	
Actuated g/C Ratio		0.33			0.33			0.36			0.36	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Lane Grp Cap (vph)		433			443			534			340	
v/s Ratio Prot												
v/s Ratio Perm		c0.27			0.09			0.20			c0.35	
v/c Ratio		0.82			0.27			0.56			0.96	
Uniform Delay, d1		22.0			17.6			18.4			22.6	
Progression Factor		0.99			0.58			0.76			1.00	
Incremental Delay, d2		15.6			1.5			3.8			40.7	
Delay (s)		37.4			11.6			17.9			63.2	
Level of Service		D			B			B			E	
Approach Delay (s/veh)		37.4			11.6			17.9			63.2	
Approach LOS		D			B			B			E	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			37.1			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			72.0			Sum of lost time (s)				17.0		
Intersection Capacity Utilization			77.8%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

538: Champion St & Prospect St

04/04/2026

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	27	124	189	4	55	55	2	281	3	136	134	44
Future Volume (vph)	27	124	189	4	55	55	2	281	3	136	134	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.96			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.92			0.93			1.00			0.98	
Flt Protected		1.00			1.00			1.00			0.98	
Satd. Flow (prot)		1324			1334			1484			1405	
Flt Permitted		0.97			0.96			1.00			0.70	
Satd. Flow (perm)		1288			1288			1482			1002	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	28	129	197	4	57	57	2	293	3	142	140	46
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	354	0	0	118	0	0	298	0	0	328	0
Confl. Peds. (#/hr)	20		11	11		20	18		31	31		18
Confl. Bikes (#/hr)			3			3			16			7
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)		13.0			13.0			29.0			29.0	
Effective Green, g (s)		13.0			13.0			29.0			29.0	
Actuated g/C Ratio		0.18			0.18			0.40			0.40	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Lane Grp Cap (vph)		232			232			596			403	
v/s Ratio Prot												
v/s Ratio Perm		c0.27			0.09			0.20			c0.33	
v/c Ratio		1.53			0.51			0.50			0.81	
Uniform Delay, d1		29.5			26.6			16.1			19.1	
Progression Factor		0.99			0.69			0.54			1.00	
Incremental Delay, d2		257.3			7.7			2.7			16.3	
Delay (s)		286.6			26.0			11.4			35.4	
Level of Service		F			C			B			D	
Approach Delay (s/veh)		286.6			26.0			11.4			35.4	
Approach LOS		F			C			B			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		108.9			HCM 2000 Level of Service			F				
HCM 2000 Volume to Capacity ratio		0.72										
Actuated Cycle Length (s)		72.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		77.8%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

520: Bay St & W Holly St

04/21/2026

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	34	534	254	15	36	0	0	324	3
Future Volume (vph)	0	0	0	34	534	254	15	36	0	0	324	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					8.0	8.0		8.0			8.0	
Lane Util. Factor					1.00	1.00		1.00			1.00	
Frpb, ped/bikes					1.00	0.86		1.00			1.00	
Flpb, ped/bikes					0.99	1.00		0.99			1.00	
Frt					1.00	0.85		1.00			1.00	
Flt Protected					1.00	1.00		0.99			1.00	
Satd. Flow (prot)					1471	1091		1451			1485	
Flt Permitted					1.00	1.00		0.74			1.00	
Satd. Flow (perm)					1471	1091		1094			1485	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	35	556	265	16	38	0	0	338	3
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	591	265	0	54	0	0	341	0
Confl. Peds. (#/hr)			58	58		50	30		44	44		30
Confl. Bikes (#/hr)						25			3			5
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					2			4			4	
Permitted Phases				2		2	4					
Actuated Green, G (s)					39.0	39.0		17.0			17.0	
Effective Green, g (s)					39.0	39.0		17.0			17.0	
Actuated g/C Ratio					0.54	0.54		0.24			0.24	
Clearance Time (s)					8.0	8.0		8.0			8.0	
Lane Grp Cap (vph)					796	590		258			350	
v/s Ratio Prot											c0.23	
v/s Ratio Perm					0.40	0.24		0.05				
v/c Ratio					0.74	0.45		0.21			0.97	
Uniform Delay, d1					12.6	10.0		22.1			27.3	
Progression Factor					0.11	0.08		0.67			0.65	
Incremental Delay, d2					4.4	1.7		1.8			27.2	
Delay (s)					5.8	2.5		16.6			45.0	
Level of Service					A	A		B			D	
Approach Delay (s/veh)		0.0			4.8			16.6			45.0	
Approach LOS		A			A			B			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			16.2		HCM 2000 Level of Service						B	
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			72.0		Sum of lost time (s)						16.0	
Intersection Capacity Utilization			72.5%		ICU Level of Service						C	
Analysis Period (min)			15									
c Critical Lane Group												

c Critical Lane Group

HCM 7th TWSC
57: W Holly St & Champion St

Intersection

Int Delay, s/veh 2.1

Movement	WBL	WBR	SEL	SET	NWT	NWR
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Lane Configurations		↗	↘		↕	
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Traffic Vol, veh/h	0	101	333	0	545	0
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Future Vol, veh/h	0	101	333	0	545	0
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Conflicting Peds, #/hr	0	0	0	0	0	0
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Sign Control	Stop	Stop	Free	Free	Free	Free
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RT Channelized	-	None	-	None	-	None
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Storage Length	-	0	-	-	-	-
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Veh in Median Storage, #	0	-	-	0	0	-
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Grade, %	0	-	-	0	0	-
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Peak Hour Factor	96	96	96	96	96	96
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Heavy Vehicles, %	0	0	0	0	0	0
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Mvmt Flow	0	105	347	0	568	0
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Major/Minor	Minor2	Major2
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Conflicting Flow All	- 568	- 0
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Stage 1	- -	- -
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Stage 2	- -	- -
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Critical Hdwy	- 6.2	- -
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Critical Hdwy Stg 1	- -	- -
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Critical Hdwy Stg 2	- -	- -
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Follow-up Hdwy	- 3.3	- -
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Pot Cap-1 Maneuver	0 526	- 0
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Stage 1	0 -	- 0
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Stage 2	0 -	- 0
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Platoon blocked, %		-
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Mov Cap-1 Maneuver	- 526	- -
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Mov Cap-2 Maneuver	- -	- -
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Stage 1	- -	- -
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Stage 2	- -	- -
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Approach	WB	NW
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HCM Ctrl Dly, s/v	13.54	0
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HCM LOS	B	
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Minor Lane/Major Mvmt	NWTWBLn1
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Capacity (veh/h)	- 526
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HCM Lane V/C Ratio	- 0.2
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HCM Ctrl Dly (s/v)	- 13.5
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HCM Lane LOS	- B
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HCM 95th %tile Q(veh)	- 0.7
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HCM Unsignalized Intersection Capacity Analysis

57: W Holly St & Champion St

						
Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (veh/h)	0	101	333	0	545	0
Future Volume (Veh/h)	0	101	333	0	545	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	105	347	0	568	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (ft)	351					
pX, platoon unblocked						
vC, conflicting volume	347				452	347
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	347				452	347
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				0	100
cM capacity (veh/h)	1223				569	701
Direction, Lane #	WB 1	SE 1	NW 1			
Volume Total	105	347	568			
Volume Left	0	0	568			
Volume Right	0	0	0			
cSH	1700	1700	569			
Volume to Capacity	0.06	0.20	1.00			
Queue Length 95th (ft)	0	0	363			
Control Delay (s/veh)	0.0	0.0	64.2			
Lane LOS			F			
Approach Delay (s/veh)	0.0	0.0	64.2			
Approach LOS			F			
Intersection Summary						
Average Delay		35.7				
Intersection Capacity Utilization		59.0%		ICU Level of Service		B
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

57: W Holly St & Champion St

						
Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (veh/h)	0	101	333	0	545	0
Future Volume (Veh/h)	0	101	333	0	545	0
Sign Control	Stop			Stop	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	105	347	0	568	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)					417	
pX, platoon unblocked						
vC, conflicting volume	1310	1136	1136	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1310	1136	1136	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	0	21	0	100	65	
cM capacity (veh/h)	0	133	133	1091	1636	
Direction, Lane #	WB 1	SE 1	NW 1			
Volume Total	105	347	568			
Volume Left	0	0	568			
Volume Right	0	0	0			
cSH	133	133	1636			
Volume to Capacity	0.79	2.61	0.35			
Queue Length 95th (ft)	119	774	39			
Control Delay (s/veh)	93.6	797.4	8.4			
Lane LOS	F	F	A			
Approach Delay (s/veh)	93.6	797.4	8.4			
Approach LOS	F	F				
Intersection Summary						
Average Delay		285.6				
Intersection Capacity Utilization		59.0%		ICU Level of Service		B
Analysis Period (min)		15				

HCM 7th AWSC
57: W Holly St & Champion St

Intersection

Intersection Delay, s/veh	15.8
Intersection LOS	C

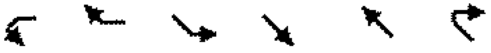
Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	0	101	333	0	545	0
Future Vol, veh/h	0	101	333	0	545	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	105	347	0	568	0
Number of Lanes	0	1	1	0	1	0

Approach	WB	SE	NW
Opposing Approach		NW	SE
Opposing Lanes	0	1	1
Conflicting Approach Left	NW	WB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	SE		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay, s/veh	9.4	12.7	18.8
HCM LOS	A	B	C

Lane	NWLn1	WBLn1	SELn1
Vol Left, %	0%	0%	100%
Vol Thru, %	100%	0%	0%
Vol Right, %	0%	100%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	545	101	333
LT Vol	0	0	333
Through Vol	545	0	0
RT Vol	0	101	0
Lane Flow Rate	568	105	347
Geometry Grp	1	1	1
Degree of Util (X)	0.723	0.155	0.481
Departure Headway (Hd)	4.582	5.306	4.991
Convergence, Y/N	Yes	Yes	Yes
Cap	783	668	718
Service Time	2.638	3.402	3.057
HCM Lane V/C Ratio	0.725	0.157	0.483
HCM Control Delay, s/veh	18.8	9.4	12.7
HCM Lane LOS	C	A	B
HCM 95th-tile Q	6.3	0.5	2.6

HCM Signalized Intersection Capacity Analysis

57: W Holly St & Champion St

						
Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations		↰	↰		↱	
Traffic Volume (vph)	0	101	333	0	545	0
Future Volume (vph)	0	101	333	0	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	
Lane Util. Factor		1.00	1.00		1.00	
Frpb, ped/bikes		1.00	1.00		1.00	
Flpb, ped/bikes		1.00	1.00		1.00	
Frt		0.87	1.00		1.00	
Flt Protected		1.00	0.95		1.00	
Satd. Flow (prot)		1287	1413		1488	
Flt Permitted		1.00	0.95		1.00	
Satd. Flow (perm)		1287	1413		1488	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	105	347	0	568	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	105	347	0	568	0
Confl. Bikes (#/hr)						2
Parking (#/hr)	0	0	0	0	0	0
Turn Type		Over	Prot		NA	
Protected Phases		6	6		2	
Permitted Phases						
Actuated Green, G (s)		25.0	25.0		37.0	
Effective Green, g (s)		25.0	25.0		37.0	
Actuated g/C Ratio		0.35	0.35		0.51	
Clearance Time (s)		5.0	5.0		5.0	
Lane Grp Cap (vph)		446	490		764	
v/s Ratio Prot		0.08	c0.25		c0.38	
v/s Ratio Perm						
v/c Ratio		0.24	0.71		0.74	
Uniform Delay, d1		16.7	20.3		13.8	
Progression Factor		0.66	1.00		0.85	
Incremental Delay, d2		1.1	8.4		4.5	
Delay (s)		12.1	28.7		16.2	
Level of Service		B	C		B	
Approach Delay (s/veh)	12.1			28.7	16.2	
Approach LOS	B			C	B	
Intersection Summary						
HCM 2000 Control Delay (s/veh)		20.0		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio		0.73				
Actuated Cycle Length (s)		72.0		Sum of lost time (s)		10.0
Intersection Capacity Utilization		59.9%		ICU Level of Service		B
Analysis Period (min)		15				
c Critical Lane Group						

MOVEMENT SUMMARY

 **Site: [1 (4)] W Holly St & W Champion St - Existing Vol (90ft diam) (Folder1)**

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Single-lane roundabout scenario. Holly St is one-way (approach only) to the west of Champion St

Site Category: (None)

Roundabout

Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop of Cycles	Number of Depart	Aver. Speed
			[Total HV]	[Total HV]	[Total HV]	[Total HV]				[Veh.]	[Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	ft				mph
East: W Holly St															
6	T1	All MCs	568	0.0	568	0.0	0.604	5.3	LOS A	4.9	121.4	0.67	0.61	0.75	18.4
Approach			568	0.0	568	0.0	0.604	5.3	LOS A	4.9	121.4	0.67	0.61	0.75	18.4
North: W Champion St															
14	R2	All MCs	105	0.0	105	0.0	0.146	5.1	LOS A	0.8	20.0	0.65	0.61	0.65	18.0
Approach			105	0.0	105	0.0	0.146	5.1	LOS A	0.8	20.0	0.65	0.61	0.65	18.0
West: W Holly St															
5	L2	All MCs	347	0.0	347	0.0	0.282	5.5	LOS A	0.0	0.0	0.00	0.57	0.00	18.5
Approach			347	0.0	347	0.0	0.282	5.5	LOS A	0.0	0.0	0.00	0.57	0.00	18.5
All Vehicles			1020	0.0	1020	0.0	0.604	5.4	LOS A	4.9	121.4	0.44	0.59	0.49	18.4

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: L:\All-DKS\SEA\Company\1 PROJECTS - 24000 EFF 5.15.23\25000\500s\25597-000 Bellingham Holly St Bike Facility Study & Design\07 Analysis\Sidra\Holly & Champion Roundabout (one-way).spx

HCM 7th Signalized Intersection Summary

33: W Holly St & F St

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	0	358	144	0	552	35	54	227	11	32	174	45
Future Volume (veh/h)	0	358	144	0	552	35	54	227	11	32	174	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	0.98		0.94	0.98		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1841	1856	0	1856	1900	1870	1870	1900	1796	1841	1900
Adj Flow Rate, veh/h	0	369	148	0	569	36	56	234	11	33	179	46
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	4	3	0	3	0	2	2	0	7	4	0
Cap, veh/h	0	795	319	0	1104	70	105	322	14	116	539	133
Arrive On Green	0.00	0.64	0.64	0.00	0.64	0.64	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	0	1240	498	0	1723	109	219	1393	61	254	2333	577
Grp Volume(v), veh/h	0	0	517	0	0	605	301	0	0	136	0	122
Grp Sat Flow(s),veh/h/ln	0	0	1738	0	0	1832	1673	0	0	1639	0	1525
Q Serve(g_s), s	0.0	0.0	11.9	0.0	0.0	13.8	7.9	0.0	0.0	0.0	0.0	5.2
Cycle Q Clear(g_c), s	0.0	0.0	11.9	0.0	0.0	13.8	13.1	0.0	0.0	4.8	0.0	5.2
Prop In Lane	0.00		0.29	0.00		0.06	0.19		0.04	0.24		0.38
Lane Grp Cap(c), veh/h	0	0	1114	0	0	1174	441	0	0	436	0	352
V/C Ratio(X)	0.00	0.00	0.46	0.00	0.00	0.52	0.68	0.00	0.00	0.31	0.00	0.35
Avail Cap(c_a), veh/h	0	0	1114	0	0	1174	695	0	0	679	0	586
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	7.2	0.0	0.0	7.5	28.0	0.0	0.0	24.9	0.0	25.1
Incr Delay (d2), s/veh	0.0	0.0	1.4	0.0	0.0	0.4	1.9	0.0	0.0	0.4	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	4.2	0.0	0.0	4.8	5.4	0.0	0.0	2.1	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	8.6	0.0	0.0	7.9	29.9	0.0	0.0	25.3	0.0	25.7
LnGrp LOS			A			A	C			C		C
Approach Vol, veh/h		517			605			301			258	
Approach Delay, s/veh		8.6			7.9			29.9			25.5	
Approach LOS		A			A			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		55.0		23.0		55.0		23.0				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		50.0		30.0		50.0		30.0				
Max Q Clear Time (g_c+I1), s		13.9		7.2		15.8		15.1				
Green Ext Time (p_c), s		4.2		1.6		5.0		1.6				
Intersection Summary												
HCM 7th Control Delay, s/veh			14.7									
HCM 7th LOS			B									

Existing Conditions
Prohibited Left Turns

Synchro 12 Report

HCM 7th Signalized Intersection Summary

33: W Holly St & F St

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	46	312	144	41	511	35	54	227	11	32	174	45
Future Volume (veh/h)	46	312	144	41	511	35	54	227	11	32	174	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	0.98		0.94	0.98		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1841	1856	1900	1856	1900	1870	1870	1900	1796	1841	1900
Adj Flow Rate, veh/h	47	322	148	42	527	36	56	234	11	33	179	46
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	4	3	0	3	0	2	2	0	7	4	0
Cap, veh/h	109	689	300	95	1015	67	105	322	14	116	539	133
Arrive On Green	0.64	0.64	0.64	0.64	0.64	0.64	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	91	1075	468	71	1584	105	219	1393	61	254	2333	577
Grp Volume(v), veh/h	517	0	0	605	0	0	301	0	0	136	0	122
Grp Sat Flow(s),veh/h/ln	1634	0	0	1760	0	0	1673	0	0	1639	0	1525
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	7.9	0.0	0.0	0.0	0.0	5.2
Cycle Q Clear(g_c), s	11.9	0.0	0.0	13.8	0.0	0.0	13.1	0.0	0.0	4.8	0.0	5.2
Prop In Lane	0.09		0.29	0.07		0.06	0.19		0.04	0.24		0.38
Lane Grp Cap(c), veh/h	1097	0	0	1177	0	0	441	0	0	436	0	352
V/C Ratio(X)	0.47	0.00	0.00	0.51	0.00	0.00	0.68	0.00	0.00	0.31	0.00	0.35
Avail Cap(c_a), veh/h	1097	0	0	1177	0	0	695	0	0	679	0	586
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.2	0.0	0.0	7.5	0.0	0.0	28.0	0.0	0.0	24.9	0.0	25.1
Incr Delay (d2), s/veh	1.5	0.0	0.0	0.4	0.0	0.0	1.9	0.0	0.0	0.4	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	0.0	4.8	0.0	0.0	5.4	0.0	0.0	2.1	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	8.6	0.0	0.0	7.9	0.0	0.0	29.9	0.0	0.0	25.3	0.0	25.7
LnGrp LOS	A			A			C			C		C
Approach Vol, veh/h		517			605			301			258	
Approach Delay, s/veh		8.6			7.9			29.9			25.5	
Approach LOS		A			A			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		55.0		23.0		55.0		23.0				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		50.0		30.0		50.0		30.0				
Max Q Clear Time (g_c+I1), s		13.9		7.2		15.8		15.1				
Green Ext Time (p_c), s		4.5		1.6		5.2		1.6				
Intersection Summary												
HCM 7th Control Delay, s/veh				14.7								
HCM 7th LOS				B								

Existing Conditions
Permissive Left Turns

Synchro 12 Report

HCM 7th Signalized Intersection Summary

33: W Holly St & F St

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	46	312	144	41	511	35	54	227	11	32	174	45
Future Volume (veh/h)	46	312	144	41	511	35	54	227	11	32	174	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	0.98		0.94	0.98		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1841	1856	1900	1856	1900	1870	1870	1900	1796	1841	1900
Adj Flow Rate, veh/h	47	322	148	42	527	36	56	234	11	33	179	46
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	4	3	0	3	0	2	2	0	7	4	0
Cap, veh/h	46	316	145	40	503	34	95	291	13	104	495	125
Arrive On Green	0.29	0.29	0.29	0.32	0.32	0.32	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	157	1074	494	127	1589	109	211	1323	58	244	2250	567
Grp Volume(v), veh/h	517	0	0	605	0	0	301	0	0	134	0	124
Grp Sat Flow(s),veh/h/ln	1724	0	0	1824	0	0	1593	0	0	1535	0	1526
Q Serve(g_s), s	26.0	0.0	0.0	28.0	0.0	0.0	10.1	0.0	0.0	0.0	0.0	6.1
Cycle Q Clear(g_c), s	26.0	0.0	0.0	28.0	0.0	0.0	16.2	0.0	0.0	5.4	0.0	6.1
Prop In Lane	0.09		0.29	0.07		0.06	0.19		0.04	0.25		0.37
Lane Grp Cap(c), veh/h	507	0	0	577	0	0	399	0	0	388	0	336
V/C Ratio(X)	1.02	0.00	0.00	1.05	0.00	0.00	0.75	0.00	0.00	0.35	0.00	0.37
Avail Cap(c_a), veh/h	507	0	0	577	0	0	427	0	0	416	0	362
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.2	0.0	0.0	30.2	0.0	0.0	33.2	0.0	0.0	29.0	0.0	29.3
Incr Delay (d2), s/veh	45.3	0.0	0.0	50.7	0.0	0.0	7.0	0.0	0.0	0.5	0.0	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.9	0.0	0.0	20.1	0.0	0.0	6.9	0.0	0.0	2.4	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	76.5	0.0	0.0	80.9	0.0	0.0	40.2	0.0	0.0	29.5	0.0	30.0
LnGrp LOS	F			F			D			C		C
Approach Vol, veh/h		517			605			301			258	
Approach Delay, s/veh		76.5			80.9			40.2			29.7	
Approach LOS		E			F			D			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		31.0		24.5		33.0		24.5				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		26.0		21.0		28.0		21.0				
Max Q Clear Time (g_c+I1), s		28.0		8.1		30.0		18.2				
Green Ext Time (p_c), s		0.0		1.2		0.0		0.5				
Intersection Summary												
HCM 7th Control Delay, s/veh			64.4									
HCM 7th LOS			E									

Existing Conditions
Split Phasing

Synchro 12 Report

HCM 7th Signalized Intersection Summary

33: W Holly St & F St

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	0	358	144	0	552	35	54	227	11	32	174	45
Future Volume (veh/h)	0	358	144	0	552	35	54	227	11	32	174	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	0.98		0.94	0.98		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1841	1856	0	1856	1900	1870	1870	1900	1796	1841	1900
Adj Flow Rate, veh/h	0	369	148	0	569	36	56	234	11	33	179	46
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	4	3	0	3	0	2	2	0	7	4	0
Cap, veh/h	0	795	319	0	1110	70	107	324	14	82	289	69
Arrive On Green	0.00	0.64	0.64	0.00	0.64	0.64	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	0	1234	495	0	1723	109	228	1430	63	132	1273	305
Grp Volume(v), veh/h	0	0	517	0	0	605	301	0	0	258	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1730	0	0	1832	1721	0	0	1709	0	0
Q Serve(g_s), s	0.0	0.0	11.8	0.0	0.0	13.6	2.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	11.8	0.0	0.0	13.6	12.5	0.0	0.0	10.4	0.0	0.0
Prop In Lane	0.00		0.29	0.00		0.06	0.19		0.04	0.13		0.18
Lane Grp Cap(c), veh/h	0	0	1114	0	0	1180	445	0	0	440	0	0
V/C Ratio(X)	0.00	0.00	0.46	0.00	0.00	0.51	0.68	0.00	0.00	0.59	0.00	0.00
Avail Cap(c_a), veh/h	0	0	1114	0	0	1180	710	0	0	700	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	7.0	0.0	0.0	7.3	27.9	0.0	0.0	27.2	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	1.4	0.0	0.0	0.4	1.8	0.0	0.0	1.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	4.1	0.0	0.0	4.6	5.3	0.0	0.0	4.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	8.4	0.0	0.0	7.7	29.7	0.0	0.0	28.4	0.0	0.0
LnGrp LOS			A			A	C			C		
Approach Vol, veh/h	517				605				301		258	
Approach Delay, s/veh	8.4				7.7				29.7		28.4	
Approach LOS	A				A				C		C	
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	55.0		22.6		55.0		22.6					
Change Period (Y+Rc), s	5.0		5.0		5.0		5.0					
Max Green Setting (Gmax), s	50.0		30.0		50.0		30.0					
Max Q Clear Time (g_c+I1), s	13.8		12.4		15.6		14.5					
Green Ext Time (p_c), s	4.2		1.5		5.0		1.7					
Intersection Summary												
HCM 7th Control Delay, s/veh			15.0									
HCM 7th LOS			B									

Existing Conditions
Prohibited Left Turns, F St Turn Lane Removal

Synchro 12 Report

HCM 7th Signalized Intersection Summary

33: W Holly St & F St

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	46	312	144	41	511	35	54	227	11	32	174	45
Future Volume (veh/h)	46	312	144	41	511	35	54	227	11	32	174	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	0.98		0.94	0.98		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1841	1856	1900	1856	1900	1870	1870	1900	1796	1841	1900
Adj Flow Rate, veh/h	47	322	148	42	527	36	56	234	11	33	179	46
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	4	3	0	3	0	2	2	0	7	4	0
Cap, veh/h	109	689	300	95	1021	67	107	324	14	82	289	69
Arrive On Green	0.64	0.64	0.64	0.64	0.64	0.64	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	91	1070	466	71	1585	105	228	1430	63	132	1273	305
Grp Volume(v), veh/h	517	0	0	605	0	0	301	0	0	258	0	0
Grp Sat Flow(s),veh/h/ln	1626	0	0	1760	0	0	1721	0	0	1709	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	11.8	0.0	0.0	13.6	0.0	0.0	12.5	0.0	0.0	10.4	0.0	0.0
Prop In Lane	0.09		0.29	0.07		0.06	0.19		0.04	0.13		0.18
Lane Grp Cap(c), veh/h	1099	0	0	1184	0	0	445	0	0	440	0	0
V/C Ratio(X)	0.47	0.00	0.00	0.51	0.00	0.00	0.68	0.00	0.00	0.59	0.00	0.00
Avail Cap(c_a), veh/h	1099	0	0	1184	0	0	710	0	0	700	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.0	0.0	0.0	7.3	0.0	0.0	27.9	0.0	0.0	27.2	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	0.0	0.4	0.0	0.0	1.8	0.0	0.0	1.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	0.0	4.6	0.0	0.0	5.3	0.0	0.0	4.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	8.4	0.0	0.0	7.7	0.0	0.0	29.7	0.0	0.0	28.4	0.0	0.0
LnGrp LOS	A			A			C			C		
Approach Vol, veh/h	517				605				301			
Approach Delay, s/veh	8.4				7.7				29.7			
Approach LOS	A				A				C			
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	55.0		22.6		55.0		22.6					
Change Period (Y+Rc), s	5.0		5.0		5.0		5.0					
Max Green Setting (Gmax), s	50.0		30.0		50.0		30.0					
Max Q Clear Time (g_c+I1), s	13.8		12.4		15.6		14.5					
Green Ext Time (p_c), s	4.5		1.5		5.2		1.7					
Intersection Summary												
HCM 7th Control Delay, s/veh			15.0									
HCM 7th LOS			B									

Existing Conditions
 Permissive Left Turns, F St Turn Lane Removal

Synchro 12 Report

HCM 7th Signalized Intersection Summary

33: W Holly St & F St

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	46	312	144	41	511	35	54	227	11	32	174	45
Future Volume (veh/h)	46	312	144	41	511	35	54	227	11	32	174	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.96	0.98		0.94	0.98		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1841	1856	1900	1856	1900	1870	1870	1900	1796	1841	1900
Adj Flow Rate, veh/h	47	322	148	42	527	36	56	234	11	33	179	46
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	4	3	0	3	0	2	2	0	7	4	0
Cap, veh/h	46	315	145	40	506	35	97	296	13	74	267	64
Arrive On Green	0.30	0.30	0.30	0.32	0.32	0.32	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	156	1066	490	127	1589	109	226	1381	61	132	1242	298
Grp Volume(v), veh/h	517	0	0	605	0	0	301	0	0	258	0	0
Grp Sat Flow(s),veh/h/ln	1711	0	0	1824	0	0	1668	0	0	1672	0	0
Q Serve(g_s), s	26.0	0.0	0.0	28.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	26.0	0.0	0.0	28.0	0.0	0.0	15.2	0.0	0.0	12.4	0.0	0.0
Prop In Lane	0.09		0.29	0.07		0.06	0.19		0.04	0.13		0.18
Lane Grp Cap(c), veh/h	506	0	0	581	0	0	407	0	0	405	0	0
V/C Ratio(X)	1.02	0.00	0.00	1.04	0.00	0.00	0.74	0.00	0.00	0.64	0.00	0.00
Avail Cap(c_a), veh/h	506	0	0	581	0	0	447	0	0	445	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	30.9	0.0	0.0	29.9	0.0	0.0	32.8	0.0	0.0	31.8	0.0	0.0
Incr Delay (d2), s/veh	45.4	0.0	0.0	48.4	0.0	0.0	5.9	0.0	0.0	2.6	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.8	0.0	0.0	19.7	0.0	0.0	6.7	0.0	0.0	5.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	76.4	0.0	0.0	78.3	0.0	0.0	38.7	0.0	0.0	34.5	0.0	0.0
LnGrp LOS	F			F			D			C		
Approach Vol, veh/h		517			605			301			258	
Approach Delay, s/veh		76.4			78.3			38.7			34.5	
Approach LOS		E			E			D			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		31.0		23.9		33.0		23.9				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		26.0		21.0		28.0		21.0				
Max Q Clear Time (g_c+I1), s		28.0		14.4		30.0		17.2				
Green Ext Time (p_c), s		0.0		0.8		0.0		0.6				
Intersection Summary												
HCM 7th Control Delay, s/veh			63.9									
HCM 7th LOS			E									

Existing Conditions
Split, F St Turn Lane Removal

Synchro 12 Report

HCM Signalized Intersection Capacity Analysis

44: W Holly St/Eldridge Ave & Broadway

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	91	346	2	1	429	180	1	1	0	156	1	112
Future Volume (vph)	91	346	2	1	429	180	1	1	0	156	1	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99			1.00		1.00	0.97	
Flpb, ped/bikes		1.00			1.00			1.00		0.99	1.00	
Frt		1.00			0.96			1.00		1.00	0.85	
Flt Protected		0.99			1.00			0.98		0.95	1.00	
Satd. Flow (prot)		1746			1707			1789		1716	1516	
Flt Permitted		0.80			1.00			0.88		0.76	1.00	
Satd. Flow (perm)		1415			1706			1611		1367	1516	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	92	349	2	1	433	182	1	1	0	158	1	113
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	443	0	0	616	0	0	2	0	158	114	0
Confl. Peds. (#/hr)	7		7	7		7	3		6	6		3
Confl. Bikes (#/hr)			10			5						4
Heavy Vehicles (%)	4%	4%	0%	0%	3%	1%	0%	0%	0%	1%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		28.6			28.6			9.9		9.9	9.9	
Effective Green, g (s)		28.6			28.6			9.9		9.9	9.9	
Actuated g/C Ratio		0.59			0.59			0.20		0.20	0.20	
Clearance Time (s)		5.0			5.0			5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		834			1006			328		279	309	
v/s Ratio Prot											0.08	
v/s Ratio Perm		0.31			0.36			0.00		0.12		
v/c Ratio		0.53			0.61			0.01		0.57	0.37	
Uniform Delay, d1		5.9			6.4			15.4		17.4	16.6	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.7			1.1			0.0		2.6	0.7	
Delay (s)		6.6			7.5			15.4		20.0	17.4	
Level of Service		A			A			B		B	B	
Approach Delay (s/veh)		6.6			7.5			15.4			18.9	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		9.5			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.60										
Actuated Cycle Length (s)		48.5			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		85.2%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

Existing Conditions
Permissive Left Turns

Synchro 12 Report

HCM Signalized Intersection Capacity Analysis

44: W Holly St/Eldridge Ave & Broadway

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	91	346	2	1	429	180	1	1	0	156	1	112
Future Volume (vph)	91	346	2	1	429	180	1	1	0	156	1	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99			1.00		1.00	0.97	
Flpb, ped/bikes		1.00			1.00			1.00		0.99	1.00	
Frt		1.00			0.96			1.00		1.00	0.85	
Flt Protected		0.99			1.00			0.98		0.95	1.00	
Satd. Flow (prot)		1747			1703			1787		1706	1509	
Flt Permitted		0.99			1.00			0.91		0.76	1.00	
Satd. Flow (perm)		1747			1703			1673		1358	1509	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	92	349	2	1	433	182	1	1	0	158	1	113
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	443	0	0	616	0	0	2	0	158	114	0
Confl. Peds. (#/hr)	7		7	7		7	3		6	6		3
Confl. Bikes (#/hr)			10			5						4
Heavy Vehicles (%)	4%	4%	0%	0%	3%	1%	0%	0%	0%	1%	0%	0%
Turn Type	Split	NA		Split	NA		Perm	NA		Perm	NA	
Protected Phases	2	2		6	6			4			4	
Permitted Phases							4			4		
Actuated Green, G (s)		26.0			36.4			15.7		15.7	15.7	
Effective Green, g (s)		26.0			36.4			15.7		15.7	15.7	
Actuated g/C Ratio		0.28			0.39			0.17		0.17	0.17	
Clearance Time (s)		5.0			5.0			5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		487			665			282		229	254	
v/s Ratio Prot		c0.25			c0.36							0.08
v/s Ratio Perm								0.00		c0.12		
v/c Ratio		0.91			0.93			0.01		0.69	0.45	
Uniform Delay, d1		32.4			27.1			32.2		36.4	34.8	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		20.7			18.9			0.0		8.4	1.3	
Delay (s)		53.1			46.0			32.2		44.8	36.1	
Level of Service		D			D			C		D	D	
Approach Delay (s/veh)		53.1			46.0			32.2			41.1	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			47.3									HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			93.1							15.0		
Intersection Capacity Utilization			85.2%									ICU Level of Service E
Analysis Period (min)			15									
c Critical Lane Group												

Existing Conditions
Split Phasing

Synchro 12 Report

HCM Signalized Intersection Capacity Analysis

520: Bay St & W Holly St

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	45	710	351	20	48	0	0	435	4
Future Volume (vph)	0	0	0	45	710	351	20	48	0	0	435	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					8.0	5.0		8.0			8.0	
Lane Util. Factor					1.00	1.00		1.00			1.00	
Frpb, ped/bikes					1.00	1.00		1.00			1.00	
Flpb, ped/bikes					0.99	1.00		0.99			1.00	
Frt					1.00	0.85		1.00			1.00	
Flt Protected					1.00	1.00		0.99			1.00	
Satd. Flow (prot)					1471	1265		1456			1485	
Flt Permitted					1.00	1.00		0.46			1.00	
Satd. Flow (perm)					1471	1265		686			1485	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	45	710	351	20	48	0	0	435	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	755	351	0	68	0	0	439	0
Confl. Peds. (#/hr)			58	58		50	30		44	44		30
Confl. Bikes (#/hr)						25			3			5
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type				Perm	NA	custom	Perm	NA			NA	
Protected Phases					2 3	3		4			4	
Permitted Phases				2 3			4					
Actuated Green, G (s)					42.0	19.0		17.0			17.0	
Effective Green, g (s)					42.0	19.0		17.0			17.0	
Actuated g/C Ratio					0.58	0.26		0.24			0.24	
Clearance Time (s)						5.0		8.0			8.0	
Lane Grp Cap (vph)					858	333		161			350	
v/s Ratio Prot						c0.28					c0.30	
v/s Ratio Perm					0.51			0.10				
v/c Ratio					0.88	1.05		0.42			1.25	
Uniform Delay, d1					12.8	26.5		23.3			27.5	
Progression Factor					0.17	0.46		1.00			1.07	
Incremental Delay, d2					5.7	46.7		7.9			123.3	
Delay (s)					7.9	58.7		31.3			152.7	
Level of Service					A	E		C			F	
Approach Delay (s/veh)		0.0			24.0			31.3			152.7	
Approach LOS		A			C			C			F	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			59.3		HCM 2000 Level of Service						E	
HCM 2000 Volume to Capacity ratio			1.16									
Actuated Cycle Length (s)			72.0		Sum of lost time (s)					21.0		
Intersection Capacity Utilization			90.0%		ICU Level of Service						E	
Analysis Period (min)			15									
c Critical Lane Group												

Future 2045 Conditions
One Way - Shared Westbound Left Through Lane and Right-Turn Lane

Synchro 12 Report

HCM Signalized Intersection Capacity Analysis

520: Bay St & W Holly St

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	45	710	351	20	48	0	0	435	4
Future Volume (vph)	0	0	0	45	710	351	20	48	0	0	435	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				8.0	8.0			8.0			8.0	
Lane Util. Factor				1.00	1.00			1.00			1.00	
Frpb, ped/bikes				1.00	0.95			1.00			1.00	
Flpb, ped/bikes				0.86	1.00			0.99			1.00	
Frt				1.00	0.95			1.00			1.00	
Flt Protected				0.95	1.00			0.99			1.00	
Satd. Flow (prot)				1217	1338			1456			1485	
Flt Permitted				0.95	1.00			0.46			1.00	
Satd. Flow (perm)				1217	1338			686			1485	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	45	710	351	20	48	0	0	435	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	45	1061	0	0	68	0	0	439	0
Confl. Peds. (#/hr)			58	58		50	30		44	44		30
Confl. Bikes (#/hr)						25			3			5
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					2			4			4	
Permitted Phases				2			4					
Actuated Green, G (s)				24.0	24.0			17.0			17.0	
Effective Green, g (s)				24.0	24.0			17.0			17.0	
Actuated g/C Ratio				0.33	0.33			0.24			0.24	
Clearance Time (s)				8.0	8.0			8.0			8.0	
Lane Grp Cap (vph)				405	446			161			350	
v/s Ratio Prot					c0.79						c0.30	
v/s Ratio Perm				0.04				0.10				
v/c Ratio				0.11	2.38			0.42			1.25	
Uniform Delay, d1				16.6	24.0			23.3			27.5	
Progression Factor				0.45	0.47			1.00			0.83	
Incremental Delay, d2				0.2	623.3			7.9			123.3	
Delay (s)				7.7	634.5			31.3			146.1	
Level of Service				A	F			C			F	
Approach Delay (s/veh)		0.0			609.0			31.3			146.1	
Approach LOS		A			F			C			F	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			458.7			HCM 2000 Level of Service					F	
HCM 2000 Volume to Capacity ratio			1.54									
Actuated Cycle Length (s)			72.0			Sum of lost time (s)			21.0			
Intersection Capacity Utilization			105.7%			ICU Level of Service			G			
Analysis Period (min)			15									

c Critical Lane Group

Future 2045 Conditions

One Way - Westbound Left-Turn Lane and Shared Through Right Lane

Synchro 12 Report

HCM Signalized Intersection Capacity Analysis

520: Bay St & W Holly St

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	0	261	45	719	351	20	48	0	0	185	4
Future Volume (vph)	0	0	261	45	719	351	20	48	0	0	185	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			8.0	8.0	8.0			8.0			8.0	
Lane Util. Factor			1.00	1.00	1.00			1.00			1.00	
Frpb, ped/bikes			0.84	1.00	0.95			1.00			1.00	
Flpb, ped/bikes			1.00	0.86	1.00			0.99			1.00	
Frt			0.87	1.00	0.95			1.00			1.00	
Flt Protected			1.00	0.95	1.00			0.99			1.00	
Satd. Flow (prot)			1086	1217	1339			1445			1481	
Flt Permitted			1.00	0.95	1.00			0.86			1.00	
Satd. Flow (perm)			1086	1217	1339			1258			1481	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	261	45	719	351	20	48	0	0	185	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	261	45	1070	0	0	68	0	0	189	0
Confl. Peds. (#/hr)			58	58		50	30		44	44		30
Confl. Bikes (#/hr)						25			3			5
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type			Perm	Perm	NA		Perm	NA			NA	
Protected Phases					2			4			4	
Permitted Phases			2 3 4	2			4					
Actuated Green, G (s)			72.0	24.0	24.0			17.0			17.0	
Effective Green, g (s)			67.0	24.0	24.0			17.0			17.0	
Actuated g/C Ratio			0.93	0.33	0.33			0.24			0.24	
Clearance Time (s)				8.0	8.0			8.0			8.0	
Lane Grp Cap (vph)			1010	405	446			297			349	
v/s Ratio Prot					c0.80						c0.13	
v/s Ratio Perm			c0.24	0.04				0.05				
v/c Ratio			0.26	0.11	2.40			0.23			0.54	
Uniform Delay, d1			0.2	16.6	24.0			22.2			24.1	
Progression Factor			1.00	0.45	0.47			1.00			1.18	
Incremental Delay, d2			0.6	0.2	632.5			1.8			1.6	
Delay (s)			0.8	7.7	643.8			24.0			30.0	
Level of Service			A	A	F			C			C	
Approach Delay (s/veh)		0.8			618.1			24.0			30.0	
Approach LOS		A			F			C			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			426.7			HCM 2000 Level of Service					F	
HCM 2000 Volume to Capacity ratio			1.37									
Actuated Cycle Length (s)			72.0			Sum of lost time (s)			21.0			
Intersection Capacity Utilization			102.8%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

Future 2045 Conditions

Two Way - Westbound Left-Turn Lane and Shared Through Right Lane

Synchro 12 Report

HCM 7th AWSC
538: Champion St & Prospect St

04/04/2026

Intersection

Intersection Delay, s/veh	39
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	36	167	254	5	74	74	2	378	4	183	180	59
Future Vol, veh/h	36	167	254	5	74	74	2	378	4	183	180	59
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	36	167	254	5	74	74	2	378	4	183	180	59
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	46.4	16	35	43.1
HCM LOS	E	C	D	E

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	8%	3%	43%
Vol Thru, %	98%	37%	48%	43%
Vol Right, %	1%	56%	48%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	384	457	153	422
LT Vol	2	36	5	183
Through Vol	378	167	74	180
RT Vol	4	254	74	59
Lane Flow Rate	384	457	153	422
Geometry Grp	1	1	1	1
Degree of Util (X)	0.804	0.902	0.354	0.872
Departure Headway (Hd)	7.539	7.107	8.333	7.437
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	480	507	430	485
Service Time	5.607	5.164	6.421	5.5
HCM Lane V/C Ratio	0.8	0.901	0.356	0.87
HCM Control Delay, s/veh	35	46.4	16	43.1
HCM Lane LOS	D	E	C	E
HCM 95th-tile Q	7.5	10.3	1.6	9.3

HCM Signalized Intersection Capacity Analysis

538: Champion St & Prospect St

04/04/2026

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	167	254	5	74	74	2	378	4	183	180	59
Future Volume (vph)	36	167	254	5	74	74	2	378	4	183	180	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.97			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.92			0.93			1.00			0.98	
Flt Protected		1.00			1.00			1.00			0.98	
Satd. Flow (prot)		1332			1344			1484			1401	
Flt Permitted		0.97			0.98			1.00			0.60	
Satd. Flow (perm)		1292			1326			1482			856	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	36	167	254	5	74	74	2	378	4	183	180	59
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	457	0	0	153	0	0	384	0	0	422	0
Confl. Peds. (#/hr)	20		11	11		20	18		31	31		18
Confl. Bikes (#/hr)			3			3			16			7
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)		22.0			22.0			28.0			28.0	
Effective Green, g (s)		22.0			22.0			28.0			28.0	
Actuated g/C Ratio		0.31			0.31			0.39			0.39	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Lane Grp Cap (vph)		394			405			576			332	
v/s Ratio Prot												
v/s Ratio Perm		c0.35			0.12			0.26			c0.49	
v/c Ratio		1.16			0.38			0.67			1.27	
Uniform Delay, d1		25.0			19.6			18.2			22.0	
Progression Factor		0.99			1.00			0.88			1.00	
Incremental Delay, d2		96.6			2.7			5.0			143.6	
Delay (s)		121.4			22.3			21.0			165.6	
Level of Service		F			C			C			F	
Approach Delay (s/veh)		121.4			22.3			21.0			165.6	
Approach LOS		F			C			C			F	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		96.6			HCM 2000 Level of Service			F				
HCM 2000 Volume to Capacity ratio		1.11										
Actuated Cycle Length (s)		72.0			Sum of lost time (s)			17.0				
Intersection Capacity Utilization		107.5%			ICU Level of Service			G				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

520: Bay St & W Holly St

04/21/2026

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	45	719	342	20	48	0	0	435	4
Future Volume (vph)	0	0	0	45	719	342	20	48	0	0	435	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					8.0	8.0		8.0			8.0	
Lane Util. Factor					1.00	1.00		1.00			1.00	
Frpb, ped/bikes					1.00	0.86		1.00			1.00	
Flpb, ped/bikes					0.99	1.00		0.99			1.00	
Frt					1.00	0.85		1.00			1.00	
Flt Protected					1.00	1.00		0.99			1.00	
Satd. Flow (prot)					1471	1091		1456			1485	
Flt Permitted					1.00	1.00		0.46			1.00	
Satd. Flow (perm)					1471	1091		686			1485	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	45	719	342	20	48	0	0	435	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	764	342	0	68	0	0	439	0
Confl. Peds. (#/hr)			58	58		50	30		44	44		30
Confl. Bikes (#/hr)						25			3			5
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					2			4			4	
Permitted Phases				2		2	4					
Actuated Green, G (s)					39.0	39.0		17.0			17.0	
Effective Green, g (s)					39.0	39.0		17.0			17.0	
Actuated g/C Ratio					0.54	0.54		0.24			0.24	
Clearance Time (s)					8.0	8.0		8.0			8.0	
Lane Grp Cap (vph)					796	590		161			350	
v/s Ratio Prot											c0.30	
v/s Ratio Perm					0.52	0.31		0.10				
v/c Ratio					0.96	0.58		0.42			1.25	
Uniform Delay, d1					15.8	11.0		23.3			27.5	
Progression Factor					0.09	0.07		1.00			0.58	
Incremental Delay, d2					12.8	1.7		7.9			116.7	
Delay (s)					14.3	2.5		31.3			132.6	
Level of Service					B	A		C			F	
Approach Delay (s/veh)		0.0			10.7			31.3			132.6	
Approach LOS		A			B			C			F	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			44.7		HCM 2000 Level of Service						D	
HCM 2000 Volume to Capacity ratio			1.05									
Actuated Cycle Length (s)			72.0		Sum of lost time (s)						16.0	
Intersection Capacity Utilization			90.5%		ICU Level of Service						E	
Analysis Period (min)			15									
c Critical Lane Group												

Future 2045 Conditions
Holly St / Bay St Adjact to Updates at Champion / Prospect

Synchro 12 Report

HCM 7th TWSC
57: W Holly St & Champion St

Intersection

Int Delay, s/veh 2.7

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	0	135	447	0	734	0
Future Vol, veh/h	0	135	447	0	734	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	135	447	0	734	0

Major/Minor	Minor2	Major2
Conflicting Flow All	- 734	- 0
Stage 1	- -	- -
Stage 2	- -	- -
Critical Hdwy	- 6.2	- -
Critical Hdwy Stg 1	- -	- -
Critical Hdwy Stg 2	- -	- -
Follow-up Hdwy	- 3.3	- -
Pot Cap-1 Maneuver	0 423	- 0
Stage 1	0 -	- 0
Stage 2	0 -	- 0
Platoon blocked, %		-
Mov Cap-1 Maneuver	- 423	- -
Mov Cap-2 Maneuver	- -	- -
Stage 1	- -	- -
Stage 2	- -	- -

Approach	WB	NW
HCM Ctrl Dly, s/v	17.43	0
HCM LOS	C	

Minor Lane/Major Mvmt	NWTWBLn1
Capacity (veh/h)	- 423
HCM Lane V/C Ratio	- 0.319
HCM Ctrl Dly (s/v)	- 17.4
HCM Lane LOS	- C
HCM 95th %tile Q(veh)	- 1.4

HCM Unsignalized Intersection Capacity Analysis

57: W Holly St & Champion St

						
Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (veh/h)	0	135	447	0	734	0
Future Volume (Veh/h)	0	135	447	0	734	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	135	447	0	734	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (ft)	351					
pX, platoon unblocked						
vC, conflicting volume	447				582	447
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	447				582	447
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				0	100
cM capacity (veh/h)	1124				479	616
Direction, Lane #	WB 1	SE 1	NW 1			
Volume Total	135	447	734			
Volume Left	0	0	734			
Volume Right	0	0	0			
cSH	1700	1700	479			
Volume to Capacity	0.08	0.26	1.53			
Queue Length 95th (ft)	0	0	975			
Control Delay (s/veh)	0.0	0.0	272.6			
Lane LOS			F			
Approach Delay (s/veh)	0.0	0.0	272.6			
Approach LOS			F			
Intersection Summary						
Average Delay		152.1				
Intersection Capacity Utilization		77.1%		ICU Level of Service		D
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

57: W Holly St & Champion St

						
Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (veh/h)	0	135	447	0	734	0
Future Volume (Veh/h)	0	135	447	0	734	0
Sign Control	Stop			Stop	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	135	447	0	734	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)					417	
pX, platoon unblocked						
vC, conflicting volume	1692	1468	1468	0	0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1692	1468	1468	0	0	
tC, single (s)	7.1	6.5	6.5	6.2	4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.0	4.0	3.3	2.2	
p0 queue free %	0	0	0	100	55	
cM capacity (veh/h)	0	71	71	1091	1636	
Direction, Lane #	WB 1	SE 1	NW 1			
Volume Total	135	447	734			
Volume Left	0	0	734			
Volume Right	0	0	0			
cSH	71	71	1636			
Volume to Capacity	1.90	6.29	0.45			
Queue Length 95th (ft)	304	Err	60			
Control Delay (s/veh)	548.3	Err	9.0			
Lane LOS	F	F	A			
Approach Delay (s/veh)	548.3	Err	9.0			
Approach LOS	F	F				
Intersection Summary						
Average Delay		3457.6				
Intersection Capacity Utilization		77.1%		ICU Level of Service		D
Analysis Period (min)		15				

HCM 7th AWSC
57: W Holly St & Champion St

Intersection

Intersection Delay, s/veh	39.8
Intersection LOS	E

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Vol, veh/h	0	135	447	0	734	0
Future Vol, veh/h	0	135	447	0	734	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	135	447	0	734	0
Number of Lanes	0	1	1	0	1	0

Approach	WB	SE	NW
Opposing Approach		NW	SE
Opposing Lanes	0	1	1
Conflicting Approach Left	NW	WB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	SE		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay, s/veh	10.9	19.2	57.6
HCM LOS	B	C	F

Lane	NWLn1	WBLn1	SELn1
Vol Left, %	0%	0%	100%
Vol Thru, %	100%	0%	0%
Vol Right, %	0%	100%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	734	135	447
LT Vol	0	0	447
Through Vol	734	0	0
RT Vol	0	135	0
Lane Flow Rate	734	135	447
Geometry Grp	1	1	1
Degree of Util (X)	1.009	0.227	0.677
Departure Headway (Hd)	4.948	6.057	5.453
Convergence, Y/N	Yes	Yes	Yes
Cap	734	591	662
Service Time	2.977	4.11	3.488
HCM Lane V/C Ratio	1	0.228	0.675
HCM Control Delay, s/veh	57.6	10.9	19.2
HCM Lane LOS	F	B	C
HCM 95th-tile Q	17	0.9	5.2

HCM Signalized Intersection Capacity Analysis

57: W Holly St & Champion St

						
Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Traffic Volume (vph)	0	135	447	0	734	0
Future Volume (vph)	0	135	447	0	734	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	
Lane Util. Factor		1.00	1.00		1.00	
Frpb, ped/bikes		1.00	1.00		1.00	
Flpb, ped/bikes		1.00	1.00		1.00	
Frt		0.87	1.00		1.00	
Flt Protected		1.00	0.95		1.00	
Satd. Flow (prot)		1287	1413		1488	
Flt Permitted		1.00	0.95		1.00	
Satd. Flow (perm)		1287	1413		1488	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	135	447	0	734	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	135	447	0	734	0
Confl. Bikes (#/hr)						2
Parking (#/hr)	0	0	0	0	0	0
Turn Type		Over	Prot		NA	
Protected Phases		6	6		2	
Permitted Phases						
Actuated Green, G (s)		26.0	26.0		36.0	
Effective Green, g (s)		26.0	26.0		36.0	
Actuated g/C Ratio		0.36	0.36		0.50	
Clearance Time (s)		5.0	5.0		5.0	
Lane Grp Cap (vph)		464	510		744	
v/s Ratio Prot		0.10	c0.32		c0.49	
v/s Ratio Perm						
v/c Ratio		0.29	0.88		0.99	
Uniform Delay, d1		16.4	21.5		17.8	
Progression Factor		0.60	1.00		0.54	
Incremental Delay, d2		1.3	18.7		17.0	
Delay (s)		11.2	40.2		26.6	
Level of Service		B	D		C	
Approach Delay (s/veh)	11.2			40.2	26.6	
Approach LOS	B			D	C	
Intersection Summary						
HCM 2000 Control Delay (s/veh)			29.7		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.94			
Actuated Cycle Length (s)			72.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization			77.9%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

MOVEMENT SUMMARY

 **Site: [1 (5)] W Holly St & W Champion St - 2045 Vol (90ft diam) (Folder1)**
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Single-lane roundabout scenario. Holly St is one-way (approach only) to the west of Champion St
Site Category: (None)
Roundabout
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop of Cycles	Number of Cycles	Aver. Speed
			[Total HV]		[Total HV]					[Veh.]	[Dist]		Rate to Depart		mph
			veh/h	%	veh/h	%	v/c	sec		veh	ft				
East: W Holly St															
6	T1	All MCs	765	0.0	765	0.0	0.773	9.4	LOS A	9.9	246.9	0.86	0.92	1.20	15.8
Approach			765	0.0	765	0.0	0.773	9.4	LOS A	9.9	246.9	0.86	0.92	1.20	15.8
North: W Champion St															
14	R2	All MCs	141	0.0	141	0.0	0.224	6.3	LOS A	1.5	37.2	0.82	0.71	0.82	16.9
Approach			141	0.0	141	0.0	0.224	6.3	LOS A	1.5	37.2	0.82	0.71	0.82	16.9
West: W Holly St															
5	L2	All MCs	466	0.0	466	0.0	0.344	5.5	LOS A	0.0	0.0	0.00	0.57	0.00	18.5
Approach			466	0.0	466	0.0	0.344	5.5	LOS A	0.0	0.0	0.00	0.57	0.00	18.5
All Vehicles			1371	0.0	1371	0.0	0.773	7.8	LOS A	9.9	246.9	0.56	0.78	0.76	16.7

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

HCM 7th Signalized Intersection Summary

33: W Holly St & F St

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	0	481	193	0	743	47	72	305	14	43	234	60
Future Volume (veh/h)	0	481	193	0	743	47	72	305	14	43	234	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	0.99		0.95	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1841	1856	0	1856	1900	1870	1870	1900	1796	1841	1900
Adj Flow Rate, veh/h	0	481	193	0	743	47	72	305	14	43	234	60
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	4	3	0	3	0	2	2	0	7	4	0
Cap, veh/h	0	737	296	0	1023	65	111	367	16	125	615	157
Arrive On Green	0.00	0.59	0.59	0.00	0.59	0.59	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	0	1240	498	0	1723	109	209	1278	55	247	2142	548
Grp Volume(v), veh/h	0	0	674	0	0	790	391	0	0	168	0	169
Grp Sat Flow(s),veh/h/ln	0	0	1738	0	0	1832	1542	0	0	1398	0	1539
Q Serve(g_s), s	0.0	0.0	21.7	0.0	0.0	25.9	13.3	0.0	0.0	0.0	0.0	7.4
Cycle Q Clear(g_c), s	0.0	0.0	21.7	0.0	0.0	25.9	20.7	0.0	0.0	6.3	0.0	7.4
Prop In Lane	0.00		0.29	0.00		0.06	0.18		0.04	0.26		0.36
Lane Grp Cap(c), veh/h	0	0	1032	0	0	1088	493	0	0	455	0	442
V/C Ratio(X)	0.00	0.00	0.65	0.00	0.00	0.73	0.79	0.00	0.00	0.37	0.00	0.38
Avail Cap(c_a), veh/h	0	0	1032	0	0	1088	606	0	0	562	0	549
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	11.3	0.0	0.0	12.2	28.9	0.0	0.0	23.5	0.0	24.0
Incr Delay (d2), s/veh	0.0	0.0	3.2	0.0	0.0	2.5	5.8	0.0	0.0	0.5	0.0	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	8.4	0.0	0.0	10.2	8.2	0.0	0.0	2.7	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	14.5	0.0	0.0	14.6	34.7	0.0	0.0	24.0	0.0	24.6
LnGrp LOS			B			B	C			C		C
Approach Vol, veh/h		674			790			391			337	
Approach Delay, s/veh		14.5			14.6			34.7			24.3	
Approach LOS		B			B			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		55.0		29.2		55.0		29.2				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		50.0		30.0		50.0		30.0				
Max Q Clear Time (g_c+I1), s		23.7		9.4		27.9		22.7				
Green Ext Time (p_c), s		5.7		2.1		6.5		1.5				
Intersection Summary												
HCM 7th Control Delay, s/veh			19.7									
HCM 7th LOS			B									

Future 2045 Conditions
Prohibited Left Turns

Synchro 12 Report

HCM 7th Signalized Intersection Summary

33: W Holly St & F St

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	61	420	193	55	688	47	72	305	14	43	234	60
Future Volume (veh/h)	61	420	193	55	688	47	72	305	14	43	234	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.97	0.99		0.95	1.00		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1841	1856	1900	1856	1900	1870	1870	1900	1796	1841	1900
Adj Flow Rate, veh/h	61	420	193	55	688	47	72	305	14	43	234	60
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	4	3	0	3	0	2	2	0	7	4	0
Cap, veh/h	104	627	275	92	937	62	107	355	15	120	597	153
Arrive On Green	0.60	0.60	0.60	0.60	0.60	0.60	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	98	1040	457	81	1554	103	206	1253	54	242	2105	541
Grp Volume(v), veh/h	674	0	0	790	0	0	391	0	0	166	0	171
Grp Sat Flow(s),veh/h/ln	1595	0	0	1738	0	0	1513	0	0	1348	0	1540
Q Serve(g_s), s	0.0	0.0	0.0	4.0	0.0	0.0	14.4	0.0	0.0	0.0	0.0	7.9
Cycle Q Clear(g_c), s	23.5	0.0	0.0	27.5	0.0	0.0	22.2	0.0	0.0	6.7	0.0	7.9
Prop In Lane	0.09		0.29	0.07		0.06	0.18		0.04	0.26		0.35
Lane Grp Cap(c), veh/h	1006	0	0	1091	0	0	477	0	0	434	0	437
V/C Ratio(X)	0.67	0.00	0.00	0.72	0.00	0.00	0.82	0.00	0.00	0.38	0.00	0.39
Avail Cap(c_a), veh/h	1006	0	0	1091	0	0	516	0	0	470	0	473
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.4	0.0	0.0	12.3	0.0	0.0	30.8	0.0	0.0	24.8	0.0	25.4
Incr Delay (d2), s/veh	3.5	0.0	0.0	2.4	0.0	0.0	9.5	0.0	0.0	0.6	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.8	0.0	0.0	10.6	0.0	0.0	9.1	0.0	0.0	2.8	0.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	15.0	0.0	0.0	14.7	0.0	0.0	40.3	0.0	0.0	25.4	0.0	26.0
LnGrp LOS	B			B			D			C		C
Approach Vol, veh/h	674			790			391			337		
Approach Delay, s/veh	15.0			14.7			40.3			25.7		
Approach LOS	B			B			D			C		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	58.0			29.9			58.0			29.9		
Change Period (Y+Rc), s	5.0			5.0			5.0			5.0		
Max Green Setting (Gmax), s	53.0			27.0			53.0			27.0		
Max Q Clear Time (g_c+I1), s	25.5			9.9			29.5			24.2		
Green Ext Time (p_c), s	6.2			2.0			7.0			0.7		
Intersection Summary												
HCM 7th Control Delay, s/veh				21.0								
HCM 7th LOS				C								

HCM 7th Signalized Intersection Summary

33: W Holly St & F St

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	61	420	193	55	688	47	72	305	14	43	234	60
Future Volume (veh/h)	61	420	193	55	688	47	72	305	14	43	234	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.96	0.99		0.94	1.00		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1841	1856	1900	1856	1900	1870	1870	1900	1796	1841	1900
Adj Flow Rate, veh/h	61	420	193	55	688	47	72	305	14	43	234	60
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	4	3	0	3	0	2	2	0	7	4	0
Cap, veh/h	50	344	158	43	540	37	69	227	10	85	450	120
Arrive On Green	0.32	0.32	0.32	0.34	0.34	0.34	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	156	1075	494	127	1589	109	171	946	41	226	1873	500
Grp Volume(v), veh/h	674	0	0	790	0	0	391	0	0	151	0	186
Grp Sat Flow(s),veh/h/ln	1725	0	0	1824	0	0	1159	0	0	1053	0	1546
Q Serve(g_s), s	48.0	0.0	0.0	51.0	0.0	0.0	20.4	0.0	0.0	0.0	0.0	15.6
Cycle Q Clear(g_c), s	48.0	0.0	0.0	51.0	0.0	0.0	36.0	0.0	0.0	16.4	0.0	15.6
Prop In Lane	0.09		0.29	0.07		0.06	0.18		0.04	0.28		0.32
Lane Grp Cap(c), veh/h	552	0	0	620	0	0	306	0	0	283	0	371
V/C Ratio(X)	1.22	0.00	0.00	1.27	0.00	0.00	1.28	0.00	0.00	0.53	0.00	0.50
Avail Cap(c_a), veh/h	552	0	0	620	0	0	306	0	0	283	0	371
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	51.0	0.0	0.0	49.5	0.0	0.0	61.5	0.0	0.0	48.4	0.0	49.2
Incr Delay (d2), s/veh	115.0	0.0	0.0	135.5	0.0	0.0	147.0	0.0	0.0	1.9	0.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	38.5	0.0	0.0	46.7	0.0	0.0	24.5	0.0	0.0	5.1	0.0	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	166.0	0.0	0.0	185.0	0.0	0.0	208.5	0.0	0.0	50.3	0.0	50.3
LnGrp LOS	F			F			F			D		D
Approach Vol, veh/h		674			790			391			337	
Approach Delay, s/veh		166.0			185.0			208.5			50.3	
Approach LOS		F			F			F			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		53.0		41.0		56.0		41.0				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		48.0		36.0		51.0		36.0				
Max Q Clear Time (g_c+I1), s		50.0		18.4		53.0		38.0				
Green Ext Time (p_c), s		0.0		2.0		0.0		0.0				
Intersection Summary												
HCM 7th Control Delay, s/veh			162.7									
HCM 7th LOS			F									

HCM 7th Signalized Intersection Summary

33: W Holly St & F St

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	0	481	193	0	743	47	72	305	14	43	234	60
Future Volume (veh/h)	0	481	193	0	743	47	72	305	14	43	234	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	0.99		0.95	1.00		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1841	1856	0	1856	1900	1870	1870	1900	1796	1841	1900
Adj Flow Rate, veh/h	0	481	193	0	743	47	72	305	14	43	234	60
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	4	3	0	3	0	2	2	0	7	4	0
Cap, veh/h	0	742	298	0	1036	66	112	369	16	85	334	80
Arrive On Green	0.00	0.60	0.60	0.00	0.60	0.60	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	0	1234	495	0	1723	109	220	1323	57	130	1199	288
Grp Volume(v), veh/h	0	0	674	0	0	790	391	0	0	337	0	0
Grp Sat Flow(s),veh/h/ln	0	0	1729	0	0	1832	1600	0	0	1618	0	0
Q Serve(g_s), s	0.0	0.0	21.2	0.0	0.0	25.2	4.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	21.2	0.0	0.0	25.2	19.5	0.0	0.0	15.5	0.0	0.0
Prop In Lane	0.00		0.29	0.00		0.06	0.18		0.04	0.13		0.18
Lane Grp Cap(c), veh/h	0	0	1039	0	0	1101	497	0	0	500	0	0
V/C Ratio(X)	0.00	0.00	0.65	0.00	0.00	0.72	0.79	0.00	0.00	0.67	0.00	0.00
Avail Cap(c_a), veh/h	0	0	1039	0	0	1101	631	0	0	632	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	10.8	0.0	0.0	11.6	28.4	0.0	0.0	27.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	3.1	0.0	0.0	2.3	5.1	0.0	0.0	2.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	8.1	0.0	0.0	9.8	8.0	0.0	0.0	6.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	14.0	0.0	0.0	13.9	33.5	0.0	0.0	28.9	0.0	0.0
LnGrp LOS			B			B	C			C		
Approach Vol, veh/h		674			790			391			337	
Approach Delay, s/veh		14.0			13.9			33.5			28.9	
Approach LOS		B			B			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		55.0		28.2		55.0		28.2				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		50.0		30.0		50.0		30.0				
Max Q Clear Time (g_c+I1), s		23.2		17.5		27.2		21.5				
Green Ext Time (p_c), s		5.7		1.8		6.6		1.7				
Intersection Summary												
HCM 7th Control Delay, s/veh			19.7									
HCM 7th LOS			B									

Future 2045 Conditions
Prohibited Left Turns, F St Turn Lane Removal

Synchro 12 Report

HCM 7th Signalized Intersection Summary

33: W Holly St & F St

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	61	420	193	55	688	47	72	305	14	43	234	60
Future Volume (veh/h)	61	420	193	55	688	47	72	305	14	43	234	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	0.99		0.95	1.00		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1841	1856	1900	1856	1900	1870	1870	1900	1796	1841	1900
Adj Flow Rate, veh/h	61	420	193	55	688	47	72	305	14	43	234	60
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	4	3	0	3	0	2	2	0	7	4	0
Cap, veh/h	105	635	279	93	949	63	109	358	16	82	326	78
Arrive On Green	0.61	0.61	0.61	0.61	0.61	0.61	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	98	1041	457	80	1556	104	217	1299	56	129	1182	284
Grp Volume(v), veh/h	674	0	0	790	0	0	391	0	0	337	0	0
Grp Sat Flow(s),veh/h/ln	1596	0	0	1740	0	0	1573	0	0	1596	0	0
Q Serve(g_s), s	0.0	0.0	0.0	3.9	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	22.7	0.0	0.0	26.5	0.0	0.0	21.0	0.0	0.0	16.5	0.0	0.0
Prop In Lane	0.09		0.29	0.07		0.06	0.18		0.04	0.13		0.18
Lane Grp Cap(c), veh/h	1018	0	0	1105	0	0	482	0	0	486	0	0
V/C Ratio(X)	0.66	0.00	0.00	0.71	0.00	0.00	0.81	0.00	0.00	0.69	0.00	0.00
Avail Cap(c_a), veh/h	1018	0	0	1105	0	0	540	0	0	543	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	10.9	0.0	0.0	11.7	0.0	0.0	30.1	0.0	0.0	28.5	0.0	0.0
Incr Delay (d2), s/veh	3.4	0.0	0.0	2.2	0.0	0.0	8.3	0.0	0.0	3.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.4	0.0	0.0	10.1	0.0	0.0	8.9	0.0	0.0	6.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.3	0.0	0.0	13.9	0.0	0.0	38.4	0.0	0.0	31.8	0.0	0.0
LnGrp LOS	B			B			D			C		
Approach Vol, veh/h	674			790			391			337		
Approach Delay, s/veh	14.3			13.9			38.4			31.8		
Approach LOS	B			B			D			C		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	58.0			28.9			58.0			28.9		
Change Period (Y+Rc), s	5.0			5.0			5.0			5.0		
Max Green Setting (Gmax), s	53.0			27.0			53.0			27.0		
Max Q Clear Time (g_c+I1), s	24.7			18.5			28.5			23.0		
Green Ext Time (p_c), s	6.3			1.4			7.1			0.9		
Intersection Summary												
HCM 7th Control Delay, s/veh	21.2											
HCM 7th LOS	C											

Future 2045 Conditions
 Permissive Left Turns, F St Turn Lane Removal

Synchro 12 Report

HCM 7th Signalized Intersection Summary

33: W Holly St & F St

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	61	420	193	55	688	47	72	305	14	43	234	60
Future Volume (veh/h)	61	420	193	55	688	47	72	305	14	43	234	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.96	1.00		0.94	1.00		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1841	1856	1900	1856	1900	1870	1870	1900	1796	1841	1900
Adj Flow Rate, veh/h	61	420	193	55	688	47	72	305	14	43	234	60
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	4	3	0	3	0	2	2	0	7	4	0
Cap, veh/h	49	334	154	43	540	37	70	233	10	58	253	62
Arrive On Green	0.31	0.31	0.31	0.34	0.34	0.34	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	155	1067	490	127	1589	109	170	946	41	126	1026	250
Grp Volume(v), veh/h	674	0	0	790	0	0	391	0	0	337	0	0
Grp Sat Flow(s),veh/h/ln	1712	0	0	1824	0	0	1157	0	0	1402	0	0
Q Serve(g_s), s	47.0	0.0	0.0	51.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	47.0	0.0	0.0	51.0	0.0	0.0	37.0	0.0	0.0	35.6	0.0	0.0
Prop In Lane	0.09		0.29	0.07		0.06	0.18		0.04	0.13		0.18
Lane Grp Cap(c), veh/h	536	0	0	620	0	0	314	0	0	373	0	0
V/C Ratio(X)	1.26	0.00	0.00	1.27	0.00	0.00	1.25	0.00	0.00	0.90	0.00	0.00
Avail Cap(c_a), veh/h	536	0	0	620	0	0	314	0	0	373	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	51.5	0.0	0.0	49.5	0.0	0.0	57.2	0.0	0.0	54.9	0.0	0.0
Incr Delay (d2), s/veh	130.0	0.0	0.0	135.5	0.0	0.0	134.5	0.0	0.0	24.6	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	39.6	0.0	0.0	46.7	0.0	0.0	24.0	0.0	0.0	15.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	181.5	0.0	0.0	185.0	0.0	0.0	191.6	0.0	0.0	79.5	0.0	0.0
LnGrp LOS	F			F			F			E		
Approach Vol, veh/h	674			790			391			337		
Approach Delay, s/veh	181.5			185.0			191.6			79.5		
Approach LOS	F			F			F			E		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	52.0			42.0			56.0			42.0		
Change Period (Y+Rc), s	5.0			5.0			5.0			5.0		
Max Green Setting (Gmax), s	47.0			37.0			51.0			37.0		
Max Q Clear Time (g_c+I1), s	49.0			37.6			53.0			39.0		
Green Ext Time (p_c), s	0.0			0.0			0.0			0.0		
Intersection Summary												
HCM 7th Control Delay, s/veh	168.9											
HCM 7th LOS	F											

HCM Signalized Intersection Capacity Analysis

44: W Holly St/Eldridge Ave & Broadway

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	122	466	2	1	577	242	1	1	0	210	1	150
Future Volume (vph)	122	466	2	1	577	242	1	1	0	210	1	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99			1.00		1.00	0.97	
Flpb, ped/bikes		1.00			1.00			1.00		0.99	1.00	
Frt		1.00			0.96			1.00		1.00	0.85	
Flt Protected		0.99			1.00			0.98		0.95	1.00	
Satd. Flow (prot)		1746			1706			1789		1713	1516	
Flt Permitted		0.74			1.00			0.91		0.76	1.00	
Satd. Flow (perm)		1308			1705			1660		1364	1516	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	122	466	2	1	577	242	1	1	0	210	1	150
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	590	0	0	820	0	0	2	0	210	151	0
Confl. Peds. (#/hr)	7		7	7		7	3		6	6		3
Confl. Bikes (#/hr)			10			5						4
Heavy Vehicles (%)	4%	4%	0%	0%	3%	1%	0%	0%	0%	1%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		36.9			36.9			14.8		14.8	14.8	
Effective Green, g (s)		36.9			36.9			14.8		14.8	14.8	
Actuated g/C Ratio		0.60			0.60			0.24		0.24	0.24	
Clearance Time (s)		5.0			5.0			5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		782			1019			398		327	363	
v/s Ratio Prot											0.10	
v/s Ratio Perm		0.45			0.48			0.00		0.15		
v/c Ratio		0.75			0.80			0.01		0.64	0.42	
Uniform Delay, d1		9.1			9.6			17.8		21.1	19.8	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		4.2			4.7			0.0		4.3	0.8	
Delay (s)		13.2			14.3			17.9		25.3	20.6	
Level of Service		B			B			B		C	C	
Approach Delay (s/veh)		13.2			14.3			17.9			23.3	
Approach LOS		B			B			B			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		15.8			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.76										
Actuated Cycle Length (s)		61.7			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		107.6%			ICU Level of Service			G				
Analysis Period (min)		15										
c Critical Lane Group												

Future 2045 Conditions
Permissive Left Turns

Synchro 12 Report

HCM Signalized Intersection Capacity Analysis

44: W Holly St/Eldridge Ave & Broadway

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	122	466	2	1	577	242	1	1	0	210	1	150
Future Volume (vph)	122	466	2	1	577	242	1	1	0	210	1	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99			1.00		1.00	0.96	
Flpb, ped/bikes		1.00			1.00			1.00		0.98	1.00	
Frt		1.00			0.96			1.00		1.00	0.85	
Flt Protected		0.99			1.00			0.98		0.95	1.00	
Satd. Flow (prot)		1747			1699			1786		1693	1502	
Flt Permitted		0.99			1.00			0.92		0.76	1.00	
Satd. Flow (perm)		1747			1699			1686		1349	1502	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	122	466	2	1	577	242	1	1	0	210	1	150
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	590	0	0	820	0	0	2	0	210	151	0
Confl. Peds. (#/hr)	7		7	7		7	3		6	6		3
Confl. Bikes (#/hr)			10			5						4
Heavy Vehicles (%)	4%	4%	0%	0%	3%	1%	0%	0%	0%	1%	0%	0%
Turn Type	Split	NA		Split	NA		Perm	NA		Perm	NA	
Protected Phases	2	2		6	6			4			4	
Permitted Phases							4			4		
Actuated Green, G (s)		45.0			63.0			22.0		22.0	22.0	
Effective Green, g (s)		45.0			63.0			22.0		22.0	22.0	
Actuated g/C Ratio		0.31			0.43			0.15		0.15	0.15	
Clearance Time (s)		5.0			5.0			5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		542			738			255		204	227	
v/s Ratio Prot		c0.34			c0.48						0.10	
v/s Ratio Perm								0.00		c0.16		
v/c Ratio		1.09			1.11			0.01		1.03	0.67	
Uniform Delay, d1		50.0			41.0			52.2		61.5	58.0	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		64.9			67.9			0.0		70.9	7.2	
Delay (s)		114.9			108.9			52.2		132.4	65.2	
Level of Service		F			F			D		F	E	
Approach Delay (s/veh)		114.9			108.9			52.2			104.3	
Approach LOS		F			F			D			F	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		109.9										
HCM 2000 Volume to Capacity ratio		1.09										
Actuated Cycle Length (s)		145.0								15.0		
Intersection Capacity Utilization		107.6%								G		
Analysis Period (min)		15										
c Critical Lane Group												

SIMTRAFFIC REPORTS



Queuing and Blocking Report
One-Way Shared Westbound Left/ Through Lane and Right-Turn Lane at Bay St

Intersection: 519: Commercial St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	282	248	54	84
Average Queue (ft)	112	95	12	37
95th Queue (ft)	225	198	41	74
Link Distance (ft)	285	285	464	450
Upstream Blk Time (%)	0	0		
Queuing Penalty (veh)	2	0		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 520: Bay St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	R	LT	TR
Maximum Queue (ft)	272	262	106	78
Average Queue (ft)	75	126	35	77
95th Queue (ft)	204	227	87	83
Link Distance (ft)	301	301	434	25
Upstream Blk Time (%)	0	0		70
Queuing Penalty (veh)	1	0		229
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 521: E Magnolia St & Champion St & Grand St

Movement	EB	EB	WB	SB
Directions Served	L	R	LTR	LR
Maximum Queue (ft)	56	115	80	106
Average Queue (ft)	13	71	33	43
95th Queue (ft)	40	118	67	83
Link Distance (ft)	99	99	262	299
Upstream Blk Time (%)		2		
Queuing Penalty (veh)		3		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

Bay St One Way Westbound Left-Turn Lane and Shared Through / Right Lane

Intersection: 507: N Garden St & E Chestnut St

Movement	SE	SE	NE	SW
Directions Served	LT	TR	TR	LT
Maximum Queue (ft)	248	256	477	207
Average Queue (ft)	100	130	322	49
95th Queue (ft)	257	286	593	151
Link Distance (ft)	287	287	465	453
Upstream Blk Time (%)	7	14	39	0
Queuing Penalty (veh)	32	61	157	1
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 509: B.FrankJr & E Chestnut St

Movement	SE	SE	NE	SW
Directions Served	LT	TR	TR	LT
Maximum Queue (ft)	292	299	969	93
Average Queue (ft)	122	151	261	21
95th Queue (ft)	324	338	747	73
Link Distance (ft)	299	299	1475	461
Upstream Blk Time (%)	17	21		
Queuing Penalty (veh)	77	96		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 512: B.FrankJr/B.Frank & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	366	349	408	71
Average Queue (ft)	324	320	180	17
95th Queue (ft)	399	387	431	53
Link Distance (ft)	281	281	461	317
Upstream Blk Time (%)	72	69	8	
Queuing Penalty (veh)	391	371	10	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

Bay St One Way Westbound Left-Turn Lane and Shared Through / Right Lane

Intersection: 513: High St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	340	340	132	72
Average Queue (ft)	284	286	32	13
95th Queue (ft)	420	423	116	49
Link Distance (ft)	296	296	452	462
Upstream Blk Time (%)	63	60		
Queuing Penalty (veh)	363	345		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 514: N Garden St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	365	366	469	165
Average Queue (ft)	318	320	340	44
95th Queue (ft)	473	474	591	122
Link Distance (ft)	304	304	453	472
Upstream Blk Time (%)	66	63	33	
Queuing Penalty (veh)	380	362	94	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 515: N Forest St & W Holly St

Movement	NW	NW	NE	NE
Directions Served	T	TR	LT	T
Maximum Queue (ft)	346	348	479	482
Average Queue (ft)	309	313	358	331
95th Queue (ft)	429	418	601	602
Link Distance (ft)	284	284	454	454
Upstream Blk Time (%)	68	66	31	24
Queuing Penalty (veh)	424	410	130	101
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

Bay St One Way Westbound Left-Turn Lane and Shared Through / Right Lane

Intersection: 516: N State St & W Holly St

Movement	NW	NW	SW	SW
Directions Served	LT	T	T	TR
Maximum Queue (ft)	360	358	464	472
Average Queue (ft)	316	312	212	227
95th Queue (ft)	441	434	501	513
Link Distance (ft)	292	292	463	463
Upstream Blk Time (%)	60	63	11	12
Queuing Penalty (veh)	438	456	36	41
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 517: Railroad Ave & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	369	371	128	134
Average Queue (ft)	330	336	94	79
95th Queue (ft)	461	457	160	154
Link Distance (ft)	307	307	74	80
Upstream Blk Time (%)	53	67	60	39
Queuing Penalty (veh)	330	415	67	47
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 518: Cornwall Ave & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	359	361	319	341
Average Queue (ft)	312	317	119	136
95th Queue (ft)	462	464	298	329
Link Distance (ft)	292	292	466	466
Upstream Blk Time (%)	53	71	0	4
Queuing Penalty (veh)	309	411	0	7
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

Bay St One Way Westbound Left-Turn Lane and Shared Through / Right Lane

Intersection: 519: Commercial St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	348	353	66	112
Average Queue (ft)	277	309	12	34
95th Queue (ft)	436	458	45	95
Link Distance (ft)	285	285	463	450
Upstream Blk Time (%)	24	61		
Queuing Penalty (veh)	125	317		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 520: Bay St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	L	TR	LT	TR
Maximum Queue (ft)	355	371	112	84
Average Queue (ft)	220	329	32	79
95th Queue (ft)	441	491	88	105
Link Distance (ft)	301	301	429	31
Upstream Blk Time (%)	11	40		68
Queuing Penalty (veh)	47	167		223
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 521: E Magnolia St & Champion St & Grand St

Movement	EB	EB	WB	SB
Directions Served	L	R	LTR	LR
Maximum Queue (ft)	45	115	70	135
Average Queue (ft)	11	70	21	48
95th Queue (ft)	37	125	54	144
Link Distance (ft)	99	99	262	299
Upstream Blk Time (%)		7		3
Queuing Penalty (veh)		10		4
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

Bay St Two-way

Intersection: 507: N Garden St & E Chestnut St

Movement	SE	SE	NE	SW
Directions Served	LT	TR	TR	LT
Maximum Queue (ft)	272	280	480	223
Average Queue (ft)	108	138	342	49
95th Queue (ft)	268	279	603	165
Link Distance (ft)	287	287	465	453
Upstream Blk Time (%)	8	11	39	1
Queuing Penalty (veh)	37	48	158	3
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 509: B.FrankJr & E Chestnut St

Movement	SE	SE	NE	SW
Directions Served	LT	TR	TR	LT
Maximum Queue (ft)	277	291	686	77
Average Queue (ft)	108	140	199	17
95th Queue (ft)	301	317	568	53
Link Distance (ft)	299	299	1475	461
Upstream Blk Time (%)	14	17		
Queuing Penalty (veh)	66	77		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 512: B.FrankJr/B.Frank & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	364	349	408	78
Average Queue (ft)	327	319	192	17
95th Queue (ft)	400	391	467	59
Link Distance (ft)	281	281	461	317
Upstream Blk Time (%)	74	69	7	
Queuing Penalty (veh)	397	370	8	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

Bay St Two-way

Intersection: 513: High St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	340	340	114	68
Average Queue (ft)	291	293	27	16
95th Queue (ft)	417	422	86	51
Link Distance (ft)	296	296	452	462
Upstream Blk Time (%)	69	63		
Queuing Penalty (veh)	397	360		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 514: N Garden St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	369	367	468	167
Average Queue (ft)	318	319	352	49
95th Queue (ft)	479	481	600	141
Link Distance (ft)	304	304	453	472
Upstream Blk Time (%)	68	65	36	
Queuing Penalty (veh)	389	376	104	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 515: N Forest St & W Holly St

Movement	NW	NW	NE	NE
Directions Served	T	TR	LT	T
Maximum Queue (ft)	345	348	482	486
Average Queue (ft)	314	315	354	328
95th Queue (ft)	420	422	600	599
Link Distance (ft)	284	284	454	454
Upstream Blk Time (%)	70	66	21	15
Queuing Penalty (veh)	433	408	87	61
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

Bay St Two-way

Intersection: 516: N State St & W Holly St

Movement	NW	NW	SW	SW
Directions Served	LT	T	T	TR
Maximum Queue (ft)	359	359	448	447
Average Queue (ft)	331	327	199	217
95th Queue (ft)	417	407	481	488
Link Distance (ft)	292	292	463	463
Upstream Blk Time (%)	61	61	3	4
Queuing Penalty (veh)	443	443	10	14
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 517: Railroad Ave & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	370	373	128	133
Average Queue (ft)	339	348	87	83
95th Queue (ft)	445	441	159	155
Link Distance (ft)	307	307	74	80
Upstream Blk Time (%)	51	69	53	40
Queuing Penalty (veh)	317	429	59	48
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 518: Cornwall Ave & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	360	362	355	310
Average Queue (ft)	331	336	159	119
95th Queue (ft)	424	423	382	268
Link Distance (ft)	292	292	466	466
Upstream Blk Time (%)	52	74	5	0
Queuing Penalty (veh)	300	426	7	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

Bay St Two-way

Intersection: 519: Commercial St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	348	354	69	88
Average Queue (ft)	291	326	14	30
95th Queue (ft)	418	428	48	70
Link Distance (ft)	285	285	463	450
Upstream Blk Time (%)	24	64		
Queuing Penalty (veh)	125	333		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 520: Bay St & W Holly St

Movement	SE	NW	NW	NE	SW
Directions Served	R	L	TR	LT	TR
Maximum Queue (ft)	141	356	371	79	84
Average Queue (ft)	52	233	352	28	67
95th Queue (ft)	146	441	435	66	105
Link Distance (ft)	339	301	301	429	31
Upstream Blk Time (%)	3	11	42		43
Queuing Penalty (veh)	5	45	175		61
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 521: E Magnolia St & Champion St & Grand St

Movement	EB	EB	WB	SB
Directions Served	L	R	LTR	LR
Maximum Queue (ft)	48	116	78	106
Average Queue (ft)	11	68	23	40
95th Queue (ft)	37	119	60	89
Link Distance (ft)	99	99	262	299
Upstream Blk Time (%)		3		
Queuing Penalty (veh)		4		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

Champion and Prospect AWSC

Intersection: 534: N State St & Champion St

Movement	NW	NW	SW	SW
Directions Served	LT	T	T	TR
Maximum Queue (ft)	139	73	230	241
Average Queue (ft)	62	29	161	168
95th Queue (ft)	117	68	216	228
Link Distance (ft)	290	290	449	449
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 536: Cornwall Ave & Champion St

Movement	SE	SE	NW	NW	NE	SW
Directions Served	L	R	LT	R	LT	TR
Maximum Queue (ft)	53	52	109	84	206	201
Average Queue (ft)	18	13	38	29	72	112
95th Queue (ft)	45	41	82	66	150	178
Link Distance (ft)	82	82	279	279	440	166
Upstream Blk Time (%)	0	0				3
Queuing Penalty (veh)	0	0				6
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 538: Champion St & Prospect St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	140	86	140	167
Average Queue (ft)	67	41	63	70
95th Queue (ft)	115	68	105	126
Link Distance (ft)	264	138	173	299
Upstream Blk Time (%)	0	0	0	
Queuing Penalty (veh)	0	0	0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

Champion and Prospect - Bike Phase

Intersection: 534: N State St & Champion St

Movement	NW	NW	SW	SW
Directions Served	LT	T	T	TR
Maximum Queue (ft)	125	98	228	241
Average Queue (ft)	62	33	160	169
95th Queue (ft)	113	79	214	228
Link Distance (ft)	290	290	449	449
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 536: Cornwall Ave & Champion St

Movement	SE	SE	NW	NW	NE	SW	B80
Directions Served	L	R	LT	R	LT	TR	T
Maximum Queue (ft)	56	55	95	75	193	209	11
Average Queue (ft)	16	13	39	29	71	114	0
95th Queue (ft)	45	41	79	66	152	188	7
Link Distance (ft)	82	82	279	279	440	166	160
Upstream Blk Time (%)	0	0				3	
Queuing Penalty (veh)	0	0				7	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 538: Champion St & Prospect St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	253	90	165	314
Average Queue (ft)	170	34	86	170
95th Queue (ft)	261	78	144	293
Link Distance (ft)	264	138	173	299
Upstream Blk Time (%)	2	1	0	3
Queuing Penalty (veh)	6	1	0	10
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

Holly / Bay Adjacent to Champion / Prospect Update - Existing

Intersection: 519: Commercial St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	267	255	48	80
Average Queue (ft)	116	99	12	33
95th Queue (ft)	221	196	40	69
Link Distance (ft)	285	285	464	450
Upstream Blk Time (%)	0	0		
Queuing Penalty (veh)	1	1		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 520: Bay St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	R	LT	TR
Maximum Queue (ft)	140	122	147	78
Average Queue (ft)	50	40	43	74
95th Queue (ft)	105	85	116	89
Link Distance (ft)	301	301	434	25
Upstream Blk Time (%)				64
Queuing Penalty (veh)				210
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 521: E Magnolia St & Champion St & Grand St

Movement	EB	EB	WB	SB
Directions Served	L	R	LTR	LR
Maximum Queue (ft)	39	111	80	107
Average Queue (ft)	8	49	31	48
95th Queue (ft)	30	95	64	92
Link Distance (ft)	99	99	262	299
Upstream Blk Time (%)		1		
Queuing Penalty (veh)		1		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

Champion St One-Way Stop SB

Intersection: 55: Railroad Ave

Movement	NE	SW
Directions Served	UT	T
Maximum Queue (ft)	44	32
Average Queue (ft)	6	1
95th Queue (ft)	28	14
Link Distance (ft)	260	74
Upstream Blk Time (%)		0
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 57: W Holly St & Champion St

Movement	WB	SE	NW
Directions Served	R	L	T
Maximum Queue (ft)	70	204	13
Average Queue (ft)	33	86	1
95th Queue (ft)	57	161	7
Link Distance (ft)	280	251	346
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 59: Railroad Ave

Movement	SW
Directions Served	UT
Maximum Queue (ft)	10
Average Queue (ft)	1
95th Queue (ft)	9
Link Distance (ft)	273
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report

One-Way Stop Control Westbound on Holly St

Intersection: 55: Railroad Ave

Movement	NE	SW
Directions Served	UT	T
Maximum Queue (ft)	37	16
Average Queue (ft)	4	1
95th Queue (ft)	21	8
Link Distance (ft)	260	74
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 57: W Holly St & Champion St

Movement	WB	SE	NW
Directions Served	R	L	T
Maximum Queue (ft)	17	18	365
Average Queue (ft)	1	1	324
95th Queue (ft)	9	9	430
Link Distance (ft)	280	251	346
Upstream Blk Time (%)			11
Queuing Penalty (veh)			62
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 59: Railroad Ave

Movement	SW
Directions Served	UT
Maximum Queue (ft)	8
Average Queue (ft)	0
95th Queue (ft)	4
Link Distance (ft)	273
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report

One-Way Stop Control Westbound on Holly St

Intersection: 516: N State St & W Holly St

Movement	NW	NW	SW	SW
Directions Served	LT	T	T	TR
Maximum Queue (ft)	353	348	139	173
Average Queue (ft)	231	213	62	74
95th Queue (ft)	384	358	120	140
Link Distance (ft)	292	292	463	463
Upstream Blk Time (%)	6	4		
Queuing Penalty (veh)	44	31		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 517: Railroad Ave & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	313	326	111	124
Average Queue (ft)	123	135	45	61
95th Queue (ft)	281	299	93	110
Link Distance (ft)	307	307	74	80
Upstream Blk Time (%)	3	4	4	7
Queuing Penalty (veh)	16	24	4	9
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 518: Cornwall Ave & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	341	340	147	209
Average Queue (ft)	185	181	66	107
95th Queue (ft)	361	357	127	178
Link Distance (ft)	292	292	466	466
Upstream Blk Time (%)	8	7		
Queuing Penalty (veh)	45	41		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

One-Way Stop Control Westbound on Holly St

Intersection: 519: Commercial St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	348	340	63	88
Average Queue (ft)	219	201	13	35
95th Queue (ft)	406	386	42	73
Link Distance (ft)	285	285	464	450
Upstream Blk Time (%)	16	9		
Queuing Penalty (veh)	82	47		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 520: Bay St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	R	LT	TR
Maximum Queue (ft)	370	362	143	78
Average Queue (ft)	257	226	41	77
95th Queue (ft)	473	396	116	82
Link Distance (ft)	301	301	434	25
Upstream Blk Time (%)	21	6		71
Queuing Penalty (veh)	86	26		234
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 521: E Magnolia St & Champion St & Grand St

Movement	EB	EB	WB	SB
Directions Served	L	R	LTR	LR
Maximum Queue (ft)	56	114	83	102
Average Queue (ft)	15	67	32	42
95th Queue (ft)	43	115	69	85
Link Distance (ft)	99	99	262	299
Upstream Blk Time (%)		2		
Queuing Penalty (veh)		3		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

Champion St Two-Way Stop

Intersection: 55: Railroad Ave

Movement	NE	SW
Directions Served	UT	T
Maximum Queue (ft)	54	22
Average Queue (ft)	6	1
95th Queue (ft)	31	10
Link Distance (ft)	260	74
Upstream Blk Time (%)		0
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 57: W Holly St & Champion St

Movement	WB	SE
Directions Served	R	L
Maximum Queue (ft)	78	248
Average Queue (ft)	35	114
95th Queue (ft)	62	202
Link Distance (ft)	280	251
Upstream Blk Time (%)		0
Queuing Penalty (veh)		1
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 59: Railroad Ave

Movement	NE	SW
Directions Served	T	UT
Maximum Queue (ft)	2	19
Average Queue (ft)	0	1
95th Queue (ft)	2	9
Link Distance (ft)	64	273
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

Champion St All-Way Stop

Intersection: 55: Railroad Ave

Movement	NE	SW
Directions Served	UT	T
Maximum Queue (ft)	48	7
Average Queue (ft)	4	0
95th Queue (ft)	27	8
Link Distance (ft)	260	74
Upstream Blk Time (%)		0
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 57: W Holly St & Champion St

Movement	WB	SE	NW
Directions Served	R	L	T
Maximum Queue (ft)	68	199	329
Average Queue (ft)	34	89	176
95th Queue (ft)	56	149	300
Link Distance (ft)	280	251	346
Upstream Blk Time (%)		0	0
Queuing Penalty (veh)		0	1
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 59: Railroad Ave

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Queuing and Blocking Report

Champion St Signal

Intersection: 55: Railroad Ave

Movement	NE	SW
Directions Served	UT	T
Maximum Queue (ft)	46	5
Average Queue (ft)	5	0
95th Queue (ft)	27	3
Link Distance (ft)	260	74
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 57: W Holly St & Champion St

Movement	WB	SE	NW
Directions Served	R	L	T
Maximum Queue (ft)	91	250	220
Average Queue (ft)	36	141	144
95th Queue (ft)	77	236	209
Link Distance (ft)	280	251	346
Upstream Blk Time (%)		1	
Queuing Penalty (veh)		3	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 59: Railroad Ave

Movement	SW
Directions Served	UT
Maximum Queue (ft)	2
Average Queue (ft)	0
95th Queue (ft)	2
Link Distance (ft)	273
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report

F St - Prohibited Left Turn

Intersection: 33: W Holly St & F St

Movement	SE	NW	NE	SW	SW
Directions Served	TR	TR	LTR	LT	TR
Maximum Queue (ft)	362	309	241	124	174
Average Queue (ft)	186	171	149	72	70
95th Queue (ft)	326	290	239	128	139
Link Distance (ft)	1259	697	230		493
Upstream Blk Time (%)			2		
Queuing Penalty (veh)			6		
Storage Bay Dist (ft)				100	
Storage Blk Time (%)				5	3
Queuing Penalty (veh)				6	4

Intersection: 34: F St & Roeder Ave

Movement	SE	SE	NW	NW	NE	NE	SW	SW
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	174	410	50	555	41	109	212	172
Average Queue (ft)	101	143	4	239	8	34	101	73
95th Queue (ft)	177	290	31	484	31	80	176	134
Link Distance (ft)		754		694		208	230	230
Upstream Blk Time (%)				0			0	0
Queuing Penalty (veh)				1			0	0
Storage Bay Dist (ft)	150		100		50			
Storage Blk Time (%)	2	6		39	1	9		
Queuing Penalty (veh)	10	12		1	0	1		

Intersection: 37: Commercial St & Champion St

Movement	WB	SB	NE
Directions Served	LTR	LR>	<LR
Maximum Queue (ft)	73	55	59
Average Queue (ft)	41	33	29
95th Queue (ft)	66	44	51
Link Distance (ft)	289	306	171
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report

F St - Permissive Left Turns

Intersection: 33: W Holly St & F St

Movement	SE	NW	NE	SW	SW
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (ft)	531	550	241	124	202
Average Queue (ft)	225	236	144	68	75
95th Queue (ft)	437	482	234	121	154
Link Distance (ft)	1259	697	230		493
Upstream Blk Time (%)		1	2		
Queuing Penalty (veh)		4	5		
Storage Bay Dist (ft)				100	
Storage Blk Time (%)				4	4
Queuing Penalty (veh)				5	5

Intersection: 34: F St & Roeder Ave

Movement	SE	SE	NW	NW	NE	NE	SW	SW
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	174	396	33	378	50	107	211	206
Average Queue (ft)	101	161	3	168	9	31	96	95
95th Queue (ft)	180	320	23	291	35	76	171	165
Link Distance (ft)		754		694		208	230	230
Upstream Blk Time (%)							0	0
Queuing Penalty (veh)							1	0
Storage Bay Dist (ft)	150		100		50			
Storage Blk Time (%)	2	7		29	2	7		
Queuing Penalty (veh)	9	16		1	1	1		

Intersection: 37: Commercial St & Champion St

Movement	WB	SB	NE
Directions Served	LTR	LR>	<LR
Maximum Queue (ft)	78	59	59
Average Queue (ft)	41	33	29
95th Queue (ft)	64	46	51
Link Distance (ft)	289	306	171
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report

F St - Split Phasing

Intersection: 25: C St

Movement	SE	NW	NE	SW
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	425	451	298	120
Average Queue (ft)	70	136	115	40
95th Queue (ft)	343	466	323	88
Link Distance (ft)	694	620	399	224
Upstream Blk Time (%)	4	8	12	
Queuing Penalty (veh)	23	27	0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 26: W Holly St

Movement	SE	NW	B58	NE	SW
Directions Served	LTR	LTR	T	LTR	LTR
Maximum Queue (ft)	62	275	218	207	65
Average Queue (ft)	3	141	69	105	18
95th Queue (ft)	30	336	274	242	53
Link Distance (ft)	697	205	350	224	463
Upstream Blk Time (%)		24	4	20	
Queuing Penalty (veh)		135	21	12	
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 27: Ellis St & Gladstone St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	74	87	148	166
Average Queue (ft)	38	32	32	24
95th Queue (ft)	68	83	101	142
Link Distance (ft)	63	307	405	476
Upstream Blk Time (%)	2			1
Queuing Penalty (veh)	1			3
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

F St - Split Phasing

Intersection: 33: W Holly St & F St

Movement	SE	NW	NE	SW	SW
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (ft)	1228	700	248	125	232
Average Queue (ft)	864	596	185	82	94
95th Queue (ft)	1454	860	276	139	209
Link Distance (ft)	1259	697	230		493
Upstream Blk Time (%)	9	25	10		1
Queuing Penalty (veh)	44	145	30		0
Storage Bay Dist (ft)				100	
Storage Blk Time (%)				12	5
Queuing Penalty (veh)				16	6

Intersection: 34: F St & Roeder Ave

Movement	SE	SE	NW	NW	NE	NE	SW	SW
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	175	522	64	513	51	112	210	211
Average Queue (ft)	115	210	3	244	8	37	112	98
95th Queue (ft)	201	489	27	520	33	86	194	177
Link Distance (ft)		754		694		208	230	230
Upstream Blk Time (%)		3		2			3	0
Queuing Penalty (veh)		0		6			5	0
Storage Bay Dist (ft)	150		100		50			
Storage Blk Time (%)	6	12		40	1	11		
Queuing Penalty (veh)	25	26		1	0	1		

Intersection: 37: Commercial St & Champion St

Movement	WB	SB	NE
Directions Served	LTR	LR>	<LR
Maximum Queue (ft)	67	53	59
Average Queue (ft)	41	33	28
95th Queue (ft)	63	45	50
Link Distance (ft)	289	306	171
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report

F St - Split Phasing

Intersection: 38: Lakeway Dr

Movement	EB	WB	WB	WB	NB	SB
Directions Served	TR	L	T	TR	TR	TR
Maximum Queue (ft)	10	40	56	50	48	33
Average Queue (ft)	0	10	14	12	18	6
95th Queue (ft)	5	36	141	122	46	27
Link Distance (ft)	890		614	614	240	243
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		80				
Storage Blk Time (%)			3			
Queuing Penalty (veh)			0			

Intersection: 41: E Chestnut St & Bay St

Movement	SE	NW	SW	SW
Directions Served	T	TR	L	R
Maximum Queue (ft)	27	27	153	56
Average Queue (ft)	2	2	85	25
95th Queue (ft)	18	29	132	50
Link Distance (ft)	452	283	434	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			180	
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 44: W Holly St/Eldridge Ave & Broadway

Movement	SE	NW	NE	SW	SW
Directions Served	LTR	LTR	LTR	L	TR
Maximum Queue (ft)	715	331	9	100	279
Average Queue (ft)	310	183	0	65	70
95th Queue (ft)	710	310	5	106	221
Link Distance (ft)	941	1259	239		644
Upstream Blk Time (%)	6				1
Queuing Penalty (veh)	0				0
Storage Bay Dist (ft)				75	
Storage Blk Time (%)				13	2
Queuing Penalty (veh)				15	3

Queuing and Blocking Report

F St Left Turn Lane Removal- Prohibited Left Turn

Intersection: 33: W Holly St & F St

Movement	SE	NW	NE	SW
Directions Served	TR	TR	LTR	LTR
Maximum Queue (ft)	508	324	242	297
Average Queue (ft)	215	169	154	149
95th Queue (ft)	431	294	248	271
Link Distance (ft)	1268	697	229	494
Upstream Blk Time (%)			3	0
Queuing Penalty (veh)			10	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 34: F St & Roeder Ave

Movement	SE	SE	NW	NW	NE	NE	SW
Directions Served	L	TR	L	TR	L	TR	LTR
Maximum Queue (ft)	174	415	77	521	61	98	247
Average Queue (ft)	108	167	4	282	9	36	172
95th Queue (ft)	187	323	30	561	37	82	266
Link Distance (ft)		754		694		208	229
Upstream Blk Time (%)				3			5
Queuing Penalty (veh)				13			17
Storage Bay Dist (ft)	150		100		50		
Storage Blk Time (%)	4	8		47	1	12	
Queuing Penalty (veh)	16	16		1	0	1	

Intersection: 37: Commercial St & Champion St

Movement	WB	SB	NE
Directions Served	LTR	LR>	<LR
Maximum Queue (ft)	74	54	56
Average Queue (ft)	42	33	29
95th Queue (ft)	67	46	52
Link Distance (ft)	289	306	171
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report

F St Left Turn Lane Removal- Permissive Left Turns

Intersection: 33: W Holly St & F St

Movement	SE	NW	NE	SW
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	708	620	241	346
Average Queue (ft)	324	303	152	166
95th Queue (ft)	741	619	243	346
Link Distance (ft)	1268	697	229	494
Upstream Blk Time (%)	1	5	3	3
Queuing Penalty (veh)	6	30	8	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 34: F St & Roeder Ave

Movement	SE	SE	NW	NW	NE	NE	SW
Directions Served	L	TR	L	TR	L	TR	LTR
Maximum Queue (ft)	174	440	53	387	46	116	249
Average Queue (ft)	110	177	4	198	7	35	191
95th Queue (ft)	190	350	30	352	29	86	275
Link Distance (ft)		754		694		208	229
Upstream Blk Time (%)		1				0	9
Queuing Penalty (veh)		0				0	34
Storage Bay Dist (ft)	150		100		50		
Storage Blk Time (%)	3	10		37	1	10	
Queuing Penalty (veh)	14	20		1	0	1	

Intersection: 37: Commercial St & Champion St

Movement	WB	SB	NE
Directions Served	LTR	LR>	<LR
Maximum Queue (ft)	78	56	63
Average Queue (ft)	44	34	29
95th Queue (ft)	69	46	54
Link Distance (ft)	289	306	171
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report

F St Left Turn Lane Removal- Split Phasing

Intersection: 21: Prospect St & Flora

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	163	4	363
Average Queue (ft)	65	0	113
95th Queue (ft)	185	4	467
Link Distance (ft)	292	299	740
Upstream Blk Time (%)	6		9
Queuing Penalty (veh)	8		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 22: Grand St & Flora

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	67	69	58	132
Average Queue (ft)	34	34	23	54
95th Queue (ft)	60	52	50	217
Link Distance (ft)	292	303	299	721
Upstream Blk Time (%)				1
Queuing Penalty (veh)				0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 23: Central Ave & W Holly St

Movement	SE	B58	NW	NW	NE
Directions Served	TR	T	L	T	LR
Maximum Queue (ft)	245	91	90	240	126
Average Queue (ft)	55	19	37	94	46
95th Queue (ft)	272	120	96	278	123
Link Distance (ft)	350	205		251	218
Upstream Blk Time (%)	9	5		19	3
Queuing Penalty (veh)	31	19		124	1
Storage Bay Dist (ft)			75		
Storage Blk Time (%)			11	21	
Queuing Penalty (veh)			61	20	

Queuing and Blocking Report

F St Left Turn Lane Removal- Split Phasing

Intersection: 25: C St

Movement	SE	NW	NE	SW
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	364	578	359	137
Average Queue (ft)	43	281	167	51
95th Queue (ft)	252	738	410	140
Link Distance (ft)	694	620	399	224
Upstream Blk Time (%)	1	23	21	3
Queuing Penalty (veh)	7	85	0	2
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 26: W Holly St

Movement	SE	NW	B58	NE	SW
Directions Served	LTR	LTR	T	LTR	LTR
Maximum Queue (ft)	586	292	335	186	90
Average Queue (ft)	66	159	130	92	25
95th Queue (ft)	365	363	393	218	74
Link Distance (ft)	697	205	350	224	463
Upstream Blk Time (%)	2	39	16	14	
Queuing Penalty (veh)	7	226	93	8	
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 27: Ellis St & Gladstone St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	69	56	120	143
Average Queue (ft)	32	28	27	12
95th Queue (ft)	63	53	91	79
Link Distance (ft)	63	307	405	476
Upstream Blk Time (%)	1			0
Queuing Penalty (veh)	1			1
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

F St Left Turn Lane Removal- Split Phasing

Intersection: 33: W Holly St & F St

Movement	SE	NW	NE	SW
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	1282	710	249	468
Average Queue (ft)	975	584	216	293
95th Queue (ft)	1600	894	280	545
Link Distance (ft)	1268	697	229	494
Upstream Blk Time (%)	26	31	30	18
Queuing Penalty (veh)	131	185	89	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 34: F St & Roeder Ave

Movement	SE	SE	NW	NW	NE	NE	SW
Directions Served	L	TR	L	TR	L	TR	LTR
Maximum Queue (ft)	174	707	87	697	50	135	251
Average Queue (ft)	142	366	6	448	11	51	197
95th Queue (ft)	210	809	43	850	38	137	281
Link Distance (ft)		754		694		208	229
Upstream Blk Time (%)		18		27		7	20
Queuing Penalty (veh)		0		93		0	73
Storage Bay Dist (ft)	150		100		50		
Storage Blk Time (%)	30	10		67	1	20	
Queuing Penalty (veh)	126	22		2	0	2	

Intersection: 37: Commercial St & Champion St

Movement	WB	SB	NE
Directions Served	LTR	LR>	<LR
Maximum Queue (ft)	83	76	59
Average Queue (ft)	40	37	25
95th Queue (ft)	70	86	51
Link Distance (ft)	289	306	171
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report

F St Left Turn Lane Removal- Split Phasing

Intersection: 38: Lakeway Dr

Movement	WB	WB	WB	NB	SB
Directions Served	L	T	TR	TR	TR
Maximum Queue (ft)	42	204	194	48	35
Average Queue (ft)	9	46	45	18	7
95th Queue (ft)	35	305	305	46	28
Link Distance (ft)		614	614	240	243
Upstream Blk Time (%)		6	5		
Queuing Penalty (veh)		0	0		
Storage Bay Dist (ft)	80				
Storage Blk Time (%)		8			
Queuing Penalty (veh)		1			

Intersection: 41: E Chestnut St & Bay St

Movement	SE	NW	SW	SW
Directions Served	T	TR	L	R
Maximum Queue (ft)	22	77	148	47
Average Queue (ft)	1	7	75	23
95th Queue (ft)	18	61	135	47
Link Distance (ft)	452	283	434	
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		1		
Storage Bay Dist (ft)			180	
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 44: W Holly St/Eldridge Ave & Broadway

Movement	SE	NW	NE	SW	SW
Directions Served	LTR	LTR	LTR	L	TR
Maximum Queue (ft)	944	307	18	100	390
Average Queue (ft)	509	159	1	74	143
95th Queue (ft)	1106	314	10	118	438
Link Distance (ft)	941	1268	239		644
Upstream Blk Time (%)	31				7
Queuing Penalty (veh)	0				0
Storage Bay Dist (ft)				75	
Storage Blk Time (%)				34	2
Queuing Penalty (veh)				39	4

Queuing and Blocking Report

F St Left Turn Lane Removal- Split Phasing

Intersection: 55: Railroad Ave

Movement	NE	SW
Directions Served	UT	T
Maximum Queue (ft)	89	30
Average Queue (ft)	16	1
95th Queue (ft)	77	14
Link Distance (ft)	260	74
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 57: W Holly St & Champion St

Movement	WB	SE	NW
Directions Served	R	L	T
Maximum Queue (ft)	207	225	281
Average Queue (ft)	79	97	77
95th Queue (ft)	230	198	302
Link Distance (ft)	280	251	346
Upstream Blk Time (%)	13	1	16
Queuing Penalty (veh)	13	4	85
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 59: Railroad Ave

Movement	SW
Directions Served	UT
Maximum Queue (ft)	3
Average Queue (ft)	0
95th Queue (ft)	3
Link Distance (ft)	273
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report

Broadway Permissive Left Turn

Intersection: 38: Lakeway Dr

Movement	EB	EB	WB	WB	WB	NB	SB
Directions Served	T	TR	L	T	TR	TR	TR
Maximum Queue (ft)	4	6	32	9	9	54	33
Average Queue (ft)	0	0	9	0	0	18	4
95th Queue (ft)	5	4	32	7	6	47	22
Link Distance (ft)	890	890		614	614	240	243
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			80				
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 41: E Chestnut St & Bay St

Movement	SE	SW	SW
Directions Served	T	L	R
Maximum Queue (ft)	29	159	53
Average Queue (ft)	2	85	26
95th Queue (ft)	26	136	51
Link Distance (ft)	452	434	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		180	
Storage Blk Time (%)		0	
Queuing Penalty (veh)		0	

Intersection: 44: W Holly St/Eldridge Ave & Broadway

Movement	SE	NW	NE	SW	SW
Directions Served	LTR	LTR	LTR	L	TR
Maximum Queue (ft)	682	337	13	100	159
Average Queue (ft)	267	157	1	63	56
95th Queue (ft)	618	291	7	105	118
Link Distance (ft)	940	1259	234		638
Upstream Blk Time (%)	1				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)				75	
Storage Blk Time (%)				8	3
Queuing Penalty (veh)				9	5

Queuing and Blocking Report

Broadway and Eldridge Split Phasing

Intersection: 38: Lakeway Dr

Movement	EB	WB	NB	SB
Directions Served	TR	L	TR	TR
Maximum Queue (ft)	6	39	50	32
Average Queue (ft)	0	9	19	4
95th Queue (ft)	5	33	48	22
Link Distance (ft)	890		240	243
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		80		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 41: E Chestnut St & Bay St

Movement	SE	SW	SW
Directions Served	T	L	R
Maximum Queue (ft)	27	152	57
Average Queue (ft)	1	85	25
95th Queue (ft)	17	134	51
Link Distance (ft)	452	434	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			180
Storage Blk Time (%)		0	
Queuing Penalty (veh)		0	

Intersection: 44: W Holly St/Eldridge Ave & Broadway

Movement	SE	NW	NE	SW	SW
Directions Served	LTR	LTR	LTR	L	TR
Maximum Queue (ft)	602	835	16	100	230
Average Queue (ft)	302	465	1	81	91
95th Queue (ft)	532	852	8	119	183
Link Distance (ft)	940	1259	234		638
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				75	
Storage Blk Time (%)				23	10
Queuing Penalty (veh)				26	15

Queuing and Blocking Report

2045 - One-Way Shared Westbound Left/ Through Lane and Right-Turn Lane at Bay St

Intersection: 65: Champion St

Movement	EB	WB	NE
Directions Served	T	T	LR
Maximum Queue (ft)	20	52	25
Average Queue (ft)	1	9	4
95th Queue (ft)	21	42	19
Link Distance (ft)	138	52	218
Upstream Blk Time (%)	0	11	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 68: Bay St

Movement	SB	NE
Directions Served	R	LT
Maximum Queue (ft)	197	75
Average Queue (ft)	175	73
95th Queue (ft)	202	86
Link Distance (ft)	173	25
Upstream Blk Time (%)	58	3
Queuing Penalty (veh)	256	11
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 519: Commercial St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	3442	3457	89	121
Average Queue (ft)	2113	2127	38	50
95th Queue (ft)	3585	3600	75	95
Link Distance (ft)	5204	5204	237	225
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

2045 - One-Way Shared Westbound Left/ Through Lane and Right-Turn Lane at Bay St

Intersection: 520: Bay St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	R	LT	TR
Maximum Queue (ft)	358	342	123	78
Average Queue (ft)	147	193	50	78
95th Queue (ft)	346	334	101	78
Link Distance (ft)	302	302	444	25
Upstream Blk Time (%)	4	3		87
Queuing Penalty (veh)	20	15		381
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 538: Champion St & Prospect St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	293	142	189	952
Average Queue (ft)	250	73	110	871
95th Queue (ft)	339	139	159	1188
Link Distance (ft)	280	138	173	937
Upstream Blk Time (%)	23	12	1	83
Queuing Penalty (veh)	101	19	3	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 1158

Queuing and Blocking Report

2045 - One Way Westbound Left-Turn Lane and Shared Through / Right Lane at Bay St

Intersection: 68: Bay St

Movement	SB	NE
Directions Served	R	LT
Maximum Queue (ft)	192	80
Average Queue (ft)	176	58
95th Queue (ft)	191	96
Link Distance (ft)	173	31
Upstream Blk Time (%)	55	0
Queuing Penalty (veh)	242	1
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 519: Commercial St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	5332	5332	109	112
Average Queue (ft)	4508	4510	43	49
95th Queue (ft)	6669	6656	89	94
Link Distance (ft)	5317	5317	237	224
Upstream Blk Time (%)	56	57		
Queuing Penalty (veh)	0	0		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 520: Bay St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	L	TR	LT	TR
Maximum Queue (ft)	354	371	132	84
Average Queue (ft)	208	360	49	84
95th Queue (ft)	430	372	107	85
Link Distance (ft)	301	301	440	31
Upstream Blk Time (%)	8	42		85
Queuing Penalty (veh)	46	234		374
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

2045 - Two Way Westbound Left-Turn Lane and Shared Through / Right Lane

Intersection: 68: Bay St

Movement	SB	NE
Directions Served	R	LT
Maximum Queue (ft)	180	80
Average Queue (ft)	165	59
95th Queue (ft)	219	98
Link Distance (ft)	172	31
Upstream Blk Time (%)	84	0
Queuing Penalty (veh)	159	2
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 519: Commercial St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	5272	5272	119	127
Average Queue (ft)	4489	4491	45	53
95th Queue (ft)	6561	6551	103	107
Link Distance (ft)	5257	5257	237	223
Upstream Blk Time (%)	57	58	1	1
Queuing Penalty (veh)	0	0	0	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 520: Bay St & W Holly St

Movement	SE	NW	NW	NE	SW
Directions Served	R	L	TR	LT	TR
Maximum Queue (ft)	307	356	372	90	84
Average Queue (ft)	158	231	361	38	82
95th Queue (ft)	317	431	373	75	86
Link Distance (ft)	339	301	301	441	31
Upstream Blk Time (%)	5	12	43		97
Queuing Penalty (veh)	12	64	237		183
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Queuing and Blocking Report

AWSC at Champion / Prospect - 2045

Intersection: 41: E Chestnut St & Bay St

Movement	NW	SW	SW
Directions Served	TR	L	R
Maximum Queue (ft)	3	469	205
Average Queue (ft)	0	444	139
95th Queue (ft)	3	501	295
Link Distance (ft)	137	446	
Upstream Blk Time (%)		19	
Queuing Penalty (veh)		93	
Storage Bay Dist (ft)			180
Storage Blk Time (%)		99	0
Queuing Penalty (veh)		66	0

Intersection: 57: W Holly St & Champion St

Movement	WB	SE	NW
Directions Served	R	L	TR
Maximum Queue (ft)	113	4941	294
Average Queue (ft)	42	2458	25
95th Queue (ft)	90	5009	153
Link Distance (ft)	264	5374	337
Upstream Blk Time (%)		1	0
Queuing Penalty (veh)		0	3
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 65: Champion St

Movement	WB	NE
Directions Served	T	LR
Maximum Queue (ft)	8	21
Average Queue (ft)	0	3
95th Queue (ft)	7	14
Link Distance (ft)	7378	218
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

AWSC at Champion / Prospect - 2045

Intersection: 68: Bay St

Movement	SB	NE
Directions Served	R	LT
Maximum Queue (ft)	189	74
Average Queue (ft)	173	70
95th Queue (ft)	194	85
Link Distance (ft)	173	23
Upstream Blk Time (%)	55	2
Queuing Penalty (veh)	240	9
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 520: Bay St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	R	LT	TR
Maximum Queue (ft)	1027	952	123	76
Average Queue (ft)	593	481	47	75
95th Queue (ft)	1121	1010	95	76
Link Distance (ft)	5932	5932	446	23
Upstream Blk Time (%)				87
Queuing Penalty (veh)				381
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 538: Champion St & Prospect St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	275	118	218	3672
Average Queue (ft)	238	56	105	1835
95th Queue (ft)	334	96	183	3805
Link Distance (ft)	264	138	173	5637
Upstream Blk Time (%)	31	0	3	
Queuing Penalty (veh)	139	0	10	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 942

Queuing and Blocking Report

Bike Phase at Champion / Prospect - 2045

Intersection: 41: E Chestnut St & Bay St

Movement	SW	SW
Directions Served	L	R
Maximum Queue (ft)	469	205
Average Queue (ft)	439	143
95th Queue (ft)	526	296
Link Distance (ft)	446	
Upstream Blk Time (%)	19	
Queuing Penalty (veh)	91	
Storage Bay Dist (ft)		180
Storage Blk Time (%)	97	0
Queuing Penalty (veh)	65	0

Intersection: 57: W Holly St & Champion St

Movement	WB	SE	NW
Directions Served	R	L	TR
Maximum Queue (ft)	141	5165	330
Average Queue (ft)	46	2868	35
95th Queue (ft)	103	5523	186
Link Distance (ft)	264	5374	337
Upstream Blk Time (%)		8	1
Queuing Penalty (veh)		0	4
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 65: Champion St

Movement	EB	WB	NE
Directions Served	T	T	LR
Maximum Queue (ft)	21	118	21
Average Queue (ft)	1	11	2
95th Queue (ft)	21	85	14
Link Distance (ft)	138	7378	218
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report

Bike Phase at Champion / Prospect - 2045

Intersection: 68: Bay St

Movement	SB	NE
Directions Served	R	LT
Maximum Queue (ft)	194	74
Average Queue (ft)	163	69
95th Queue (ft)	225	93
Link Distance (ft)	173	23
Upstream Blk Time (%)	26	2
Queuing Penalty (veh)	112	9
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 520: Bay St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	R	LT	TR
Maximum Queue (ft)	964	917	126	76
Average Queue (ft)	508	398	49	76
95th Queue (ft)	926	838	100	81
Link Distance (ft)	5747	5747	446	23
Upstream Blk Time (%)				86
Queuing Penalty (veh)				377
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 538: Champion St & Prospect St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	280	141	227	3636
Average Queue (ft)	257	78	125	2031
95th Queue (ft)	306	137	205	3827
Link Distance (ft)	264	138	173	5637
Upstream Blk Time (%)	48	5	4	
Queuing Penalty (veh)	218	8	14	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 897

Queuing and Blocking Report

Holly / Bay Adjacent to Champion / Prospect Update - 2045

Intersection: 68: Bay St

Movement	SB	NE
Directions Served	R	LT
Maximum Queue (ft)	194	74
Average Queue (ft)	163	69
95th Queue (ft)	225	93
Link Distance (ft)	173	23
Upstream Blk Time (%)	26	2
Queuing Penalty (veh)	112	9
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 520: Bay St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	R	LT	TR
Maximum Queue (ft)	964	917	126	76
Average Queue (ft)	508	398	49	76
95th Queue (ft)	926	838	100	81
Link Distance (ft)	5747	5747	446	23
Upstream Blk Time (%)				86
Queuing Penalty (veh)				377
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 538: Champion St & Prospect St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	280	141	227	3636
Average Queue (ft)	257	78	125	2031
95th Queue (ft)	306	137	205	3827
Link Distance (ft)	264	138	173	5637
Upstream Blk Time (%)	48	5	4	
Queuing Penalty (veh)	218	8	14	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 897

Queuing and Blocking Report

2045 - SB Stop at Champion

Intersection: 23: Central Ave & W Holly St

Movement	SE	NW	NW	NE
Directions Served	TR	L	T	LR
Maximum Queue (ft)	1540	84	88	138
Average Queue (ft)	656	26	12	76
95th Queue (ft)	1786	67	51	143
Link Distance (ft)	5263		251	107
Upstream Blk Time (%)				34
Queuing Penalty (veh)				0
Storage Bay Dist (ft)		75		
Storage Blk Time (%)		1	0	
Queuing Penalty (veh)		6	0	

Intersection: 41: E Chestnut St & Bay St

Movement	SW	SW
Directions Served	L	R
Maximum Queue (ft)	467	205
Average Queue (ft)	442	145
95th Queue (ft)	501	297
Link Distance (ft)	444	
Upstream Blk Time (%)	16	
Queuing Penalty (veh)	79	
Storage Bay Dist (ft)		180
Storage Blk Time (%)	98	0
Queuing Penalty (veh)	66	0

Intersection: 57: W Holly St & Champion St

Movement	WB	SE	NW
Directions Served	R	L	T
Maximum Queue (ft)	101	277	27
Average Queue (ft)	32	236	3
95th Queue (ft)	69	323	16
Link Distance (ft)	280	251	346
Upstream Blk Time (%)		37	
Queuing Penalty (veh)		166	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report

2045 - WB Stop at Champion

Intersection: 23: Central Ave & W Holly St

Movement	SE	NW	NW	NE
Directions Served	TR	L	T	LR
Maximum Queue (ft)	1781	79	104	144
Average Queue (ft)	716	24	11	84
95th Queue (ft)	2070	63	56	150
Link Distance (ft)	5263		251	107
Upstream Blk Time (%)			0	48
Queuing Penalty (veh)			0	0
Storage Bay Dist (ft)		75		
Storage Blk Time (%)		1	0	
Queuing Penalty (veh)		5	0	

Intersection: 41: E Chestnut St & Bay St

Movement	SW	SW
Directions Served	L	R
Maximum Queue (ft)	467	205
Average Queue (ft)	444	141
95th Queue (ft)	486	296
Link Distance (ft)	444	
Upstream Blk Time (%)	17	
Queuing Penalty (veh)	82	
Storage Bay Dist (ft)		180
Storage Blk Time (%)	99	0
Queuing Penalty (veh)	67	0

Intersection: 57: W Holly St & Champion St

Movement	WB	SE	NW
Directions Served	R	L	T
Maximum Queue (ft)	18	274	368
Average Queue (ft)	1	209	340
95th Queue (ft)	9	368	415
Link Distance (ft)	280	251	346
Upstream Blk Time (%)		39	10
Queuing Penalty (veh)		176	76
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report

2045 - WB Stop at Champion

Intersection: 65: Champion St

Movement	EB	WB	NE
Directions Served	T	T	LR
Maximum Queue (ft)	41	59	21
Average Queue (ft)	1	12	2
95th Queue (ft)	30	52	12
Link Distance (ft)	138	52	218
Upstream Blk Time (%)		14	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 68: Bay St

Movement	SB	NE
Directions Served	R	LT
Maximum Queue (ft)	196	75
Average Queue (ft)	178	68
95th Queue (ft)	192	96
Link Distance (ft)	173	25
Upstream Blk Time (%)	62	2
Queuing Penalty (veh)	271	7
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 519: Commercial St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	5210	5198	95	102
Average Queue (ft)	3440	3444	42	48
95th Queue (ft)	5872	5854	82	90
Link Distance (ft)	5204	5204	237	225
Upstream Blk Time (%)	18	18		
Queuing Penalty (veh)	0	0		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

2045 - WB Stop at Champion

Intersection: 520: Bay St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	R	LT	TR
Maximum Queue (ft)	369	360	134	78
Average Queue (ft)	313	228	52	77
95th Queue (ft)	448	390	112	79
Link Distance (ft)	302	302	444	25
Upstream Blk Time (%)	26	5		86
Queuing Penalty (veh)	142	27		379
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 538: Champion St & Prospect St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	299	144	178	952
Average Queue (ft)	279	77	98	898
95th Queue (ft)	342	146	160	1158
Link Distance (ft)	280	138	173	937
Upstream Blk Time (%)	51	15	1	87
Queuing Penalty (veh)	227	24	2	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 1484

Queuing and Blocking Report

2045 - Two-Way Stop at Champion

Intersection: 23: Central Ave & W Holly St

Movement	SE	NW	NW	NE
Directions Served	TR	L	T	LR
Maximum Queue (ft)	2151	82	93	143
Average Queue (ft)	965	25	14	93
95th Queue (ft)	2181	62	57	159
Link Distance (ft)	5263		251	107
Upstream Blk Time (%)				62
Queuing Penalty (veh)				0
Storage Bay Dist (ft)		75		
Storage Blk Time (%)		0	0	
Queuing Penalty (veh)		2	0	

Intersection: 41: E Chestnut St & Bay St

Movement	SW	SW
Directions Served	L	R
Maximum Queue (ft)	468	205
Average Queue (ft)	444	140
95th Queue (ft)	503	295
Link Distance (ft)	444	
Upstream Blk Time (%)	19	
Queuing Penalty (veh)	92	
Storage Bay Dist (ft)		180
Storage Blk Time (%)	99	0
Queuing Penalty (veh)	66	0

Intersection: 57: W Holly St & Champion St

Movement	WB	SE
Directions Served	R	L
Maximum Queue (ft)	90	277
Average Queue (ft)	32	251
95th Queue (ft)	69	305
Link Distance (ft)	280	251
Upstream Blk Time (%)		43
Queuing Penalty (veh)		192
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

2045 - All Way Stop at Champion

Intersection: 23: Central Ave & W Holly St

Movement	SE	NW	NW	NE
Directions Served	TR	L	T	LR
Maximum Queue (ft)	1732	74	70	129
Average Queue (ft)	720	28	8	76
95th Queue (ft)	1753	66	39	141
Link Distance (ft)	5263		251	107
Upstream Blk Time (%)				38
Queuing Penalty (veh)				0
Storage Bay Dist (ft)		75		
Storage Blk Time (%)		1	0	
Queuing Penalty (veh)		4	0	

Intersection: 41: E Chestnut St & Bay St

Movement	SW	SW
Directions Served	L	R
Maximum Queue (ft)	468	205
Average Queue (ft)	445	137
95th Queue (ft)	488	295
Link Distance (ft)	444	
Upstream Blk Time (%)	20	
Queuing Penalty (veh)	96	
Storage Bay Dist (ft)		180
Storage Blk Time (%)	99	0
Queuing Penalty (veh)	66	0

Intersection: 57: W Holly St & Champion St

Movement	WB	SE	NW
Directions Served	R	L	T
Maximum Queue (ft)	110	271	352
Average Queue (ft)	35	239	282
95th Queue (ft)	77	318	405
Link Distance (ft)	280	251	346
Upstream Blk Time (%)		36	2
Queuing Penalty (veh)		160	14
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report

2045 - All Way Stop at Champion

Intersection: 65: Champion St

Movement	EB	WB	NE
Directions Served	T	T	LR
Maximum Queue (ft)	21	60	26
Average Queue (ft)	1	13	4
95th Queue (ft)	21	52	25
Link Distance (ft)	138	52	218
Upstream Blk Time (%)	0	16	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 68: Bay St

Movement	SB	NE
Directions Served	R	LT
Maximum Queue (ft)	195	75
Average Queue (ft)	177	70
95th Queue (ft)	195	95
Link Distance (ft)	173	25
Upstream Blk Time (%)	61	2
Queuing Penalty (veh)	267	9
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 519: Commercial St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	4643	4618	99	117
Average Queue (ft)	2580	2588	42	54
95th Queue (ft)	4719	4714	84	102
Link Distance (ft)	5204	5204	237	225
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

2045 - All Way Stop at Champion

Intersection: 520: Bay St & W Holly St

Movement	NW	NW	NE	SW
Directions Served	LT	R	LT	TR
Maximum Queue (ft)	365	343	137	78
Average Queue (ft)	209	192	53	78
95th Queue (ft)	409	333	108	78
Link Distance (ft)	302	302	444	25
Upstream Blk Time (%)	7	3		87
Queuing Penalty (veh)	40	15		381
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 538: Champion St & Prospect St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	294	145	200	952
Average Queue (ft)	278	80	108	888
95th Queue (ft)	336	149	167	1161
Link Distance (ft)	280	138	173	937
Upstream Blk Time (%)	33	17	1	85
Queuing Penalty (veh)	149	26	5	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 1233

Queuing and Blocking Report

2045 - Signal at Champion

Intersection: 23: Central Ave & W Holly St

Movement	SE	NW	NW	NE
Directions Served	TR	L	T	LR
Maximum Queue (ft)	1829	91	126	133
Average Queue (ft)	773	28	19	77
95th Queue (ft)	1958	71	76	139
Link Distance (ft)	5263		251	107
Upstream Blk Time (%)				36
Queuing Penalty (veh)				0
Storage Bay Dist (ft)		75		
Storage Blk Time (%)		1	1	
Queuing Penalty (veh)		5	1	

Intersection: 41: E Chestnut St & Bay St

Movement	SW	SW
Directions Served	L	R
Maximum Queue (ft)	469	205
Average Queue (ft)	437	154
95th Queue (ft)	512	297
Link Distance (ft)	444	
Upstream Blk Time (%)	16	
Queuing Penalty (veh)	78	
Storage Bay Dist (ft)		180
Storage Blk Time (%)	97	0
Queuing Penalty (veh)	65	0

Intersection: 57: W Holly St & Champion St

Movement	WB	SE	NW
Directions Served	R	L	T
Maximum Queue (ft)	105	279	240
Average Queue (ft)	32	246	142
95th Queue (ft)	80	316	208
Link Distance (ft)	280	251	346
Upstream Blk Time (%)		44	
Queuing Penalty (veh)		197	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report

F St - Prohibited Left Turns 2045

Intersection: 26: W Holly St

Movement	SE	NW	NE	SW
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	240	923	117	74
Average Queue (ft)	54	211	57	15
95th Queue (ft)	162	926	115	50
Link Distance (ft)	697	10662	115	463
Upstream Blk Time (%)			17	
Queuing Penalty (veh)			0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 33: W Holly St & F St

Movement	SE	NW	NE	SW	SW
Directions Served	TR	TR	LTR	LT	TR
Maximum Queue (ft)	500	699	248	125	327
Average Queue (ft)	199	426	208	95	111
95th Queue (ft)	413	748	282	145	238
Link Distance (ft)	1259	697	230		4718
Upstream Blk Time (%)		7	13		
Queuing Penalty (veh)		54	52		
Storage Bay Dist (ft)				100	
Storage Blk Time (%)				12	7
Queuing Penalty (veh)				22	11

Intersection: 34: F St & Roeder Ave

Movement	SE	SE	NW	NW	NE	NE	SW	SW
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	175	765	84	394	60	126	240	198
Average Queue (ft)	159	430	7	353	10	46	144	100
95th Queue (ft)	208	814	46	425	38	105	234	183
Link Distance (ft)		752		344		4007	230	230
Upstream Blk Time (%)		9		74			2	0
Queuing Penalty (veh)		0		0			3	1
Storage Bay Dist (ft)	150		100		50			
Storage Blk Time (%)	30	15		77	2	17		
Queuing Penalty (veh)	163	42		3	1	2		

Queuing and Blocking Report

F St - Permissive Left Turns 2045

Intersection: 26: W Holly St

Movement	SE	NW	NE	SW
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	126	1364	139	100
Average Queue (ft)	9	615	82	22
95th Queue (ft)	119	1918	151	72
Link Distance (ft)	697	10662	115	463
Upstream Blk Time (%)	0		44	
Queuing Penalty (veh)	0		0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 33: W Holly St & F St

Movement	SE	NW	NE	SW	SW
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (ft)	1048	710	251	125	354
Average Queue (ft)	546	585	220	94	130
95th Queue (ft)	1162	881	278	146	276
Link Distance (ft)	1259	697	230		4718
Upstream Blk Time (%)	2	16	19		
Queuing Penalty (veh)	11	128	75		
Storage Bay Dist (ft)				100	
Storage Blk Time (%)				13	11
Queuing Penalty (veh)				24	18

Intersection: 34: F St & Roeder Ave

Movement	SE	SE	NW	NW	NE	NE	SW	SW
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	175	765	74	391	59	121	234	236
Average Queue (ft)	165	519	4	360	11	44	133	123
95th Queue (ft)	206	917	35	402	41	100	226	219
Link Distance (ft)		752		344		4007	230	230
Upstream Blk Time (%)		23		84			1	1
Queuing Penalty (veh)		0		0			3	3
Storage Bay Dist (ft)	150		100		50			
Storage Blk Time (%)	37	16		82	3	18		
Queuing Penalty (veh)	203	45		3	1	2		

Queuing and Blocking Report

F St - Split Phasing 2045

Intersection: 26: W Holly St

Movement	SE	NW	NE	SW
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	186	5605	140	114
Average Queue (ft)	9	2980	114	35
95th Queue (ft)	119	5601	152	110
Link Distance (ft)	697	10662	115	463
Upstream Blk Time (%)	0		91	
Queuing Penalty (veh)	0		0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 33: W Holly St & F St

Movement	SE	NW	NE	SW	SW
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (ft)	1278	714	252	125	536
Average Queue (ft)	1174	701	238	111	260
95th Queue (ft)	1506	725	251	154	497
Link Distance (ft)	1259	697	230		4718
Upstream Blk Time (%)	28	49	52		
Queuing Penalty (veh)	188	389	203		
Storage Bay Dist (ft)				100	
Storage Blk Time (%)				35	30
Queuing Penalty (veh)				63	48

Intersection: 34: F St & Roeder Ave

Movement	SE	SE	NW	NW	NE	NE	SW	SW
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	175	805	92	396	69	189	241	242
Average Queue (ft)	172	744	4	359	12	63	150	139
95th Queue (ft)	189	931	34	383	42	147	249	228
Link Distance (ft)		752		344		4007	230	230
Upstream Blk Time (%)		73		91			4	3
Queuing Penalty (veh)		0		0			9	6
Storage Bay Dist (ft)	150		100		50			
Storage Blk Time (%)	75	12		89	1	36		
Queuing Penalty (veh)	408	33		4	1	4		

Queuing and Blocking Report

F St - Split Phasing 2045

Intersection: 44: W Holly St/Eldridge Ave & Broadway

Movement	SE	NW	NE	SW	SW
Directions Served	LTR	LTR	LTR	L	TR
Maximum Queue (ft)	6510	487	15	100	544
Average Queue (ft)	3222	283	1	92	258
95th Queue (ft)	6620	436	8	118	613
Link Distance (ft)	8397	1259	239		644
Upstream Blk Time (%)	0				8
Queuing Penalty (veh)	0				0
Storage Bay Dist (ft)				75	
Storage Blk Time (%)				53	8
Queuing Penalty (veh)				80	16

Network Summary

Network wide Queuing Penalty: 1451

Queuing and Blocking Report

F St Left Turn Lane Removal - Prohibited Left Turns 2045

Intersection: 26: W Holly St

Movement	SE	NW	NE	SW
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	433	678	117	70
Average Queue (ft)	93	238	59	19
95th Queue (ft)	384	1047	118	55
Link Distance (ft)	697	10662	115	463
Upstream Blk Time (%)	2		17	
Queuing Penalty (veh)	10		0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 33: W Holly St & F St

Movement	SE	NW	NE	SW
Directions Served	TR	TR	LTR	LTR
Maximum Queue (ft)	1071	653	249	1756
Average Queue (ft)	532	422	218	938
95th Queue (ft)	1202	747	279	2631
Link Distance (ft)	1268	697	229	4718
Upstream Blk Time (%)	12	5	30	4
Queuing Penalty (veh)	78	42	116	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 34: F St & Roeder Ave

Movement	SE	SE	NW	NW	NE	NE	SW
Directions Served	L	TR	L	TR	L	TR	LTR
Maximum Queue (ft)	175	794	84	384	53	252	251
Average Queue (ft)	170	634	6	353	8	93	227
95th Queue (ft)	192	976	45	407	33	373	270
Link Distance (ft)		752		344		4007	229
Upstream Blk Time (%)		41		81			36
Queuing Penalty (veh)		0		0			155
Storage Bay Dist (ft)	150		100		50		
Storage Blk Time (%)	50	16		85	1	28	
Queuing Penalty (veh)	270	46		3	0	3	

Queuing and Blocking Report

F St Left Turn Lane Removal - Permissive Left Turns 2045

Intersection: 26: W Holly St

Movement	SE	NW	NE	SW
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	620	6902	140	126
Average Queue (ft)	41	2816	90	31
95th Queue (ft)	311	7339	153	99
Link Distance (ft)	697	10662	115	463
Upstream Blk Time (%)	0	1	63	
Queuing Penalty (veh)	1	0	0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 33: W Holly St & F St

Movement	SE	NW	NE	SW
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	1285	711	250	1787
Average Queue (ft)	923	598	212	818
95th Queue (ft)	1676	964	283	1926
Link Distance (ft)	1268	697	229	4718
Upstream Blk Time (%)	18	39	22	
Queuing Penalty (veh)	119	311	85	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 34: F St & Roeder Ave

Movement	SE	SE	NW	NW	NE	NE	SW
Directions Served	L	TR	L	TR	L	TR	LTR
Maximum Queue (ft)	175	802	83	392	68	140	252
Average Queue (ft)	161	573	6	340	10	44	217
95th Queue (ft)	212	987	42	443	38	101	299
Link Distance (ft)		752		344		4007	229
Upstream Blk Time (%)		33		74			28
Queuing Penalty (veh)		0		0			136
Storage Bay Dist (ft)	150		100		50		
Storage Blk Time (%)	43	17		79	2	19	
Queuing Penalty (veh)	234	47		3	1	2	

Queuing and Blocking Report

F St Left Turn Lane Removal - Permissive Left Turns 2045

Intersection: 44: W Holly St/Eldridge Ave & Broadway

Movement	SE	NW	NE	SW	SW
Directions Served	LTR	LTR	LTR	L	TR
Maximum Queue (ft)	6157	688	17	100	592
Average Queue (ft)	2561	243	1	83	180
95th Queue (ft)	5821	562	9	121	485
Link Distance (ft)	8397	1268	239		644
Upstream Blk Time (%)					3
Queuing Penalty (veh)					0
Storage Bay Dist (ft)				75	
Storage Blk Time (%)				38	6
Queuing Penalty (veh)				57	12

Network Summary

Network wide Queuing Penalty: 1009

Queuing and Blocking Report

F St Left Turn Lane Removal - Split Phasing 2045

Intersection: 26: W Holly St

Movement	SE	NW	NE	SW
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	268	5838	145	128
Average Queue (ft)	13	2821	111	44
95th Queue (ft)	163	6011	150	128
Link Distance (ft)	697	10662	115	463
Upstream Blk Time (%)	0		90	
Queuing Penalty (veh)	1		0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 33: W Holly St & F St

Movement	SE	NW	NE	SW
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	1286	712	251	1816
Average Queue (ft)	1228	702	235	1017
95th Queue (ft)	1500	716	249	1869
Link Distance (ft)	1268	697	229	4718
Upstream Blk Time (%)	47	51	50	
Queuing Penalty (veh)	321	400	196	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 34: F St & Roeder Ave

Movement	SE	SE	NW	NW	NE	NE	SW
Directions Served	L	TR	L	TR	L	TR	LTR
Maximum Queue (ft)	175	806	40	390	67	178	251
Average Queue (ft)	172	737	2	359	12	70	218
95th Queue (ft)	188	939	25	378	47	150	275
Link Distance (ft)		752		344		4007	229
Upstream Blk Time (%)		72		91			21
Queuing Penalty (veh)		0		0			100
Storage Bay Dist (ft)	150		100		50		
Storage Blk Time (%)	74	11		90	3	37	
Queuing Penalty (veh)	405	30		4	1	4	

Queuing and Blocking Report

F St Left Turn Lane Removal - Split Phasing 2045

Intersection: 44: W Holly St/Eldridge Ave & Broadway

Movement	SE	NW	NE	SW	SW
Directions Served	LTR	LTR	LTR	L	TR
Maximum Queue (ft)	8208	457	20	100	690
Average Queue (ft)	4282	270	1	95	489
95th Queue (ft)	8589	440	9	117	886
Link Distance (ft)	8397	1268	239		644
Upstream Blk Time (%)	5				56
Queuing Penalty (veh)	0				0
Storage Bay Dist (ft)				75	
Storage Blk Time (%)				76	9
Queuing Penalty (veh)				115	19

Network Summary

Network wide Queuing Penalty: 1597

Queuing and Blocking Report

2045 - Broadway Permissive Left Turn

Intersection: 33: W Holly St & F St

Movement	SE	SE	NW	NW	NE	SW	SW
Directions Served	L	TR	L	TR	LTR	LT	TR
Maximum Queue (ft)	102	443	89	588	153	125	264
Average Queue (ft)	36	180	32	301	128	65	142
95th Queue (ft)	94	365	84	518	142	141	234
Link Distance (ft)		1258		9787	112		488
Upstream Blk Time (%)					65		
Queuing Penalty (veh)					0		
Storage Bay Dist (ft)	80		65			100	
Storage Blk Time (%)	2	21	1	32		1	19
Queuing Penalty (veh)	9	13	4	18		1	31

Intersection: 44: W Holly St/Eldridge Ave & Broadway

Movement	SE	NW	NE	SW	SW
Directions Served	LTR	LTR	LTR	L	TR
Maximum Queue (ft)	7334	654	20	100	233
Average Queue (ft)	3718	332	2	83	90
95th Queue (ft)	7424	591	11	118	190
Link Distance (ft)	17292	1258	233		638
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				75	
Storage Blk Time (%)				18	6
Queuing Penalty (veh)				28	13

Network Summary

Network wide Queuing Penalty: 117

Queuing and Blocking Report

2045 - Broadway Split Phasing

Intersection: 33: W Holly St & F St

Movement	SE	SE	NW	NW	NE	SW	SW
Directions Served	L	TR	L	TR	LTR	LT	TR
Maximum Queue (ft)	105	553	89	3891	149	125	306
Average Queue (ft)	38	290	39	1739	128	68	147
95th Queue (ft)	94	512	99	4212	141	145	254
Link Distance (ft)		1258		9980	112		488
Upstream Blk Time (%)					71		
Queuing Penalty (veh)					0		
Storage Bay Dist (ft)	80		65			100	
Storage Blk Time (%)	1	27	0	59		1	23
Queuing Penalty (veh)	9	17	3	32		2	36

Intersection: 44: W Holly St/Eldridge Ave & Broadway

Movement	SE	NW	NE	SW	SW
Directions Served	LTR	LTR	LTR	L	TR
Maximum Queue (ft)	1972	1275	24	100	652
Average Queue (ft)	1210	1133	2	98	499
95th Queue (ft)	2275	1541	13	111	806
Link Distance (ft)	17476	1258	234		638
Upstream Blk Time (%)		11			40
Queuing Penalty (veh)		92			0
Storage Bay Dist (ft)				75	
Storage Blk Time (%)				70	39
Queuing Penalty (veh)				105	82

Network Summary

Network wide Queuing Penalty: 378



PARKING EVALUATION

DATE: July 24, 2025

TO: Shane Sullivan, PE, PTOE | City of Bellingham
Nathan Polanski, PE | MIG

FROM: Nikki Davis, Wintana Miller, PE, PTOE, Ilana Burstein, PE, Khang Nguyen | DKS Associates

SUBJECT: Bellingham Holly Street Bike Facility Study and Design

Project #25597-000

PARKING EVALUATION

This memorandum documents the existing on street public parking on Holly Street from Ellis Street to Broadway and on side streets, one block off of Holly Street. It also documents the existing public parking utilization within the evaluation area during midday and evening periods on both weekdays and Saturdays. Occupancy data was collected during the following two weekdays and two Saturdays for two time periods:

- Wednesday, June 18, 2025 - 2:00-3:00 PM & 6:00-7:00 PM
- Saturday, June 21, 2025 - 2:00-3:00 PM & 6:00-7:00 PM
- Wednesday, June 25, 2025 - 2:00-3:00 PM & 6:00-7:00 PM
- Saturday, June 28, 2025 - 2:00-3:00 PM & 6:00-7:00 PM

On-street public parking and its capacity was collected on Holly Street and side streets, documenting legally authorized parking stalls and noting existing parking restrictions. For block spaces with marked stalls, the number of spaces was counted directly. For unmarked block faces, capacity was estimated using an assumption of one stall per 20 feet of unobstructed curb length.

Figure 1 shows the study area and includes existing parking restrictions, parking time limits, and the estimated number of parking spaces per block.

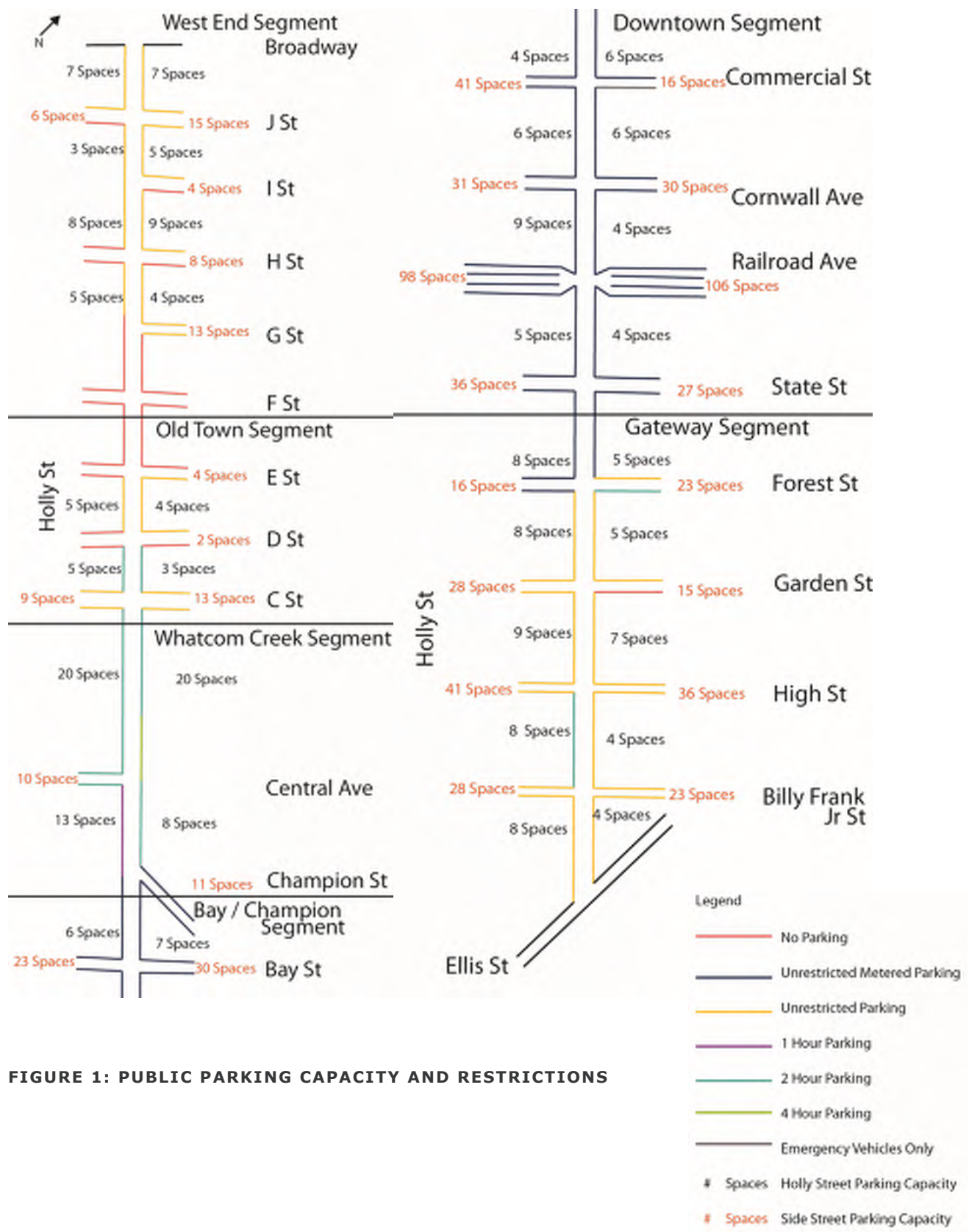


FIGURE 1: PUBLIC PARKING CAPACITY AND RESTRICTIONS

KEY FINDINGS

The Holly Street corridor has been divided into six segments determined by City staff and an analysis was performed for each:

- Gateway – Ellis Street to State Street
- Downtown – State Street to Bay Street
- Bay / Champion – Bay Street to Champion Street
- Whatcom Creek – Champion Street to Creek (West Side)
- Old Town – Creek (West Side) to F Street
- West End – F Street to Broadway

Parking capacity and utilization were analyzed for each segment along Holly Street and its side streets, with separate evaluations for weekdays and weekends. Among the segments, the Bay/Champion area demonstrated the highest overall parking utilization at 92% occupancy, while the West End segment had the lowest, with occupancy below 35%. Overall, weekday and weekend patterns were consistent across all segments, with only minor variations observed. Notably, both the Downtown and Bay/Champion segments exhibited higher utilization on weekends compared to weekdays. These key findings are summarized in Table 1 and included in Appendix Section 1.

TABLE 1: PARKING SUMMARY

	WEEKDAYS AND WEEKENDS	WEEKDAYS	WEEKENDS
GATEWAY SEGMENT			
OVERALL VEHICLE PARKING CAPACITY	276	276	276
HOLLY STREET PARKING CAPACITY	66	66	66
SIDE STREET PARKING CAPACITY	210	210	210
OVERALL PARKING UTILIZATION	59.6%	61.1%	58.0%
HOLLY STREET PARKING UTILIZATION	58.5%	62.9%	54.2%
SIDE STREET PARKING UTILIZATION	59.9%	60.6%	59.2%
DOWNTOWN SEGMENT			
OVERALL VEHICLE PARKING CAPACITY	429	429	429
HOLLY STREET PARKING CAPACITY	44	44	44
SIDE STREET PARKING CAPACITY	385	385	385
OVERALL PARKING UTILIZATION	80.5%	77.3%	83.7%
HOLLY STREET PARKING UTILIZATION	90.9%	92.6%	89.2%
SIDE STREET PARKING UTILIZATION	79.3%	75.6%	83.1%
BAY/CHAMPION SEGMENT			
OVERALL VEHICLE PARKING CAPACITY	66	66	66
HOLLY STREET PARKING CAPACITY	13	13	13
SIDE STREET PARKING CAPACITY	53	53	53
OVERALL PARKING UTILIZATION	92.0%	89.0%	95.1%
HOLLY STREET PARKING UTILIZATION	90.4%	90.4%	90.4%
SIDE STREET PARKING UTILIZATION	92.5%	88.7%	96.2%
WHATCOM CREEK SEGMENT			
OVERALL VEHICLE PARKING CAPACITY	82	82	82
HOLLY STREET PARKING CAPACITY	61	61	61
SIDE STREET PARKING CAPACITY	21	21	21
OVERALL PARKING UTILIZATION	82.9%	80.2%	85.7%

	WEEKDAYS AND WEEKENDS	WEEKDAYS	WEEKENDS
HOLLY STREET PARKING UTILIZATION	80.3%	76.6%	84.0%
SIDE STREET PARKING UTILIZATION	90.5%	90.5%	90.5%
OLD TOWN SEGMENT			
OVERALL VEHICLE PARKING CAPACITY	45	45	45
HOLLY STREET PARKING CAPACITY	17	17	17
SIDE STREET PARKING CAPACITY	28	28	28
OVERALL PARKING UTILIZATION	43.6%	43.9%	43.3%
HOLLY STREET PARKING UTILIZATION	37.5%	30.9%	44.1%
SIDE STREET PARKING UTILIZATION	47.3%	51.8%	42.9%
WEST END SEGMENT			
OVERALL VEHICLE PARKING CAPACITY	94	94	94
HOLLY STREET PARKING CAPACITY	48	48	48
SIDE STREET PARKING CAPACITY	46	46	46
OVERALL PARKING UTILIZATION	32.8%	34.8%	30.9%
HOLLY STREET PARKING UTILIZATION	19.8%	20.3%	19.3%
SIDE STREET PARKING UTILIZATION	46.5%	50.0%	42.9%

APPENDIX

CONTENTS

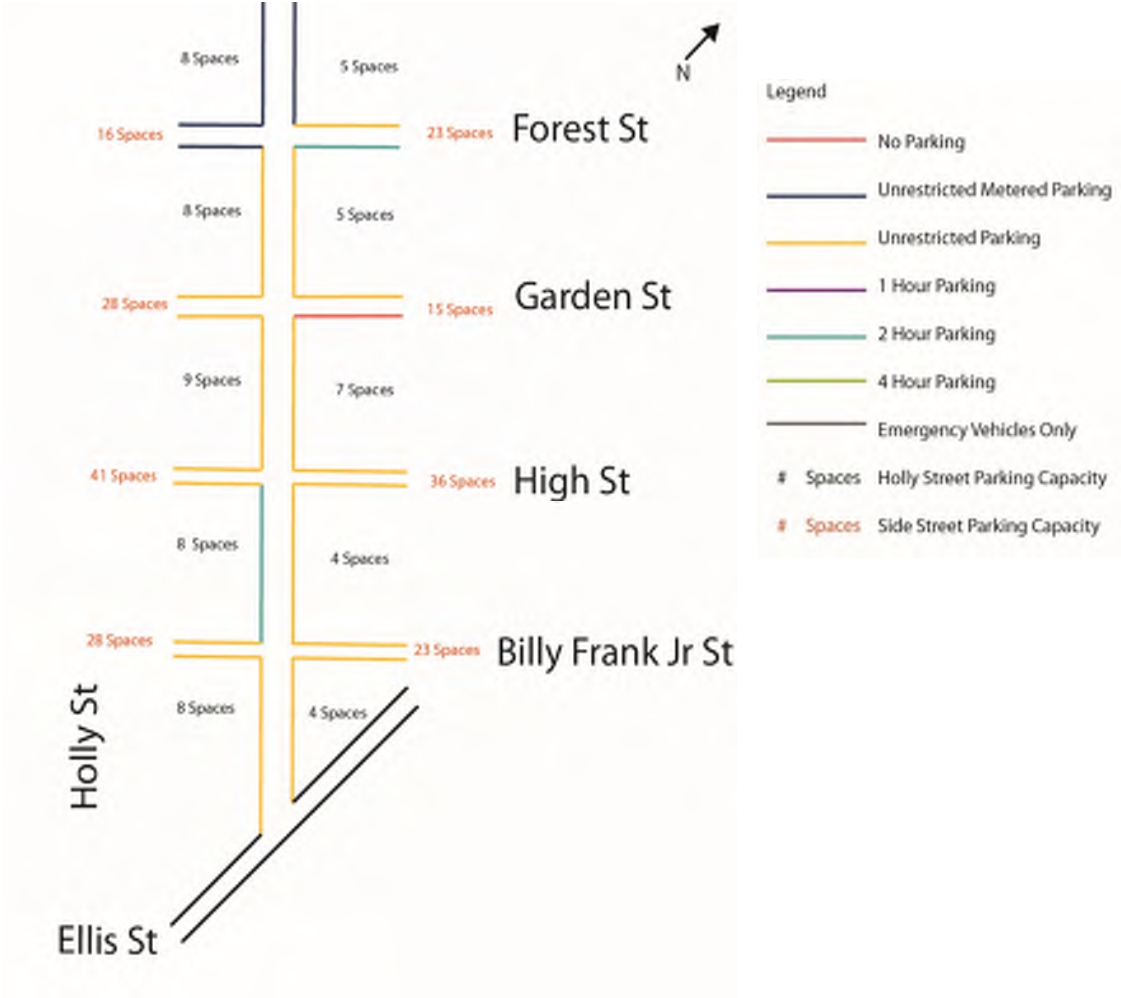
SECTION 1: PARKING EVALUATION BY SEGMENT

SECTION 1: PARKING EVALUATION BY SEGMENT

Summary Statistics - Gateway Segment

	Weekdays and Weekends	Weekdays	Weekends
Total Observations Completed	8	4	4
Remaining Observations	0	0	0
Percent Study Complete	100%	100%	100%
Overall Vehicle Parking Capacity ¹		276	
Overall Average Parked Vehicles	164.4	168.8	160
Overall Percent Utilization	59.6%	61.1%	58.0%
Overall Eastbound Parking Capacity		41	
Overall Eastbound Percent Utilization	55.2%	62.2%	48.2%
Overall Westbound Parking Capacity		25	
Overall Westbound Percent Utilization	64.0%	64.0%	64.0%
Overall Southside Parking Capacity		113	
Overall Southside Percent Utilization	50.4%	52.9%	48.0%
Overall Northside Parking Capacity		97	
Overall Northside Percent Utilization	70.9%	69.6%	72.2%
Overall Holly Street Parking Capacity		66	
Overall Holly Street Percent Utilization	58.5%	62.9%	54.2%
Overall Side Street Parking Capacity		210	
Overall Side Street Percent Utilization	59.9%	60.6%	59.2%

¹ Parking capacity estimated by counting marked spaces or dividing the length of legal parking block space by an assumed 20' stall length



Date	Ellis St to State St				Totals (Avg = 164.4) ¹	Percent Utilization (Max Capacity = 275)
	Eastbound along Holly St	Westbound along Holly St	South of Holly St (side streets)	North of Holly St (side streets)		
Wednesday, June 18, 2025						
2:00 PM - 3:00 PM	25	21	58	67	171	62.0%
6:00 PM - 7:00 PM	20	19	66	64	169	61.2%
Saturday, June 21, 2025						
2:00 PM - 3:00 PM	24	17	61	69	171	62.0%
6:00 PM - 7:00 PM	14	14	58	72	158	57.2%
Wednesday, June 25, 2025						
2:00 PM - 3:00 PM	31	15	51	72	169	61.2%
6:00 PM - 7:00 PM	26	9	64	67	166	60.1%
Saturday, June 28, 2025						
2:00 PM - 3:00 PM	24	18	44	64	150	54.3%
6:00 PM - 7:00 PM	17	15	54	75	161	58.3%

¹ Green < Average, Red > Average

Bellingham Holly Street Bike Facility Study and Design - Parking Evaluation

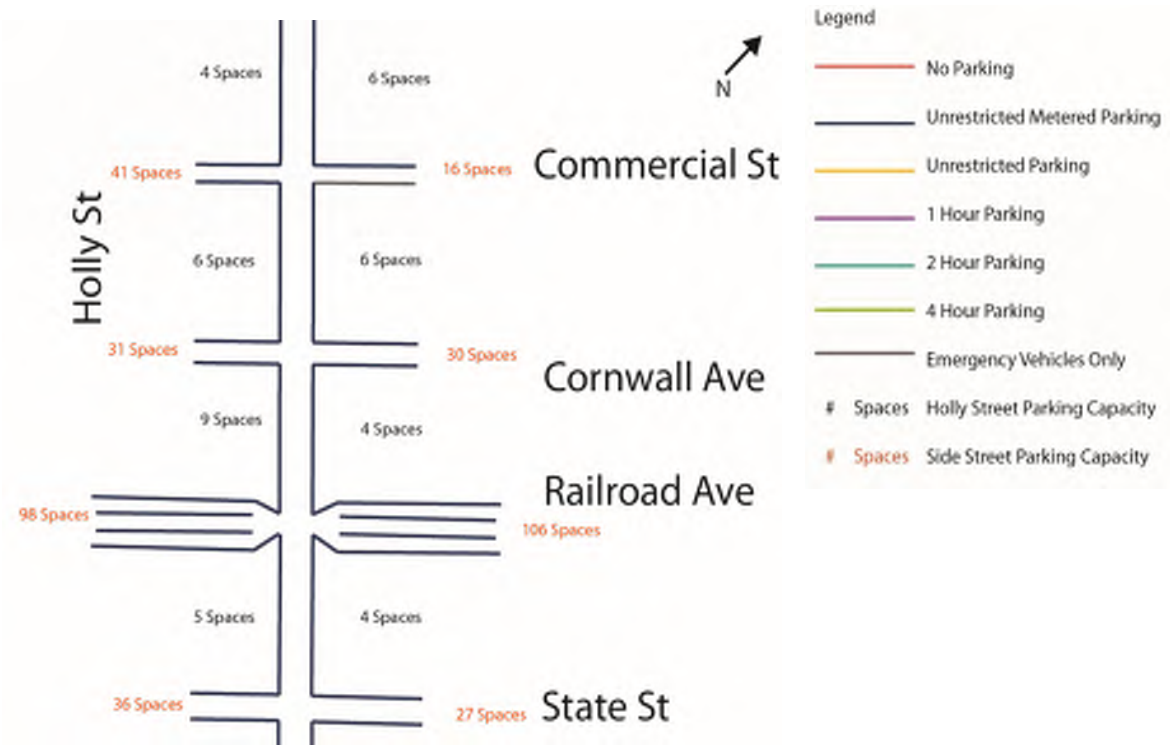
July 24, 2025
P25597-000-002



Summary Statistics - Downtown Segment

	Weekdays and Weekends	Weekdays	Weekends
Total Observations Completed	8	4	4
Remaining Observations	0	0	0
Percent Study Complete	100%	100%	100%
Overall Vehicle Parking Capacity ¹		429	
Overall Average Parked Vehicles	345.4	331.8	359
Overall Percent Utilization	80.5%	77.3%	83.7%
Overall Eastbound Parking Capacity		24	
Overall Eastbound Percent Utilization	87.0%	91.7%	82.3%
Overall Westbound Parking Capacity		20	
Overall Westbound Percent Utilization	95.6%	93.8%	97.5%
Overall Southside Parking Capacity		206	
Overall Southside Percent Utilization	75.8%	70.8%	80.8%
Overall Northside Parking Capacity		179	
Overall Northside Percent Utilization	83.4%	81.1%	85.6%
Overall Holly Street Parking Capacity		44	
Overall Holly Street Percent Utilization	90.9%	92.6%	89.2%
Overall Side Street Parking Capacity		385	
Overall Side Street Percent Utilization	79.3%	75.6%	83.1%

¹ Parking capacity estimated by counting marked spaces or dividing the length of legal parking block space by an assumed 20' stall length



Date	State St to Bay St				Totals (Avg = 345.4) ¹	Percent Utilization (Max Capacity = 429)
	Eastbound along Holly St	Westbound along Holly St	South of Holly St (side streets)	North of Holly St (side streets)		
Wednesday, June 18, 2025						
2:00 PM - 3:00 PM	21	19	131	123	294	68.5%
6:00 PM - 7:00 PM	24	19	161	152	356	83.0%
Saturday, June 21, 2025						
2:00 PM - 3:00 PM	24	22	194	164	404	94.2%
6:00 PM - 7:00 PM	22	20	182	172	396	92.3%
Wednesday, June 25, 2025						
2:00 PM - 3:00 PM	20	16	121	132	289	67.4%
6:00 PM - 7:00 PM	23	21	170	174	388	90.4%
Saturday, June 28, 2025						
2:00 PM - 3:00 PM	15	15	127	121	278	64.8%
6:00 PM - 7:00 PM	18	21	163	156	358	83.4%

¹ Green < Average, Red > Average



Summary Statistics - Bay/Champion Segment

	Weekdays and Weekends	Weekdays	Weekends
Total Observations Completed	8	4	4
Remaining Observations	0	0	0
Percent Study Complete	100%	100%	100%
Overall Vehicle Parking Capacity ¹		66	
Overall Average Parked Vehicles	60.8	58.8	62.8
Overall Percent Utilization	92.0%	89.0%	95.1%
Overall Eastbound Parking Capacity		6	
Overall Eastbound Percent Utilization	83.3%	83.3%	83.3%
Overall Westbound Parking Capacity		7	
Overall Westbound Percent Utilization	96.4%	96.4%	96.4%
Overall Southside Parking Capacity		23	
Overall Southside Percent Utilization	92.9%	87.0%	98.9%
Overall Northside Parking Capacity		30	
Overall Northside Percent Utilization	92.1%	90.0%	94.2%
Overall Holly Street Parking Capacity		13	
Overall Holly Street Percent Utilization	90.4%	90.4%	90.4%
Overall Side Street Parking Capacity		53	
Overall Side Street Percent Utilization	92.5%	88.7%	96.2%

¹ Parking capacity estimated by counting marked spaces or dividing the length of legal parking block space by an assumed 20' stall length



Date	Bay St to Champion St				Totals (Avg = 60.8) ¹	Percent Utilization (Max Capacity = 66)
	Eastbound along Holly St	Westbound along Holly St	South of Holly St (side streets)	North of Holly St (side streets)		
Wednesday, June 18, 2025						
2:00 PM - 3:00 PM	5	8	18	28	59	89.4%
6:00 PM - 7:00 PM	5	6	23	27	61	92.4%
Saturday, June 21, 2025						
2:00 PM - 3:00 PM	6	6	22	28	62	93.9%
6:00 PM - 7:00 PM	6	8	23	28	65	98.5%
Wednesday, June 25, 2025						
2:00 PM - 3:00 PM	5	6	16	24	51	77.3%
6:00 PM - 7:00 PM	5	7	23	29	64	97.0%
Saturday, June 28, 2025						
2:00 PM - 3:00 PM	4	6	23	29	62	93.9%
6:00 PM - 7:00 PM	4	7	23	28	62	93.9%

¹ Green < Average, Red > Average



Summary Statistics - Whatcom Creek Segment

	Weekdays and Weekends	Weekdays	Weekends
Total Observations Completed	8	4	4
Remaining Observations	0	0	0
Percent Study Complete	100%	100%	100%
Overall Vehicle Parking Capacity ¹		82	
Overall Average Parked Vehicles	68.0	65.8	70.3
Overall Percent Utilization	82.9%	80.2%	85.7%
Overall Eastbound Parking Capacity		33	
Overall Eastbound Percent Utilization	80.3%	79.5%	81.1%
Overall Westbound Parking Capacity		28	
Overall Westbound Percent Utilization	80.4%	73.2%	87.5%
Overall Southside Parking Capacity		10	
Overall Southside Percent Utilization	90.0%	90.0%	90.0%
Overall Northside Parking Capacity		11	
Overall Northside Percent Utilization	90.9%	90.9%	90.9%
Overall Holly Street Parking Capacity		61	
Overall Holly Street Percent Utilization	80.3%	76.6%	84.0%
Overall Side Street Parking Capacity		21	
Overall Side Street Percent Utilization	90.5%	90.5%	90.5%

¹ Parking capacity estimated by counting marked spaces or dividing the length of legal parking block space by an assumed 20' stall length



Date	Champion St to Creek (West Side)				Totals (Avg = 68.0) ¹	Percent Utilization (Max Capacity = 82)
	Eastbound along Holly St	Westbound along Holly St	South of Holly St (side streets)	North of Holly St (side streets)		
Wednesday, June 18, 2025						
2:00 PM - 3:00 PM	27	19	9	11	66	80.5%
6:00 PM - 7:00 PM	31	26	9	10	76	92.7%
Saturday, June 21, 2025						
2:00 PM - 3:00 PM	32	25	10	10	77	93.9%
6:00 PM - 7:00 PM	31	27	9	10	77	93.9%
Wednesday, June 25, 2025						
2:00 PM - 3:00 PM	18	19	10	8	55	67.1%
6:00 PM - 7:00 PM	29	18	8	11	66	80.5%
Saturday, June 28, 2025						
2:00 PM - 3:00 PM	18	21	8	9	56	68.3%
6:00 PM - 7:00 PM	26	25	9	11	71	86.6%

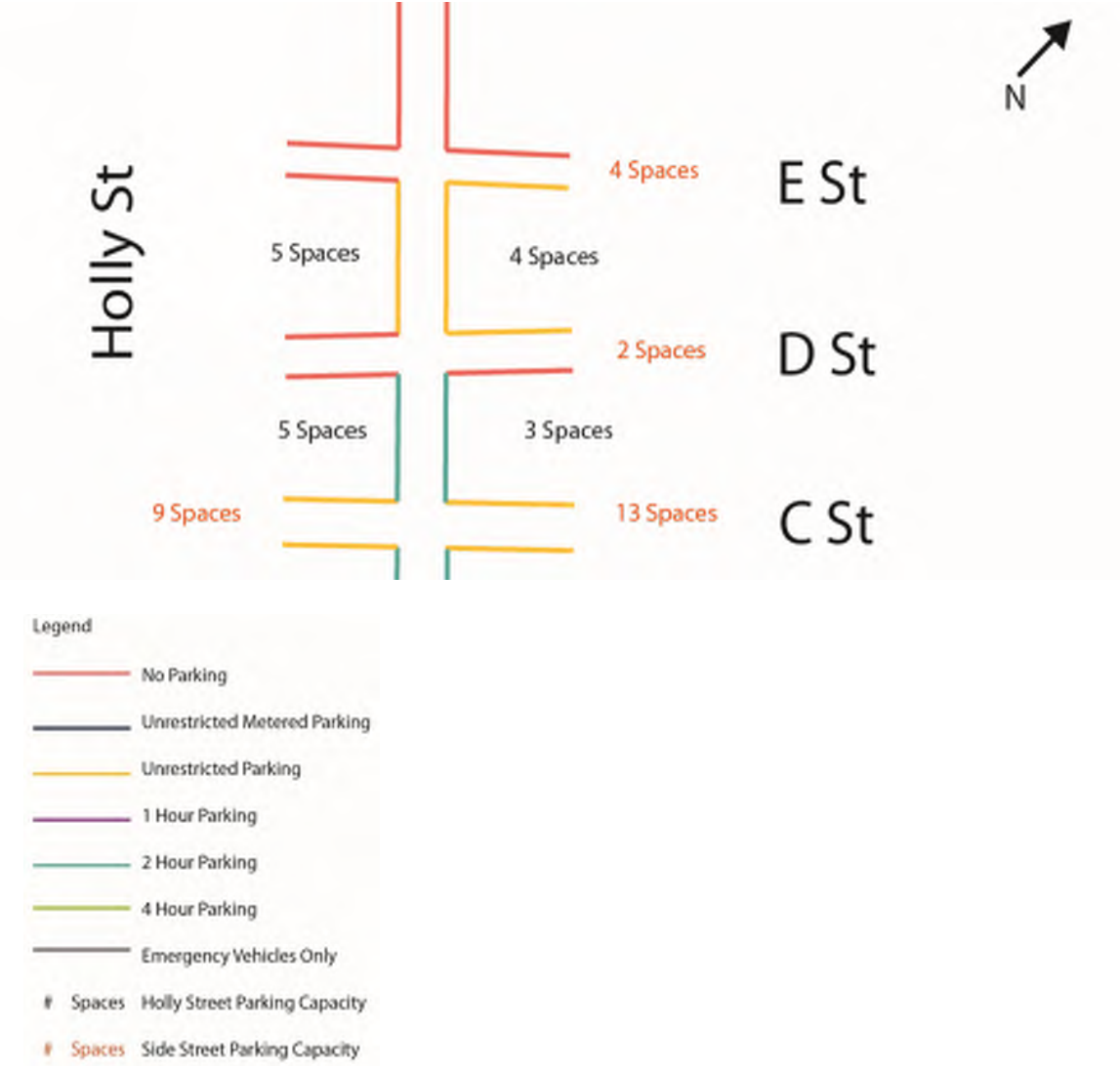
¹ Green < Average, Red > Average



Summary Statistics - Old Town Segment

	Weekdays and Weekends	Weekdays	Weekends
Total Observations Completed	8	4	4
Remaining Observations	0	0	0
Percent Study Complete	100%	100%	100%
Overall Vehicle Parking Capacity ¹		45	
Overall Average Parked Vehicles	19.6	19.8	19.5
Overall Percent Utilization	43.6%	43.9%	43.3%
Overall Eastbound Parking Capacity		10	
Overall Eastbound Percent Utilization	42.5%	35.0%	50.0%
Overall Westbound Parking Capacity		7	
Overall Westbound Percent Utilization	30.4%	25.0%	35.7%
Overall Southside Parking Capacity		9	
Overall Southside Percent Utilization	62.5%	58.3%	66.7%
Overall Northside Parking Capacity		19	
Overall Northside Percent Utilization	40.1%	48.7%	31.6%
Overall Holly Street Parking Capacity		17	
Overall Holly Street Percent Utilization	37.5%	30.9%	44.1%
Overall Side Street Parking Capacity		28	
Overall Side Street Percent Utilization	47.3%	51.8%	42.9%

¹ Parking capacity estimated by counting marked spaces or dividing the length of legal parking block space by an assumed 20' stall length



Date	Creek (West Side) to F St				Totals (Avg = 19.6) ¹	Percent Utilization (Max Capacity = 45)
	Eastbound along Holly St	Westbound along Holly St	South of Holly St (side streets)	North of Holly St (side streets)		
Wednesday, June 18, 2025						
2:00 PM - 3:00 PM	1	1	3	11	16	35.6%
6:00 PM - 7:00 PM	6	3	9	12	30	66.7%
Saturday, June 21, 2025						
2:00 PM - 3:00 PM	5	3	4	6	18	40.0%
6:00 PM - 7:00 PM	8	3	8	7	26	57.8%
Wednesday, June 25, 2025						
2:00 PM - 3:00 PM	2	0	5	9	16	35.6%
6:00 PM - 7:00 PM	5	3	4	5	17	37.8%
Saturday, June 28, 2025						
2:00 PM - 3:00 PM	1	2	4	4	11	24.4%
6:00 PM - 7:00 PM	6	2	8	7	23	51.1%

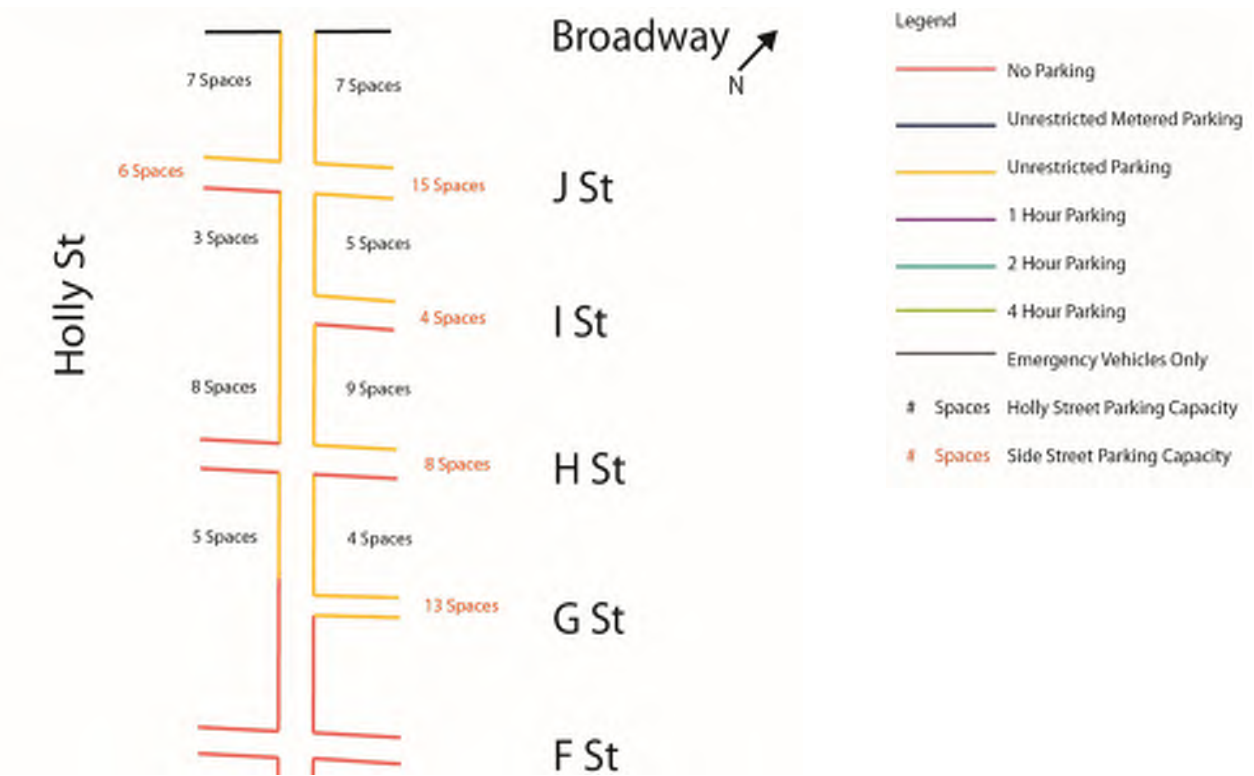
¹ Green < Average, Red > Average



Summary Statistics - West End Segment

	Weekdays and Weekends	Weekdays	Weekends
Total Observations Completed	8	4	4
Remaining Observations	0	0	0
Percent Study Complete	100%	100%	100%
Overall Vehicle Parking Capacity ¹		94	
Overall Average Parked Vehicles	30.9	32.8	29
Overall Percent Utilization	32.8%	34.8%	30.9%
Overall Eastbound Parking Capacity		23	
Overall Eastbound Percent Utilization	15.8%	17.4%	14.1%
Overall Westbound Parking Capacity		25	
Overall Westbound Percent Utilization	23.5%	23.0%	24.0%
Overall Southside Parking Capacity		6	
Overall Southside Percent Utilization	25.0%	37.5%	12.5%
Overall Northside Parking Capacity		40	
Overall Northside Percent Utilization	49.7%	51.9%	47.5%
Overall Holly Street Parking Capacity		48	
Overall Holly Street Percent Utilization	19.8%	20.3%	19.3%
Overall Side Street Parking Capacity		46	
Overall Side Street Percent Utilization	46.5%	50.0%	42.9%

¹ Parking capacity estimated by counting marked spaces or dividing the length of legal parking block space by an assumed 20' stall length



Date	F St to Broadway				Totals (Avg = 30.9) ¹	Percent Utilization (Max Capacity = 94)
	Eastbound along Holly St	Westbound along Holly St	South of Holly St (side streets)	North of Holly St (side streets)		
Wednesday, June 18, 2025						
2:00 PM - 3:00 PM	4	5	1	23	33	35.1%
6:00 PM - 7:00 PM	2	7	1	17	27	28.7%
Saturday, June 21, 2025						
2:00 PM - 3:00 PM	3	3	0	16	22	23.4%
6:00 PM - 7:00 PM	0	8	0	20	28	29.8%
Wednesday, June 25, 2025						
2:00 PM - 3:00 PM	5	4	3	23	35	37.2%
6:00 PM - 7:00 PM	5	7	4	20	36	38.3%
Saturday, June 28, 2025						
2:00 PM - 3:00 PM	3	9	1	14	27	28.7%
6:00 PM - 7:00 PM	7	4	2	26	39	41.5%

¹ Green < Average, Red > Average