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CHAPTER 4A
QUICK-BUILD PILOTS

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Contents

4A.1.0 Introduction

This chapter provides more details on the existing conditions and proposed treatments included the conceptual designs for the Broadway and Northern Oceanside corridors.

4A.1.1 Broadway

This section provides additional details on the existing conditions, the decision-making process, and the recommended treatments for the Broadway Pilot Project.

Background

Existing Conditions

The Downtown Corridor encompasses a 1.1-mile stretch of Broadway, from Harbor Drive to City College Transit Center in Downtown San Diego. It was selected due to high ridership, safety concerns, and its central location as the primary transit artery for the region. Numerous local and Rapid routes operate along the corridor, including:

- Local Buses: 992, 923, 2, 7, 110, 901, 929, 910
- Rapid Buses: 215, 225, 235, 280, 290

The corridor experiences as many as an estimated 40 buses/hour during peak times. Additional buses are planned for future service expansion; therefore, improvements to bus operations on Broadway would have significant regional impacts on transit service.

Other concurrent planning efforts are underway to improve multimodal transportation on Broadway over the long term. The intent of this conceptual design is not only to improve the accessibility and speed at which buses travel through the Broadway corridor, but also to demonstrate how quick-build treatments can be used to advance the goals outlined in the San Diego Downtown Mobility Plan.

Street-Level Survey

To further understand the specific conditions along Broadway a street-level survey was conducted. Below is a summary of the results from the survey; more details can be found in Appendix 4A.1.

Traffic in the right lane: At various intersections across the corridor, the project team looked at how many cars were using the right lane to make right turns, versus using it for through-travel. This was done to assess the effectiveness of adding a bus lane with permitted right turns:

- Across the corridor, only 44% of vehicles in the right lane are turning, meaning the majority travel straight and could block buses.
    - As such, a bus-priority lane would likely reduce delays caused by this mixed traffic, especially in the central and eastern segments of the corridor.

Intersection delay: Intersections were analyzed to determine how frequently buses encounter red lights: Red lights are a frequent source of bus delay on Broadway. Within a stretch of 4 intersections (our unit of study), most buses stop at 1–2 red lights per segment. Delays vary significantly by segment:

- The eastern part of the corridor is the most congested, with the highest average red-light delays and busy intersections like 11th Avenue recording the most stops.
- The central segment (especially 5th and 6th Avenues) also experiences high delays.

Stopping at green lights: Buses were found to often stop at green lights, typically because they must load or unload passengers. They often then had to wait for a full red signal cycle afterwards. Signal timing improvements could perhaps benefit this issue.

- Buses stop at green lights 16% of the time, often due to traffic queues from right turning vehicles waiting for pedestrians or long boardings.

Bicycles: Cyclist presence was measured to assess existing demand for bicycle infrastructure:

- High cyclist volumes occur in the westernmost portion of Broadway, especially in the eastbound direction.

Buses passing: How often buses had to pass each other at bus stops was measured to assess operational impacts:

- Bus passing presents a significant operational challenge for bus priority lanes.
- The central segment experiences bus volumes high enough to generate significant bus passing movements, requiring buses to leave the curbside lane frequently.
- If vehicle volumes in the “inside” lane (the one away from the curb) increase as a result of the bus priority lane, buses may have more difficulty merging into general traffic, potentially exacerbating bus passing challenges.

Design Elements

The following narrative describes the different design elements for each intersection that have been incorporated into the conceptual design drawings.

Pedestrian Curb Extensions

- Existing Conditions: Currently, there are no existing pedestrian curb extensions along the corridor, and pedestrians are exposed to vehicle traffic as soon as they leave the sidewalk to cross the street. Additionally, turning vehicles often make fast turns that bring them directly adjacent to the sidewalk.
- Proposed Configuration: Seven pedestrian curb extensions, built with striping and bollards are included throughout the design.
- Benefits: Encourage slower vehicle speeds by tightening turn radii, increase pedestrian visibility by aligning crosswalks with the parking lane, reduce crossing distances for pedestrians and enhance bus stop accessibility.

Addition Considerations

- City maintenance crews should already have experience with these treatments, making implementation more easily achieved.
- Need to reference turning templates and emergency access design requirements in future iterations.

Bus-Priority Lanes

- Existing conditions: Currently, buses operate in general traffic lanes along the corridor, frequently experiencing conflicts that slow travel times and increase red-light stops. Buses must also merge in and out of traffic to access curbside stops.
- Proposed configuration: Bus-priority lanes established in the outermost lane along the entire mile-long corridor. Lane widths vary depending on available right-of-way, but a minimum width of 12 feet is maintained, as requested by MTS. Signified via the inclusion of a "BUS ONLY" or “BUS BIKE ONLY” stencil. Where available a hashed space is created on the inside of the lane at bus-stops to give cyclists an avenue to pass stopped buses.
- Benefits: Bus-priority lanes are a central feature of the conceptual designs, with the goal of reducing delays caused by congestion and increasing the visibility of high-quality bus service.
- Design Considerations: MTS has noted challenges from the El Cajon bus-priority lanes, where confusion over right-turn access led to a slight increase in collisions. They recommended using the concept of "right-turn only lanes, with buses exempt," instead of bus priority lanes. While this approach is worth consideration, the current design retains bus-priority lanes to align with the City of San Diego's street design guidelines.
- Right Turns for General Traffic: Where right turners are permitted, right turn arrows and dashed lane lines will be used to signal to right turners and improve clarity. Additionally “Right Lane Must Turn Right Except Buses” signage is included.
- Parking Removal: Parking spots will need to be removed to incorporate a bus-only lane along Broadway.
    - Three metered spots and a taxi zone between 1st Ave and Front St going westbound
    - Two metered spots between Columbia St and State St going Eastbound
    - A loading zone between State and Union streets

Bicycle Lanes

- Existing conditions: Currently, no dedicated bicycle infrastructure exists along the corridor, forcing cyclists to either mix with traffic or, as frequently observed, ride on sidewalks.
- Proposed configuration: Standard 8-foot-wide (6-foot lane, with 2-foot margin) bicycle lanes with painted buffers adjacent to the curb, where lane widths allow. This currently means that the separated bike lanes would exist from Santa Fe Depot to Third Avenue.
- Benefits: Addresses safety concerns for cyclists currently mixing with traffic or riding on sidewalks and represents a significant improvement over current conditions
- Safety features: Mixing zones will occur at right turns and bus stops, so green conflict striping is included to alert cyclists, bus operators, and drivers to these interactions.

Bicycle Shared Lane Arrow Markings

- Existing conditions: East of Third Avenue, the Broadway corridor has significantly less right-of-way, limiting the ability to include dedicated bike lanes.
- Proposed configuration: Shared lane arrow markings (SLMs) added within bus-priority lanes to give cyclists preferential treatment along the remainder of the corridor. These SLMs will be stenciled within the bus-priority lanes.
- Benefits: While SLMs are considered the most minimal form of bicycle infrastructure, they still represent a clear improvement over existing conditions and improve cyclist safety in the corridor.
- Operational considerations: MTS has raised concern that SLMs within bus-priority lanes may create conflicts that slow down buses. However, it was concluded that this issue can be revisited and resolved in future iterations of the project.
- Safety features: Mixing zones will occur at right turns and bus stops, so green conflict striping is included to alert cyclists, bus operators, and drivers to these interactions.

4A.2 Northern Oceanside

This section will give additional details on the existing conditions, the decision making process, and the recommended treatments for the Oceanside Pilot Project.

Background

Existing Conditions

The Northern Oceanside Corridor includes two intersections along Mission Avenue. It was selected due to safety concerns and because it carries some of the highest ridership in the NCTD service area. The corridor is primarily served by the BREEZE 303, with routes 309 and 313 also running through the area, with the corridor ultimately terminating at the San Luis Rey Transit Center.

Concurrent efforts, such as recommendations from the BREEZE Speed and Reliability Study, are underway to improve multimodal transportation along Mission Avenue in the long term. Outreach conducted as part of this project revealed consistent priorities for NCTD's service area, including a strong interest in implementing a systemwide Transit Signal Priority (TSP) network. At the same time, community feedback indicated opposition to removing lanes for bus-priority measures, with a preference for improvements that are less impactful on general traffic.

Site Visit

To validate these findings, the project team conducted a site visit to further document existing conditions along the corridor. More detail on these observations is included in Appendix 4A.2.

Design Elements

The following narrative describes the different design elements that have been incorporated into the conceptual design drawings.

4A.3 Mission Avenue and Mesa Drive (Amick St.)

Queue Jumps

The conceptual design includes two queue jumps to improve bus travel times.

Eastbound

- Existing conditions: Currently, buses queue with general traffic at the light, often facing delays during peak periods before reaching the far-side bus stop. There is an existing median separating forward traffic lanes and a right-turning lane.
- Proposed configuration: Convert median into dedicated bus queue jump lane by taking away some excessive width from the existing four lanes to create a 12-foot bus lane, as requested by NCTD. A sharrow is included to allow cyclist to use this zone as well.
- Benefit: This allows buses to bypass general traffic and proceed directly to the stop.

Westbound

- Existing conditions: At present, buses pull to the curb to serve a near-side stop, then they must merge back into traffic, causing delays.
- Proposed configuration: Move the bus-stop to the far side of the intersection, with an existing bicycle lane being converted into a turning pocket buses can also use as a queue jump lane. A sharrow is included to allow cyclist to use this zone as well.
- Benefit: This enables buses to skip the traffic queue while still serving riders.
- Signal enhancement: At both queue jumps, a small bus signal may be installed to give buses a leading signal over general traffic. Initially, this would be a simple timed signal but could later be upgraded once a corridor-wide TSP system is in place.

Bus Stop Relocation

- Relocation: Eastbound bus stop has been moved to the far side of the intersection to maximize the effectiveness of the queue jump.
- ADA compliance: Limited sidewalk width (approximately five feet) on the far side restricts the installation of standard seating. To address ADA requirements without exceeding the scope of a quick-build project, the design proposes the use of a low-cost temporary seating solution suitable for tight spaces, such as those outlined in Chapter 3.

Pedestrian Crosswalk Improvements

- Existing conditions: Existing crosswalks, currently marked only by white border striping
- Proposed configuration: Crosswalks at the intersection are enhanced with bold horizontal striping for higher visibility to improve pedestrian safety and bus stop access

4A.4 Mission Avenue and El Camino Real

Bus-Only Lanes

Eastbound

- Existing conditions: Currently, buses queue with general traffic at the intersection, an area NCTD has noted experiences heavy congestion during peak periods, before pulling into a bus stop located on a small island. After serving the stop, buses must merge back into traffic to continue through the intersection, often causing delays.
- Proposed configuration: A small bus only lane will be added at the bus stop, by reducing the size of other traffic lanes. This lane is signified through the inclusion of "BUS ONLY" stencils. Additionally buses will be permitted to use an existing right-turning slip lane to skip traffic and approach this bus-only lane. A sharrow is included to allow cyclist to use this zone as well.
- Benefits: Allows buses to bypass queued traffic and move directly to the front of the line.

Operational Considerations

Currently, the lane closest to the curb acts almost as a slip-lane for vehicles turning east onto Mission Ave. from northbound El Camino Real. This lane will also be utilized by buses coming from the designated bus-only lane on the near side. There may be a potential issue with right turning traffic cutting in front buses due to the lane previously being dedicated to right turners. If this is anticipated to be a significant issue, "No Right on Red" signage can be added for vehicles turning from El Camino Real onto Mission Avenue.

Southbound

- Existing conditions: Currently on the unique "pork-chop" island feature of the intersection, there is an unmarked lane that is used by the 309 bus to pull up to a southbound bus-stop location.
- Proposed configuration: Lane has been marked with "BUS ONLY" stencils to further designate the lane for buses.
- Benefits: Formalizes existing bus operations and provides clear designation for transit priority.

Keep Clear Markings

- Existing conditions: Currently, buses use a dedicated pullout to serve a westbound stop but face delays merging back into traffic.
- Proposed configuration: "KEEP CLEAR" markings added to the curbside lane at the Westbound Mission Avenue and El Camino Real bus stop, reinforced with "KEEP CLEAR" stencils and white striping.
- Benefits: The keep-clear zone provides a dedicated space for buses to re-enter the lane after serving the stop.

Pedestrian Crosswalk Improvements

- Existing conditions: Existing crosswalks, currently marked only by white border striping.
- Proposed configuration: Crosswalks at the intersection are enhanced with bold horizontal striping for higher visibility to improve pedestrian safety and bus stop access. At the southwest corner, bollards and a "Yield to Pedestrians" sign are added.
- Benefits: Further improve pedestrian visibility and safety at the intersection.

Appendix 4A.1:
Broadway On-Street Study

Introduction

Broadway was selected in Chapter 1 as the Metropolitan Transit System (MTS) corridor for preliminary design. Due to its role as a central hub for the MTS bus system, even moderate improvements to bus operations on the corridor because of quick-build improvements could impact bus service regionally. Improving delays or reducing congestion for buses at their central hub could improve on-time performance and reliability in other parts of the system.

However, the project team and project partners felt that for the Broadway corridor, the project team would have a stronger case for bus-priority treatments if they had more data to back up their recommendations. Without adequate data to back up recommendations, a few partner agencies felt it would be difficult to garner support from vital partners and funding agents.

As of 2025, between Harbor Drive and City College Transit Center, Broadway is mostly two through-lanes in each direction, with buses and automobiles in mixed traffic. Bus priority along Broadway entails the conversion of the righthand lane along the corridor to a bus-only/right turn lane. Additionally, some sections of the corridor would be bus-bike lanes. More details are available in Chapter 4A.

The On the Move project was not scoped to perform computer-aided traffic modeling as part of its preliminary design aspect. As such, the project team created a plan for gathering data by hand in the corridor to identify what existing conditions on Broadway could lend themselves to quick-build improvements, and what could pose issues to implementation.

Observed Issues

The issues on the corridor that this study sought to observe were:

Right Turning Traffic

- The recommended bus priority treatment would be a bus priority lane which allows right turning cars to enter the lane before an intersection in order to make their turn. This introduces conflict and reduces the effectiveness of the lane for improving bus operations.
- The project team sought to observe the volume of right-turning traffic on the corridor, and where it is localized, to identify if right-turning traffic is prevalent enough to render the bus-priority lane ineffective at separating cars and buses.

Intersections

- Partner feedback from the City of San Diego proposed that intersection delay is also a significant factor in bus performance through the corridor.
- The project team sought to observe where buses were being stopped at red lights most along the corridor. The city noted that transit signal priority is likely not feasible on the corridor, due to the complexity of one-way streets, bi-directional traffic, and pedestrian phases. However, the PDT still desired to understand the role that intersection delay plays in the overall bus operations along the corridor.

Bicyclists

- Bicyclists presently share the roadway with buses and cars, and would continue to do so with the recommended treatments.
- The project team sought to identify the volume of bike traffic on Broadway to see how much conflict there potentially could be.

Bus Passing and Long Boarding Times

- Partners identified buses passing other stopped buses (bus passing) as a potential activity which could negate the effectiveness of bus priority treatments by forcing buses back into the general-purpose lane.
- The project team sought to identify the frequency of bus passing to identify how much this could affect the recommended treatments.
- The team also identified instances of long boarding times which could cause high levels of bus passing activity.

Methodology

The project team collected data across three segments of Broadway:

1. West – between State St. and First Ave.
2. Central – between Third Ave. and Sixth Ave.
3. East – between Eight Ave. and Eleventh Ave.

Data was collected for each direction:

- Eastbound
- Westbound

Data was collected four times per day:

- 7:30-8:30am
- 8:30-9:30am
- 11:30-12:30pm
- 4:30-5:30pm

This means that in total, each segment had eight separate observations counted.

Because this observational study was only conducted on two days of the week, Tuesdays and Fridays, the findings may not reflect a full week's average. For example, Friday afternoon congestion may have contributed to elevated red-light shares. Additionally, as observations were manually recorded, some degree of measurement error and directional mislabeling is possible. Despite these limitations, the consistent patterns across intersections suggest that the data provides a useful snapshot of transit delay hotspots along the corridor.

See the end of this document for specific data tools used to collect this information.

Results

The project team presents many averages here because they allow comparisons for traffic patterns across different intersections, directions, and time periods in a clear and consistent way. Since the goal is to understand broader trends rather than focusing on individual outliers, this method helps account for differences in sample size across locations.

Results

Right Turning Traffic

The project team observed, at each intersection, the volume of cars in the right lane, and their behavior at that given intersection (turning right, or going straight). The project team only observed intersections onto which cars have the ability to turn right. This means that each intersection (except for State Street) only captures data for one direction, that being westbound for north-only cross-streets, and eastbound for south-only cross-streets.

Largely, this should be used to highlight higher-level trends, and not specific traffic volumes. The data should be used to compare levels of congestion in the right lane between segments, as well as compare right-turning volume across the corridor.

Table 4A.1.1: Average Hourly Right-Turn Volumes (Right-Lane Only)

Segment	Intersection	Right Turns (Veh/hr)	Through (Veh/hr)	Share of Right Turns (%)
West	State - WB	85.5	122.0	41%
West	Union - WB	78.0	138.7	36%
West	Front -EB	112.0	95.0	54%
Central	3rd - WB	35.3	197.3	15%
Central	4th - EB	47.3	61.3	44%
Central	5th - WB	72.7	108.7	40%
Central	6th - EB	59.0	39.0	60%
East	8th - EB	57.0	97.0	37%
East	9th - WB	29.3	41.3	42%
East	10th - EB	46.0	88.0	34%
East	11th - WB	80.0	36.7	69%
	Average	**63.8**	**93.2**	**43%**

Our observations of traffic patterns along selected segments of Broadway indicate that:

- There is significant traffic in the right lane, indicating that it is not currently functioning as a “de-facto” bus lane.

This addresses the concern that bus priority lane treatments along the corridor may be ineffective if existing automobile traffic chooses to avoid the right lane in order to avoid conflict with buses. We observed that there are many cars that still choose to use the right lane, both for turning activity, and through-traffic.

Table 4A.1.2: Share of Right Turns by Segment

Segment	Share of Right Turns (%)
West	40%
Central	49%
East	44%

Our observations of traffic patterns along selected segments of Broadway indicate that:

- There is significant traffic in the right lane, indicating that it is not currently functioning as a "de-facto" bus lane.

This addresses the concern that bus priority lane treatments along the corridor may be ineffective if existing automobile traffic chooses to avoid the right lane in order to avoid conflict with buses. We observed that there are many cars that still choose to use the right lane, both for turning activity, and through-traffic.

Our observations of auto behavior were at the intersection level, and observed between 71 and 233 cars per hour in the right lanes of different intersections (Table 4A.1.1). This shows that there is a significant number of cars contending with buses for curb space, intersection queues, and generally impeding bus operations.

Our observations also indicate that:

- Much of the traffic in the right lane is through-traffic, indicating that bus priority treatments could be effective at improving bus travel.

The observations indicate that the majority of cars (57%) we observed in the right lane along the entire corridor were through-traffic at any given intersection. Therefore, bus priority treatments could possibly remove more than half of the cars currently sharing the right lane with buses, if the only cars to continue using the right lanes are those which are turning right. Additionally, on blocks without right-turning intersections (such as those with a one-way cross-street), it can be assumed that all cars will be removed from the right lane. This could improve bus operations.

Finally, our observations, paired with existing traffic counts data along Broadway indicate that:

- Bus priority treatments could shift a high percentage of cars from the right lane to the inside lane, thus possibly creating more congestion for automobiles along the corridor.

This study was only observational, and traffic modeling will be required to understand the effects of such a treatment on general traffic operations along the corridor. For example, the assumption that all existing traffic in the right lane will simply move to the inside lane cannot be proven, as there may not be capacity in the inside lane to receive all the new traffic. Also, these changes may change traffic behavior across the downtown network, reducing automobile traffic along Broadway, which could mitigate this issue. It can be assumed that bus operations would improve, but the effects on general traffic, both on Broadway and along other roadways in the area, are unclear.

Source: SANDAG

Intersections

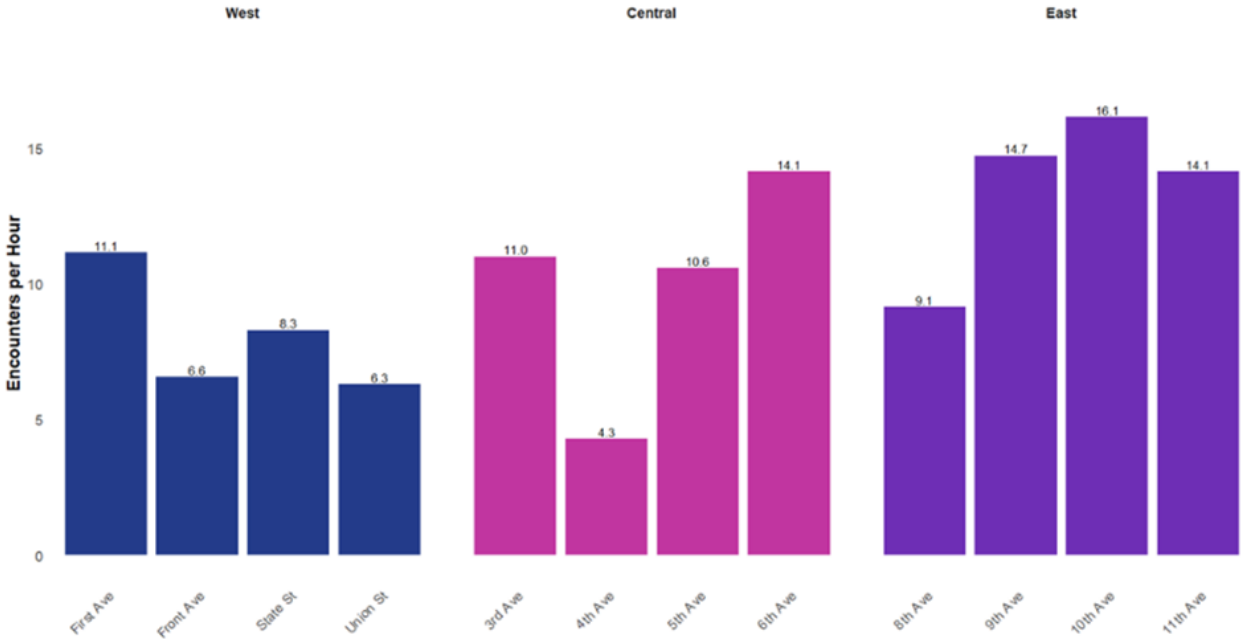
The project team also observed how buses move through intersections. For a given segment (East, West, Central), the project team observed how a given bus traveled through the four intersections of the segment (see the maps at the end of this document).

The project team identified:

- If the bus traveled through an intersection uninterrupted
- If the bus was stopped at a red light
- If the bus was given a green light, but had to stop anyway, either for a station or some other impediment.

The purpose of this analysis was to identify if there are intersections which consistently cause issues for buses along Broadway, and which could be flagged for signal improvements.

Figure 4A.1.1: Red Light Encounters per Hour by Intersection



Source: Original Data

Table 4A.1.3: Share of Red-light Stops by Segment

Segment	Avg. Red Lights Encountered per segment (4 intersections)	Number of Observations
East	1.61	235
West	1.29	175
Central	1.17	240

This graph shows:

- East segment has the highest delays
  - 11th Ave in the East segment had the highest number of red-light stops (153) overall. This intersection is particularly congested at peak hours from traffic entering and leaving the downtown area.
  - All four intersections in the East segment (8th to 11th Ave) show consistently high red-light delay counts, ranging from 88 to 153.
- Central segment also sees high delays
  - 6th Ave and 5th Ave in the Central segment follow closely behind with 123 and 118 stops, respectively.
  - 3rd Ave is moderately congested (102), while 4th Ave had the lowest in this group (56).
- West Segment has fewer delays overall
  - Intersections like Union St (46) and State St (67) show the least delay, indicating better traffic flow or signal timing.
  - Even the busiest West intersection (First Ave, 83 stops) had fewer delays than most Central and East intersections.

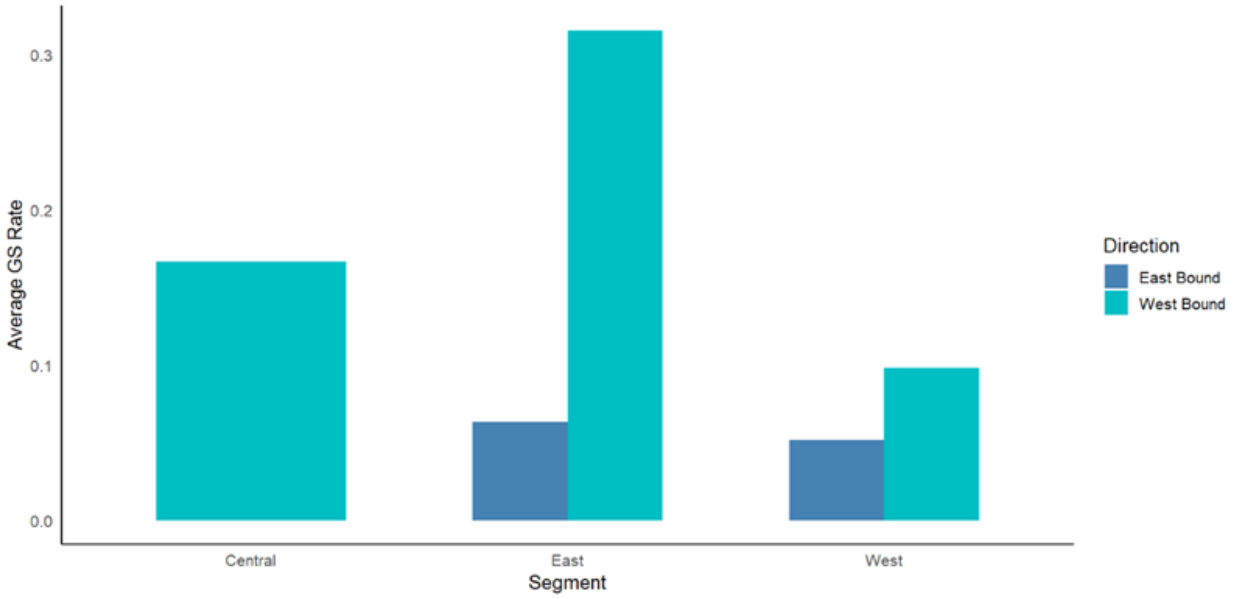
Buses Stopping at Green Lights

Even when the light is green, buses are unable to move about 16% of the time, often due to lane blockages, traffic ahead, or long boarding times.

Table 4A.1.4: Rate of Buses Stopping at Green Lights

Total Green Lights	Total Stops on Green	Stop Rate on Green
1412	225	16%

Figure 4A.1.2: Stops on Green Lights by Segment and Direction



Source: Original Data

Figure 4A.1.2 highlights the percent of buses on a given segment that stopped at a green light at least once.

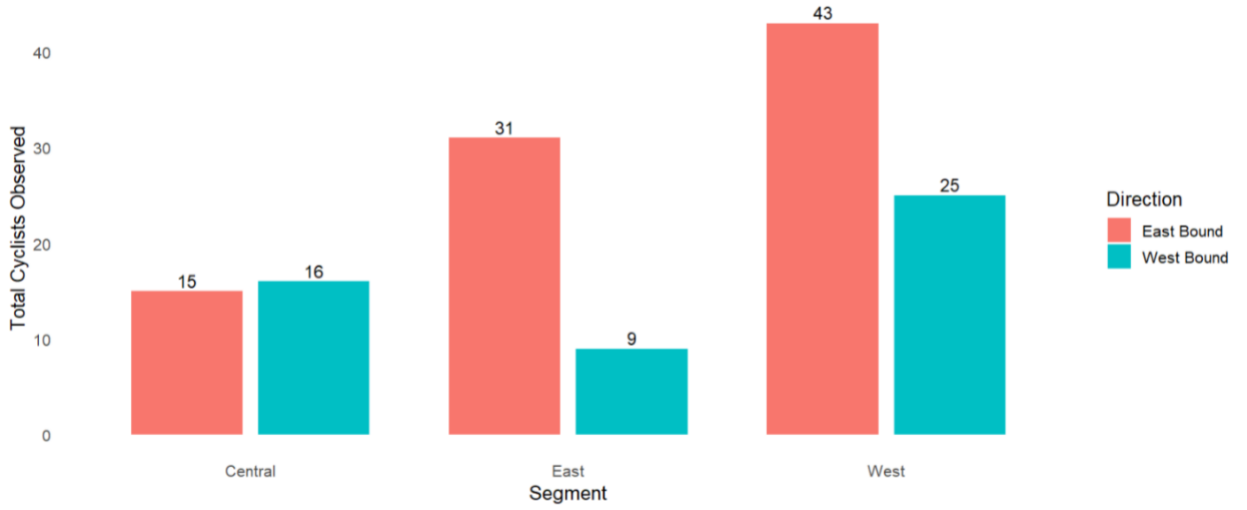
Notable observations:

- 3rd Avenue and 6th Avenue in the Eastbound direction had significant numbers of GS.
    - Both of these intersections have a near-side station, where a high percentage of buses typically stop, regardless of if the light is green.
- Union Street, 4th Avenue, 8th Avenue and 11th Avenue in the Westbound direction had significant numbers of GS.
    - All of these intersections have a near-side station, where a high percentage of buses typically stop, regardless of if the light is green.
- East Segment – West Bound buses have the highest GS rate, meaning they are more likely to stop despite having a green signal.
- Central and West Segments show lower GS rates overall, especially for East Bound buses, indicating smoother movement through green signals in those sections.
- Westbound buses experience more green light stops than eastbound buses.

The primary cause of stopped traffic at green lights for buses was near-side bus stops, which made buses stop regardless of the light condition. However, for general traffic, pedestrian crossings often led to cars standing at green lights while waiting to turn right. This would not be affected by changes to signals.

Cyclists

Figure 4A.1.3: Cyclists Presence on Broadway by Segment and Direction



Source: Original Data

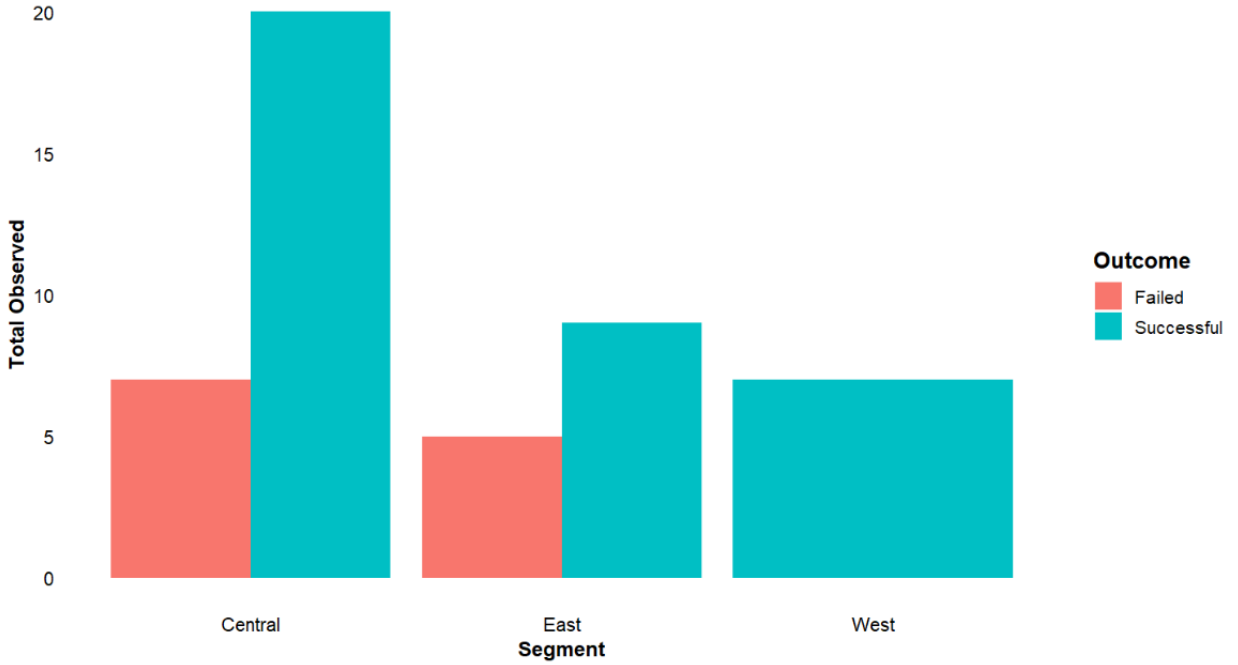
This graph shows:

- The West segment sees the most cycling activity overall, with 43 eastbound and 25 westbound cyclists observed.
- The East segment had many riders in the eastbound direction, but relatively few westbound riders.
- The Central segment has the lowest cyclist volume, with nearly equal traffic in both directions.
- This data aligns with the expectations of the project team, as the cycling experience in the West segment is more safe than in the other segments, leading cyclists to be more prevalent in that area. The Central segment is relatively cramped and unsafe for bicyclists under present conditions, which may lead riders to avoid that stretch of Broadway.

Bus Passing

The PDT identified how often buses attempted, successfully or unsuccessfully, to pass each other. The most common reason for a pass was to avoid being delayed at a stop that the bus did not serve. This measure helps identify where buses are most likely to leave a bus priority lane, and how frequently that occurs.

Figure 4A.1.4: Bus Passing Activity by Segment and Block



Source: Original Data

Figure 4A.1.4 shows where bus passing happened most frequently. The Central segment had the most bus passing action, which coincides with the Central segment having the most bus activity in general.

With Rapid and local buses interacting frequently, and Rapid and local bus stops alternating on different blocks, buses were sometimes observed "leapfrogging" and passing each other at stops.

Note: Buses passing each other
Source: SANDAG

Conclusion

Right-Lane Traffic

- On average, only 44% of vehicles in the right lane are turning, meaning the majority are going straight and could block buses.
- A bus-priority lane would likely reduce delays caused by this mixed traffic, especially in Central and East segments.

Intersections

Red lights are a frequent source of bus delay on Broadway. Per segment of 4 intersections, most buses stop at 1–2 red lights per 4 intersections (1 segment).

Delays Vary Significantly by Segment

- The East segment is the most congested, with the highest average red-light delays and intersections like 11th Avenue recording the most stops.
- The Central segment (especially 5th and 6th Ave) also sees high delays.
- The West segment experiences fewer red-light delays overall.
- Considerations should be given to optimization of signal timing to prevent buses from stopping at green lights
- Buses stop at green lights 16% of the time, often due to traffic blockages or long boardings.

Cyclists

- Cyclist volumes are highest in the West segment, especially in the eastbound direction.
- Central segment has the least cyclist activity.
- It is possible that with improved bike amenities, bicycle traffic could increase

Bus Passing

- Bus passing is an issue which should be considered prior to implementation.
- With the Central segment having bus volumes high enough to generate significant bus passing movements, buses would likely need to leave the lane frequently.
- If car volumes on the inside lane increase as a result of the bus priority lane, buses may have more difficulty merging into general traffic, thus making bus passing more difficult.

Data Collection Sheets

On the Move: Broadway Corridor Observation

This project seeks to improve bus operations on the Broadway corridor by recommending the implementation of bus priority treatments. Before recommending these treatments, we want to understand how buses on Broadway currently operate in mixed traffic so we can be sure that the proposed improvements won't have negative unintended consequences, will speed up buses, will make riders safer, and will reduce conflict.

Study Goals

We want to see how buses interact with general automobile traffic, as well as with other buses. We will be recording 2 main behaviors and some others to capture these interactions:

Person 1 - Behavior of automobiles in the right lane

Are the cars in the rightmost lane at intersections turning right, or are they thru-traffic?

- One person will focus on an intersection in the segment which has right turning traffic. They will count how many cars over a 15-minute period turn right, and how many go straight through.
- Each segment only has 1 or 2 intersections with right turns, so split up your hour slot to evenly get both, and note which intersection you looked at which time.

Person 2 – Buses and intersections

Are buses getting stuck at lights often?

- One person will record the movement of individual buses through the segment, noting if they made a green light or hit a red light at each intersection they encounter.

Both – Bus passing into left lane

Is a bus stopped at the curb or moving slowly such that another bus is trying to pass it?

- i.e. when a bus is stopped at a station the bus behind it does not stop at, or if a bus takes longer boarding than the one behind it
- We want to record if the bus successfully passes by moving into the left lane, or if it is unable to.

Both People - Buses impeded by curbside uses

- If a truck is loading, car is loading or unloading, or any other non-bus curbside use is impeding a bus in a way that slows it down or makes operations more difficult, record it.
- Record each time it seems a bus is impeded, even for the same impediment.

Both People – Long boarding times

- Record whenever a bus is in a station and loading for more than a minute.
- Add notes of if it is a wheelchair boarding, if possible.

Both People – Bicyclists

- Note when you see a cyclist

These will all be recorded with tally marks in the block or intersection column where it occurred, and the time row when it occurred.

Safety

Personal Prep and Conduct

To help things go smoothly and keep everyone safe, please keep the following in mind:

- Wear your badge at all times. It helps identify you as part of the group.
- Stay hydrated. We'll be out for about an hour, so bring a water bottle if needed.
- Dress for standing/moving. Wear comfortable shoes and weather-appropriate clothing, you might be on your feet for a while.
- Stick with your partner. Groups of two are for safety and for coverage if someone needs a break. Stay together unless there's a clear, short-term reason to separate.
- Be aware of your surroundings. Be aware of people around you, as some of the areas of study may feel unsafe.

Bad Situations

- If you ever feel unsafe, just leave the area. We can always do it at another time.
- Don't feel pressured by your group partner to do something or go somewhere you feel might not be safe.
- Don't go onto the street or the center median for a better view.

Breaks

- You should be out there only for an hour, so try to stick it out and record the whole time, but if you need a break, take one!

Emergency Point of Contact:

Group Name: _____ **Member Names:** _____

Time of Day (circle): early morning peak mid day afternoon peak **Direction (circle):** Eastbound Westbound

Segment (see map): **WEST** **Day of the week:** _____ **Date:** _____

West Segment:

Times
Early: 7:30 to 8:30
Morning Peak: 8:30 to 9:30
Mid Day: 11:30 to 12:30
Afternoon: 4:30 to 5:30

Group Name: _____ **Member Names:** _____

Time of Day (circle): early morning peak mid day afternoon peak **Direction (circle):** Eastbound Westbound

Segment (see map): **EAST** **Day of the week:** _____ **Date:** _____

East Segment:

Times
Early: 7:30 to 8:30
Morning Peak: 8:30 to 9:30
Mid Day: 11:30 to 12:30
Afternoon: 4:30 to 5:30

Group Name: _____ **Member Names:** _____

Time of Day (circle): early morning peak mid day afternoon peak **Direction (circle):** Eastbound Westbound

Segment (see map): CENTRAL **Day of the week:** _____ **Date:** _____

Central Segment:

Times
Early: 7:30 to 8:30
Morning Peak: 8:30 to 9:30
Mid Day: 11:30 to 12:30
Afternoon: 4:30 to 5:30

PERSON 1: Behavior of automobiles in the right lane

Intersection	Direction	:	:
	Straight		
	Right Turn		
Intersection	Direction	:	:
	Straight		
	Right Turn		

NOTES:

Long boardings (1+ minute) (i.e. wheelchairs)

Time	Block 1	Block 2	Block 3
:30			
:45			
:00			
:15			

NOTES:

Bicyclist Observed

Time	Count
:30	
:45	
:00	
:15	

PERSON 2: Buses and Intersections

Time	Route #	Intersection 1	Intersection 2	Intersection 3	Intersection 4
:					
:					
:					
:					
:					
:					
:					
:					
:					
:					
:					
:					
:					
:					
:					
:					
:					
:					
:					
:					
:					
:					

NOTES:

Bus impeded by curbside use (trucks, loading, etc.)

Time	Block 1	Block 2	Block 3
:30			
:45			
:00			
:15			

Bus moving into left lane to pass

Time	Block 1		Block 2		Block 3	
	Failed Pass	Successful Pass	Failed Pass	Successful Pass	Failed Pass	Successful Pass
:30						
:45						
:00						
:15						

NOTES:

Appendix 4A.2: Oceanside Site Visit

Introduction

The Northern Oceanside corridor is composed of three separate intersections, which were combined into one unit for our study because they are all used by NCTD Route 303, the highest ridership BREEZE route, and all serve a relatively linear region along Mission Road and SR 76, which stretches northeast from the coast to Vista.

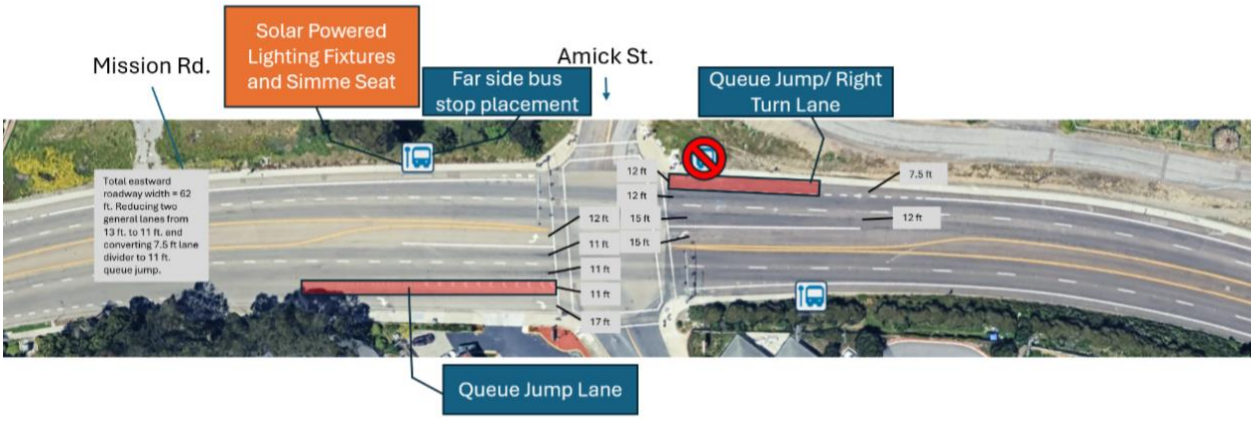
The PDT conducted a site visit of the three different locations, and sought to identify the current conditions of these locations, as well as to identify opportunities and challenges for proposed treatments

At the time that the site visit was conducted, the PDT had recommended some improvements, and the site visit would help to confirm or remove some of the recommendations given. To see how which recommendations we incorporated into the final design, see Chapter 4A.

Mission Avenue and Amick Street/Mesa Drive

At the time of the site visit, the PDT had initially proposed the recommendations highlighted in Figure 4A.2.1: Initial Recommendations for Mission Ave & Amick St./Mesa Dr. for this segment of the corridor:

Figure 4A.2.1: Initial Recommendations for Mission Ave & Amick St./Mesa Dr.



As such, the PDT desired to use the site visit to observe the following:

- Check grade of sidewalk where we are proposing a far side stop and potential alternative seating
- Observe merging of bus with general traffic at bus-stops
- Observe prevalence of right turning traffic on both sides

Many of the proposed improvements appear feasible given current corridor conditions.

- ADA ramp deployment appears to not be affected by proposed recommendations.
- Queue jump lanes are viable but may benefit from lengthening to increase their effectiveness

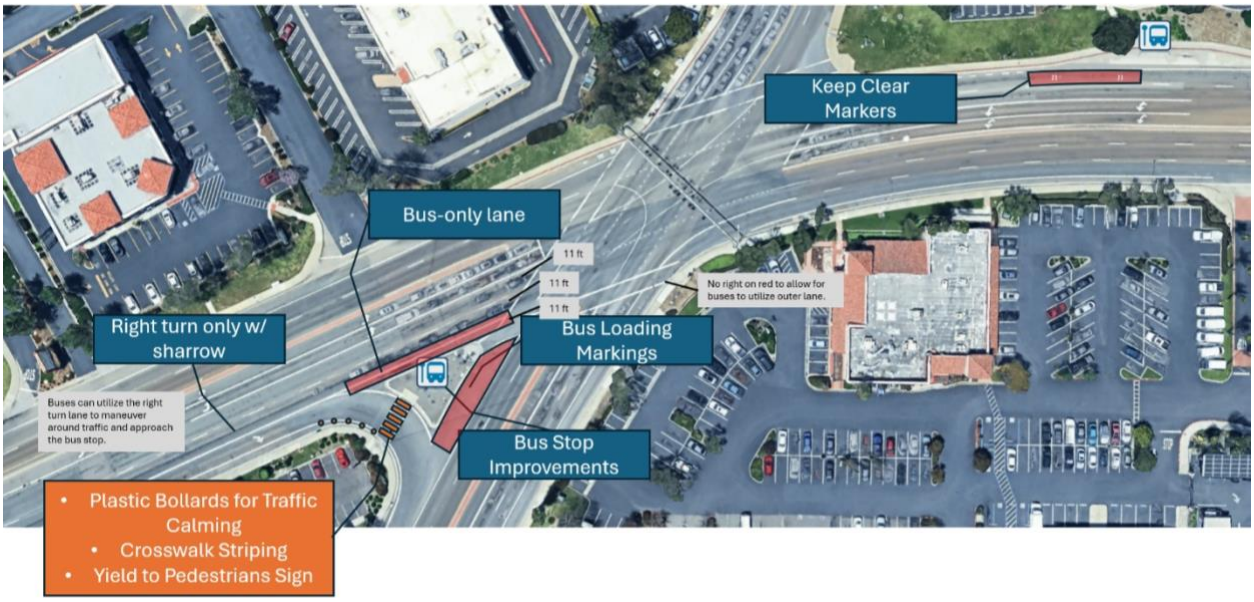
- Far-side stop placement is supported, though sidewalk grades and alternative seating should be considered where needed.
- There is adequate room for marked bike lanes and buffers (noted at approximately 3 feet), and right-turn signage may be necessary to guide drivers more clearly.

Feasible with signage, and possible extensions to bus priority features (queue jump).

Mission Avenue and El Camino Real

At the time of the site visit, the PDT had initially proposed the following recommendations for this segment of the corridor:

Figure 4A.2.2: Initial Recommendations for Mission Ave & El Camino Real



As such, the PDT desired to use the site visit to observe the following:

- Observe merging of bus with general traffic at bus-stops
- See if there is space for a bus-only lane at pork-chop bus stop
- Observe general traffic activity through the unprotected slip lane
- Observe general traffic patterns in right turn only lane from El Camino Real to Mission Avenue
- · Treatments are generally feasible and appropriate for the context.
- · The proposed eastbound bus-only lane utilizing the current right-turn lane is functionally possible.
- · Observations suggest a need for clearer markings and signage, particularly regarding right-turn-on-red restrictions, which may be missing or unclear.
- · Pedestrian safety improvements, such as crosswalk striping, and pedestrian signage, are supported by the current traffic pattern and road layout. We need to re-visit bollards.

Treatments are feasible and necessary, with strong justification for clearer signage and pedestrian safety features.

N. River Road and College Boulevard

At the time of the site visit, the PDT had initially proposed the following recommendations for this segment of the corridor:

Figure 4A.2.3: Initial Recommendations for N. River Road and College Boulevard

As such, the PDT desired to use the site visit to observe the following:

- Observe prevalence of right turning traffic at location of proposed queue jump
- · Limited opportunities exist at this intersection for meaningful infrastructure upgrades.
- · The street is narrow and presents significant constraints.
- · A southbound queue jump was proposed, but observations suggest it may not be impactful due to the existing traffic configuration and potential elimination of the right-turn movement.
- · No significant treatments were identified as actionable or needed beyond minimal adjustments.

The proposed treatment (queue jump) is likely not impactful given the constrained street width and lack of right-turn conflicts. No major improvements are recommended.

Data Collection Tool

Oceanside Site Visit Data Collection Tool

Purpose of Site Visit

We are conducting a site visit of three different locations that will be included as part of the Oceanside On the Move preliminary designs. We will be looking to identify the current conditions of these locations, as well as to identify opportunities and challenges for our currently proposed treatments

Safety:

Personal Prep and Conduct

To help things go smoothly and keep everyone safe, please keep the following in mind:

- Wear your badge at all times. It helps identify you as part of the group.
- Stay hydrated. We'll be out for about an hour, so bring a water bottle if needed.
- Dress for standing/moving. Wear comfortable shoes and weather-appropriate clothing, you might be on your feet for a while.
- Stick with your partner. Groups of two are for safety and for coverage if someone needs a break. Stay together unless there's a clear, short-term reason to separate.
- Be aware of your surroundings. Be aware of people around you, as some of the areas of study may feel unsafe.

Bad Situations

- If you ever feel unsafe, just leave the area. We can always do it at another time.
- Don't feel pressured by your group partner to do something or go somewhere you feel might not be safe.
- Don't go onto the street or the center median for a better view.

Breaks

- You should be out there only for an hour, so try to stick it out and record the whole time, but if you need a break, take one!

Emergency Point of Contact:

Corridor Overview

The corridor includes three intersections: (1) Mission Avenue and Amick Street/ Mesa Drive; (2) Mission Avenue and El Camino Real; (3) N River Road and College Boulevard. It primarily serves Breeze 303. Key issues identified through scoring and outreach, include on-time performance and bus travel speed, particularly during rush hour.

Proposed Treatments

Mission Avenue and Amick Street/Mesa Drive

1. Far side stop placement
2. Bus stop seating to serve as accommodation, until a concrete pad can be built for better seating accommodation
3. Queue Jumps going both ways

Mission Avenue and El Camino Real

1. Keep clear markings
2. A bus-only lane going east on Mission Avenue that will allow BREEZE 303 to utilize the outward lane that is currently designated for right turners
3. Bus Loading Markings
4. Pedestrian Improvements (Plastic bollards for traffic calming, Crosswalk Striping, Yield to Pedestrian Signs)

N River Road & College Blvd

1. Southbound queue jump

Observation Checklist

Mission Ave & Amick St/Mesa Dr

- Check grade of sidewalk where we are proposing a far side stop and alternative seating
- Observe merging of bus with general traffic at bus-stops
- Observe prevalence of right turning traffic on both sides

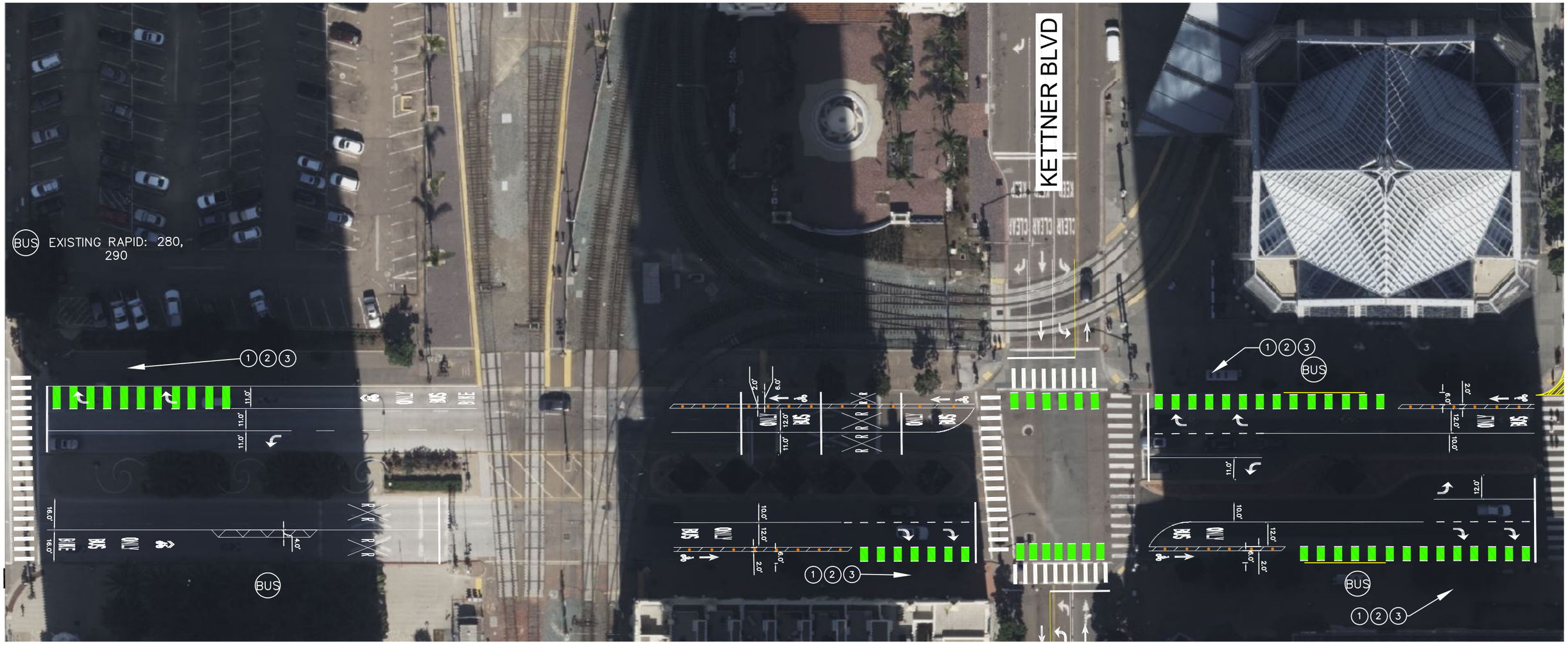
Mission Ave & El Camino Real

- Observe merging of bus with general traffic at bus-stops
- See if there is space for a bus-only lane at pork-chop bus stop
- Observe general traffic activity through the unprotected slip lane
- Observe general traffic patterns in right turn only lane from El Camino Real to Mission Ave

N River Road & College Blvd

- Observe prevalence of right turning traffic at location of proposed queue jump

Appendix 4A.3:
Broadway Pilot Designs



Plan not to scale

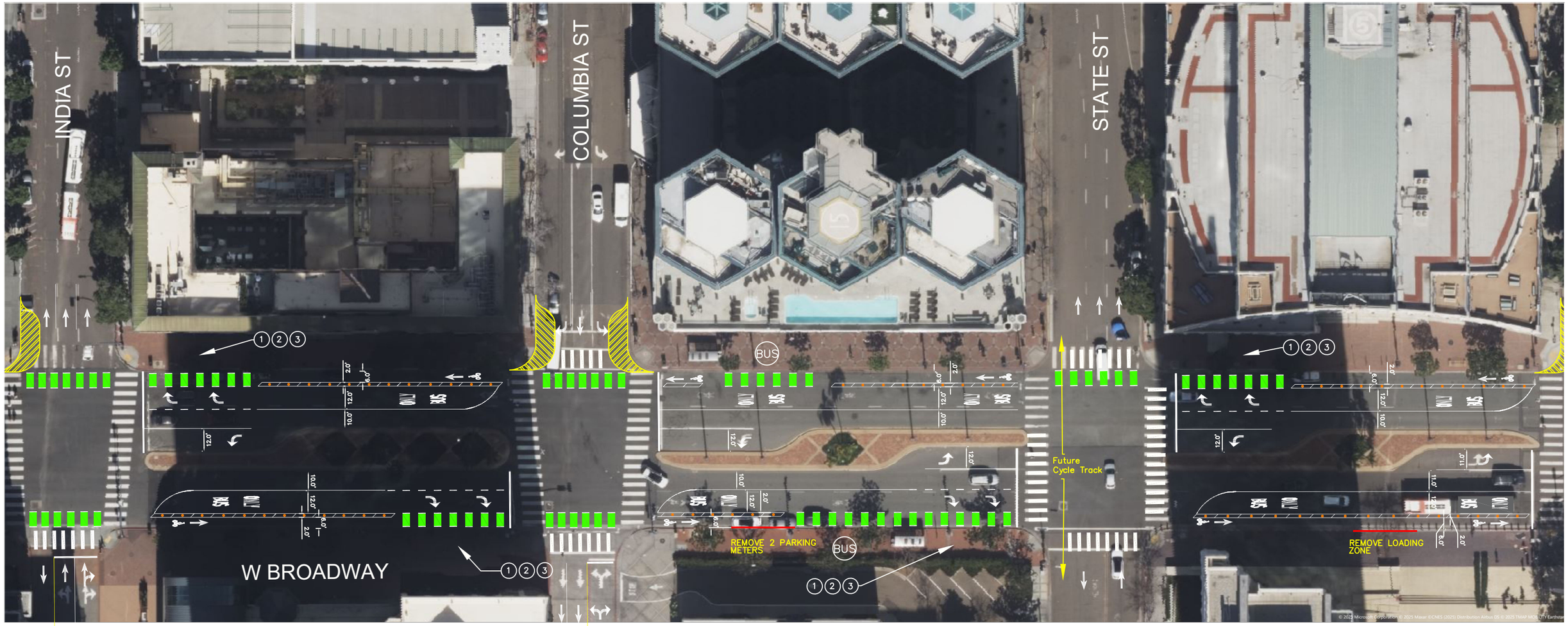
SANDAG

1 RIGHT LANE MUST TURN RIGHT R3-7

2 EXCEPT BUSES R3-7aP

3 EXCEPT BICYCLES R3-7bP

N



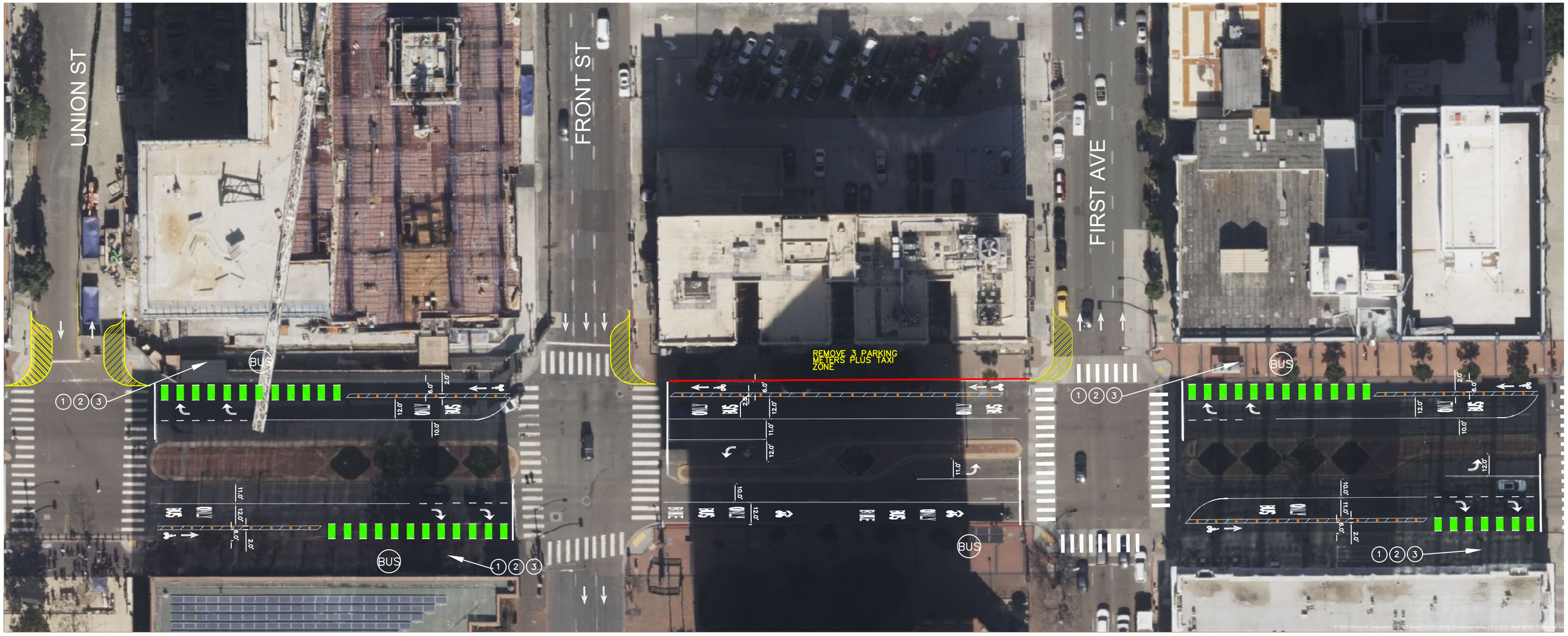
Plan not to scale

SANDAG

1 RIGHT LANE MUST TURN RIGHT R3-7

2 EXCEPT BUSES R3-7aP

3 EXCEPT BICYCLES R3-7bP



Plan not to scale

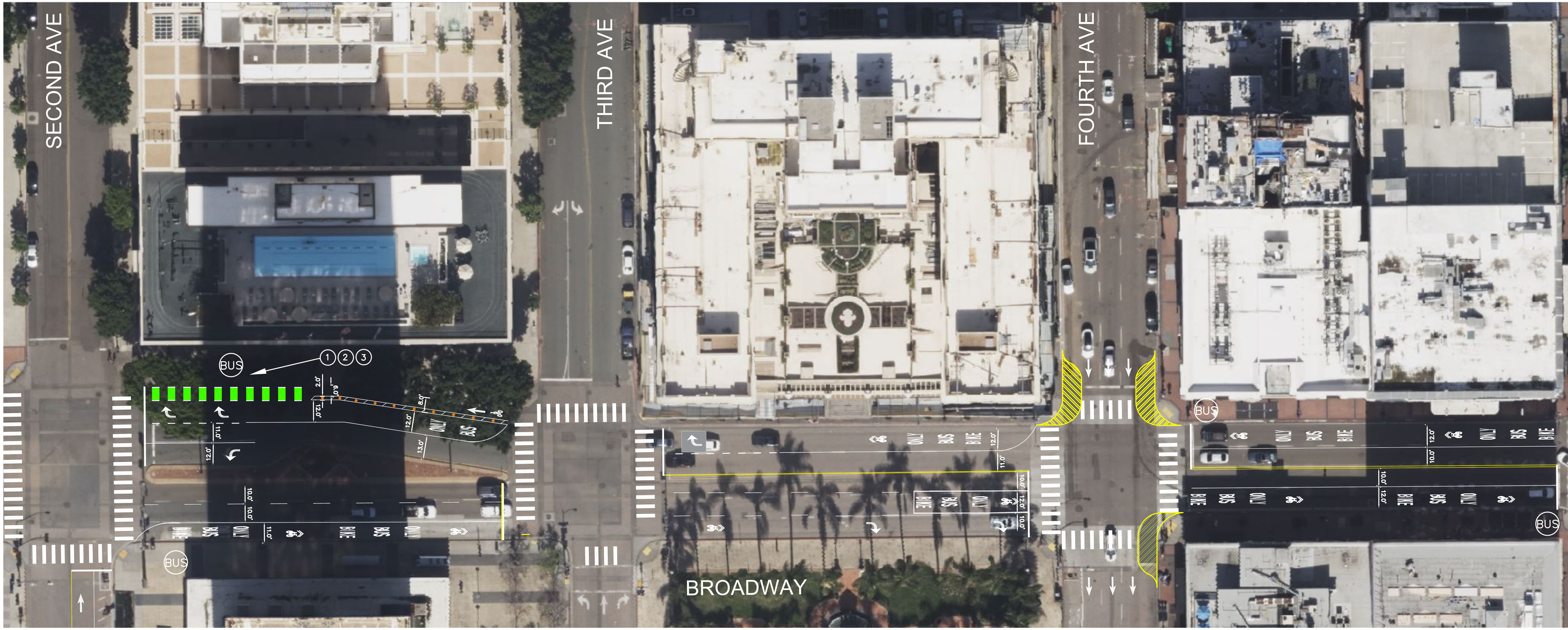
SANDAG

1 — RIGHT LANE MUST TURN RIGHT — R3-7

2 — EXCEPT BUSES — R3-7aP

3 — EXCEPT BICYCLES — R3-7bP

N



SANDAG

Plan not to scale

1	RIGHT LANE MUST TURN RIGHT	R3-7
2	EXCEPT BUSES	R3-7aP
3	EXCEPT BICYCLES	R3-7bP

N

SANDAG

Plan not to scale

1 RIGHT LANE MUST TURN RIGHT R3-7

2 EXCEPT BUSES R3-7aP

3 EXCEPT BICYCLES R3-7bP

N

Plan not to scale

SANDAG

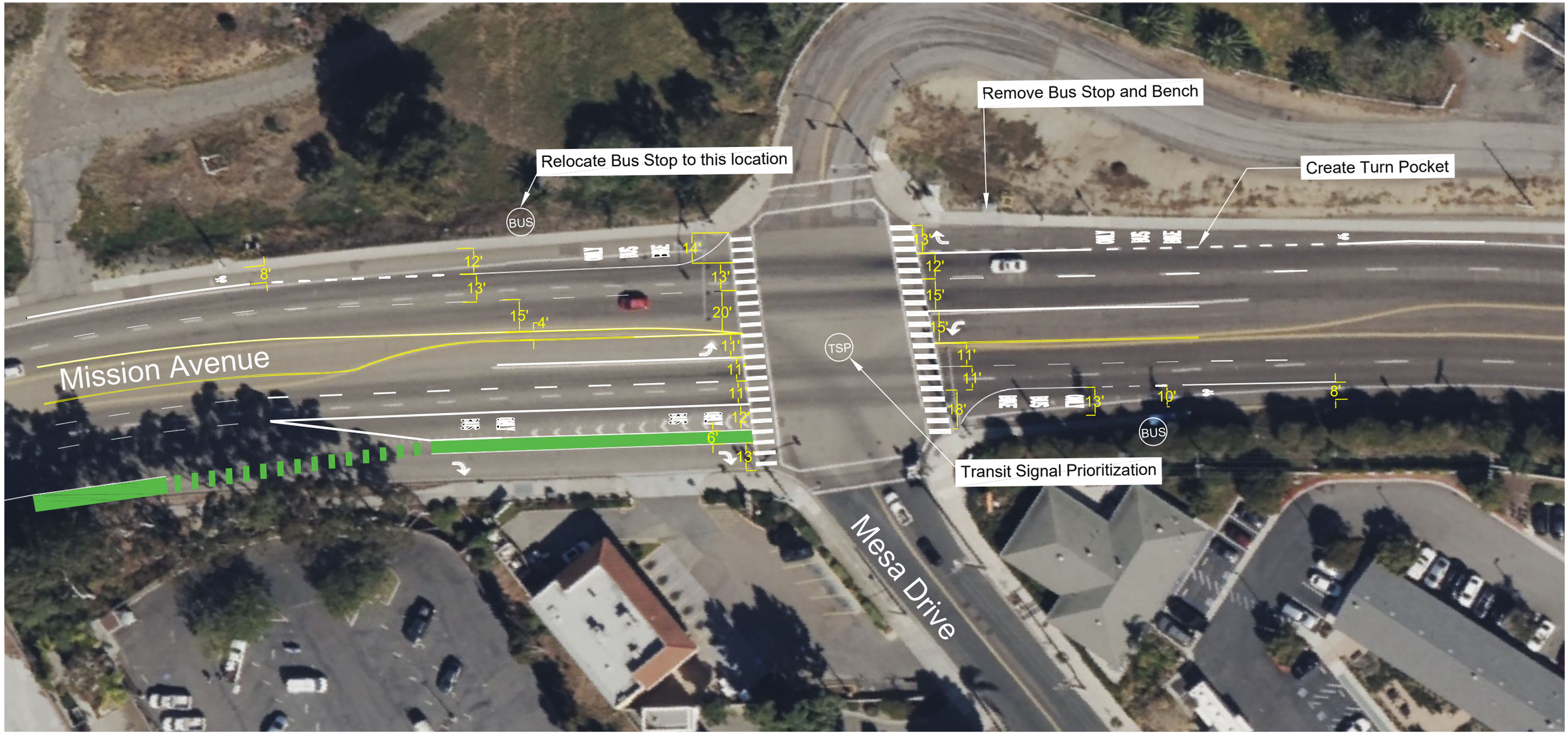
1 RIGHT LANE MUST TURN RIGHT R3-7

2 EXCEPT BUSES R3-7aP

3 EXCEPT BICYCLES R3-7bP

N

Appendix 4A.4:
Oceanside Pilot Designs



Plan not to scale

SANDAG

Mission Avenue

Matchline

Mission Avenue

10'
10'
10'
10'

12'

14'

40 foot Bus Bay Exit Clearance

HERE TO

R1-5

El Camino Real

Matchline

Plan not to scale

SANDAG