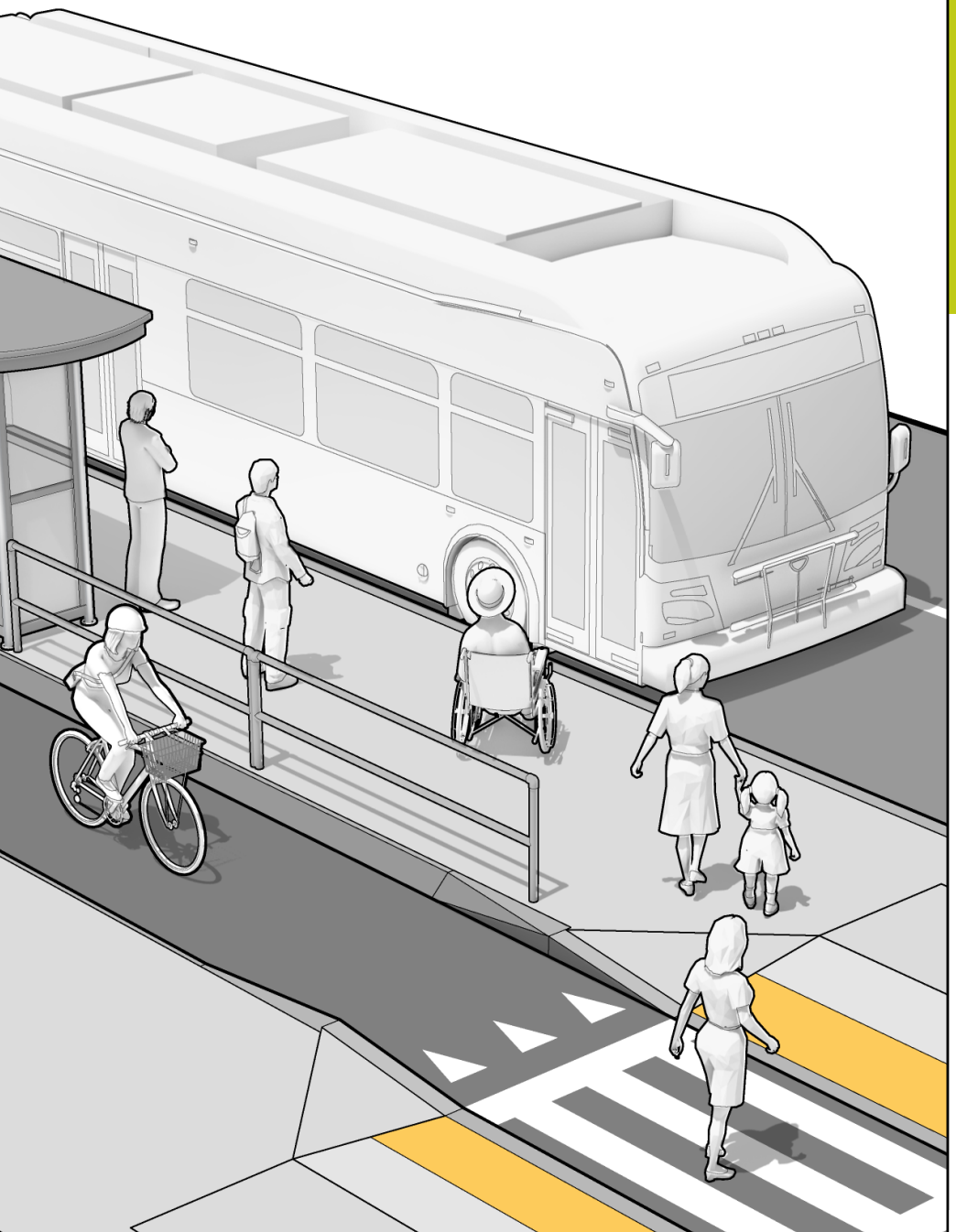


5

CURBSIDE ACTIVITY DESIGN

This chapter provides design guidance for separated bike lanes adjacent to curbside activities including parking, loading and bus stops. Typical configurations are presented for mid-block and intersection locations.

Curbside activities often present daily challenges for people with disabilities. Design guidance presented in this chapter conforms to federal and state accessibility requirements to ensure that separated bike lane designs adhere to accessibility standards:

- **Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way, United States Access Board – 2011 (or subsequent guidance that may supersede these guidelines in the future)**
- **Massachusetts Architectural Access Board (AAB) Rules and Regulations (521 CMR) - 2006**

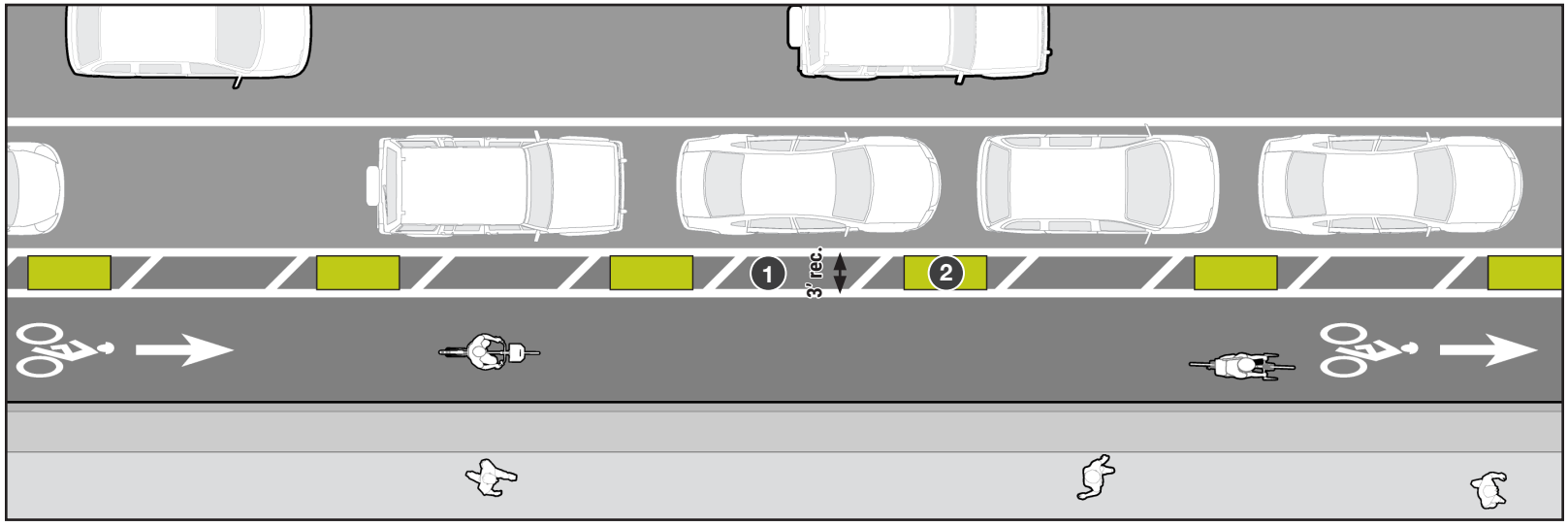
5.1 ON-STREET MOTOR VEHICLE PARKING

5.1.1 CONVENTIONAL MOTOR VEHICLE PARKING

On-street motor vehicle parking increases the comfort of people bicycling in the separated bike lane by providing physical separation (see **EXHIBIT 5A**). On-street motor vehicle parking can also coexist with contra-flow separated bicycle lanes since risk of injury from dooring to a contra-flow cyclist is much smaller than when riding with the flow of traffic due to the reduced frequency of passenger door openings and the passenger visibility of on-coming cyclists. On-street parking is typically common along roadways through more developed areas such as village and town centers, urban neighborhoods and central business districts.

- Compatible with street, intermediate or sidewalk level separated bike lanes.
- **3 ft.** street buffer recommended (**2 ft.** minimum) when adjacent to on-street parking to avoid conflicts with motor vehicle doors. ❶
- It may not be necessary to provide vertical objects adjacent to on-street parking, except in locations where parking is absent, such as near intersections.
- Vertical objects should be provided in all locations where on-street parking is prohibited for portions of the day, commercial areas where on-street parking turnover is high, or locations where parking demand is low.
- Locate vertical objects in a manner that minimizes conflicts with motor vehicle doors. ❷
- Ensure parking does not encroach into the intersection approach clear space (see Section 4.2.5).
- Locate parking meters on a raised median in the street buffer. Where raised median is too narrow, place parking meters in the sidewalk buffer zone near a crosswalk.

EXHIBIT 5A: CONVENTIONAL ON-STREET MOTOR VEHICLE PARKING (MID-BLOCK)



5.1.2 ACCESSIBLE MOTOR VEHICLE PARKING

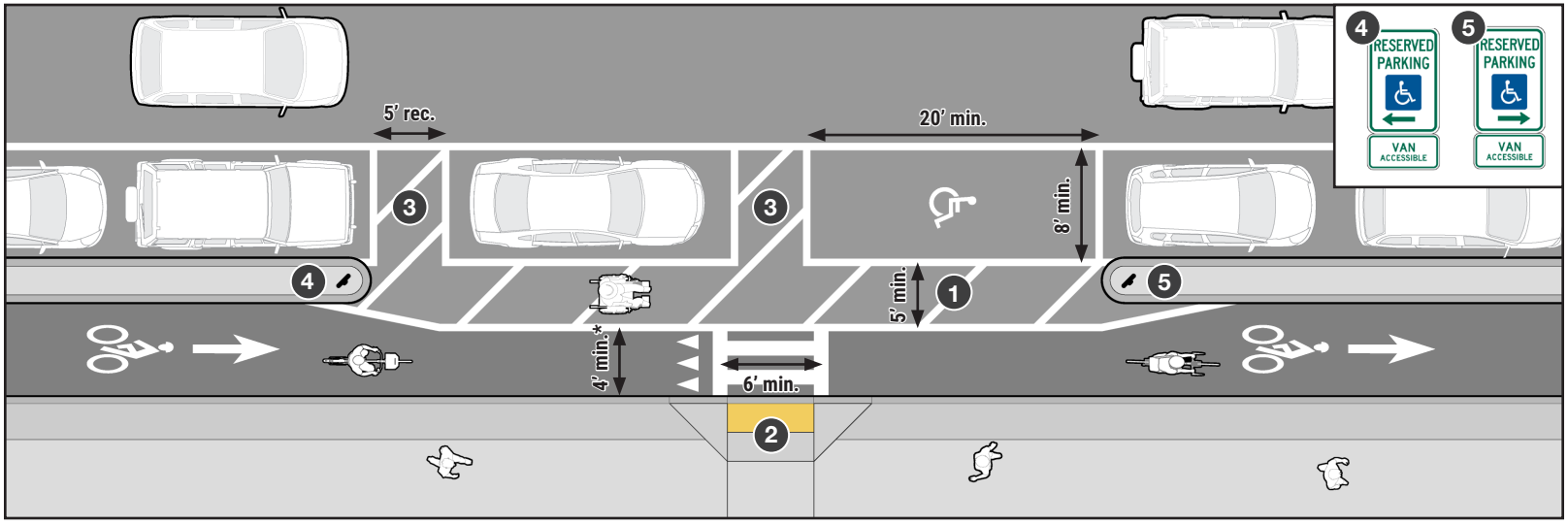
PROWAG R214 requires a minimum number of accessible on-street parking spaces on a block perimeter where marked or metered on-street parking is provided. Proximity to key destinations or roadway grades may require locating accessible parking on a block face with separated bike lanes.

- Refer to PROWAG R309 for accessible parking guidance and PROWAG R302.7 for surface guidance.
- The bike lane may be narrowed to **4 ft.** at accessible parking spaces with a design exception.
- A **5 ft. minimum** street level access aisle is required where sidewalk width exceeds **14 ft.** ❶ It must be free from obstructions, extend the full length of the parking space and connect to a pedestrian access route via curb ramp or blended transition. ❷
- Where an access aisle is not required, signed accessible space must be located at the end of the block face and adjacent sidewalk must be free of obstructions for vehicle lift deployment.
- Rear access aisles are recommended for driver side access to the sidewalk. ❸
- Place RESERVED PARKING (R7-8) and, if applicable, VAN ACCESSIBLE (R7-8P) sign at the head of each accessible parking space. ❹ ❺

MID-BLOCK LOCATIONS

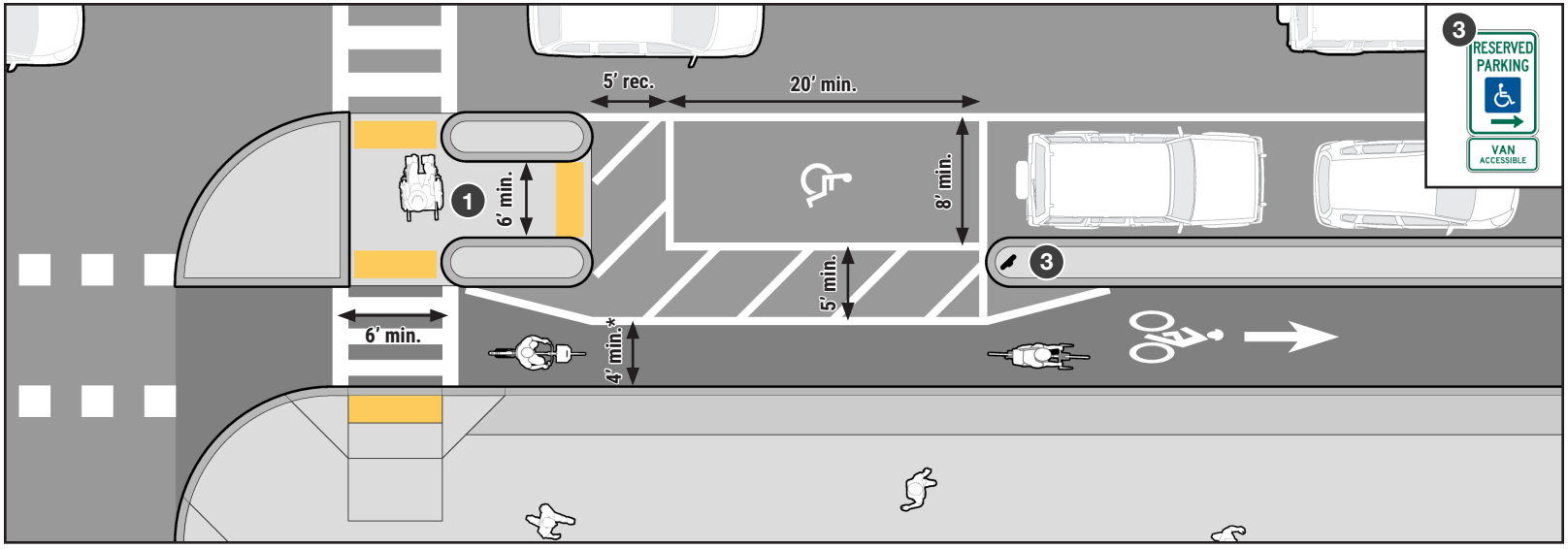
Locate accessible parking at a mid-block location (see EXHIBIT 5B) where intersection locations are infeasible or if proximity to a specific destination is advantageous.

EXHIBIT 5B: ACCESSIBLE ON-STREET MOTOR VEHICLE PARKING (MID-BLOCK)



* A bike lane width narrower than 5 ft. requires a design exception.

EXHIBIT 5C: ACCESSIBLE ON-STREET MOTOR VEHICLE PARKING (INTERSECTION)

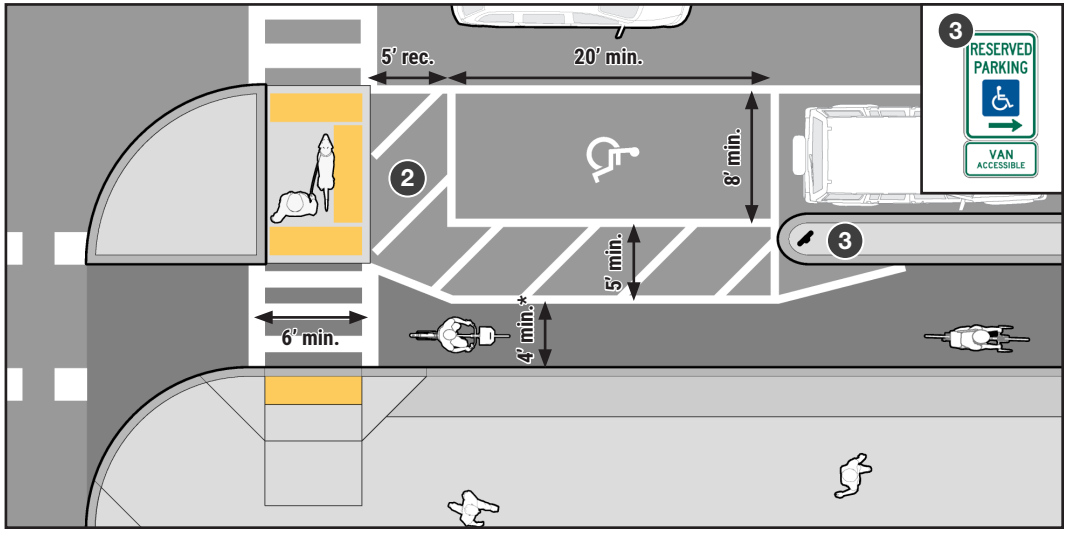


* A bike lane width narrower than 5 ft. requires a design exception.

INTERSECTION LOCATIONS

Locate accessible parking near an intersection to connect to curb ramps (see EXHIBIT 5C). Where feasible, avoid placing accessible spaces in near-side locations to preserve intersection approach clear space (see Section 4.2.5). Consider side street locations for accessible parking where far-side placement conflicts with bus operations.

- Pedestrian crossing islands with cut-throughs are recommended to prevent parking encroachment. ❶
- A rear access aisle may abut pedestrian crossing island in constrained situations. ❷



* A bike lane width narrower than 5 ft. requires a design exception.

5.2 LOADING ZONES

Designated loading zones may accommodate passenger loading (e.g., pick-up and drop-off at schools, hotels, hospitals, taxi stands, etc.), commercial loading (e.g., goods or parcel deliveries), or both.

5.2.1 COMMERCIAL LOADING

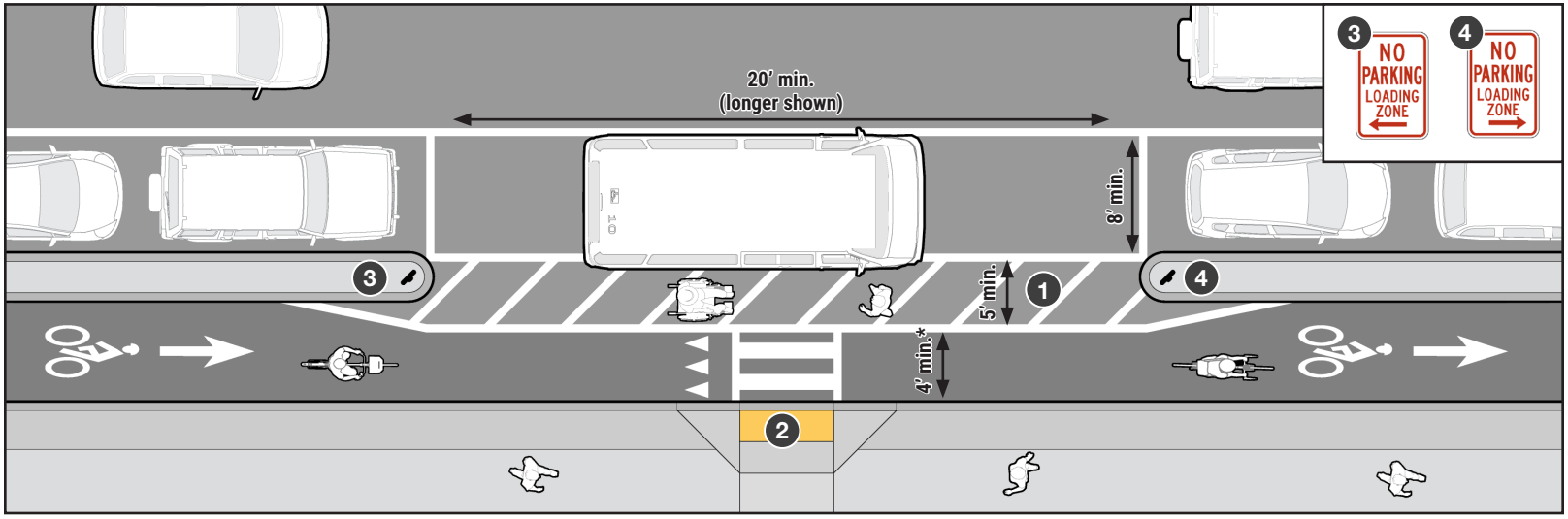
Commercial loading zones are often a restricted and managed portion of conventional on-street parking. They are typically longer than a single parking space to accommodate large commercial vehicles. They are not required to be accessible, and designers should follow conventional on-street parking guidance in Section 5.1.1.

5.2.2 PASSENGER LOADING

PROWAG R310 requires at least one accessible loading zone per **100 ft.** of continuous loading zone space when passenger loading is provided (see EXHIBIT 5D).

- Refer to PROWAG R310 for accessible passenger loading guidance and PROWAG R302.7 for surface guidance.
- The bike lane may be narrowed to **4 ft.** at accessible loading zones with a design exception.
- Length of the passenger loading zone should accommodate the length of the typical passenger vehicle that will use the zone. Longer zones may be needed if vehicle queues are anticipated.
- The access aisle must be at the same level as the motor vehicle pull-up space. ❶ It must be free from obstructions, extend the full length of the accessible loading zone and connect to a pedestrian access route via curb ramp or blended transition. ❷
- Curb ramps are recommended to accommodate dollies/hand trucks. ❷
- Place NO PARKING LOADING ZONE (R7-6) at the rear and head of an accessible loading zone. ❸ ❹

EXHIBIT 5D: ACCESSIBLE LOADING ZONE (MID-BLOCK WITH PARKING)



* A bike lane width narrower than 5 ft. requires a design exception.

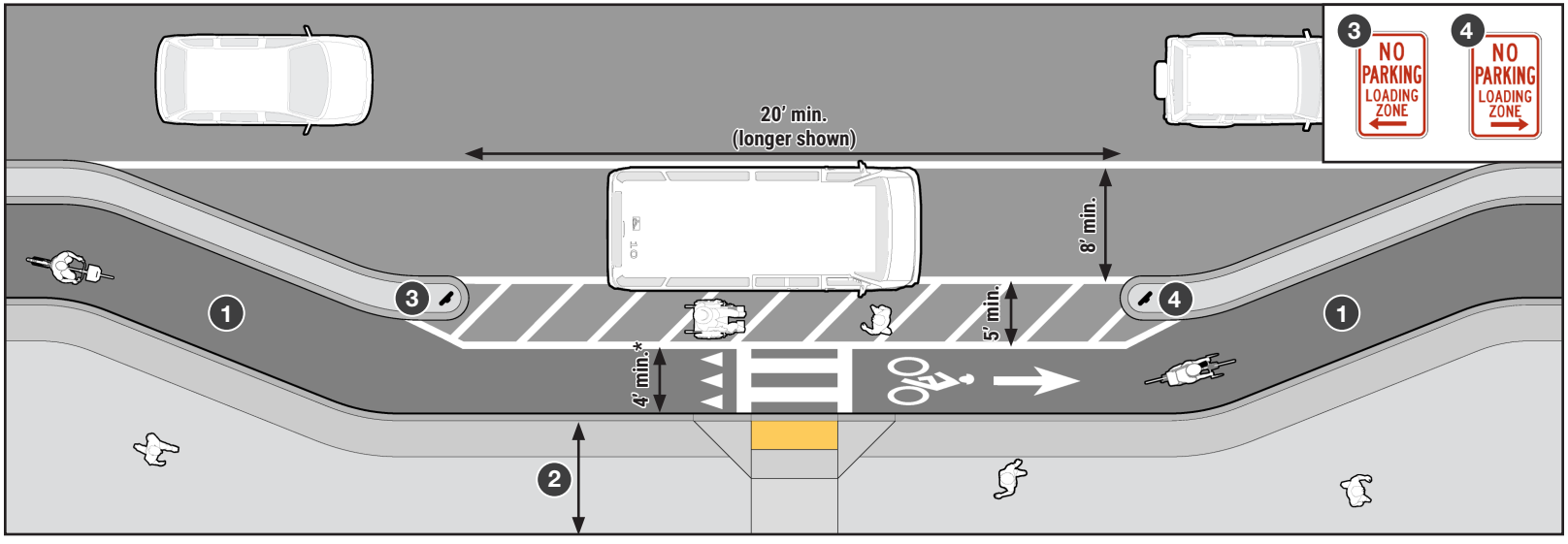
In locations without on-street parking, a lateral deflection of the separated bike lane may be required to accommodate an accessible loading zone (see **EXHIBIT 5E**).

- Bike lane deflection should occur gradually, but not greater than a **3:1** taper to maintain bicyclist safety and comfort (see Section 4.3.2). ❶
- An appropriate sidewalk width, which is often wider than the minimum pedestrian access route, must be maintained. ❷

INTERSECTION LOCATIONS

As demonstrated in **EXHIBIT 5D**, accessible loading zones are nearly identical to accessible on-street parking spaces. Designers should consult **EXHIBIT 5C** when designing accessible loading zones at intersections.

EXHIBIT 5E: ACCESSIBLE LOADING ZONE (MID-BLOCK WITHOUT PARKING)



* A bike lane width narrower than 5 ft. requires a design exception.

5.3 ON-STREET BIKE PARKING

On-street bike parking reduces conflicts between bicyclists and pedestrians, helps preserve sidewalk width, provides direct connections to bike lanes, and increases bicycle parking capacity and visibility (see EXHIBIT 5F and EXHIBIT 5G). When converted to space for bicycle parking, a single on-street motor vehicle parking space can store up to 14 bicycles or 10 bike share bicycles, thus increasing overall parking capacity for adjacent businesses. Bike parking should be considered in locations with observed demand, for example where bicycles are locked to trees, signs, parking meters and other streetscape elements. Adjacent businesses may be willing to fund and/or maintain on-street bike parking, including bike share stations.

- A **2 ft.** street buffer recommended (**1 ft.** minimum) and should be free of obstructions. ❶
- Parking should be flush with the bike lane or accessible by a mountable curb (see Section 3.3.4).
- Consider locating vertical objects between bike and motor vehicle parking to increase visibility for motorists and to protect bicycles from motor vehicle encroachment. ❷
- Locate bike parking close to destinations or transit connections.
- Bike share stations and temporary bike parking corrals may be removed seasonally for snow clearance and removal. ❸

EXHIBIT 5F: ON-STREET BIKE PARKING (MID-BLOCK)

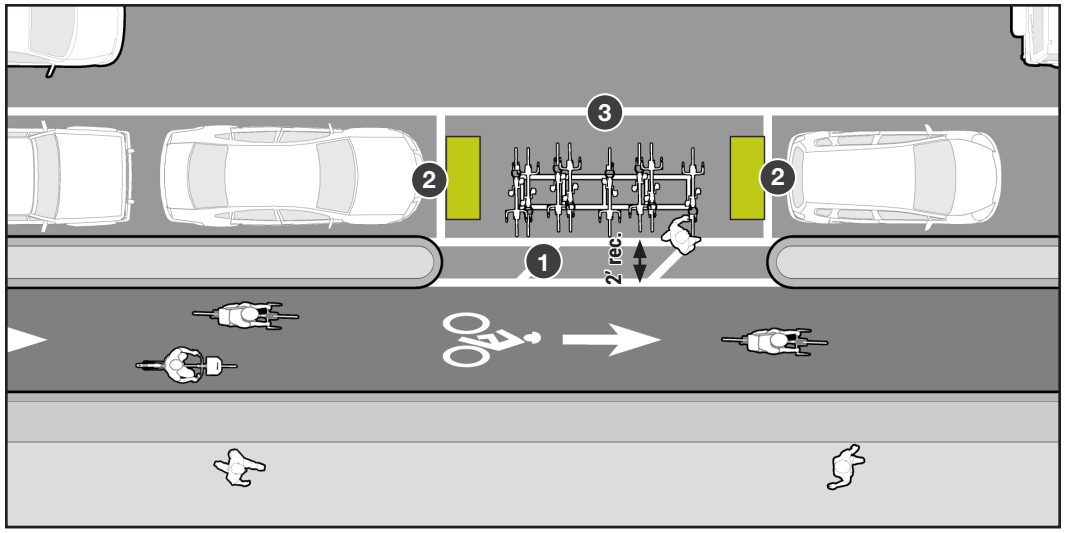
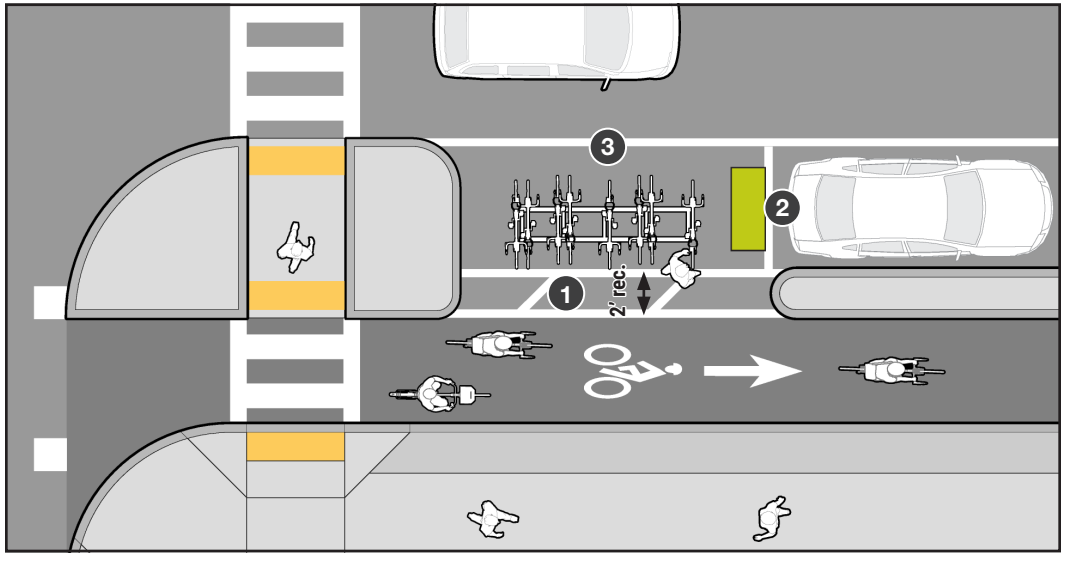


EXHIBIT 5G: ON-STREET BIKE PARKING (INTERSECTION)



5.4 BUS STOPS

Separated bike lanes can be integrated with a variety of bus stop designs. They are compatible with mid-block, near-side and far-side bus stop locations. Where feasible, separated bike lanes should be routed behind bus stops to eliminate conflicts between buses and bicyclists. This recommended configuration—referred to as "a floating bus stop"—repurposes the street buffer into a dedicated passenger platform between the motor vehicle lane and the bike lane.

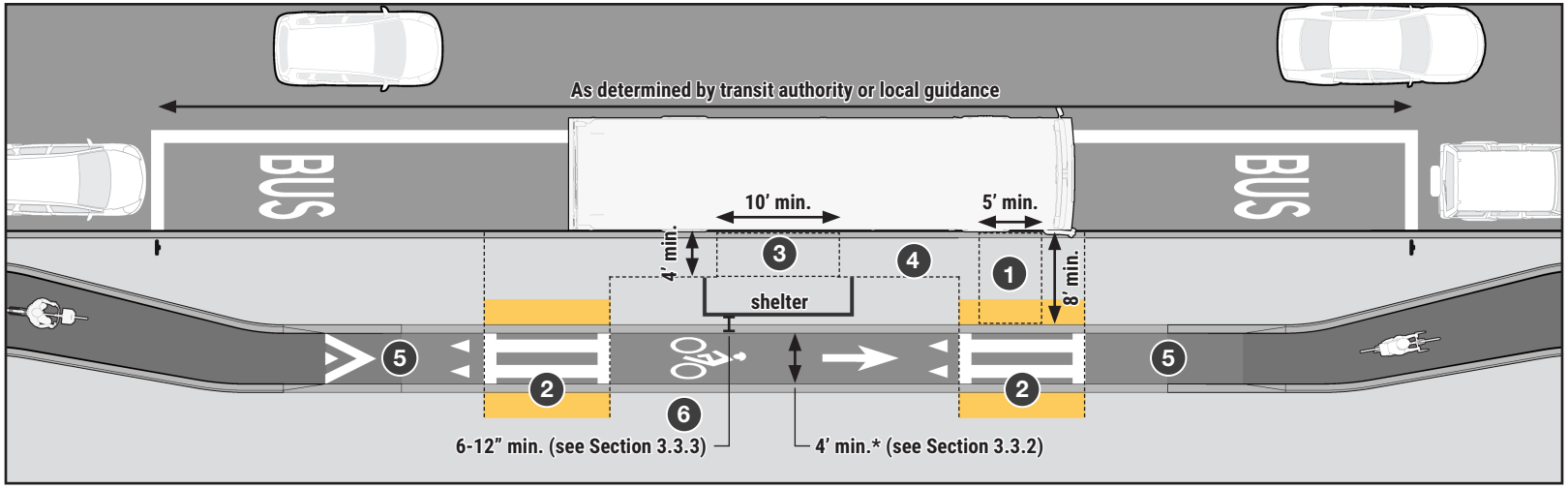
Bus passengers must cross the separated bike lane when entering and exiting the platform. Designers can communicate expectations for people bicycling and taking transit by following these principles to the maximum extent feasible:

- **Guide bus passengers across the bike lane at clearly marked locations.**
- **Provide clear direction to people bicycling when they are expected to yield to pedestrians crossing the bike lane at bus stops.**

Designers should consider in-lane bus stops to preserve space for the street buffer, maintain separated bike lane width, and simplify bus re-entry into traffic. Where on-street parking is present, a curb extension is required to provide an in-lane stop, as shown in **EXHIBIT 5J**.

Bus stops are natural locations for bike parking. Bike racks increase the catchment area of bus stops, providing a longer-range and faster first- and last-mile connection compared to walking. See to **Section 5.3** for on-street bike parking.

EXHIBIT 5H: BUS STOP DESIGN ELEMENTS



* A bike lane width narrower than 5 ft. requires a design exception.

5.4.1 DESIGN ELEMENTS

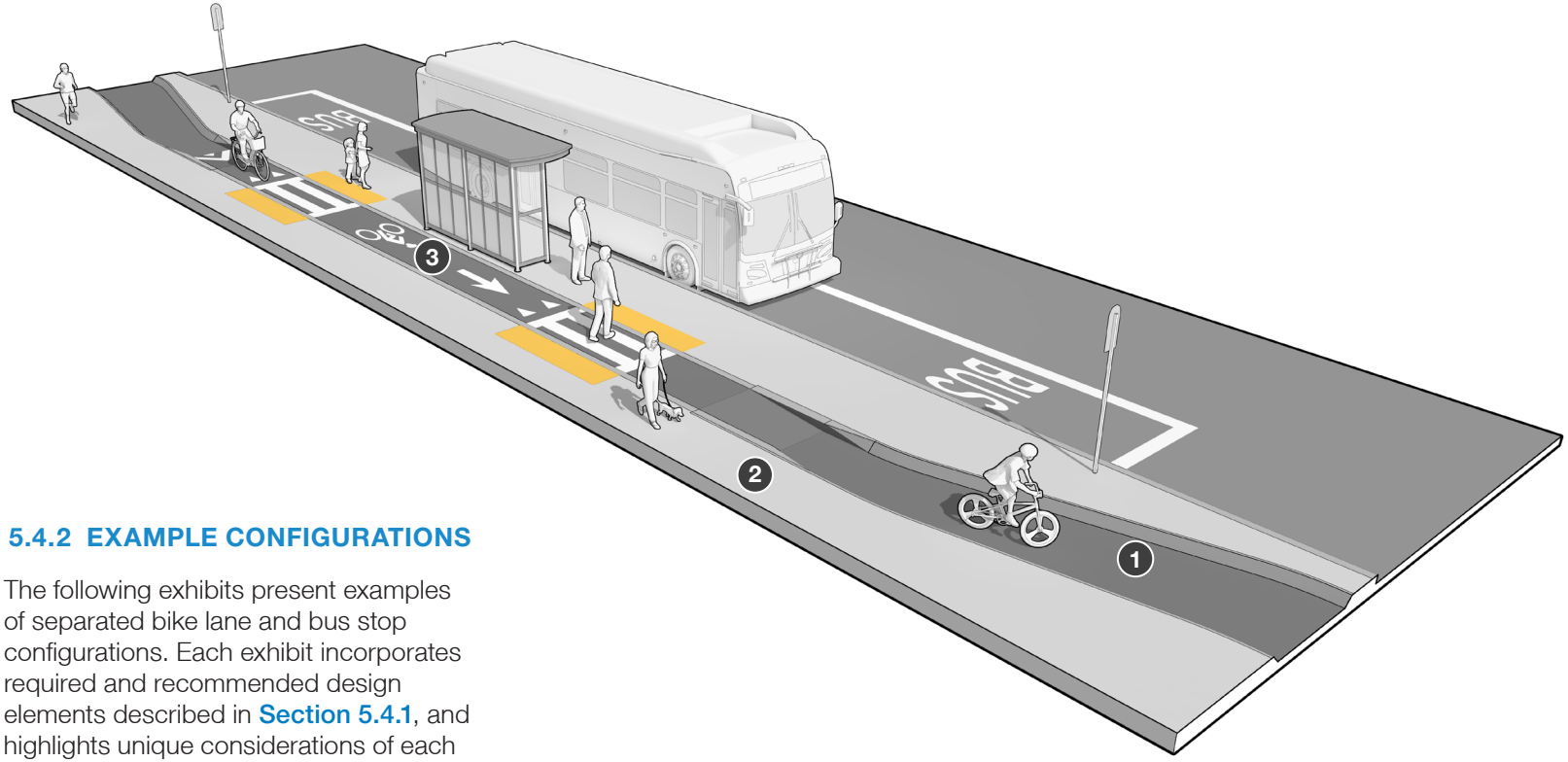
All bus stops should include a common set of required design elements to provide accessible, high-quality transit service (see **EXHIBIT 5H**). Elements that may influence separated bike lane design are highlighted in this section. Designers should consult MBTA or local guidelines for more detail, including for the design of amenities beyond the scope of this Guide (e.g., trash receptacles, informational signage, etc.).

- Preserve a clear boarding and alighting area that connects to a pedestrian access route. Advanced lateral deflection of the bike lane may be necessary to accommodate the boarding and alighting area (see Section 4.3.1). ❶
- Maintain a pedestrian access route between the sidewalk, the boarding and alighting area, and shelters and benches. Two pedestrian crossings are recommended, but not required. ❷
- Include a rear door clear zone connected to a pedestrian access route. ❸ It is preferable to have a continuous clear zone to connect the boarding and alighting area and the rear door clear zone. ❹

Additional design elements are recommended to improve operations at bus stops.

- Transition the bike lane to sidewalk level in constrained situations or to provide level pedestrian crossings. Locate bicycle transition ramps near crosswalks and outside of any lateral shift of the bike lane. ❺
- Locate shelters and other vertical objects that are **36 in.** or higher a minimum of **6-12 in.** from the bike lane edge (see Section 3.3.3). ❻
- Place railings or planters (**3 ft.** maximum height) at the back of the platform for high ridership stops or along two-way separated bike lanes to channelize pedestrians to designated crossings. Ends of railings should be flared inward toward the bus stop and away from the bike lane for a safer bicycling environment.

EXHIBIT 5I: FLOATING BUS STOP (MID-BLOCK)



5.4.2 EXAMPLE CONFIGURATIONS

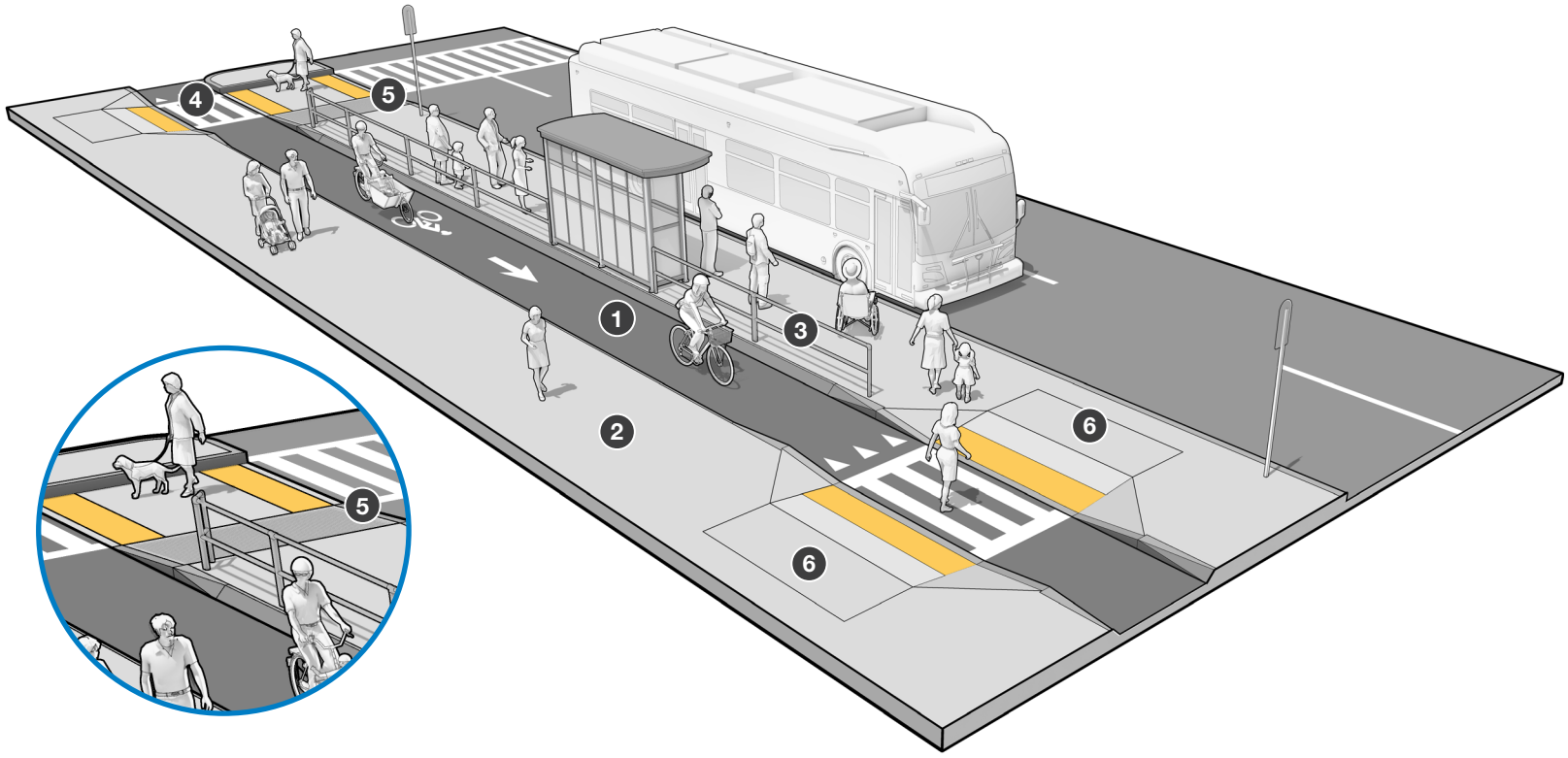
The following exhibits present examples of separated bike lane and bus stop configurations. Each exhibit incorporates required and recommended design elements described in Section 5.4.1, and highlights unique considerations of each configuration.

FLOATING BUS STOP (MID-BLOCK)

EXHIBIT 5I shows a raised separated bike lane alongside a mid-block floating bus stop. This is a typical curbside stop located between parked motor vehicles, which minimizes traffic impacts by requiring the bus driver to pull into and out of the stop.

- Where street buffer is less than **8 ft.**, taper the bike lane to create space for the bus stop. ❶
- Maintain an appropriate sidewalk width, which is typically wider than the minimum pedestrian access route. ❷
- Consider railing or planters to channelize pedestrian access to and from busy bus stops.
- Narrow the bike lane along the bus stop to maintain an accessible sidewalk and bus stop in constrained areas. Where narrowed to **4 ft.** (less than **5 ft.** requires a design exception), elevate the bike lane to sidewalk level to minimize pedal strike risks on curbs. In the case of two-way facilities, a minimum width of **8 ft.** should be used. ❸

EXHIBIT 5J: FLOATING BUS STOP (INTERSECTION)



FLOATING BUS STOP (INTERSECTION)

EXHIBIT 5J shows a street level separated bike lane alongside a far-side floating bus stop. Transit operators generally prefer far-side stops because conflicts with crossing pedestrians and turning motor vehicles are minimized.

This stop is located on a curb extension, also known as a bus bulb. Bus bulbs minimize the loss of on-street parking, simplify maneuvers for bus operators and provide more space for passenger amenities.

- Consider bus bulbs adjacent to separated bike lanes to preserve right-of-way for the separated bike lane and sidewalk. ❶ ❷
- Consider railing or planters to channelize pedestrian access to and from busy bus stops. ❸
- Integrate bus stop into the pedestrian crossing at the intersection for convenient access. ❹
- Ramp to street level pedestrian cut-through must not exceed **8.3 percent**. ❺
- Provide level landing at curb ramps (**4 ft. by 4 ft.** minimum). ❻

EXHIBIT 5K: FLOATING BUS STOP (NEAR-SIDE)

EXHIBIT 5K shows a raised separated bike lane alongside a near-side floating bus stop. When occupied by a bus, near-side stops reduce approach sight distance for right-turning motorists before crossing the separated bike lane (see **Section 4.2.3**).

- Consider raised crossings if near-side bus stop diminishes motorist approach sight distance or increases the effective turning radius for motor vehicles. ❶
- Consider railing or planters to channelize pedestrian access to and from busy bus stops. ❷
- Locate near-side stop far enough from the cross street to provide space for a forward bicycle queuing area and, if applicable, a corner refuge island. ❸

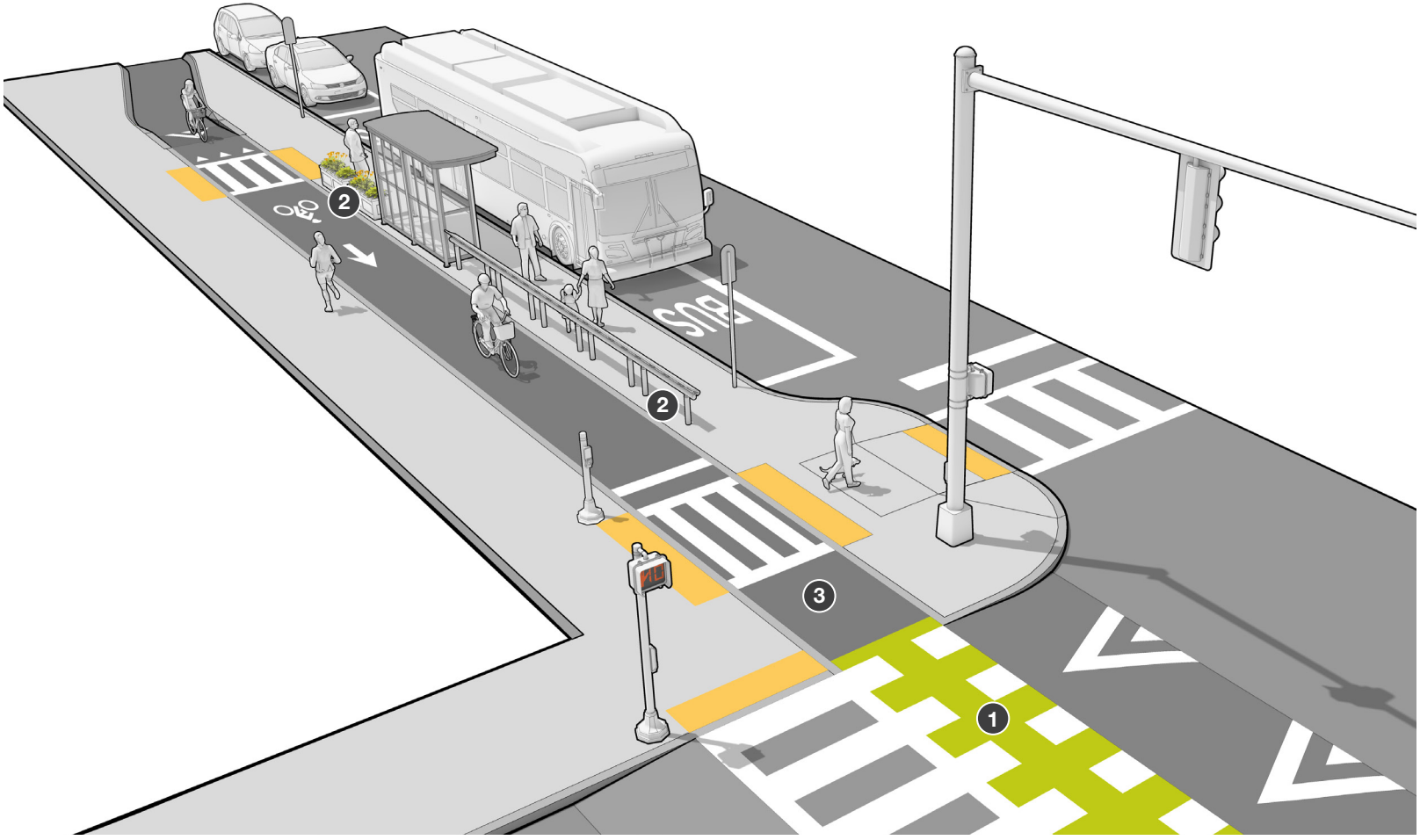


EXHIBIT 5L: FLOATING BUS STOP (FAR-SIDE)

EXHIBIT 5L shows a two-way raised separated bike lane alongside a far-side floating bus stop. The contra-flow direction of bicycle travel in a two-way separated bike lane introduces a potentially unexpected bicycle movement for bus passengers.

- Consider railing or planters to channelize pedestrian access to and from bus stops along two-way separated bike lanes. Consider agreements with businesses, community improvement districts or developers for long-term maintenance of planters. ❶
- Use solid yellow line to discourage passing along a bus stop. ❷
- Locate the top level landing in the street buffer, and not within the bike lane, wherever possible. ❸

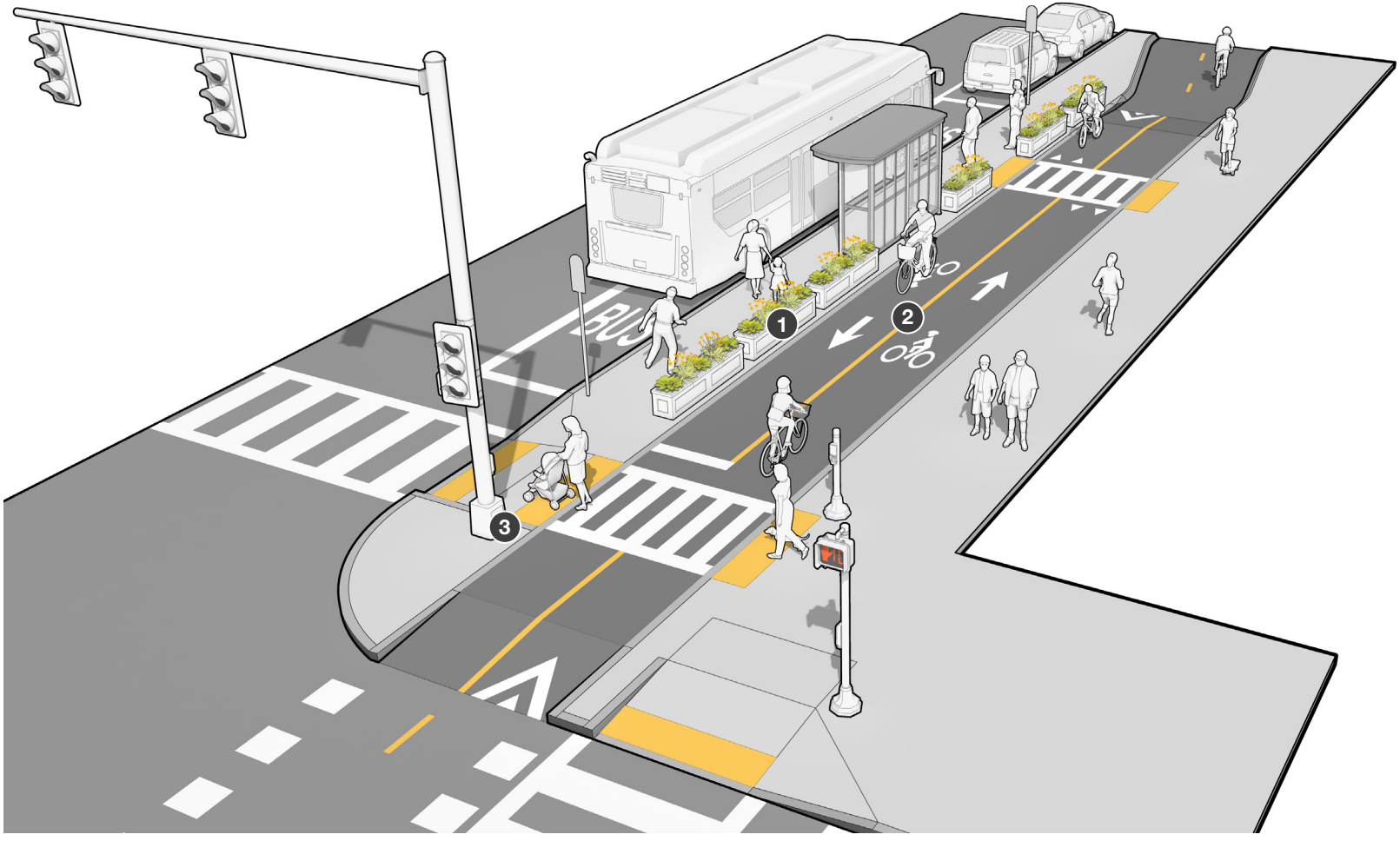
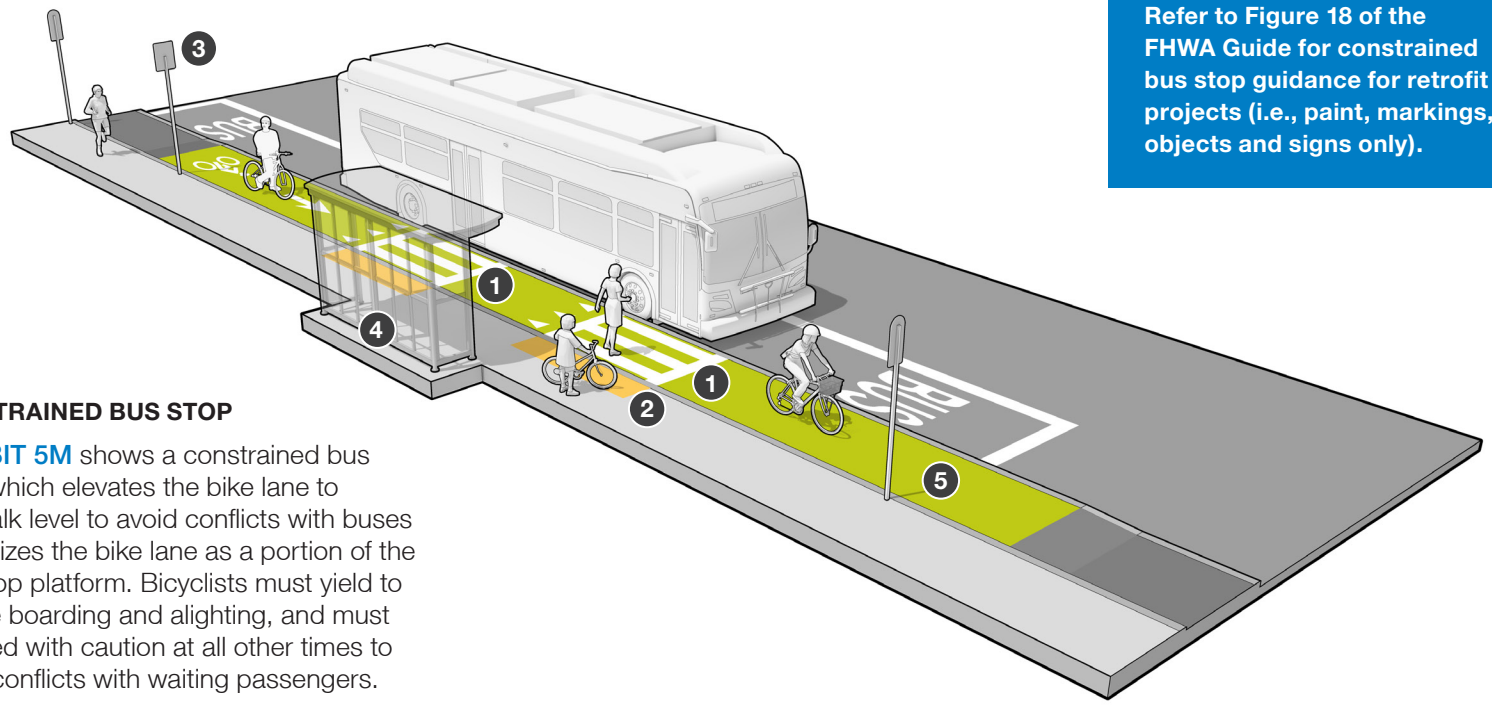


EXHIBIT 5M: CONSTRAINED BUS STOP



Refer to Figure 18 of the FHWA Guide for constrained bus stop guidance for retrofit projects (i.e., paint, markings, objects and signs only).

CONSTRAINED BUS STOP

EXHIBIT 5M shows a constrained bus stop, which elevates the bike lane to sidewalk level to avoid conflicts with buses but utilizes the bike lane as a portion of the bus stop platform. Bicyclists must yield to people boarding and alighting, and must proceed with caution at all other times to avoid conflicts with waiting passengers.

Constrained bus stops should only be considered when the introduction of a floating bus stop would do one of the following:

- Create non-compliant elements of the public right-of-way according to the most recent accessibility standards.
- Narrow the sidewalk below an appropriate width given pedestrian volumes and context of the built environment.
- Narrow the bike lane below **4 ft.** along the bus stop (less than **5 ft.** requires a design exception).

Constrained bus stops require additional considerations:

- Place crosswalks with blended transitions at the boarding and alighting area and the rear door clear zone to align with bus doors. Coordinate with the local transit agency to identify vehicle type(s) anticipated to serve the stop. ❶
- Provide combined bike lane and sidewalk width equal to at least **8 ft.** to qualify as an accessible boarding and alighting area. ❷
- Place DO NOT PASS WHEN BUS IS STOPPED sign in advance of the first pedestrian crossing a bicyclist approaches (i.e., the rear door clear zone). ❸
- When included, place shelter and/or bench at the back of the sidewalk. ❹
- Consider optional colored pavement within the constrained bike lane. ❺