BUILDING A BETTER BART

MULTIMODAL ACCESS DESIGN GUIDELINES

AUGUST 2017

BART

CONTENTS

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INTRODUCTION

The **BART Facilities Standards (BFS)** contains all system-wide requirements affecting planning, design, construction, operations, and maintenance of BART facilities. Within the BFS, the Facility Design Criteria section contains principles and recommendations for designing a functional facility based on good practices and BART's experience, including a section on Passenger Station Sites – i.e. station areas.

The **Multimodal Access Design Guidelines (MADG)** provide easy-to-use guidance and minimum/maximum and recommended standards for planning the pedestrian, bicycle, transit, and vehicle access within BART's station areas, and are designed to update and complement the Passenger Station Sites section of the BFS. This guide covers the area from the station faregate to the edge of BART's property, and applies to connecting intersections.

HOW TO USE THE MADG

WHO WILL USE THE MADG

All **BART departments** whose work touches on station areas in any way. This includes:

- Planning, Development & Construction (Strategic Planning, Stations Planning, Real Estate, Office of the District Architect, BART Extensions, eBART), and Maintenance & Engineering (Civil Engineering & Construction, Electrical & Mechanical Engineering, Facilities, Grounds) (*required*).
- **Developers and Consultants** involved with TOD projects on BART property (*required*).
- **Local jurisdictions** who wish to reference the MADG to support street design efforts around station areas to promote non-driving modes to and from the BART station. BART will share this document with local jurisdictions to encourage consistent design (*recommended*).

WHEN TO USE THE MADG

The MADG are to be used early in the process for:

- **Station modernization** projects affecting access infrastructure in station areas (*required*).
- **TOD** projects within BART property (*required*).
- **New station construction** projects (*required*).
- **Maintenance projects** (e.g. repaving, substation upgrades) affecting the access infrastructure within the station area (*required*).
- **Any other project by outside entities** affecting the access infrastructure within the station area (*recommended*).

The MADG applies to BART property, even if other transit operators share the space. Non-BART property roadways and intersections are subject to design standards per the local jurisdiction.

Design guidelines require further engineering to confirm all components work together to provide access that works operationally. Note: for flexibility to install facilities that do not meet the listed minimum or maximum design guidelines in instances of retrofits or other constraints, exceptions may be made. The standard process for any BFS exception will be followed to approve designs outside of specifications defined in the MADG (refer to Division 1 section of BFS for temporary access guidelines applicable when stations undergo renovation).

CONTEXT

In June 2016, BART adopted new Station Access and Transit Oriented Development (TOD) policies, followed by corresponding Performance Measures and Targets adopted in December 2016.

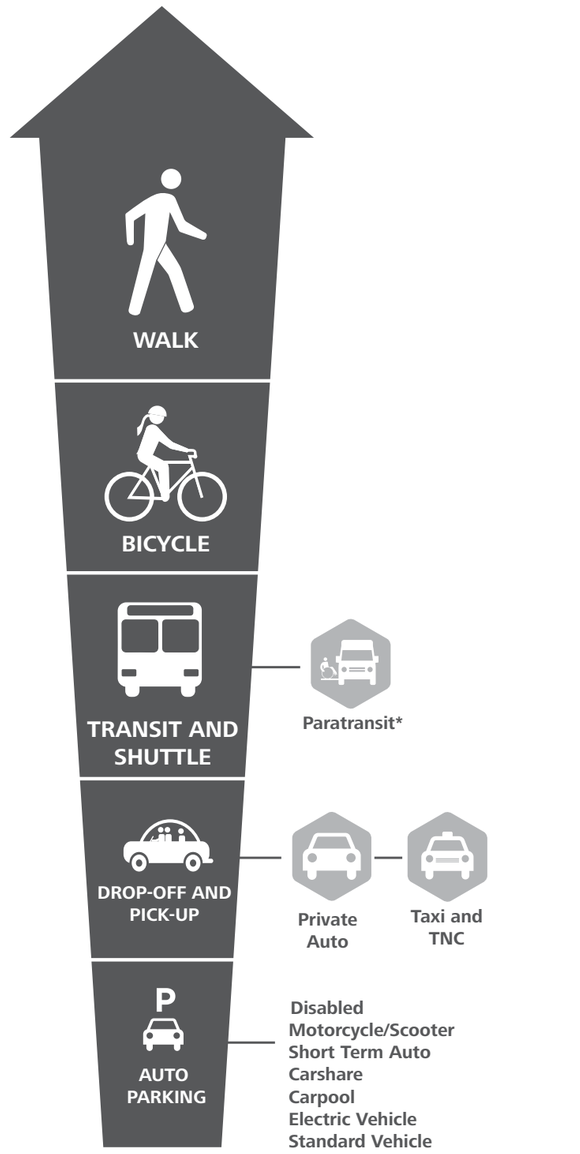
BART Station Access Policy, Performance Measures and Targets

The BART Station Access Policy is designed to support the broader livability goals of the Bay Area, reinforce sustainable communities, and enable riders to get to and from stations safely, comfortably, affordably, and cost-effectively. It includes an Access Hierarchy and a Station Access Investment Framework, both of which prioritize the active modes (walking, then biking) over high-occupancy vehicle (HOV) modes (buses, shuttles) over single-occupancy vehicle (SOV) modes (driving/parking, drop-offs).

The MADG supports the advancement of the following goals, which are consistent with the BART Station Access Policy:

- **Generate more riders** by making it easier and more comfortable for people to get to and from BART without having to use station area space for vehicle storage and circulation.
- **Promote healthy communities** by encouraging active transportation as an access mode share and decreasing vehicle miles traveled (VMT) and greenhouse gases (GHG) by reducing auto trips.
- **Increase efficiency and productivity** by streamlining the design and planning process and implementing more cost effective access improvements over costly efforts to expand parking.
- **Provide a better passenger experience** through design that puts people at the center of design decisions. All customers

BART ACCESS HIERARCHY



*All stations must be paratransit accessible

BART STATION ACCESS INVESTMENT FRAMEWORK

STATION TYPE	PRIMARY INVESTMENTS	SECONDARY INVESTMENTS	ACCOMMODATED	NOT ENCOURAGED
URBAN	Walk, Bicycle	Transit and Shuttle	Taxi and TNC, Drop-Off and Pick-Up	Auto Parking*
URBAN WITH PARKING	Walk, Bicycle	Transit and Shuttle	Taxi and TNC, Drop-Off and Pick-Up	Auto Parking*
BALANCED INTERMODAL	Walk, Bicycle	Transit and Shuttle, Drop-Off and Pick-Up	Taxi and TNC, Auto Parking*	
INTERMODAL/ AUTO RELIANT	Walk	Bicycle, Drop-Off and Pick-Up, Transit and Shuttle	Taxi and TNC, Auto Parking*	
AUTO DEPENDENT	Walk	Bicycle, Drop-Off and Pick-Up, Auto Parking*, Transit and Shuttle	Taxi and TNC	

become pedestrians at some point on their way to and from a BART station faregate. Implementing design elements that create a safe and secure environment for pedestrian activity in the station area, and a sense of place by complementing the surrounding neighborhood can greatly improve the customer experience.

- **Provide equitable service** by providing more safe and secure access options to those who are not able or cannot afford to drive to BART stations.
- **Be an innovation leader** by setting the stage for multimodal transit access that places people first.

BART Transit Oriented Development Policy, Performance Measures, Targets, and Guidelines

The new BART TOD Policy aims to strengthen the connections between people, places, and services, thus enhancing BART's value as a regional resource. It comes with a set of aggressive performance targets that greatly increase the pace and scale of BART's TOD projects, and sets new goals for growth within the half-mile station area. To achieve these targets and implement the TOD Policy, BART has developed a set of TOD Guidelines, intended to clearly articulate BART's process for development, and expectations for station area planning. The MADG are incorporated into the TOD Guidelines by reference.

BART's Policies and Performance Measures and Targets can be found on BART's website (bart.gov/about/planning) and should be reviewed before using the MADG.

BART'S STATION ACCESS PLANNING

MADG design elements focus on the user to ensure a safe and comfortable experience as people move through the station area to access the station entrance. The MADG should be applied alongside BART's Station Experience Design Guidelines, which provide additional guidance on the design and location of customer amenities on BART property and inside stations.

People are at the center of every access design decision. By prioritizing human activity, the MADG seeks to minimize conflicts between modes. Access routes are direct and place people where they want to be; station areas are easy to navigate via the built environment; and humans feel safe and secure while traveling through or waiting in the station area.

The MADG aims to reduce barriers and strengthen station area design with person-scaled standards that provide consistent access at all points across all stations. At the same time, the MADG supplements many elements of the BFS, which regulates and controls design, construction, materials use, occupancy, location, equipment, and installation of all facilities within BART's jurisdiction.

PEDESTRIANS FIRST

Everyone is a pedestrian at some point in their trip, whether walking directly to the station, riding/parking a bicycle, taking a bus or shuttle, or driving/parking a car. Access to station entrances should accommodate pedestrian desire lines and be as short and direct as possible. A pedestrian desire line represents the most convenient and, typically, the shortest route for a person to walk from their origin to the station entrance and faregate.

Pedestrians, including wheelchair users, must be able to pass each other or walk next to each other safely and comfortably everywhere within station areas. The minimum dimension for pedestrian paths of travel contained in the MADG (6' wide) is designed to allow for two travelers in wheelchairs to pass each other. Pedestrian path of travel refers to the sidewalk zone reserved for walking, which does not include the frontage zone or the furniture zone (see Sidewalk Zones illustration). This standard applies whether the pedestrian path of travel is at-grade, below-grade (tunnels), or above-grade (bridges). All sidewalks, crosswalks, and paths must maintain a clear, minimum 6' width at all times.

The maximum speed limit on BART property, established by resolution, is 15 miles per hour. This is appropriate for BART's roadways, which see high pedestrian volumes and provide limited access to parking lots and bus transit areas, and where delay due to low speed is not a consideration because distances are very short. Where appropriate, a lower speed limit may be posted; for example, a 10 mile per hour speed limit may be desired in high pedestrian activity zones such as the pick-up/drop-off to minimize risk and severity of injuries due to collisions. The MADG includes traffic calming design elements intended to minimize vehicle speeds without having to rely heavily on enforcement; and to convey to drivers that they are no longer on city streets and should expect to slow down for other people using the roadways and station access routes.

BUS INTERMODAL AND CIRCULATION

Currently, BART's existing station areas have

large, spread-out spaces called the “bus intermodal”, where both the bus boarding/alighting, and layover functions take place. Generally, using the same space for both operational uses prevents bus routes from sharing bus stops, which increases the overall spatial need in the intermodal. Furthermore, this results in bus “parking” – a passive use of space – in areas nearest to the station entrance, which is prime real estate for active passenger access functions (i.e. boarding/alighting). The spaced-out layout of BART’s bus intermodals puts many bus stops far from the Station Agent booth and requires bus passengers to cross longer distances to access the station and other amenities, both of which reduce passenger security.

The MADG also promotes two-way roadway operation to optimize circulation in the station area where feasible. Existing roadways in BART’s station areas, including those adjacent to the station entrance and in the intermodals, have historically been designed for one-way operation. This can:

- Cause congestion by funneling all vehicles through the same points of entry and exit;
- Increase VMT and GHG emissions by requiring drivers to make long loops;
- Require additional paved space for buses to pull in/out of bus stops; and
- Reduce the linear footage of curb available for boarding/alighting functions. Buses only have doors on the right side and SOV passengers are usually in the passenger seat, also on the right; using a left-side curb would require passengers to access the vehicle door from a lane of traffic.

In sum, the combination of boarding/alighting and layover functions in the same space and one-way road operation have negative effects on the user experience with respect to safety, security, comfort, and convenience. The MADG requires the separation of the bus boarding/alighting function from the bus layover function and encourages two-way (over one-way) operation on BART’s roadways, particularly immediately adjacent to the station entrance.

MADG ORGANIZATION

The MADG includes three sections to help users easily understand BART’s guidance and implement access improvements during station area planning, design, and engineering.

Illustrations. This section includes nine illustrations that diagram the quantitative and qualitative components of the MADG. Each illustration is annotated to call out specific design requirement details. The numbers and annotation text correspond with the numbered lines on the accompanying Measurement Tables.

1. Station Area Map
2. Sidewalk Zones
3. Accessible Paths
4. Bikeways
5. Adjacent Network Connections
6. Station Entrance and Exit
7. Bus Stop
8. Passenger Pick-Up/Drop-Off - Parallel Curbside
9. Passenger Pick-Up/Drop-Off - Angled Loading Zone

Measurement Tables by Transportation Mode. Tables for pedestrian, bicycle, bus, street, and parking facilities include quantitative measurements and qualitative descriptions. Quantitative measurements define *specifications* for minimum, maximum, and recommended dimensions (minimum and maximum specifications define what is required, while recommended specifications define the desired measurements). Qualitative descriptions provide *guidance* for design option, approach, and special considerations where multiple options are feasible. Bold text highlights the most foundational direction of the MADG.

Table 1. Pedestrian Facilities

Table 2. Bicycle Facilities

Table 3. Bus Facilities

Table 4. Street Facilities

Table 5. Parking Facilities

All sources cited in the table were the most recent version at the time of publishing, and BART will follow the most current standards as they are adopted.

Appendices. The appendices include Sources for Multimodal Best Practices and a Glossary.

ILLUSTRATIONS

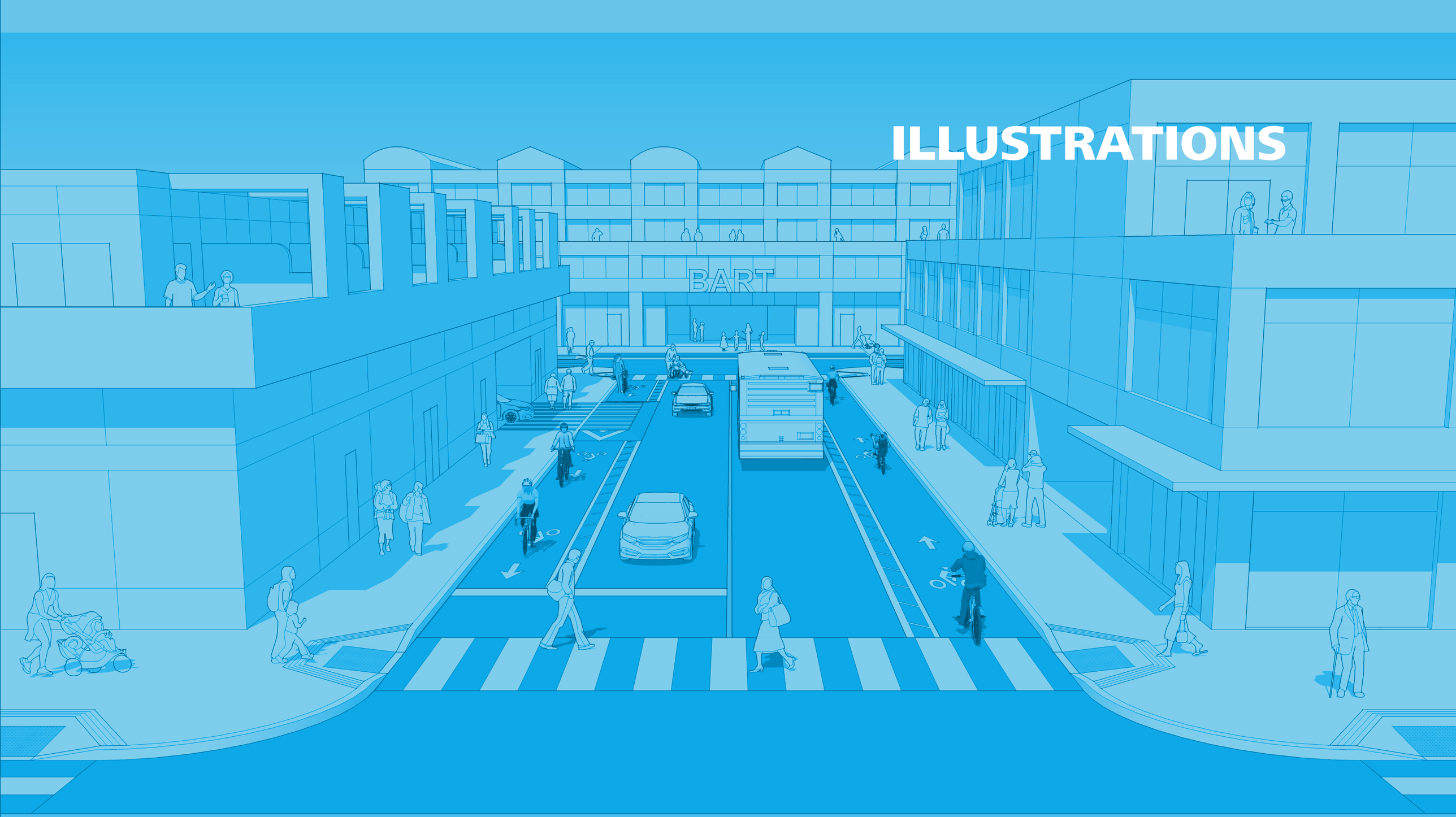


FIGURE ONE

STATION AREA MAP

Each BART station has a unique layout and connection to the surrounding street grid. The above illustration presents a hypothetical approach to accommodating station access for all modes. Pedestrian and bicycle paths connect to the surrounding street grid and follow desire lines along the shortest possible path to faregates and connecting bike routes. Buses and private vehicles utilize two-way roads, and separate curb spaces to avoid conflicts at loading zones. The following figures present design considerations and possible right-of-way organization for a variety of station and multimodal access elements.

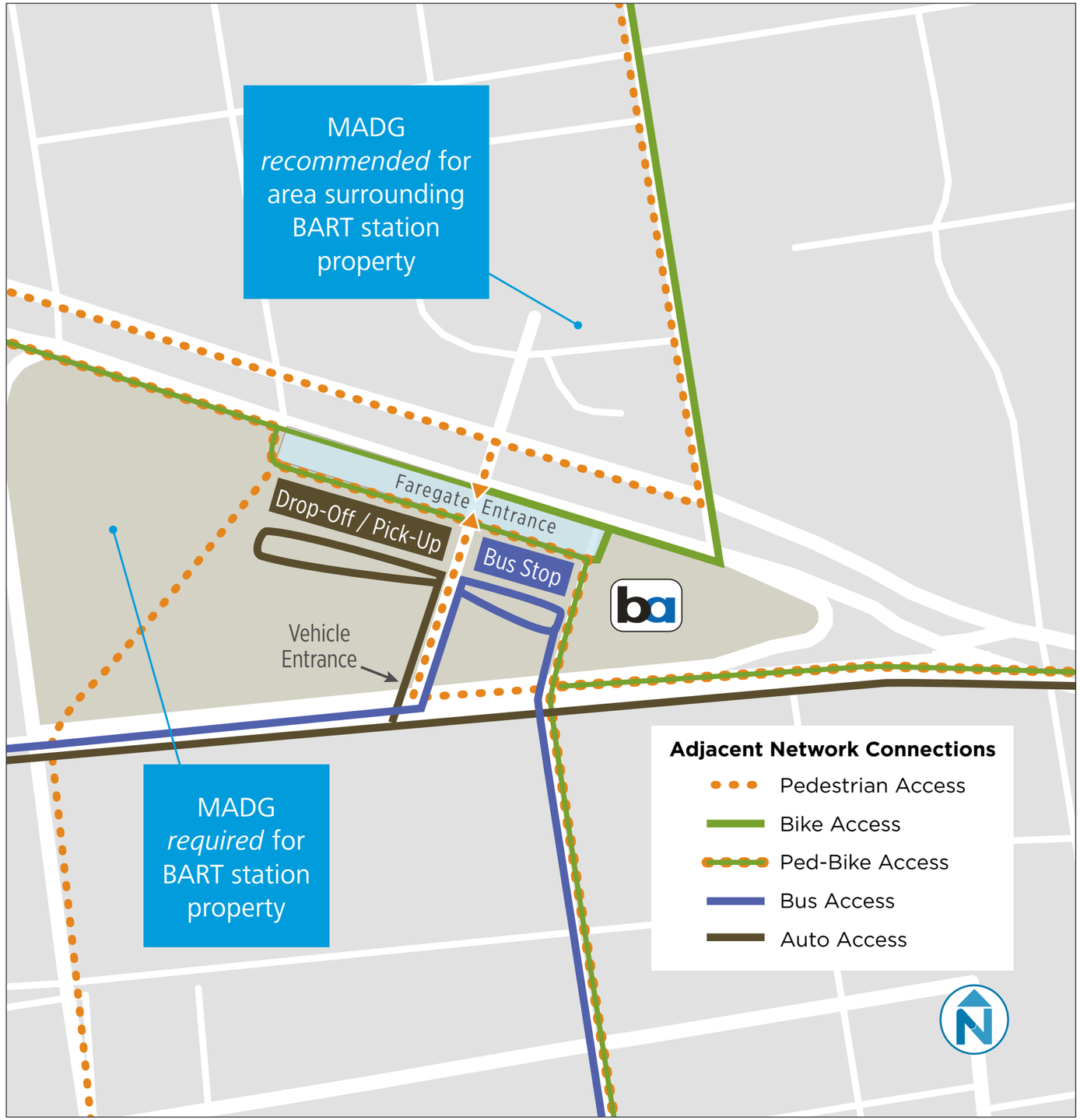
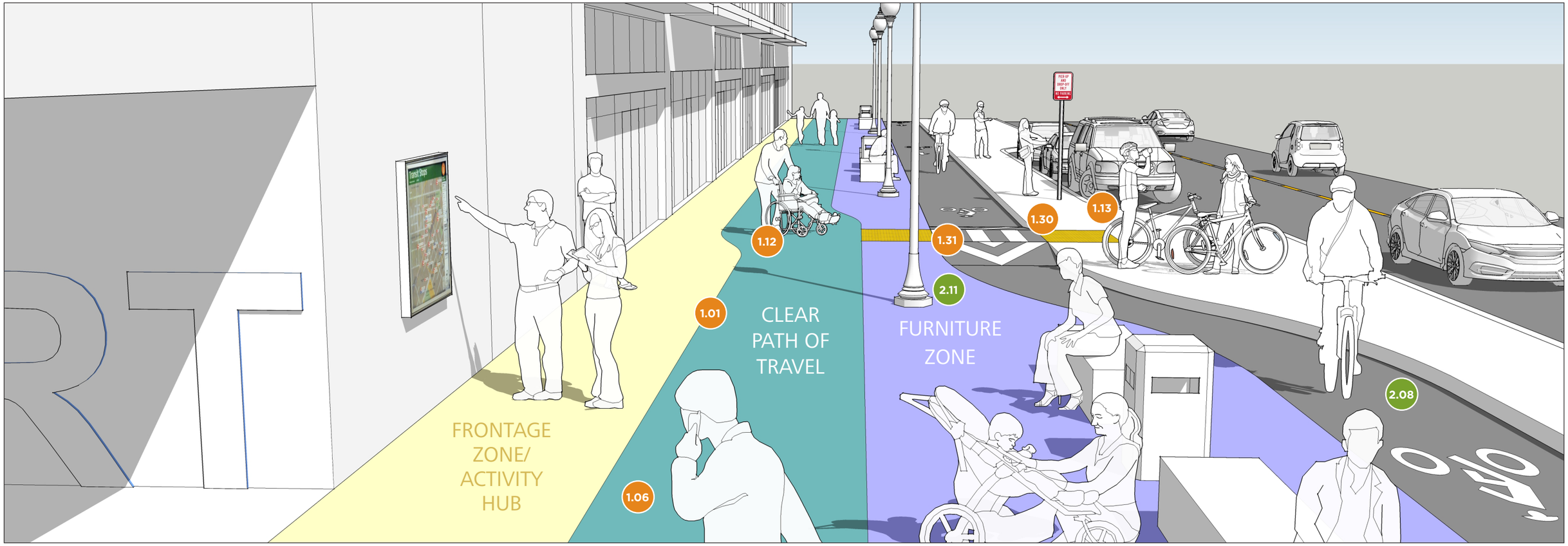


FIGURE TWO

SIDEWALK ZONES



Sidewalk Zones: Individual sections of sidewalk space, including clear path of travel, frontage zone, and furniture zone.

Different colors are used to call out individual sections of sidewalk space, including clear path of travel, frontage zone/activity hub, and furniture zone within the diagram (this does not indicate colored pavement).

Clear Path of Travel: Unobstructed path for pedestrians (also known as Accessible Paths and Pedestrian Path of Travel).

Frontage Zone/Activity Hub: Section of the sidewalk that functions as an extension of the building, whether through entryways and doors or sidewalk cafes and sandwich boards. The frontage zone consists of both the structure and the facade of the building fronting the street, as well as the space immediately adjacent to the building.

Furniture Zone: Section of the sidewalk between the curb and the clear path of travel in which street furniture and amenities, such as lighting, benches, newspaper kiosks, utility poles, tree pits, and bicycle parking are provided. The street furniture zone may also consist of green infrastructure elements, such as rain gardens or flow-through planters.

PEDESTRIAN FACILITIES

1.01 Sidewalks (and all pedestrian routes) have a minimum through zone of at least 6’ wide at pinch points.

1.06 The clear path of travel shall be maintained separate from activity hubs that require additional width. For example, if the sidewalk is adjacent to a location where people stop to buy tickets at fare vending machines, the minimum clear path shall be maintained outside of the area accommodating fare vending machine activity to ensure that other station activity areas do not impede pedestrian activity within the designated clear paths of travel.

1.12 All pedestrian pathways should be barrier-free, step-free spaces and shared-use, single-surface areas. All pedestrian pathways should provide direct connections and a clear path of travel to ramps, elevators, and stairs, and allow for a clear view to support active surveillance and perception of safety.

1.13 Provide sufficient additional walkway width in locations where paths meet from different directions. This is intended to avoid bottlenecks and to enable pedestrians to move against the predominant flow at peak periods.

1.30 Raised crosswalks may be used across cycletracks to increase awareness between bicyclists and transit users, reduce bicycle speeds at pedestrian priority areas, and emphasize a preferred crossing location for pedestrians being picked up and dropped off.

1.31 For raised crosswalks, the longitudinal drainage taper should be eliminated to form a level pedestrian crossing.

BICYCLE FACILITIES

2.08 The cycletrack separation width depends on the type of separation between the bikeway and the adjacent travel way, including grade separation, flexible posts, inflexible physical barrier, on-street parking, or a raised island. See Caltrans Class IV Bikeway Guidance Design for details

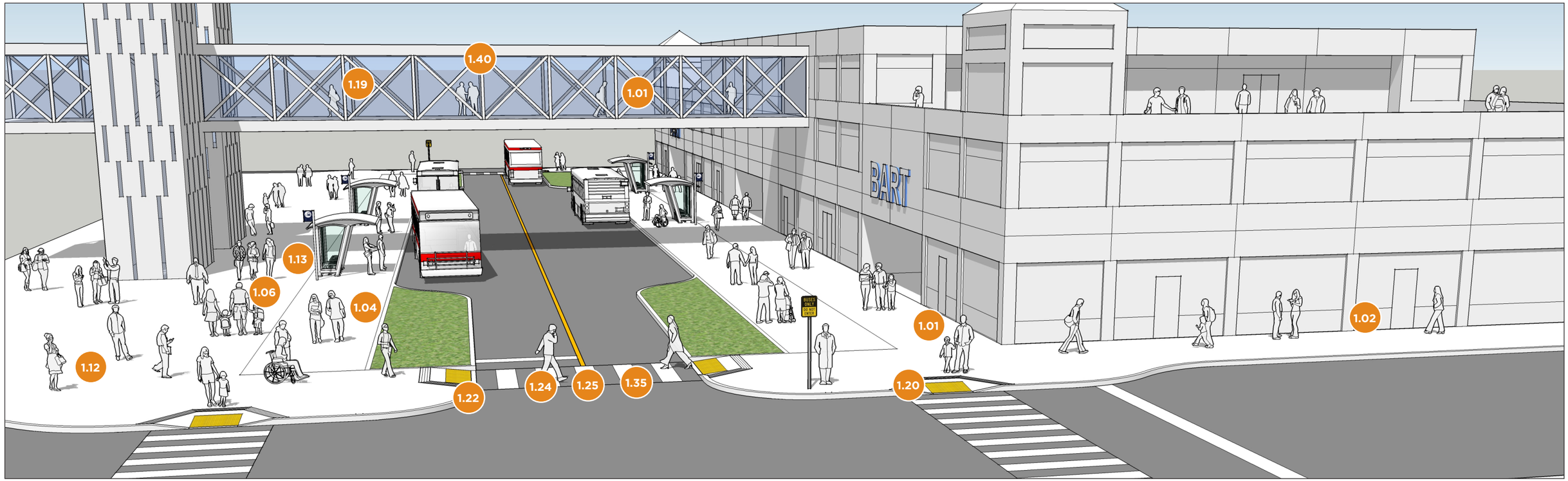
2.11 A minimum 1.5’ horizontal clearance from the paved edge of a bikeway to obstructions shall be provided.

For more details, see specifications and descriptions with corresponding numbers in Measurement Tables.

FIGURE THREE

ACCESSIBLE PATHS

Station Entrance



PEDESTRIAN FACILITIES

1.01 Sidewalks (and all pedestrian routes) have a minimum through zone of at least 6’ wide at pinch points.

1.02 Where a sidewalk is directly adjacent to moving traffic, the minimum width is 8’, providing a minimum 2’ buffer for curbside utilities and separation from moving traffic, and at least 6’ for a clear path of travel. This applies to solid walls as well.

1.04 Sidewalk next to a loading zone must maintain at least the basic sidewalk minimum width perpendicular to the curb (6’) plus additional 8’ width at front door curbside loading space to accommodate the passenger loading activity, for a minimum 14’ wide zone adjacent to a passenger loading, and a recommended 16-20’ wide zone, or wider to accommodate high volume areas. See bus stop specifications for details.

1.06 The clear path of travel shall be maintained separate from activity hubs that require additional width. For example, if the sidewalk is adjacent to a location where people stop to buy tickets at fare vending machines, the minimum clear path shall be maintained outside of the area accommodating fare vending machine activity to ensure that other station activity areas do not impede pedestrian activity within the designated clear paths of travel.

1.12 All pedestrian pathways should be barrier-free, step-free spaces and shared-use, single-surface areas. All pedestrian pathways should provide direct connections and a clear path of travel to ramps, elevators, and stairs, and allow for a clear view to support active surveillance and perception of safety.

1.13 Provide sufficient additional walkway width in locations where paths meet from different directions. This is intended to avoid bottlenecks and to enable pedestrians to move against the predominant flow at peak periods.

1.19 When passengers or pedestrian walkways are provided above trackways, highways, or streets, the walkways shall be fenced.

1.20 Curb ramps at intersections should be perpendicular to the roadway and parallel to the crosswalk, providing direct access to crosswalks.

1.22 Where feasible, curb ramps should be as wide as the crosswalk width, especially where pedestrian crossing volumes are high.

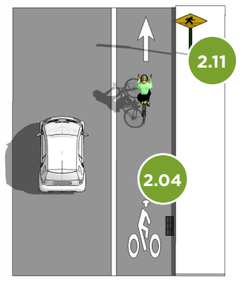
1.24 The width of the crosswalk should be at least equal to the width of the adjacent sidewalks, but not less than 10’ in width.

1.25 The crosswalk marking type is a continental crosswalk. Consider traffic calming and/or traffic controls for all midblock and/or uncontrolled crossings.

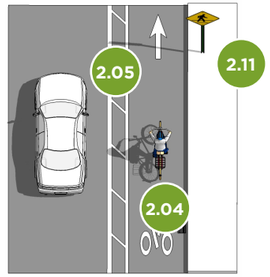
1.35 Locate crosswalks with good sight lines to improve pedestrian crossing visibility for pedestrians and drivers. Crosswalks shall be placed behind, rather than in front of, bus stop locations.

1.40 The key goal of visibility is to see the open space on the other end of the walkway. Wherever possible, there shall be unobstructed visibility from one end of the overpass or underpass to the other.

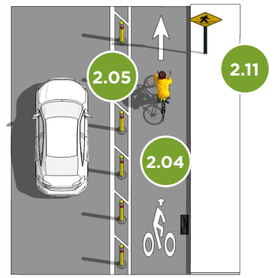
For more details, see specifications and descriptions with corresponding numbers in Measurement Tables.



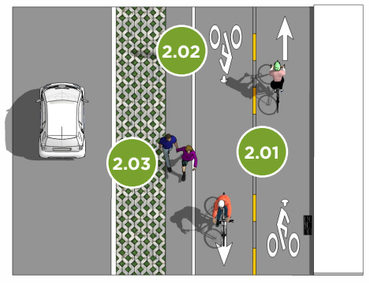
Standard Bike Lane (Class II)



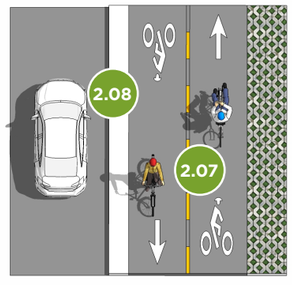
Buffered Bike Lane (Class II)



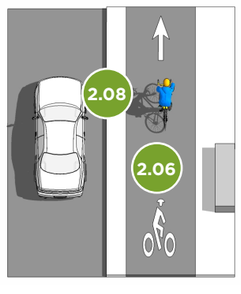
Buffered Bike Lane (Class II)



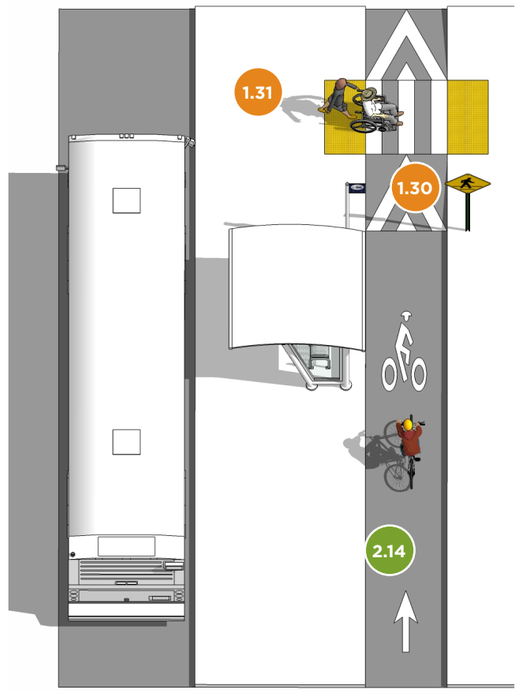
Separated Multi-Use Bike Path (Class I)



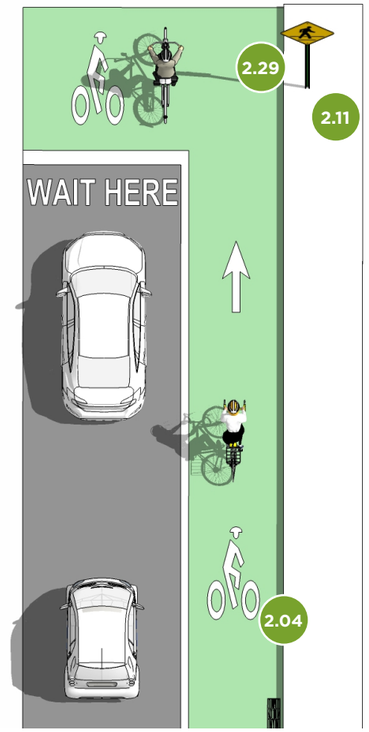
Two-Way Cycletrack (Class IV)



One-Way Cycletrack (Class IV)



One-Way Cycletrack (Class IV) at Transit Stop



Bikeway with Bike Box

BICYCLE FACILITIES

2.01 The minimum paved width of travel way for a two-way bike and pedestrian shared-use path shall be 10'. Where heavy bicycle volumes are anticipated, the paved width of a two-way bike path should be greater than 10', preferably 12' or more.

2.02 A minimum 2'-wide shoulder, composed of the same pavement material as the bike path or all weather surface material that is free of vegetation, is recommended adjacent to the traveled way of the bike path when not on a structure.

2.03 The minimum separation between the edge of pavement of a one-way or a two-way bicycle path and the edge of traveled way of a parallel road or street shall be 5'; as an alternative, a barrier may be used where a 5' separation is not feasible

2.04 Standard bike lanes (Class II) shall have a minimum width of 5'.

2.05 Buffers should be at least 18" wide. Total width of buffered bikeway, including both travel width and outside buffer width, should be no greater than 10', to ensure that the lane does not appear wide enough for use as a vehicle travel way.

2.06 One-way cycletracks (Class IV) clear width should be 7'-8' to allow cyclists to pass others if necessary, with 5' being the minimum width for one-way travel when adjacent to a roadway (5' width should be limited to pinch points such as transit islands). Cycle track width should be larger in locations where the gutter seam extends more than 12" from the curb.

2.07 For two-way travel, the same width as a Class I Bikeway (bike path) should apply.

2.08 The cycletrack separation width depends on the type of separation between the bikeway and the adjacent travel way, including grade separation, flexible posts, inflexible physical barrier, on-street parking, or a raised island. See Caltrans Class IV Bikeway Guidance Design for details

2.11 A minimum 1.5' horizontal clearance from the paved edge of a bikeway to obstructions shall be provided.

2.14 Any bikeway on a street with a passenger loading zone (e.g. pick-up/drop-off zone or transit stop) should be a cycletrack. The bikeway should be placed between the passenger loading zone and the sidewalk.

2.29 A bike box will occur only at signalized intersections between BART driveways and city streets. The bike box allows bicyclists to move to the front of the traffic queue on a red light and proceed first when that signal turns green.

PEDESTRIAN FACILITIES

1.30 Raised crosswalks may be used across cycletracks to increase awareness between bicyclists and transit users, reduce bicycle speeds at pedestrian priority areas, and emphasize a preferred crossing location for pedestrians being picked up and dropped off.

1.31 For raised crosswalks, the longitudinal drainage taper should be eliminated to form a level pedestrian crossing.

For more details, see specifications and descriptions with corresponding numbers in Measurement Tables.

FIGURE FIVE

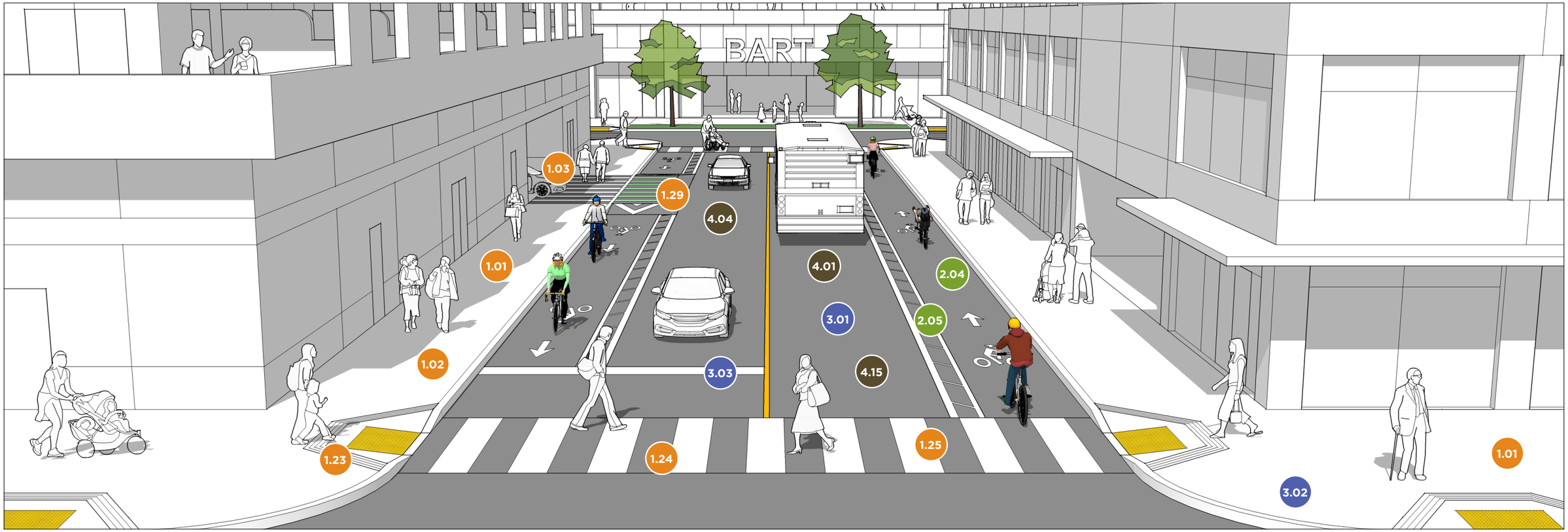
ADJACENT NETWORK CONNECTIONS

PEDESTRIAN FACILITIES	BICYCLE FACILITIES	STREET FACILITIES
1.14 Direct and safe approach for pedestrians shall be provided from all adjacent streets to the faregate entrance. A pedestrian's path from bus drop-off areas and light rail stops to faregate entrances shall be as direct as possible. The alignment of walkways should be as direct as possible. The required walkway width may be determined on the basis of the expected peak pedestrian volumes and the design capacity or service level of the walkway. **1.15 Prioritize pedestrian movements** in and around BART property by providing continuity between station faregate entrances and sidewalks at station edges, and by incorporating traffic-calming measures at conflict points between pedestrian and vehicle travel. The path from the parking lot edges and adjacent sidewalks to the faregate entrances shall accommodate pedestrian desire lines to be as short and direct as possible.	**2.15 Bikeways** shall allow bicyclists approaching the station structure to reach the main entrance by a safe and relatively direct route, with a convenient and clearly marked bikeway between bicycle parking and bicycle access points at station perimeters. Design bicycle access routes to be separate from motor vehicle traffic, and minimize conflict with other modes to maximize comfort for all users. **2.16 Bikeways** shall be designed to provide a direct, convenient connection between the station and any existing or proposed bike routes throughout the community, and to provide a continuous facility for cyclists crossing station property.	**4.03 Automobile traffic patterns** should fit within the context of the adjacent street network to minimize conflicts with pedestrian, bicycle, and transit access and prevent unnecessary queuing and circling.

For more details, see specifications and descriptions with corresponding numbers in Measurement Tables.

FIGURE SIX

STATION ENTRANCE AND EXIT



PEDESTRIAN FACILITIES

1.01 Sidewalks (and all pedestrian routes) have a minimum through zone of at least 6’ wide at pinch points.

1.02 Where a sidewalk is directly adjacent to moving traffic, the minimum width is 8’, providing a minimum 2’ buffer for curbside utilities and separation from moving traffic, and at least 6’ for a clear path of travel. This applies to solid walls as well.

1.03 Sidewalk crossings of parking garage entrances have a width consistent with connecting sidewalks.

1.23 Detectable warnings shall consist of a surface of truncated domes and all design requirements and placement shall comply with ADA standards. Maintain minimum clear sidewalk – without detectable warnings to allow for wheelchair travel parallel to path of travel.

1.24 The width of the crosswalk should be at least equal to the width of the adjacent sidewalks, but not less than 10’ in width.

1.25 The crosswalk marking type is a continental crosswalk.

1.29 Raised crosswalks can be used as speed tables, which are traffic calming devices that raise the entire wheelbase of a vehicle to reduce speed and improve driver yielding. Where a speed table coincides with a cycletrack, it should be designed as a raised cycletrack.

BICYCLE FACILITIES

2.04 Standard bike lanes (Class II) shall have a minimum width of 5’.

2.05 Buffers should be at least 18” wide. Total width of buffered bikeway, including both travel width and outside buffer width, should be no greater than 10’, to ensure that the lane does not appear wide enough for use as a vehicle travel way.

BUS FACILITIES

3.01 Bus lanes should be 11’ wide when offset from curb, and 11–12’ when configured curbside or in transitway adjacent to an opposing lane of bus traffic.

3.02 Effective turning radius for transit vehicles is approximately 20–30’, depending on lane width and presence of curbside parking lanes or buffer distance (effective turning radius utilizes all available street space depending on roadway configuration, such as additional space from parking or receiving lanes, and is typically larger than the curb radius).

3.03 Recessed stop bars to accommodate turning buses allows large transit vehicles to use the full width of the street around tight curb radii, including additional space in the oncoming lanes on the receiving street.

STREET FACILITIES

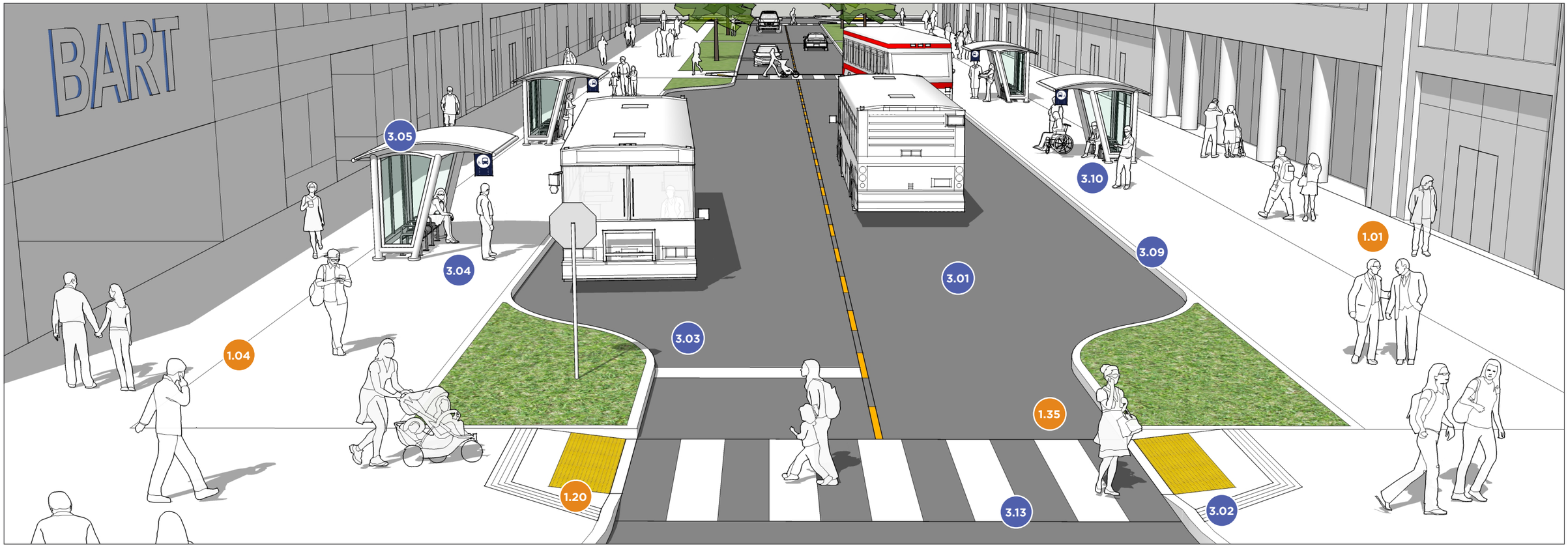
4.01 Vehicle travel lane widths for private vehicles should not exceed 10’ in width. For transit routes, one travel lane of 11’ may be used in each direction.

4.04 BART station streets shall have at least one traffic lane for each direction of travel, except as described for one-way access roadways, or those used mainly for service or maintenance purposes.

4.15 Emergency vehicles are permitted full use of the right-of-way in both directions, especially where tight curb radii may necessitate use of the opposite lane during a turn.

For more details, see specifications and descriptions with corresponding numbers in Measurement Tables.

BUS STOP



PEDESTRIAN FACILITIES

1.01 Sidewalks (and all pedestrian routes) have a minimum through zone of at least 6’ wide at pinch points.

1.04 Sidewalk next to a loading zone must maintain at least the basic sidewalk minimum width perpendicular to the curb (6’) plus additional 8’ width at front door curbside loading space to accommodate the passenger loading activity, for a minimum 14’ wide zone adjacent to a passenger loading, and a recommended 16-20’ wide zone, or wider to accommodate high volume areas. See bus stop specifications for details.

1.20 Curb ramps at intersections should be perpendicular to the roadway and parallel to the crosswalk, providing direct access to crosswalks.

1.35 Locate crosswalks with good sight lines to improve pedestrian crossing visibility for pedestrians and drivers. Crosswalks shall be placed behind, rather than in front of, bus stop locations.

BUS FACILITIES

3.01 Bus lanes should be 11’ wide when offset from curb, and 11–12’ when configured curbside or in transitway adjacent to an opposing lane of bus traffic.

3.02 Effective turning radius for transit vehicles is approximately 20–30’, depending on lane width and presence of curbside parking lanes or buffer distance (effective turning radius utilizes all available street space depending on roadway configuration, such as additional space from parking or receiving lanes, and is typically larger than the curb radius).

3.03 Recessed stop bars to accommodate turning buses allows large transit vehicles to use the full width of the street around tight curb radii, including additional space in the oncoming lanes on the receiving street.

3.04 Maintain a minimum 5’ sidewalk clear zone around shelter structure, including distance to the curb. Bus shelters should be placed parallel to the curb.

3.05 Bus passenger shelters in commercial and high use settings should maintain an 8’- to 12’-wide pedestrian through-zone on the sidewalk, adjacent to the shelter, with a minimum 6’ sidewalk clear path of travel.

3.09 The number of bus bays is determined on a case-by-case basis and is informed by the forecast number and scheduling of bus routes being served over the required planning horizon, taking dwell time into consideration. Bus bays should be shared between routes as much as possible.

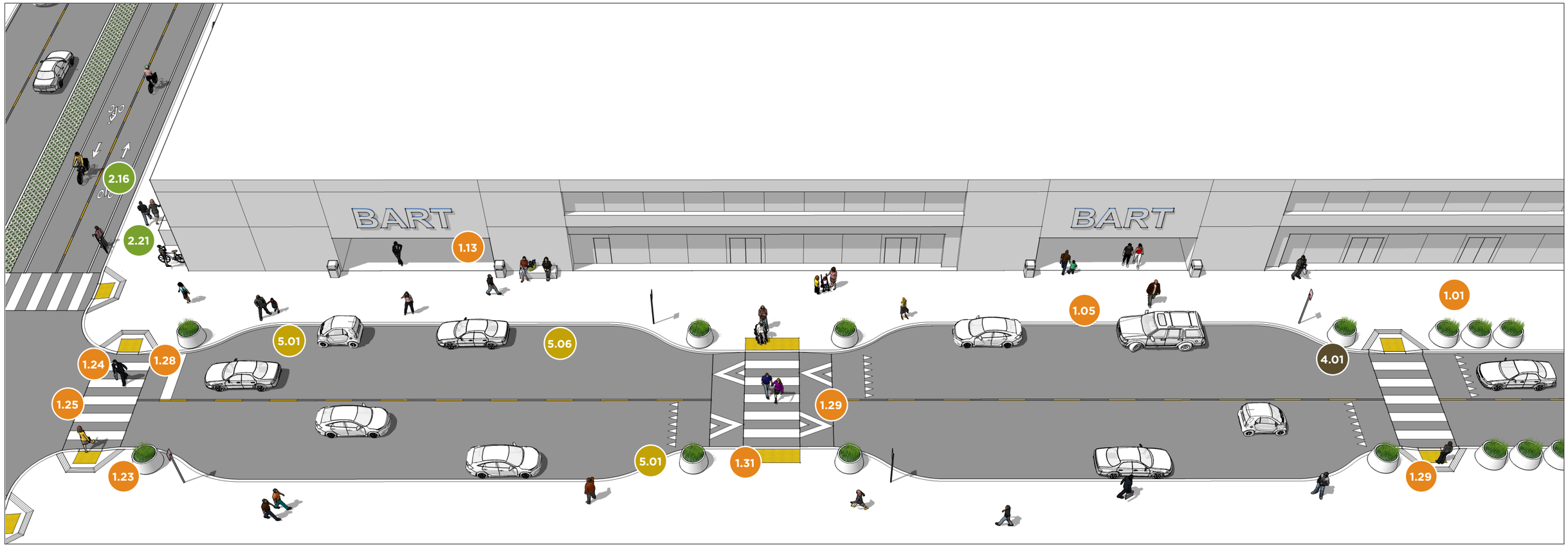
3.10 Bus stop wheelchair boarding/landing should provide a minimum clearance of 8’ length parallel to curb and 8’ width perpendicular to curb, at vehicle’s front entrance.

3.13 Pedestrian crosswalks shall be located within clear sightlines of bus drivers, accommodate pedestrian desire lines to be as short and direct as possible, and minimize the need for barriers or fences. If barriers or fences are required to prevent unsafe pedestrian crosswalks, consider altering the design, or including aesthetically pleasing custom fences and/or landscaping to improve the pedestrian environment.

Linear bus loading shown for illustration purposes; additional design considerations and bus bay configurations are included in the BART Bus Facilities Standards Table.

FIGURE EIGHT

PASSENGER PICK-UP AND DROP-OFF - PARALLEL CURBSIDE



PEDESTRIAN FACILITIES

1.01 Sidewalks (and all pedestrian routes) have a minimum through zone of at least 6’ wide at pinch points.

1.05 Sidewalk adjacent to a taxi or pick-up/drop-off loading zone must maintain at least the clear path of travel plus seven feet, or a minimum total of 13’.

1.13 Provide sufficient additional walkway width in locations where paths meet from different directions. This is intended to avoid bottlenecks and to enable pedestrians to move against the predominant flow at peak periods.

1.23 Detectable warnings shall consist of a surface of truncated domes and all design requirements and placement shall comply with ADA standards.

1.24 The width of the crosswalk should be at least equal to the width of the adjacent sidewalks, but not less than 10’ in width.

1.25 The crosswalk marking type is a continental crosswalk. Consider traffic calming and/or traffic controls for all midblock and/or uncontrolled crossings.

1.28 Curb extensions should be placed at all crosswalks where on-street parking exists or passenger pick-up/drop-off occurs.

1.29 Raised crosswalks should be considered at all mid-block crosswalks, and considered for use at locations close to faregate entrances, to reinforce awareness of pedestrians.

1.31 For raised crosswalks, the longitudinal drainage taper should be eliminated to form a level pedestrian crossing.

BICYCLE FACILITIES

2.16 Bikeways shall be designed to provide a direct, convenient connection between the station and any existing or proposed bike routes throughout the community, and to provide a continuous facility for cyclists crossing station property.

2.21 Locate bicycle parking adjacent to desire lines, and as close as possible to faregate entrances, within sight of the station agent, but not in locations that obstruct pedestrian movements.

STREET FACILITIES

4.01 Vehicle travel lane widths for private vehicles should not exceed 10’ in width. For transit routes, one travel lane of 11’ may be used in each direction.

PARKING FACILITIES

5.01 Curbside parking, including pick-up and drop-off zones, shall not be closer than 20’ on the approach to a crosswalk.

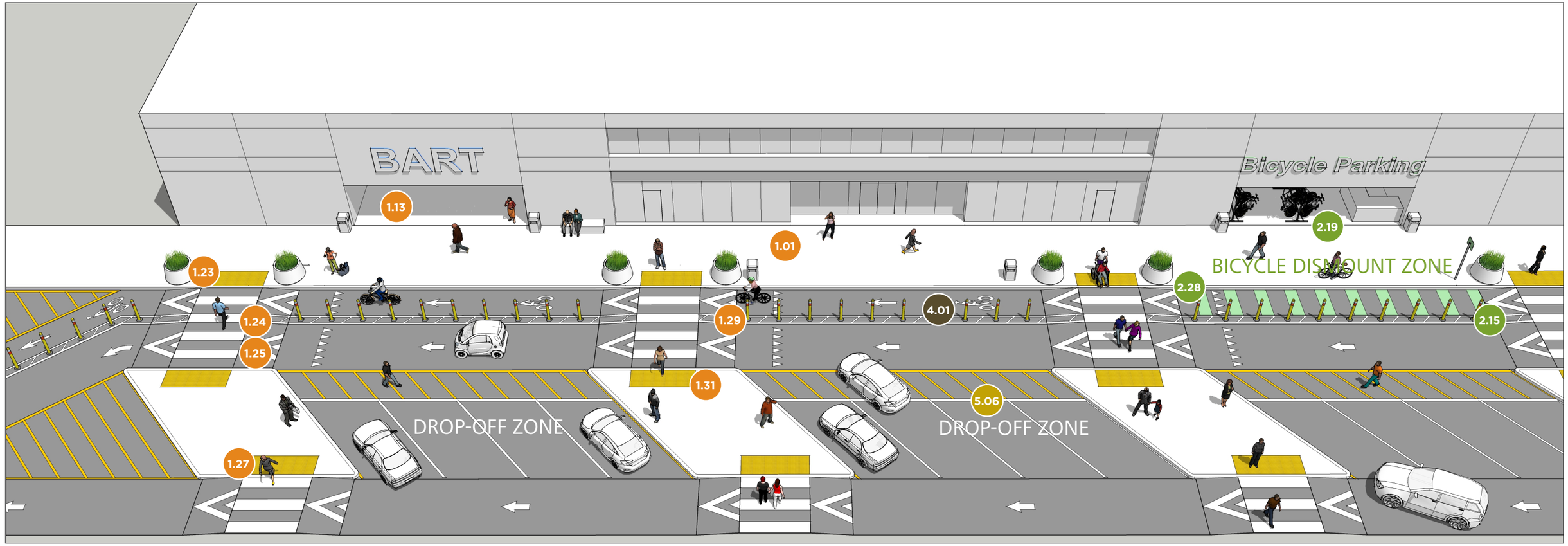
5.06 The passenger pick-up/drop-off facility should be sited close to the faregate entrance, but in a separately designated length of curb from transit stops. This will provide convenient access for all dropped-off passengers while minimizing conflicts between transit vehicles and passenger pick-up/drop-off activities.

Pick-up spaces designated for taxis and ride-hailing services may be located separately and slightly farther away; however, they should not require passengers to cross more than one street. Otherwise, passengers will likely be picked-up at locations that are considered more convenient and closer to the faregate entrance.

For more details, see specifications and descriptions with corresponding numbers in Measurement Tables.

FIGURE NINE

PASSENGER PICK-UP AND DROP-OFF - ANGLED LOADING ZONE



PEDESTRIAN FACILITIES

1.01 Sidewalks (and all pedestrian routes) have a minimum through zone of at least 6’ wide at pinch points.

1.13 Provide sufficient additional walkway width in locations where paths meet from different directions. This is intended to avoid bottlenecks and to enable pedestrians to move against the predominant flow at peak periods.

1.23 Detectable warnings shall consist of a surface of truncated domes and all design requirements and placement shall comply with ADA standards.

1.24 The width of the crosswalk should be at least equal to the width of the adjacent sidewalks, but not less than 10’ in width.

1.25 The crosswalk marking type is a continental crosswalk. Consider traffic calming and/or traffic controls for all midblock and/or uncontrolled crossings.

1.27 Pedestrian refuge islands should be at least 6’ wide, but have a preferred width of 10’. Where a 6’-wide median cannot be attained, a narrower raised median is still preferable to nothing. The minimum protected width is 6’, based on the length of a bicycle or a person pushing a stroller.

1.29 Raised crosswalks should be considered at all mid-block crosswalks, and considered for use at locations close to faregate entrances, to reinforce awareness of pedestrians.

1.31 For raised crosswalks, the longitudinal drainage taper should be eliminated to form a level pedestrian crossing.

BICYCLE FACILITIES

2.15 Bikeways shall allow bicyclists approaching the station structure to reach the main entrance by a safe and relatively direct route, with convenient and clearly marked bikeway between bicycle parking and bicycle access points at station perimeters. Design bicycle access routes to be separate from motor vehicle traffic, and minimize conflict with other modes to maximize comfort for all users.

2.19 Class I long-term bicycle parking includes bicycle lockers, secured rooms or cages, and attended bicycle parking “Bike Stations”.

2.28 A bicycle dismount zone is where bicyclists can transition from the bikeway to the sidewalk, to walk their bikes to the faregate entrance or designated bicycle parking.

STREET FACILITIES

4.01 Vehicle travel lane widths for private vehicles should not exceed 10’ in width. For transit routes, one travel lane of 11’ may be used in each direction.

PARKING FACILITIES

5.06 The passenger pick-up/drop-off facility should be sited close to the faregate entrance, but in a separately designated length of curb from transit stops. This will provide convenient access for all dropped-off passengers while minimizing conflicts between transit vehicles and passenger pick-up/drop-off activities.

Pick-up spaces designated for taxis and ride-hailing services may be located separately and slightly farther away; however, they should not require passengers to cross more than one street. Otherwise, passengers will likely be picked-up at locations that are considered more convenient and closer to the faregate entrance.

For more details, see specifications and descriptions with corresponding numbers in Measurement Tables.

MEASUREMENT TABLES

TABLE 1. BART PEDESTRIAN FACILITIES STANDARDS

The following table defines design specifications and guidance to maintain pedestrian facilities on BART property. All pedestrian pathways should be barrier-free, step-free spaces and shared-use, single-surface areas. All pedestrian pathways should provide direct connections and a clear path of travel to ramps, elevators, and stairs. All sources consulted were the most recent version at the time of publishing, and BART will follow the most current standards as they are adopted.

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
Specifications								
1.01	Sidewalk	Width	6’	n/a	8’ or more in high volume areas	**Sidewalks (and all pedestrian routes) have a minimum through zone of at least 6’ wide at pinch points.** A desired minimum through zone of 8’ is recommended for locations with higher pedestrian activity such as station access sidewalks, and additional width beyond the 6-8’ is recommended for areas with high volumes, such as faregate entrances and commercial areas.	NACTO Urban Street Design Guide	http://nacto.org/publication/urban-street-design-guide/street-design-elements/sidewalks/
1.02	Sidewalk	Width of sidewalk adjacent to moving traffic or solid wall/fence	8’	n/a	10’	Where a sidewalk is directly adjacent to moving traffic, the minimum width is 8’, providing a minimum 2’ buffer for curbside utilities and separation from moving traffic, and at least 6’ for a clear path of travel. This applies to solid walls as well.	NACTO Urban Street Design Guide	http://nacto.org/publication/urban-street-design-guide/street-design-elements/sidewalks/
1.03	Sidewalk	Width of sidewalk crossing of driveway or parking garage entrance	6’	n/a	8’	Maintain consistent width for crossings of driveways and garage entrances as for connecting sidewalks. Maintain level sidewalk through 6’ minimum width, with driveway slopes located outside of clear path of travel.	NACTO Urban Street Design Guide	http://nacto.org/publication/urban-street-design-guide/street-design-elements/sidewalks/
1.04	Sidewalk	Width of sidewalk at transit loading zone (see also Bus Stop)	14’	n/a	16’	Sidewalk next to a loading zone must maintain at least the basic sidewalk minimum width perpendicular to the curb (6’) plus additional 8’ width at front door curbside loading space to accommodate the passenger loading activity, for a minimum 14’ wide zone adjacent to a passenger loading, and a recommended 16-20’ wide zone (providing 8’ for passenger loading activity and 8-12’ pedestrian through zone), or wider to accommodate high volume areas. See bus stop specifications for width requirements if bus shelter is present, and for bus stop wheelchair boarding and landing dimensions.	NACTO Transit Street Design Guide	http://nacto.org/publication/transit-street-design-guide/stations-stops/stop-design-factors/accessible-paths-slopes/
1.05	Sidewalk	Width of sidewalk at taxi, or pick-up/drop-off zone	13’	n/a	13’	The minimum width of sidewalk adjacent to a taxi or pick-up/drop-off loading zone shall be the adjacent sidewalk width plus seven feet, or a minimum total of 13’.	BFS	
1.06	Sidewalk	Width of clear path at high volume areas/activity hubs	8’	n/a	8’ plus additional space for high volumes	Sidewalks (and all pedestrian routes) have a minimum through zone of at least 6’, but additional space is necessary where pedestrian volumes are high. This clear path shall be maintained separate from activity hubs that require additional width. For example, if the sidewalk is adjacent to a location where people stop to buy tickets at fare vending machines, the minimum clear path shall be maintained outside of the area accommodating fare vending machine activity to ensure that other station activity areas do not impede pedestrian activity within the designated clear paths of travel. This also applies to loading zones, drop-off and transit zones, and at stations with high ridership.	NACTO Urban Street Design Guide	http://nacto.org/publication/urban-street-design-guide/street-design-elements/sidewalks/

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
1.07	Sidewalk	Longitudinal Slope (or Running Slope)	n/a	5%	0.5%	The running slope of walking surfaces shall not be steeper than 1:20. ADA requirements are non-negotiable.	2010 ADA Standards for Accessible Design, Chapter 4	https://www.ada.gov/regs2010/2010ADAStandards/2010ADAStandards.pdf
1.08	Sidewalk	Head Clearance to Minor Obstructions	8’ 6”	n/a	8’ 6”	Minimum head clearance shall be 8’ 6” to minor obstructions. This includes pedestrian overpasses and underpasses.	BART Facilities Standards R2.1 October 2009	
1.09	Sidewalk	Head Clearance to Ceilings	10’	n/a	The ceiling shall be as high as practical.	Minimum head clearance shall be 10’ to continuous ceilings. This includes pedestrian overpasses and underpasses.	BART Facilities Standards R2.1 October 2009	
1.10	Sidewalk	Bench/Sitting Location Intervals	150’	n/a	150’	Benches shall be provided at 150’ intervals, and shall be located within the Furniture Zone of the sidewalk (see Sidewalk Zone illustration).	BART Facilities Standards R2.1 October 2009	
1.11	Sidewalk	Cross Slope	n/a	2%	1%	The cross slope of walking surfaces should not be steeper than 2%. ADA requirements are non-negotiable.	2010 ADA Standards for Accessible Design, Chapter 4	https://www.ada.gov/regs2010/2010ADAStandards/2010ADAStandards.pdf
Guidance								
1.12	Pathways	Pathways through open areas and plazas	**All pedestrian pathways should be barrier-free, step-free spaces and shared-use, single-surface areas.** All pedestrian pathways should provide direct connections and a clear path of travel to ramps, elevators, and stairs, and allow for a clear view to support active surveillance and perception of safety. Cross-slopes, gradients, and level areas – including tactile and audio treatments – should be designed to no less than regulatory or statutory standards. Where physical obstructions are present, there must be a clear path of travel outside of the obstructed area (consider placement of street furniture and concessions to ensure these do not present obstructions).				TransLink Bus Infrastructure Design Guideline (2012)	
1.13	Walkways	Pedestrian approach design from parking areas	When applying a clear path of travel, take care to provide sufficient additional walkway width in locations cutting through parking areas and points where paths meet from different directions. This is intended to avoid bottlenecks and to enable pedestrians to move against the predominant flow at peak periods. Maintain sidewalk design standards throughout station property, including on parking lot sidewalks.				TransLink Bus Infrastructure Design Guideline (2012)	
1.14	Walkways	Direct and safe approach for pedestrians to Transit Intermodal Areas	**Direct and safe approach for pedestrians shall be provided from all adjacent streets to the faregate entrance.** A pedestrian’s path from bus drop-off areas and light rail stops to faregate entrances shall be as direct as possible. Coordinate with local jurisdictions to ensure ADA compliant curb ramps are provided on primary access routes from adjacent streets. The alignment of walkways should be as direct as possible. The required walkway width may be determined on the basis of the expected peak pedestrian volumes and the design capacity or service level of the walkway.				TransLink Bus Infrastructure Design Guideline (2012)	

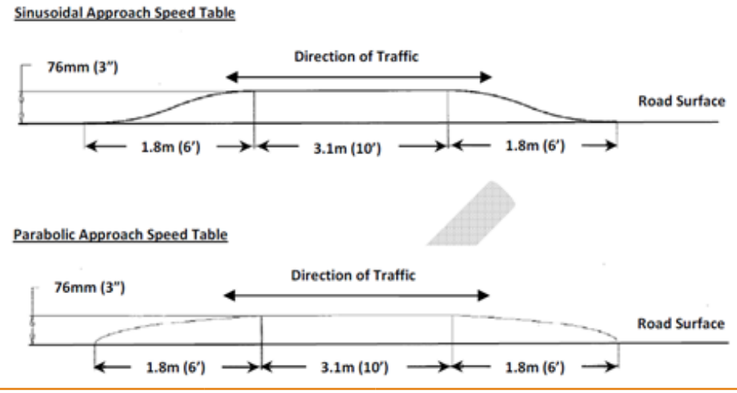
CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
1.15	Walkways	Pedestrian walkway locations				**Prioritize pedestrian movements in and around BART property by providing continuity between station faregate entrances and sidewalks at station edges, and by incorporating traffic-slowing measures at conflict points between pedestrian and vehicle travel.** Examples of measures may include widening for curb extensions at intersections that prioritize pedestrian circulation. These same strategies should be incorporated to provide pedestrian paths connecting from the edges of parking lots, so pedestrians are accommodated in the aisles of parking lots. **The path from the parking lot edges and adjacent sidewalks to the faregate entrances shall accommodate pedestrian desire lines to be as short and direct as possible.** See image below for example sidewalk through parking lot (at Ashby BART Station). 	TransLink Bus Infrastructure Design Guideline (2012)	
1.16	Walkways	Pedestrian barrier locations and material				As much as possible, pedestrian crosswalks should be located on pedestrian desire lines to minimize the need for barriers or fences. If safe crosswalks are not feasible and barriers or fences are required to prevent unsafe pedestrian crossings, consider altering the design or including aesthetically pleasing custom fences and/or landscaping to improve the pedestrian environment. See image for example of pedestrian desire line path leading to a bus loading area. 	TransLink Bus Infrastructure Design Guideline (2012)	

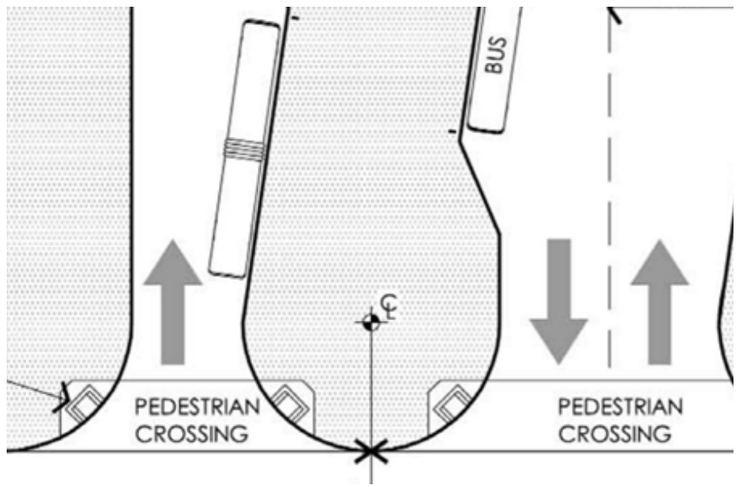
CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
1.17	Walkways	Shared streets and alleys				Shared streets, or woonerfs, provide space that is accessible to pedestrians and vehicles. These are appropriate at locations with low traffic, especially where they provide continuous paths along pedestrian desire lines and BART may want to accommodate occasional vehicle access. These shared streets are free of traffic controls, curbs and painted lines, and vehicle speeds are controlled through traffic calming designs such as textured pavement, narrow right of way, curving travel ways, landscape treatments, and other pedestrian focused designs. See images below for examples in Seattle (Bell Street Park, top image), and Santa Monica (Longfellow, bottom image).  	NACTO Urban Street Design Guide case studies	http://nacto.org/case-study/bell-street-park-seattle/ http://nacto.org/case-study/longfellow-street-residential-shared-street-santa-monica-ca/
1.18	Walkways	Pedestrian walkway surface material				Pedestrian walkways shall be paved and free of tripping hazards	BART Facilities Standards R2.1 October 2009	
1.19	Walkways	Walkway fencing - locations				When passengers or pedestrian walkways are provided above trackways, highways, or streets, the walkways shall be fenced. When a pedestrian overpass is part of the route between bus drop-off areas and the train platform, an overhead covering and wind protection shall be provided. Minimum head clearance shall be 8’6 ” to minor obstructions and 10 ’ to continuous soffits/ceilings.	BART Facilities Standards R2.1 October 2009	

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
Specifications								
1.20	Curb Ramp	Location	n/a	n/a	n/a	Curb ramps at intersections should be perpendicular to the roadway and parallel to the crosswalk, providing direct access to crosswalks. It is recommended that the curb ramps (1) point pedestrians into each crosswalk, (2) are placed within the crosswalk, and (3) connect directly to the curb ramp on the opposite side. Two curb ramps per corner may be required to meet this recommendation. A single curb ramp may be used where curb space at intersecting crosswalk is too small for two curb ramps, but must allow a minimum 48" long clear space at the bottom of the curb ramp outside of active vehicle traffic lanes.	Additional curb ramp illustrations from FHWA	https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalk2/sidewalks207.cfm
1.21	Curb Ramp	Longitudinal Slope	n/a	1:12	1:10	Ramp runs shall be consistent with ADA curb ramp specifications and have a running slope not steeper than 1:12. ADA requirements are non-negotiable.	2010 ADA Standards for Accessible Design, Chapter 4	https://www.ada.gov/regs2010/2010ADAStandards/2010ADAStandards.pdf
1.22	Curb Ramp	Width	3'	n/a	8'-10' or wider to match crosswalk width	Where feasible, **curb ramps should be as wide as the crosswalk width,** especially where pedestrian crossing volumes are high. Minimum curb ramp widths shall be consistent with ADA curb ramp specifications, the clear width of a ramp shall be 36" minimum. ADA requirements are non-negotiable.	2010 ADA Standards for Accessible Design, Chapter 4, Section 405.5 Caltrans Standard Plans	https://www.ada.gov/regs2010/2010ADAStandards/2010ADAStandards.pdf http://www.dot.ca.gov/hq/esc/oe/project_plans/highway_plans/stdplans_US-customary-units_15/viewable_pdf/rspa88a.pdf
1.23	Detectable Warnings	Dimensions	n/a	n/a	n/a	Detectable warnings shall consist of a surface of truncated domes and all design requirements and placement shall comply with ADA standards. Truncated domes in a detectable warning surface shall have a base diameter of 0.9"(23 mm) minimum and 1.4" (36 mm) maximum, a top diameter of 50% of the base diameter minimum to 65 percent of the base diameter maximum, and a height of 0.2" (5.1 mm). Truncated domes in a detectable warning surface shall have a center-to-center spacing of 1.6" (41 mm) minimum and 2.4" (61 mm) maximum, and a base-to-base spacing of 0.65"(17 mm) minimum, measured between the most adjacent domes on a square grid. Detectable warning surfaces shall contrast visually with adjacent walking surfaces either light-on-dark, or dark-on-light. Maintain minimum clear sidewalk – without detectable warnings to allow for wheelchair travel parallel to path of travel and bus and paratransit lift deployment. ADA requirements are non-negotiable.	2010 ADA Standards for Accessible Design, Chapter 7, Section 705 (Detectable Warnings)	https://www.ada.gov/regs2010/2010ADAStandards/2010ADAStandards.pdf

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
Specifications								
1.24	Crosswalk	Width	10’	n/a	10’	The width of the crosswalk should be at least equal to the width of the adjacent sidewalks, but not less than 10’ in width. This minimum width shall also apply to raised crosswalks. The minimum width for crosswalks across cycletracks is 6’.	BART Facilities Standards R2.1 October 2009 U.S. DOT FHWA Separated Bike Lane Planning and Design Guide (2015)	https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page09.cfm Chapter 4, Step 3
1.25	Crosswalk	Safety Enhancements	n/a	n/a	n/a	The design standard for crosswalk marking is a continental crosswalk. Consider traffic calming and/or traffic controls such as yield markings, raised cross walks, flashing beacons, or stop signs for all midblock and/or uncontrolled crossings.	Crosswalk Marking Field Visibility Study, FHWA Publication No.: FHWA-HRT-10-067. NACTO Urban Street Design Guide	http://www.fhwa.dot.gov/publications/research/safety/pedbike/10067/10067.pdf http://nacto.org/publication/urban-street-design-guide/intersection-design-elements/crosswalks-and-crossings/midblock-crosswalks/ https://nacto.org/publication/urban-bikeway-design-guide/bicycle-signals/active-warning-beacon-for-bike-route-at-unsignalized-intersection/
1.26	Crosswalk	Minimum Static Coefficient of Friction	0.6	n/a	n/a	In consideration of the propensity for slipping on a crosswalk marking, the static coefficient of friction on the crosswalk surface shall not be less than 0.6.	BART Facilities Standards R2.1 October 2009	
1.27	Crosswalk	Pedestrian Refuge Island	6’	n/a	10’	**Pedestrian refuge islands are recommended where a pedestrian must cross three lanes or more of traffic** (on a one-way or a two-way street), but may be implemented at smaller cross-sections where space permits Pedestrian refuge islands should be at least 6’ wide, but have a preferred width of 10’. Where a 6’-wide median cannot be attained, a narrower raised median is still preferable to nothing. The minimum protected width is 6’, based on the length of a bicycle or a person pushing a stroller. All medians at intersections should have a “nose” which extends past the crosswalk. The nose protects people waiting on the median and slows turning drivers.	NACTO Urban Street Design Guide	

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION		SOURCE	LINK
			MIN.	MAX.	RECOMMENDED				
1.28	Crosswalks	Curb Extension	n/a	n/a	n/a	**Curb extensions should be placed at all crosswalks where on-street parking exists or passenger pick-up/drop-off occurs.** The length of a curb extension should at least be equal to the width of the crosswalk. The curb extension should extend to the recessed stop bar where present. A curb extension should generally be 1–2' narrower than the parking lane (typically 6'-wide), except where the parking lane or pick-up/drop-off lane is treated with materials that integrate it into the structure of the sidewalk.		NACTO Urban Street Design Guide	http://nacto.org/publication/urban-street-design-guide/street-design-elements/curb-extensions/gateway/
1.29	Raised Crosswalk	Location on Roadways	n/a	n/a	n/a	Raised crosswalks should be considered at all mid-block crosswalks, and considered for use at locations close to faregate entrances, to reinforce awareness of pedestrians. Raised crosswalks also act as speed tables, which are traffic calming devices that raise the entire wheelbase of a vehicle to reduce its traffic speed. Where a speed table coincides with a crosswalk or cycletrack, it should be designed as a raised crosswalk or cycletrack. Raised crosswalks are designed to accommodate all vehicles, including transit vehicles. Raised crosswalks are not recommended for installation on sections of streets with grades in excess of 6%.		NACTO Urban Street Design Guide	http://nacto.org/publication/urban-street-design-guide/street-design-elements/vertical-speed-control-elements/speed-table/
1.30	Raised Crosswalk	Location on Cycletracks	n/a	n/a	n/a	To increase awareness between bicyclists and transit users, reduce bicycle speeds at pedestrian priority areas, and emphasize a preferred crossing location for pedestrians being picked up and dropped off, an optional raised crosswalk may be used at cycletracks. Ramp up to raised crosswalk should be 1:10 – 1:25 slope. See Bikeways Illustration 4 for example layout. Ideally, the crosswalk is placed at the anticipated location of the transit vehicle front door. If this transit stop is at a street crossing, the bike lane crosswalk should be placed at the start (upstream) end of the platform and included with the full street crossing. Yield triangle pavement markings can be placed prior to the crosswalk in accordance with the MUTCD (2009).		Federal Highway Administration Separated Bike Lane Planning And Design Guide (May 2015) MUTCD R1-5 (2009)	https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page00.cfm https://mutcd.fhwa.dot.gov/HTM/2003r1/part2/part2b1.htm#section2B11

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
1.31	Raised Crosswalk – Speed Table	Height	3”	4”	3”	For raised crosswalks, the longitudinal drainage taper should be eliminated to form a level pedestrian crossing. Drainage needs to be provided, particularly near the curbed edges, such as by using a trench drain with ADA-compliant grates. A speed table (with flat top) is preferred to a speed hump for installation on transit routes. If speed tables are to be installed on transit routes - a vertical height of 3” is recommended.	Translink Bus Infrastructure Design Guidelines (2012) DelDOT Traffic Calming Design Manual (2012) NACTO Urban Street Design Guide	http://nacto.org/wp-content/uploads/2015/04/DE-Traffic-Calming-Manual_2012.pdf http://nacto.org/publication/urban-street-design-guide/street-design-elements/vertical-speed-control-elements/speed-table/
1.32	Speed Table	Total Length (direction of travel)	22’	n/a	22’	A speed table (with flat top) is preferred to a speed hump for installation on transit routes. If speed tables are to be installed on transit routes, 22’ speed table with a 10’ plateau, 6’ sinusoidal or parabolic approaches is	Translink Bus Infrastructure Design Guidelines (2012)	http://nacto.org/wp-content/uploads/2015/04/DE-Traffic-Calming-Manual_2012.pdf
1.33	Raised Crosswalk	Plateau length (direction of travel)	10’	n/a	10’			
1.34	Raised Crosswalk	Approach length (direction of travel)	6’	n/a	6’	Recommended (see diagram from Translink Bus Infrastructure Design Guidelines for sinusoidal and parabolic approaches). 	DelDOT Traffic Calming Design Manual (2012) NACTO Urban Street Design Guide	http://nacto.org/wp-content/uploads/2015/04/DE-Traffic-Calming-Manual_2012.pdf http://nacto.org/publication/urban-street-design-guide/street-design-elements/vertical-speed-control-elements/speed-table/

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
Guidance								
1.35	Crosswalks	Pedestrian crossing visibility for pedestrians and drivers				**Locate crosswalks with good sight lines to improve pedestrian crossing visibility for pedestrians and drivers.** Consider visibility in relation to existing structural components such as support columns. Crosswalks should be located at all intersections, and adjacent to midblock station entrances across the street from pedestrian destinations such as major transit stops. Crosswalks shall be placed behind, rather than in front of, bus stop locations. At parallel bus loading areas, the crosswalk should not be placed immediately in front of a stopped bus that would block the view of pedestrians from the adjacent lane; the preferred location is behind a line of buses, or at a break in the bus loading area. In bus bay loading areas, the crosswalk should be placed at the beginning or end of a curved section, or behind stopped busses (see diagram for preferred pedestrian crossing locations at bus bays).  	WMATA Bus Stop Guidelines (2010)	https://www.wmata.com/about/board/meetings/load/031120_3ABusStops.pdf
1.36	Crosswalks	Wheelchair curb ramp locations				**Wheelchair curb ramps shall be provided wherever a pedestrian path of travel crosses a curb.** A separate ramp shall be provided for each crosswalk rather than one serving both crosswalks. A single curb ramp may be used where curb space at intersecting crosswalk is too small for two curb ramps, but must allow a minimum 48” long clear space at the bottom of the curb ramp outside of active vehicle traffic lanes.	CBC, Section 1127.B.5 2010 ADA Standards for Accessible Design, Chapter 4	

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
1.37	Crosswalks	Crosswalk and sidewalk pavement marking				Crosswalk design should: • Prioritize pedestrian safety. • Offer as much comfort and protection to pedestrians as possible. • Facilitate eye contact by moving pedestrians directly into the driver's field of vision. • Stripe all signalized crosswalks to reinforce yielding of right-turning vehicles turning during a green signal phase (to improve pedestrian visibility to drivers who are making a right turn). • Stripe the crosswalk as wide as or wider than the walkway it connects. • Use high--visibility ladder, zebra, and continental crosswalk markings rather than standard parallel or dashed pavement markings. • Include street lighting at all intersections, with additional care and emphasis taken at and near crosswalks.	NACTO Urban Street Design Guide	http://nacto.org/publication/urban-street-design-guide/intersection-design-elements/crosswalks-and-crossings/conventional-crosswalks/
1.38	Pedestrian Entrances/Exits	Distance from Each Other	n/a	150'	150'	**Station area entrances/exits should align with desire lines from adjacent sidewalk and street network.** Station area entrances/exits should be no more than 150' apart (aligning with desire line connections).		
Specifications								
1.39	Pedestrian/Bicycle Bridge	Barrier Height	5'	n/a	n/a	Barriers/railings shall be a minimum height of 5'. See image below of example pedestrian bridge with barriers approximately 5' high (Contra Costa County). 		https://goo.gl/maps/apB8MnsGGFT2
Guidance								
1.40	Overpasses and Underpasses	Pedestrian and bicycle overpasses and underpasses - visibility	The key goal of visibility is to see the open space on the other end of the walkway. Wherever possible, there shall be unobstructed visibility from one end of the overpass or underpass to the other and also from the sides of the overpass. If unobstructed visibility from one end of overpass or underpass to the other is not possible, CCTV coverage shall be provided and monitored in Station Agent's Booth. Refer to Facilities Design, Criteria, ELECTRONIC, Closed-Circuit Television Systems, for station CCTV. Also consider installing mirrors to improve visibility for pedestrians.					
1.41	Lighting	Pedestrian safety and scale	For safety of pedestrians, lighting shall be directed on all crosswalks. Lighting provided on sidewalks should be scaled to pedestrian heights and visibility.					

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
Specifications								
1.42	Escalators	Capacity	100 people per minute			Calculate escalator requirements on an assumed capacity of 100 passengers per minute.	Translink Transit Passenger Facility Guidelines (2011)	https://www.translink.ca/-/media/Documents/plans_and_projects/transit_oriented_communities/TPFDG-Interactive-Version.pdf
1.43	Elevators	Waiting Area	8.6 quare feet per waiting passenger			Provide at least 8.6 square feet (0.8 square meters) per waiting passenger for entry and exit to elevators.	Translink Transit Passenger Facility Guidelines (2011)	https://www.translink.ca/-/media/Documents/plans_and_projects/transit_oriented_communities/TPFDG-Interactive-Version.pdf
Guidance								
1.44	Elevators	Elevator Circulation				• Elevators should be the main or secondary vertical circulation to achieve step-free access between street, ticket vending areas and platform. • Optimize elevator and escalator locations to achieve direct routes over multiple levels and avoid the need for mezzanine connections where possible. • Optimize elevator and escalator capacity and number based on facility use and function. • Consider all users when determining the capacity and location of elevators, including those with mobility impairments, strollers, baggage and bicycles, and, where possible, provide large two-door elevators to accommodate wheelchair and bicycle movement. • Make elevator and escalator locations clearly visible from platform/concourse areas and on or adjacent to main pedestrian flows, with clear directions for alternative routes in case of breakdowns. • Consider the need for redundancy in the provision of elevators and escalators to accommodate service interruptions, commensurate with expected passenger volumes. • Design elevators with transparent walls and locate elevator entrances in positions of good natural surveillance; and consider use of CCTV for additional security. Refer to Facilities Design, Criteria, ELECTRONIC, Closed-Circuit Television Systems, for station CCTV.	Translink Transit Passenger Facility Guidelines (2011)	https://www.translink.ca/-/media/Documents/plans_and_projects/transit_oriented_communities/TPFDG-Interactive-Version.pdf

TABLE 2 BART BICYCLE FACILITIES STANDARDS

The following table defines design specifications and guidance to maintain bicycle facilities on BART property. For additional details, and latest best practice recommendations, see NACTO's Urban Bikeway Design Guide (https://nacto.org/publication/urban-bikeway-design-guide/).

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
Specifications								
2.01	Bikeways – Class I Path	Paved Width	10'	n/a	12' or more	The minimum paved width of travel way for a two-way bike and pedestrian shared-use path shall be 10'. Where heavy bicycle volumes are anticipated, the paved width of a two-way bike path should be greater than 10', preferably 12' or more.	California Highway Design Manual, Chapter 1000 Bicycle Transportation Design	http://www.dot.ca.gov/hq/oppd/hdm/pdf/english/chp1000.pdf
2.02	Bikeways – Class I Path	Shoulder Width	2'	n/a	2'-3'	A minimum 2'-wide shoulder, composed of the same pavement material as the bike path or all weather surface material that is free of vegetation, is recommended adjacent to the traveled way of the bike path when not on a structure. A shoulder width of 2-3' should be provided where feasible. Where the paved bike path width is wider than the minimum required, the unpaved shoulder area may be reduced proportionately.	California Highway Design Manual, Chapter 1000 Bicycle Transportation Design; see Figure 1003.1A	http://www.dot.ca.gov/hq/oppd/hdm/pdf/english/chp1000.pdf
2.03	Bikeways – Class I Path	Minimum Separation from Street	5'	n/a	n/a	The minimum separation between the edge of pavement of a one-way or a two-way bicycle path and the edge of traveled way of a parallel road or street shall be 5'; as an alternative, a barrier may be used where a 5' separation is not feasible.	California Highway Design Manual, Chapter 1000 Bicycle Transportation Design	http://www.dot.ca.gov/hq/oppd/hdm/pdf/english/chp1000.pdf
2.04	Bikeways – Class II Bike Lane	Travel Width	5'	7'	6'	Class II bike lanes shall have a minimum width of 5'. Bike lane width should be larger in locations where the gutter seam extends more than 12" from the curb.	NACTO Urban Bikeway Design Guide	http://nacto.org/publication/urban-bikeway-design-guide/bike-lanes/
2.05	Bikeways – Class II Buffered Bike Lane	Buffer Width	18"	n/a	2'	Buffers should be at least 18" wide. Total width of buffered bikeway, including both travel width and outside buffer width, should be no greater than 10', to ensure that the lane does not appear wide enough for use as a vehicle travel way.	NACTO Urban Bikeway Design Guide	http://nacto.org/publication/urban-bikeway-design-guide/bike-lanes/buffered-bike-lanes/
2.06	Bikeways – Class IV One-Way Cycletrack	Travel Width	5'	n/a	7'-8'	The separated bikeway clear width should be 7'-8' to allow cyclists to pass others if necessary, with 5' being the minimum width for one-way travel when adjacent to a roadway. 5' width should be limited to pinch points such as transit islands. Cycle track width should be larger in locations where the gutter seam extends more than 12" from the curb.	NACTO Urban Bikeway Design Guide Class IV Bikeway, Design Information Bulletin Number 89, Department of Transportation Division of Design Office of Standards and Procedures	https://nacto.org/publication/urban-bikeway-design-guide/cycle-tracks/one-way-protected-cycle-tracks/ http://www.dot.ca.gov/hq/oppd/dib/dib89.pdf

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
2.07	Bikeways – Class IV Two-Way Cycletrack	Travel Width	10’	n/a	12’	For two-way travel, the same width as a Class I Bikeway (bike path) should apply (a minimum of 10’, preferable 12’ or more).	Class IV Bikeway, Design Information Bulletin Number 89, Department of Transportation Division of Design Office of Standards and Procedures	http://www.dot.ca.gov/hq/oppd/dib/dib89.pdf
2.08	Bikeways – Class IV One-Way and Two-Way Cycletrack	Separation Width	n/a	n/a	n/a	The separation width depends on the type of separation between the bikeway and the adjacent travel way, including grade separation, flexible posts, inflexible physical barrier, on-street parking, or a raised island. See Caltrans Class IV Bikeway Guidance Design Information Bulletin Number 89 (December 2015), Section 3.2 for specific separation width measurements as they apply to varying cycletrack configurations. Vertical separation between the cycle track and the sidewalk should be between zero (flush with the sidewalk surface) and 5 inches. A separation of 3 inches or greater discourages conflicts with pedestrians. If configured at a height flush with the sidewalk, color, pavement markings, textured surfaces, landscaping, or other furnishings should be used to discourage pedestrian use of the cycle zone.	Class IV Bikeway, Design Information Bulletin Number 89, Department of Transportation Division of Design Office of Standards and Procedures NACTO Urban Bikeway Design Guide	http://www.dot.ca.gov/hq/oppd/dib/dib89.pdf http://nacto.org/publication/urban-bikeway-design-guide/cycle-tracks/raised-cycle-tracks/ http://nacto.org/publication/urban-bikeway-design-guide/bikeway-signing-marking/colored-bike-facilities/
2.09	Bikeways – All Classes	Widths with Gutter Seam	n/a	n/a	n/a	Bike lane width should be larger than the design width in locations where the gutter seam extends more than 12″ from the curb. Where possible, grates should be flush with surface, gaps in grating either orthogonal to direction of travel and/or gaps too small for wheels to get stuck		
2.10	Bikeways – All Classes	Vertical Barriers	n/a	n/a	n/a	Class IV facilities are differentiated from Class II facilities by the presence of a vertical barrier between the bicycle lane and vehicular traffic, which may include on-street parking, curbs, flexible pylons, or raising the bike lane to the pedestrian sidewalk level.	NACTO Urban Bikeway Design Guide	https://nacto.org/publication/urban-bikeway-design-guide/cycle-tracks/two-way-cycle-tracks/ http://nacto.org/publication/urban-bikeway-design-guide/cycle-tracks/raised-cycle-tracks/
2.11	Bikeways – All Classes	Clearance to Obstructions	1.5’	n/a	3’	A minimum 1.5’ horizontal clearance from the paved edge of a bikeway to obstructions shall be provided. Applies to all classes of bikeways.	California Highway Design Manual, Chapter 1000 Bicycle Transportation Design	
2.12	Bikeways – All Classes	Grade	n/a	5%	n/a	The maximum grade of a shared use path adjacent to a roadway should be 5%, but the grade should generally match the grade of the adjacent roadway. When the road grade is greater than 5%, exemptions may be permitted.	AASHTO Guide for the Development of Bicycle Facilities, 4th Edition (2012)	

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
2.13	Bikeways – All Classes	Pavement	n/a	n/a	n/a	Bikeways and paths away from the concourse area may be used occasionally by maintenance vehicles, and therefore will have a pavement structure equivalent to a BART Type C street.	BART Facilities Standards, Civil Streets and Surface Parking	BART Facilities Standards, Civil Streets and Surface Parking, Article 4.2-B
Guidance								
2.14	Bikeways	Adjacent to loading zone	Any bikeway on a street with a passenger loading zone (e.g. pick-up/drop-off zone or transit stop) should be a cycletrack. The bikeway should be placed between the passenger loading zone and the sidewalk.					
2.15	Bikeways	Bicycle approach design	**Bicycles approaching the station structure shall be able to reach the main entrance by a safe and relatively direct route.** Provide convenient and clearly marked bikeway between bicycle parking and bicycle access points at the perimeter of facilities. Design bicycle access routes to be separate from motor vehicle traffic, and minimize conflict with other modes to maximize comfort for all users. Bikeways provide connections and access routes that allow people on bikes to ride at their preferred speed without interference or conflicts with other modes, especially vehicle traffic, and make interactions between bicyclists and motorists more predictable.				TransLink Transit Passenger Facility Design Guidelines (2011)	http://www.translink.ca/-/media/Documents/plans_and_projects/ transit_oriented_communities/TPFDG%20Print%20Version.pdf, pages 40 and 66
2.16	Bikeways	Bikeway and connection design	**Bikeways shall be designed to provide a direct, convenient connection between the station and any existing or proposed bike routes throughout the community, and to provide a continuous facility for cyclists crossing station property** (so that the station does not present a barrier for bicyclists and pedestrians moving through the surrounding neighborhood). Extend design and placement of wayfinding beyond the transit facility to direct passengers to and from surrounding streets, bicycle routes, and nearby destinations. Wayfinding should direct passengers to bike parking options on site. Curb cuts should be provided to connect bikeways to bike parking.				TransLink Transit Passenger Facility Design Guidelines (2012)	http://www.translink.ca/-/media/Documents/plans_and_projects/ transit_oriented_communities/TPFDG%20Print%20Version.pdf, page 43
2.17	Bikeways	Separate bicycle entrance location	Where the adjacent roadway configuration and location of existing bikeways does not align with vehicle entrances, provide a separate bicycle entrance (or shared use path) to maintain continuity of the existing bicycle network; these should be clearly marked and allow for uninterrupted bicycle access (with ramps to accommodate grade changes).				TransLink Transit Passenger Facility Design Guidelines (2012)	http://www.translink.ca/-/media/Documents/plans_and_projects/ transit_oriented_communities/TPFDG%20Print%20Version.pdf, page 66
2.18	Bikeways	Bicycle signage actuator markings locations	Signal control will only be present at intersections with city streets. All bicycle signal actuation should be passive detection, and bicycle signal actuation location pavement markings shall be provided. Include bicycle signal traffic heads where needed.				BART Facilities Standards R2.1 October 2009	
Specifications								
2.19	Bicycle Parking – Class I	Minimum Number	5% of projected AM peak period ridership	n/a	n/a	Class I long-term bicycle parking includes bicycle lockers and secured rooms or cages. APBP Bike Parking Guidelines recommends enough long-term bicycle parking to accommodate 5% of projected AM peak period ridership, or no less than projected by the bike parking modeling described in Appendix A of the BART Bicycle Program Capital Plan. Attended bicycle parking "Bike Stations" shall be considered at stations where the demand for bicycle parking exceeds 100 bicycles per day; and are most appropriate for stations that have demand during the whole day.	APBP Bicycle Parking Guidelines, Second Edition (2010) BART Facilities Standards R2.1 October 2009 BART Bicycle Program Capital Plan (2017)	http://c.ymcdn.com/sites/www.apbp.org/resource/resmgr/Bicycle_Parking/EssentialsofBikeParking_FINA.pdf http://www.bart.gov/sites/default/files/docs/BART%20bike%20capital%20plan_FINAL_2017-05-31.pdf

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
2.20	Bicycle Parking – Class II	Minimum Number	1.5% of projected AM peak period ridership	n/a	n/a	Bike parking best practices call for enough short-term bicycle parking to accommodate 1.5% of projected AM peak period ridership, or no less than is called for in the BART Bicycle Program Capital Plan.	APBP Bicycle Parking Guidelines, Second Edition (2010) BART Bicycle Program Capital Plan (2017)	http://c.ymcdn.com/sites/www.apbp.org/resource/resmgr/Bicycle_Parking/EssentialsofBikeParking_FINA.pdf http://www.bart.gov/sites/default/files/docs/BART%20bike%20capital%20plan_FINAL_2017-05-31.pdf
Guidance								
2.21	Bicycle parking	Bicycle parking locations and design	Locate bicycle parking adjacent to desire lines, and as close as possible to faregate entrances, within sight of the station agent, but not in locations that obstruct pedestrian movements. Establish bicycle access and parking requirements based on passenger demand, transit passenger facility usage, and local context. **Parking for bicycles outside of the faregate entrances shall be covered and located within sight of the station agent, vendors, passing pedestrians, or in a highly visible area with heavy foot traffic.** Refer to BART Bicycle and Parking Plan for guidelines.				TransLink Transit Passenger Facility Design Guidelines (2012)	http://www.translink.ca/-/media/Documents/plans_and_projects/ transit_oriented_communities/TPFDG%20Print%20Version.pdf pages 40, 66
2.22	Bicycle parking	Bicycle parking classes	Provide long-term bicycle parking, such as a bicycle station, lockers or cages; Provide short-term bicycle parking, such as bicycle racks, preferably sheltered and close to the transit passenger facility *[See Bicycle parking locations and design, below, for guidance on locations]*				TransLink Transit Passenger Facility Design Guidelines (2012)	http://www.translink.ca/-/media/Documents/plans_and_projects/ transit_oriented_communities/TPFDG%20Print%20Version.pdf page 66
2.23	Bicycle parking	Class I bicycle parking design	Class I bicycle parking shall consist of perforated metal bicycle lockers that include an on-demand electronic locking system. Bicycle lockers shall be provided at all stations with space for installation at the street level or in an external plaza. The minimum number of lockers shall be two lockers (accommodating four bicycles). Obtain the required number of lockers for a given station from the Bicycle Program Manager who will base it on anticipated demand.					
2.24	Bicycle parking	Class I bicycle parking cage locations	In areas of high demand for bicycle parking, or if bicycle lockers cannot be provided, the construction of attended bike stations or unattended bicycle parking cages shall be considered, as demand warrants.					
2.25	Bicycle parking	Class II bicycle parking design and locations	Class II bicycle parking consists of bicycle racks. Primary locations for bicycle racks shall be in both the paid and the free area of the concourse and within sight of the station agent's booth, if space permits. For outdoor installations, cover bicycle racks with a roof or locate under a structural overhang. Class II bicycle parking shall consist of surface mounted bicycle racks that allow the two wheels and frame to be securely locked. Preferred racks shall be square tube "inverted U" type racks. Locate bicycle parking as close as possible to transit passenger facility entrances/ exits, in areas with good natural surveillance from other transit passenger facility users and passers-by and readily accessible from every entrance (at transit passenger facilities with more than one entrance) without obstructing pedestrian movement.				TransLink Transit Passenger Facility Design Guidelines (2012)	http://www.translink.ca/-/media/Documents/plans_and_projects/ transit_oriented_communities/TPFDG%20Print%20Version.pdf page 66

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
Guidance								
2.26	Bicycle entrances	Elevator access				Where elevators are used, provide large two-door elevators to accommodate wheelchair and bicycle movement in addition to accessible pedestrian access.	TransLink Transit Passenger Facility Design Guidelines (2012)	http://www.translink.ca/-/media/Documents/plans_and_projects/ transit_oriented_communities/TPFDG%20Print%20Version.pdf, page 46
2.27	Bicycle entrances	Stairway access				All stairs should include a ramp for bicycles, called a bike channel. A bike channel allows people to roll their bicycles up or down a set of stairs instead of carrying it. Current bike channels on BART stairs place the bike channel directly under the handrails. This creates a conflict between the handlebars and the handrails. Further, the steepness of the stairwells can be challenging for pushing a bike up or down the bike channel. Preferred design includes putting the bike channel on the outside of the stairwell away from handrails.	2017 Edition City of Seattle Standard Plans for Municipal Construction	http://www.seattle.gov/util/cs/groups/public/@spu/@engineering/documents/webcontent/2_035033.pdf, Standard 440c
2.28	Bicycle entrances	Dismount Zone				**Add a dismount zone where bicyclists can transition from the bikeway to the sidewalk. A dismount zone is a pedestrian priority zone where bicyclists dismount from their bikes to walk their bikes to the faregate entrance or designated bicycle parking.** The length of dismount zone can be sized to align with the size of the area of high pedestrian activity and bicycle access needs. Dismount zones may be identified with signs or high-visibility bikeway striping. A curb ramp for bicycle access to the dismount zone may be considered.		
2.29	Bike Box	General Guidance				A bike box will occur only at signalized intersections between BART driveways and city streets. A bike box is a right angle extension of a bike lane at the head of a signalized intersection. It is colored green, formed by transverse lines, and includes a pavement marking of a bicycle for easy identification and high visibility. The bike box allows bicyclists to move to the front of the traffic queue on a red light and proceed first when that signal turns green. Motor vehicles must stop behind the stop lines at the rear of the bike box. . Bike boxes should be located at signalized intersections only, and right turns on red should be prohibited (and signed as such) to prevent vehicles from entering the bike box. Bike boxes should be used at locations that have a relatively large volume of cyclists. On roadways without left turn pockets, the bike box also facilitates left turning movements for cyclists. Bike box dimensions are typically 10-16’ deep to allow for bicycle positioning. Use appropriate signs as recommended by the MUTCD. Signs should prohibit ‘right turn on red’ and indicate where the motorist must stop.	NACTO Urban Bikeway Design Guide	https://nacto.org/publication/urban-bikeway-design-guide/intersection-treatments/bike-boxes/

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
2.30	Bikeway	Application				Class I path should be provided adjacent to a high volume roadway where improving the roadway to accommodate bicycle travel is impractical. A separate sidewalk for pedestrian use should be provided (unless the path is designed to accommodate mixed-use). Class II bike lanes are most helpful on streets with equal to or greater than 3,000 motor vehicle trips per day and with a posted speed limit equal to or greater than 25 mph. Class II buffered bike lanes may be applied anywhere a standard Class II bike lane is considered, and should be provided on streets with higher traffic volumes, higher vehicle travel speeds, transit service, multiple vehicle lanes in each direction, and/or on-street parking. Class IV cycle tracks should be provided where feasible, especially on streets where Class II bike lanes cause many bicyclists to feel stress because of factors such as high traffic volumes, multiple vehicle lanes, high vehicle speeds, high parking turn over or curb activity, and transit service. Cycle tracks are also helpful in locations with high bicycle volumes, where contra-flow bicycle is desired, and on streets with few conflicts such as cross-streets or driveways. In many cases, a Class II buffered bike lane may be converted into a protected Class IV cycle track with the addition of vertical elements within the buffer zone, such as planter boxes, curbs, or other physical barriers. Bikeways should be located separate from bus stops and intermodal loading curb, and bus routes should not cross dedicated bikeways to access bus stops and intermodal loading curbs.	NACTO Urban Bikeway Design Guide	https://nacto.org/publication/urban-bikeway-design-guide/
2.31	Bikeway	Use of Green				**Colored pavement within a bicycle lane increases the visibility of the facility, identifies potential areas of conflict, and reinforces priority to bicyclists in conflict areas and in areas with pressure for illegal parking.** Colored pavement can be utilized either as a corridor treatment along the length of a bike lane or cycle track, or as a spot treatment, such as a bike box, conflict area, or intersection crossing marking. Color can be applied along the entire length of bike lane or cycle track to increase the overall visibility of the facility. Consistent application of color across a bikeway corridor is important to promote clear understanding for all users.	NACTO Urban Bikeway Design Guide	http://nacto.org/publication/urban-bikeway-design-guide/bikeway-signing-marking/colored-bike-facilities/

TABLE 3 BART BUS FACILITIES STANDARDS

The following table defines design specifications and guidance to maintain bus facilities on BART property. The design approach is the same for all transit modes; for example, bus stop design considerations may also apply to light rail boarding areas.

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
Specifications								
3.01	Bus Travel Lane	Transit lane width	11’	12’	11’	**Bus lanes should be 11’ wide when offset from curb, and 11–12’ when configured curbside or in transitway adjacent to an opposing lane of bus traffic.** Curbside lane widths are inclusive of gutter width where gutters occur.	NACTO Transit Street Design Guide	http://nacto.org/publication/transit-street-design-guide/transit-lanes-transitways/lane-design-controls/vehicle-widths-buffers/
3.02	Intersections	Bus turning – curb radii (for 40’- 60’ bus)	20’ (inner)	43’ (outer)	20-30’	Transit vehicles typically require an effective turning radius of approximately 20–30’, depending on lane width and presence of curbside parking lanes or buffer distance (effective turning radius utilizes all available street space depending on roadway configuration, such as additional space from parking or receiving lanes, and is typically larger than the curb radius). A typical inner effective turning radius of a standard 40’ bus is 21.5’, which is required to clear the curb. At its tightest turning angle, the rear overhang of the back bumper extends out to 43.25’. The turning geometry of a 60’ articulated bus is similar to a 40’ bus, the primary difference being the vehicle’s ability to pivot around the center bridge plate.	NACTO Transit Street Design Guide	http://nacto.org/publication/transit-street-design-guide/intersections/transit-route-turns/turn-radii/
3.03	Intersections	Recessed stop bar to accommodate turning buses on receiving streets	10’	20’	10’ or more (depending on vehicle size)	**Pulling the stop bar back from the intersection for oncoming lanes on the receiving street allows large transit vehicles to use the full width of the street around tight curb radii.** Additional clearance may be necessary to accommodate buses with bike racks deployed, and for 45’ highway coaches. (On-street parking and bikeways may also provide space for a larger effective radius for transit vehicles to turn.)	NACTO Transit Street Design Guide	http://nacto.org/publication/transit-street-design-guide/intersections/transit-route-turns/recessed-stop-line/
3.04	Bus Stop	Passenger shelter – distance from curb	5’	n/a	5’	Maintain a minimum 5’ sidewalk clear zone around shelter structure (which may be wider than the ADA standard in some cases). Bus shelters should be placed parallel to the curb.	NACTO Transit Street Design Guide	http://nacto.org/publication/transit-street-design-guide/station-stop-elements/stop-elements/small-transit-shelter/

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
3.05	Bus Stop	Passenger shelter – clear path behind or in front of shelter	6’	n/a	8-12’	An 8’- to 12’-wide pedestrian through-zone on the sidewalk, adjacent to the shelter, is preferred in commercial and high-use settings. Maintain a minimum 6’ sidewalk clear path of travel zone around shelter structure (which may be wider than the ADA standard in some cases). Maintain a clear path of travel between bus shelter and bus boarding/landing area This is consistent with sidewalk clear path of travel and wheelchair boarding/landing specifications.	NACTO Transit Street Design Guide Access Board accessible guidelines for wheelchair spaces	http://nacto.org/publication/transit-street-design-guide/station-stop-elements/stop-elements/small-transit-shelter/ https://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-ada-standards/ada-standards/chapter-8-special-rooms,-spaces,-and-elements
3.06	Bus Stop	Passenger shelter – height	8’ 6”	n/a	10’	Bus shelters should maintain the same clearance as sidewalk height clearances, and canopy area should be maximized while maintaining the smallest shelter structure footprint possible, to provide coverage without impeding the path of travel on the sidewalk. Shelter should be able to accommodate real-time information signs above 8’ 6”. Avoid excessively high shelters, which offer limited protection from elements with too much overhead clearance.	See Pedestrian Facilities Table 1, Head clearance specifications (1.8 and 1.9)	
3.07	Bus Stop	Passenger shelter –clearance from curb	2’	n/a	2’	Bus shelters can extend beyond the structure footprint, but should maintain at least 2’ clearance from curb, to allow for bus movements adjacent to curbs. The sheltered area should be maximized while maintaining the smallest shelter structure footprint possible, to provide coverage without impeding the path of travel on the sidewalk. Shelter roofs can be separate – no continuation required.	Memphis Area Transit Authority Bus Stop Design & Accessibility Guidelines, 2016	http://memphismpo.org/sites/default/files/public/documents/transit-plans/Bus%20Stop%20Design%20%26%20Accessibility%20Guidelines_April%202017.pdf
3.08	Bus Stop	Location – distance between crosswalk and rear of bus	10’	n/a	10’	Bus stop location should allow for minimum clearance between crosswalk and rear of bus.	NACTO Transit Street Design Guide	http://nacto.org/publication/transit-street-design-guide/stations-stops/stop-design-factors/platform-length/

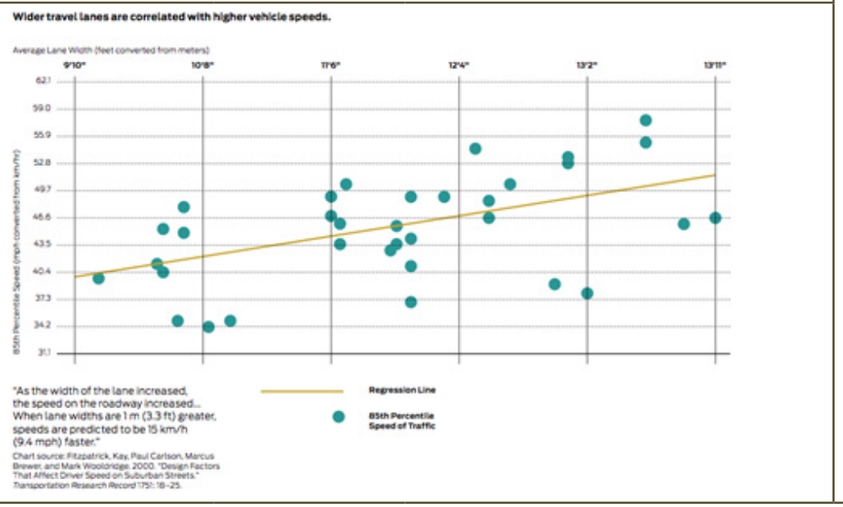
CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
3.09	Bus Stop	Loading area – number of bus bays, spatial requirements	As few as possible to serve planned peak number of buses per hour. Bus layover at the bus stop is not recommended.			The number of bus bays is determined on a case-by-case basis and is informed by the forecast number and scheduling of bus routes being served over the required planning horizon, taking dwell time into consideration. Bus bays should be shared between routes as much as possible, with operators encouraged to provide immediate pick-up/drop-off within BART property. Starting point for demand is: • Routes with combined headways > 5 minutes need 1 bay; • Routes with combined headways < 5 minutes need 2 bays. Calculations and bus bay planning should be done in coordination with the bus operator. The following formula may provide a starting point: Loading area bus capacity (buses/hour) = [(3,600)/the ratio of effective green time to total traffic signal cycle length (called green time ratio, which equals 1.0 at bus facilities)]/(clearance times in seconds + average dwell time in seconds x (green time ratio) + standard normal variable corespondidg to a desired failure rate (typical is 0.25) x coefficient of variation of dwell times (typically assume 0.6) x average dwell time in seconds)] Additional consideration may be given to address spatial needs for timed transfer operations where applicable (pulse scheduling may reduce capacity for shared bus bays).	TransLink Bus Infrastructure Design Guidelines, 2012 The Transit Capacity and Quality of Service Manual, TRB	
3.10	Bus Stop	Wheelchair boarding/landing	8’ x 8’	n/a	8’ x 8’ at front vehicle entrance, or 10’ x 8’ at rear door	Bus stop wheelchair boarding/landing should provide a minimum clearance of 8’ length parallel to curb and 8’ width perpendicular to curb, at vehicle’s front entrance to ensure a wheelchair can make a full turn upon boarding and alighting a transit vehicle (also known as a wheelchair landing pad), which is consistent with local operator preferences. Provide a minimum clearance of 10’ by 8’ for rear door, if required (Confirm vehicle dimensions to determine distance from primary boarding area). Passenger loading zones shall comply with current ADA standards and 2016 California Building Code, and with local agency standards where applicable.	ADA Standards for Transportation Facilities, Chapter 8	https://www.access-board.gov/guidelines-and-standards/transportation/facilities/about-the-ada-standards-for-transportation-facilities/ada-standards-for-transportation-facilities-single-file#a8
Guidance								
3.11	Bus Stop	Bus loading and unloading locations on BART property	At BART stations with bus service accessing BART property, an exclusive area for bus loading and unloading shall be provided at the curb near the main faregates to facilitate BART patrons to access BART services. **The path from the bus loading and unloading area to the faregate entrances shall accommodate pedestrian desire lines to be as short and direct as possible.**				Translink Transit Passenger Design Guide (2012)	
3.12	Bus Stop	Boarding and off-loading of bus - location	Where practical, **bus loading and unloading zones shall be located so that patrons do not have to cross traffic lanes.** Site bus stops to minimize walking distances between connections.				Translink Bus Infrastructure Design Guidelines (2012)	

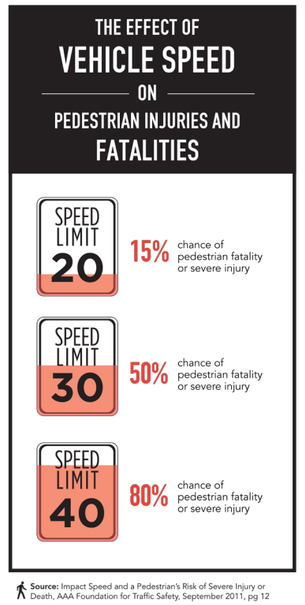
CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
3.13	Bus Stop	Pedestrian Crossings at Bus Stops				At unsignalized crossing locations, to avoid any potential blocked sightline within a station, pedestrian crosswalks should be placed at locations behind stopped buses, before bus turning maneuver points, or at the end of a bus turning maneuver. There should be sufficient stopping sight distance for a bus operator to see pedestrians; otherwise, a STOP sign should be installed to ensure that buses stop before a crosswalk and bus drivers can check for pedestrians before proceeding. The locations where pedestrians step out from the bus loading area or bus platform should not be located in the visibility impairment zone of the bus operator while the bus is making a turn around the platform. Crosswalks should be placed behind the bus wherever possible. Crosswalks should be placed 10-20' in front of bus stops to address sight lines for bus drivers passing the bus parked at the bus stop. Where buses load parallel to a curb in line with other buses, crossings should be provided at gaps in the line that allow for this 10-20' spacing. The total bus stop length should be addressed outside of the pedestrian crosswalk placement, and allow buses to fully pull into the loading zone. **Pedestrian crosswalks shall be located within clear sightlines of bus drivers, accommodate pedestrian desire lines to be as short and direct as possible,** and minimize the need for barriers or fences. If barriers or fences are required to prevent unsafe pedestrian crosswalks, consider altering the design (including the installation of a proper mid-block crossing), or including aesthetically pleasing custom fences and/or landscaping to improve the pedestrian environment (for example, planters may be placed to obstruct diagonal short cuts that would put pedestrians outside of the sightlines). Pedestrians should be oriented so they face oncoming buses when entering a crosswalk; designs where pedestrians have their back to oncoming buses should be avoided. See Pedestrian Facilities Standards Table for additional details and illustrations.	Translink Bus Infrastructure Design Guidelines (2012) Nelson\Nygaard	
3.14	Bus Stop	Bus stop design				Curbside or parallel loading at an island with shared bus stops or flexible bay assignment is the preferred bus stop design for BART stations, as it allows for compact intermodal design. Where site conditions will not accommodate the length required for parallel bus loading (due to constrained curb space and/or number of buses), sawtooth design may be considered.		
3.15	Bus Stop	Passenger amenities				Provide passenger amenities such as shelters, benches, garbage cans, and wayfinding signage, ensuring that these components do not block the clear pedestrian path. Minimize visual obstructions, integrate transit infrustructure to aid in legibility and security, enhancing a sense of place and minimizing clutter. Design outdoor space to maximize comfort of passengers and pedestrians through canopies, overhangs, landscapes. Integrate shelters where possible, and apply noise reduction techniques to minimize ambient noise. Design amenities to be sustainable and coordinated between the transit agencies whose passengers are using them. Refer to ADA standards for accessible furniture design guidances.	Translink Bus Infrastructure Design Guide (2012) Translink Transit Passenger Design Guide (2012)	
3.16	Bus Stop	Bus Layover				Where possible, design bus layover areas away from passenger pick-up and drop-off areas, and accommodate on-street bus stops adjancent to the station where possible. Where feasible, use technology to incorporate real time bus bay assignment. The provision of additional bus storage areas, such as layover space for routes that terminate at BART stations should be made on a case-by-case basis, and use regional and local planning horizon documents as a guide. Layover space will ideally be located so that a driver can use the facilities, and when the bus goes back into service it travels a minimal distance, and with minimal conflict with other road users and pedestrians.	Translink Bus Infrastructure Design Guide (2012)	

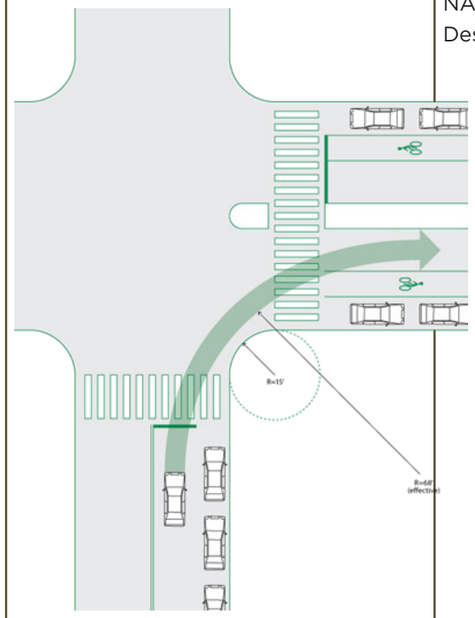
CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
3.17	Bus Stop	Point of Entry/Exit				Minimize pedestrian and vehicular conflicts. The locations of bus entry and exit points should be segregated from pedestrian and bicycle traffic, wherever possible.	Translink Bus Infrastructure Design Guide (2012)	
3.18	Bus Stop	Real Time Information				Provide real-time passenger information in both audio and visual formats when possible.	Translink Bus Infrastructure Design Guide (2012)	
3.19	Bus Stop	Signage				Coordinate signs with lighting. Use low-glare materials, and illuminate signs.	Translink Bus Infrastructure Design Guide (2012)	
3.20	Bus Stop	Paratransit loading				Curb loading space for patatransit vehicles should provide enough space for the maximum vehicle length plus 10’ of space between vehicles to accommodate pull in/pull out operations. For example, at a station where two 25’ paratransit vehicles are expected to arrive at the same time, curb space should be 25’ + 25’ + 10’ = 60’ curb for paratransit. Where only one paratransit vehicle is expected at a time, curb space should be 25’ + 10’ = 35’ curb for paratransit.	Nelson\Nygaard best practices	

TABLE 4 STREET FACILITIES STANDARDS

The following table defines design specifications and guidance to design streets and roads on BART property. The design approach emphasize traffic calming and a pedestrian-friendly environment.

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
Specifications								
4.01	Vehicle Travel Lane	Lane Width	9’	11’	10’	**Vehicle travel lane widths for private vehicles should not exceed 10’ in width.** Lane widths of 10’ have a positive impact on a street’s safety without impacting traffic operations. For transit routes, one travel lane of 11’ may be used in each direction. Transit lane widths will also accommodate cash collection trucks and other oversize vehicles requiring occasional access to BART property. In select cases, narrower travel lanes (9–9.5’) can be effective as through lanes in conjunction with a turn lane.  	NACTO Urban Street Design Guide	http://nacto.org/publication/urban-street-design-guide/street-design-elements/lane-width/

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION		SOURCE	LINK
			MIN.	MAX.	RECOMMENDED				
4.02	Vehicle Travel Lane	Speed	n/a	15 MPH	15 MPH	BART has an adopted policy of 15 MPH in station areas. The slower the vehicle speed, the lower the chance for injury or death for a pedestrian in case of collision.		Per BART Board Resolution (BR) 2495-3 – No person shall at any time drive any vehicle in any district parking facility at a speed in excess of 15 miles per hour, unless otherwise posted U. S. Department of Transportation National Highway Traffic Safety Administration DOT HS 809 021 October 1999 Impact Speed and a Pedestrian's Risk of Severe Injury or Death, AAA Foundation for Traffic Safety, September 2011, p. 12	http://www.nhtsa.gov/people/injury/research/pub/HS809012.html
Guidance									
4.03	Roadways	Automobile traffic patterns	Automobile traffic patterns should fit within the context of the adjacent street network to minimize conflicts with pedestrian, bicycle, and transit access and prevent unnecessary queuing and circling. Two-way traffic shall be accommodated wherever possible to maximize connections to the surrounding street network. Refer to BART's Curb Management Guidelines for passenger loading considerations.						
4.04	Roadways	BART System streets - design	Except as described for one-way access roadways, roadways other than those used mainly for service or maintenance purposes shall have at least one traffic lane for each direction of travel.						
4.05	Roadways	Grade separations	Grade separated designs should be avoided where possible. If a grade separated design is still necessary, they shall include facilities dedicated for bicycles and pedestrians.						
Specifications									
4.06	Entrances/Exits	Distance from each other	150'	n/a	350'	Minimize the number of vehicle access points. Access points should be spaced at least 150' apart. A distance of 350' is considered desirable.		BART Facilities Standards	
Guidance									
4.07	Vehicle access	Vehicle access point location	Site access points shall be located to minimize traffic congestion, and traffic patterns for vehicles and pedestrians shall be clearly marked.						

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION		SOURCE	LINK
			MIN.	MAX.	RECOMMENDED				
4.08	Vehicle access	Vehicle entrances - intersections	**Vehicular entrances shall align with the adjacent street network** with provision for sufficient waiting and stacking space provided at intersections with major roads.						
4.09	Vehicle access	Vehicle entrances - right turns and left turns	Right turns in and out of the station are preferable to left turns at uncontrolled intersections. A left turn in is less objectionable than a left turn out.						
4.10	Roadways	Entrance and exit roads in relation to bus and auto drop-off	Bus and private autos may use the same entrance and exit roads. It is recommended to separate buses from passenger vehicle circulation after they enter the station.						
4.11	Vehicle access	Station access in relation to existing transit routes/ services	Whenever possible, station access shall be oriented toward existing transit routes and services, especially trunk lines. Design guidelines of transit agencies shall be consulted and shall be accommodated as necessary.						
Specifications									
4.12	Curb	Radius	5’	15’	10’	Curb radii should be designed as tightly as possible to reduce pedestrian crossing distance and slow turning speeds without adversely affecting transit operations – this applies to all curbs, including driveway and parking lot entrances at the edge of BART property. Where vehicle turns are permitted at an intersection, curb return radii shall be 10-15’. Where vehicles are not permitted to make turns, curb return radii shall be 5’. Note, curb radius is distinct from the effective turning radius (which utilizes all available street space depending on roadway configuration, such as additional space from parking or receiving lanes, and is typically larger than the curb radius).		NACTO Urban Street Design Guide	https://nacto.org/publication/urban-street-design-guide/intersection-design-elements/corner-radii/
4.13	Street Intersections	Angle	n/a	n/a	90 degrees	Intersection angles shall be 90 degrees whenever possible (consistent with compact intersection design and continuity with connecting street grid).			

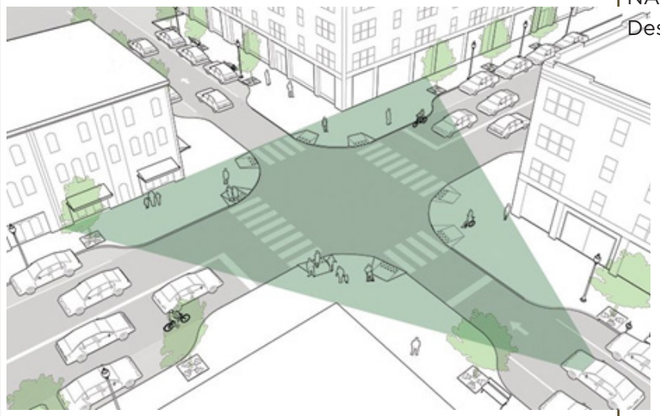
CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
Guidance								
4.14	Intersections	BART system streets - intersection sight distance	Vehicular intersections in parking lots or parking lot vehicular entryways and exit ways shall not have landscaping or other obstructions which would diminish driver visibility of traffic in or approaching such intersections. At all intersections, objects more than 3' above the high point of the traveled way shall be excluded from areas referred to as "sight triangles." See visibility/sight distance diagram from NACTO.				NACTO Urban Street Design Guide	http://nacto.org/publication/urban-street-design-guide/intersection-design-elements/visibility-sight-distance/
Specifications								
4.15	Emergency Access	Roadway width	20'	n/a	20'	Assume that emergency vehicles are permitted full use of the right-of-way in both directions, especially where tight curb radii may necessitate use of the opposite lane during a turn (supports compact intersection design).		
4.16	Street Curves	Radius of Parabolic Horizontal Curves	n/a	n/a	n/a	Calculate stopping sight distance to determine minimum length of horizontal curve consistent with Caltrans guidance.	Caltrans HDM Chapter 0200, Section 201.6	http://www.dot.ca.gov/hq/oppd/hdm/pdf/english/chp0200.pdf
4.17	Horizontal Street Clearance	Horizontal Distance	2' 6"	2' 6"	2' 6"	Minimum horizontal clearance between any structure and inside face of curb, or edge of shoulder, shall be 2' 6", except that this clearance may be reduced to 1'6' at signs, fences, base of light standards, and at pedestrian barriers. Additional clearance may be needed to provide sufficient sight distance at intersections.		

TABLE 5 BART PARKING FACILITIES STANDARDS

The following table defines design specifications and guidance to design parking facilities on BART property. The design approach emphasizes comfortable pedestrian access and accommodation of passenger pick-up/drop-off activity.

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
Specifications								
5.01	All Parking	Distance to Crosswalk at Unsignalized Intersection	20’	n/a	20’	Curbside parking, including pick-up and drop-off zones, shall not be closer than 20’ on the approach to a crosswalk.	NACTO Urban Street Design Guidelines	http://nacto.org/publication/urban-street-design-guide/intersection-design-elements/visibility-sight-distance/#footnotes
5.02	All Parking	Distance to Crosswalk at Signalized Intersection	40’	n/a	40’	Curbside parking, including pick-up and drop-off zones, shall not be closer than 40’ on the approach to a crosswalk at a signalized intersection.	BART Facilities Standards R2.1 October 2009	
Guidance								
5.03	All Parking	Parking facilities - pedestrian safety	**Provide pedestrians with safe crossings of major streets along pedestrian desire lines,** installing traffic controls where necessary for pedestrian safety. Additional details about curb management and delegation of curb use at BART station property is available in the Curb Use Guidelines.					
Specifications								
5.04	Taxi Parking	Width	7’	7’	7’	Taxi zones shall have a minimum lane width of 7’.		
5.05	Taxi Parking	Length	20’	n/a	20’	Parking spaces for taxis shall be 20’ long.	BART Facilities Standards R2.1 October 2009	
5.06	Pick-Up/Drop-Off	Length	n/a	n/a	n/a	The passenger pick-up/drop-off facility should be sited close to the faregate entrance, but in a separately designated length of curb from transit stops (e.g., where curb space is limited, transit stops are the highest priority motorized mode). This will provide convenient access for all dropped-off passengers while minimizing conflicts between transit vehicles and passenger pick-up/drop-off activities. Pick-up spaces designated for taxis and ride-hailing services may be located separately and slightly farther away; however, they should not require passengers to cross more than one street. Otherwise, passengers will likely be picked-up at locations that are considered more convenient and closer to the faregate entrance.	BC Transit Infrastructure Design Guidelines – November, 2010	

CODE	COMPONENT	SPECIFICATION	MEASUREMENT			DESCRIPTION	SOURCE	LINK
			MIN.	MAX.	RECOMMENDED			
5.07	ADA drop-off	Design	n/a	n/a	n/a	n/a Passenger drop-off and loading zones shall provide access aisles adjacent and parallel to the vehicle pull-up space. Access aisles shall adjoin an accessible route and shall not serve as a vehicular through route. Access aisles shall be marked with a painted borderline around their perimeter. The area within the borderlines shall be marked with hatched lines a maximum of 36" on center in a color contrasting with that of the aisle surface. Access aisles shall be at the same level as the vehicle pull-up space they serve. Changes in level are not permitted.	2016 California Building Code 11B-503.3 Access aisle; Section 11B-503 and Section 11B-302	
5.08	ADA drop-off	Width	60'	n/a	60'	Access aisles serving vehicle pull-up spaces shall be 60" wide minimum.	2013 California Building Code 11B-503.3 Access aisle	
5.09	ADA drop-off	Length	20'	n/a	20'	Vehicle pull-up space. Passenger drop-off and loading zones shall provide a vehicular pull-up space 96" wide minimum and 20' long minimum. Access aisles shall extend the full length of the vehicle pull-up spaces they serve.	2013 California Building Code 11B-503.3.2 Length	
5.10	All Parking	Parking Stall				Refer to the BART Facilities Standards for all parking stall and parking space design details.		

APPENDICES

SOURCES FOR MULTIMODAL ACCESS BEST PRACTICES

ADA Accessibility Guidelines (2010)

Alexandria Complete Streets Design Guide

Ann Arbor Street Design Manual

APBP Bicycle Parking Guidelines, Second Edition (2010)

BC Transit Infrastructure Design Guidelines

Berkeley, CA Bicycle Master Plan Update 2017

Boston Complete Streets Guidelines

California Building Code (CBC) 2016

California Highway Design Manual, Chapter 1000 Bicycle Transportation Design

California Manual for Uniform Traffic Control Design (MUTCD)

Chicago Complete Streets Guidelines

California Department of Transportation (Caltrans) Class IV Bikeway, Design Information
Bulletin Number 89, Department of Transportation Division of Design Office of Standards and Procedures

Caltrans Highway Design Manual and Standard Plans

DelDOT Traffic Calming Design Manual

Emeryville Pedestrian and Bicycle Plan

Federal Highway Administration Separated Bike Lane Planning And Design Guide

Los Angeles Model Street Design Manual

NACTO Urban Street Design Guide

NACTO Urban Bikeway Design Guide

NACTO Transit Street Design Guide

New York City Department of Transportation Street Design Manual

Philadelphia Complete Streets Design Handbook

Portland Bicycle Plan For 2030, Bikeway Facility Design: Survey Of Best Practices

San Mateo Sustainable Streets Guide

Spokane Street Design Standards

Translink Transit Passenger Design Guide

Translink Bus Infrastructure Design Guidelines

U.S. Access Board Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG)

WMATA Bus Stop Guidelines

NACTO as Design Guide Resource

Many of the specifications and design considerations included in this document are derived from or consistent with the National Association of City Transportation Officials (NACTO) design guides, including the Urban Street Design Guide, Transit Street Design Guide, and Urban Bikeway Design Guide. These NACTO design guides are available online, and are updated as best practices advance, and have been endorsed by the U.S. DOT, Caltrans, and cities across the country. According to Caltrans' April 2014 Design Flexibility in Multimodal Design memo, "Publications such as the [NACTO] "Urban Street Design Guide" and "Urban Bikeway Design Guide," ... are resources that Caltrans and local entities can reference when making planning and design decisions on the State highway system and local streets and roads."

The NACTO guides provide effective tools for planning streets and multimodal access facilities on and around BART property, and BART should consider adopting or endorsing NACTO guides as primary resources for up-to-date specifications and design details.

GLOSSARY OF TERMS

TERM	DEFINITION
Adjacent Networks	Transportation networks for each mode on streets surrounding the BART station property. For example, sidewalks, bicycle lanes, vehicle streets, and transit routes on adjacent and connecting streets around the BART station and BART parking lots.
Americans with Disabilities Act (ADA)	Prohibits discrimination against people with disabilities in employment, transportation, public accommodation, communications, and governmental activities.
Above-grade	Above the level of the roadway.
At-grade	At the same level and/or continuous with the roadway.
BART Access Hierarchy	The order of priority, by mode, of accommodating station access established by the District and defined in the BART Station Access Policy. At the station level, project design should consider the primary modes, in the following order of priority (Station Access Hierarchy) for convenience and directness of routing • Pedestrian • Bicycle • Other transit systems, i.e. bus, light rail, and shuttles • Pick-up/ Drop-off (by private automobile or taxi) • Station parking (patrons, including those in carpools, park at the station site, ride BART, and pick up their cars on their return) Station investment priorities are defined according to station types (Urban, Urban with Parking, Balanced Intermodal, Intermodal/Auto Reliant, and Auto Dependent). This investment framework defines primary, secondary, accommodated and not encourages investments by mode for each station type.
BART Facilities Standards	2015 BART document describing design requirements relevant to station site development, including parking, vehicular and pedestrian circulation, parking structures, and traffic considerations.
BART Station Access Investment Framework	2016 BART Policy designed to support the broader livability goals of the Bay Area, reinforce sustainable communities, and enable riders to get to and from stations safely, comfortably, affordably, and cost-effectively.
BART System Streets	A BART access, circulation, maintenance or service roadway, or other thoroughfare within the BART System right-of-way.
Below-grade	Below the level of the roadway.
Bicycle Access Route	Path of access for passengers to travel by bicycle from the surrounding streets, onto BART property, and to the station entrance.

TERM	DEFINITION
Bicycle Parking	Designated, clear space for short-term and long-term bike storage, separated from impeding traffic (including transit vehicle doors, adjacent sidewalks, and long-term storage facilities). Locate in well-lit areas in full view of sidewalks and pedestrian paths. Class 1 bicycle parking includes spaces in secure, weather protected facilities intended for long-term, overnight, and workday storage. Class 2 bicycle parking includes spaces in publicly accessible, highly visible locations intended for short-term use.
Bike Box	Designated spaces at signalized intersections placed between the stop line and the pedestrian crosswalk that allow bicyclists to queue in front of motor vehicles at red lights. Bike boxes increase the visibility of queued bicyclists and provide them with the ability to start up and enter the intersection in front of motor vehicles when the signal turns green.
Bikeways (all classes)	Portion of the roadway that has been designated by striping, signage, and pavement markings for the preferential or exclusive use of bicyclists. Class I: Paved rights-of-way completely separated from streets, often with a limited number of cross streets and driveways. These paths are typically shared with pedestrians and often called mixed-use paths. Class II: On-street facilities designated for bicyclists using stripes and stencils. Bike lanes may include buffer striping to provide greater separation between bicyclists and parked or moving vehicles. Bike lanes are the preferred treatment for all arterial and collector streets on the bikeway network, and not typically installed on low-volume, low-speed residential streets. Class III: Streets designated for bicycle travel and shared with motor vehicles. While the only required treatment is signage, streets are designated as bike routes because they are suitable for sharing with motor vehicles and provide better connectivity than other streets. Class IV: Protected bike lanes, or cycle tracks, provide space that is exclusively for bicyclists and separated from motor vehicle travel lanes, parking lanes, and sidewalks. Parked cars, curbs, bollards, or planter boxes provide physical separation between bicyclists and moving cars. Where on-street parking is allowed, it is placed between the bikeway and the travel lanes (rather than between the bikeway and the sidewalk, as is typical for Class 2 bike lanes).
Bus Bays	Designated spot on the side of a road where buses may pull out of the flow of traffic to pick up and drop off passengers.
Bus Intermodal	Bus facility accommodating buses and shuttle providing connections at a BART station.
Bus Layover	Dedicated space for buses out of passenger service; bus layover space may be accommodated outside of the station area.
Bus Platforms	Flat concrete pad adjacent to the roadway used to access bus above street grade.

TERM	DEFINITION
Bus Stops	A place where a bus regularly stops, typically marked by a sign. Clearly marked bus stops that call attention to the stop and explain the route.
Bus Travel Lane	Lane within vehicle travel way dedicated to transit vehicle traffic.
Cash Truck Lane	Lane or lanes within vehicle travel that may accommodate armored cash trucks as necessary.
Clear Path of Travel	Unobstructed path for pedestrians (also known as Accessible Paths and Pedestrian Path of Travel).
Continental Crosswalk	Highly visible sets of parallel, white multiple bars across the crosswalk that are perpendicular to the direction of crossing; typically 12 to 24 inches wide and are set 12 to 24 inches apart.
Crosswalk	Walkable street crossing designed to offer as much comfort and protection to pedestrians as possible through close alignment with the pedestrian through zone.
Curb Extension	Curb extensions visually and physically narrow the roadway, creating safer and shorter crossings for pedestrians while increasing the available space for street furniture, benches, plantings, and street trees.
Curb Radii	Curved connection of curbs in the corners formed by the intersection of two streets.
Curb Ramp, Sidewalk Ramp	• Perpendicular curb ramps are placed two per corner and provide the shortest and most convenient crossing. • Parallel curb ramps are oriented parallel to the street and ramp the sidewalk down. • Diagonal ramps are single ramps at the apex of the corner and are discouraged, as they necessitate longer crossings and may require users to travel outside of a marked crosswalk
Detectable Warnings	Surface of truncated domes aligned in a square or radial grid pattern, required by the ADA for curb ramps, hazardous vehicle ways, reflecting pools, and transit platform edges.
Emergency Access Lane	Lane or lanes within vehicle travel that may accommodate emergency service vehicles as necessary (multiple lanes may be shared, including bicycle lanes).
Frontage Zone	Section of the sidewalk that functions as an extension of the building, whether through entryways and doors or sidewalk cafes and sandwich boards. The frontage zone consists of both the structure and the facade of the building fronting the street, as well as the space immediately adjacent to the building.
Furniture Zone	Section of the sidewalk between the curb and the through zone in which street furniture and amenities, such as lighting, benches, newspaper kiosks, utility poles, tree pits, and bicycle parking are provided. The street furniture zone may also consist of green infrastructure elements, such as rain gardens or flow-through planters.
Greenhouse Gases (GHG)	Refers to carbon dioxide, nitrous oxide, methane, ozone and chlorofluorocarbons occurring naturally and resulting from human activities (production and consumption), and contributing to the greenhouse effect (global warming).

TERM	DEFINITION
Handrails	Rail designed to be grasped by the hand for providing stability or support.
High Occupancy Vehicle (HOV)	Vehicles with two or more persons.
Measurement Specifications:	• Minimum allowable dimension defined in the modal facilities standards tables. • Maximum allowable dimension defined in the modal facilities standards tables. • Recommended dimension defined in the modal facilities standards tables, consistent with best practices.
Multimodal	Describing the movement of people and goods beyond an exclusive focus on automobile travel, including transit, pedestrian, and bicycle transport.
Parking Lane	Lane within vehicle travel way dedicated to parked vehicles.
Parking Area	Parking lot or street right of way designated for long and short-term vehicle parking.
Park & Ride	Provides daytime (and sometimes limited overnight) parking for transit customers' automobiles and bicycles. A park & ride may or may not function as a transit center or include transit layover facilities.
Parking Space	Individual space dedicated to vehicular parking.
Passenger Shelter	Facility designed to improve passenger comfort while waiting for transit service. Shelters should be provided at transfer points, at stops in weather-exposed locations or without nearby potential sheltering locations, and at stops with a relatively high use by senior and child passengers.
Pedestrian Barrier	Physical barrier preventing pedestrian access, such as a fence, guardrail, or landscaping.
Pedestrian Safety Islands	Pedestrian safety islands are pedestrian refuges located within a crosswalk, often aligned with a median, designed to limit pedestrian exposure in the intersection reduce crossing distance between protected areas.
Pick-up/Drop-off	Station area designated for passenger cars stopping to load or unload at curbside and/or designed parking areas.
Raised Crosswalk	Crosswalks where roadway level is even to the sidewalk, forcing vehicles to slow before passing over the crosswalk and providing a level pedestrian path of travel from curb to curb.
Roadways	Portion of a highway included between the outside lines of the sidewalks, or curbs and gutters, or side ditches including all of the appertaining structures and all slopes, ditches, channels, waterways, and other features necessary for proper drainage and protection.
Sidewalk	Refers to full pedestrian area of paved path, starting at curb edge.
Sidewalk Zones	Individual sections of sidewalk space, including clear path of travel, frontage zone, and furniture zone.
Single Occupancy Vehicle (SOV)	Privately operated vehicle where the driver is the sole occupant.
Speed Limit	The maximum speed at which a vehicle may legally travel on a particular stretch of road.

TERM	DEFINITION
Speed Table	Midblock traffic calming devices that raise the entire wheelbase of a vehicle to reduce its traffic speed. Where a speed table coincides with a crossing or crosswalk, it should be designed as a raised crosswalk.
Static Coefficient of Friction	Static friction is friction between two or more solid objects that are not moving relative to each other.
Station Agent	BART employee, working at the station to provide information to BART passengers, ensure passenger safety and ensure that station equipment and facilities are operating properly.
Station Agent Booth	Enclosed space where station agent performs job duties, ideally located to allow clear lines of sight from station agent booth to fare gates and station entrances.
Station Area	The area surrounding a BART station described approximately by a circle with half- or quarter-mile radius. (Specific station area boundaries will be established by the District for each project.)
Station Area Entrance	Entrance point from surrounding streets to BART property.
Station Entrance	Entrance point from surrounding streets, parking lot, or intermodal area to the BART structure and fare gates.
Stop Bar	Line at intersection designating where traffic should stop. Stop and yield lines may be staggered longitudinally on a lane-by-lane basis to address sight distance, pedestrian safety, and turning radius for various vehicle sizes.
Transit Oriented Development (TOD)	A type of community development that includes a mixture of housing, office, amenities, retail and/or other commercial development and amenities integrated into a walkable neighborhood and located within a half-mile of quality public transportation.
Traffic Calming	Combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users.
Transit Loading Zone	Dedicated space for rider boarding and alighting.
Transit Lane	Lane within vehicle travel way dedicated to transit service.
Vehicle Lane	Lane within vehicle travel way dedicated to automobile traffic.
Vehicle Miles Travelled (VMT)	Quantitative measure of miles traveled by any vehicle, often a metric associated with fuel and GHG reduction targets.
Vehicle Travel Way	Portion of roadway dedicated for vehicle travel.

BART