

**CRITERIA
ARCHITECTURE**

PASSENGER STATION SITES

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CRITERIA ARCHITECTURE

PASSENGER STATION SITES

I. **GENERAL**

This Section lists the design requirements relevant to station site development, including parking, vehicular and pedestrian circulation, parking structures, and traffic considerations.

1.1 RELATED SECTIONS

Refer to Facility Design/ Criteria/ ARCHITECTURE/ Landscaping and Vegetation Control, for landscaping and irrigation requirements.

Refer to Facility Design/ Criteria/ CIVIL/ Streets and Parking Facilities and Facility Design/ Criteria/ ARCHITECTURE/ Passenger Station Sites.

Refer to Appendices/ District Policies/ Station Area Development Implementation Policy.

Refer to Appendices/ District Programs and Guidelines/ Station Access Guidelines.

Refer to Appendices/ District Programs and Guidelines/ Transit-Oriented Development Guidelines.

1.2 REGULATIONS AND SAFETY REQUIREMENTS

A. Emergency Access to Stations

- *Access to station entrances, pedestrian bridges, facilities, parking structures, and emergency egress locations shall be from public streets, BART parking lots, or an access road with a minimum paved width of 20 feet in accordance with California Fire Code (CFC) Section 503.*
- *An access road to a station shall be continuous from a public street to a public street, or a 66-foot outside radius turnaround shall be provided.*

B. Fire lanes shall be provided, from a public street to the station, through parking lots, meeting the requirements of the CFC, Section 503, and shall have minimum radii for inside and outside paths of 30 feet and 50 feet respectively.

- *Fire truck access shall be provided to all building structures, especially the station entrance. Access roads and parking lot perimeter roads shall accommodate fire trucks. Confirm turning radius and access requirements with local fire department.*

C. Refer to Facility Design, Criteria, CIVIL, Basic Design Policies, for Underground Trainway Protection Against Hazardous Substance Intrusion

1.3 DEFINITIONS

Terms used in this Station Site Facilities Design Criteria.

- **Access Roadway:** A BART System roadway which is the primary means of vehicular access to a BART facility from the adjoining street and highway network.

- **BART System Street:** A BART access, circulation, maintenance or service roadway, or other thoroughfare within the BART System right-of-way.
- **Drop-Off Pick-up:** Vehicle mode in which passenger cars stop only to load or unload passengers at curbside and/or designed parking areas.
- **Level of Service (LOS):** Description of the ease or difficulty of traffic flow.
- **Public Street:** A public thoroughfare inside, outside or crossing the BART System right-of-way which is under the jurisdiction of a public agency.
- **Roadway:** That 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.
- **Station Access Hierarchy:** The order of priority, by mode, of accommodating station access established by the District and defined in the Access Guidelines. Refer to Access Hierarchy Chart.
- **Station Area:** The area surrounding a BART station described approximately by a circle with half-mile radius. The actual boundaries of the station area will be established by the District for each project.
- **Volume, Pedestrian:** The pedestrian volume, measured in terms of number of pedestrians per unit of time (usually a peak hour, peak 15 minutes or peak 5 minutes). Pedestrian volumes generated by BART System patrons shall be determined from data provided by the District. Pedestrian volumes not generated by BART System patrons shall be obtained from the appropriate agency as available.
- **Volume, Vehicular:** The vehicular volume, measured in terms of number of vehicles per unit of time (usually an average weekday peak hour, peak 15 minutes or peak 5 minutes). BART system vehicular design volumes shall be determined from data provided by the District. Vehicular volumes on public streets shall be obtained from the appropriate public agency as available.

1.4 BASIC GOALS

- Accommodate all modes of BART patron circulation without compromise to quality of transit service, capacity of the station, and safety of riding public.
- Prioritize modes of BART patron circulation consistent with BART's Station Access Hierarchy to allow for convenient, rapid, and safe access to and egress from the station, parking facilities, and the surrounding neighborhoods.
- Use innovative approaches and best practices to design a station site that is a community-oriented, lively, walkable, and sustainable human environment.
- Design of a passenger station site may include studies for future joint development opportunities between the District and other entities to increase property value and maximize use of BART services. Such study may explore potential joint uses of additional

properties adjacent to a passenger station that can be potentially subject to the District's acquisition.

- Provide access for patrons with disabilities as required by State and Federal statutes. Also provide additional accessible amenities as required by the local disabled communities and as required by the District.
- Site shall be designed in accordance with Appendices/ District Programs and Guidelines/ Station Access Guidelines and designed to be supportive of Transit-Oriented Development. Refer to Appendices/ District Programs and Guidelines/ Transit-Oriented Development Guidelines, and Appendices/ District Policies/ Station Area Development Implementation Policy.

1.5 TRAFFIC MODES

BART System patrons will arrive at, and depart from, the station in five basic ways or modes. The primary modes, in order of priority (Station Access Hierarchy) for convenience and directness of routing, are as follows:

- Pedestrian
- Other transit systems, i.e. bus, light rail, and shuttles
- Bicycle
- Drop-Off Pick-up (patrons are dropped off or picked up 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)

2. PEDESTRIAN AND BICYCLE ACCESS

2.1 PEDESTRIAN ACCESS – BASIC DESIGN

- A. Direct and safe approach for pedestrians shall be provided from all adjacent streets into the station area. A pedestrian's path from bus drop-off areas and light rail stops to station entrance shall be as direct as possible. The design of pedestrian approaches from parking areas to the station entrances shall be contingent upon the location of other, more primary station area pedestrian walkways serving the Station Area and the location and orientation of station area development.
- B. Parking pattern shall be designed so the pedestrians walk down the aisles toward the station, minimizing traffic crossings, or along a major walkway.
- C. Pedestrian walkways shall be provided in certain locations to discourage interference with vehicular traffic. Walkways may be provided to minimize pedestrian use of an aisle, or may be provided to minimize the number of points at which pedestrians cross a circulation road. Where pedestrians approach the station from major on- and off-site destinations and important intersections, consideration shall be given to the provision of a walkway which extends toward the station in a nearly straight line.

Aisles serving pedestrians who originate from outlying parts of a large parking lot shall be designed to support the walkway described above, where feasible. Where this is not feasible, consideration shall be given to provision of an additional walkway extending toward the station entrance from these outlying parking areas.

- D. Pedestrian crossings shall have good visibility both for pedestrians and drivers.
- E. Surface Treatment:
 - 1. Pavers, tiles, and other architectural materials shall be considered for creating attractive walking environment and enhancing zones and sense of direction that are associated with functional areas such as drop-off pick-up, other transit stops, as well as disabled access and very young-aged activities. Landscaping should be used to effectively reinforce this association.
 - 2. The major pedestrian walks and the areas in front of the fare gates should have special paving to signify the prominence of these areas.
 - 3. An open area with architectural floor or paving treatment shall be provided to collect pedestrians from the major walkways and allow a milling area adjoining the entry or exit from the station. Changes in texture or color of the vehicular paving at pedestrian crossings should be considered.
- F. Barriers: If necessary, pedestrian barriers shall be provided to either discourage or prevent pedestrians from crossing vehicular traffic at locations where unsafe conditions would otherwise result. Pedestrian barriers may consist of railing, fencing, walls or landscaping that are architecturally harmonious with the site.

2.2 **GENERAL – ACCESSIBILITY AND SAFETY**

- A. *Pedestrian walkways shall be paved and free of tripping hazards.*
- B. A 1 foot wide minimum paving feature strip which incorporates a material, pattern, or texture detectable to blind and low-vision patrons shall be provided from bus loading and drop-off pick-up area(s) through the station main entrance and accessible fare gate(s) to the stairs leading to the platform level. The feature strip shall provide a clear unobstructed linear pathway with 90 degree or greater turns. Arcs or curves are not allowed. Strip shall be raised a minimum of 1/8 inch to a maximum of 1/4 inch above adjacent paving and shall be a color, texture and material that contrasts with the adjacent paving.
- C. *Wheelchair curb ramps, complying with the CBC, Section 1127.B.5, shall be provided wherever a pedestrian traffic lane 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.*
- D. Pedestrian crossings which are part of an accessible route shall be emphasized with concrete pavement raised one-half inch above roadway with 12-inch thermoplastic edge markings to avoid confusion with other pavement markings. The width of the crossing shall be at least equal to the width of the adjacent pedestrian walks, but not less than 7 feet in width.

- E. *Crosswalks shall be clearly defined and well marked. Crosswalks and sidewalks shall be provided with slip-resistant surfaces. The static coefficient of friction shall not be less than 0.6 when tested in accordance with ASTM C1028, Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method, 15.02. "Zebra Stripe (Continental)" pavement marking shall be used for crosswalks to provide maximum visibility.*
- F. Where direct connections to commercial, retail, or residential facilities are provided or where elements are provided to facilitate future direct connections, such connections shall have an accessible route to boarding platforms and other transportation system elements used by the public. Refer to ADA Guidelines, 402 and 206.4.4.2.
- G. *Walkway Fencing*
- *When passengers or pedestrian walkways are provided above trackways, highways, or streets, the walkways shall be fenced.*
 - *The walkway fence shall be constructed in accordance with Caltrans Bridge Design Details — Chain Link Railing Type 3, Chain Link Railing Type 3L, or Chain Link Railing Type 4 (or use other design details which will provide equal or better means of preventing persons from climbing over it and falling to the surface below, and preventing trash or other objects from being thrown onto the trackway).*
 - *Walkway fencing will be so designed to provide a timeless aesthetic, and a positive experience for pedestrians and motorists.*

2.3 **PEDESTRIAN OVERPASSES AND UNDERPASSES - GENERAL**

- A. Avoid or minimize pedestrian overpasses and underpasses.
- B. Provide features that maximize safety and protection of pedestrians when an overpass or an underpass is necessary.
- C. 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.
- D. *When a pedestrian overpass or underpass is part of the exit way, the minimum unobstructed width as required by code for exiting shall be maintained to a point of safety.*
- E. *Comply with code requirements in regard to fire resistance. Fire resistance of construction materials, at minimum:*
- *Overpasses shall be constructed of "fire resistive materials".*

- *Underpasses shall be constructed with "non-combustible materials".*

F. Finishes of overpasses and underpasses shall be durable and maintenance-free.

2.4 PEDESTRIAN OVERPASSES

- A. 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 feet 6 inches to minor obstructions and 10 feet to continuous soffits/ceilings.
- B. For the primary drainage system, the overhead covering shall be sloped and drained by screened roof drains and downspouts rather than by naturally draining over roof edges. Downspouts shall be concealed.
- C. Drainage of the walking surface shall be designed so that water does not flow over the side edges, but is channeled into an internal system.
- D. A toe guard of 6 inches minimum height shall be provided at the overpass edge which will also function as a wheel guide for those in wheelchairs.
- E. Pedestrian overpasses shall be as level as possible. When ramping is necessary, the slope shall be no greater than 1 foot vertical in 15 feet horizontal.
- F. *When overpasses are over trackways, highways, or streets, barriers shall be provided to prevent persons from climbing over and falling to surface below, and to prevent trash and other objects from being thrown to the surface below. When barriers are combined with overhead coverings, provisions for ventilation shall be included in the design.*
- *Barriers shall be a minimum height of 8 feet.*
 - *When an open material or design is used as a barrier, the openings shall not be larger than 1 inch in any dimension.*
 - *Barriers shall not be opaque.*
- G. Handrails shall be provided at both sides of the overpass whether or not a barrier is provided and regardless of slope or lack of slope.
- H. Benches shall be provided at 150-foot intervals.

2.5 PEDESTRIAN UNDERPASSES

- A. Minimum head clearance shall be 8 feet 6 inches to minor obstructions and 10 feet to continuous ceilings. The ceiling shall be as high as practical.
- B. The entire underpass enclosure structure shall be waterproofed on the exterior surface.
- C. Surface drainage system of area drains or trench drains shall prevent surface water from entering pedestrian undercrossings.

- D. Underpasses shall be lighted and include call boxes for safety.
- E. Underpasses shall be designed to maximize accessibility, usability, and friendliness for pedestrians.

2.6 SIDEWALKS

- A. Sidewalks shall include curb ramps and other accessibility features as required by CAC Title 24, and 49 CFR 37. A sidewalk shall be provided contiguous to all curb-side parking lanes and to all loading zones. Crosswalks and pedestrian ramps shall have a maximum slope in conformance with Title 24 and ADAAG requirements.
- B. Sidewalks intended for use by the general public shall have a minimum width of 5'-6" for two-way pedestrian volumes (two-direction total count) not exceeding 70 pedestrians per minute. Where pedestrian volumes exceed this amount, an additional two feet six inches of sidewalk width shall be provided for every additional 35 pedestrians per minute. The minimum width of sidewalk adjacent to a bus, taxi, or drop-off pick-up loading zone shall be 12'-6" or the adjacent sidewalk width plus seven feet, whichever is greater.
- C. Sidewalks providing access to service and maintenance facilities shall have a minimum width of three feet.
- D. Sidewalks, paths, and plaza areas that are designed to allow for mixed-use, including bicycle and pedestrian traffic, shall be at least 10' to 14' wide, depending on pedestrian and bicycle volumes. Refer to AASHTO Standards "Guide for the development of bicycle facilities," pp. 35-36.

2.7 PEDESTRIAN PAVING

- A. Provisions for pedestrian paving apply to sidewalks and other pedestrian areas, i.e. pedestrian overpasses and plazas.
- B. Finishes on all paving and steps shall be slip resistant and matte with adequate expansion and control joints. Exposed aggregate concrete shall not be used in pedestrian paving at station site because of the difficulty and expense in matching it with replacement concrete when necessary due to utility work or repairs.
- C. The longitudinal slope of walkways shall be 5 percent maximum. Minimum grades for adequate surface drainage of various paving materials are as follows:
 - Broom finish concrete, 1.5 percent
 - Asphalt, 1.5 percent
 - Brick or stone set in sand, 2 percent
 - Brick or stone set in mortar, 1.5 percent
 - Crushed stone, decomposed granite, 1 percent

- D. Design of pedestrian walkways shall take into account maximum cross slopes designated in California Code of Regulations, Title 24, Part 2, and Americans With Disabilities Act (ADA) Accessibility Guidelines, as applicable.

2.8 BICYCLE BASIC DESIGN

- A. The design of bicycle facilities shall reflect principles stated in the BART Bicycle Access & Parking Plan, and BART Station Access Guidelines.
- B. Bicycles approaching the station structure shall be able to reach the main entrance by a safe and relatively direct route. Parking for bicycles shall be prioritized inside the paid area as space permits, or in the free area of the concourse within sight of the station agent. Parking for bicycles outside of the station 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.
- C. Bikeways shall be designed to provide a direct, convenient connection between the station and any existing or proposed bike routes throughout the community.
- D. Bikeways shall avoid undue conflicts with motor vehicles moving parallel to the path, turning across the path, and crossing the bikeway at street intersections.
- E. Bikeways shall be designed to promote public safety. Paths that are hidden from the view of the general public shall be avoided as well as bikeways near steps, curbs, and over drainage grates.
- F. Bikeways shall be designed to pass through an uninterrupted corridor with access to station bicycle parking facilities. Pavement shall be asphalt or concrete, or pavers. Where bikeway is an continuation of a jurisdictional authority's bikeway, consideration shall be given to matching its paving.
- G. Attended bicycle storage facility shall be provided if directed by the District.
- H. Accessible fare gates shall be installed at every gate array to improve access for bicyclists as well as to provide for patrons with disabilities.
- I. Signage directing bicyclists throughout the station shall be placed to provide for general wayfinding and directions to bicycle facilities, preferred routes, bicycle stair channels, elevators, etc.

2.9 BICYCLE PATHS

- A. When it is not a part of a walkway, a bicycle path shall have a width of 8 feet. Additional width may be justified for heavily used paths or those adjacent to a walkway. Paths shall have a minimum of 2 feet clearance from the edge of any permanent obstacle. Refer to Caltrans Highway Design Manual, Chapter 1000 "Bikeway Planning and Design". Follow Caltrans standards at minimum; in areas with high volumes of bicycle and pedestrian traffic exceed minimum standards for safety.

- B. Bicycle paths shall be crowned or shall have a cross slope for positive drainage. Bicycle paths will generally not be curbed. If curbs are necessary, inlets or other drainage provisions shall be provided (preferably on the outside edges) and consideration shall be given to widening the path to maintain the 8 foot width not including the inlets. All inlets shall have bicycle-proof grates.
- C. Bicycle paths shall avoid unnecessary curvature or excessively steep grades. Gradients for bike paths shall comply with the following requirements:

<u>Gradient</u>	<u>Normal Length, Feet</u>	<u>Maximum Length, Feet</u>
1.5 %	1200	---
3.0 %	400	800
4.5 %	150	300
10.0 %	30	60

- D. Horizontal curve radii will be measured on the inside edge of the path. The desirable minimum curve radius is 35 feet; the absolute minimum curve radius is 15 feet.

2.10 BICYCLE SIGNAGE

- A. Wayfinding signage should be posted on the closest arterial and bikeways to connect cyclists to the station along the most bicycle-friendly routes. Bicycle routes and signage shall be coordinated with local jurisdictions. Refer to Bicycle Access and Parking Plan for guidelines.
- B. Based upon the adjacent roadway configuration and location of existing bikeways, a separate bicycle entrance to the station may be preferable and available; these should be identified and clearly marked.
- C. Signage is needed to direct bicyclists into and through the station area and to the bicycle parking areas or onto the platform itself.

2.11 BICYCLE PARKING

- A. Either Class 1 or Class 2 bicycle parking shall be provided at each station. In new construction, both Class 1 and Class 2 shall be provided.
- B. Bicycle parking shall not interfere with passenger circulation and shall be located outside the path of travel for people with disabilities. If necessary, paving, curbs, or railings shall be used to provide a detectable warning for the visually impaired.
- C. Both Class 1 and Class 2 bicycle parking shall be clustered as much as possible for convenience and theft prevention.
- D. Class 1 bicycle parking shall consist of perforated metal bicycle lockers that include an electronic locking system accessed by smart card. 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.

- Obtain current specifications for bicycle lockers from the Bicycle Program Manager.
 - Bicycle lockers shall be installed on a concrete or asphalt platform with a maximum slope of 1.5 percent. Other surfaces may be approved if compatible with locker installation requirements.
 - Electrical design shall provide a 1-inch conduit with pull wire from electrical equipment room to designated bicycle parking area with necessary junction boxes to serve electronic bicycle lockers.
 - Communications design shall provide a 1-inch conduit with pull wire from communications source to designated bicycle parking area with necessary junction boxes to serve electronic bicycle lockers.
- E. 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.
- F. Class 2 bicycle parking consists of bicycle racks. Primary locations for bicycle racks shall be in either the paid or the free area of the concourse and within sight of the station agent's booth, if space permits. Secondary locations for bicycle racks shall be visible and well lighted areas as near as possible to the station entrance. Racks shall be located in areas of high pedestrian activity and visibility.
- Obtain specifications and typical installation details for racks from the Bicycle Program Manager.
 - Class 2 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 U type racks. Five loop wave racks shall be used where U racks are not practical.
 - For outdoor installations, cover bicycle racks with a roof or locate under a structural overhang wherever possible.
- G. Bicycle parking facilities shall be identified by signage in accordance with Facility Design/ Criteria/ ARCHITECTURE/ Wayfinding and Signage.

3. VEHICULAR ACCESS

3.1 GENERAL

- A. Refer to "Regulations and Safety Requirements" herein for fire truck access criteria.
- B. *Site access points shall be located to minimize traffic congestion, and traffic patterns for vehicles and pedestrians shall be clearly marked.*

- C. *Automobile traffic patterns that cross or result in counterflow shall be minimized.*
- D. *Drop-off/pick-up zones and stops of other transit systems shall be located to minimize patron exposure to traffic. Where practical, patrons shall be able to move directly from zones and stops of other transit systems to the station entrance without crossing traffic lanes.*
- E. Placement of loading zones on access roadways shall reflect the following order of preference with respect to proximity of the loading zone to the station concourse:
 - 1. Other transit systems, i.e. buses, light rail, and shuttles
 - 2. Drop-off pick-up
 - 3. Taxis
- F. Location of bus and taxi loading zones:
 - 1. Loading zones for buses and taxis shall be separate and located on station access roadways wherever practicable. Where such a location is not practicable, the loading zones in order of preference may be located within a special area or upon a roadway reserved exclusively for loading purposes, or they may be located on an adjacent public street.
 - 2. Loading zones for buses and taxis shall preferably be located along that side of a roadway or street which is nearest the station concourse entrances.
- G. Vehicular entrances shall be so located that the traffic loads will be evenly distributed over all traffic facilities surrounding the site.
- H. The number of vehicular entrances along any one street shall be kept to a minimum.
- I. Turn lanes that cross major pedestrian walkways shall generally be discouraged. However, if specifically required for traffic mitigation, turn lanes shall be provided for entering or exiting vehicles and controlled by signs or signals to prioritize pedestrian access. Push-button activation for pedestrians which subordinate automobile traffic to pedestrian traffic should only be used as a last resort on turn lanes when it cannot be demonstrated that pedestrian-priority devices such as stop signs, tight curb radii, and sidewalk bulbs are reasonably safe alternatives.
- J. The spacing of right-hand-turning points is less critical than left-hand-turning points. The minimum spacing shall be determined by the storage and weaving length as required by street pattern and traffic.
- K. Use speed limit restrictions to enhance pedestrian access.
- L. An access road with a minimum paved width of 20 feet shall be provided for access to the station main electrical rooms. A minimum clear area of 30' by 50' adjacent to the main electrical rooms shall be provided for future replacement of large electrical equipment and temporary generators.

3.2 VEHICULAR ACCESS PRINCIPLES

- A. Vehicular entrances shall be from minor roads wherever possible, with provision for sufficient waiting and stacking space provided at intersections with major roads.
- B. Entrance and exit roads for station parking facilities are recommended to be separate from bus and auto drop-off circulation systems.
- C. Right turns in and out of the station are preferable to left turns. A left turn in is less objectionable than a left turn out.
- D. The separation of left turns in and out is desirable, where the length of frontage permits.

3.3 OTHER TRANSIT SYSTEMS INCLUDING BUSES, LIGHT RAIL AND SHUTTLES

- A. Whenever possible, stations should be located within the existing fabric of an urban center. 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 wherever possible.
- B. If the station design requires rerouting through routes to the station, transit service in and out of the station site shall be as direct as possible. A “transit street” serving the station site shall be identified. For through routes, curb bulb-outs shall be provided, whenever possible, to allow these routes to stop in-lane. These transit streets shall not feature angled parking for either cars or busses, and shall not be designated as key bicycle routes. Where bus turning is required, curb radii shall be adequate to allow for turning without crossing the centerline. Station transit streets shall generally be two-way streets allowing for transit travel in both directions.
- C. An exclusive area for bus loading and unloading shall be provided near the main station entrance to facilitate BART patrons to access BART services.
- D. The path from the bus loading and unloading area to the station entrances shall be as short and direct as possible.
- E. Loading and unloading area shall be located away from residential areas when practical.
- F. Buses which terminate at the station shall be able to move from the unloading area to a waiting area and back to the loading area without excessively circuitous travel.
- G. If a BART station is located adjacent to a light rail station, the path from light rail station to BART station entrance shall be as short and direct as possible. In addition, the bus loading zone shall be located to facilitate transfers between buses and light rail.

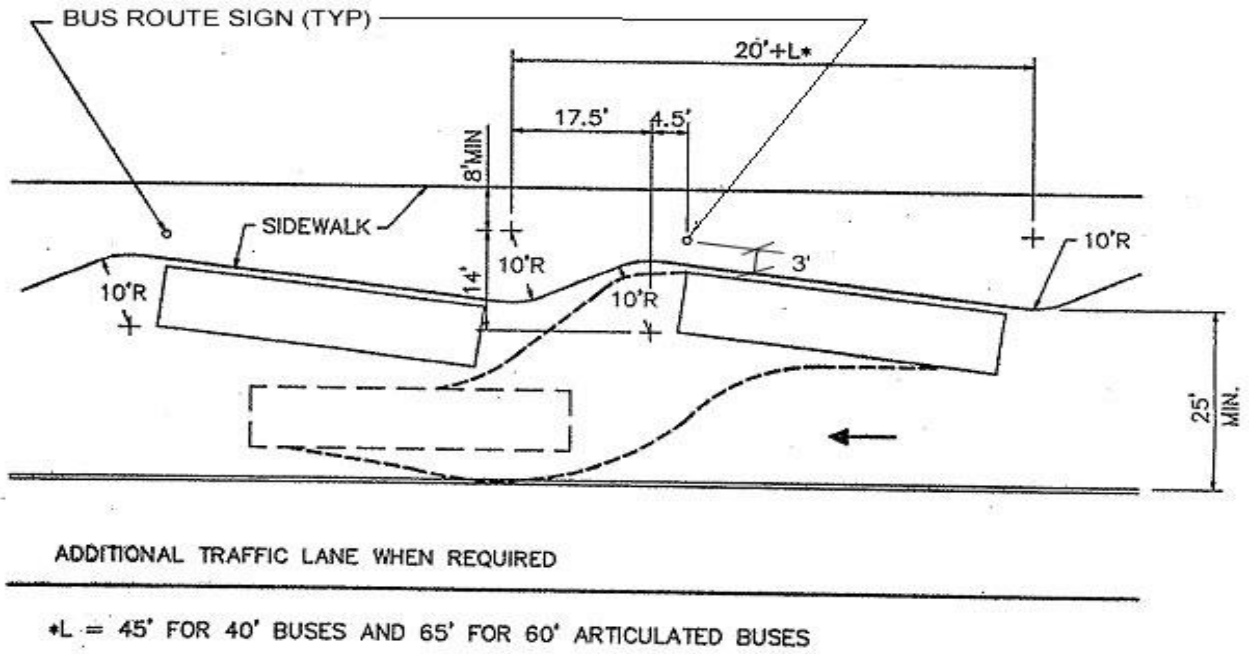
3.4 DROP-OFF PICK-UP (INCLUDING TAXIS)

- A. Drop-off pick-up is defined as the vehicle mode in which passenger cars stop only to load or unload passengers at curbside or designated parking areas. A canopy for weather protection shall be considered.

- B. A drop-off pick-up zone, preferably with loading on the right-hand side, shall be provided adjacent to the main entrance of the station. A curb ramp shall be provided within or adjacent to the drop-off pick-up area for patrons with disabilities.
- C. The drop-off pick-up parking area shall be more convenient to the main station entrance than the other parking areas. It shall have a convenient approach and departure from all directions. This parking area for persons waiting to pick up passengers shall be conveniently located close to the pick-up zone to give good visibility of the station exit, and to permit easy re-circulation.
- D. The drop-off pick-up area shall be designed for one-way traffic.
- E. The length of the drop-off and pick-up zone and the number of drop-off pick-up parking spaces will be established based on station capacity, other access modes on site, and as approved by the District.

3.5 **BUSES AND TAXIS**

- A. Capacity: The required bus or taxi design capacity for a station will be established by the District. The minimum design capacity for any bus loading zone or any taxi loading zone shall be two vehicles.
- B. *Boarding and off-loading of bus patrons shall be protected from vehicular traffic. Where practical, bus loading and unloading zones shall be located so that patrons do not have to cross traffic lanes. Where this is not possible, bus patrons can be protected by:*
 - *Prohibiting automobile traffic in bus loading areas or,*
 - *Providing controlled crosswalks (controlled by stop signs) to permit bus patrons to safely cross vehicular traffic lanes.*
- C. Bus stop design and choice of stop type shall be made in cooperation with local bus operators. The stops will reflect the design criteria of local operators as much as possible.
- D. Sawtooth platform arrangement shall be as illustrated below. Note: Consider sharpening radius to make curb detectable to sightless pedestrians.



SHALLOW SAWTOOTH PLATFORM
BUS LOADING ZONE

FIGURE 1. SHALLOW SAWTOOTH PLATFORM BUS LOADING ZONE

- E. Provide bus bollards at the head end of each sawtooth bus bay capable of stopping a 60 foot articulated coach at 15 mph in accordance with FTA regulations.
- F. Bus loading areas shall have adequate clear space to allow for deployment of a wheelchair lift from either the front or rear bus doors. Provide a continuous unobstructed loading zone along the entire length of bus berth curb(s). Zone shall be area from face of curb to minimum 8 feet back from the curb. Designer shall verify requirements with the bus transit system.
- G. Flow of water at bus loading zones shall be minimized in order of preference: first by sloping the pavement away from the curb, and second by providing sufficient inlets.
- H. Passenger shelters shall be provided. The shelter shall be 8 feet to 10 feet high and its canopy shall be located no closer than 2 feet 6 inches from the face of curb.
- I. Weather protection, including canopies, shall be provided for passengers from the bus stop to the station entrance point.
- J. All bus stops shall have signs on poles at the head of the stop.
- K. Taxi zones shall have a minimum lane width of eight feet. Parking spaces for taxis shall be 25 feet long and shall not be closer than 20 feet to a crosswalk.

3.6 STATION PARKING BASIC DESIGN

- A. The design layout of parking facilities shall be based on the following BART operations policies:
 - 1. Entrance to the parking facilities will be available to the public at all times. Each parking facility shall have multiple points of entry and exit.
 - 2. The principal objective is to provide as convenient and inviting access as possible to BART patrons.
 - 3. Parking Areas shall consist of Mid-Day Parking, Reserve Parking, Handicapped Parking, Motorcycle Parking, Bicycle Parking, and, if applicable, Long-Term Parking. Guidelines for Handicapped Parking, Motorcycle Parking, and Bicycle Parking are given elsewhere in this Section.
 - 4. Designated Mid-day Parking Areas: The need for reserved parking space for shoppers at non-commute hours is recognized by the District, and site planning shall include provisions for this facility. Allowable hours for parking in the designated Mid-Day Parking area are limited to a prescribed time. A portion of each parking facility, as established by the District, shall be designated as mid-day parking. This area shall be located in the portion of the parking lot closest to the station entrance and shall, in general, include all Reserve Parking areas after the morning “reserve period” has expired.
 - 5. Fencing: Perimeter fencing will not be provided for suburban station parking lots as a general rule. Where local ordinances require this, the matter should be referred to the District for resolution on an individual basis. Plans shall not

- include provisions for fencing off remote parking section during nights, weekends, or holidays.
- B. Capacity: Parking facility capacities will be established by the District, based on a consideration of patronage estimates and budget limitations.
 - C. Capacity for Parking Expansion: The District will base its parking expansion strategy on the principle of establishing expansion parking goals on a line segment rather than strictly on a station by station basis in order to balance development and access objectives.
 - D. Circulation: The system of traffic circulation produced by the arrangement of parking aisles and stalls shall be designed to minimize vehicular travel distances, conflicting movements, and number of turns.
 - E. Reservoir Areas: Every entrance and exit to a parking facility shall be provided with a reservoir area for the storage of entering and leaving vehicles. The storage of vehicles entering or leaving the parking lot shall not interfere with the normal activity of parking and unparking of vehicles at stalls. The size of every reservoir area shall be sufficient to store the number of vehicles that enter or leave the parking lot during the peak hour in conformance with queue length requirements dictated by the LOS calculation.
 - F. If required by the District, make accommodations for future paid parking at surface parking areas. Refer to “Parking Structures”, for required provisions for future paid parking at parking structures.
 - G. Planted Areas. Planted areas shall be provided within parking areas and at perimeters except where the provision of such areas is incompatible with surrounding development and is approved by the District. Planted areas at lot perimeters shall typically be 15 feet wide. Refer to Introduction, COMMON REQUIREMENTS, Environmental Design and Sustainability, for requirements in regard to possible use of shade trees to reduce non-roof heat islands.

3.7 STATION SURFACE PARKING

- A. Parking layout requirements shall comply with the applicable provisions of Article 5. PARKING STRUCTURE, 5.4 LAYOUT, in this Section. Grading and other requirements for surface parking are included in Facility Design, Criteria, CIVIL, Streets and Surface Parking.
- B. Wheel stops within each parking space unit shall not be used except at accessible parking spaces.
- C. Accessible parking spaces (designated for use by the physically impaired) shall be located close to the facility entrance and shall not require crossing traffic lanes nor require patrons to move behind vehicles. A path shall be provided in front of vehicles leading from accessible parking spaces to accessible route. The minimum number of accessible parking spaces shall be in accordance with the CCR, State Building Code, Title 24, Part 2, Americans with Disabilities Act (ADA) Accessibility Guidelines, or 41 CFR Chapter 101, Appendix A, whichever requires the greater number of spaces.

- D. All stalls shall be numbered sequentially.
- E. Alpha Designators: Each lot shall have its own discrete alpha designator. Signs indicating the lot designator shall be provided on the associated lighting standards.
- F. Clearances:
- Minimum vertical clearance between any overhead obstruction and parking lot surfaces shall be 15 feet, except that an eight foot six inch clearance may be used for stalls provided that vehicular passage beneath the structure restricting the clearance is prevented by curbs, fencing or an equivalent type of barrier.
 - At the head end of parking stalls, horizontal clearance shall be two feet six inches from the front face of curbs or wheel bumpers to any obstruction. At the side of stalls, no horizontal clearance need be provided between stalls and obstructions except at walls, where a one foot clearance shall be provided.
- G. Parking along BART System roadways: Parking on BART System roadways shall be parallel to the curb. Parking spaces for passenger cars shall not be closer than 20 feet to a crosswalk.
- H. Curbs and Medians:
- Curbs shall be provided around the entire outer edge of parking lot pavement to protect landscaping or fencing from vehicular damage. Curbs shall also be provided along circulation roads, at raised concrete medians, and at intermediate points in the larger lots as necessary. Exposed corners of curbs shall have a minimum radius (to inside face of curb) of 12-inches. Curb return radii not intended to permit turns shall be 5 feet. Curb return radii permitting turns for passenger cars shall be 20 feet.
 - Where columns supporting structures are to be located in a parking lot, a raised concrete island shall be provided between head ends of abutting stalls. Curb shall provide a minimum 2 foot 6 inch clearance between face of curb and column.
 - Curbs and tree pocket curbs shall be a minimum of 6 inches high.
 - All curbs not designated for parking shall be painted the appropriate color (yellow, red, etc.).
 - Where the side of a parking stall is edged with a curb and planting area, provide an 18 inch wide paved strip along the inside face of curb or increase the width of the parking stall accordingly to help prevent patrons from stepping into planters when entering and exiting vehicles.
- I. Designate the following reserved vehicle parking spaces for District and Police use. Locations as approved by the District.
- One car stall near the Police Room, if applicable, shall be designated for "Police Only."

- Two car stalls shall be designated for "Staff Only" and located near the station employee entrance/exit.
- Two stalls shall be designated for "Maintenance Only" and located near the ancillary rooms.
- Parking at terminal stations containing "End of Line" Facilities shall provide 30 dedicated spaces for personnel using these facilities.
- Parking at front entrance of station for cash collection tractor trailer.

3.8 MOTORCYCLE PARKING

- A. Separate parking areas for motorcycles shall be provided at each station.
- B. At minimum, provide four motorcycle spaces.
- C. Motorcycle parking shall be separated from automobile parking by curbs or bollards to prevent automobile parking in motorcycle spaces.

3.9 ENTRANCES AND EXITS

- A. Entrances or exits shall not be closer than 150 feet apart and not closer than 150 feet to a public intersection, all measured centerline to centerline. Where the capacity of the parking area does not exceed 150 stalls, the above spacings may be reduced to 100 feet. Entrances and exits shall preferably be located so that they are available for use by vehicles with any applicable direction of approach from the adjacent street, or any applicable direction of departure onto the adjacent street.
- B. A sufficient number of entrances and exits shall be provided so that the volume per lane does not exceed 300 vehicles per peak hour. The number of entrances and exits shall be kept as few as circulation requirements indicate necessary, but not less than 2 of each. Continuous curb access shall not be provided under any circumstances.

4. BART SYSTEM STREETS

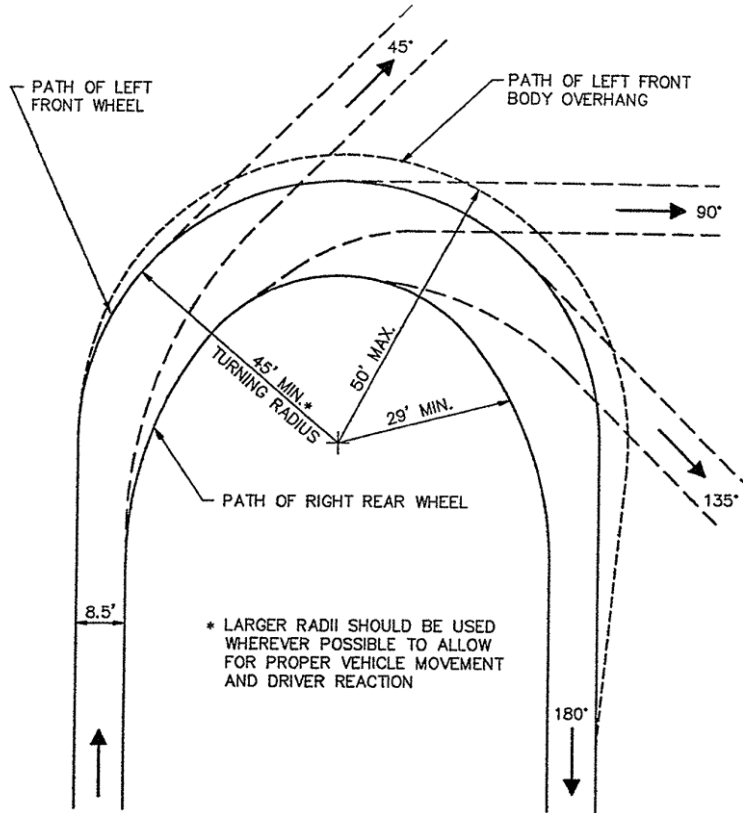
4.1 BART SYSTEM STREETS BASIC DESIGN

- A. 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. Where these roadways are one-way and have only a single traffic lane, the roadbed width shall be 12 feet, except if the roadway is for the exclusive use of buses or is a fire lane the roadbed width shall be 20 feet. (Note, one-way access roadways shall have a minimum of two traffic lanes.) Lane width in all other cases, shall preferably be 12 feet, but shall not be less than 11 feet.
- B. Roadways to be used by emergency fire fighting equipment shall be a minimum of 20 feet wide and are subject to review and approval by the local fire protection jurisdiction.
- C. Roadway width in all cases shall be exclusive of the gutter width where gutters occur.

- D. Level of service (LOS) for intersections of BART system roadways with adjacent public roadways shall conform to LOS standards of the public agency having jurisdiction over the public roadway, or shall conform to alternative, accepted measures for evaluating traffic performance that favor transit access or pedestrian mobility and are recognized by the jurisdiction. Level of service for intersections of BART system roadways within BART right-of-way shall generally be at a "C" designation, and at a "D" during peak hour.
- E. Traffic Medians. The minimum width of a median within a two-way access roadway shall be four feet curb face to curb face, except that the width of medians designed as an integral part of a left-turn storage lane may, when space is limited, be reduced to a minimum of two feet. Two-foot wide medians shall not be used if the installation of a lighting standard or traffic signal standard within the two foot wide section of the median is planned or appears probable in the future. If a push button signal post is warranted, the minimum width of median shall be six feet. If either or both sides of a median strip are to be utilized for curbside parking and the subsequent loading and unloading of passengers, the median shall have a minimum width of 12 feet, curb face to curb face. Isolated raised traffic medians shall be not less than 15 feet in overall length.

4.2 DESIGN VEHICLES AND DESIGN SPEED

BART System roadways shall be designed to accommodate passenger cars, single unit trucks, fire trucks, or buses, as applicable. The dimensions and turning paths for passenger cars, single unit trucks, and fire trucks shall be as per "A Policy on Geometric Design of Highway and Streets," by AASHTO, and those for buses shall be as illustrated below:



BUS

DESIGN VEHICLE AND MINIMUM TURNING PATHS

FIGURE 2. BUS DESIGN VEHICLE AND MINIMUM TURNING PATHS

Designer shall verify dimensions and turning paths of buses with the appropriate bus transit authorities. The design speed for BART System roadways shall not exceeding 15 miles per hour.

4.3 CLEARANCES

Minimum vertical clearance between any structure and street surface shall be 15 feet. Minimum horizontal clearance between any structure and inside face of curb, or edge of shoulder, shall be two feet six inches, except that this clearance may be reduced to two feet at signs, fences, base of light standards, and at pedestrian barriers. Sidewalk clearances shall be in accordance with California Code of Regulations, Title 24, Part 2, and ADA Guidelines.

4.4 CURVATURE

The radius of horizontal curves, measured to the center of the traveled way, shall be not less than 150 feet, except as specified in under "Intersections" herein. In special purpose areas and roadways, where the design is sufficiently restrictive so that speeds will not exceed seven miles per hour, the applicable design vehicle turning path shall be used.

Parabolic vertical curves shall be used to effect a gradual change between breaks in street grade. The minimum length of vertical curve on roadways shall be determined from the following formula:

$L = KA$, but not less than 75 feet where:

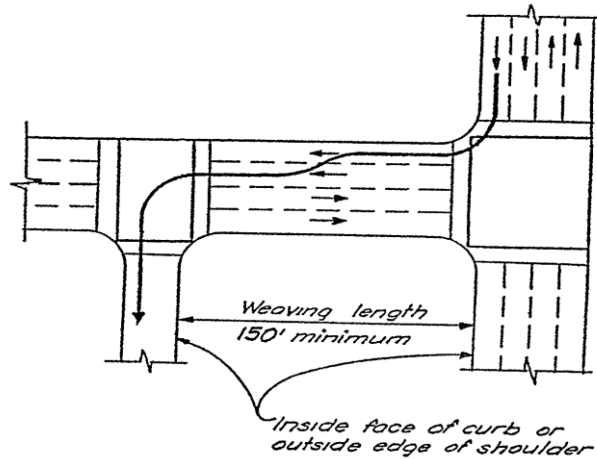
L = Length of curve, feet

A = Algebraic difference in grades, percent

K = 28 for crest curves, 20 for sag curves

4.5 WEAVING LENGTH

Where vehicles must move across the path of other vehicles moving in the same direction, a minimum weaving length shall be provided as shown below:



Note Weaving length shown is for one lane of transition Add 75 feet for each additional lane of transition

WEAVING LENGTH

FIGURE 3. WEAVING LENGTHS

4.6 GRADE

The maximum grade of BART System streets for public use shall be preferably eight percent or less, but shall in no case exceed 10 percent. The minimum grade of streets shall preferably be 0.50 percent but shall in no case be less than 0.30 percent.

4.7 INTERSECTIONS

4.7.1 General.

- A. No intersection shall be closer than 150 feet, measured centerline to centerline, to any other intersection. The creation of "dog leg" movements at intersections shall be avoided if possible by aligning BART System streets.
- B. Intersection angles shall be 90 degrees where possible. When intersection angles are skewed more than 30 degrees from a right angle, consideration shall be given to realignment of the streets. Grades at intersections shall be as flat as practical, but shall be such as to provide adequate drainage. It is recommended that intersecting streets not have horizontal curvature within 150 feet of the centerline of the intersection. Where it is intended that certain turns be permitted at an intersection, curb return radii (to inside face of curb) shall be 20 feet except when bus or truck traffic is anticipated, in which case the radii shall be as illustrated below. Where the intersection design is not intended to permit certain turns, curb return radii shall be five feet.
- C. The number of intersections designed for wide vehicular turning radiances shall be minimized to promote pedestrian mobility and calmed traffic.

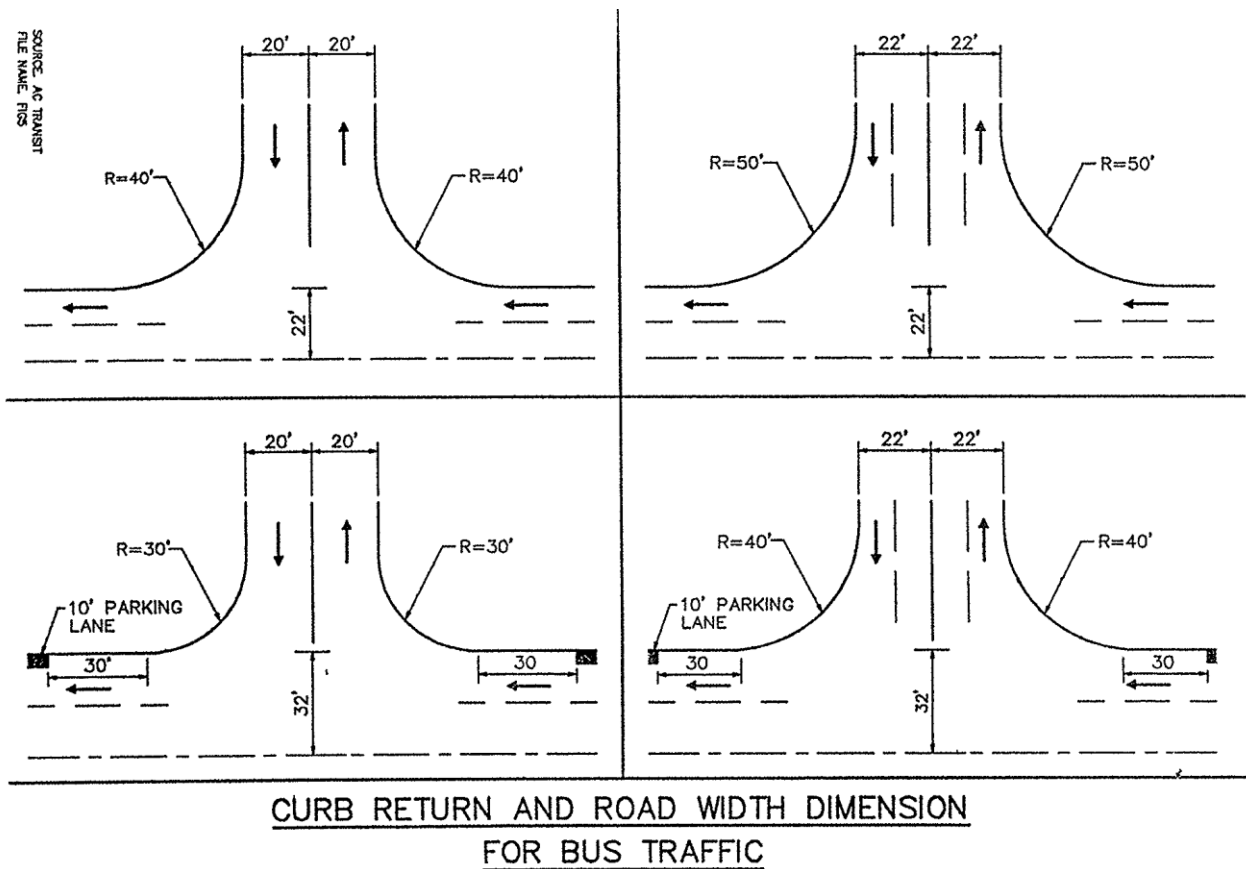
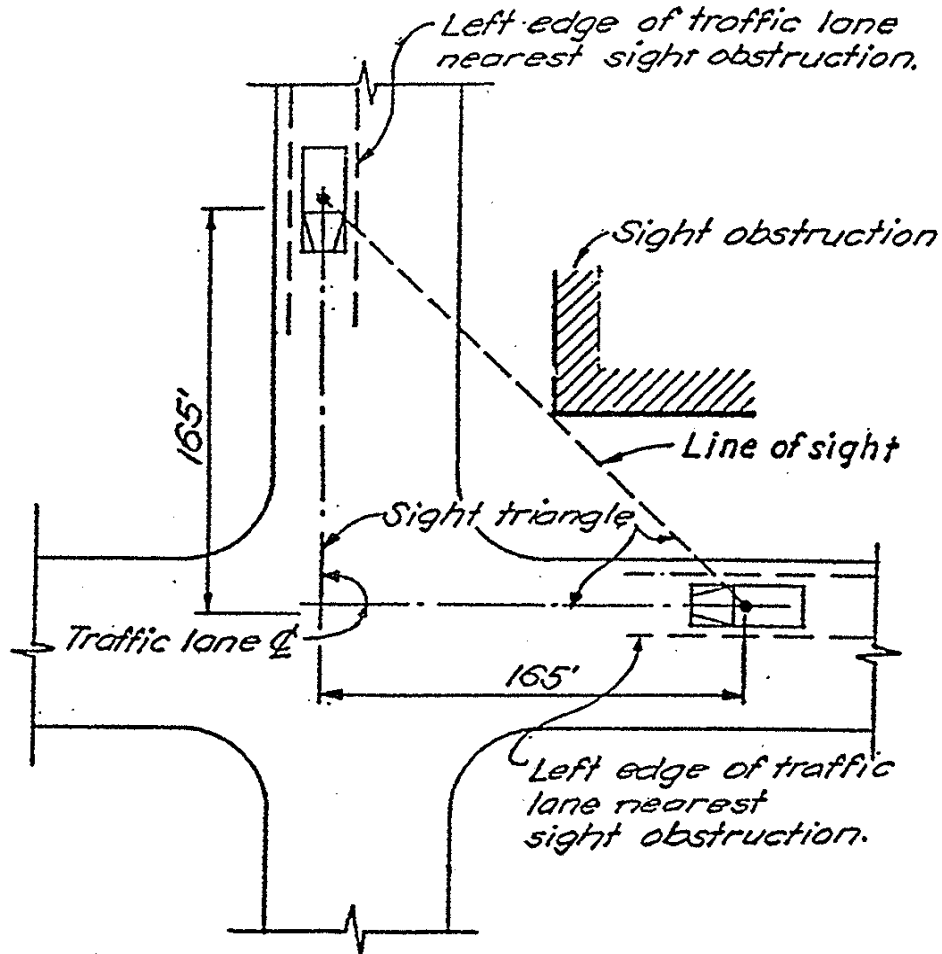


FIGURE 4. CURB RETURN AND ROAD WIDTH DIMENSION FOR BUS TRAFFIC

4.7.2 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'-0" above the high point of the traveled way shall be excluded from areas referred to as "sight triangles."

- A. At intersections where no stop sign or traffic signal control is provided, sight triangles shall be as defined in diagram below:

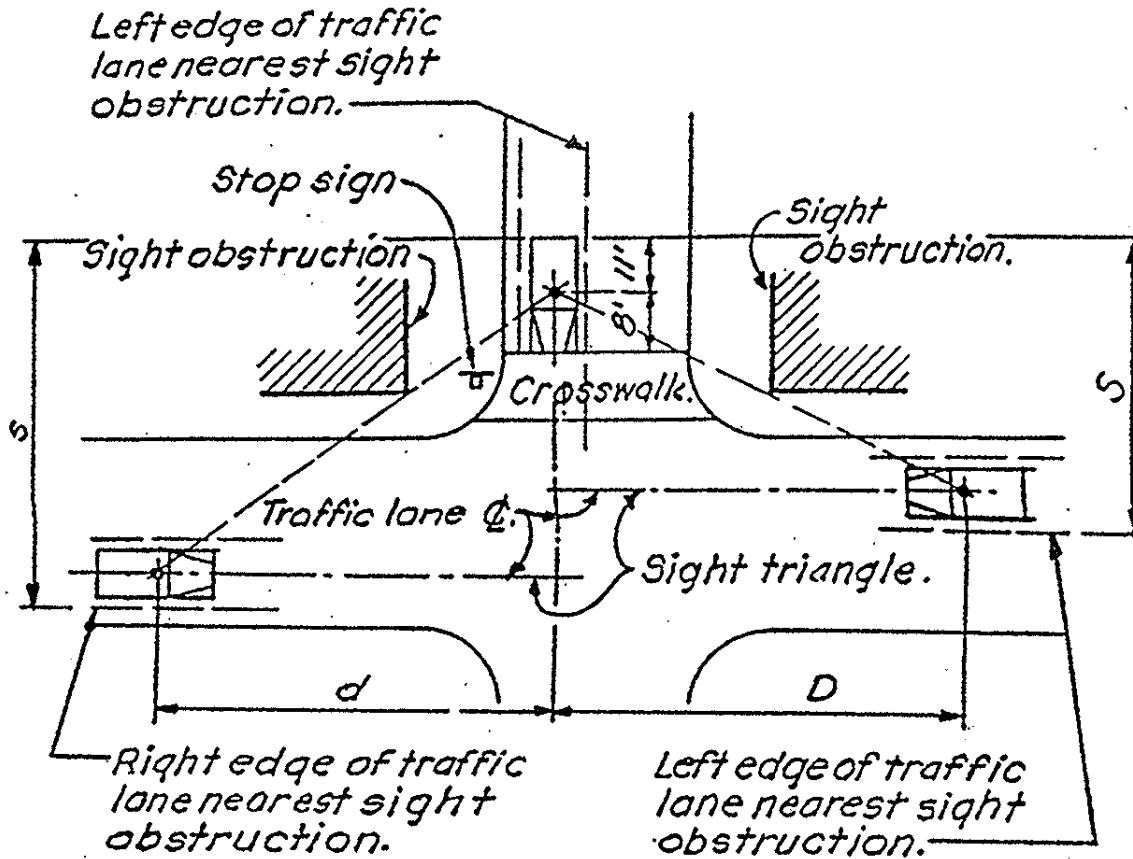


- Notes : 1. Sight distances shown are based on a design speed of 25 miles per hour.
 2. Objects exceeding 3'-0" in height shall not be placed within the sight triangle.

INTERSECTION SIGHT DISTANCES
UNCONTROLLED INTERSECTION

FIGURE 5. INTERSECTION SIGHT DISTANCES – UNCONTROLLED INTERSECTION

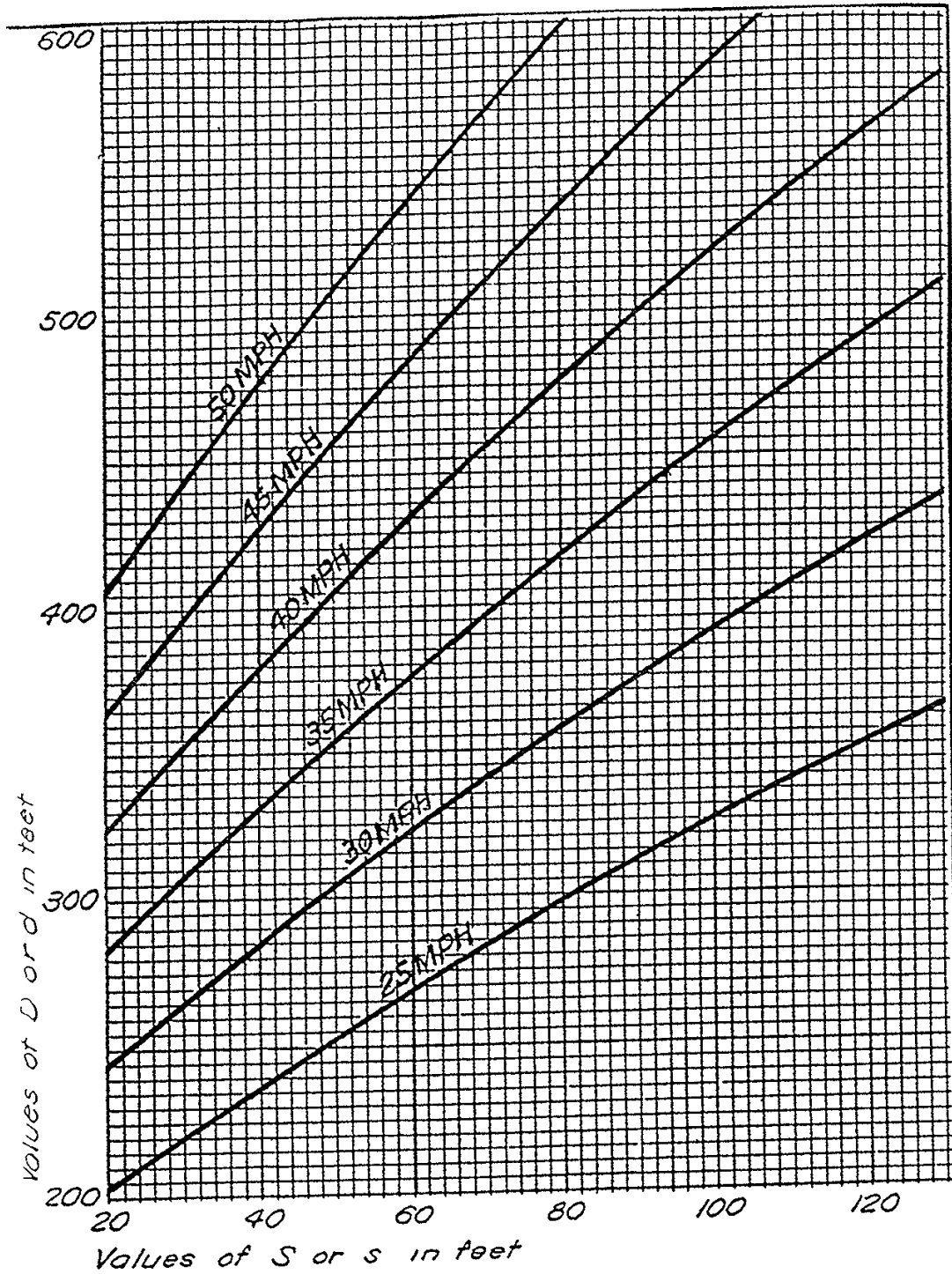
B. At intersections where stop sign control is provided for one of the streets sight triangles shall be as defined in the following diagram:



- Notes:
1. For relationship between S and D or s and d see Figure 6.8
 2. Objects exceeding 3'-0" in height shall not be placed within the sight triangles.
 3. Sight distances are based on use of a passenger vehicle.

INTERSECTION SIGHT DISTANCES STOP CONTROLLED INTERSECTION

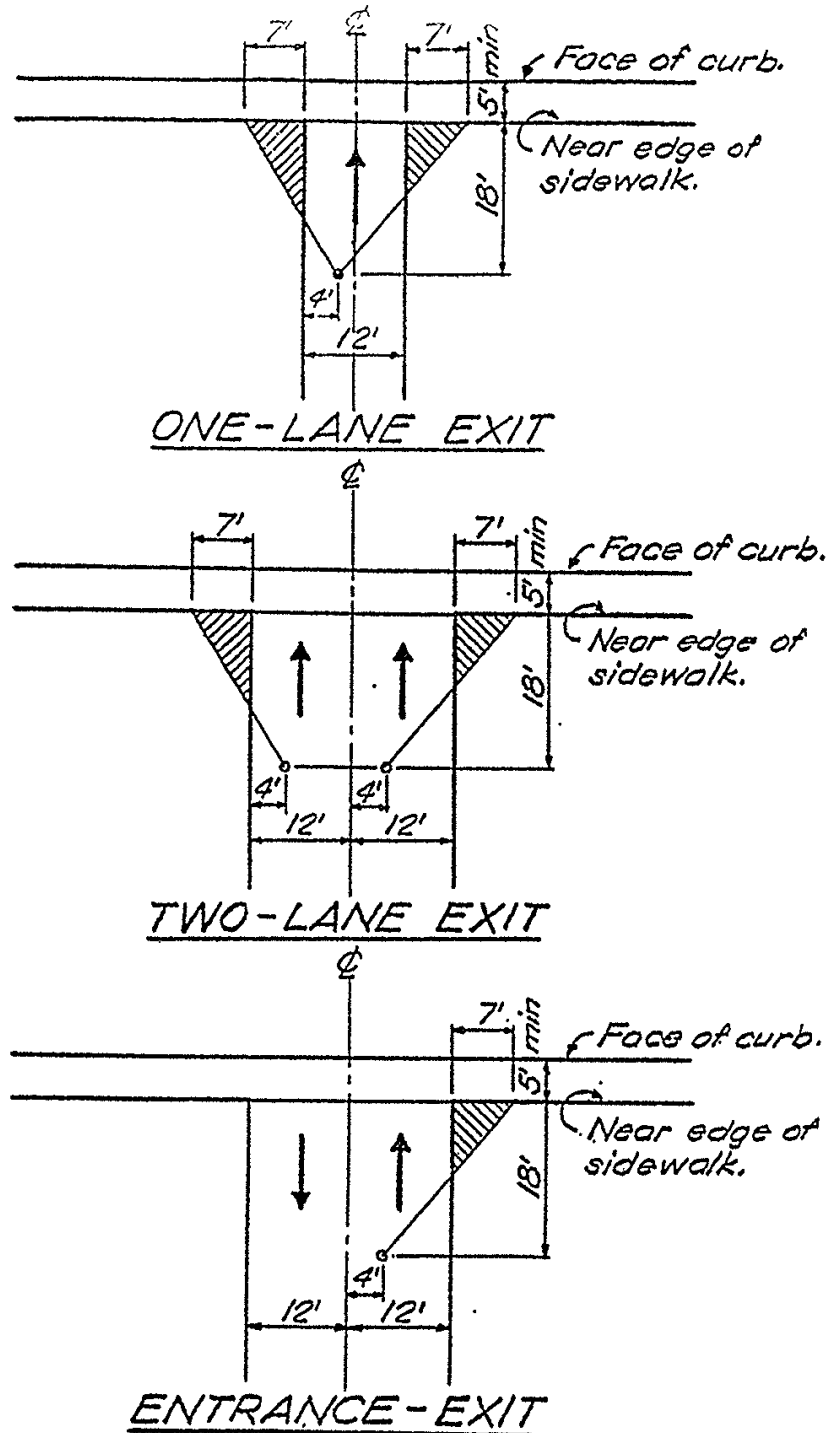
FIGURE 6. INTERSECTION SIGHT DISTANCES – STOP CONTROLLED INTERSECTION



INTERSECTION SIGHT DISTANCES
STOP CONTROLLED INTERSECTION

FIGURE 7. INTERSECTION SIGHT DISTANCES – STOP CONTROLLED INTERSECTION

- C. At parking structure entrances and exits, sight distance shall be as defined in the following diagram:



Note: exclude objects more than 3'-0" high from shaded area.

FIGURE 8. PARKING STRUCTURE EXIT AND ENTRANCE SIGHT DISTANCES

4.8 CROWN

Crown slope shall be two percent. On undivided roadways, the high point of the crown should be centered on the pavement and the pavement sloped toward the edges on a uniform grade. On divided roadways, each pavement should have a uniform cross slope with the high point at the edge nearest the median except as modified by superelevation requirements. At intersections or in unusual situations the crown position may vary, depending upon drainage requirements. Bus loading zones may have a reverse crown as a means of minimizing flow of water adjacent to passenger loading and unloading areas.

4.9 CURBS AND GUTTERS

In general, all roadways shall have curbs and gutters. Where drainage is away from the curbs, gutters may be omitted. Curbs shall be Portland cement concrete.

Valley gutters shall not extend across any bus or auto access roadways. At other streets, the use of valley gutters shall be minimized.

5. PARKING STRUCTURES

Provide parking structure at BART Station where determined by the District with the capacity as determined by the District.

5.1 PARKING STRUCTURES - BASIC GOALS

- A. The District's objective is to obtain a complete, operable parking structure which will be structurally sound and constructed in conformity with applicable codes, these BART Facilities Standards, and the preliminary engineering documents.
- B. The parking structure shall be designed to provide an optimum level of safety and security for users and BART employees at all times. Dark, confined, and indefensible spaces shall be avoided. Visibility from surrounding structures, walks, roads, etc., is essential to safe passage by the users of the facility.
- C. All elevated parking levels shall be made watertight and require as little maintenance as possible. See Facility Design/ Criteria/ ARCHITECTURE/ Passenger Stations, under "Sanitation and Maintenance", for additional maintenance requirements.
- D. Design is encourage to consider convertibility of parking garage structures to other uses such as residential or commercial purposes for adaptable land use and station area development.

5.2 VEHICLE INGRESS/EGRESS

- A. Parking structure ingress/egress for vehicles shall be accomplished using the street system and access points indicated on the preliminary engineering documents. If preliminary engineering documents do not indicate ingress/egress points, the Designer shall propose such points in conformance with the Station Access Hierarchy as part of its site design for District approval. A minimum of two vehicle

ingress/egress points shall be located along the perimeter of the structure at a minimum of 100 feet apart.

- B. Visual obstructions shall be avoided at these points and extreme care shall be taken to allow drivers unobstructed visibility of all other automobile and pedestrian traffic.
- C. Refer to Facility Design/ Criteria/ ARCHITECTURE/ Passenger Station Sites for requirements regarding sight distances for exiting parking structures.

5.3 PEDESTRIAN ACCESS

- A. Pedestrian access points to the structure shall be oriented to primary walkways in the Station.
- B. Provide concrete sidewalks, as needed, to properly access key destinations including pedestrian nodes, transit stops, and parking structures. Also, provide concrete sidewalks from all stairs and exits to the closest road and or street walks. All walks shall be not less than 4 feet in width.
- C. Provide pedestrians with safe crossings of major streets, installing traffic signals where necessary for pedestrian safety. Minimize signal cycle lengths to promote pedestrian movement while discouraging jaywalking.
- D. Pedestrian crossings shall be treated so as to be prominent and durable (e.g. textured, colored, concrete). At a minimum crossings shall be painted with “Zebra Stripe (Continental)” markings.
- E. Provide direct pedestrian access between station entrances, surface transit corridor stops and activity nodes. Avoid barriers including long walks, crossing multiple lane streets, meandering routes, visual obstructions, circuitous crossing, dark or unpleasant locations, or unnecessary changes of grade.
- F. Refer Facility Design/ Criteria/ ARCHITECTURE/ Passenger Station Sites under “Pedestrian Paving” for additional walkway criteria.

5.4 LAYOUT

- A. Ramps and Floor Slopes: Ramps containing parking stalls, and used by pedestrian for exiting shall not exceed a slope of 6 percent. Ramps not containing parking stalls and not required for use by pedestrian, shall not exceed a slope of 12 percent. All floors shall be cross-sloped for drainage at a minimum 1-1/2 percent slope.
- B. Parking Stall Design: The parking layouts shall be designed to provide the optimum traffic flow while providing the number of stalls indicated on the preliminary engineering documents. All parking spaces shall be 8’-6” by 18’-0” per stall, at 90-degree angles either side of driveway. Driveway shall be 24’-0” wide. All parking spaces shall be self-parking type; i.e., no spaces shall be “buried” or situated in such a manner that it would become necessary to move another car to utilize the parking space. Six-inch-high continuous concrete curbs shall be provided at the nose of parking stalls in the structure. Provide a raised minimum 3’-0” wide concrete curb at the perimeter of each level. Curb shall provide a minimum 2’-6” clearance between

face of curb and face of column. Encroachment into parking spaces by columns shall maintain adequate clearance for use by full-size automobiles.

- C. Accessible parking stalls shall be provided to comply with ADA and CBC accessibility requirements. Locate accessible stalls close to the elevators.
- D. Clearances: The minimum vertical clearance at any point in the basement and first/ground level shall be 8'-6". On all other levels the minimum vertical clearance shall be 7'-6". This clearance shall be maintained at ramps and traffic lanes. Lighting fixtures, conduits, and pipes shall not encroach into these clearances.
- E. Columns and Vertical Elements: No columns shall be located in drive aisles. Columns and vertical elements shall have corners armored to protect them from spalling if struck.
- F. Ingress/egress shall be designed to accommodate possible addition of paid parking gates including clearances and shall be sized for the appropriate revenue control equipment. Three 1-inch conduits (with pull wires) shall be run from each location that will have parking control equipment to the electric equipment room. At each entry/exit a junction box and a 1-inch conduit back to the electrical equipment room shall be installed in the overhead slab soffit for future electrified signs.

5.5 VERTICAL CIRCULATION

- A. Stairs. Cast-in-place reinforced concrete stairs and risers. Treads shall have non-slip grit impregnated in surfaces. Refer FACILITY DESIGN, Criteria, ARCHITECTURE, Passenger Stations, for additional requirements.
- B. Stairs shall be open to the greatest extent possible with open railings to maximize visibility and security.
- C. Elevators. There shall be a minimum of 2 elevators. Elevator capacity shall be based on the entire parking structure capacity is filled or emptied in one hour and run trip time shall not exceed 100 seconds. Elevators shall be traction type; hydraulic elevators will not be acceptable. Elevator entries shall be at garage floor level (no curbs or curb ramps); and floor slabs shall be sloped away from elevator door openings. Provide canopies at exposed elevator lobbies and landings. Refer FACILITY DESIGN, Criteria, ARCHITECTURE, Passenger Stations, for additional requirements.

5.6 SAFETY AND SECURITY

- A. *Security Closure: A vertical screen system shall be installed for security purposes at the first level on all sides of the parking structure. The screen shall be continuous and secure. At vehicular entry/exit points, motorized overhead coiling grilles shall be provided. At pedestrian entry/exit points, full height doors with closers, panic hardware, and external access via key in lock cylinder shall be provided.*
- B. Railings as required by applicable codes shall protect interior slab edges. Exterior slab edge spandrels, rails, and connections shall be designed for a minimum horizontal ultimate load of 6,000 pounds applied at 18 inches above the floor, over a

one square foot area of the barrier or as require by applicable codes whichever is more restrictive.

5.7 STRIPING AND MARKING

- A. In addition to signage, striping and painted directional arrows on the driving deck shall be provided to direct and identify the most convenient means of access and egress. A single yellow stripe shall be painted down the middle of all two-way driveway aisles.
- B. All stalls shall be sequentially numbered as required for surface parking areas. Numbering shall be coordinated with numbering of surface parking areas.

5.8 ELECTRICAL

- A. Electrical design shall provide three 1 inch conduits with pull wires from electrical equipment room to parking ingress and egress area to serve parking control equipment and junction boxes and conduits to serve possible future electrified signs over parking ingress and egress area.
- B. Electrical conduits and junction boxes shall be concealed within stair walls and floors. Multiple electrical conduits running under the base floor slab shall be encased in a reinforced concrete ductbank. Refer to Facility Design/ Criteria/ CIVIL/ Utilities, under "Electrical Power Facilities" for additional encasement criteria.
- C. Waterproof electrical outlets shall be provided for charging electric/hybrid vehicles.

5.9 EXPANSION AND CONSTRUCTION JOINTS

- A. Joints in parking structure shall be closed with expansion joint assemblies, i.e. rod and sealants.

5.10 PARKING STRUCTURES COMMUNICATIONS

All multi-level parking structures shall be equipped with a security closed circuit television monitor system, a PA system, and at least one "White" Courtesy Telephone per level. Refer to FACILITY DESIGN/ Criteria/ Architecture and Electronics for requirements.

6. SITE LIGHTING

- A. Refer to electrical design criteria for specific criteria related to lighting.
- B. Site illumination shall be used to provide safety, to ensure visibility, and give direction.
- C. Unattended parking areas shall be adequately lit for security.
- D. Directional, informational warning, and regulatory signage shall be adequately illuminated.
- E. Landscape elements, in particular plant material, shall not hinder the illumination of signage information which motorists and pedestrians may require for direction.

- F. Selection and placement of plant material and luminaires shall be coordinated and shall take into account plant material growth. Landscape development shall not diminish the general illumination of walkways, parking areas, driveways, or plazas by planting too close to the light source or in the path of the available light.
- G. In all installations of lighting, care shall be taken to minimize spill light into adjacent residential areas and minimize light directed towards motorists or pedestrians to prevent harsh glare or dangerous blind spots. In addition to the extent possible, eliminate light trespass to the night sky. Refer to Introduction/ COMMON REQUIREMENTS/ Environmental Design and Sustainability under “Light Pollution” for explanation.
- H. Lighting shall be designed to exhibit the following characteristics:
- General vehicular/pedestrian lighting, medium height pole mounted fixtures coordinated with landscaping so that unobstructed light reaches the parking area and avoids sight lines into adjacent residential areas
 - Pedestrian walkway lighting, medium to low height, pole mounted or low-mount bollard fixtures
 - Pedestrian lighting fixture illumination shall in general be directed toward the pedestrian walkway, as opposed to omni directional.
- I. The recommended spacing for pedestrian-scale lighting is every 50 feet along streets, and every 30 feet along walkways and trails.
- J. Lighting standards may be placed in one of the following locations:
- In areas not used for parking such as at the end of rows, adjacent to walkways or in corners of a lot
 - In reserved strips between parking stalls
- K. Where light standards are placed in uncurbed areas or closer than two feet six inches clear to the inside face of a curb, the standard shall be protected from physical damage by a concrete base of at least 24 inches diameter which extends not less than 30 inches above grade.
- L. A beacon light shall be provided at each side of the bus loading/unloading area to notify bus operators that a train is arriving at the station. The light shall begin flashing one minute before each train enters the station and shall continue for at least 1 minute thereafter.

7. MISCELLANEOUS SITE DEVELOPMENT

7.1 SITE FURNITURE

- A. Exterior benches shall be protected from the weather. Benches shall be designed to discourage use for sleeping. If armrests are used, they shall be spaced at intervals not greater than 4 feet.

- B. Trash receptacles shall be provided.
- C. Accessibility Considerations:
 - Obstacles such as site furniture must be a minimum of 6 inches high so as to be detected by visually impaired patrons using a cane and should not have any protruding edges or sharp corners.
 - Locate site furniture out of the traveled way.

7.2 SCREEN AND BARRIER WALLS, FENCES, OR SCREEN PLANTING

- A. No standard cyclone fencing shall be used in the station area.
- B. Screening or barriers shall be provided when insufficient depth of land is available on the perimeter for safety requirements or for visual control. These elements shall be enhanced with vines when neighborhood conditions dictate additional treatment.
- C. The areas of land surrounding the perimeter of the site not intended for near-term station area development should be landscaped with groundcover and trees. The landscape design shall integrate with the surroundings.

7.3 RETAINING WALLS

- A. Retaining walls shall be stepped where possible to reduce their overall mass and cost. Refer to Facility Design/ Criteria/ ARCHITECTURE/ Landscaping and Vegetation Control under “Planting Areas” for related sloped planting and terraced planter requirements.
- B. Retaining wall structures and barriers shall be enhanced with vines when neighborhood conditions (existing land improvements, topographical features and landscaping) dictate additional treatment.

7.4 BOLLARDS

Bollards may be used to control vehicular access or to deter unsafe pedestrian movements. When bollards are used as traffic barriers where District maintenance access may be required, bollard shall be removable and lockable. Bollards shall be a minimum of 36” in height and shall resist a force of 12,000 pounds.

END