SANTA CLARA
Valley Transportation Authority

BUS STOP AND PASSENGER FACILITIES STANDARDS

March 2010

INTRODUCTION

The purpose of this document is to provide uniform guidelines for the design and placement of bus-related facilities and amenities in Santa Clara County: These Guidelines are intended to identify specific design considerations for transit facilities rather than complete engineering design of each facility element. It is anticipated that the final design of an individual improvement would be conducted in conjunction with other street improvements or proposed developments, compatible with these Guidelines and the appropriate local jurisdiction's standards.

The guidelines for providing and designing these transit facilities and amenities are based on the following considerations:

- Basic bus operations and safety requirements.
- Current engineering practices at Valley Transportation Authority (VTA)
- Current standards used by other transit operators in the United States
- Americans with Disabilities Act (ADA)
- The amenities necessary for attracting and maintaining transit patronage.
- The anticipated benefits to developers or local agencies in providing transit services to their future residents, tenants and customers
- The compatibility of the improvements with other roadway uses

The Guidelines provide criteria, dimensions, space requirements, typical layouts and designs for the following transit facilities and amenities:

- Pedestrian Accessway
- Bus Benches
- Bus Stop Passenger Waiting Pads
- Bus Turnout
- Transit Centers
- Bus Stops
- Bus Shelters
- Bus Stop Pavements
- Park and Ride Facility

Because transit vehicles, such as the typical large coaches used by VTA, are different than other vehicles using streets or highways, the following information related to these transit vehicles is also included:

- Vehicle Characteristics
- Bus Turning Radii
- Road Grades

DESIGNING TRANSPORTATION FACILITIES

Recommended Practice for Design Engineers

- Design for Safety

  Safety must be the first and foremost consideration in transportation facilities design.

- Design for Accessibility

  Good passenger accessibility and circulation is not only desirable but is a requirement under the Americans with Disabilities Act (ADA) and California Title 24.

- Design for Ease of Operation

  Be aware that the design standards are basic minimum requirements. The design should include adequate allowances that facilitate comfortable transit vehicle circulation and operation.

- Design for Positive Transit Experience

  Transit has to compete with automobiles. The design of an aesthetically pleasant environment with good passenger amenities will enhance transit experience.

- Design for Traffic Compatibility

  Transportation facilities, particularly the "on-street facilities", should be designed to minimize traffic/pedestrian conflicts.

- Design for Ease of Maintenance

  Avoid, as much as practicable, the use of unusual materials, shapes, dimensions and locations that could pose potential procurement and/or maintenance problems.

I. BUS STOP

A. Bus Stop Installations

Bus stop areas are provided in three basic formats: Farside Stops, Nearside Stops, and Mid-Block Stops. Bus stop standards for these three formats are shown in Figures 1 through 3. Under normal conditions a Farside Stop is standard. Any other location must be approved as an exception. Therefore, the bus stop standards given should be consulted as a guide in analyzing and establishing the proper. location of new stops.

B. Bus Stop Spacing

This is the linear distance between individual bus stops. It is based on the type and density of the adjacent land uses.

1. Placement Considerations

Bus stops are spaced to maximize passenger accessibility, convenience and safety, while minimizing undue delay or traffic interruptions. The Transportation Research Board suggests that stop frequency should not exceed eight to ten stops per mile (528 to 660 feet apart). The criteria regarding the specific location of bus stops, described in the "Bus Stops" section of these Guidelines, also affect the linear spacing of bus stops.

2. Design Criteria

In the urbanized areas of Santa Clara County (greater than 5,000 residents per square mile or in areas with office or commercial development), stops should be spaced 750 to 900 feet apart. In areas of very dense, high-rise development such as activity centers, closer stop spacing may be necessary to meet transit demand. In lower density, more rural areas (less than 5,000 residents per square mile, or in areas with limited office and commercial development), stop spacing should be approximately 1,300 feet.

C. Bus Stop Sign and Information Sign Installation

In a typical bus stop sign installation, the pole is located 2' from the face of curb and the bus sign facing away from the street. If the sidewalk width is less than 5'5" wide, the bus stop pole is located 6" from the back of walk and the bus stop sign facing towards the street. This allows for better pedestrian and wheelchair traffic flow around the bus stop pole. See Figure 5 for standard details.

Pole-mounted information signs are installed at bus stops that are time-points, heavily used bus stops and major transfer points. See Figure 6 for standard details.

II. BUS STOP IMPROVEMENTS

A. Bus Stop Passenger Pad

Bus stop pads are provided at bus stops to ensure safe boarding and deboarding of passengers with or without disabilities and to provide additional room for bus stop furniture.

At existing bus stop locations where curb and sidewalk measure less 5'5", a bus stop bench pad (measuring at least 3' x' 7) shall be installed behind the sidewalk for the placement of a bus stop bench.

At bus stop locations with curb and gutter and no sidewalk, ADA requires that the new bus stop pad installations have a minimum 96" width measured from the face of curb to the back of pad to allow for proper loading and unloading of passengers in wheelchair. Considering that VTA coaches have wheelchair lifts located either in the front or rear of coach the minimum pad length is 40'

Standards for bus stop pads are shown in Figures 3 through 5.

B. Bus Stop Bench Installation

Bus stop benches are provided for the convenience and comfort of bus passengers while they wait for their scheduled bus to arrive.

At existing bus stop locations the minimum width of the sidewalk and curb together must be at least 6' before a bus stop bench can be installed. The 6' width will provide adequate room for disabled passengers in wheelchairs to maneuver around the bus stop bench.

VTA provides, installs, and maintains bus benches at bus stops.

Standards for bus stop benches are shown in Figures 3 through 5.

C. Bus Shelter

Bus shelters are provided for the convenience and comfort of bus passengers. Shelters provide protection from the elements and provide general bus schedule information.

Figure 29 and 30 provides guidelines for bus shelter design, location, requirements of developers and assistance from local cities.

Figures 3 and 4 provide recommended location details under typical circumstances for County Standard Shelters.

D. Bus Duckout/Turnout

A bus duckout is defined as a specifically constructed area provided for bus

loading and unloading which takes the bus completely off the normal roadway . The bus must be able to leave and enter the traffic lane at comfortable deceleration and acceleration rates for the passengers. For this reason, the duckout is classified on the basis of roadway operating speed. Specific lengths of the duckout are shown in Figure 8 according to three classifications:

- Less than 20 mph approach speed
- 20 to 3 0 mph approach speed
- 30 to 40 mph approach speed

E. Pedestrian Accessway

A pedestrian accessway provides for easy pedestrian movements between bus stops and adjacent land uses.

1. Placement Consideration

Pedestrian accessways should be provided between all developments and the adjacent streets identified as transit streets. District staffs are available to assist cities and project developers in identifying transit streets. In addition, pedestrian accessways should extend to individual bus stops to minimize barriers to transit service for residents, employees and visitors of a development.

2. Design Criteria

Pedestrian accessways should be designed consistent with ADA and California Title 24 requirements and to local jurisdiction's standards governing public and private accessways. The special considerations relative to maximizing accessibility to available transit services are:

- Accessways should be direct, and should minimize unnecessary meandering.
- Accessways should be paved, wheelchair accessible and, whenever possible, lighted.
- Accessways should extend from the development to the bus stop, to avoid bus passenger walking through landscaping or parking lots to access buses.

The sidewalk is adjacent to the curb, ensuring that bus patrons are not forced to walk through mud or landscaping to access the bus. Individual projects can develop additional designs, based on the project layout and the locations of the public sidewalk and bus stops.

F. VTA Bus Shelter Criteria

1. Bus Shelter Design

i. Features shelters should incorporate

a. Roof
b. One wall minimum (windbreak)
c. Bench
d. Clear walls or openings provided in end panels

ii. Guidelines for Shelter Design

a. Basic shelter dimensions range from 2.5' wide x 10.0' long to 5.0' wide x 15.0' long, depending upon use, location, etc.
b. The roof overhang shall be sufficient to provide inside protection and should be sloped to the rear for drainage.
c. The bottom opening shall be 6"+ for ventilation and to avoid trash accumulation within the shelter.
d. The use of low maintenance materials should be considered and surfaces should be textured or treated to resist vandalism and minimize maintenance.
e. The shelter should contain a bench to facilitate repair-and maintenance. A. space for wheelchairs should be provided.
f. The shelter must include provisions for mounting an information sign, a minimum 32” x 44” in size.
g. Provisions may be included for internal lighting if it is determined that illumination is needed.
h. The concrete pad, on which the shelter is placed, should be sloped toward the roadway for drainage and should have a different texture to-assist the blind in identifying the location.
i. The shelter may be (1) angled where possible to face on-coming traffic, or (2) provided with openings in the end panels to increase visibility for the bus driver and the customer.

G. Bus Shelter Location

1. Criteria considered when establishing shelter location

1. sidewalk condition and location
2. Relation to bus entrance: and exit doors
3. Obstructions of sightlines at intersections
4. Drainage
5. Electrical service, if needed
6. Available right-of-way
7. Impact on adjacent property
8. Approval of VTA.

2. Guidelines for shelter location

1. Provide a minimum of 3.5 to 6.0 feet from the face of curb to front of shelter, depending on type of shelter used (see Standard Shelter Location standards).
2. Locate shelter 2.5' from building wall to allow for cleaning.
3. Attempt to locate front of shelter away from prevailing winds in open areas when practical.

H. VTA Requirements for Developers

Require review site drawings at an appropriate scale showing all existing features, existing or proposed property lines, proposed shelter details, and proposed shelter location.

I. City Assistance to VTA

Require dedication of suitable area for a shelter when new development occurs at a planned shelter location.

Require the inclusion of a shelter and other transit facilities as part of any major new development, such as a shopping center.

III. BUS STOP PAVEMENT STANDARDS

The following pavement standards have been designed to provide for an upgraded pavement section at bus stops.

Generally, these improvements are to be made by developers, cities, and VTA at new or existing bus stops where the City or VTA has established that the existing or new roadway pavement will not sustain the bus stop loading.

The typical bus stop pavement pad constructed from Portland concrete cement and the pad size is 10' wide by 55' long pavement. If more than 2 bus routes use the same bus stop, a longer pad will be required.

An asphalt pavement section can be used in place o Portland concrete cement at the request of local city engineer.
See Figure 10 thru 13 for construction details.

IV. PARK AND RIDE FACILITY

A. Park and Ride Lot

This is a specially designated parking area for bus, vanpool and carpool users to park their cars. They then transfer to another vehicle (bus, light rail, van or car) to complete their trip.

Park-and-Ride facilities can be divided into two broad categories, permanent facilities and shared-use facilities. VTA has several operating and planned permanent park-and-ride facilities in Santa Clara County. In addition, VTA currently participates in several shared-use agreements. The arrangements can be as simple as a verbal agreement to allow bus or carpool/vanpool patrons free parking privileges. On a more formal scale, VTA can develop a written agreement with a private property owner for use of certain parking spaces for park-and-ride. Shared-use agreements can be arranged to fit the service need, and there is flexibility to alter the arrangement as service needs change.

1. Placement Considerations

Considering the growing demand for carpool, vanpool, and bus park-and-rides, parking spaces should be provided by developers at major developments such as shopping centers or planned communities. These parking spaces are intended for use by residents of the immediate community and will help to mitigate the traffic related impacts of the development and to conserve energy resources. These parking spaces should be provided as close to freeways or major arterials as possible. These spaces can be provided separately or can be joint use spaces with nearby commercial, recreational or office development. Persons parking in these reserved spaces will frequent the adjacent commercial uses and other businesses, which is an additional benefit to the developer and tenants of a facility.

2. Design Criteria

Standard parking lot design criteria will be applicable to park-and-ride lots except that a bus loading area and auto drop-off (kiss-and-ride) area may also need to be provided at the lot. Shelters, benches, telephones and other amenities may also be included at park-and-ride lots, depending on the demand at the lot. The number of parking spaces to

be reserved for park-and-ride use can be determined through coordination between VTA, the city or the developer. Park-and-ride facilities, stall requirements and layout of existing parking facilities are shown in Figures 16 through 18.

B. Parking Lot Layout

The recommended Park-and-Ride layout and parking stall dimensions are shown on pages Figure 19.

C. Lighting

The VTA has adopted a standard light fixture for use on its Park-and-Ride lots and other facilities. High pressure sodium lighting is recommended. The standard light fixture is shown in Figure 20.

D. Landscaping

Provisions should be made for landscaping and irrigation, including a landscape setback with sidewalk in residential areas.

E. Park-and-Ride Signage

- The standard Park-and-Ride regulation sign for on-site placement is detailed in Figure 21 through 23.

- The standard Park-and-Ride directional sign, for placement on local streets and expressways to announce the approach to a Park-and-Ride facility, shall comply with state wayfinding signage.

- The standard Park-and-Ride lot facility sign placement shall be placed in a visible location from adjacent access roads.

V. TRANSIT CENTER

A. General Provision

A transit center has the advantage of bringing all bus routes together for easy transferring (maybe multi-modal). Considerable variation in size and style are possible, but the center must fulfill the basic functions of serving all routes with an adequate stopping area and providing a comfortable and convenient waiting area for passengers. Shelter, seating, route information, public telephones, bicycle racks, bicycle lockers should be provided.

B. Design Considerations

- Transit Centers can be placed on-street or off-street although off-street facilities generally proved a more attractive passenger environment and smaller transfer distances. An on-street facility offers the advantage of

using the public street for right-of-way.

- Exclusive bus access and signal pre-emption or preference should be provided at off-street centers to minimize facility dwell time. Exclusive bus travelways should also be provided when transit centers are located in parking areas.

- As space is often a consideration in transit center design a sawtooth bay configuration is recommended. Figure 14 illustrates both sawtooth and linear bus bay configurations.

- Bus and pedestrian access to and circulation through the transit center should be direct, safe and convenient.

- Out of direction travel for all buses should be minimized to avoid inefficient operation and unnecessary operating cost.

- Transit center should be designed for convenient transfers between bus to bus and bus to other modes of transportation.

- Busways should have a minimum number of truning movements for ease of operation and passenger comfort.

- Transit center should be designed in compliance to the Americans with Disabilities Act (ADA) and California Title 24 design standards.

VI. SUPPLEMENTAL GUIDE: ACCESSIBLE FACILITY DESIGN ELEMENTS

Foreword

In 1998, VTA Accessible Services Department staff convened a meeting with VTA Facilities Design Department engineers and members of the Committee for Transit Accessibility (CTA) to discuss the design of the Mountain View Transit Center and how to improve the accessibility to the many persons with disabilities who will use the facility, making connections to buses, shuttles, light rail and Caltrain.

In subsequent meetings, CTA members and VTA staff agreed on a list of accessibility enhancements to be included in the Mountain View Transit Center design, even though not all of the design elements are specifically required by the Americans with Disabilities Act (ADA). This eventually led to a long-term effort to identify and specify various facility design elements which are preferred by the Accessible Services Department and may be

incorporated into the design of VTA transit centers, light rail stations and park & ride lots.

The purpose of this manual is to summarize information on the aforementioned preferred facility design elements. For some of the elements, more detailed information including technical drawings are available but not included herein. Accessible Services Department staff will provide additional information upon request and is available for consultation on all facility design projects.

A. Directional Bar & Decision Tiles

The use of directional bar tiles and decision tiles are not required by the ADA. However, they are a preference endorsed by the Accessible Services Department and recommended by the CTA as they improve the ability of persons with visual impairments to navigate at transit facilities, making it easier to locate bus stops and light rail station platforms. The common name for these products is Detectable Directional Surface Tile.

The design characteristics and use of this accessible facility design element are described as follows:

i. The primary goal of directional bar tile is to help passengers connect between different modes of transit. Directional bar tile is generally used as a wayfinding device to guide visually impaired passengers to bus stops, shuttle stops, rail station platforms and crosswalks. It is also used to guide passengers out of a transit center to a crosswalk which will lead them to a major activity center, such as a shopping mall or a college campus. Directional bar tiles may be used in conjunction with decision tiles (see below).

ii. Both the directional bar tiles and the decision tiles are made of high-strength material. One example is Vitrified Polymer Composite (VPC), which is an epoxy polymer composition employing aluminum oxide particles in the raised surface. The directional bar tile is 6” wide, and is bright yellow with two raised bars along the length of the tile. In addition, there are very small raised dots on the bars and in the spaces between the bars. The base is designed to be installed flush with the surrounding surface, while the bars are raised 0.2 inches for detectability. The decision tile is similar to directional bar tile but is 12” wide (typically a square) and includes four raised bars.

iii. The location of directional bar tiles is very important. They should be installed approximately four feet from the face of any curb with a minimum of two feet clearance on either side of the

tile. This is to ensure that passengers walking with white canes will have sufficient clearance to sweep with the cane and have a buffer from vehicular traffic. At the curb ramp, the directional bar tiles terminate at the side or top of a curb ramp that leads passengers to the crosswalk. In proximity to the curb ramp, the yellow tiles may be less than four feet from the face of the curb as necessary.

iv. The directional bar tiles should not cover any portion of the curb ramp.

v. Decision tile is used to alert visually impaired passengers using white canes that there is a choice in which direction they can travel along the path. The raised bars in the decision tile are oriented at an angle to the raised bars in the directional bar tile to improve white cane detection.

    a) Decision tile may be used to alert visually impaired passengers that they are approaching a bus stop. It should be centered along the directional bar tile path and installed such that the four raised bars are at 90 degrees to the raised bars in the directional tile. A smaller section of directional bar tile is installed to the left or right of the decision tile to take the passenger to the bus stop pole. This constitutes a "T" intersection. (Bus stop poles serving two or more routes and connecting with directional tile should have a route number sign in Braille/raised letters mounted on the pole as per established guidelines. See "Tactile Signage".) This same configuration can be used to indicate an alternate path option at the decision tile.

    b) Another important use of decision tile is at junctions where passengers are leaving a crosswalk/ramp area and have the options of going straight ahead, or to the left or to the right. The decision tile would connect the two or three paths of the directional bar tile, and would be installed such that the four raised bars are at an angle to the raised bars in the directional tile to the extent possible. This junction is called a "Y" intersection. (See

    (See Figure 31 on the next page for an example of directional bar tiles and decision tile.)

Figure 31: Directional Bar Tile with Decision Tile leading to an electrolier used as a bus stop pole. Location: West Valley College, Saratoga.

B. Crosswalk Guidance Tile

The use of crosswalk guidance tile (or crosswalk guide strips) is not required by the ADA. However, it is a preference endorsed by the Accessible Services Department and recommended by the CTA. The common name for this product is Detectable Guidance Tile.

The design characteristics and use of this accessible facility design element are described as follows:

i. The purpose of the crosswalk guidance tile is to guide visually impaired pedestrians across crosswalks at transit centers, as well as to provide an indication that they are within a vehicular area.

ii. Crosswalk guidance tile is 4" wide, and is commonly available in white and bright yellow. The CTA preference has been the color white as it provides excellent contrast, especially when mounted on asphalt.

iii. Crosswalk guidance tile is installed in the center of pedestrian crosswalks, and is made of the same high-strength material as directional bar and decision tiles. However, the crosswalk guidance tiles are thicker in order to withstand the weight of buses, paratransit vehicles and shuttles. The tile is structurally different from directional bar tile, and is formed with flanges which extend below the road surface a minimum of 1 ¼ inch. The flanges are embedded in the pavement and bonded with structural adhesive. It is very important that the tile protrude 5/16 inch above the surface of the road to allow visually impaired pedestrians to detect the material when their cane is being swept across the tile.

iv. The crosswalk guidance tile is installed across the entire crosswalk and terminates at the bottom of the curb ramp. The tile should not cover any portion of the curb ramp.

(See Figure 32 on the next page for an example of crosswalk guidance tile.)

Figure 32: Crosswalk Guidance Tile
Location: Mountain View Transit Center

C. Tactile Signage

The use of tactile signage is required by the ADA for some applications and it is a preference for other applications in transit centers, light rail stations and at bus stops.

The purpose of tactile signage is to enable visually impaired passengers to independently locate their public transit connections (e.g., find bus stops and light rail platforms), to be able to access VTA Customer Service via Speed Dialing at public telephones at transit centers and light rail stations, as well as to successfully use Ticket Vending Machines (TVM) and access other information.

Tactile signage includes both Braille and raised letters. The design characteristics and use of various tactile signs are described as follows:

i. Tactile "bus" signs should be mounted on all standard 2 3/8" OD bus stop poles (and non-standard poles where practical.) This allows visually impaired customers to differentiate bus stop poles from other similar poles. (These small Braille and raised letter signs simply say "bus" on the front.).

ii. Tactile route-specific signs (instead of generic tactile "bus" signs) should be mounted to bus stop poles which are in proximity to other bus stops, such as at transit centers. This allows visually impaired customers to identify the correct stop at locations where multiple stops are served. (This does not apply to single, stand-alone stops serving multiple routes.)

iii. Stand-alone paratransit stops should include standard paratransit signs at the top plus tactile paratransit signs attached to the same pole, including paratransit broker customer service telephone number.

iv. Tactile speed dialing signs should be installed above public telephones at transit centers and light rail stations.

v. Tactile transit center and light rail station facility name signage should be included on information cabinets.

Specifications and installation information for tactile "bus" signs:

i. Sign measures 1 ¼" high.

ii. Material is steel with weather resistant paint.

iii. Includes raised letters/Braille.

iv. Color-white letters on Blue PMS 302 (VTA blue).

v. Mount flush with curvature of the standard 2 3/8" OD bus stop pole (alternate arrangements required for non-standard poles).

vi. Sign comes with two ½" holes on left and right side of sign.

vii. Height of installation should be 60" measured from the pavement to the center of the tactile (raised letter and Braille) portion of the sign

Specifications and installation information for tactile route-specific signs:

i. Sign measures 3.5" wide and 4" long for one route, 5" long for two routes. Signs may be made as large as necessary to accommodate all routes.

ii. Material is a minimum 3/32" thick aluminum plate.

iii. Color is PMS 302, front and back.

iv. Raised letters and numbers are 1" high.

v. Width-to-height ratio for raised letters and numbers is between 3:5 and 1:1.

vi. Stroke-width-to-height ratio is between 1:5 and 1:10

vii. Raised thickness is 1/32".

viii. Horizontal separation between closest points is between .15" and .20"

ix. Vertical separation between closest points is .50" including between Braille and raised characters.

x. Type: Sans Serif. Futura Regular and Futura Bold Condensed are both ADA compliant. Futura Bold Condensed is preferred and is also easier for sighted passengers to read.

xi. Color: etched Braille (Natural) on PMS 302 background.

xii. Mounting holes are ¼" dia. placed at .6" for raised characters and Braille and .3" from edge of sign (measured from edge of hole).

Braille specifications for tactile “bus” and route route-specific signs:

i. Dot diameter: .059”

ii. Interior dot spacing: .09” on centers in each cell.

iii. Horizontal separation between cells: .241”

iv. Vertical separation between cells: .395”

v. Raised thickness: 1/40”

vi. Grade 2 Braille should be placed immediately below raised letters.

vii. Installation: signs come with ¾” wide foam strips. Sign has 2 punched holes and is attached to the pole with screws/rivets.

(See Figures 33 and 34 below for examples of a tactile “bus” and route-specific signs. Figure 34a is for tactile route-specific signs for standard bus stop poles. Figure 34b is for tactile route-specific signs used for non-standard bus stop poles.)

Figure 33: Tactile “bus” sign

Figure 34a: Tactile Route-Specific Sign for bus stop poles

Figure 34b: Tactile Route-Specific Sign

Specifications and installation information for tactile speed dialing signs:

i. Sign measures 5.5” x 8” x 1/32” thick.

ii. Sign made of aluminum with rounded corners-1/2” R Typical.

iii. Color is PMS 302

iv. 50 pt. Sans Serif-Upper case.

v. Raised letters and Braille on exposed aluminum finish-1/32” raised thickness.

vi. Backing: Sign comes with (4) ¾” wide foam tape strips.

vii. Grade 2 Braille.

viii. Installation: use a tamper proof screw in each corner (4 locations).

Text for Speed dialing:

“SPEED DIALING: PRESS # 1 FOR VTA CUSTOMER SERVICE”

Note that the raised letter text uses the # key symbol. However, the pound sign is not easily translated into Braille. Several blind passengers requested that we substitute in Braille the word “pound” for the symbol #. In other words, actually spell the word pound and do not use the symbol. This is the established design standard for the speed dialing sign.

See Figure 35 below for an example of speed dialing sign and placement.

Figure 35: Speed Dialing
Sign Location: Mountain View Transit Center

Specifications and installation information for Paratransit Stop Signs:

i. These signs are located wherever paratransit stops exist. All transit centers and light rail stations should include at least one designated stop, as well as colleges and other destinations with a high frequency of paratransit connections. A standard "paratransit stop" sign is located at the top of the pole, and a special sign with large print and tactile signage is mounted at the middle of the pole.

ii. Sign at top of pole is 8.5" wide x 17" long.

iii. Raised letters are 50 pt. Sans Serif in upper case.

iv. Color is PMS 302 on reflective white.

v. Grade 2 Braille.

Text for paratransit sign:

"PARATRANSIT STOP
800-400-3440
OUTREACH"
Include OUTREACH and VTA logos and International Symbol for Accessibility.

See Figure 36 below for an example of large print/tactile paratransit stop sign.

Figure 36: Paratransit Stop Sign

Note: These signs are constructed in-house. Separate vendors provide the frame and tactile signage. See Current Vendor Information section for more details.

D. Walking Surfaces

The purpose of defining standards for walking surfaces is to enable persons traveling in wheelchairs to experience minimal vibrations. It is also intended to reduce tripping hazards for other mobility-impaired persons or visually impaired persons who walk with canes.

The CTA's preference for a walking surface is a non-stamped or no-texture walking surface. However, architectural paving has become an important aesthetic design element in new transit centers and light rail stations.

To reduce vibrations, while recognizing the importance of an aesthetic surface treatment, it is recommended that any stamped concrete or pavers be limited to a pattern with no less than 24" x 24" dimensions. Any accent paving with dimensions less than
24" x 24" should be limited to non-primary walkway areas. Patterns with dimensions smaller than 24" x 24" should never be used in the designated accessible path.

In regards to control/expansion joints and the static coefficient of friction for walking surfaces, VTA complies with both ADA requirements and California Title 24 requirements. Walkways should also be clear and unobstructed per ADA regulations.

See Figure 37 for an example of walking surfaces.

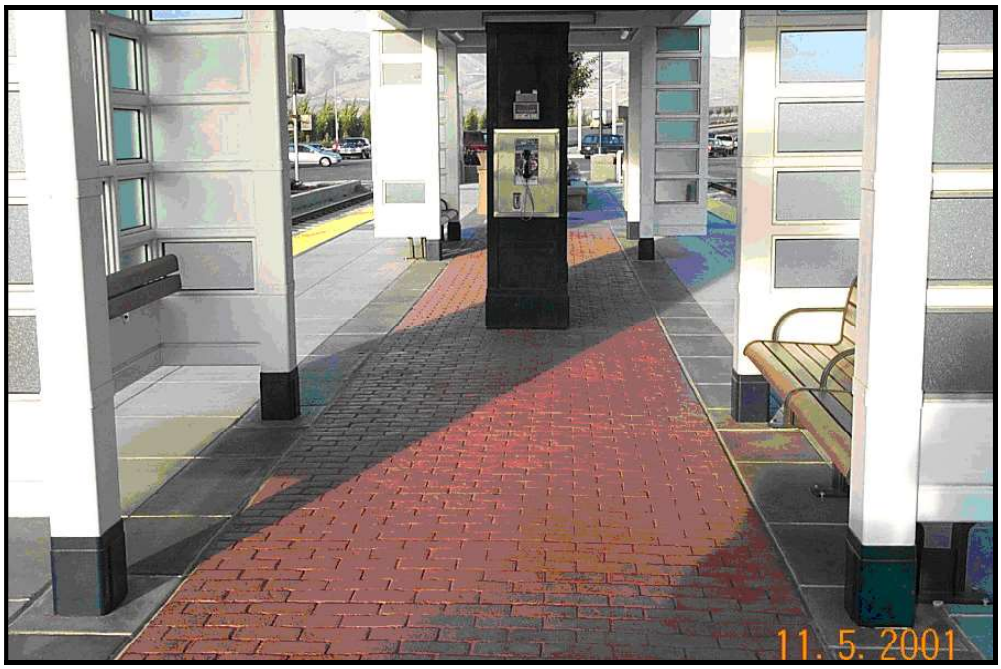


Figure 37: Example of mixed use of walking surfaces and aesthetic paving in center of light rail platform with larger pavers in the designated accessible path along the platform edge. Location: I-880/Milpitas Light Rail Station.

E. Hazardous Vehicular Areas

The purpose of identifying hazardous vehicular areas is to enhance safety for visually impaired passengers who must traverse vehicle roadways or parking lots to access different modes of transit.

It is recommended that in locations where pedestrian walkways adjoin or cross roadways at curb ramps, the boundaries between the pedestrian area and the vehicular area should incorporate a detectable warning band. ADA specifications addressing this particular issue are anticipated in the future.

Figure 38 below is an example.

Figure 38: Detectable Warning Band at edge of pedestrian path adjacent to vehicular roadway
Location: Mountain View Transit Center

F. Audible Signals

The purpose of audible signals is to provide additional cues to pedestrians with visual impairments in order to cross streets independently and safely. The major signalized crosswalks to a light rail station or transit center should include audible signals at each intersection.

In crossing east to west, one type of audible sound is used. This sound can

best be described as a high-pitched “cuckoo, cuckoo”. For crossing north to south, a different sound is used. This sound can best be described as a “chirp, chirp”.

If VTA is purchasing and installing traffic signals at project site locations, VTA should ensure audible signals are installed subject to City/County approval. If there are pre-existing traffic signals within the scope of the project VTA should request the purchase and installation of audible signals by the local jurisdiction. Each jurisdiction has its own unique approval process.

G. Current Vendor Information

VTA has used the following vendors on past projects:

Guidance Tile
Manufactured and distributed by Engineered Plastics, and known as Armor Tile: Directional Bar Tile, Decision Tile, Crosswalk Guidance Tile and Detectable Warning Tile.

Contact: Ken Szekely
Engineered Plastics
300 International Drive, Suite 100
Williamsville, NY, 14221.
800-682-2525

The web site address is www.engplastics.com. Information is also available at www.sweets.com. For additional information on the products, you can request a catalog with specifications and samples. A CD is available which contains CAD drawings.

Guidance Tile
Manufactured and distributed by ADA Solutions, Inc. Composite Way-Finding products include Directional Bar Tiles and Crosswalk Guide Tile. Composite Tactile Warning Surface Panels and panels for pedestrian crossings are also manufactured.

Contact: Helmut Klohn, Operations Manager
1 Survey Circle-2d floor
North Billerica, MA 01862
800-372-0519

The web site is www.adatactilesystems.com. Drawings are available in metric conversions and are on a CD. A catalog is also available.

Tactile Signage
Designer Sign Systems produces Raised Letter/Braille signage.

Contact: Judy Brunke
Designer Sign Systems
332 Phelan Ave.
San Jose, CA 95112
408-293-3036

Paratransit Signage
The frames for this sign are available from VTA Bus Stop Maintenance. The non-tactile portion of the sign is produced by VTA Creative Services.

The vendor for the tactile portion of the sign is Coast Engraving.

Contact: Sam Woolb
Coast Engraving
1097 N. Fifth St.
San Jose, CA
408-297-2555

H. Future Considerations

Every project needs a wish list. As new light rail stations and transit centers are approved, designed and built, the list of additional improvements grows. A short list of items that could further enhance the accessibility of VTA properties in the future is provided below.

i. Talking Signs. The Talking Signs technology is an infrared wireless communication system that provides remote directional human voice messages that make independent travel possible for visually impaired and print-handicapped individuals. It is used wherever landmark identification and wayfinding assistance are needed. The system was first installed in 1995. It consists of short audio signals sent by invisible infrared light beams from permanently installed transmitters to a hand-held receiver that decodes the signal and delivers the voice message through its speaker or headset. The signals are directional, and the beam width and distance can be adjusted. It works effectively in both interior and exterior applications. To use a Talking Sign system, the user scans the environment with the hand-held receiver. As individual signals are encountered, the user hears the messages. Messages are unique and short. They repeat and continue to identify key features in the environment. VTA engineers have included conduits for the possible addition of Talking Signs at the Mountain View Transit Center, the Gilroy Transit Center and

some of the new light rail stations. One location in particular that would greatly benefit from a Talking Sign installation is the Diridon Caltrain station pedestrian tunnel. Caltrain/JPB plan to install Talking Signs at the station, including portions of the pedestrian tunnel. VTA has a connecting tunnel that takes passengers to and from the San Jose Diridon Light Rail station (Vasona). Visually impaired pedestrians would greatly benefit from a continuation of the Talking Signs through this portion of the tunnel.

ii. Tactile maps. The use of tactile maps has been popular with large transit agencies, most notably LA Metro. Accessible Services has a set of the LA Metro maps available for viewing. They can be used by visually impaired individuals (8"x11" format) or produced on a larger scale for display at transit centers and light rail stations.

iii. Lighted crosswalks. The current technology is called "LED In Roadway Warning Light" and was evaluated by Caltrans in 1997 and is considered acceptable in crosswalk applications. The best applications are at mid-block crosswalks in streets or transit centers where drivers normally do not anticipate pedestrian crossings or where pedestrians are visually impaired and cannot see oncoming traffic. In brief, the design uses amber flashing lights which can be seen from at least ¼ mile away during the day or night. These impact-resistant lights are imbedded one inch in the pavement with epoxy. The cables are imbedded in the pavement just like signal loop detectors. They only require 12 volts to operate and can be powered by solar batteries. There are several locations in Santa Clara County that have these installations. One is at Foothill College in Los Altos, one is in Gilroy on Monterey Road between 7th Street and 8th Street, and on Camden Avenue at Winterset Way in San Jose. This warning device would be very useful at some of the new light rail stations which are adjacent to bus transit centers.

iv. Upgrades at Existing Transit Facilities. Most of the older light rail stations and transit facilities did not have any Directional Bar Tile or Crosswalk Guidance Tile installed. These minor add-ons would improve wayfinding for the visually impaired passenger, including those persons with low vision or poor vision. Also, there was some inconsistency in the application of Directional Bar and Crosswalk Guidance Tiles at the various light rail stations and transit centers. These variations were a result in part to changes in philosophy over the years about the application of the products. If possible, minor adjustments and alterations to the installation and placement of these products, consistent with the guidance herein, should be made to improve consistency and usability by VTA

customers.

In summary, there has been a long and concentrated effort to improve accessibility and wayfinding at both VTA transit centers and light rail stations. Key participants included the Committee for Transit Accessibility, Accessible Services Department staff, VTA facilities project managers and engineering design staff, consultants, contractors and private firms. Many facility design improvements have been made with the inclusion of the products and design enhancements described in this supplemental guide. However, much still needs to be done to achieve a uniform design throughout VTA facilities. This manual provides the basic framework.

VII. TRANSIT VEHICLE SPECIFICATION

A. Basic coach data.

See Figure 24 thru 26

B. Bus Turning Radii

Bus turning radii standards should be used whenever possible, on all streets identified as transit streets. While radii not equal to these standards can be used, they will result in a degradation of smooth vehicle movement through an area.

A 50-foot radius will ensure that large transit coaches -can safely conduct turning movements based on a typical coach size, as show in Figure 27. In areas that have service provided by tourist, airport, or hotel over-the-road coaches, a 55-foot radius ensures that all these coaches can maneuver smoothly.

C. Bus Maneuvering

Figure 15 shows minimum distances required for buses to maneuver pass a traffic island, parked bus or parked car to pull-in parallel to the curb/bus stop.

D. Bus Parking Standards

Figure 19 shows typical bus stall configuration and aisle width for bus parking.

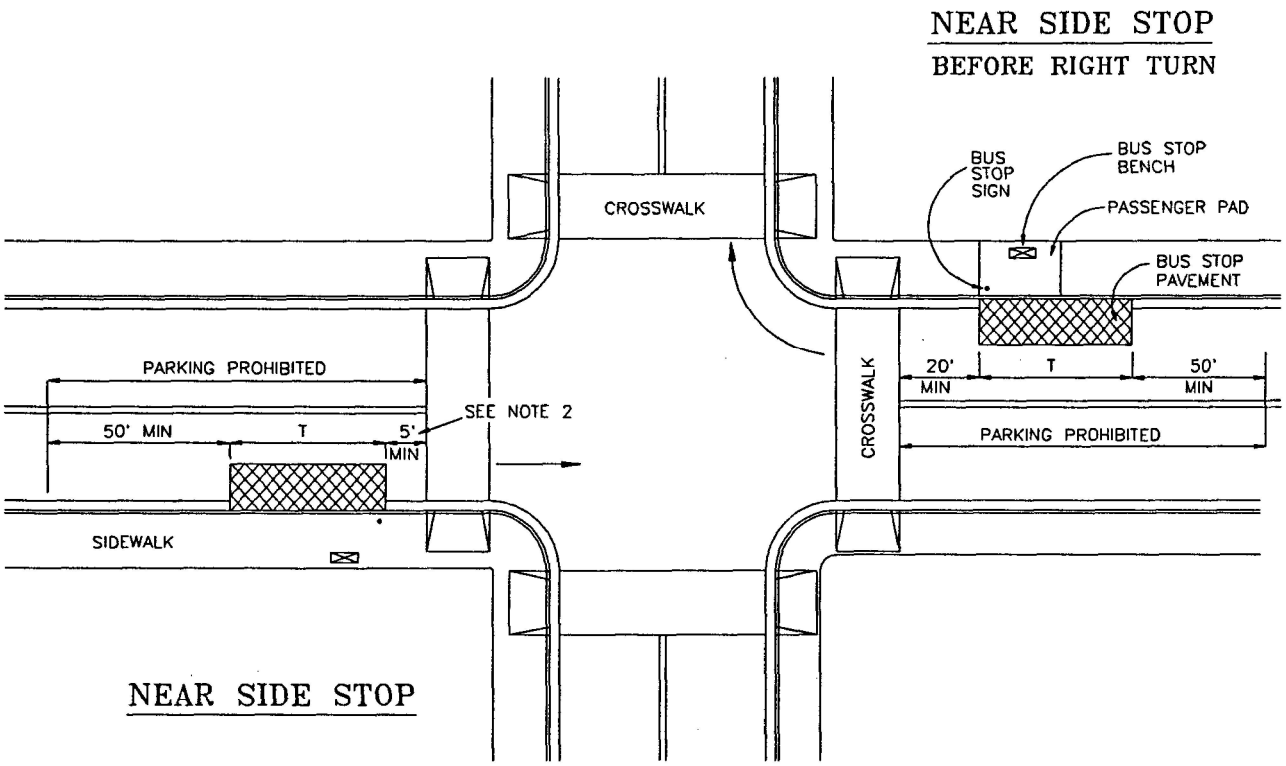
E. Road Grades

Road grades refer to the maximum slope' or grade that a standard 40-foot transit bus can negotiate safely and economically. All public roads, private roads and driveways proposed for bus service must be designed

with grades less than the maximum wherever possible.

In an up hill direction, the maximum sustained grade for roadways designated for bus service should not exceed 6 percent. For the downhill direction, the roadway should be designed with a maximum 12 percent grade. In some cases where the roadway is steep, a climbing lane for buses and trucks will be needed. These maximum grades are demonstrated in Figure 28, In addition, abrupt changes in grades should be avoided, due to bus overhangs and ground clearance requirements. Vertical curves should be specified were necessary.

Bus Stop and Passenger Facilities Standard Details - List of Figures



T = 50' FOR STANDARD BUS
T = 70' FOR ARTICULATED BUS
T = 110' FOR TRANSFER POINT

NOTES:

1. FOR BUS STOP PAVEMENT, PASSENGER PAD, BENCH AND SIGN DETAILS, SEE APPROPRIATE DETAILS.
2. THE LENGTH SHOULD BE INCREASED TO 35' MIN IF HEAVY RIGHT-TURN MOVEMENT OF OTHER VEHICLES.

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

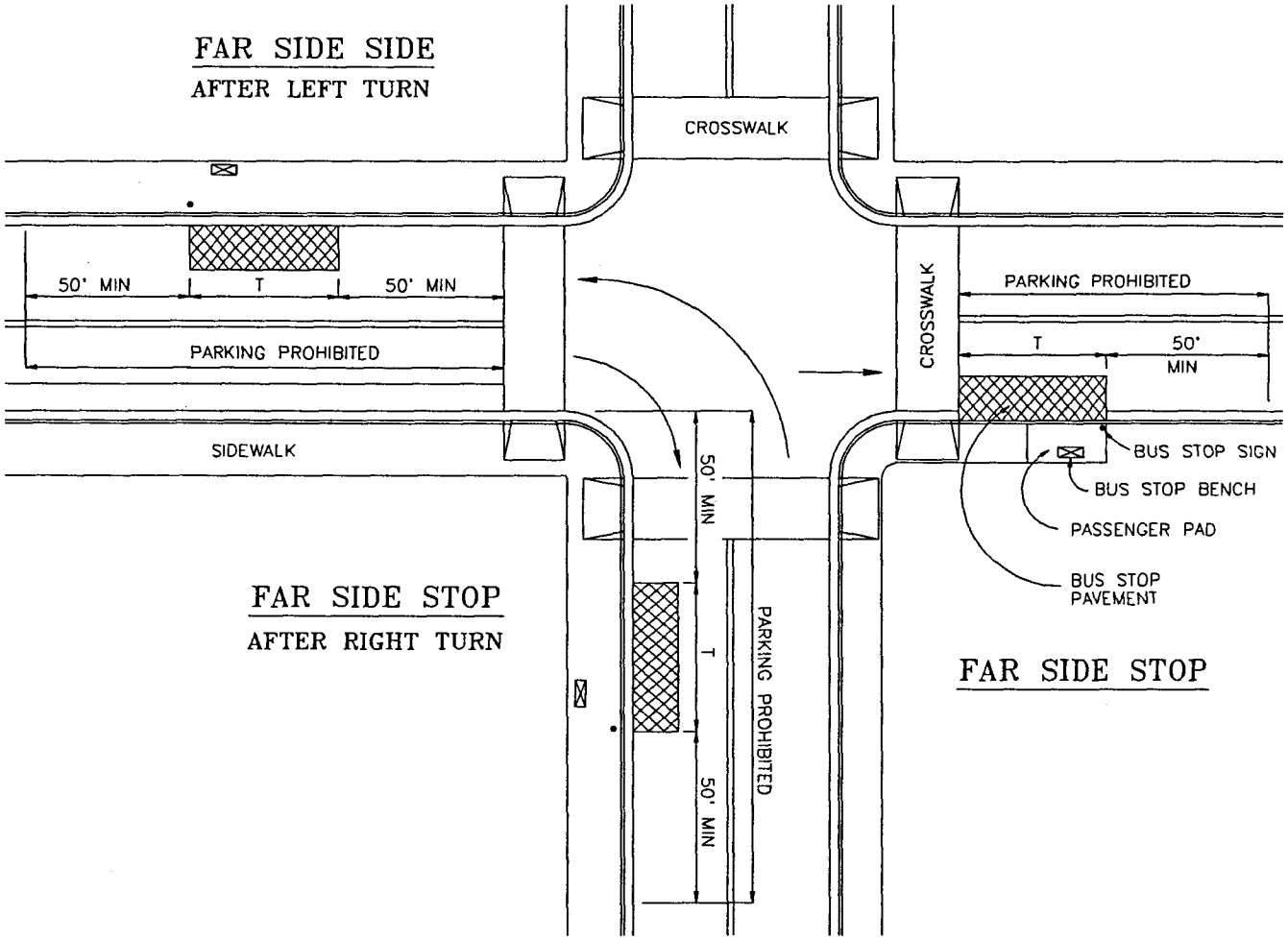
SANTA CLARA Valley Transportation Authority

BUS STOP INSTALLATION NEAR SIDE STOPS

FIGURE 1

CAD FILE NAME 2008_FSD0101.DWG

DATE AUG 2008



T = 50' FOR STANDARD BUS
T = 70' FOR ARTICULATED BUS
T = 110' FOR TRANSFER POINT

NOTES:

1. FOR BUS STOP PAVEMENT, PASSENGER PAD, BENCH AND SIGN DETAILS, SEE APPROPRIATE DETAILS.

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

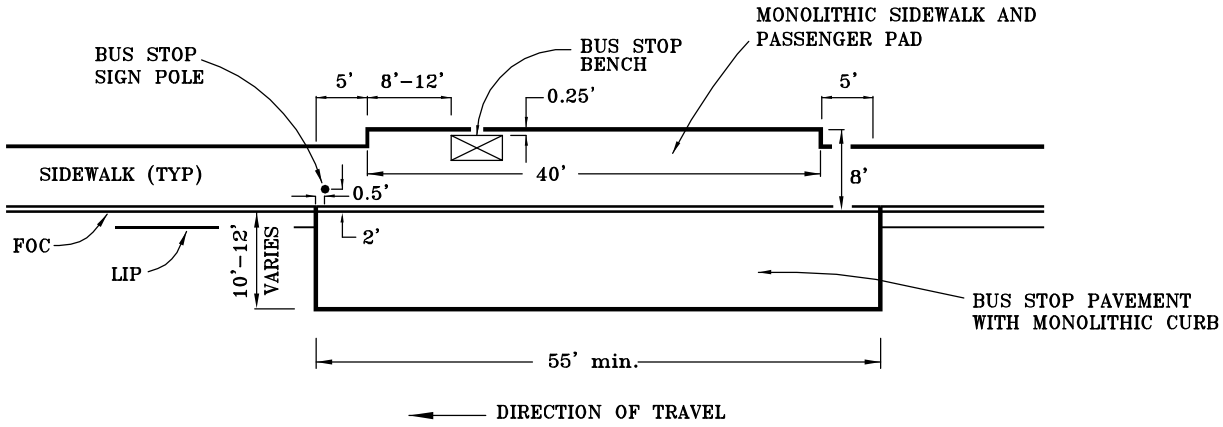
SANTA CLARA Valley Transportation Authority

BUS STOP INSTALLATION FAR SIDE STOPS

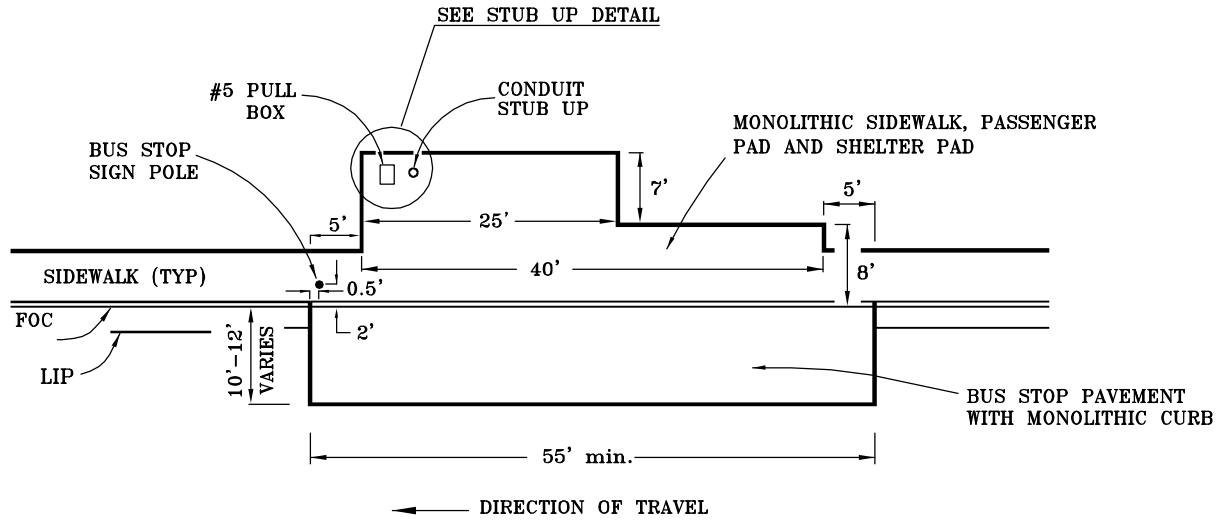
FIGURE 2

CAD FILE NAME 2008_FSD0201.DWG

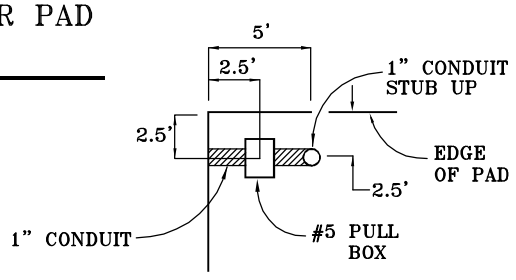
DATE AUG 2008



BUS STOP AND PASSENGER PAD
WITHOUT SHELTER



BUS STOP AND PASSENGER PAD
WITH SHELTER



STUB UP DETAIL

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

SANTA CLARA
Valley Transportation Authority

BUS STOP CONFIGURATION

FIGURE
3

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2008_FSD0301.DWG

DATE
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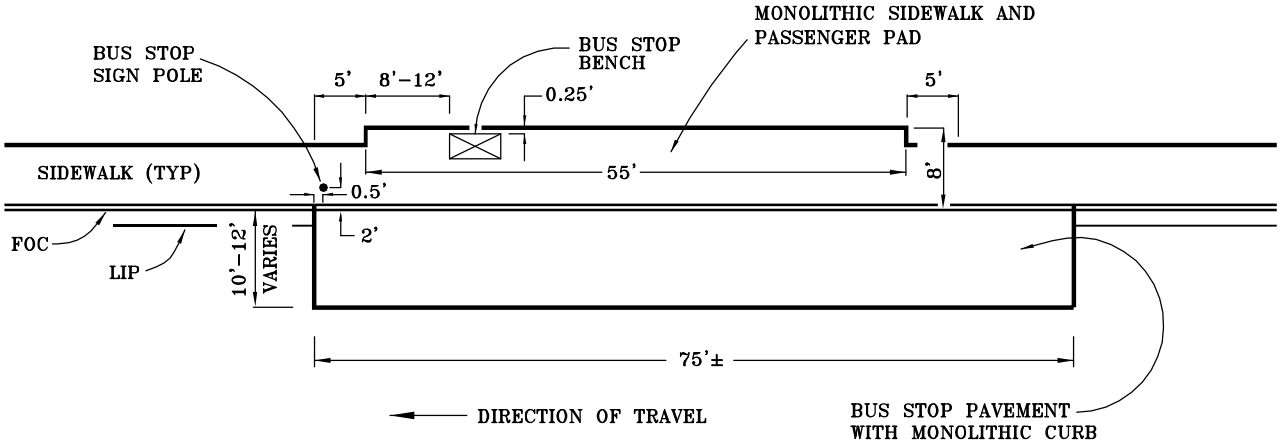
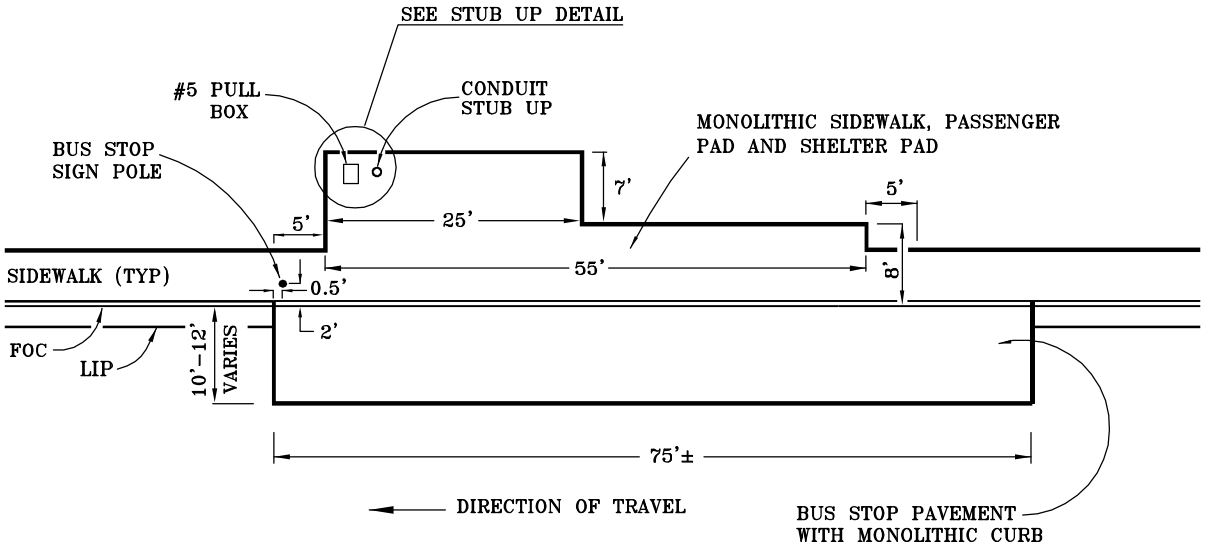
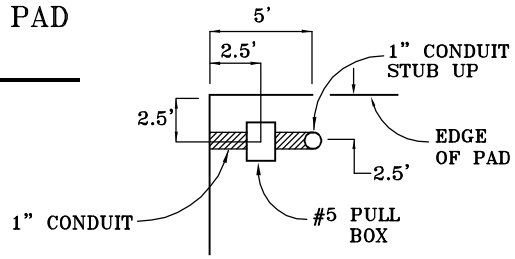


BUS STOP AND PASSENGER PAD
WITHOUT SHELTER



BUS STOP AND PASSENGER PAD
WITH SHELTER



STUB UP DETAIL

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

SANTA CLARA Valley Transportation Authority

BUS STOP CONFIGURATION ARTICULATED BUSES

FIGURE 4

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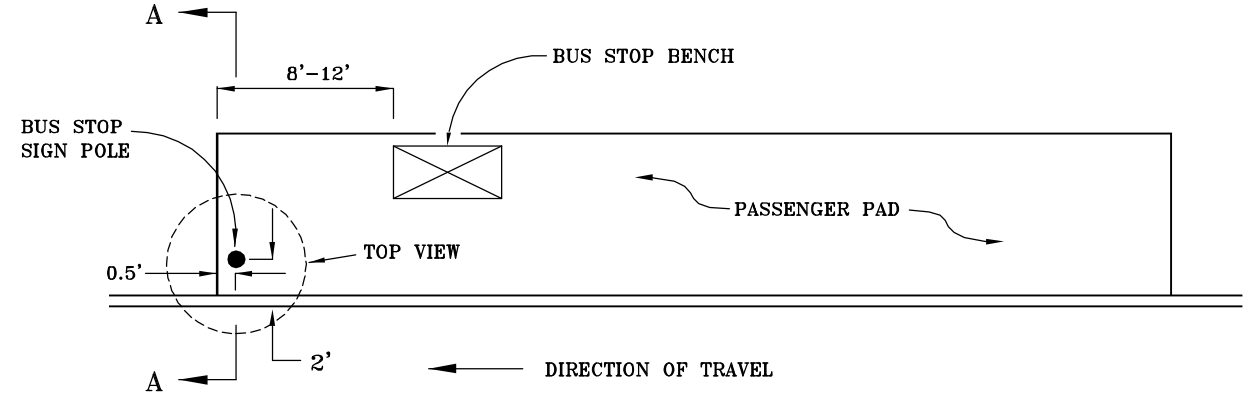
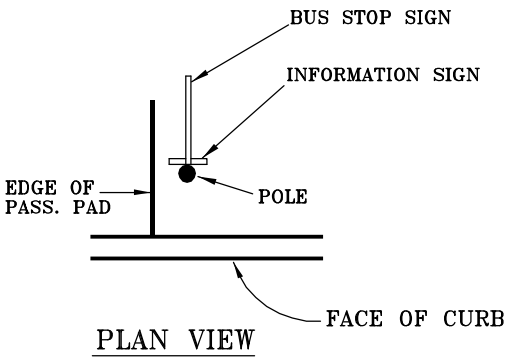
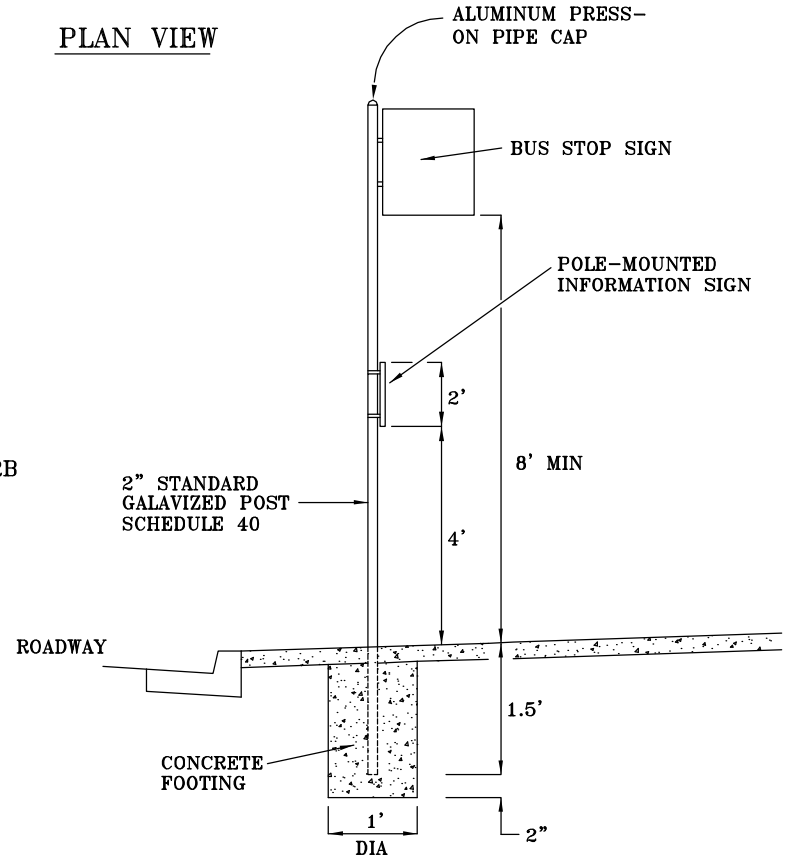


PLAN VIEW



PLAN VIEW



SECTION A-A

NOTES

1. SIGN TO BE MOUNTED PERPENDICULAR TO ROADWAY.
2. FOUNDATION SHALL BE CLASS B CONCRETE PLACED AGAINST UNDISTURBED SOIL.
3. ID SIGN POLES TO BE LOCATED WITHIN AN EXISTING CONCRETED AREA, CORE 3" MIN DIA HOLE AND FILL AROUND POST WITH PCC GROUT. DEPTH OF POST AND GROUT TO BE SIMILAR TO SECTION A-A.

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

SANTA CLARA Valley Transportation Authority

BUS STOP SIGN INSTALLATION

FIGURE 5

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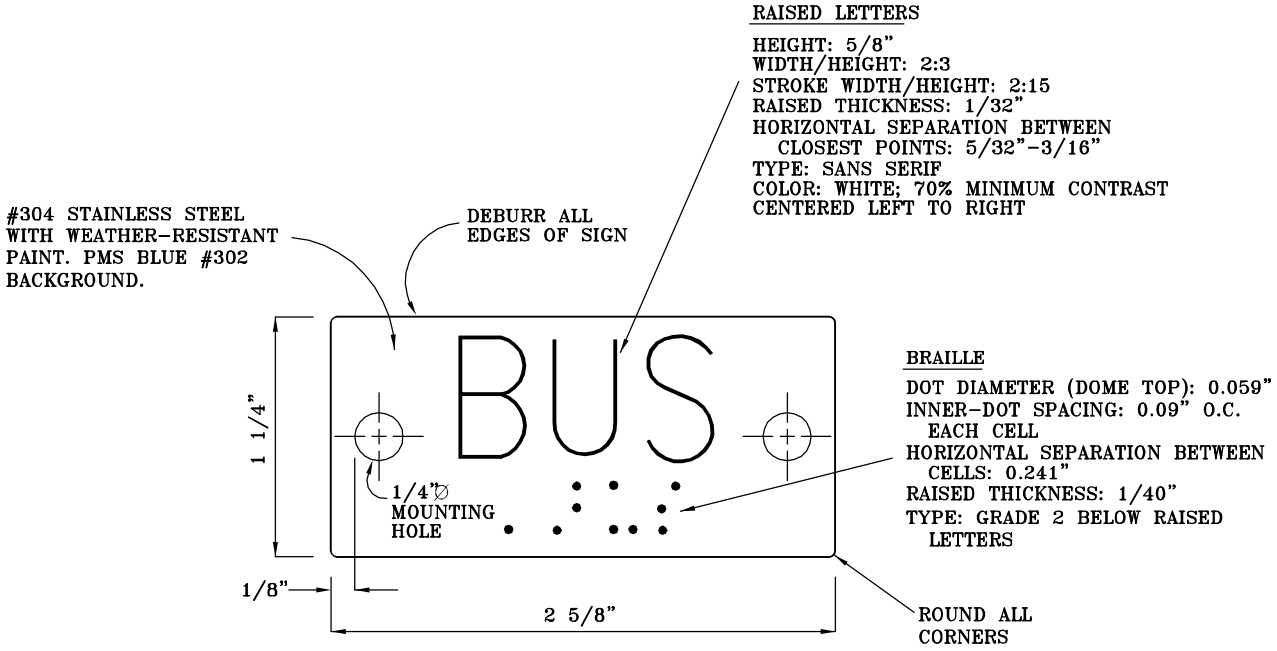
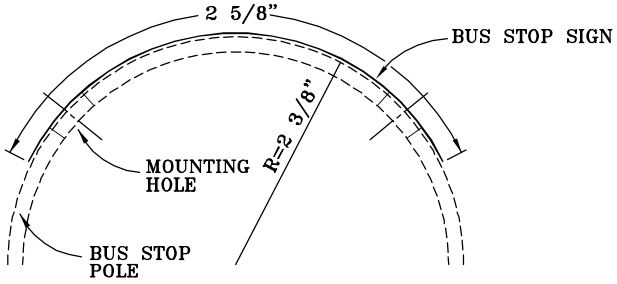


FRONT VIEW



SIGN TO BE CURVED TO FIT 2 3/8" OUTSIDE DIAMETER BUS STOP POLE.

TOP VIEW

NOTES:

1. SIGNAGE SHOULD BE DURABLE AND TAMPER-RESISTANT.
2. SIGNAGE MUST COMPLY WITH ALL APPLICABLE REGULATIONS SET FORTH BY THE AMERICANS WITH DISIBILITIES ACT AND THE CALIFORNIA CODE OF REGULATIONS, TITLE 24.

SCALE: 1"=1"

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

SANTA CLARA Valley Transportation Authority

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RAISED LETTERS AND BRAILLE SIGN DETAIL

FIGURE
6

DATE
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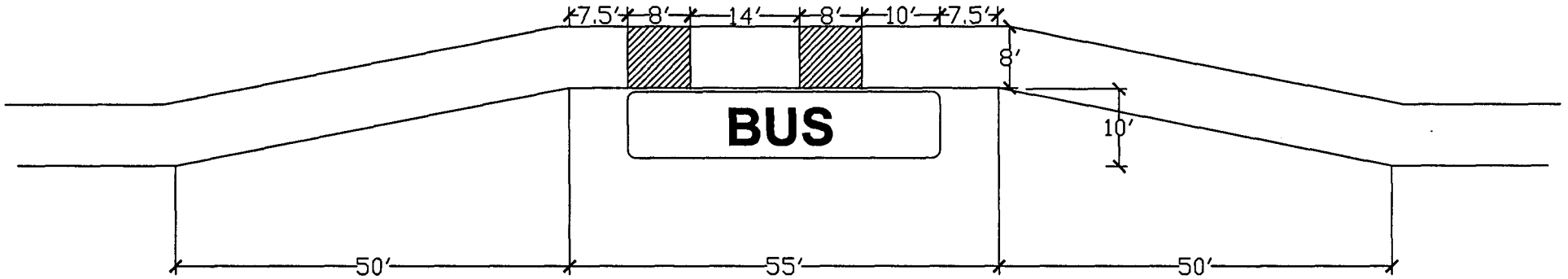
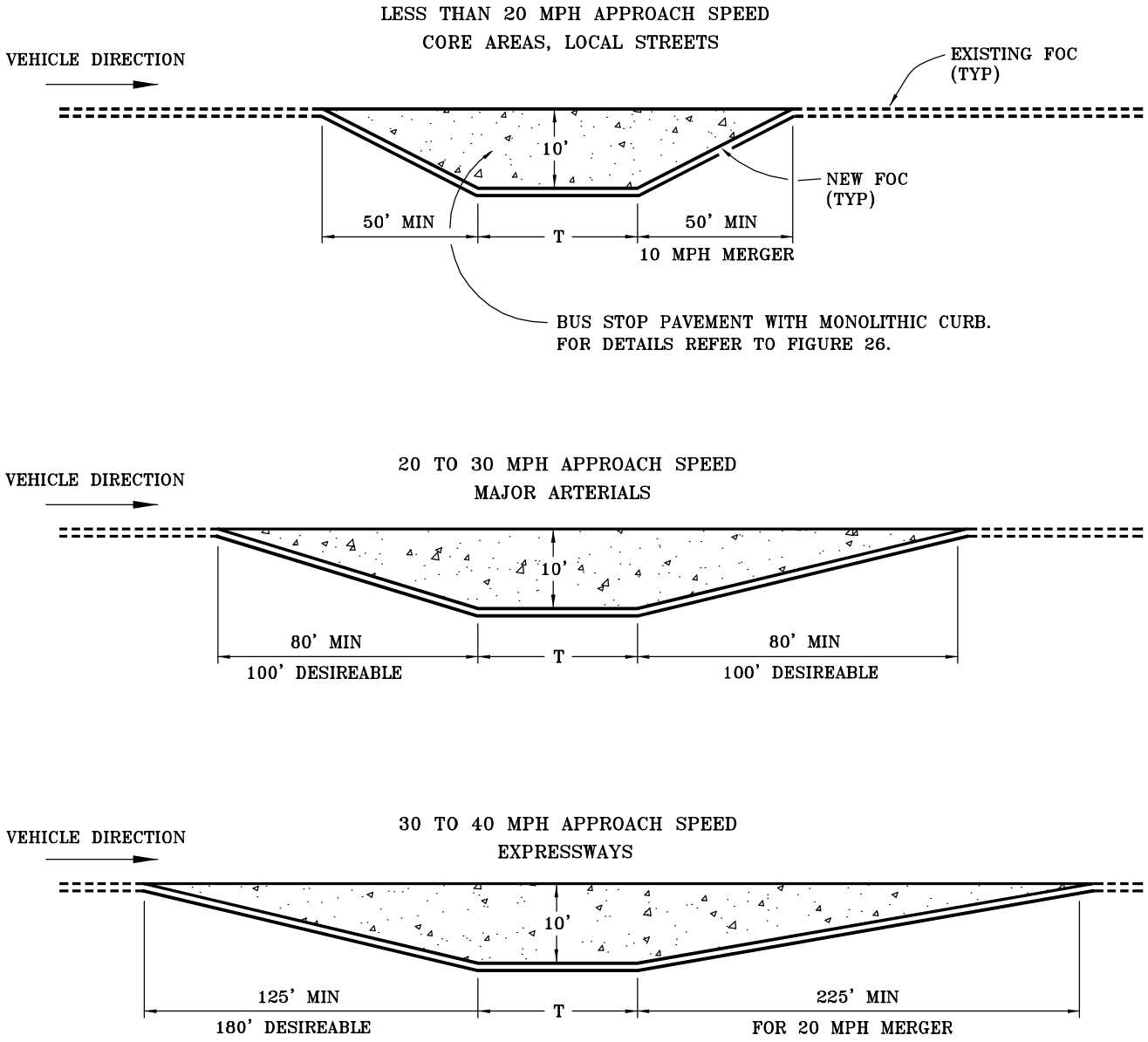


SHADED AREAS SHOWN ON SIDEWALK ADJACENT TO THE BUS STOP SHALL BE CLEAR OF ANY PHYSICAL OBSTRUCTIONS.

SCALE 1"=20'

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS		
SANTA CLARA Valley Transportation Authority	BUS STOP DESIGN GUIDELINES	FIGURE 7
CAD FILE NAME 2008_FSD0701.DWG		DATE AUG 2008



PLAN VIEW

NOTE:

T (TANGENT LENGTH) = 55' REQUIRED FOR ONE STANDARD BUS STOP
AND 75' FOR ONE ARTICULATED BUS STOP.

= T + 70' (X−1), WHERE X = # OF BUSES
(USE AT MAJOR TRANSFER TERMINAL)

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

SANTA CLARA Valley Transportation Authority

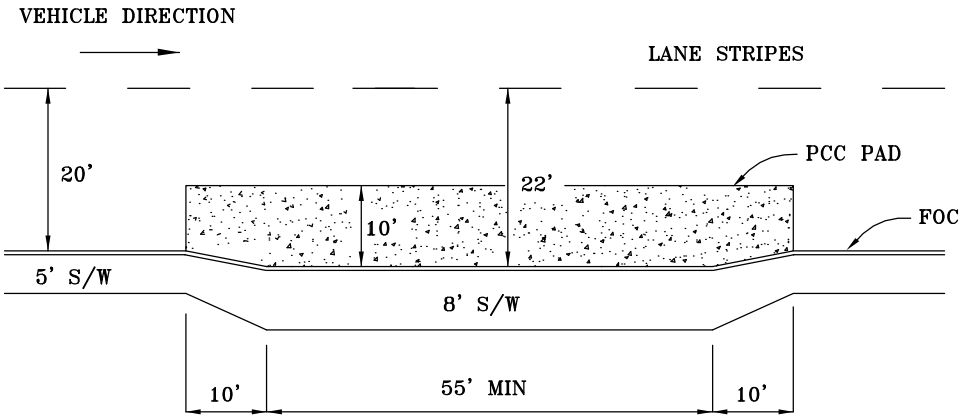
TYPICAL BUS DUCKOUT

FIGURE 8

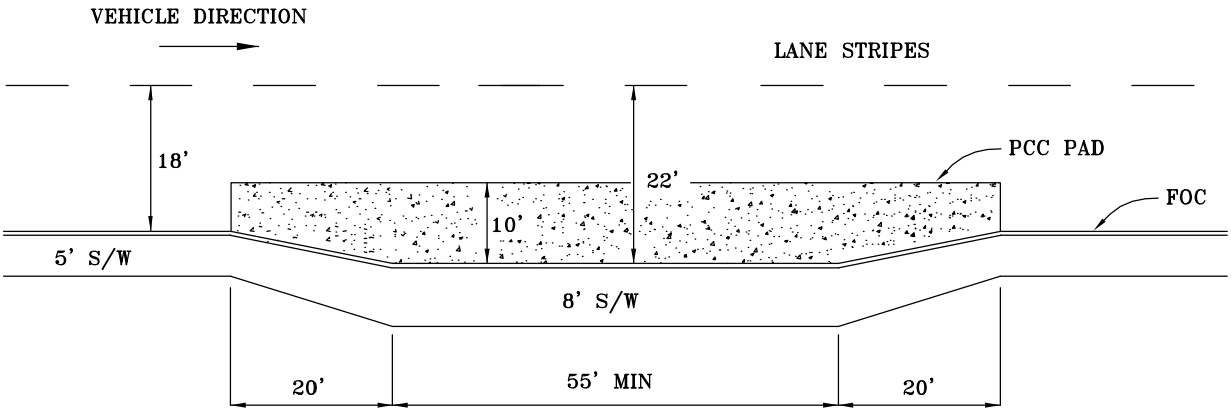
CAD FILE NAME 2008_FSD0801.DWG

DATE AUG 2008

TYPICAL 20' CURB LANE



TYPICAL 18' CURB LANE



BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

SANTA CLARA Valley Transportation Authority

MODIFIED BUS DUCKOUT TYPICAL LAYOUT

FIGURE 9

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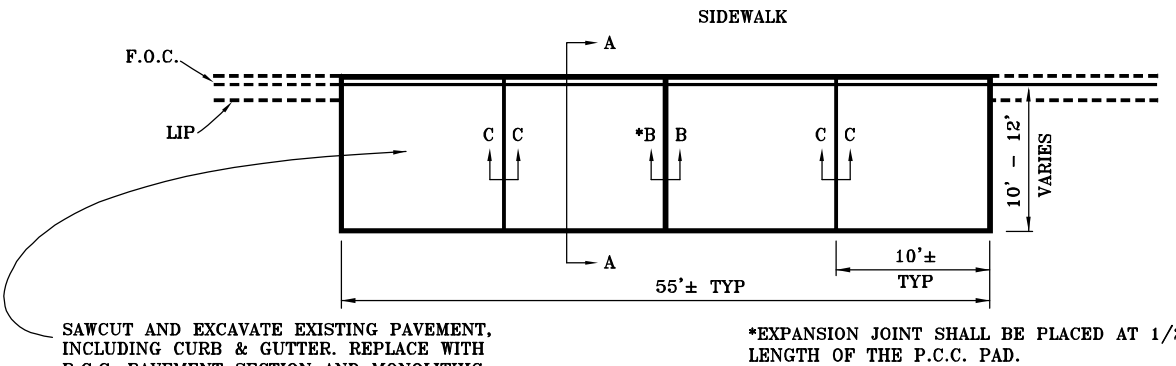
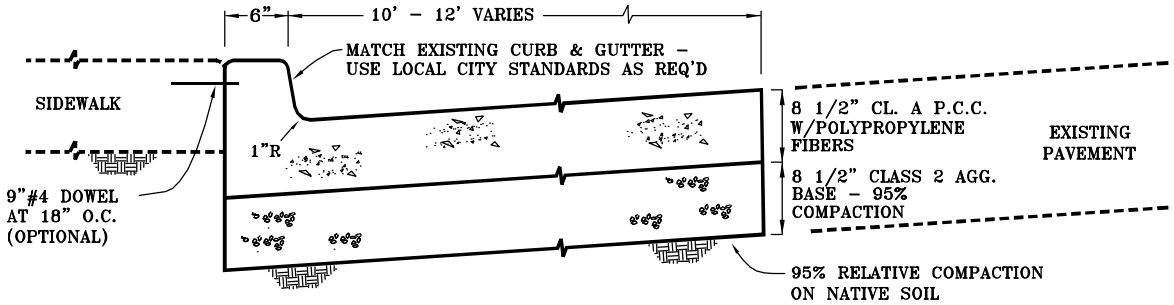
DATE AUG 2008



SAWCUT AND EXCAVATE EXISTING PAVEMENT, INCLUDING CURB & GUTTER. REPLACE WITH P.C.C. PAVEMENT SECTION AND MONOLITHIC CURB.

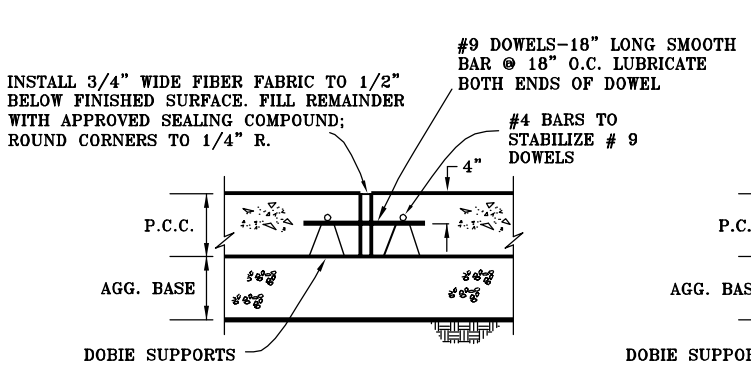
PLAN VIEW

*EXPANSION JOINT SHALL BE PLACED AT 1/2 THE LENGTH OF THE P.C.C. PAD.
IN LONG PADS, EXPANSION JOINTS SHALL BE PLACED AT APPROXIMATELY 50 FOOT INTERVALS OR AS SPECIFIED BY THE ENGINEER.



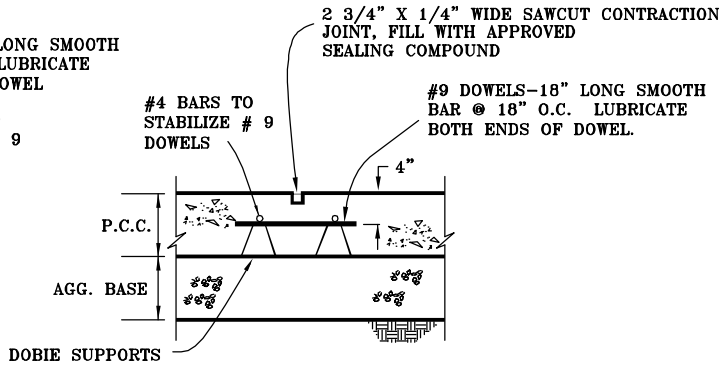
SECTION A-A

PCC PAVEMENT WITH MONOLITHIC CURB



SECTION B-B

EXPANSION JOINT



SECTION C-C

CONTRACTION JOINT

NOTE: FOR TECHNICAL SPECIFICATIONS REFER TO SHEET 2 OF 3.

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

SANTA CLARA Valley Transportation Authority

CAD FILE NAME: 2008_FSD1001.DWG

BUS STOP PAVEMENT DETAILS

SHEET 1 OF 3

FIGURE 10

DATE: AUG 2008

TECHNICAL SPECIFICATIONS

1. P.C.C. pavement with monolithic curb and gutter shall conform to the provisions in Section 40, " PORTLAND CEMENT CONCRETE PAVEMENT," and Section 90, " PORTLAND CEMENT CONCRETE" of the State Standard Specifications and these special provisions.

2. P.C.C. pavement shall be class A with a flexural strength of 650 psi at the age of 28 days to be determined by Test Method ASTM C78. Polypropylene fibers (Fibermesh or approved equal), length 1/2", shall be added to the concrete at a rate of 1 1/2 lbs/cy.

3. After spreading and compacting, P.C.C. concrete shall be given a preliminary finish , which shall be smooth and true to grade. In advance of curing operations, the pavement shall be given a final rough broom finish with grooves having a depth of 1/8" perpendicular to the curb and gutter.

4. All newly - placed concrete shall be cured in accordance with the provisions in Section 90-7, "Curing Concrete," of the State Standard Specifications. Curing compound to be used shall be applied to the P.C.C. following the surface finishing operations immediately before the moisture sheen disappears from the surface and before any drying, shrinkage or craze cracks begin to appear. Curing compound shall be applied at a nominal rate of one gallon per 150 square feet. At any point, the application rate shall be within +/- 50 square feet per gallon of the nominal rate specified.

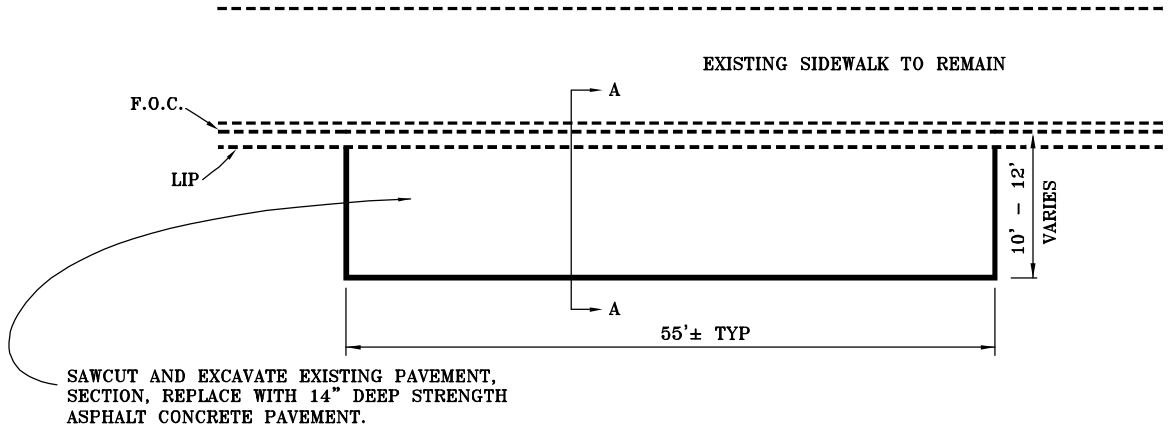
5. Sawcutting of the contraction joints must be performed within 24 hours after concrete has received final surface finish.

6. Contractor shall protect P.C.C. Pad as specified in Section 90-8.03, " Protecting Concrete Pavement." Where public traffic will be required to cross over new pavement, and if directed by the Engineer, Type III Portland Cement shall be used in concrete. When Type III Portland Cement is used in concrete, and if permitted in writing by the Engineer, the pavement may be opened to traffic as soon as the concrete has developed a modulus of rupture of 550 pounds per square inch. The modulus of rupture will be determined by Test Method ASTM C78.

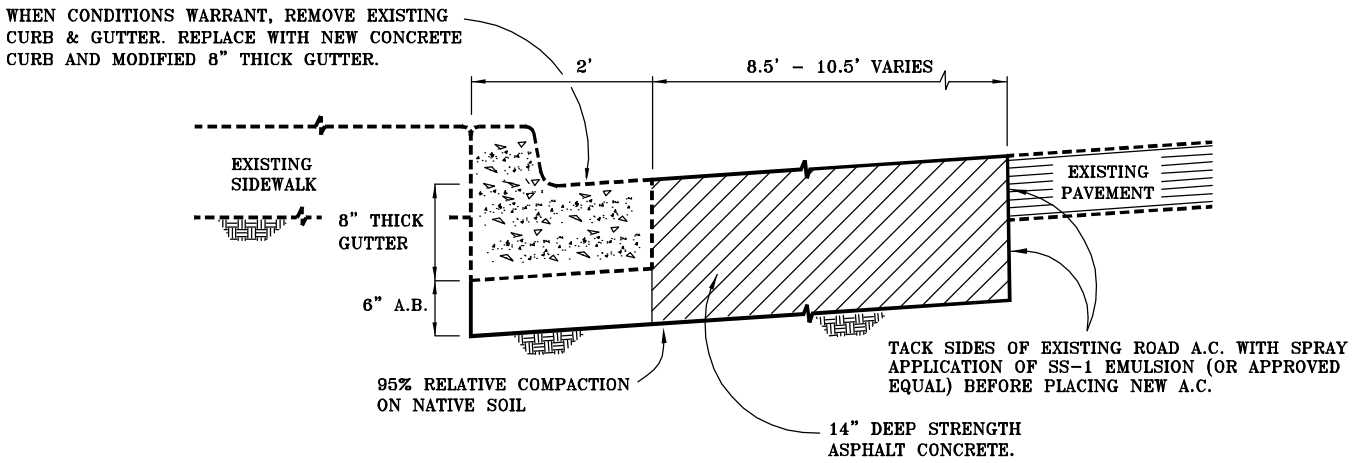
   No traffic or Contractor's equipment, except as hereinafter provided, will be permitted on the pavement before a period of ten (10) calendar days has elapsed after the concrete has been placed, nor before the concrete has developed a modulus of rupture of at least 550 pounds per square inch. Concrete that fails to attain a modulus of rupture of 550 pounds per square inch within 10 days shall not be opened to traffic until directed by the Engineer.

   Equipment for sawing contraction joints (weakened plane joints) will be permitted on the pavement as specified in Section 40-1.08B, "Weakened Plane Joints," of the State Standard Specifications.

7. Contraction joints, expansion joints and gaps between the P.C.C. pad and the existing pavement section shall be cleaned and sealed prior to permitting traffic on the pad. Joint sealing compound shall be type "A" joint seal and shall conform to the provisions of Section 51-1.12F of the State Standard Specifications. The 2 component polyurethane sealant shall be State Specification 8030 - 61J - 01 or approved equal.



PLAN VIEW



SECTION A-A

NOTES

1. ASPHALT CONCRETE (A.C.) PAD IS USED FOR BUS AVERAGE DAILY TRAFFIC (A.D.T.) OF 50 OR LESS.
2. 14" DEEP STRENGTH ASPHALT CONCRETE SHALL BE STATE STANDARD TYPE 'A' 3/4" MAX. MEDIUM GRADING, AND SHALL BE PLACED IN ACCORDANCE WITH STATE STANDARD SECTION 39.

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

SANTA CLARA Valley Transportation Authority

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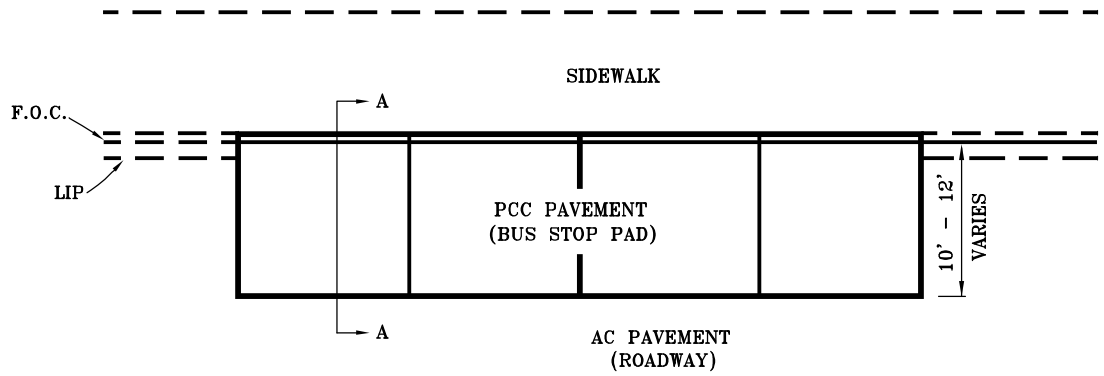
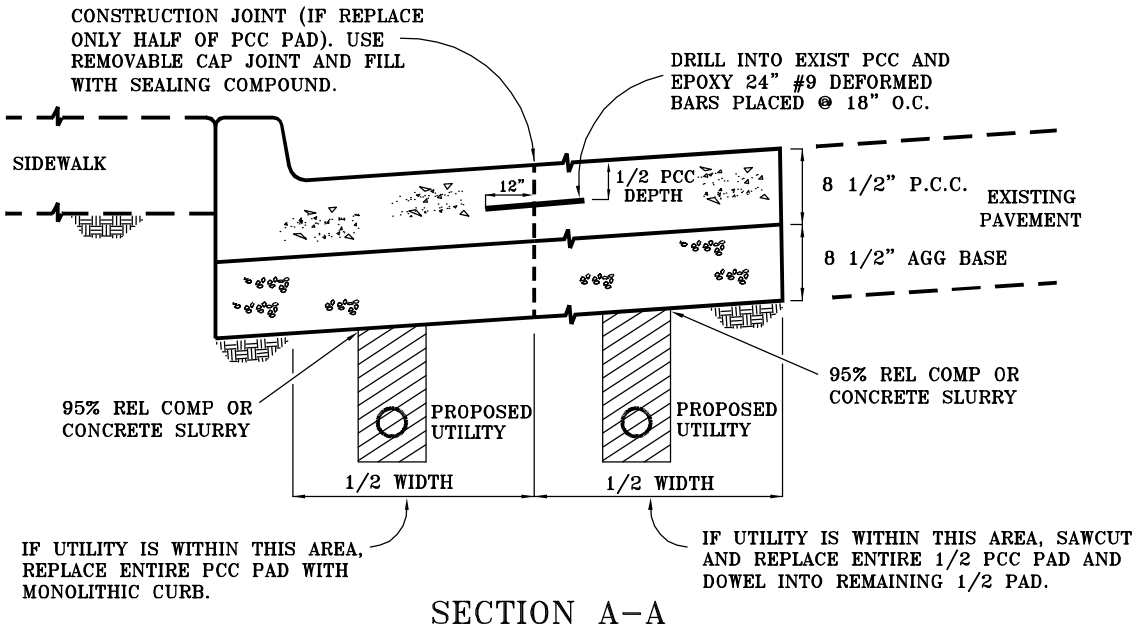
BUS STOP PAVEMENT DETAILS
ASPHALT PAD
SHEET 3 OF 3

FIGURE
12

DATE
AUG 2008



PLAN VIEW



SECTION A–A

PCC PAVEMENT BUS PAD

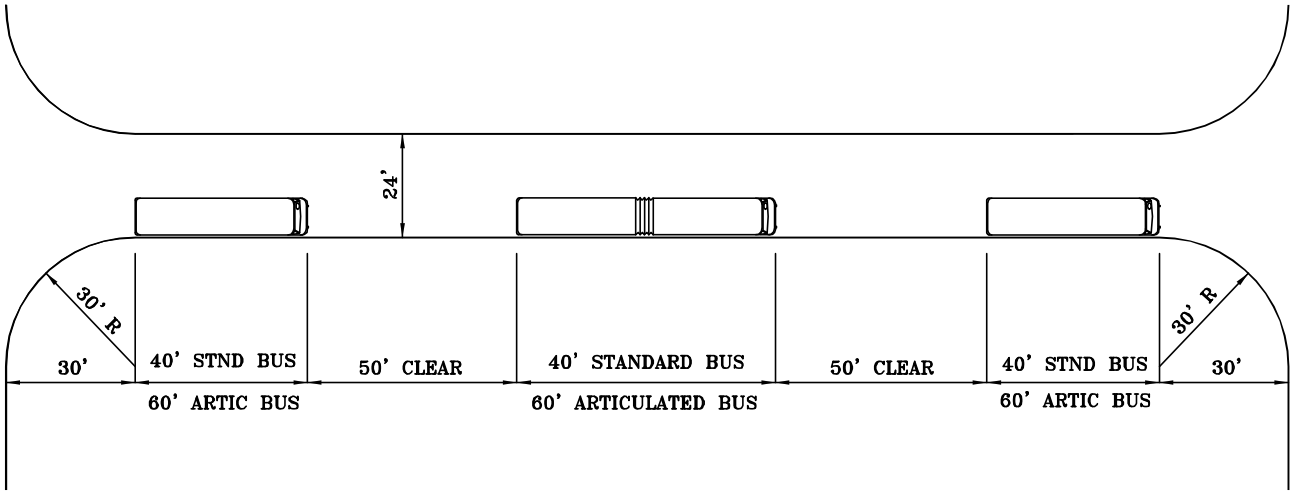
NOTES:

1. PCC PAVEMENT SHALL CONFORM TO THE DETAILS SHOWN ON SANTA CLARA TRANSPORTATION AGENCY BUS STOP PAVEMENT DETAILS FIGURE 26.

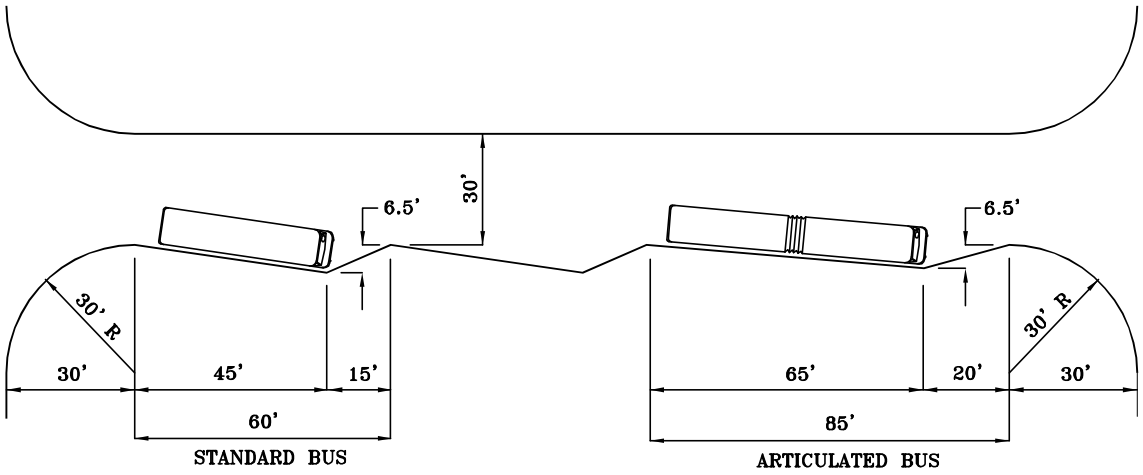
2. THIS DETAIL REFLECTS THE ABSOLUTE MINIMUM REQUIREMENTS. IT IS PREFERED THAT IF ANY UTILITY FALLS WITHIN THE PCC PAVEMENT, THAT IT EITHER BE BORE AND JACKED UNDER PAD OR THAT THE ENTIRE PCC PAD WITH MONOLITHIC CURB BE REPLACED.

3. IF ONLY THE OUTSIDE HALF OF THE PAD IS REPLACED, THE CONSTRUCTION JOINT SHALL CONFORM TO THE PROVISIONS OF SECTION 51-1.13, 'BONDING,' OF THE STATE STANDARD SPECIFICATIONS.

LINEAR BUS BAYS



SAWTOOTH BUS BAYS



BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

SANTA CLARA Valley Transportation Authority

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TRANSIT CENTER BUS BAY CONFIGURATION

FIGURE
14

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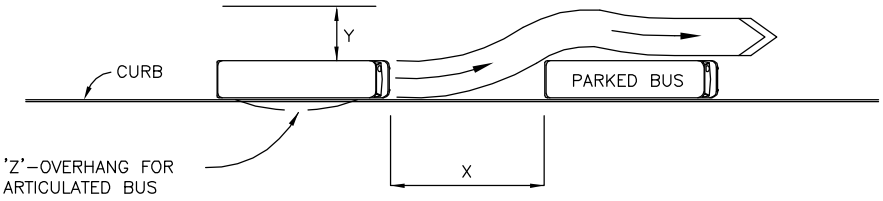
AUG 2008

PULL–OUT



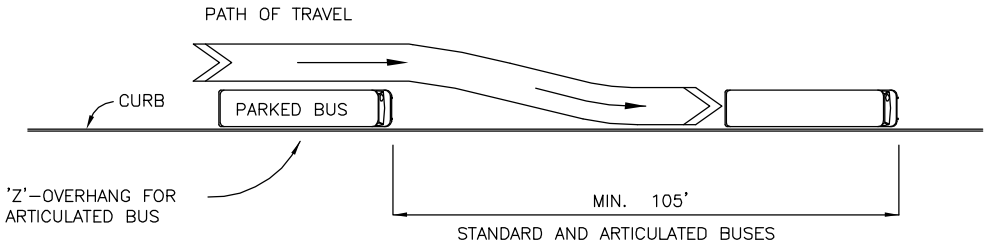
STANDARD BUS

WHEN 'X' IS	8'	10'	15'	20'	25'
MIN. 'Y' IS	18'	17'	16'	15.5'	15'

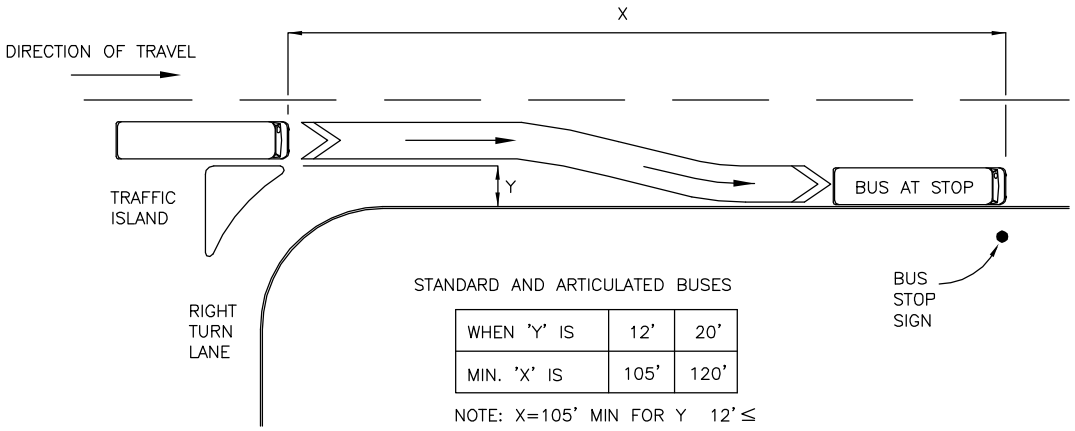
ARTICULATED BUS

WHEN 'X' IS	20'	25'	30'	35'
MIN. 'Y' IS	16'	15'	13.5'	13'
'Z IS	2'	1'	0'	0'

PULL–IN



PULL–IN AROUND TRAFFIC ISLAND



STANDARD AND ARTICULATED BUSES

WHEN 'Y' IS	12'	20'
MIN. 'X' IS	105'	120'

NOTE: X=105' MIN FOR Y 12'≤

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

SANTA CLARA Valley Transportation Authority

CAD FILE NAME
2008_FSD1501.DWG

BUS PARALLEL
PULL-IN AND PULL-OUT

FIGURE
15

DATE
AUG 2008

REQUIRED ACCESSIBLE PARKING STALLS

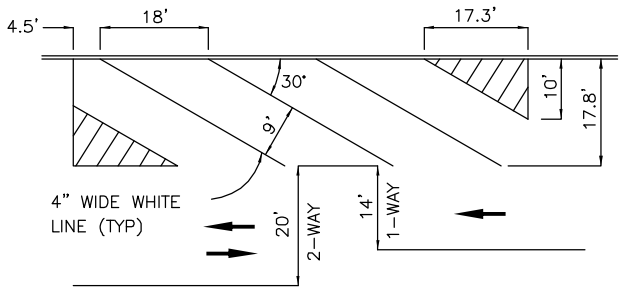
TOTAL PARKING IN LOT	REQUIRED MINIMUM NUMBER OF ACCESSIBLE SPACES
1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1000	2 percent of total
1001 and over	20 plus 1 for each 100 over 1000

~~Fig.22~~
Fig.16

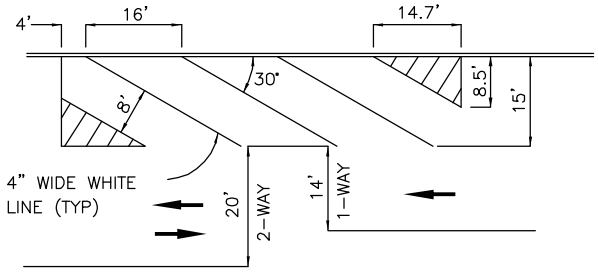
BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

SANTA CLARA Valley Transportation Authority	**REQUIRED ACCESSIBLE PARKING STALLS CALDAG**	FIGURE 16
CAD FILE NAME 2008_FSD1601.DWG		DATE AUG 2008

30° PARKING STALLS

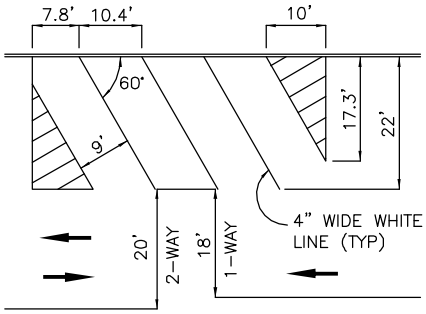


STANDARD PARKING STALL

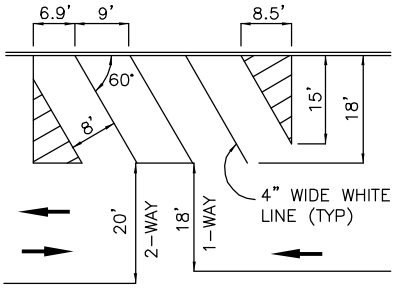


COMPACT PARKING STALL

60° PARKING STALLS

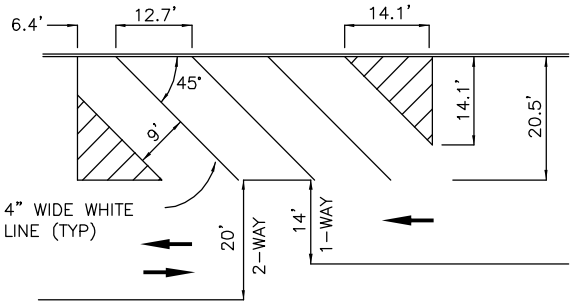


STANDARD PARKING STALL

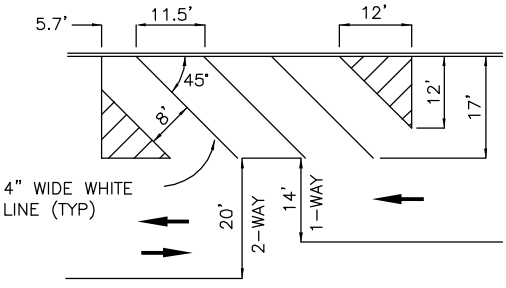


COMPACT PARKING STALL

45° PARKING STALL

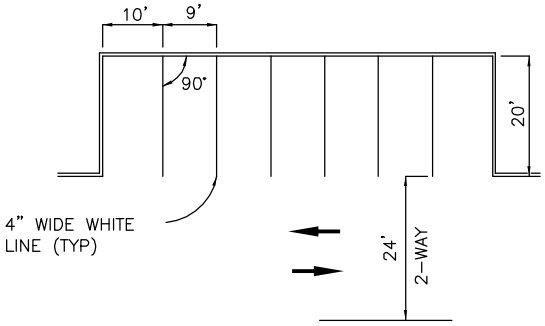


STANDARD PARKING STALL

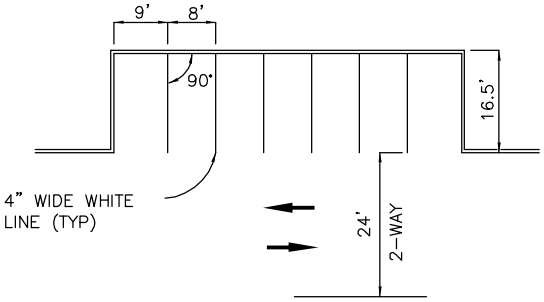


COMPACT PARKING STALL

90° PARKING STALL



STANDARD PARKING STALL



COMPACT PARKING STALL

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

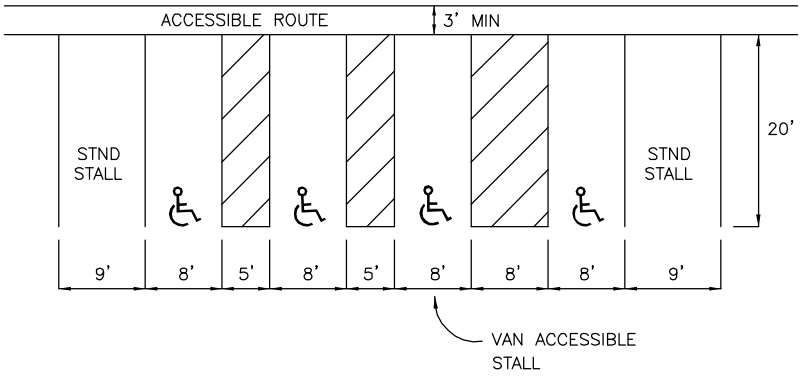
SANTA CLARA Valley Transportation Authority

CAD FILE NAME
2008_FSD1701.DWG

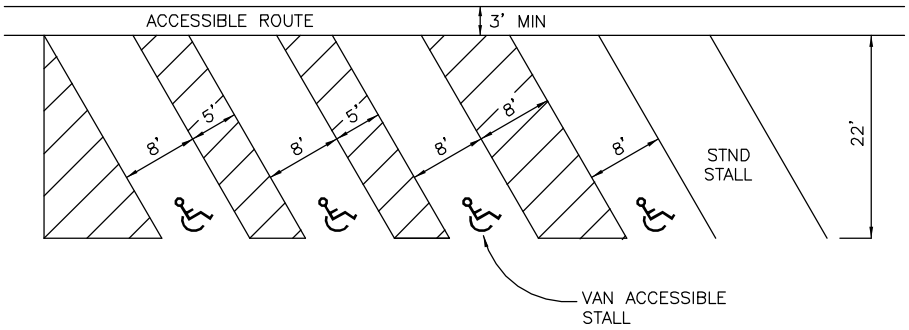
PARK AND RIDE PARKING LAYOUT

FIGURE
17

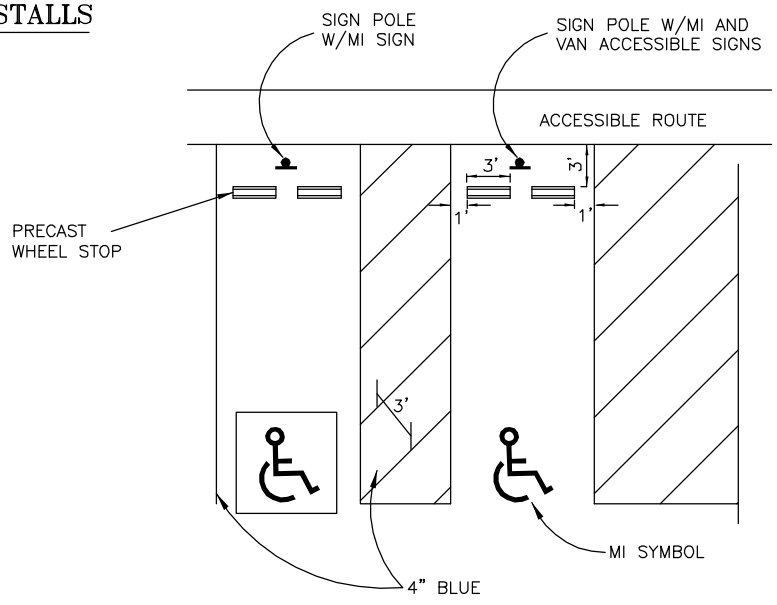
DATE
AUG 2008



90° PARKING STALLS



60° PARKING STALLS



MI STALL DETAIL

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

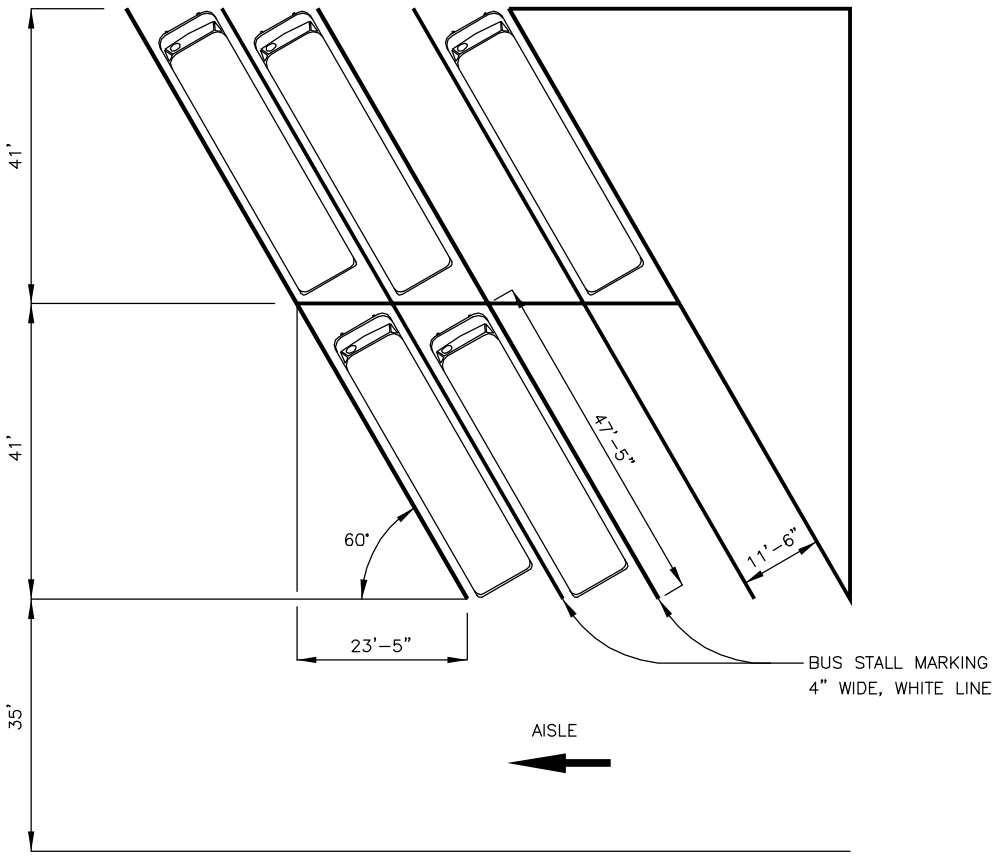
SANTA CLARA Valley Transportation Authority

MOBILITY IMPAIRED PARKING LAYOUT

FIGURE 18

CAD FILE NAME 2008_FSD1801.DWG

DATE AUG 2008



BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

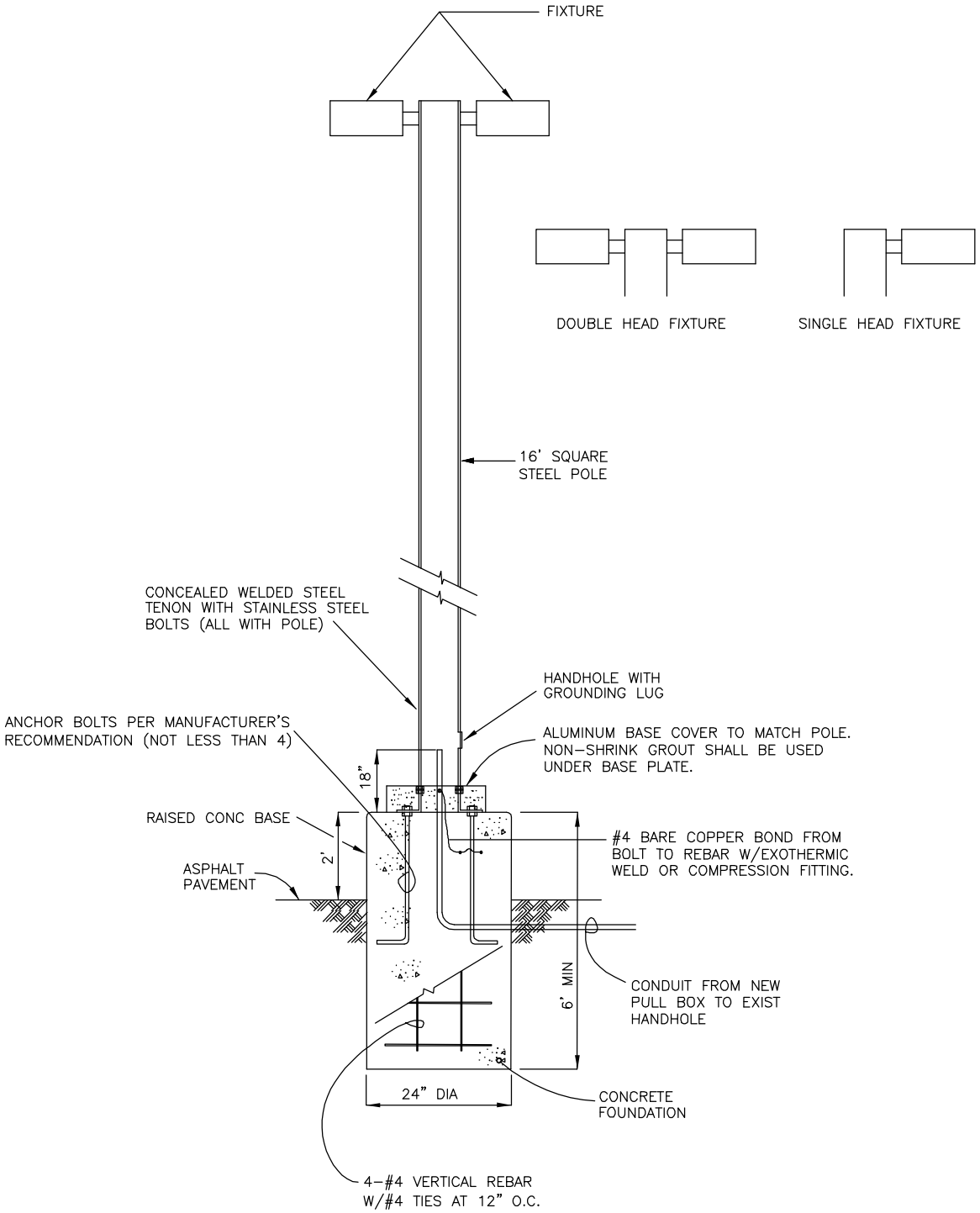
SANTA CLARA Valley Transportation Authority

BUS PARKING LAYOUT

FIGURE 19

CAD FILE NAME 2008_FSD1901.DWG

DATE AUG 2008



BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

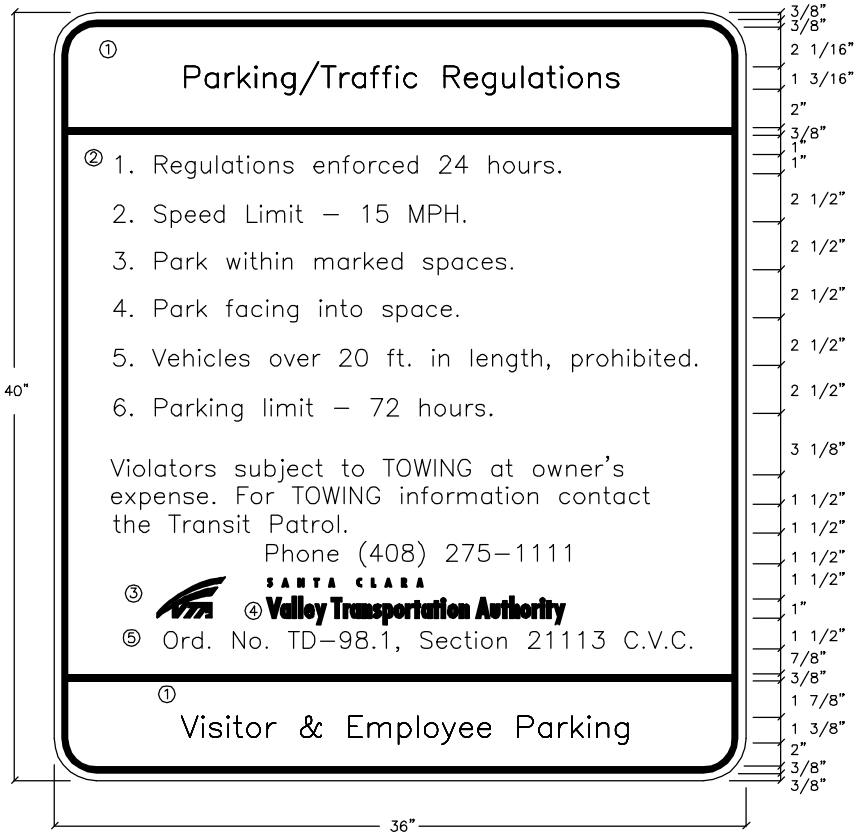
SANTA CLARA Valley Transportation Authority

STANDARD ELECTROLIER

FIGURE 20

CAD FILE NAME 2008_FSD2001.DWG

DATE AUG 2008



TDPR1

LEGEND:

① HELVETICA BOLD, CAPS AND LOWER CASE
② HELVETICA MEDIUM, CAPS AND LOWER CASE
③ VTA LOGO
④ VTA LOGO
⑤ HELVETICA LIGHT, CAPS AND LOWER CASE

BACKGROUND:

WHITE, REFLECTIVE WITH BLACK BORDER & LEGEND

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

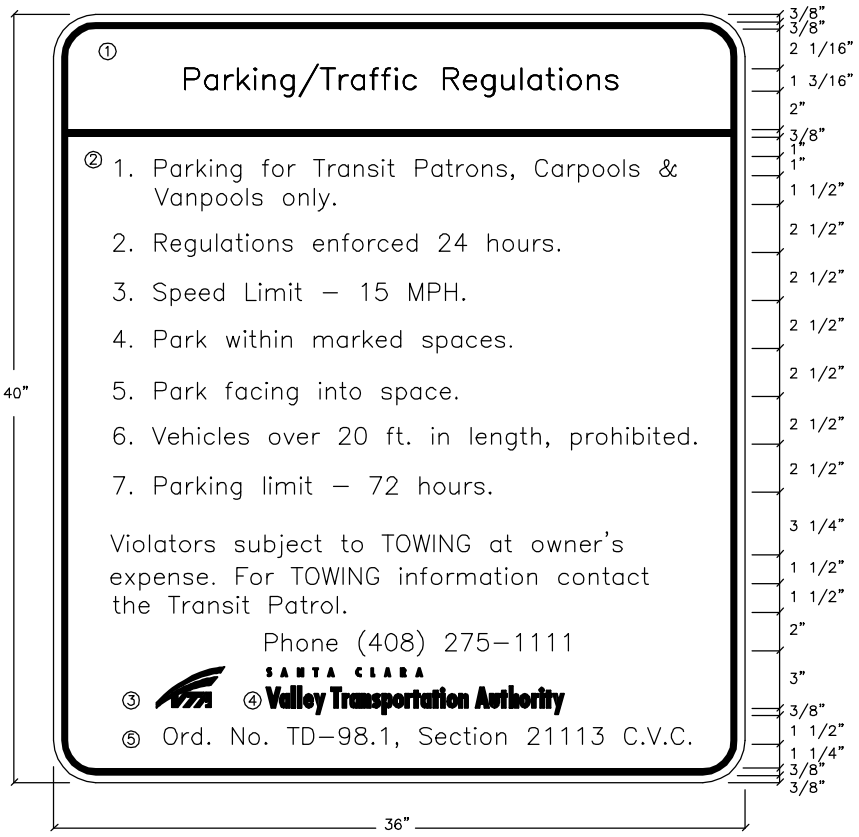
SANTA CLARA Valley Transportation Authority

PARK AND RIDE REGULATION SIGNS - A

FIGURE 21

CAD FILE NAME 2008_FSD2101.DWG

DATE AUG 2008

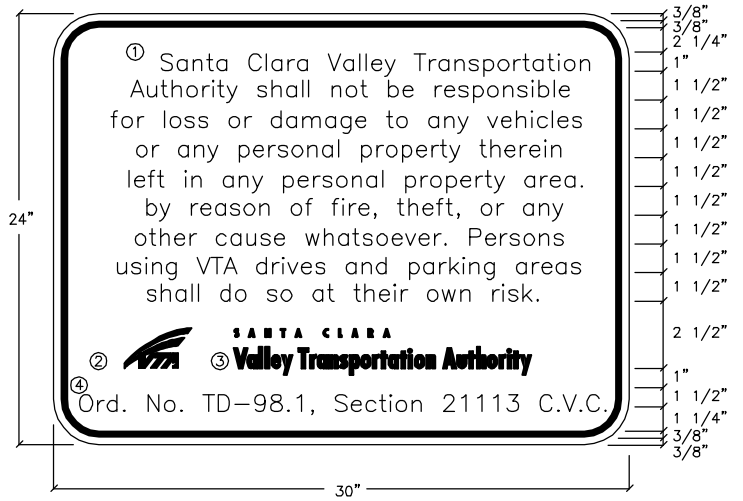


LEGEND:

① HELVETICA BOLD, CAPS AND LOWER CASE
② HELVETICA MEDIUM, CAPS AND LOWER CASE
③ VTA LOGO
④ VTA LOGO
⑤ HELVETICA LIGHT, CAPS AND LOWER CASE

BACKGROUND:
WHITE, REFLECTIVE WITH BLACK BORDER & LEGEND

TDPR2



LEGEND:

① HELVETICA MEDIUM, CAPS AND LOWER CASE
② HELVETICA LIGHT, CAPS AND LOWER CASE
③ VTA LOGO
④ VTA LOGO
⑤ HELVETICA LIGHT, CAPS AND LOWER CASE

BACKGROUND:
WHITE, REFLECTIVE WITH BLACK BORDER & LEGEND

TDPD

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

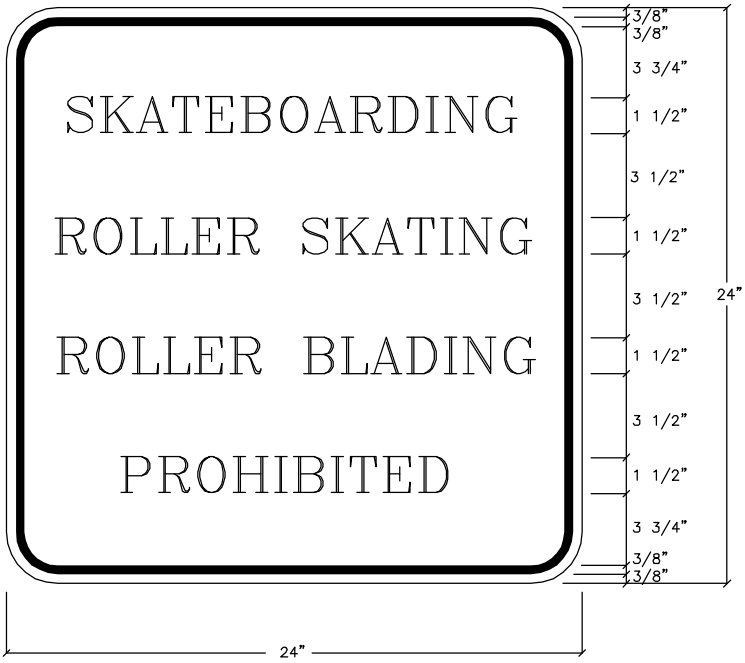
SANTA CLARA Valley Transportation Authority

CAD FILE NAME
2008_FSD2201.DWG

PARK AND RIDE REGULATION SIGNS - B

FIGURE
22

DATE
AUG 2008



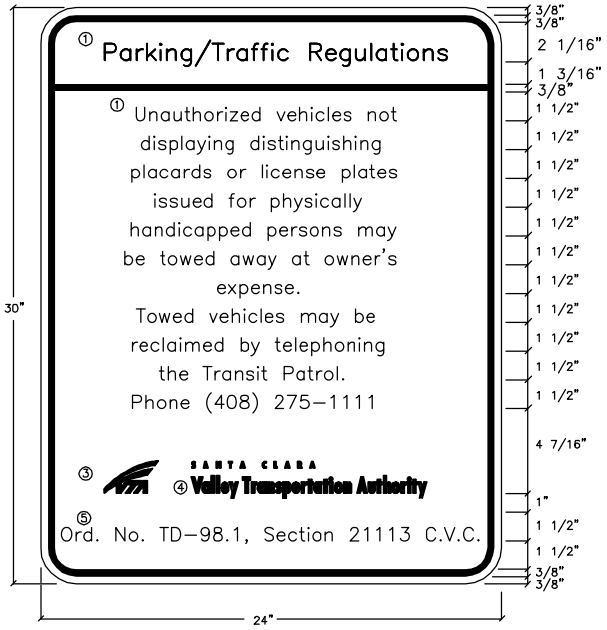
LEGEND:

HELVETICA MEDIUM, CAPS AND LOWER CASE

BACKGROUND:

RED, REFLECTIVE WITH WHITE BORDER & LEGEND

TDPROHI



LEGEND:

① HELVETICA MEDIUM, CAPS AND LOWER CASE
② VTA LOGO
③ VTA LOGO
④ HELVETICA LIGHT, CAPS AND LOWER CASE

BACKGROUND:

WHITE, REFLECTIVE WITH BLACK BORDER & LEGEND

TDPHR

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

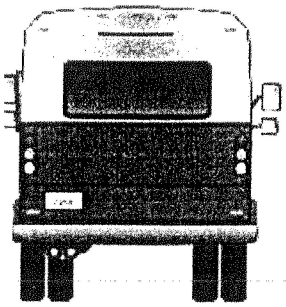
SANTA CLARA Valley Transportation Authority

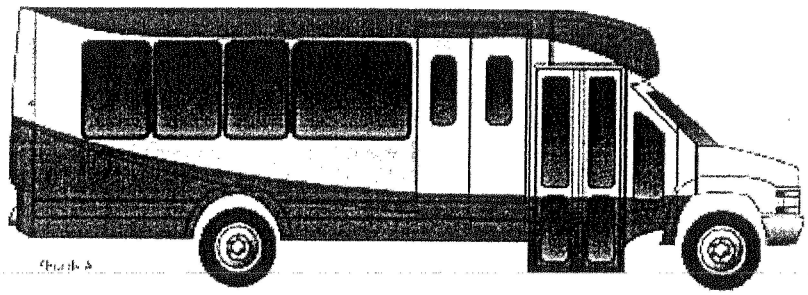
CAD FILE NAME
2008_FSD2301.DWG

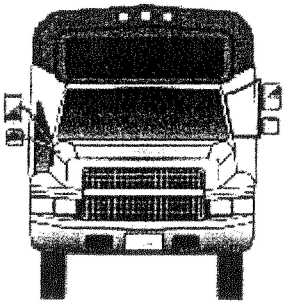
PARK AND RIDE REGULATION SIGNS - C

FIGURE
23

DATE
AUG 2008







ITEM		DIMENSION
A.	OVERALL HEIGHT	10'- 1"
B.	OVERALL LENGTH	29'- 3"
C.	OVERALL WIDTH	8'- 0"
D.	WHEEL BASE	17'- 9"
E.	FRONT AXLE TO BUMPER	2'- 11"
F.	REAR AXLE TO BUMPER	8'- 7"
G.	STEP TO GROUND, ENTRANCE	10"
H.	STEP TO GROUND, EXIT	3'- 1"*
I.	CLEAR DOOR OPENING. ENTRANCE	2'- 9.5"
J.	CLEAR DOOR OPENING, EXIT	3'- 8.5"*
K.	CENTERLINE DOOR TO FRONT	8'- 1"
L.	CENTERLINE DOOR TO REAR	17'- 3"
M.	CENTERLINE DOOR TO DOOR	3'- 11"
N.	WIDTH, MIRROR TO MIRROR	8'- 8"
	SEATING CAPACITY	25

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

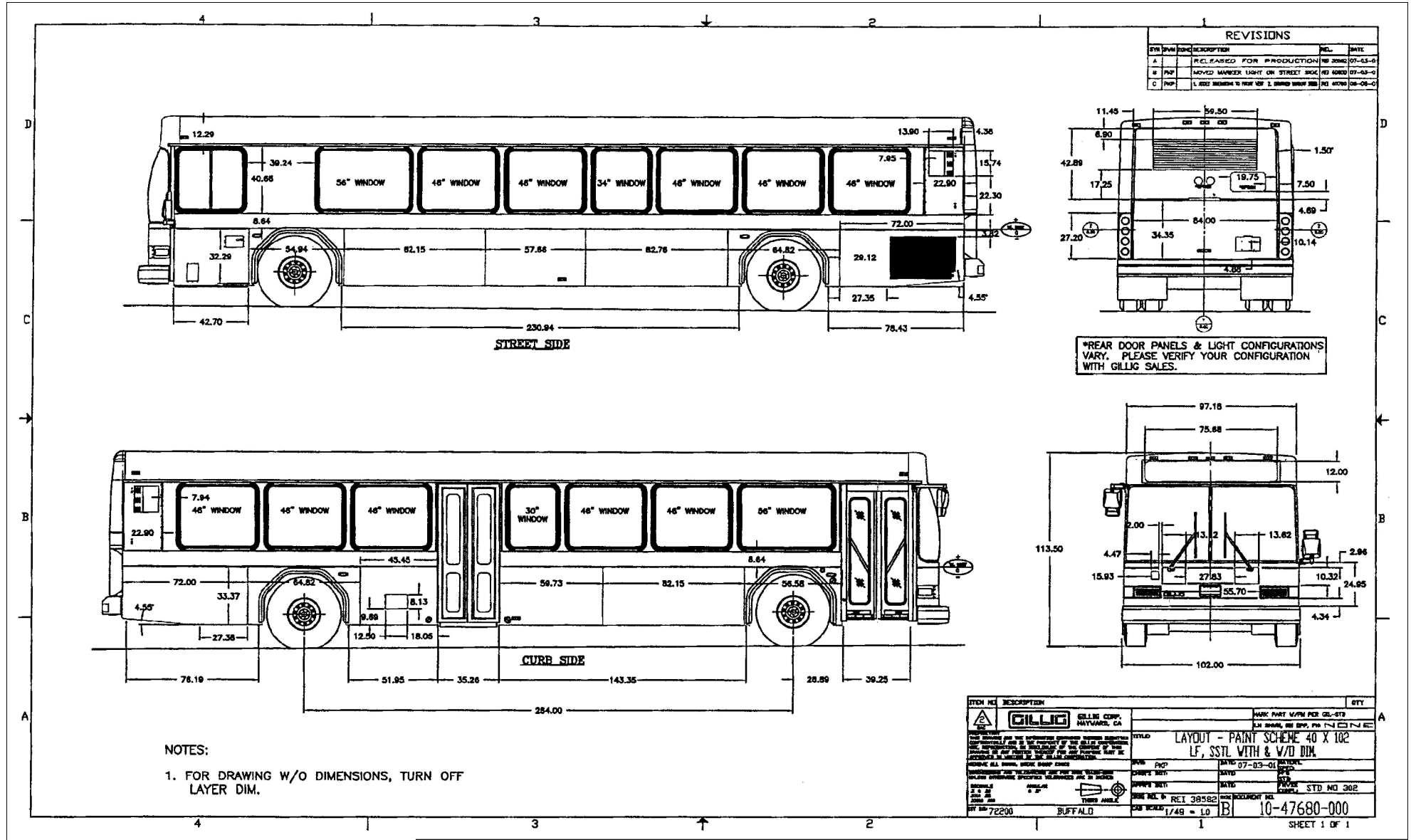
SANTA CLARA Valley Transportation Authority

CAD FILE NAME
2008_FSD2401.DWG

30' COMMUNITY BUS

FIGURE
24

DATE
AUG 2008



BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

SANTA CLARA Valley Transportation Authority

CAD FILE NAME
2008_FSD2401.DWG

BUS LAYOUT
STANDARD 40' BUS
GILLIG

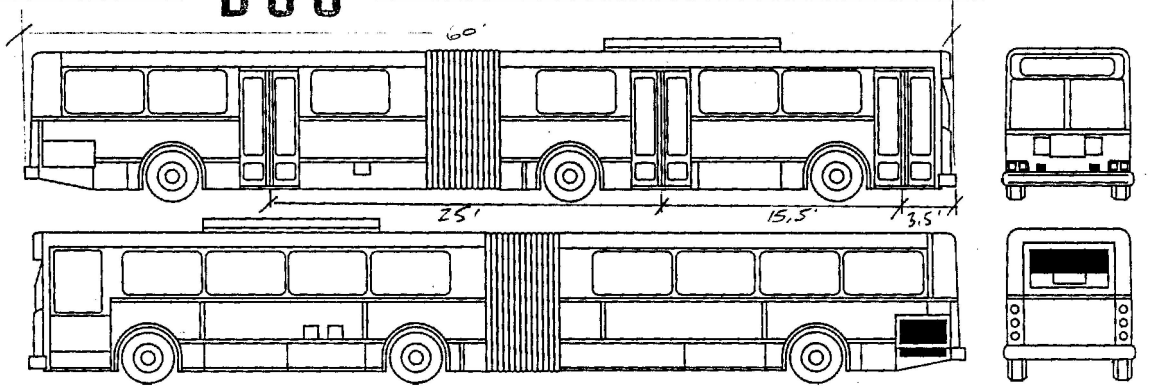
FIGURE
25

DATE
AUG 2008

NEW FLYER D60 ARTICULATED BUS

60/38.5 = 1.56

The New Flyer D60 is a 'Pusher Type' articulated coach. This coach has all the features of the New Flyer 35' & 40' models. Most components are interchangeable which simplifies maintenance and reduces parts stock.



- Reinforced fiberglass exterior roof, front & rear and aluminum side panels for maximum corrosion resistance and reduced maintenance.
- Options such as air conditioning, wheelchair lifts, double stream doors, seating and more.
- In-line T-drive configuration for maximum rear axle capacity.

SPECIFICATIONS

POWER TRAIN

Engine	• DDC Series 50
Transmission	• Allison

FUEL TANK

- Capacity 150 US gallons
- Option of 200 US gallons

SUSPENSION

- Full air suspension with 2 hydraulic shock absorbers at each axle

Front Axle	• Rockwell Reverse Elliott 14,600 lbs
Center & Rear Axles	• Rockwell Full Floating 26,000 lbs

JOINT

- ATG "Artic-O-Mat" with anti jack knife feature

4' WIDE DOOR

BRAKES

- Internal expanded S-CAM type
- Front Drum 14 1/2" x 6"
- Center & Rear Drum 14 1/2" x 10"
- Manual or Automatic slack adjusters

AIR SYSTEM

- Bendix Compressor, Governor, & Air Dryer

DOORS

Front	• Slide Glide
Center	• Optional
Rear	• Various styles

DIMENSIONS

Length	60'
Width	102"
Height	120"
Wheelbase	Front - 208" Rear - 309"
Passenger Capacity	145
Seating Capacity	64
Pivot Angle	40°
Turning Radius	41'

HEATING & VENTILATION

- Underfloor forced air heating, roof vents
- Driver's fresh air vent
- Optional A/C

ELECTRICAL

- Allen-Bradley PLC Multiplex Wiring System

FACTOR = 1.56

WINDOWS

- Aluminum sash, clamp type - Stormtite laminated or tempered safety glass.
- Two piece laced in windshield

BODY

- Integral 'chassisless' design, sides are hollow structural tubing
- Panels are aluminum and fiberglass
- Wheel housings & stepwells are stainless steel

NEW FLYER OF AMERICA

Administration:
600 Pandora Ave. West,
Winnipeg, Manitoba, Canada R2C 3T4
Tel: (204) 224-1251 Fax: (204) 224-4214
Parts Sales: 1-800-665-2637

New Flyer of America Inc.
Assembly Plant:
214-5th Avenue South West
Crookston, Minnesota, U.S.A. 56716
Tel: (218) 281-5752
Fax: (218) 281-5672

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

SANTA CLARA Valley Transportation Authority

NEW FLYER D60 ARTICULATED BUS

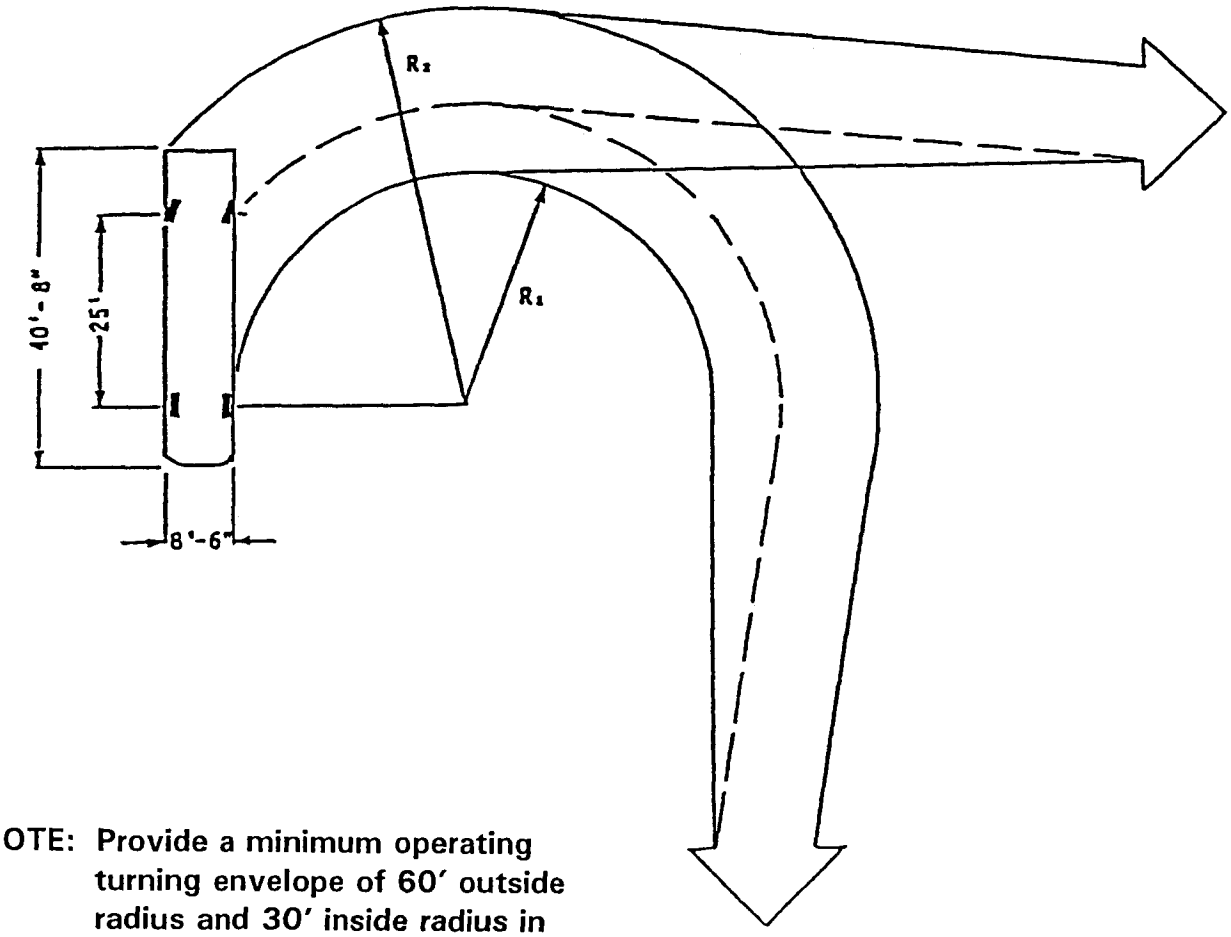
FIGURE 26

CAD FILE NAME 2008_FSD2601.DWG

DATE AUG 2008

	Radius (R1) Of Inner Rear Wheel	Radius (R2) of Outer Front Corner
Minimum	28'	50'
Desirable	30'	55'

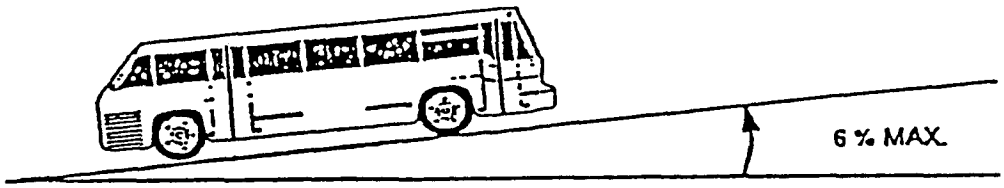
For 40' vehicles and articulated vehicles



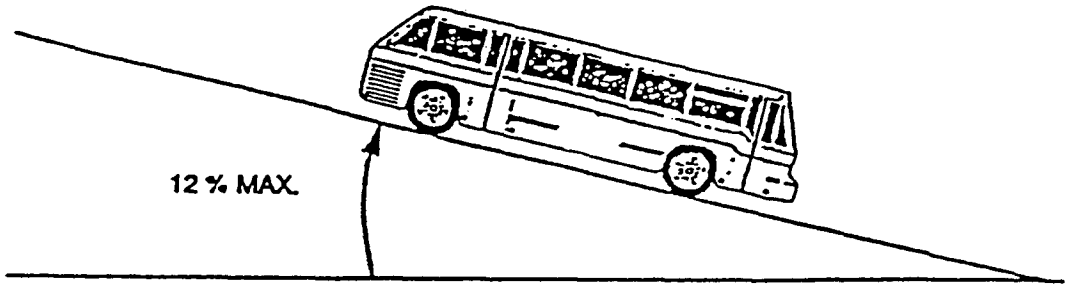
NOTE: Provide a minimum operating turning envelope of 60' outside radius and 30' inside radius in designing the transit centers.

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

SANTA CLARA Valley Transportation Authority	**BUS TURNING RADII FOR LARGE BUSES**	FIGURE 27
CAD FILE NAME 2008_FSD2701.DWG		DATE AUG 2008



UPGRADE



DOWNGRADE

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

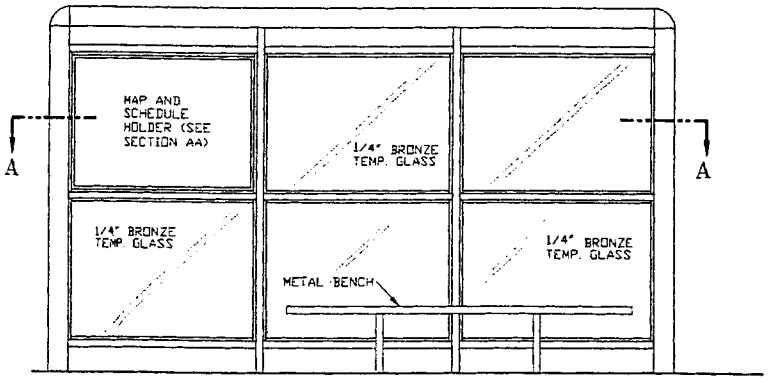
SANTA CLARA Valley Transportation Authority

ROADWAY GRADES FOR LARGE BUSES

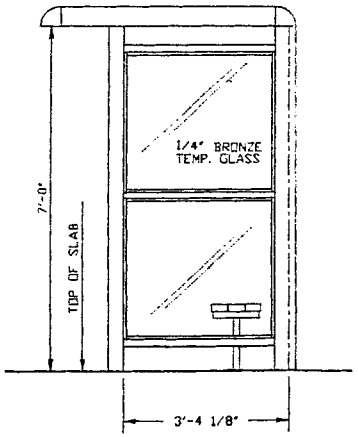
FIGURE 28

CAD FILE NAME 2008_FSD2801.DWG

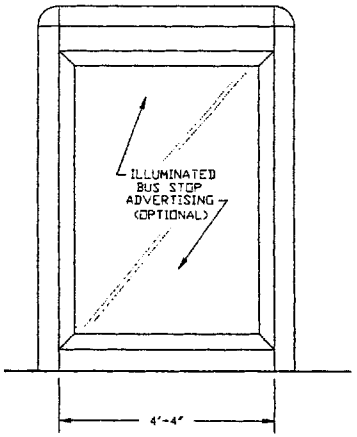
DATE AUG 2008



FRONT ELEVATION
SCALE: 3/4"=1'-0"



OPEN END
SCALE: 3/4"=1'-0"



AD PANEL
SCALE: 3/4"=1'-0"

NOT TO SCALE

NOTE:
THIS IS THE CURRENT AD SHELTER STANDARD. PROJECTS CAN COORDINATE THE USE OF AD SHELTER OR OTHER PRE-FABRICATED SHELTER DESIGN WITH THE SERVICE DEVELOPMENT PLANNING DEPARTMENT.

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

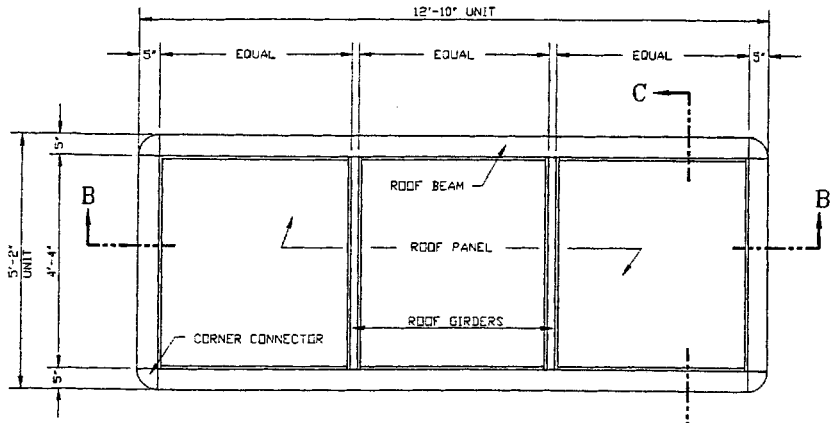
SANTA CLARA Valley Transportation Authority

CAD FILE NAME
2008_FSD2901.DWG

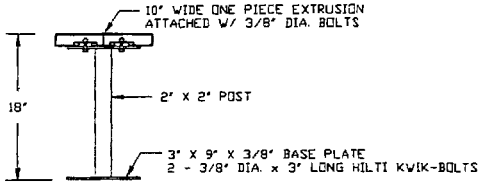
12'-0" BUS SHELTER W/ OFFSET POST AT OPEN END SHEET 1 OF 2

FIGURE
29

DATE
AUG 2008



ROOF PLAN
SCALE: 3/4"=1'-0"



BENCH DETAILS (N.T.S.)

NOT TO SCALE

BUS STOP AND PASSENGER FACILITIES STANDARD DETAILS

SANTA CLARA Valley Transportation Authority

CAD FILE NAME
2008_FSD3001.DWG

12'-0" BUS SHELTER W/ OFFSET POST AT OPEN END SHEET 2 OF 2

FIGURE
30

DATE
AUG 2008