



SFMTA
Municipal
Transportation
Agency

Transit Stops & Stations:

Stop spacing, location, & infrastructure

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Policy Tool: Stop Spacing Guidelines

Challenges of Previous Guidelines

- Existing standard not implemented uniformly
- Did not consider block lengths, delay to on-board passengers or stop usage

	Previous Policy
Bus	<p>~ 800' to 1,000' (grade \leq 10%)</p> <p>500' to 600' (grade 10%-15%)</p> <p>Bus stops may be spaced as close as 300' to 400' (grade $>$ 15%)</p>
Surface Rail	~ 1,000 to 1,200 feet



Policy Tool: Stop Spacing Guidelines

	Previous Policy	New Guidelines
Bus	<p>~ 800' to 1,000' (grade \leq 10%)</p> <p>500' to 600' (grade 10%-15%)</p> <p>Bus stops may be spaced as close as 300' to 400' (grade > 15%)</p>	<p>~ 800' to 1,360' (grade \leq 10%)</p> <p>Bus stops may be as close as 500' (grade > 10%)</p> <p>Limited and Express stops to be spaced on a case-by-case basis</p>
Surface Rail	~ 1,000 to 1,200 feet	~ 900 to 1,500 feet

Stop Spacing Example: Western San Francisco:

East-west block length - 310'

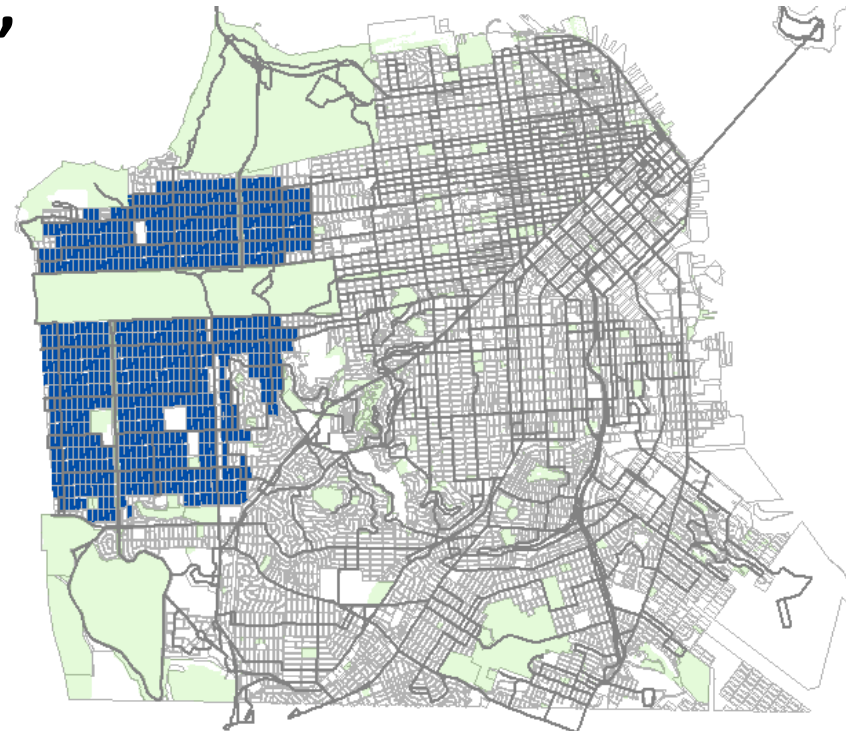
Former guideline: 3 blocks 930'

Proposed: 3-4 blocks 930' to 1240'

North-south block length – 680'

Former guideline: impossible

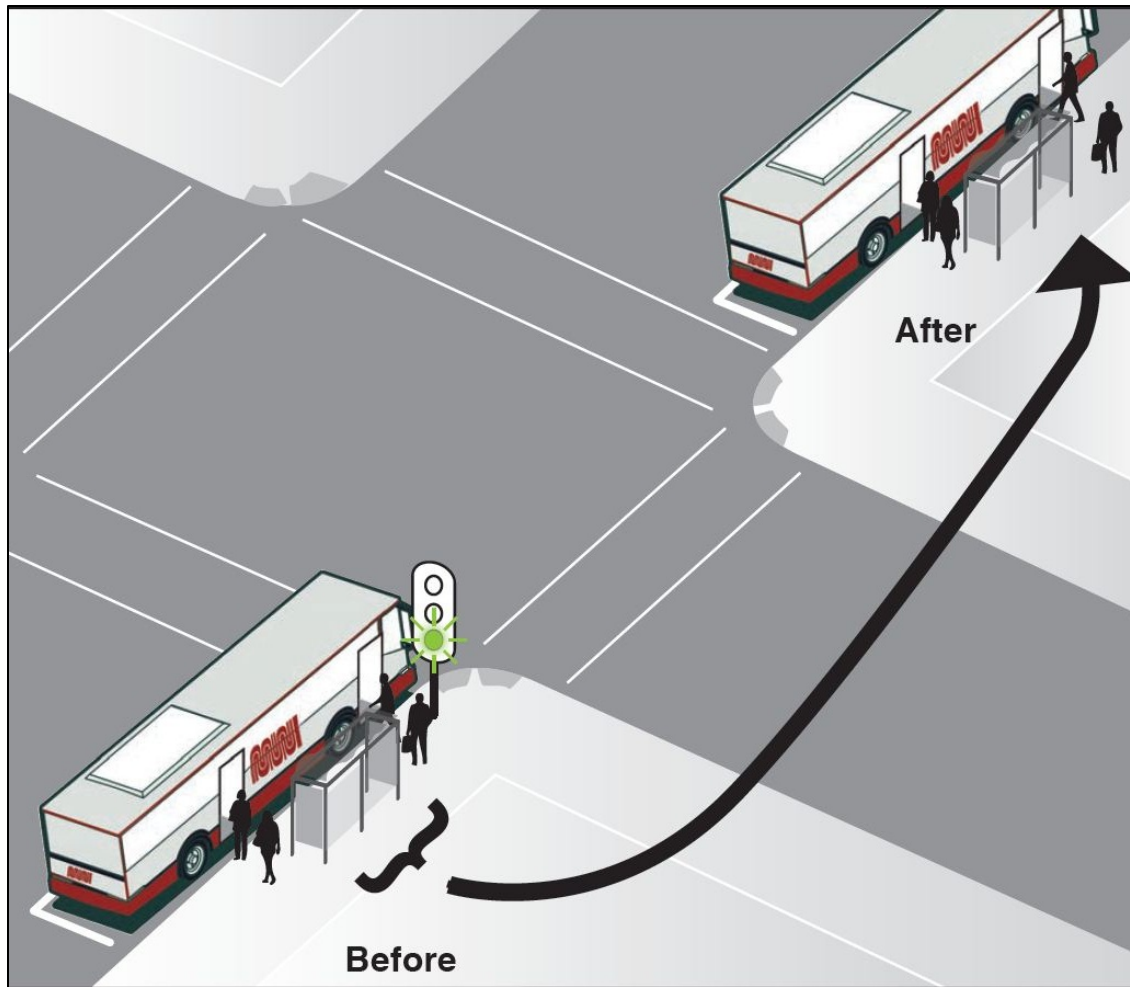
Proposed: 2 blocks (1360')



Transit Stop Spacing Guidelines for Various Cities (2012)

Agency	Type	Spacing Guideline
Chicago Transit Authority	Local	No more than 1,320 feet
	Express	½ to 1 mile (2,640 to 5,280 feet)
Seattle / King County Transit	Local	Generally 4 to 6 stops per mile (880 to 1,320 feet), up to maximum of 8 stops per mile (660 feet) May be as close as 500 feet
Washington Metropolitan Area Transit Authority (Washington, DC)	Local Bus	4-5 stops per mile (1,056 to 1,320 feet)
	Enhanced Service/ Limited Stop	2-3 stops per mile (1,760 to 2,640 feet)
Portland Tri-Met	Dense development	3 blocks/780 feet
	Low to mid density development	4 blocks/1,000 feet
AC Transit	Local	800 to 1,300 feet
	Rapid	1,700 to 5,000 feet
	Transbay	1,000 to 2,600 feet

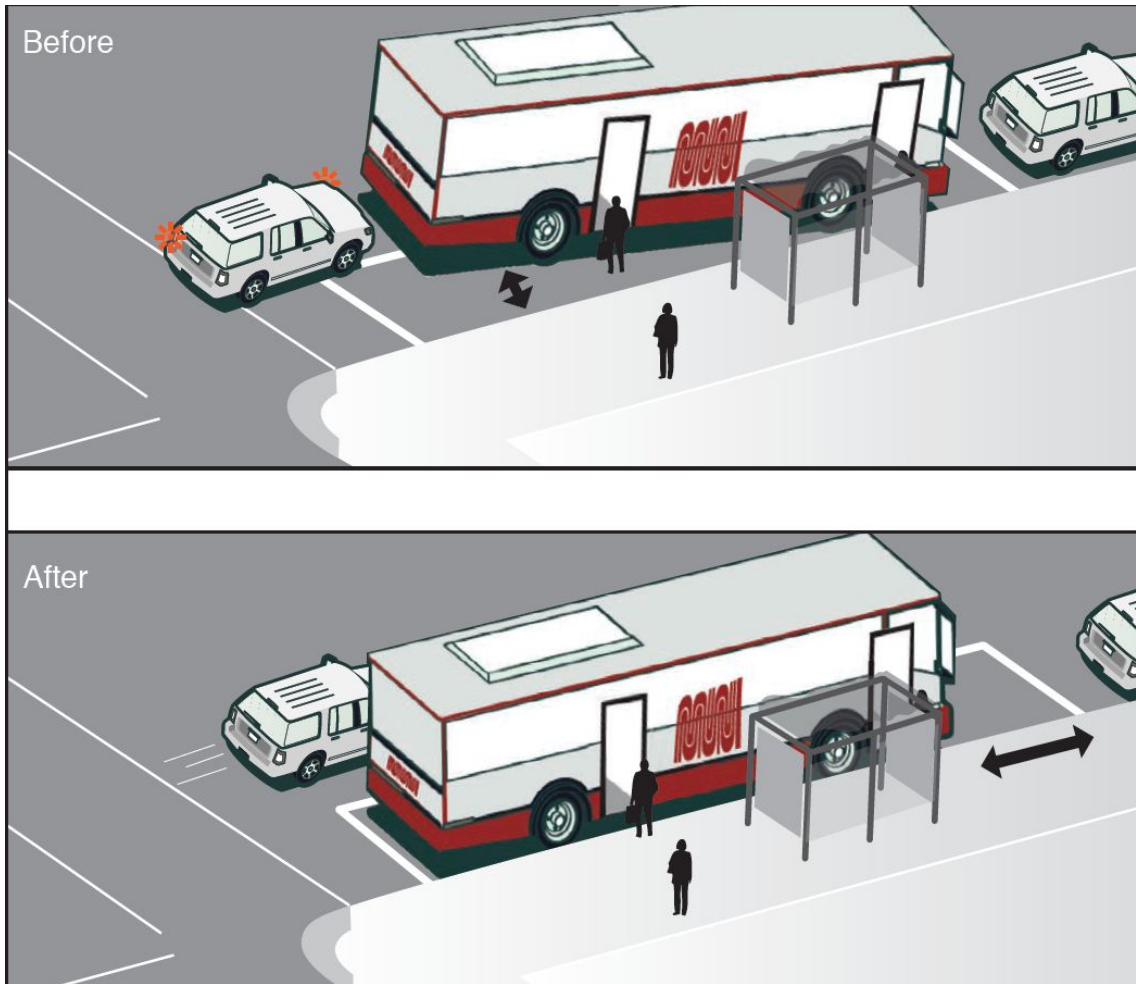
Optimizing Transit Stop Locations



Signalized intersections:
Move transit stops after the intersection, get Muni through more green lights and minimize stopping.

Stop sign intersections:
Put transit stops at the sign so Muni can stop and pick up passengers at the same time.

Longer bus zones



Gives Muni more space to get closer to the curb and out of traffic. Makes streets safer.

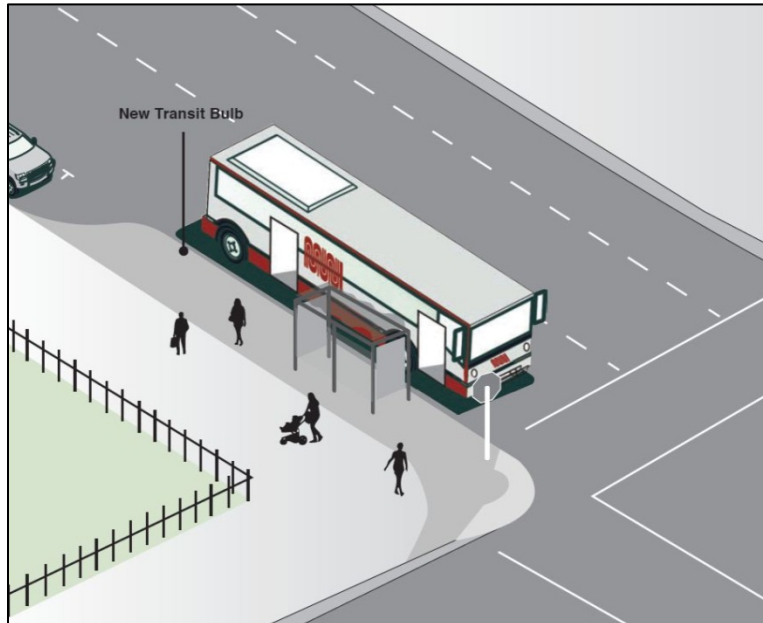
Policy Tool: Bus zone length guidelines

- Bus zones sized by vehicle type
- Plan for two buses when combined frequency is under 5 minutes

Stop Position	Type of Vehicle and Zone Length (Ft.)			
	40' Bus	2x40' Bus	60' Bus	2x60' Bus
Midblock	120	185	145	210
Nearside	100	145	120	185
Farside	80	125	100	165
Farside (After right turn)	140	140	160	230

Transit Bulbs

- Sidewalk extension into the street at transit zones, typically the width of the parking lane
- Reduces the need for buses to pull in and out when picking up customers; bulbs can reduce lost time pulling back into traffic
- Challenges: Can block a lane of traffic; must carefully consider design on two-lane roads



Transit Bulbs

Example: Carl/Cole, San Francisco

- Transit bulbs added in 2012 at busiest stops (~2,000 daily boardings)
- Encourages boarding from all doors with less front-door crowding
- Separates waiting passengers from through-pedestrians
- Ongoing work to add streetscape amenities

Before



After



Policy Tool: Bus Bulb Guidelines

Stop Position (Bus Bulbs)	Type of Vehicle and Appropriate Zone Length (Ft.)			
	40' Bus	2x40' Bus	60' Bus	2x60' Bus
Midblock	35	80	55	115
Nearside	35	80	55	115
Farside	45	90	65	130
Farside (After right turn)	Design on case-by-case basis			

Transit Island Design - Geometrics

Boarding islands



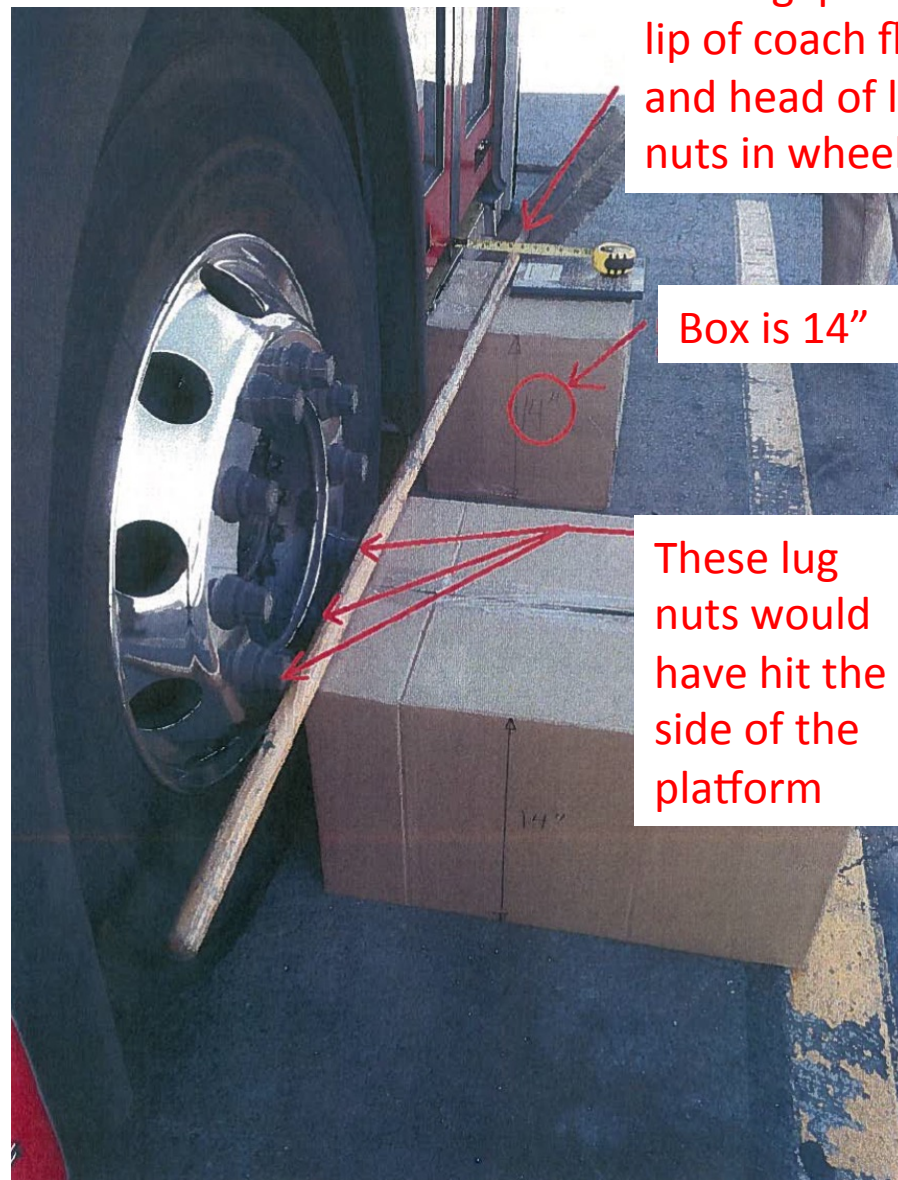
Photo credit: streetsblog

Boarding Island Design Criteria

- Width
 - Minimum of 8' clear for ADA boarding.
 - Need to be 9' wide if you have a continuous railing (6" for curb, plus railing)
- Length
 - Minimum driven by distance to rear doors
 - Maximum typically 2 vehicle-lengths
 - Passenger convenience, ADA issues if pax need to access 3rd bus
 - Include buffer for operator flexibility and bike racks

Elevation - Level Boarding?

- Low-floor buses are 14" high, but can vary from 13-15"
- New Flyer buses have lug nuts that protrude from wheel making it difficult to achieve 3' maximum gap



5 inch gap between lip of coach floor and head of lug nuts in wheel hub

Box is 14"

These lug nuts would have hit the side of the platform

Wheelchair ramp? Bikes?

- Wheelchair ramp intersects 14" platform making it unusable
- 14" high platform adds difficulty for accessing platform after loading bike on front bike racks



Bridge Plates

- Can overcome gap with bridge plate for middle and rear doors
- Front door can't have bridge plate due to wheelchair ramp
 - Railing to block off front door at level boarding stations
 - Fewer doors increases dwell times at high ridership stops
 - Changes wheelchair access door depending on stop location
- Need bridge plates all buses that might use BRT segment
- More potential failure points



Peer Agencies

Agency	Min gap	Ave gap	Platform
Health Line ¹ (Cleveland, OH)	4 inches	8.11 and 5.92 (depending on station)	14" platform (? Missing info)
EmX ¹ (Eugene, OR)	6.5	8.55 to 9.73 inches	14" platform with bridge plates; block front door
WMATA - Arlington / Alexandria			10" platform
LoopLink (Chicago, IL)	(in design)		11" platform
AC Transit (Oakland)	(in design)		Bridge plates

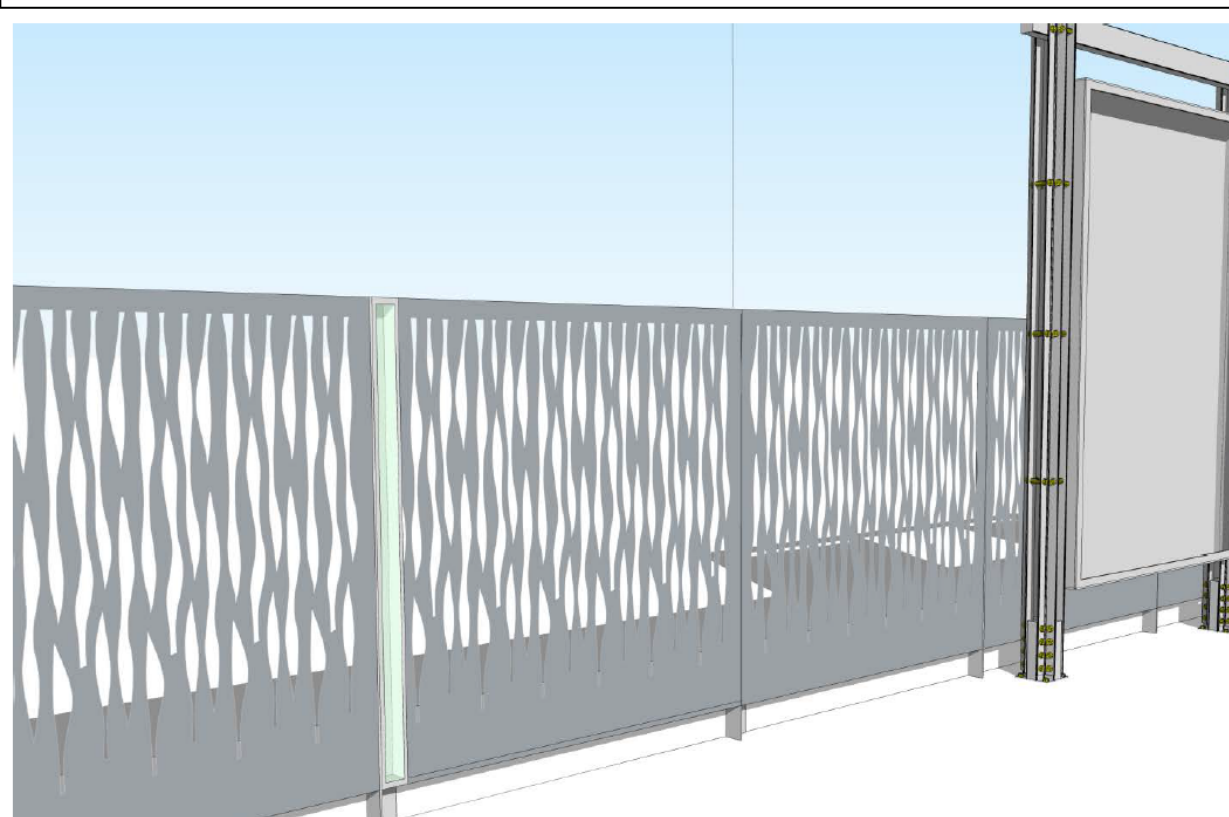
¹Data from National Bus Rapid Transit Institute Study

SF – Boarding Island Elevation

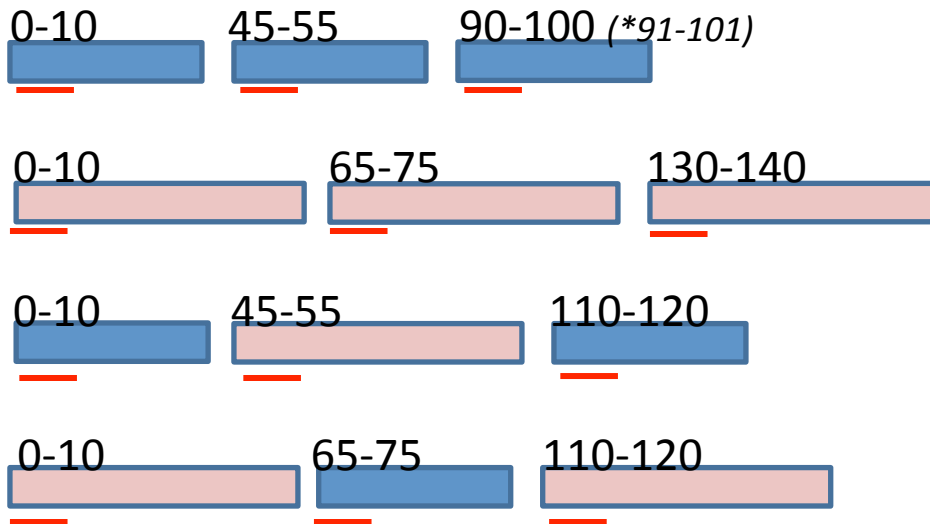
- 6' standard curb height for islands
- no painted bus boarding islands
 - low-floor bus with flip-out wheelchair ramp unable to provide 8% grade from street level to bus

Transit Island Design – Furnishings/Passenger Amenities

Photo ideas: laser cut rail - Van Ness BRT design

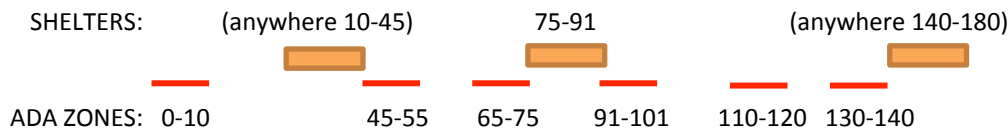


Calculating ADA clear zones

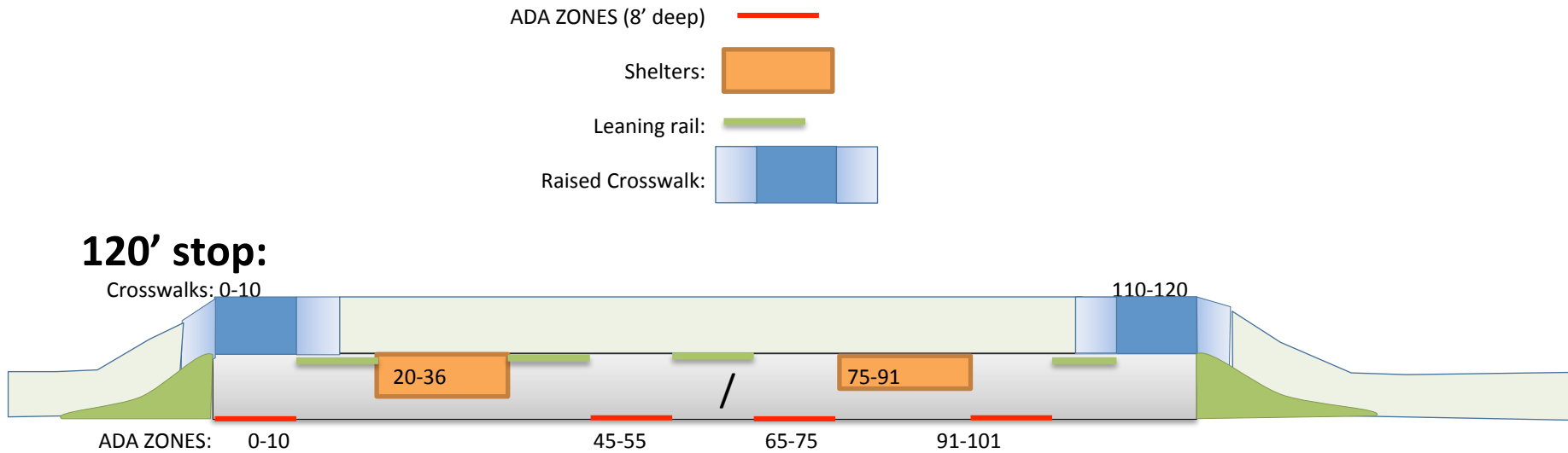


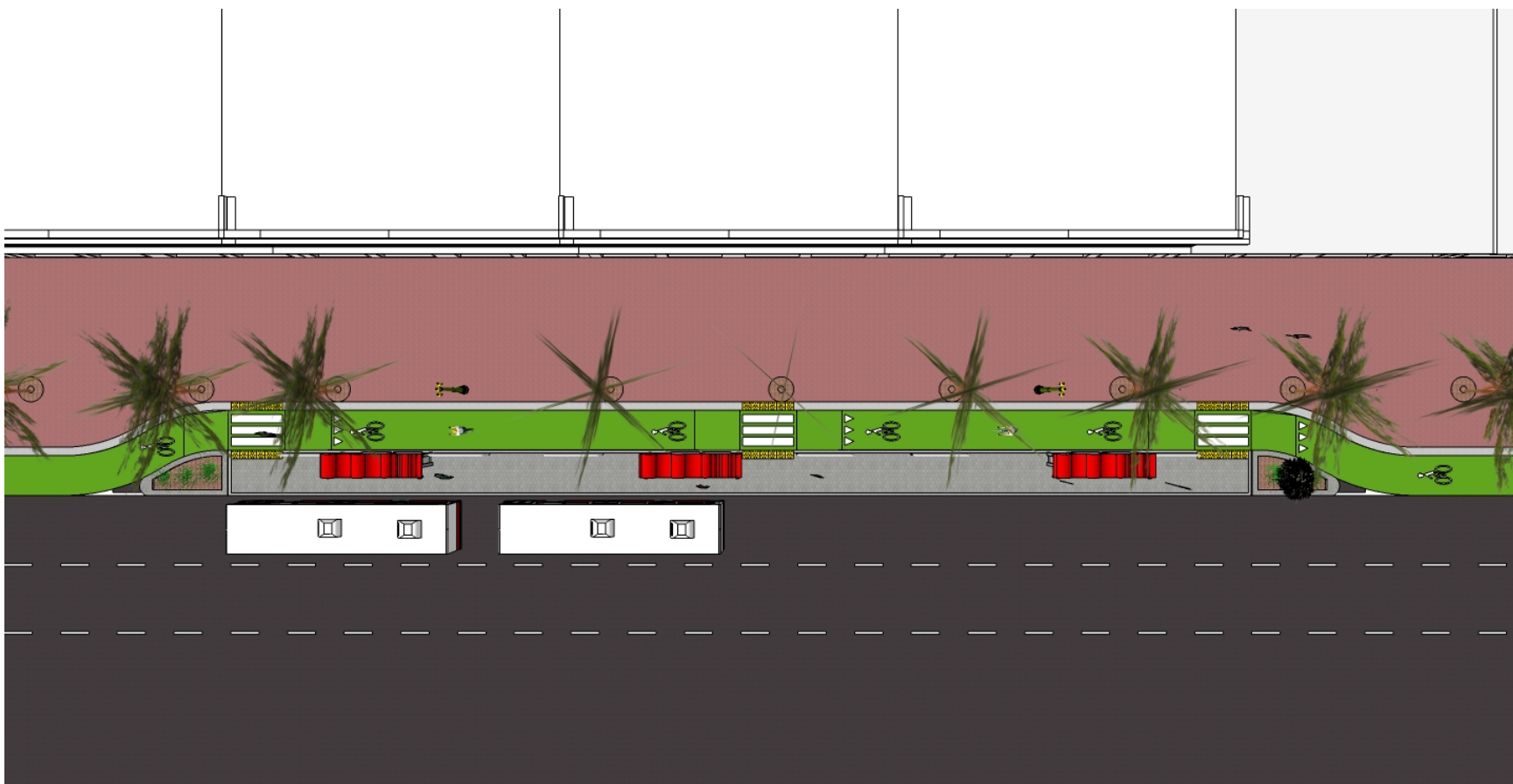
Assumptions:

- Maintain 10' clear to 8' from curb at front of each bus (8'x5' ADA zone, but expand to 10' for flexibility)
- Place shelters approximately 10' back from each 60' bus stopping point (@10-26, 75-91 and 140-156 assuming 16' long shelter. (*Assume the 90-100' clear zone would be shifted to 91-101 feet.)
- Keep 5' clear on remainder of bus zone (26-45, 55-65, 100-110, 120-130, 156-185'). When placing anything in this zone, consider passengers deboarding and keep furniture zone permeable.



Layout furnishing zones







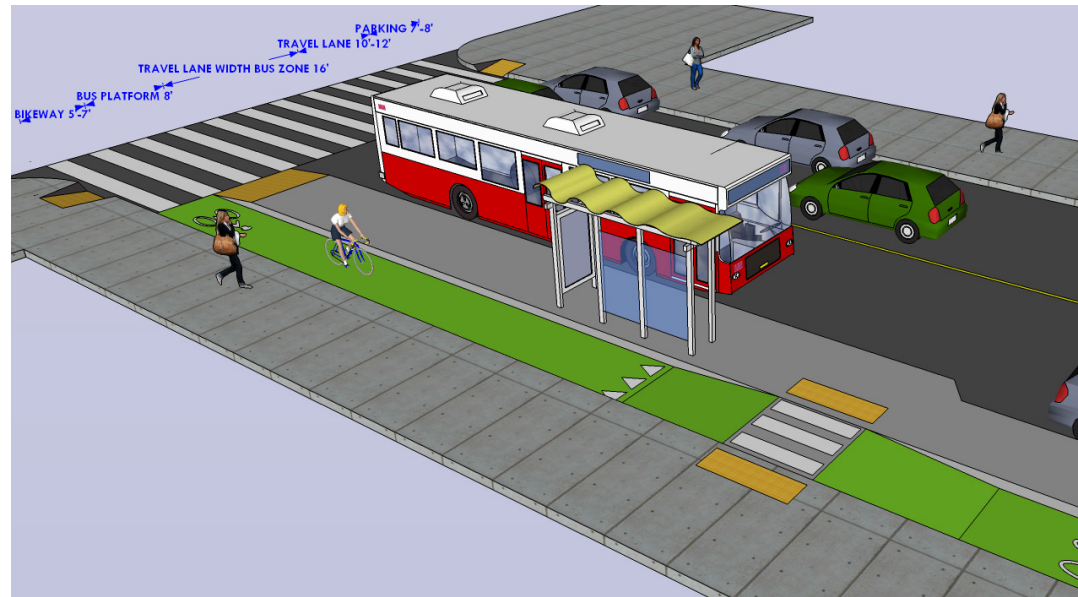
Transit Island Design – Cycle Tracks

Cycle track reduces friction



Photo Ideas

- Polk Cycle track (sleek railing)
Connecting the City concept for Market St
- SFMTA draft accessibility toolbox
for bikeways – illustrates raised crossing



Raised crosswalk serves as speed table



Cycle Track & Transit

Better Market Street conceptual design:

- Cycle track height: 2"
- Cycle track width: 7' or wider
- Cycle track at platforms:
 - EITHER 7' allows side-by side riding
OR 5' (at pinch points) - encourages single row of bicycles but may create bottleneck
- Boarding island access:
 - Midblock: raised crosswalk as speed table
 - Intersection: directly from crosswalk