SMART Bus Stop Design Goals

1 Safety for all

2 Considerate of all street users

3 Consistent and barrier free

4 Unified street, vehicle, and platform design

5 Universal design is equitable design

6 Integrated into the surrounding streetscape
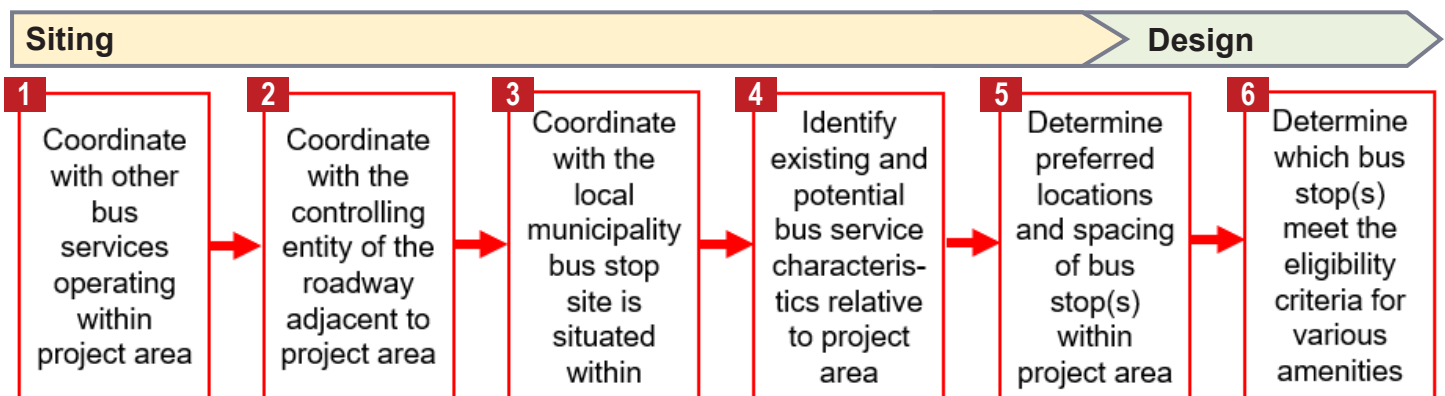
What is the Manual?

The SMART Bus Stop Design Standards Manual (the Manual) provides the following to help guide effective planning, design, and placement of bus stops:

- Comprehensive, up-to-date stop design standards that are compliant with local, state, and federal regulations
- Stop design criteria informed by national best practices, tailored to the southeast Michigan region
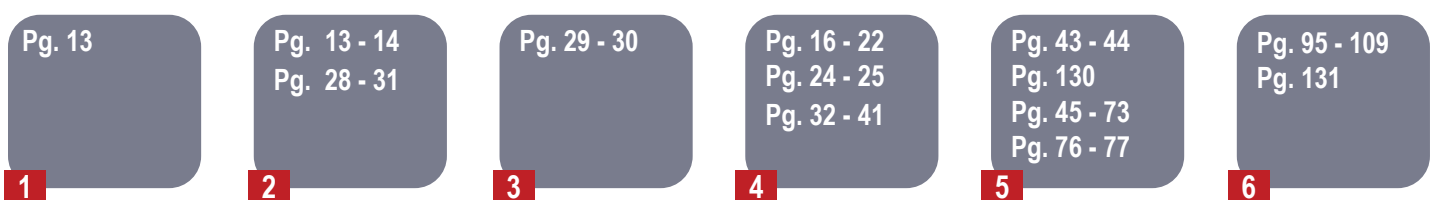
Page 10 of the Manual includes more on the Goals, see left, and page 12 includes a guide on how to use the Manual based on your role in bus stop projects (transportation planners and designers, agency officials, and bus operators).

Siting, Design, and Construction Process

The Manual is best used following SMART's standard bus stop siting, design, and construction process. A summary of the major siting and design steps for any bus stop project is provided below, and can be found on page 13 in the Manual. 'Siting' is determining where the stop will be placed, and 'design' is deciding what the stop should look like.
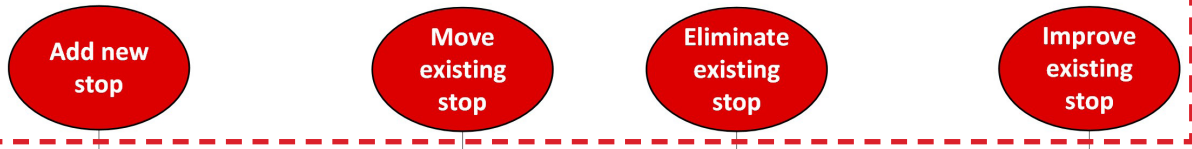
Siting ➤ **Design**

1	**2**	**3**	**4**	**5**	**6**
Coordinate with other bus services operating within project area	Coordinate with the controlling entity of the roadway adjacent to project area	Coordinate with the local municipality bus stop site is situated within	Identify existing and potential bus service characteristics relative to project area	Determine preferred locations and spacing of bus stop(s) within project area	Determine which bus stop(s) meet the eligibility criteria for various amenities

REFERENCE:

1	**2**	**3**	**4**	**5**	**6**
Pg. 13	Pg. 13 - 14 Pg. 28 - 31	Pg. 29 - 30	Pg. 16 - 22 Pg. 24 - 25 Pg. 32 - 41	Pg. 43 - 44 Pg. 130 Pg. 45 - 73 Pg. 76 - 77	Pg. 95 - 109 Pg. 131

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Bus Stop Request Flowchart

The Bus Stop Request Flowchart walks through the necessary siting, design, and construction steps depending on the action proposed by SMART or local stakeholders for a certain stop or location: adding a new stop or moving, eliminating, or improving an existing stop. Found on page 129 in the Manual, the Bus Stop Request Flowchart is the starting point for each proposed bus stop project, and should be referenced throughout the duration of the project.
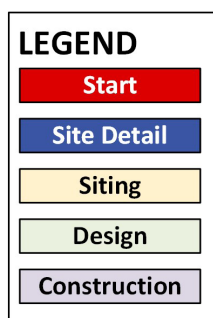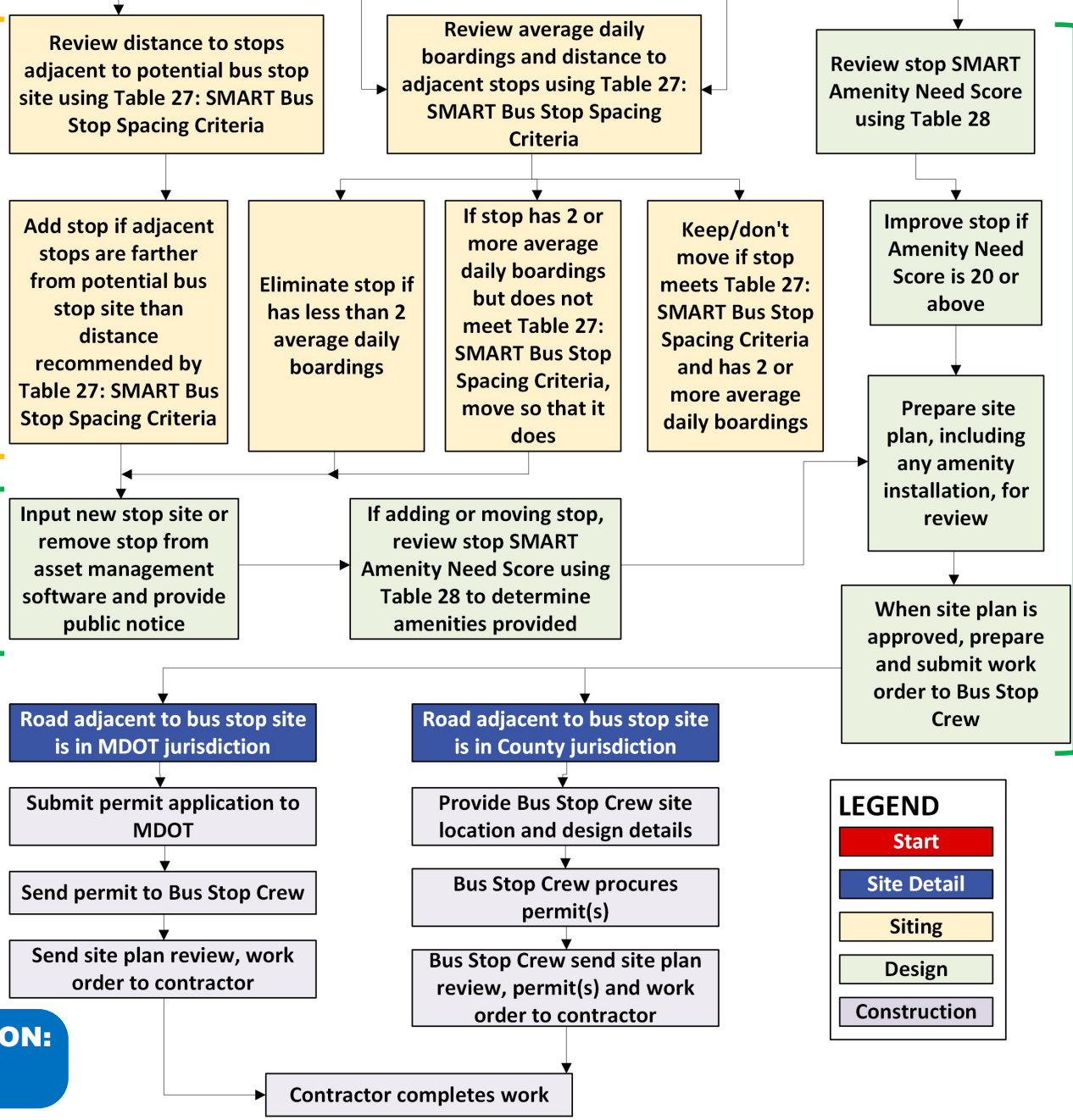
START: Are you adding a new stop or altering an existing stop?

- Add new stop
- Move existing stop
- Eliminate existing stop
- Improve existing stop

SITING: Review possible stop locations.

Review distance to stops adjacent to potential bus stop site using Table 27: SMART Bus Stop Spacing Criteria

Review average daily boardings and distance to adjacent stops using Table 27: SMART Bus Stop Spacing Criteria

Review stop SMART Amenity Need Score using Table 28

Add stop if adjacent stops are farther from potential bus stop site than distance recommended by Table 27: SMART Bus Stop Spacing Criteria

Eliminate stop if has less than 2 average daily boardings

If stop has 2 or more average daily boardings but does not meet Table 27: SMART Bus Stop Spacing Criteria, move so that it does

Keep/don't move if stop meets Table 27: SMART Bus Stop Spacing Criteria and has 2 or more average daily boardings

Improve stop if Amenity Need Score is 20 or above

DESIGN: Prepare and finalize stop site plan.

Input new stop site or remove stop from asset management software and provide public notice

If adding or moving stop, review stop SMART Amenity Need Score using Table 28 to determine amenities provided

Prepare site plan, including any amenity installation, for review

When site plan is approved, prepare and submit work order to Bus Stop Crew

CONSTRUCTION: Build the stop.

Road adjacent to bus stop site is in MDOT jurisdiction

- Submit permit application to MDOT
- Send permit to Bus Stop Crew
- Send site plan review, work order to contractor

Road adjacent to bus stop site is in County jurisdiction

- Provide Bus Stop Crew site location and design details
- Bus Stop Crew procures permit(s)
- Bus Stop Crew send site plan review, permit(s) and work order to contractor

Contractor completes work

LEGEND

Start	
Site Detail	
Siting	
Design	
Construction	

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1   Bus Stop Siting

Agency Coordination

When siting a new stop or updating an existing stop, the first question to ask is who the owner, i.e. controlling entity, responsible for that road is. Bus service typically operates on roadways that are neither owned nor controlled by the transit agency providing service. Generally, the owner of roadways with transit service is either the state, county, or the local municipality the road is located within. Identifying the owner of the roadway informs who you should coordinate with regarding your bus stop project, and what standards and regulations you will need to follow in the siting, design and construction of your stop. See pages 13 - 14 and pages 28 - 31 for more information on who to coordinate with during your project and when.

Whose road is the proposed or existing bus stop on?

State of Michigan	**Local Municipalities in SMART Service Area**	**Oakland, Macomb, or Wayne County**
MDOT standards, Michigan Manual on Uniform Traffic Control Devices (MMUTCD)	Local municipal codes, ordinances and safety codes	County road commission, department of roads or public works standards

Reach out to:

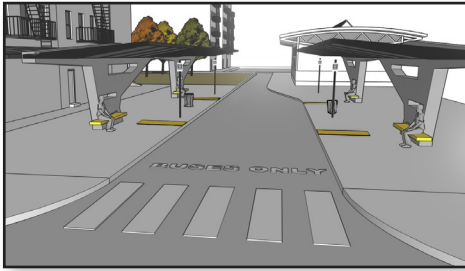|		
MDOT TSC Utilities and Permits Coordinator	Local municipality's Project Engineer	County's road commission or department of public works

Stop Spacing

SMART Bus Stop Spacing Criteria

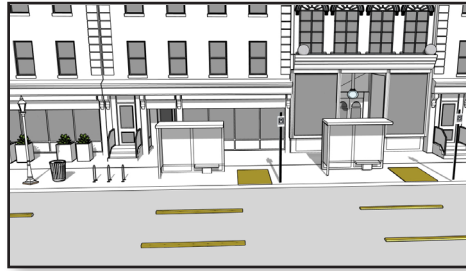| Service Type	Local Land Use Type	People per Mile^2	Recommended Distance between Bus Stops (Miles)
Standard Fixed-Route	Residential Areas	Less than 2,880	0.42 – 0.50
		2,880 – 9,660	0.33 – 0.42
		More than 9,660	0.25 – 0.33
	Central Business District (CBD) and Near CBD		2 blocks and/or every block with high passenger boarding/alighting rates
Express Limited-Stop			1 – 2

Next, use SMART's Bus Stop Spacing Criteria (pages 130) to determine the spacing between the proposed or existing stop and adjacent stops. First, identify the stop service type (express or standard). Then, consider local land uses and population densities near the stop to determine the recommended distance between stops. See pages 43-44 for more on stop spacing and pages 24-26 for more on population density and land use impact bus stop siting.

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General Stop Type

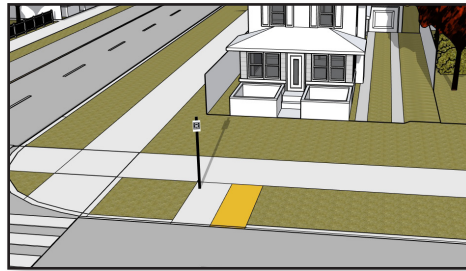| 1 **Off-Street Transfer Center**	2 **On-Street Transfer Center**	3 **Network Hub Stop**

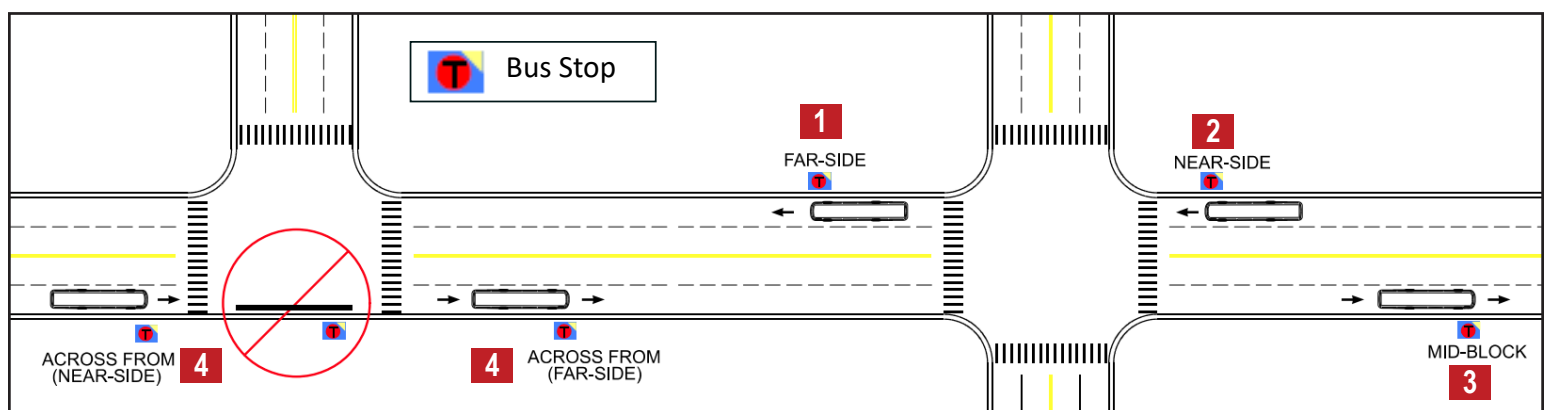| 4 **Standard Stop**	5 **Coverage Stop**	6 **Flag Stop**

Once the approximate site for the stop has been chosen, you need to decide what type of stop it will be. There are six different types of stops within SMART's network. Pages 16-22 of the Manual discuss the advantages, disadvantages, and application context for each of the six stop types. The major distinguishing factors between the different types are how many people and routes the stop has the capacity to serve, and the streetscape it is most appropriate within.

Stop Position

The last major stop siting decision that must be made is the stop's position, i.e. where it is placed relative to the adjacent intersection(s). There are four different stop positions, all shown below: far-side [1], near-side [2], mid-block [3], and across-from [4]. The Manual includes general guidance about what stop position to use in common street situations. Recommendations for when to apply each possible stop position in a wider variety of situations are also provided. These recommendations depend on the intersection and street characteristics. Traffic volumes and maneuvers in addition to pedestrian conditions are most important to stop position decisions.

- **Where are far-side stops recommended?**
  See pg. 46-47, Table 3

- **Where are near-side stops recommended?**
  See pg. 47-48, Table 4

- **Where are mid-block stops recommended?**
  See pg. 48, Table 5

- **Where are across-from stops recommended?**
  See pg. 48, Table 6

Bus Stop

1 FAR-SIDE

2 NEAR-SIDE

4 ACROSS FROM (NEAR-SIDE)

4 ACROSS FROM (FAR-SIDE)

3 MID-BLOCK

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2 Bus Stop Design

Stop Configuration

Common Configurations	
Pull-Out Stop *(pg. 51-54)*	Buses shift out of the travel lane and into part of the parking lane signed as a bus stop.
In-Lane Stop *(pg. 55-58)*	Buses stop in signed section of travel lane adjacent to the curb.
Boarding Bulb Stop *(pg. 59-62)*	Buses stop at a type of curb extension, a bulb-out, rather than pulling in and out of the parking lane.
On-Street Transfer Center *(pg. 63-65)*	Provide multiple adjacent stops serving one or more routes to streamline areas where multiple buses need to stop.
Configurations Commonly Paired with Bicycle Facilities	
Boarding Island Stop *(pg. 66-68)*	Provide a boarding/alighting area separate of the cycle track on an island situated between the cycle track and travel lane.
Shared Cycle Track Stop *(pg. 69-70)*	Buses shift into a section of the cycle track to pull to the curb and stop.

Stop design starts with deciding on a stop configuration. See pages 49-70 for advantages, disadvantages, and recommended applications of the six different configurations discussed in the Manual. See pages 71-73 for minimum dimensions by configuration, stop position, and maximum bus length.

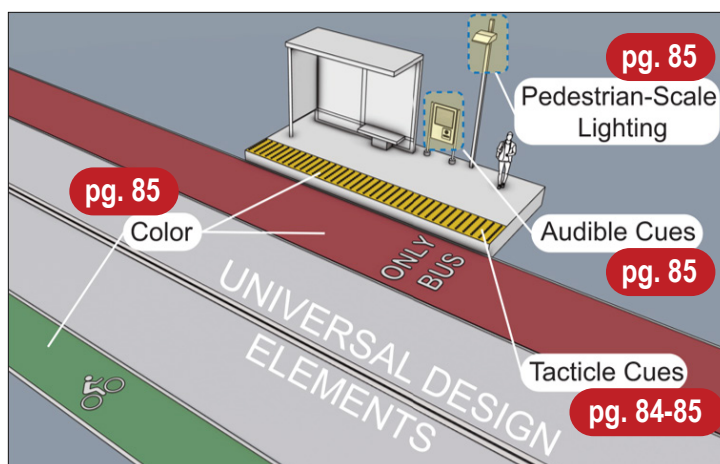> **Certain configurations are recommended for specific street contexts.**
>
> However, if a street meets the minimum dimensional requirements for a configuration, you can use that configuration even if it's not specifically recommended, as long as it's not explicitly advised against in that context.

Stop Accessibility

Centering accessibility in bus stop design is essential to the success of transit networks. Bus stops are key links in every bus passenger's journey. The Manual provides an overview of accessibility regulations and key stop accessibility considerations (see pages 80-83 and 86-94). Examples of inaccessible stops are also included for reference (see pages 76-77). Further, universal design and the primary bus stop universal design elements are discussed (see pages 84-86). At each stop, start with a review of any relevant key accessibility considerations, for which the Manual lists both the requirements for ADA-compliance and universal design guidelines. Amend your design as necessary to ensure ADA-compliance and if possible, to incorporate universal design elements.

Accessibility Regulations (pages 80-82)
US DOT ADA
ABA
PROWAG
ANSI
Title VI

UNIVERSAL DESIGN ELEMENTS

Color — pg. 85
Pedestrian-Scale Lighting — pg. 85
Audible Cues — pg. 85
Tacticle Cues — pg. 84-85

Key Accessibility Considerations

- Adjacent Paths of Travel (pg. 86-87)
- Adjacent Street Crossings (pg. 88-89)
- Shelters (pg. 90-91)
- Bus Stop Landing Pads (pg. 92-93)
- Bus Stops without Sidewalk Access (pg. 94)

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Stop Amenities

Bus Stop Amenity Need Scoring

Bus Stop Name/Location		Bus Stop Number	
Amenity Need Factor	**Range**	**Point Value**	**Point Total**
1 What is the average number of daily boardings at the stop?	N/A	1 per boarding	
2 How frequent is bus service to the stop?	Less than 15 minutes	0	
	15 – 29 minutes	1	
	30 – 44 minutes	3	
	45 – 59 minutes	5	
	60 minutes or more	7	
3 How many different bus routes serve the stop?	1	1	
	2	3	
	More than 2	5	
4 Is the stop a transfer point between buses or buses and other modes of transportation?	No	0	
	Yes	1	
5 What major passenger generators are within a quarter mile of the stop?	Medical	2	
	Grocery	2	
	Educational	2	
	Multi-family Housing	2	
	Elderly/Assisted Living	2	
6 How many wheelchair ramp deployments per week are there at the stop on average?	0 times per week	0	
	1 or more times per week	2	
TOTAL AMENITY NEED SCORE:			

Amenities based on Need Score	Less than 20	No Amenities
	20 to 30	Bench, Trash Can
	More than 30	Shelter, Trash Can
Reasons for Disqualification	Not enough space for amenity No connecting sidewalk* Slope or conditions make amenity cost prohibitive	

*Amenity should not be an island.

After deciding on a configuration and evaluating stop accessibility, it's time to figure out what amenities should be included at the proposed or existing stop. Use SMART's Bus Stop Amenity Need Scoring (page 131) to determine whether a stop needs a bench, trash can, and/or shelter. Signage should be provided at all stops. Wayfinding information and real-time information displays should be provided in specific situations. Note that the Manual discusses both amenities that SMART provides and does not provide.

SMART Funded, Installed, and Maintained	NOT SMART-Funded, Installed, or Maintained
Signage	Lighting
Shelters	Heating or Cooling
Benches	Bicycle Parking
Trash Cans	Landscaping
Wayfinding Information	Emergency Response Phones
Real-Time Information Displays	

Stop Safety and Security

Passenger and pedestrian safety and security are vital to stop design, and should always be evaluated prior to finalizing the stop site plan. The Manual groups safety and security concepts into two buckets: collision mitigation and CPTED. Collision mitigation is discussed via design factors that lower the risk of potential vehicle/people collisions and bus/other vehicle collisions. A summary of what CPTED is, its core principles, and subsequent design strategies is also included.

Collision Mitigation Factors

1 Preventing collisions between vehicles and pedestrians/passengers (pg. 120-123)

- Bus Stop Placement
- Visibility
- Road/Street Design
- ADA Accessibility

2 Preventing collisions between buses and other vehicles (pg. 123-125)

- Visibility
- Road/Street Design
- Opportunities for Incursions with Other Vehicles

Crime Prevention through Environmental Design (CPTED)

- Multidisciplinary approach to deterring criminal behavior, reduce victimization, and build community sense of safety

- **CPTED Design Strategies** (pg.126-127):

  - Natural Surveillance
  - Natural Access Control
  - Territorial Reinforcement
  - Activity Support and Maintenance
  - Mechanical Reinforcement

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3 Bus Stop Construction

High-level guidance on the bus stop construction process and how the bus stop crew should handle implementation of final stop site plans can be found within the Bus Stop Request Flowchart ().

Modifications During Construction

When construction work on an existing bus stop or other construction project directly adjacent to the stop occurs, there are several coordination and accessibility standards that must be followed.

All construction/maintenance plans affecting bus stops should be shared with SMART.

Temporary Traffic Control and Maintenance of Traffic plans must include temporary stop alterations.

SMART must provide passengers notice of temporary alterations to stops.

Temporary Alterations to Stops

Traffic control devices for temporary stop alterations:

1. Must not block pedestrian stop access
2. Should be on the same side of the road as the existing stop
   (pg. 78)

- If routes to a stop are blocked, a channelized alternative route must be provided.
- If a channelized alternative route is not feasible, a temporary bus stop must be provided.

Contact Information

Contact SMART at innovations@smartbus.org with any questions or needs for expert advice relative information contained within the Manual.

Contact the SMART Marketing Department at marcomm@smartbus.org for more information about signage and advertising.

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