NEW YORK STATE OF OPPORTUNITY. | NYSERDA Supported

The City College of New York

NEW YORK CITY DOT

Complete Streets Considerations for Freight and Emergency Vehicle Operations

Module 3: Street Design and Management Approaches

May 2018

Notice

This module was prepared by the City College of New York and New York City Department of Transportation in the course of performing work contracted for and sponsored by the New York State Energy Research and Development Authority (hereafter “NYSERDA”). The opinions expressed in this module do not necessarily reflect those of NYSERDA or the State of New York, and reference to any specific product, service, process, or method does not constitute an implied or expressed recommendation or endorsement of it. Further, NYSERDA, the State of New York, and the contractor make no warranties or representations, expressed or implied, as to the fitness for particular purpose or merchantability of any product, apparatus, or service, or the usefulness, completeness, or accuracy of any processes, methods, or other information contained, described, disclosed, or referred to in this module. NYSERDA, the State of New York, and the contractor make no representation that the use of any product, apparatus, process, method, or other information will not infringe privately owned rights and will assume no liability for any loss, injury, or damage resulting from, or occurring in connection with, the use of information contained, described, disclosed, or referred to in this module.

NYSERDA makes every effort to provide accurate information about copyright owners and related matters in the reports we publish. Contractors are responsible for determining and satisfying copyright or other use restrictions regarding the content of reports that they write, in compliance with NYSERDA’s policies and federal law. If you are the copyright owner and believe a NYSERDA document has not properly attributed your work to you or has used it without permission, please email print@nyserda.ny.gov.

Information contained in this document, such as web page addresses, are current at the time of publication.

Guidebook

Topics discussed in this module are detailed in **Chapters 3 and 4** of:

Complete Streets Considerations for Freight and Emergency Vehicle Operations

The City College of New York | CUNY The City University of New York | NEW YORK CITY DOT

NEW YORK STATE OF OPPORTUNITY. NYSERDA Supported

Module 3 Outline (1)

- Selecting an appropriate design vehicle
- Addressing vehicle navigation challenges
  - Providing adequate space for large vehicle turns
  - Reducing conflicts with vulnerable roadway users
  - Safely reducing speeds
  - Providing network connectivity and redundancy

Module 3 Outline (2)

- Addressing curbside challenges
  - Providing adequate space for parking, loading, and emergency response operations
  - Providing curb and building access
- Managing demand

Introduction

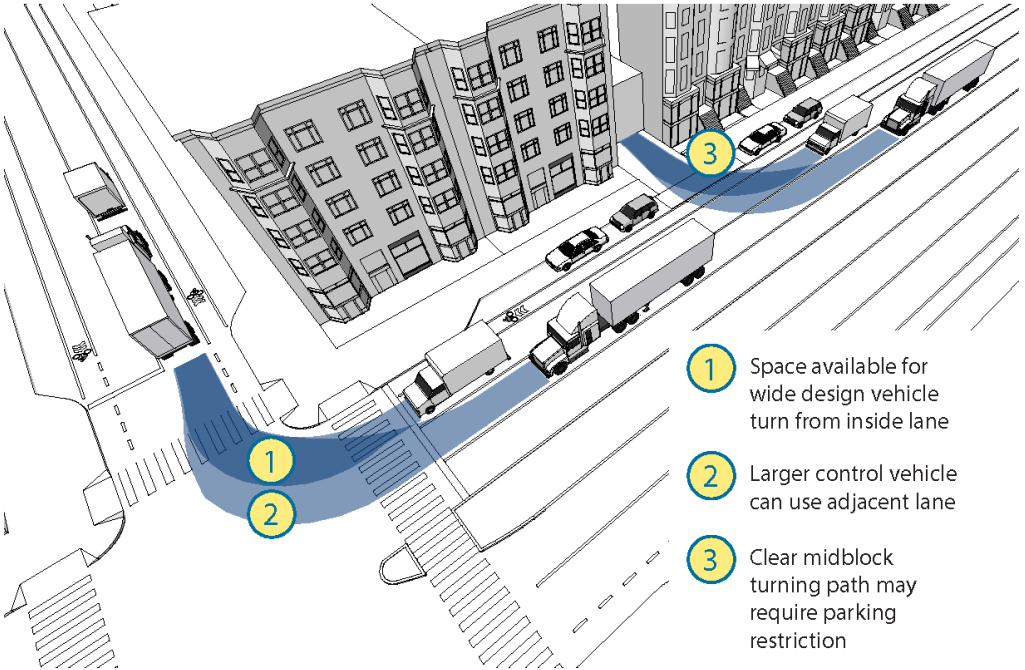
- In the US, design and operational solutions should be considered in the context of:
  - Local standards
  - Manual on Uniform Traffic Control Devices (MUTCD)
  - Americans with Disabilities Act (ADA) requirements
- Non-approved solutions can be implemented as a pilot

Selecting an appropriate design vehicle

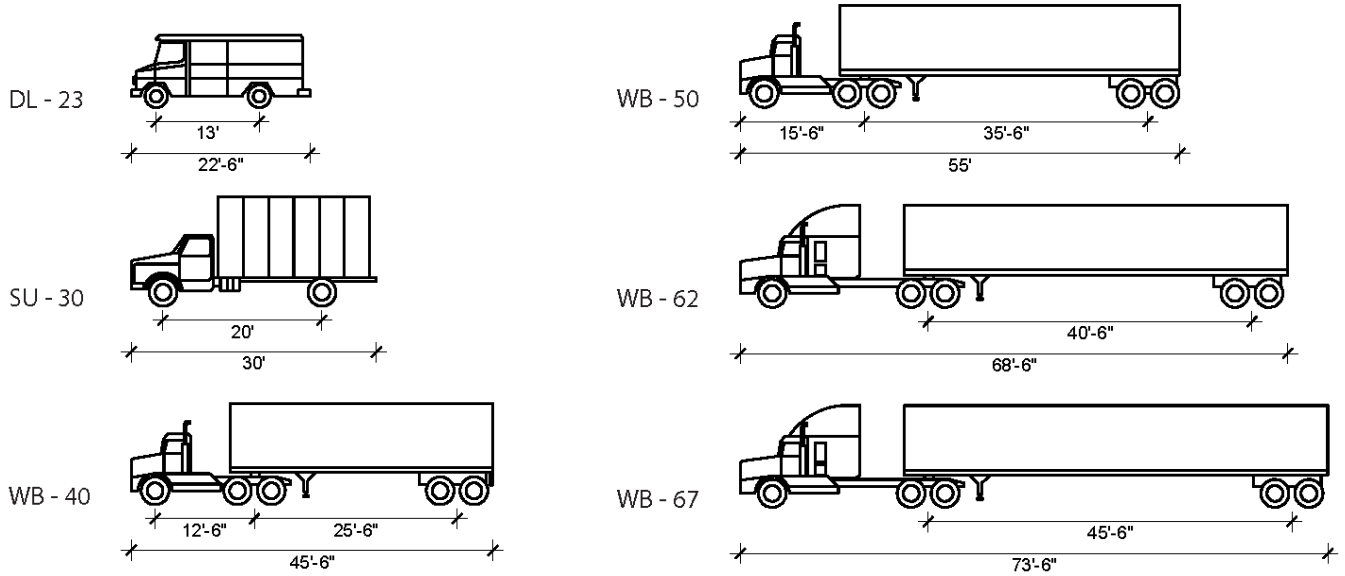
Design Vehicle vs. Control Vehicle

- Design vehicle
  - Largest commonly used vehicle
  - Can navigate without encroachment
- Control vehicle
  - Larger vehicle that may occasionally use street
  - May be permitted to encroach on infrastructure typically used by another mode or movement

Design Vehicle vs. Control Vehicle Example



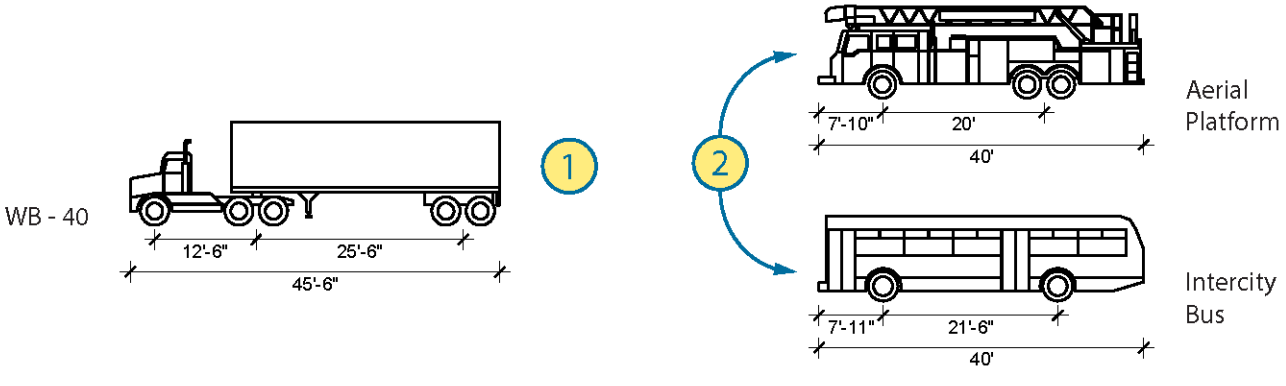
Freight Design Vehicles



Considerations for Freight Design Vehicle Selection

- Current/expected freight trip generating land uses
- Street functional classes and network designations
- Applicable truck size and weight regulations
- Current/expected freight traffic flows
- Historic incident data involving freight vehicles

Emergency Vehicle Equivalents



1 Equivalent to city fire truck in Portland, OR

2 Equivalent vehicle in Amherst, MA

Considerations for Selection of Emergency Design Vehicle Equivalent

- Types and dimensions of vehicles in local fleet
- Regulatory authorities granted to fire chief or commissioner in local fire code
- Locations of designated fire access routes
- Operating exceptions granted for emergency vehicles in state or local traffic laws

Providing adequate space for large vehicle turns

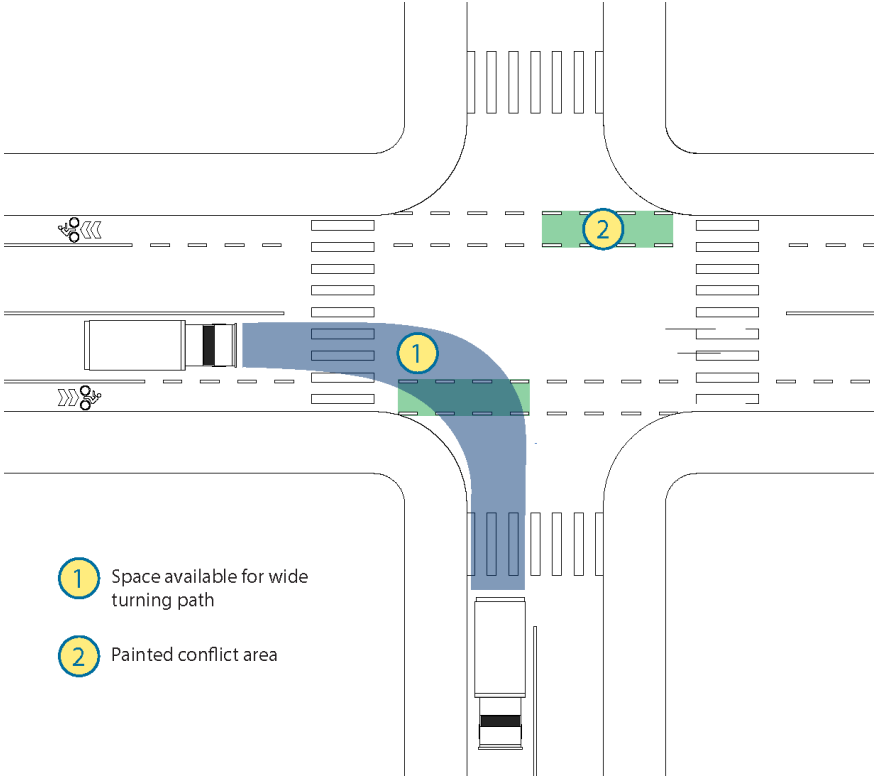
Incompatibility with Pedestrian Movements

- Narrow lanes
- Raised median islands
- Corner bulbouts
- Neckdowns

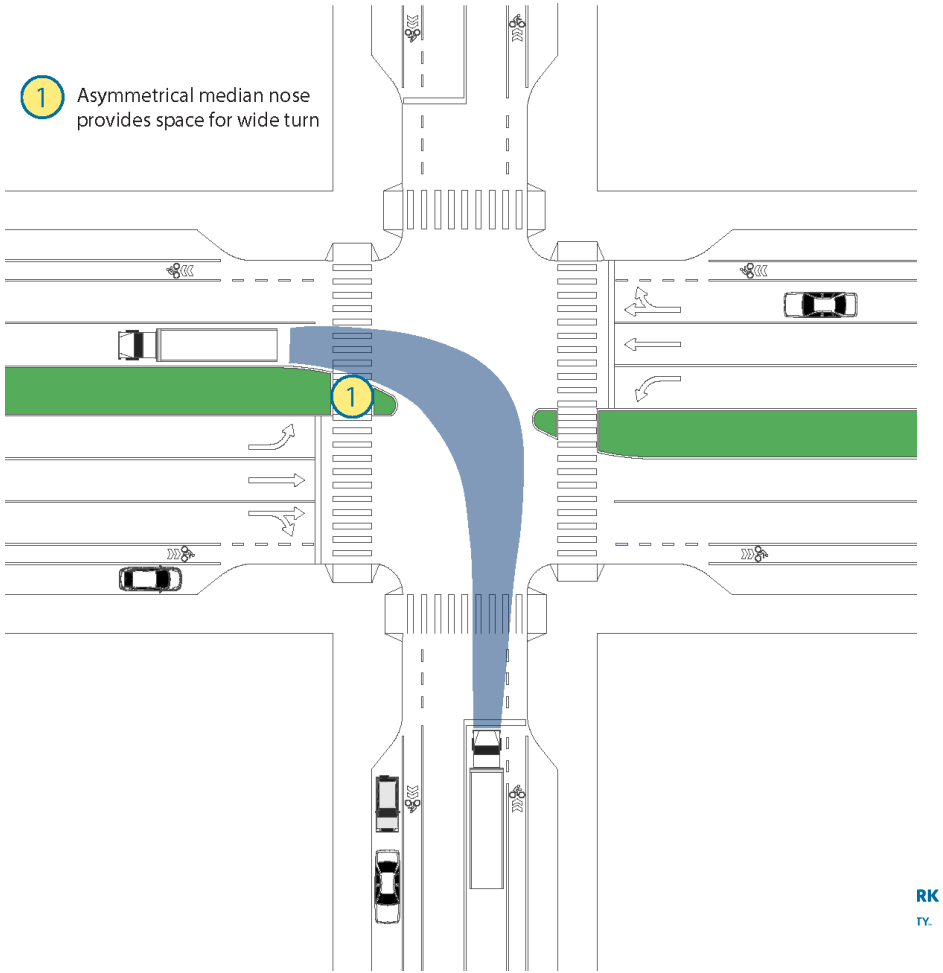
Specific Challenges

- Intersection turning movements
- Entry to driveways, loading docks, and alleys
- Entry to, navigation of, and exit from traffic circles and roundabouts

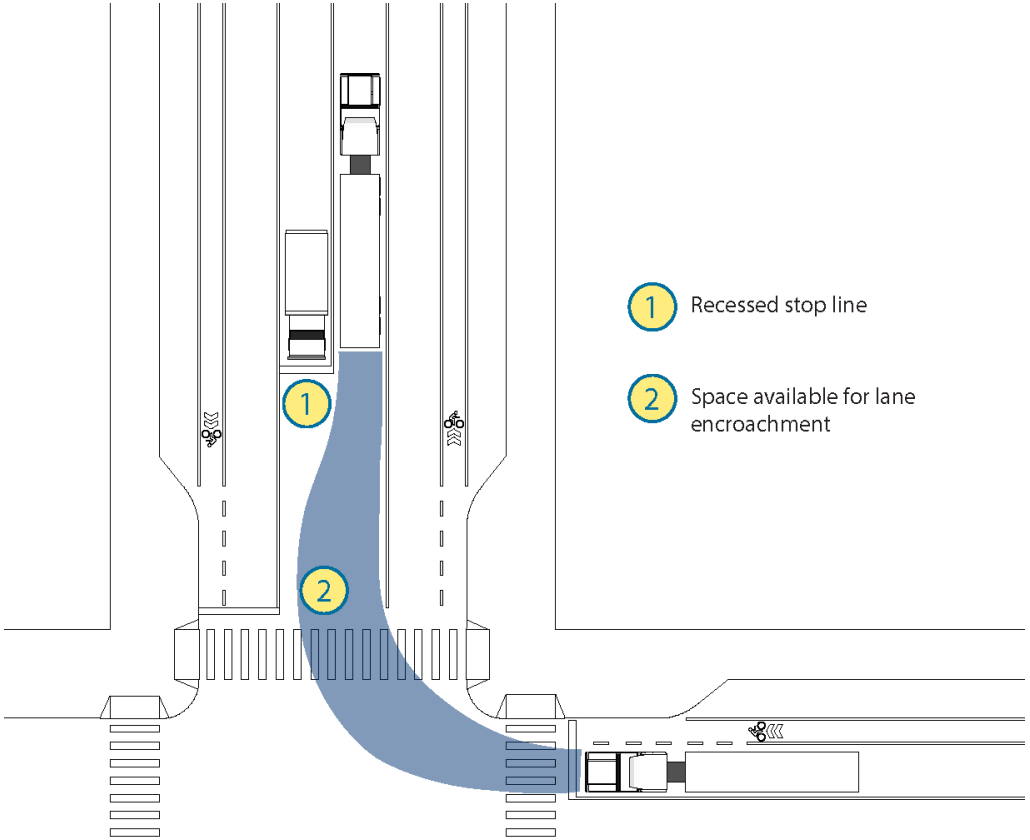
Curbside Parking and Bicycle Lanes



Asymmetrical Median Nose

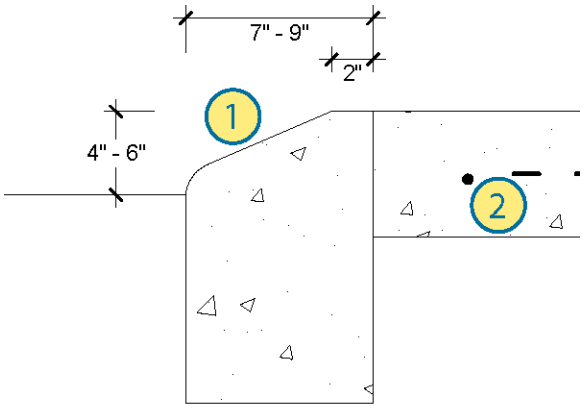


Recessed Stop Line



Mountable or Flush Curbs

1. Inclined curb
2. Infrastructure may require structural reinforcement



Painted, Striped, or Textured Curb Extensions

Channelized Right Turn Lanes

- Generally not recommended but may be best available solution at very wide intersections

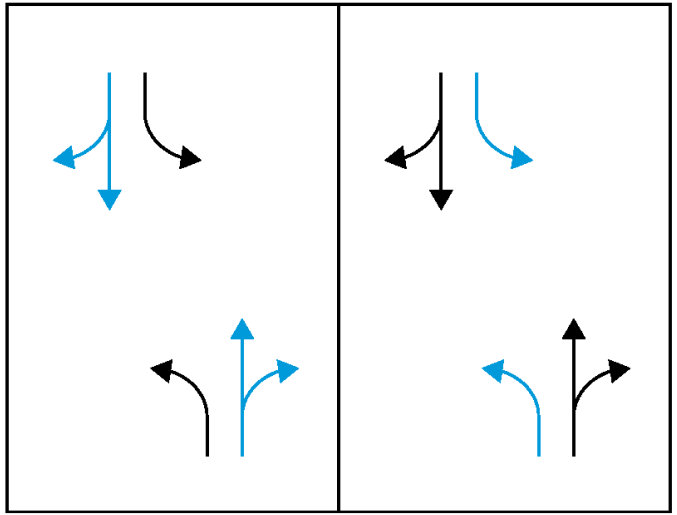
Vehicle Size Restrictions

- Fixed
- Time-based

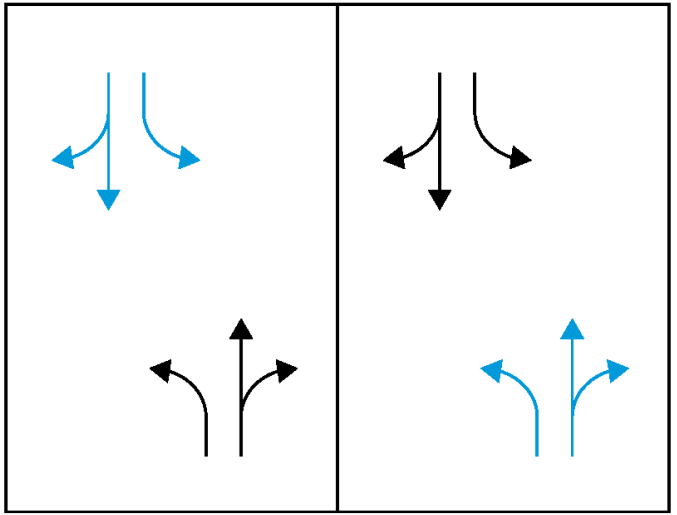
- Safety benefits of size restrictions must be carefully weighed against related impacts
  - VMT and congestion
  - Operator costs and industry participation

Dedicated Signal Phases

1 Separated turn phases



2 Separated directional movement phases



Reducing conflicts with vulnerable roadway users

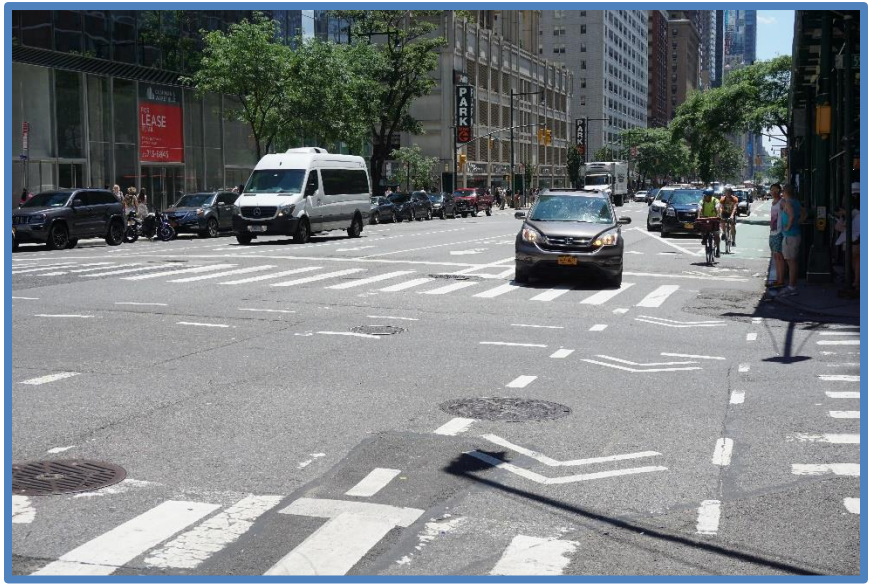
The City College of New York
CUNY The City University of New York
NEW YORK CITY DOT
NEW YORK STATE OF OPPORTUNITY. NYSERDA Supported

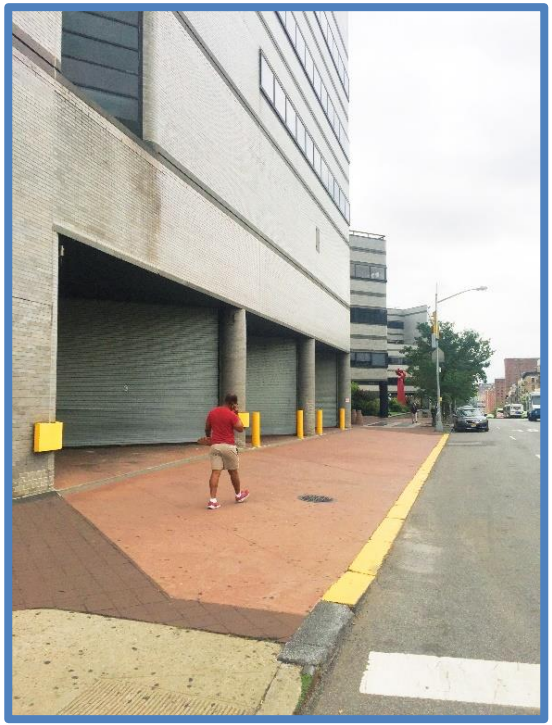
Vulnerable Road User Interaction Challenges

- Large vehicle operator blind spots
  - In front of vehicle
  - Adjacent to vehicle
- High speeds (for emergency vehicles)
- Collisions involving large vehicles disproportionately fatal

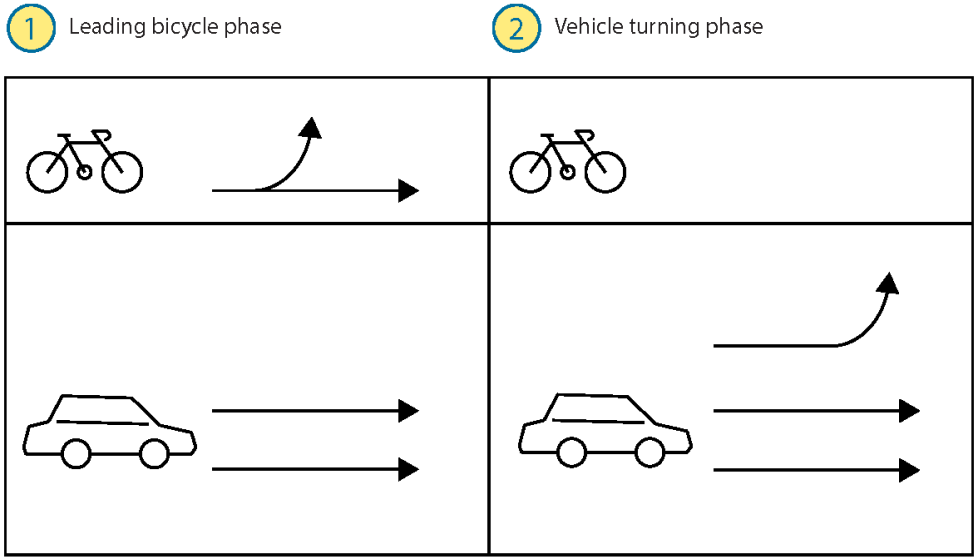
Bike Boxes and Two-Phase Turn Queue Boxes

Paint and Pavement Texturing to Delineate Conflict Areas





Dedicated or Leading Signal Phases for Non-motorized Travelers



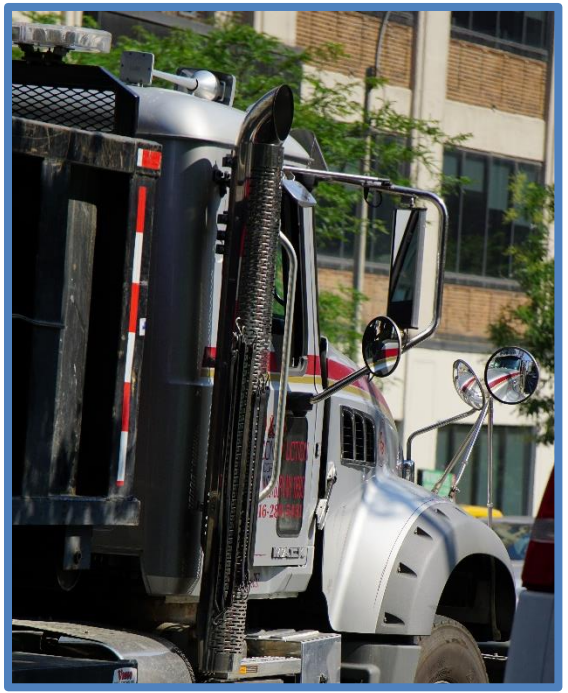
Convex Safety Mirrors

- Commonly used at driveway entrances
- Not currently approved as an on-street traffic control device in the US

On-Board Blind Spot Mitigation

- Mirrors
- Fresnel safety lenses
- Cameras

- Direct vision



Truck Side Guards

- Reduce severity of side collisions
- Mandated in:
  - Many European cities
  - Boston, MA

Education Programs

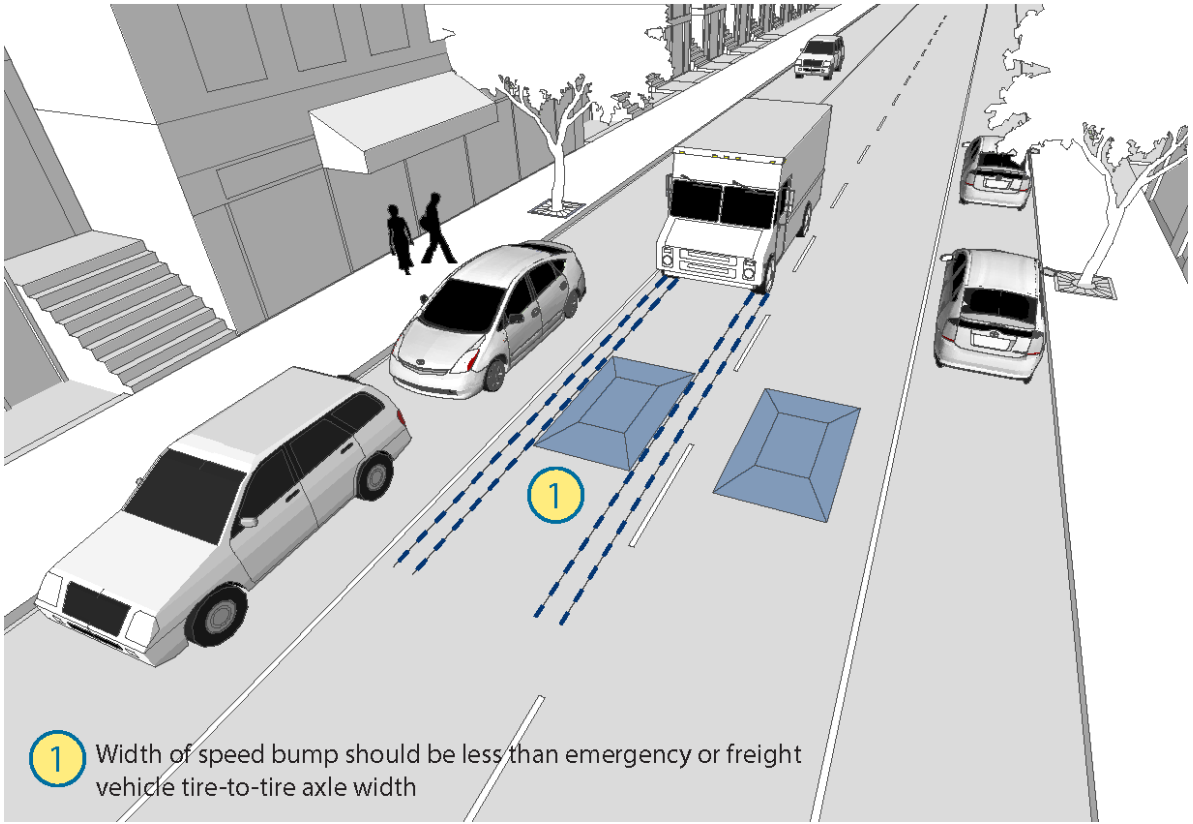
- Drivers
- Non-motorized travelers
- General public

Safely Reducing Speeds

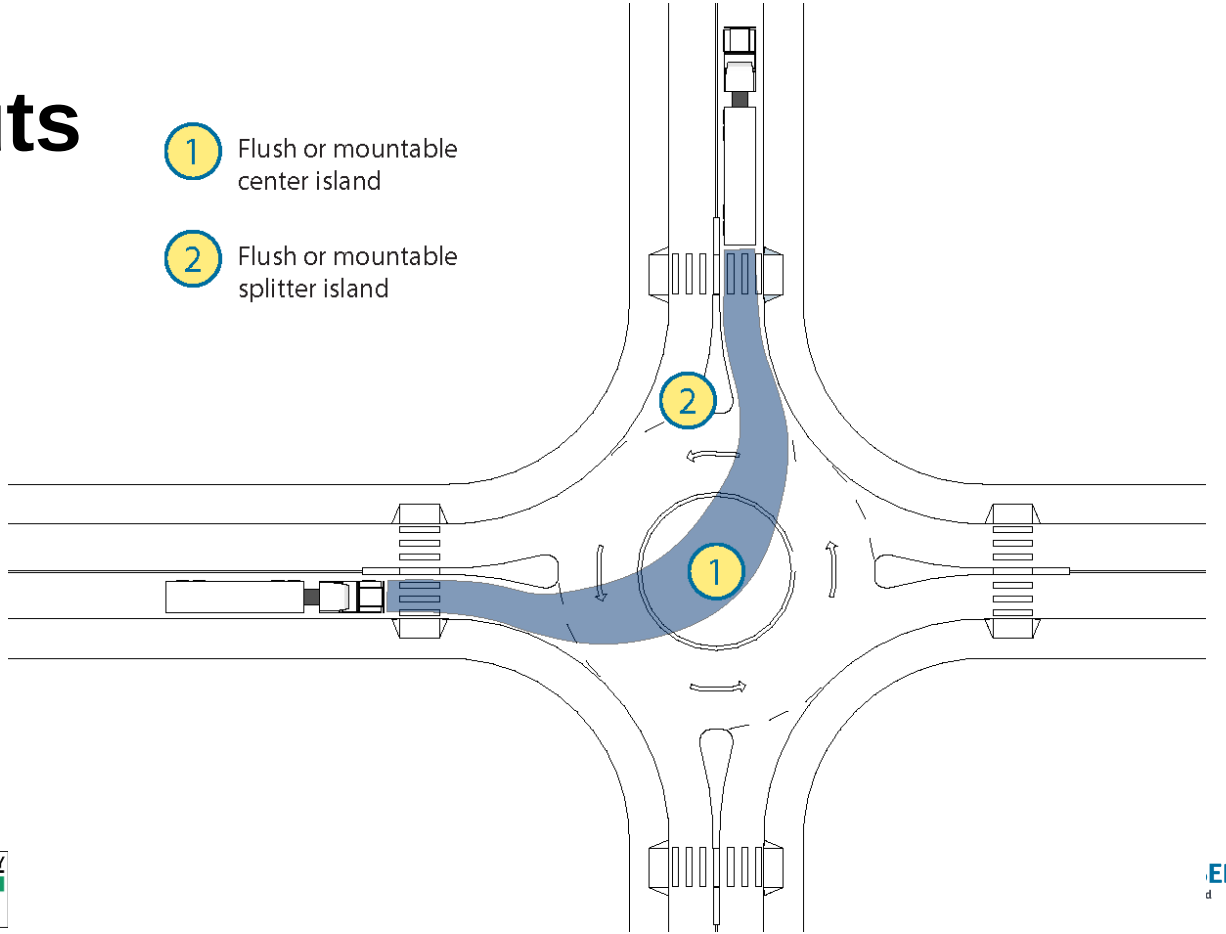
Speed Reduction Challenges

- Raised speed reducers can impact loads
  - Goods damage
  - Equipment damage
  - Patient injury
- Curved/circular routes difficult to navigate in a large vehicle

Speed Cushions



Mini Roundabouts



Providing network connectivity and redundancy

Network Challenges

- Change in street direction
- Non-traversable median
- Removal of bypass lane (e.g. two-way left turn)
- Difficult to navigate street infrastructure

Redundant Networks

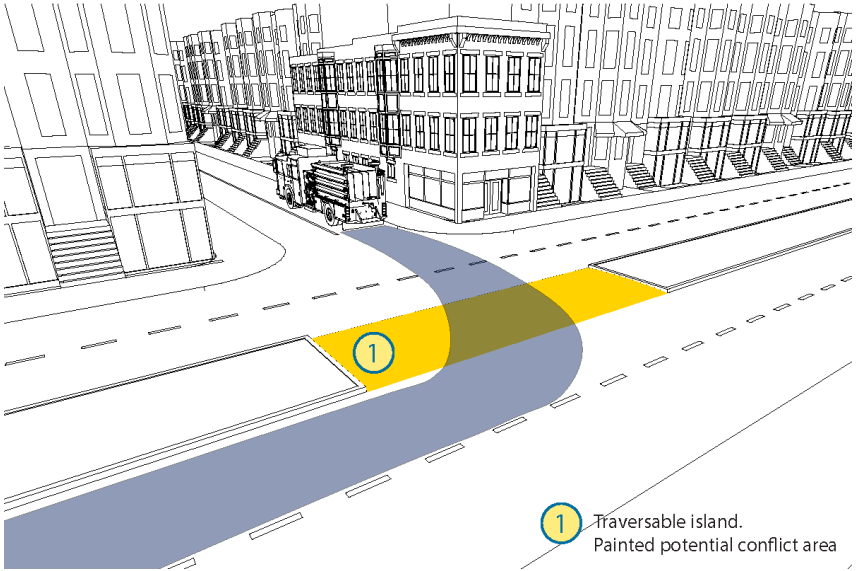
- Street connectivity
  - Short blocks/frequent intersections
  - Comparable alternative routes

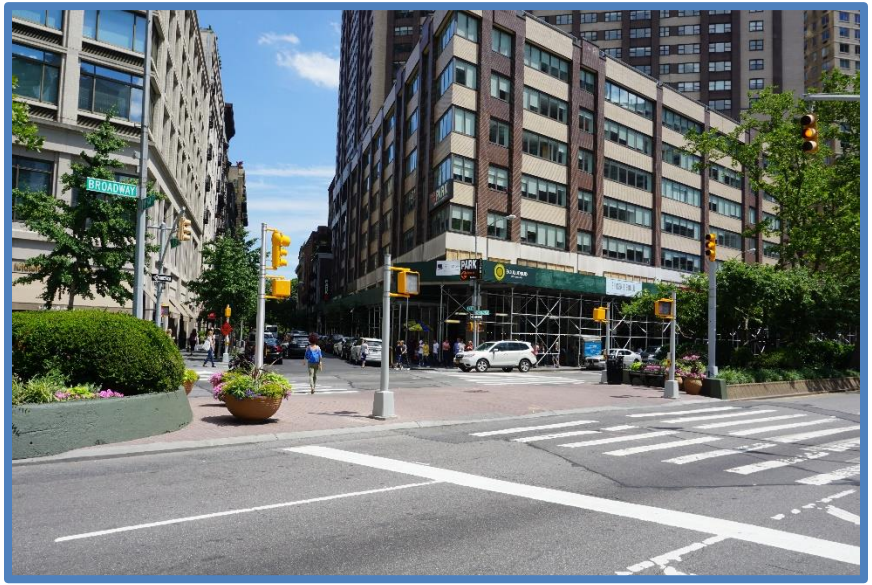
- Fire code may mandate multiple access points

Wide Bike Lanes

- Provide space to pull over
- Provide bypass lane in extreme congestion

Mountable Medians





Providing adequate space for parking, loading, and delivery or emergency operations

Loading Challenges

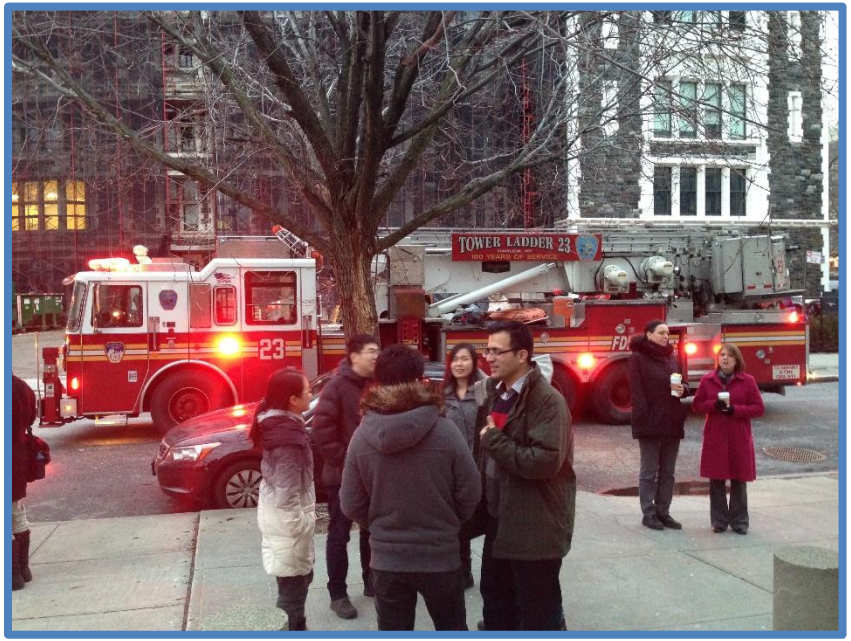
- Parking
- Curb access
- Unsafe loading conditions
- “Green” alley conversions

Loading Impacts

- Obstruction of:
  - Bike lanes
  - Sidewalks
  - Crosswalks
  - Travel lanes

Emergency Access Challenges

- Space for staging and operations

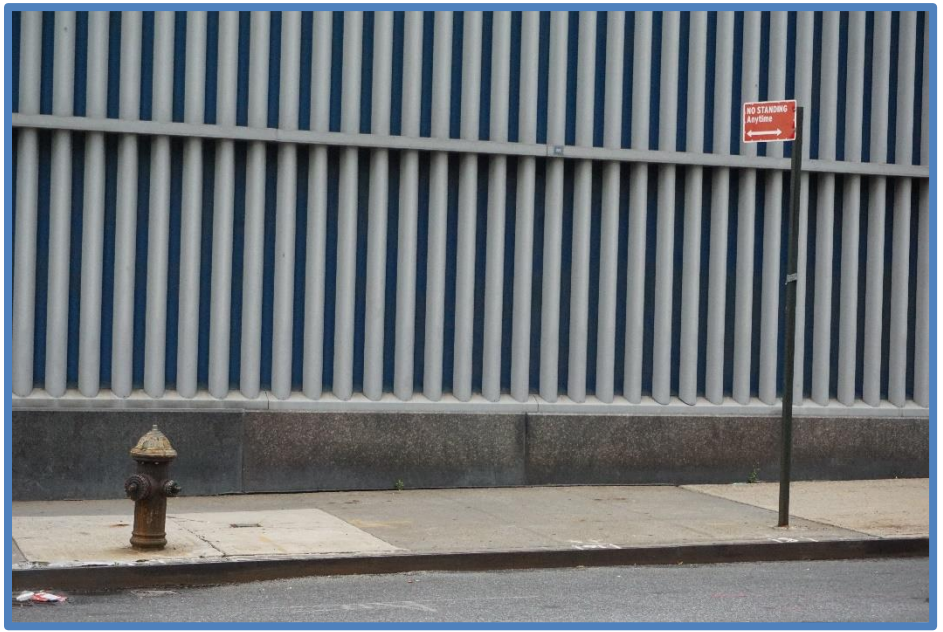


Dedicated On-Street Space for Loading

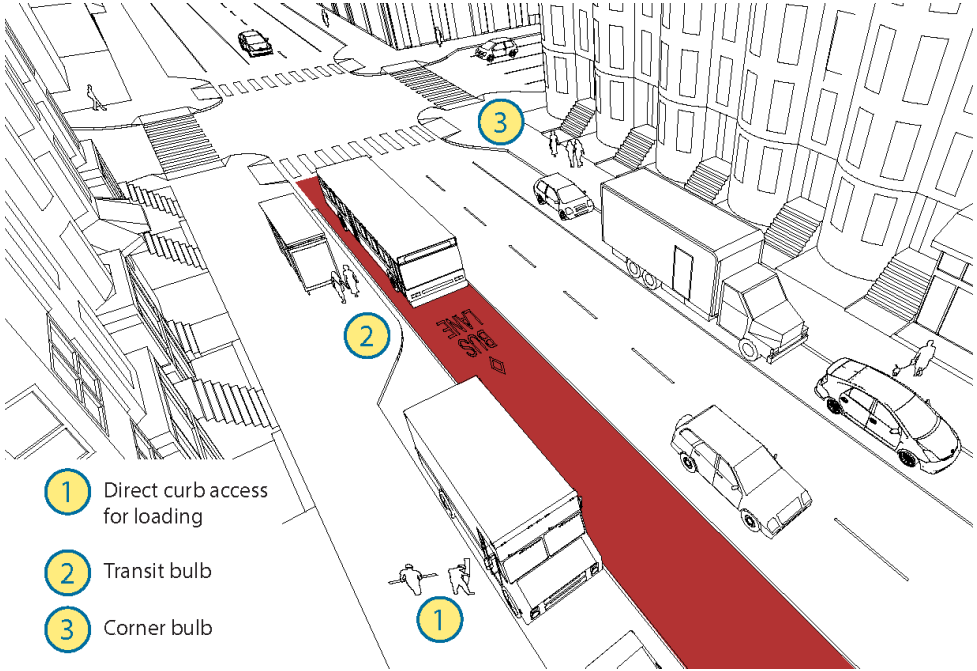
- Length to park, maneuver, and load/unload
  - Ramps
  - Lift gates
- Access aisle
- Wide lane widths

Dedicated On-Street Space for Emergency Vehicles

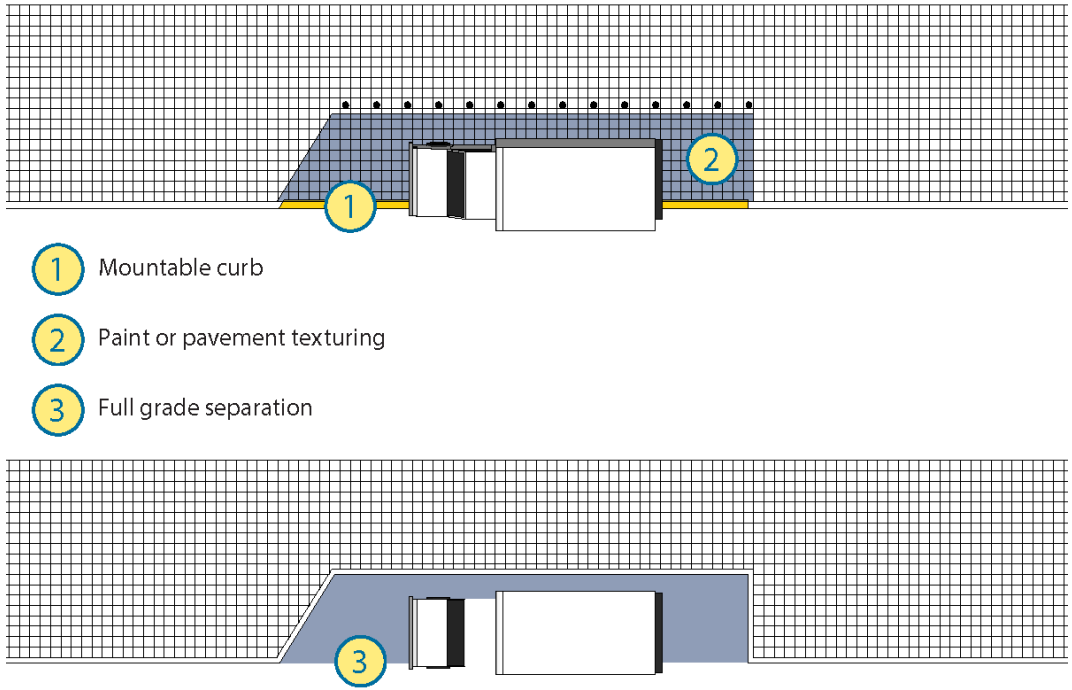
- Mid-block clearance at tall building locations
- Hydrant access



Offset Bus or Bicycle Lane



Mountable Sidewalk or Sidewalk Cutout



Zoning Regulations

- Off-street parking and loading minimums
- Freight elevator requirements

Building Delivery Management

- Centralized delivery location
- Secure storage room
- Lockers
- Loading dock appointment system

Commercial Meter Pricing

- Promotes parking space turnover
- May be occupied by service vehicles if no distinction made in regulation

Flexible Curb Regulations

- Can prioritize different modes or movements by time of day

Enforcement

- Maintain access
- Enforce consequences for operator non-compliance

- Limited effectiveness if no reasonable alternative

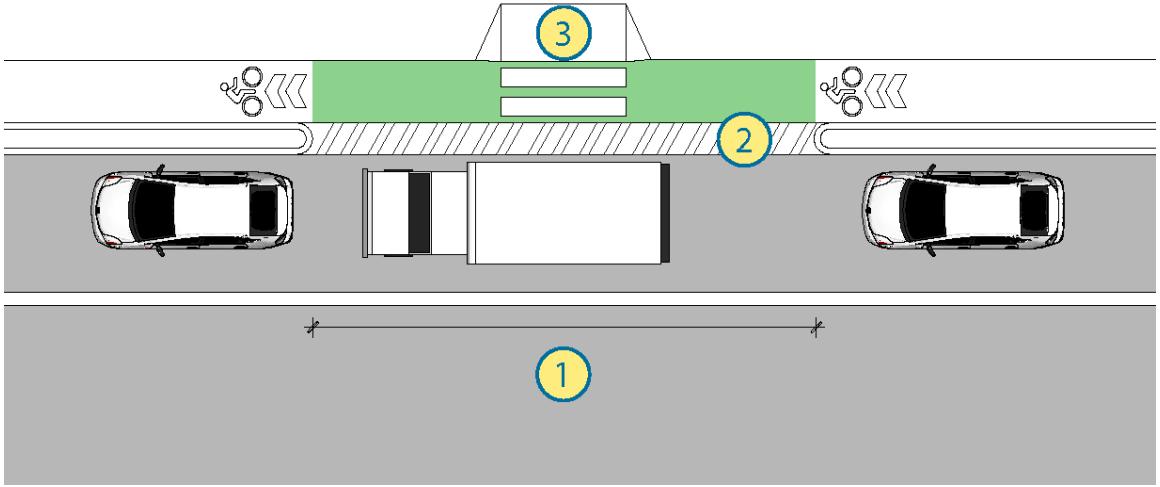
Providing curb and building access

Access Challenges

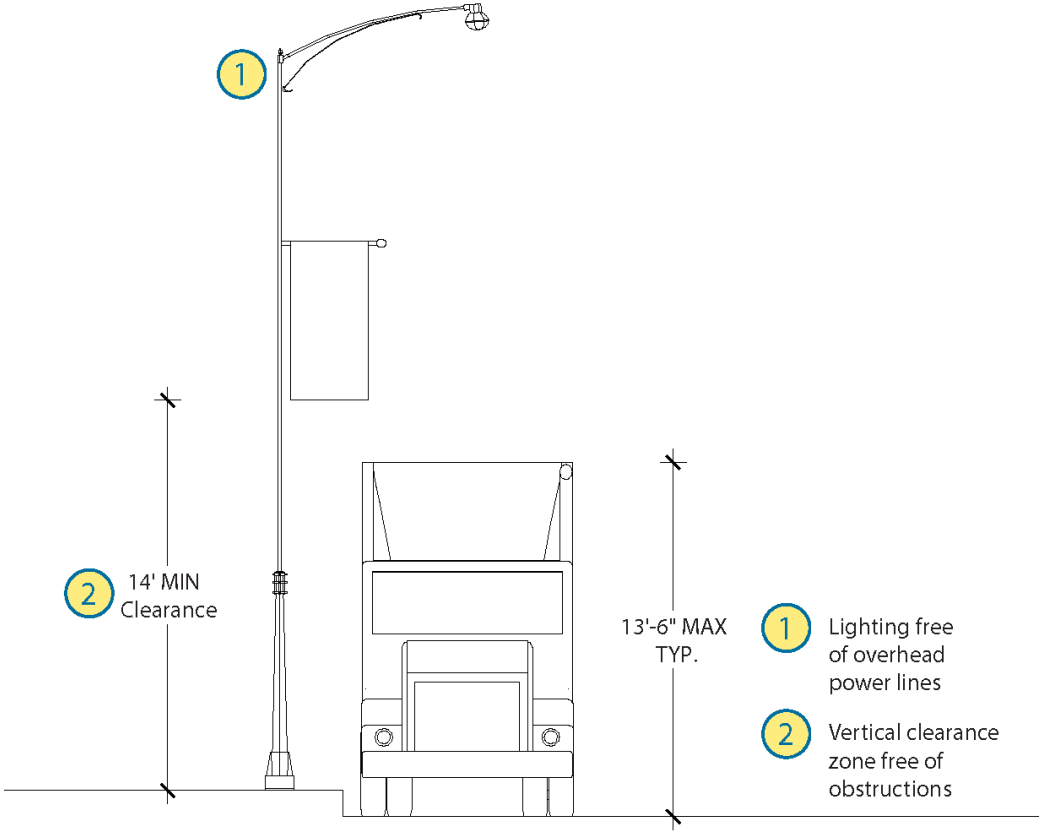
- Vehicle and bicycle conflicts
- Long delivery distances
- Sidewalk obstructions
- Vertical obstructions

Mid-Block Curb Cuts

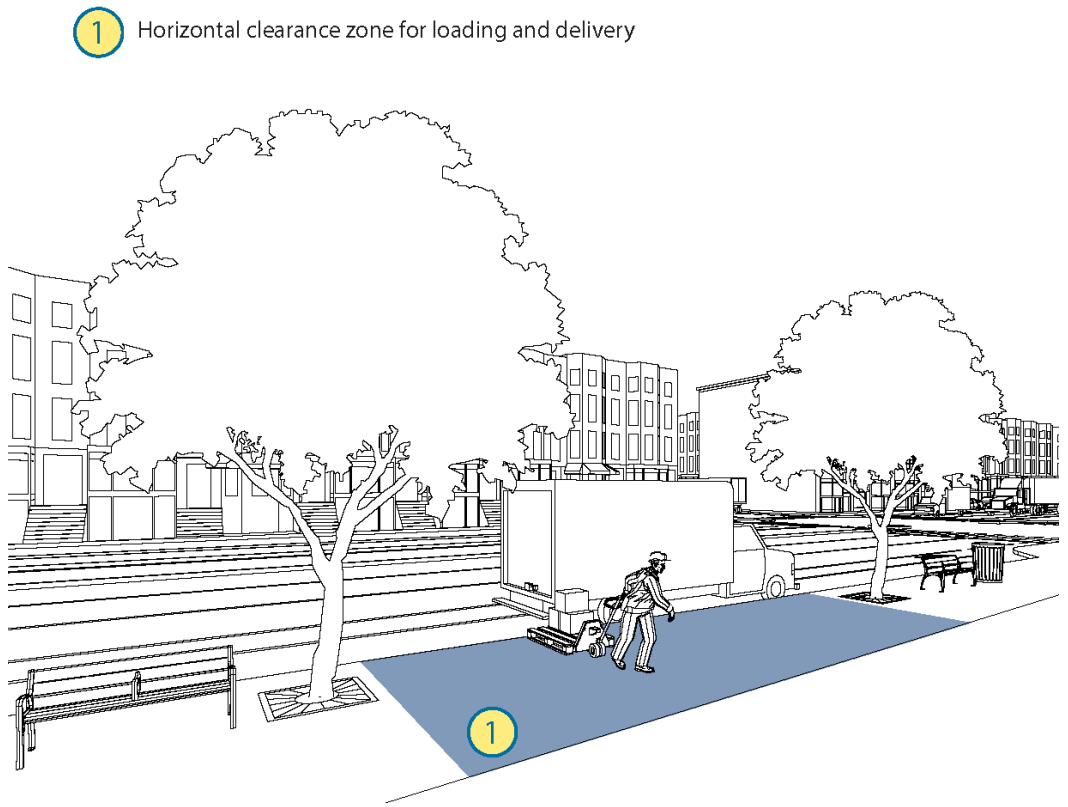
1. Loading zone with adequate length for maneuvering and rear loading
2. Access aisle
3. Midblock curb cut



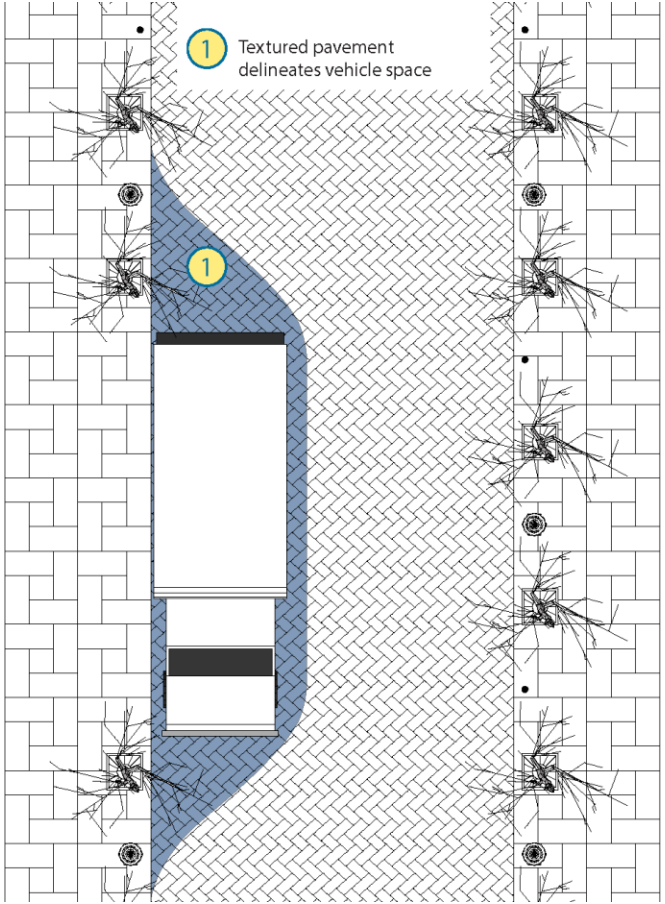
Vertical Clearance Zone



Horizontal Clearance Zone



Shared Streets



Approaches to Demand Management

Demand Management Strategies

- Change the volume, spatial, or temporal distribution of demands
- May require policy change, infrastructure investment, and/or behavior change by multiple stakeholders
- Will only be implemented if costs are acceptable to decision-makers

Off-Hour Deliveries

Method	Benefits	Challenges/Concerns
Shift deliveries to non-peak hours • Early morning • Late evening • Overnight	For operator: • Reduce travel time delays, fuel costs, and parking fines	For operator: • Increase driver labor costs • Increase safety risk
	For business: • Receive deliveries when few customers present	For business: • Additional staff costs for off-hour receipt
	For neighborhood: • Reduce congestion impacts • Reduce demand for shared curb space	For neighborhood • Generate delivery noise at night

Consolidation Center

Method	Benefits	Challenges/Concerns
Transfer goods from large freight vehicles to small, green vehicles for final delivery Consolidate goods from multiple carriers onto shared vehicles	For operator: • Avoid expensive last mile costs	For operator: • Increase costs for transloading • Lose final delivery visibility
	For business: • May provide value added services • May improve reliability	For business: • May have to pay premium for services
	For neighborhood: • Reduce large vehicle trips • Reduce demand for parking • Reduce emissions	For neighborhood • May increase local VMT • May require public subsidy for start-up, operations

Lockers and Pickup Points

Method	Benefits	Challenges/Concerns
Lockers: Secure locker where package can be accessed via security code; may be located in residential area, public space, or local business **Pick-up Points:** Staffed delivery points at local businesses (e.g. pharmacy, grocery store)	For operator: • Avoid expensive failed deliveries, repeat trips	For operator: • Difficult to identify host business
	For residents: • Provide secure location to leave package	For residents: • May be at risk during pickup
	For neighborhood: • Reduce delivery trips	For neighborhood: • May need public space
	For host business: • Generate foot traffic	For host business: • May use floor space

Secondary Referrals

Method	Benefits	Challenges/Concerns
Divert non-critical cases to local medical facilities	For providers: • Reduce unnecessary trips	For providers: • May require investment in staff training, database development, and technology support
	For neighborhood: • Reduce volume of high-speed trips	

Fireproofing

Method	Benefits	Challenges/Concerns
Reduce intensity of fire/speed of fire spread by use of fireproof building materials, sprinklers	Reduce required speed of response	Can be mandated through fire codes, but must be properly installed during construction or retrofit and well-maintained