Improving Freight System Performance in Metropolitan Areas

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RENSSELAER POLYTECHNIC INSTITUTE 1824

CoE-SUFS VREF CENTER OF EXCELLENCE FOR SUSTAINABLE URBAN FREIGHT SYSTEMS

CDM Smith

NEW YORK CITY DOT

HDR

UNIVERSITY OF WESTMINSTER

Additional Support

- Volvo Research and Educational Foundations Center of Excellence for Sustainable Urban Freight Systems (VREF CoE-SUFS)
- To jumpstart an integrative process, involving cities, private sector, and researchers to develop new freight systems paradigms that:
  - Are sustainable
  - Increase quality of life
  - Foster economic competitiveness and efficiency
  - Enhance environmental justice
- To maximize the economic benefits of production and consumption of freight, and minimize the negative externalities produced by freight traffic

Additional Resources

- **Peer-to-Peer (P2P) Exchange** to share global best practices and real world examples of sustainable urban freight systems

https://coe-sufs.org/wordpress/peer-to-peer-exchange-program/

- **Talking Freight Webinar** on NCFRP Report 33

https://connectdot.connectsolutions.com/p90dojvhomm/

Background Considerations

New York City

New York City

New York City

How Should We Tackle Freight Issues?

Improving Supply Chains

The shippers The carriers The receivers

The Economy

We need to recognize that in complex cities...

- Simple approaches don't usually work...
- We need to use all policy weapons to reduce congestion and improve environmental conditions
- It is not enough to:
  - Build infrastructure (in some cases, it is not even possible)
  - Manage traffic (it has limits, cannot solve the root problem)
  - Use ITS (it has limits, cannot solve the root problem)
  - etc.
- It is better to:
  - Use comprehensive approaches
  - Manage demand (to reduce the number of deliveries made), in combination with other initiatives

Tools Available
NCFRP 33 Products

1. Planning Guide

Planning Guide: Versions

- **Print ready version**: http://onlinepubs.trb.org/onlinepubs/ncfrp/ncfrp_rpt_033.pdf
- **Interactive version**: http://coe-sufs.org/wordpress/ncfrp33/

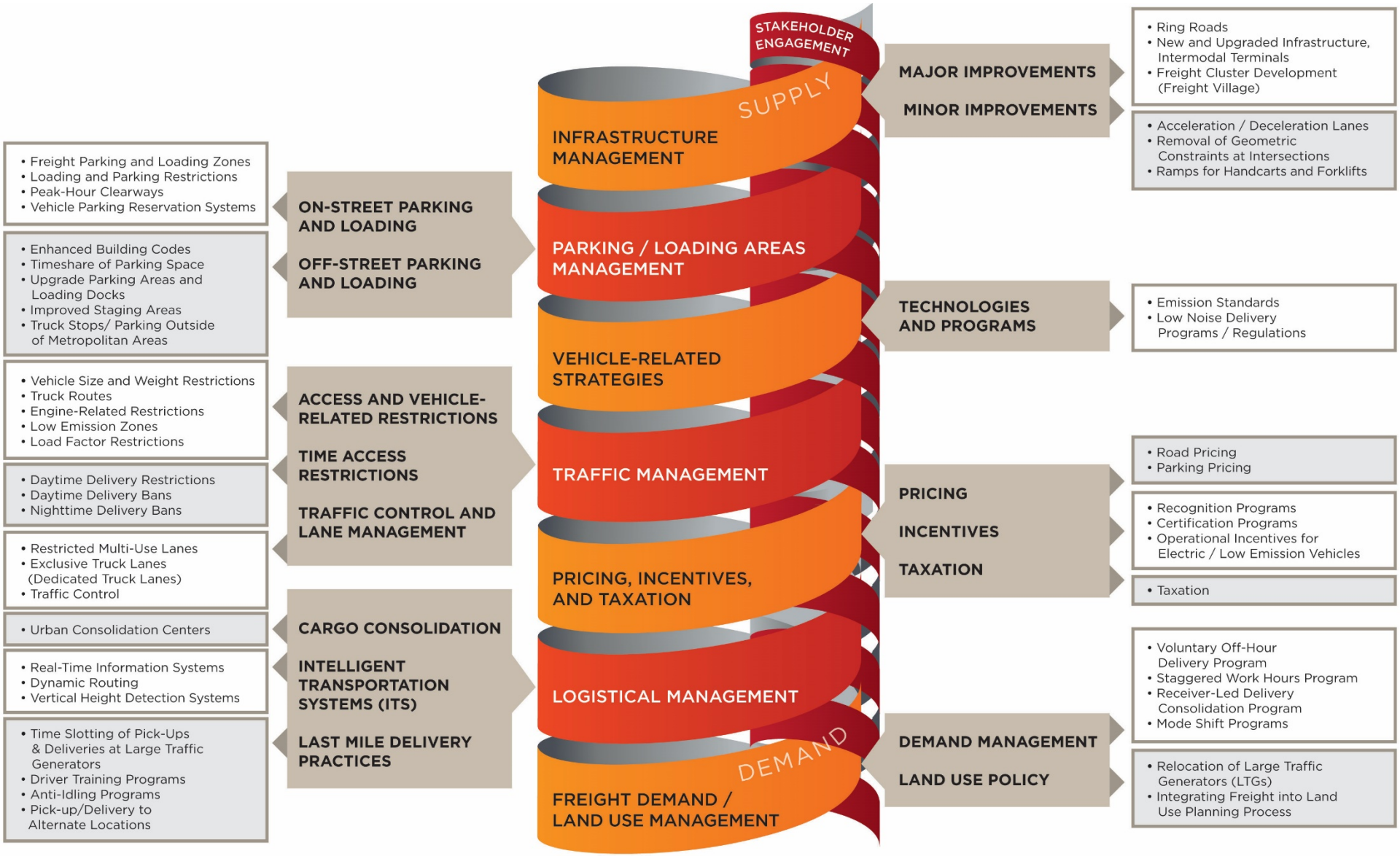
Planning Guide: Structure

1. Introduction
2. Urban Freight Transportation Decision Making

Planning Guide: Structure

3. Overview of Urban Freight Initiatives

- 8 main groups from supply to demand related
- 54 separate initiatives within the 8 groups
- For each initiative there is:
  - A summary
  - One page outline
  - Planning and design considerations


STAKEHOLDER ENGAGEMENT
SUPPLY
INFRASTRUCTURE MANAGEMENT
PARKING / LOADING AREAS MANAGEMENT
VEHICLE-RELATED STRATEGIES
TRAFFIC MANAGEMENT
PRICING, INCENTIVES, AND TAXATION
LOGISTICAL MANAGEMENT
DEMAND
FREIGHT DEMAND / LAND USE MANAGEMENT
MAJOR IMPROVEMENTS
MINOR IMPROVEMENTS
• Ring Roads
• New and Upgraded Infrastructure, Intermodal Terminals
• Freight Cluster Development (Freight Village)
• Acceleration / Deceleration Lanes
• Removal of Geometric Constraints at Intersections
• Ramps for Handcarts and Forklifts
TECHNOLOGIES AND PROGRAMS
• Emission Standards
• Low Noise Delivery Programs / Regulations
PRICING
INCENTIVES
TAXATION
• Road Pricing
• Parking Pricing
• Recognition Programs
• Certification Programs
• Operational Incentives for Electric / Low Emission Vehicles
• Taxation
DEMAND MANAGEMENT
LAND USE POLICY
• Voluntary Off-Hour Delivery Program
• Staggered Work Hours Program
• Receiver-Led Delivery Consolidation Program
• Mode Shift Programs
• Relocation of Large Traffic Generators (LTGs)
• Integrating Freight into Land Use Planning Process
ON-STREET PARKING AND LOADING
OFF-STREET PARKING AND LOADING
• Freight Parking and Loading Zones
• Loading and Parking Restrictions
• Peak-Hour Clearways
• Vehicle Parking Reservation Systems
• Enhanced Building Codes
• Timeshare of Parking Space
• Upgrade Parking Areas and Loading Docks
• Improved Staging Areas
• Truck Stops/ Parking Outside of Metropolitan Areas
ACCESS AND VEHICLE-RELATED RESTRICTIONS
TIME ACCESS RESTRICTIONS
TRAFFIC CONTROL AND LANE MANAGEMENT
• Vehicle Size and Weight Restrictions
• Truck Routes
• Engine-Related Restrictions
• Low Emission Zones
• Load Factor Restrictions
• Daytime Delivery Restrictions
• Daytime Delivery Bans
• Nighttime Delivery Bans
• Restricted Multi-Use Lanes
• Exclusive Truck Lanes (Dedicated Truck Lanes)
• Traffic Control
CARGO CONSOLIDATION
INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
LAST MILE DELIVERY PRACTICES
• Urban Consolidation Centers
• Real-Time Information Systems
• Dynamic Routing
• Vertical Height Detection Systems
• Time Slotting of Pick-Ups & Deliveries at Large Traffic Generators
• Driver Training Programs
• Anti-Idling Programs
• Pick-up/Delivery to Alternate Locations

Initiative 1: Ring Roads for Bypass Traffic

Description: The construction of bypasses (high speed ring roads, or beltways) to move through-trucks to the periphery of the urban area. Only viable if they lead to cost savings to carriers.

Targeted mode: Through traffic	**Geographic scope:** Corridor
Type of Initiative: Infrastructure management: major improvements	**Primary objective:** Reduce congestion

Expected costs and level of effort to implement: The cost and effort to construct a new ring road can be very high, involving construction of a new roadway, roadway crossings, and interchanges. Such a construction project will involve long-term planning and implementation, elaborate needs assessments, and impact analyses.

Advantages:

- Reduce congestion
- Enhance safety
- Environmental sustainability
- Reduce infrastructure damage

Disadvantages:

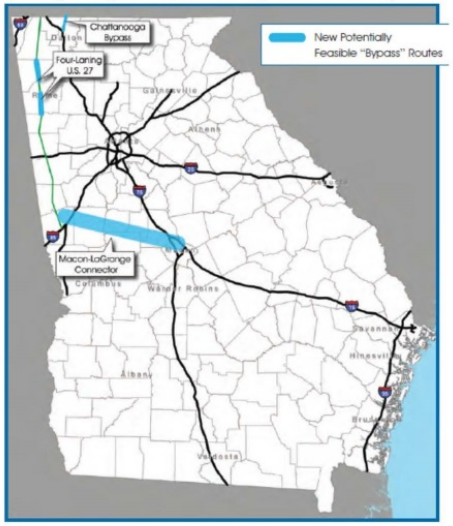
- High probability for unintended consequences
  - May lead to new development outside urban core
  - Environmental impacts on the communities affected by the new road
- Environmental impacts associated with new construction
- Require very high capital investments
- Require private-sector acceptance

Typical example:

- Sydney Orbital Network, Australia (Transport for NSW 2012)

Source: OpenStreetMap Contributors 2010

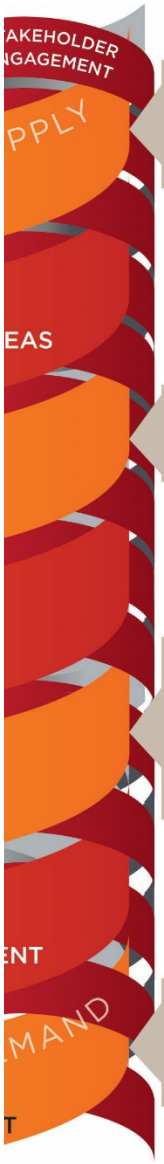
- "Through" Corridors in Atlanta, Georgia, United States (Georgia Department of Transportation 2011b)



Source: Georgia Department of Transportation 2011b

Related alternatives: 1. New and Upgraded Infrastructure, Intermodal Terminals; 2. Truck Routes; 3. Exclusive Truck Lanes (Dedicated Truck Lanes)

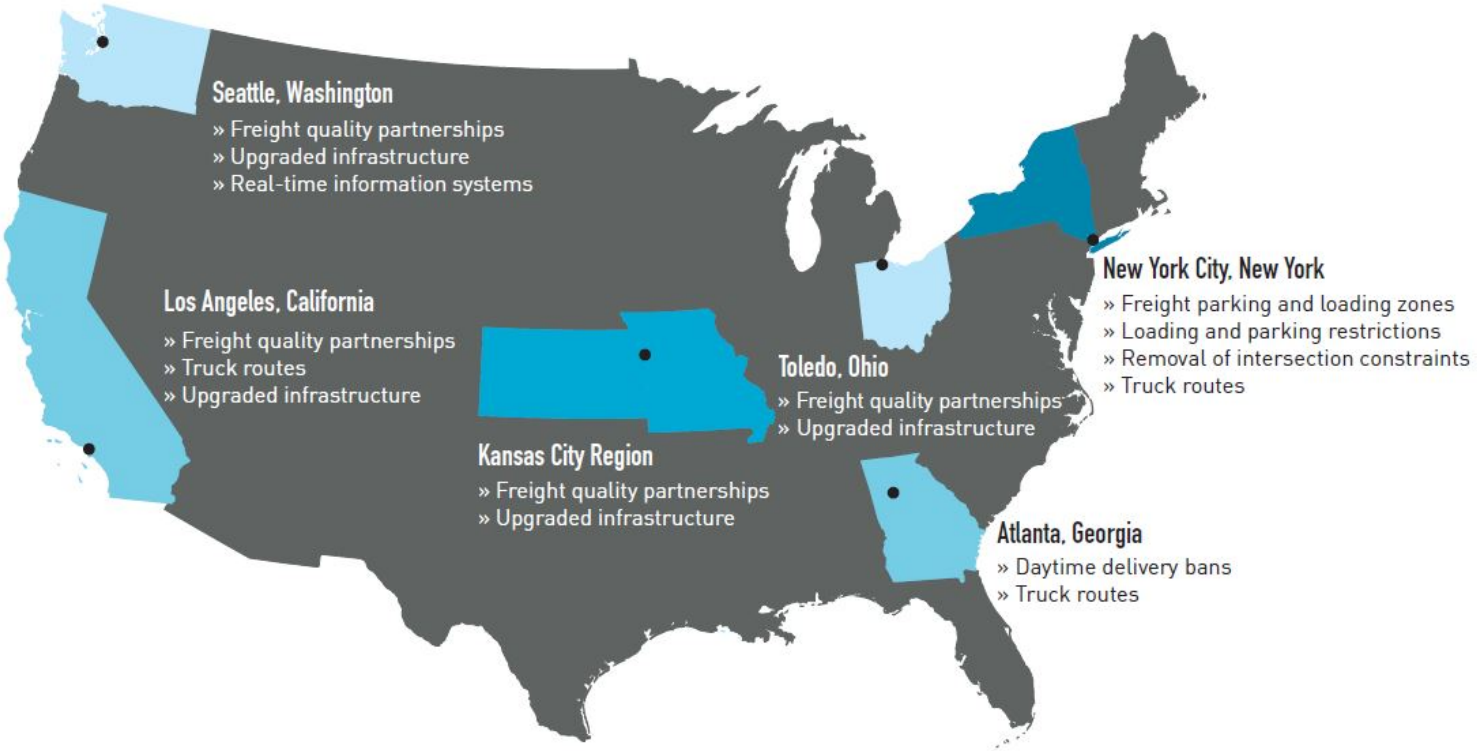
References: Marquez et al. 2004; PIARC 2011



- **MAJOR IMPROVEMENTS**
  - Ring Roads
  - New and Upgraded Infrastructure, Intermodal Terminals
  - Freight Cluster Development (Freight Village)
- **MINOR IMPROVEMENTS**
  - Acceleration / Deceleration Lanes
  - Removal of Geometric Constraints at Intersections
  - Ramps for Handcarts and Forklifts
- **TECHNOLOGIES AND PROGRAMS**
  - Emission Standards
  - Low Noise Delivery Programs / Regulations
- **PRICING**
- **INCENTIVES**
- **TAXATION**
  - Road Pricing
  - Parking Pricing
  - Recognition Programs
  - Certification Programs
  - Operational Incentives for Electric / Low Emission Vehicles
  - Taxation
- **DEMAND MANAGEMENT**
- **LAND USE POLICY**
  - Voluntary Off-Hour Delivery Program
  - Staggered Work Hours Program
  - Receiver-Led Delivery Consolidation Program
  - Mode Shift Programs
  - Relocation of Large Traffic Generators (LTGs)
  - Integrating Freight into Land Use Planning Process

Planning Guide: Structure

4. Case Studies



2. Initiative Selector

Initiative Selector: Rationale

- Objectives:
  - To provide suggestions about initiatives to consider
  - To provide a dynamic mechanism to explore the guide
  - To provide a tool that could be expanded over time
- Limitations:
  - The Initiative Selector is not a replacement for proper transportation decision making and planning
  - Due to the lack of a database of documented experiences the search criteria are very general
  - Suggestions may not necessarily apply to local conditions...
- Produced in collaboration with the CoE-SUFS, see:

  http://coe-sufs.org/wordpress/InitiativeSelector/

Initiative Selector: Rationale

1. Characterize the various initiatives in terms of:
    1. Nature of the Problem: Congestion, Pollution, Noise, Safety
    2. Geographic Scope: Nation, State, City, Area, Corridor, Point
    3. Problem Source: Through Traffic, Urban Deliveries, Large Traffic Generators, Large Trucks...
    4. Investment required: Very High, High, Moderate, Low...
    5. Implementation time: Long, Medium, Short...
    6. Potential for unintended consequences: Very High, High, Moderate, Low, None...
2. It finds initiatives that match the search parameters

How it works

Rensselaer

CITE Center for Infrastructure, Transportation, and the Environment

Initiative Selector Too
Pe

This application has been co-funded by the Transportation Research Board's (TRB) National Cooperative Frei

Page supports Google Chrome, Internet Explorer 11, Safari, and Mozilla browsers.

How to use this application:
Select aspects of the traffic problems you seek solutions to on the left. The results will contain links to all the

Nature of the Problem
- ☑ Congestion
- ☑ Inadequate Infrastructure
- ☐ Pollution
- ☐ Noise
- ☐ Safety
- ☐ Stakeholder Engagement
- ☐ Land Use

Geographic Scope
- ☐ Nation
- ☐ City
- ☑ Area
- ☐ Corridor
- ☐ Point

Problem Source
- ☐ Through Traffic
- ☑ All Traffic
- ☐ Large Trucks
- ☑ Urban Deliveries
- ☐ Large Traffic Generators

Unique Solutions: 18

Show Selected Initiatives | Clear Selected

	Initiative	Investment
☑	Enhanced building codes	Low
☐	Vehicle size and weight restrictions	Low
☐	Load factor restrictions	Low
☐	Time access restrictions	Low
☐	Truck stops/Parking outside metropolitan areas	High
☑	Restricted multi-use lanes	Low
☐	Road pricing/ incentives	Moderate
☐	Parking pricing	None / Low
☐	Certification programs	None / Low
☑	Urban consolidation centers	High
☐	Real-time information systems	High / Very Hig
☐	Vertical height detection systems	High / Very Hig
☐	Dynamic routing	High / Very Hig
☐	Time slotting of deliveries/ Pick-ups for large traffic generators	Low
☑	Pick-up/delivery to alternate locations	Low
☑	Voluntary off-hour delivery program	Moderate / Higl
☐	Staggered work hours program	Low / High
☑	Mode shift program	Low / High

Initiative 26: Restricted Multi-Use Lanes

Description: These initiatives promote the use of available road capacity by allocating restricted lane right-of-way to trucks, buses, and occasionally high-occupancy vehicles. The lane usage can be allocated to different users using time windows, shared among designated users all day, or restricted to special use for certain users. Restrictions can be by vehicle type, or they can allow mixed traffic during the restriction interval.

Targeted mode: All traffic/large trucks	**Geographic scope:** Area
Type of initiative: Traffic management: lane management	**Primary objective:** Optimize road capacity

Expected costs and level of effort to implement: Lane management strategies and restrictions to multi-use lanes require thorough planning to consider the characteristics of the network and the needs of different users. Planning should involve extensive stakeholder engagement, and weigh both the positive and negative impacts to all agents that are part of the system. The costs are mainly associated with the installation of variable message signs or changeable message signs, and enforcement resources.

Advantages:
- Reduce congestion
- Enhance safety
- Increase efficiency
- Enhance livability
- Can be used as incentive to foster other strategies

Disadvantages:
- May confuse drivers
- May conflict with other traffic users
- May not be adequate for sensitive locations
- Hard to enforce
- Lane geometry may not be adequate for large trucks

Examples:
- Multifunctional lanes in its commercial center: Barcelona, Spain (City Ports 2005)
- Clean vehicles are allowed to use public transport lanes: Göteborg, Sweden (START 2009)
- Consolidation vehicles are allowed to use bus lanes: Bristol, England (START 2009)
- Truck lane restricted to right lane: New York City, New York, United States (The City of New York 2012), North Carolina, United States (Federal Highway Administration 2011; North Carolina Department of Transportation 2013)
- Ban on through-trucks on Interstate inside the perimeter freeway: Georgia, United States (Georgia Dept. of Public Safety 2010)

Source: Federal Highway Administration 2011

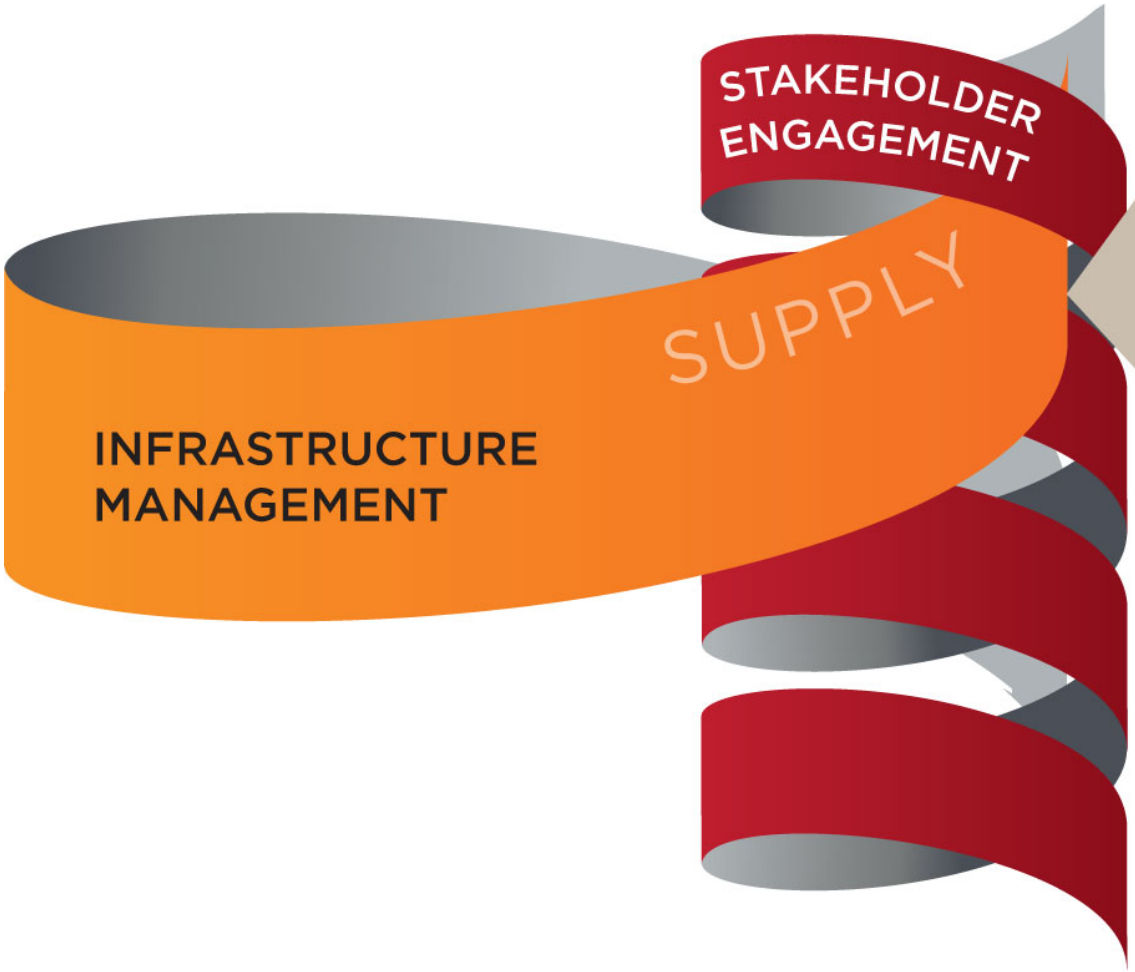
Related alternatives: 1. Acceleration/Deceleration Lanes; 2. Traffic Control; 3. Dynamic Routing

References: Ogden 1992; City Ports 2005; BESTUFS 2007; START 2009; Georgia Department of Public Safety 2010; Federal Highway Administration 2011; SUGAR 2011; The City of New York 2012; North Carolina Department of Transportation 2013

Urban Freight Initiatives

1. Infrastructure Management

Infrastructure Management



MAJOR IMPROVEMENTS

Ring Roads

New and Upgraded Infrastructure, Intermodal Terminals

Freight Cluster Development (Freight Village)

MINOR IMPROVEMENTS

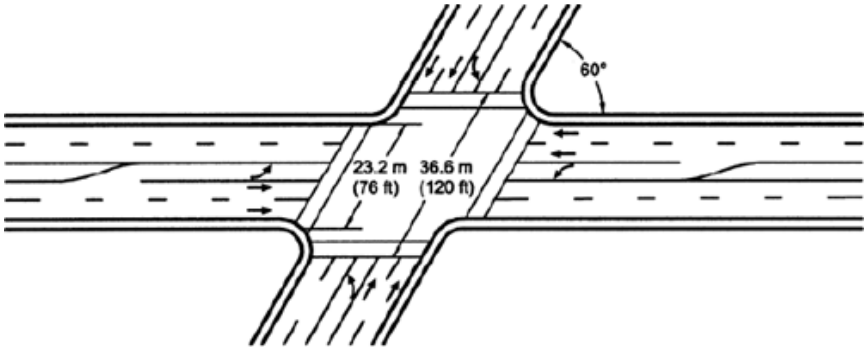
Acceleration / Deceleration Lanes

Removal of Geometric Constraints at Intersections

Ramps for Handcarts and Forklifts

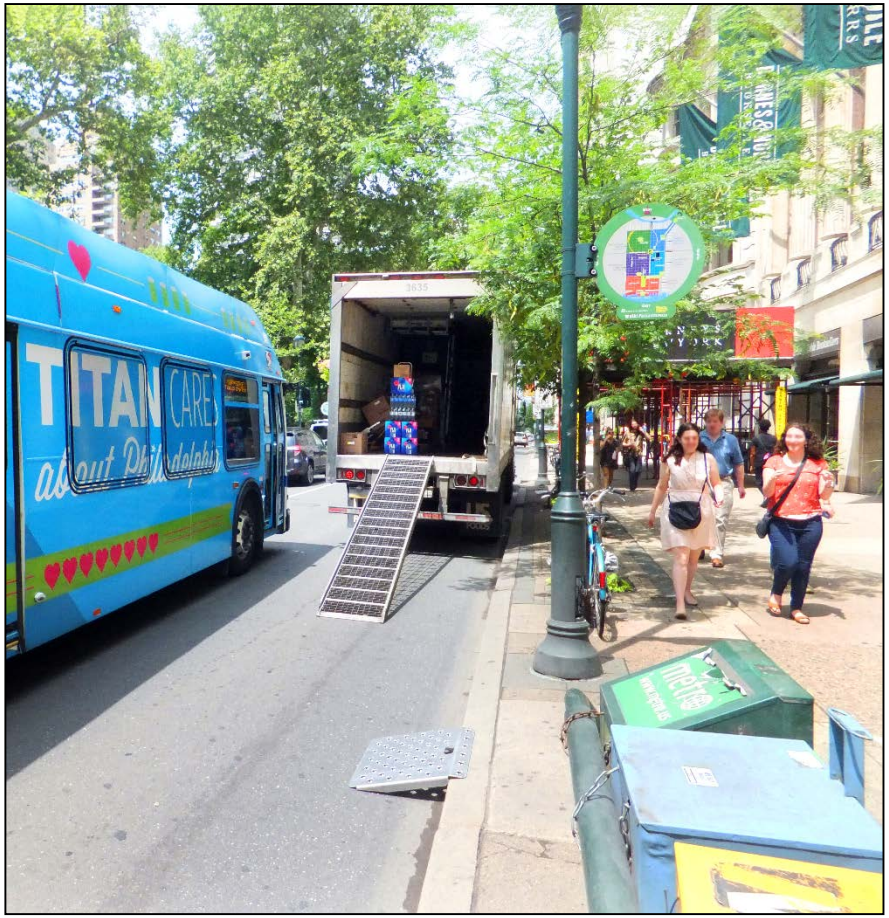
Use infrastructure improvements to enhance freight, often necessary due to increases in truck size and traffic

Removal of Geometric Constraints



Ramps for Handcarts

Source: (www.osha.gov)



Source: Delaware Valley Regional Planning Commission

2. Parking/Loading Areas Management

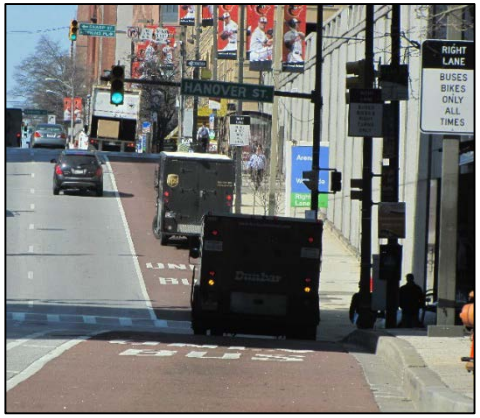
Parking/Loading Areas Management

ON-STREET PARKING AND LOADING
Freight Parking and Loading Zones
Loading and Parking Restrictions
Peak-Hour Clearways
Vehicle Parking Reservation Systems

OFF-STREET PARKING AND LOADING
Enhanced Building Codes
Timeshare of Parking Space
Upgrade Parking Areas and Loading Docks
Improved Staging Areas
Truck Stops/ Parking Outside of Metropolitan Areas

Improve the way parking is used to reduce: double parking, delivery time, conflicts with other users, etc.

Parking Issues



Key Parking Principles

- Curbside space is a public good that must be allocated to all users in proportion to their needs
- Sufficient parking for FSA must be provided, otherwise
  - Commercial vehicles circle around → Increasing traffic
  - Commercial vehicles double park → Reducing capacity
  - If curb allocation is insufficient → Not possible to conduct the activity within the law → Unjust law/ordinances

Parking/Loading Area Management: On-Street

ON-STREET PARKING AND LOADING

- Freight Parking and Loading Zones
- Loading and Parking Restrictions
- Peak-Hour Clearways
- Vehicle Parking Reservation Systems

OFF-STREET PARKING AND LOADING

- Enhanced Building Codes
- Timeshare of Parking Space
- Upgrade Parking Areas and Loading Docks
- Improved Staging Areas
- Truck Stops/ Parking Outside of Metropolitan Areas

On-Street Parking and Loading

Freight Parking and Loading Zones

See P2P Webinars 15 and 16

Peak-Hour Clearways

Southbound clearway hours

Northbound clearway hours

Are we allocating enough parking space for freight activities?

Source: TfL, Kerbside Loading Guidance (2009)

Parking/Loading Area Management: Off-Street

ON-STREET PARKING AND LOADING

Freight Parking and Loading Zones
Loading and Parking Restrictions
Peak-Hour Clearways
Vehicle Parking Reservation Systems

OFF-STREET PARKING AND LOADING

Enhanced Building Codes
Timeshare of Parking Space
Upgrade Parking Areas and Loading Docks
Improved Staging Areas
Truck Stops/ Parking Outside of Metropolitan Areas

Off-Street Parking and Loading

Enhanced Building Codes

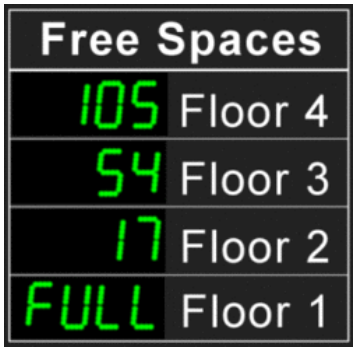
Land use	Floor area	Minimum number of bays
Office	General	1/5000 m^2
	Minimum	1 LR
	e.g., 5000 m^2	1 HR
	e.g., 20000 m^2	4 HR
Shop	General	1/2000 m^2
	Minimum	1 LR
	e.g., 2000 m^2	1 HR
	e.g., 10000 m^2	2 HR + 3 LR
Supermarket	General	1/1000 m^2
	Minimum	1 HR
	e.g., 1000 m^2	1 HR
	e.g., 2000 m^2	1 A + 1 HR
	e.g., 4000 m^2	2 A + 2 HR

Land use	Floor area	Minimum number of bays
Dept Store	General	1/1000 m^2
	Minimum	1 HR
	e.g., 2000 m^2	2 HR or 1A+1HR
	e.g., 4000 m^2	1 A + 3HR
Showrooms	General	1/2000 m^2
	Minimum	1 HR
	e.g., 5000 m^2	3 HR
	e.g., 10000 m^2	4 HR + 1A
Warehouse and Industry	General	1/1000 m^2
	Minimum	1A
	e.g., 5000 m^2	1 A + 1 HR
	e.g., 10000 m^2	2 A + 1 HR
Others	General	1/2000 m^2
	Minimum	1HR

Upgrade Parking Areas and Loading Docks

Improved Staging Areas

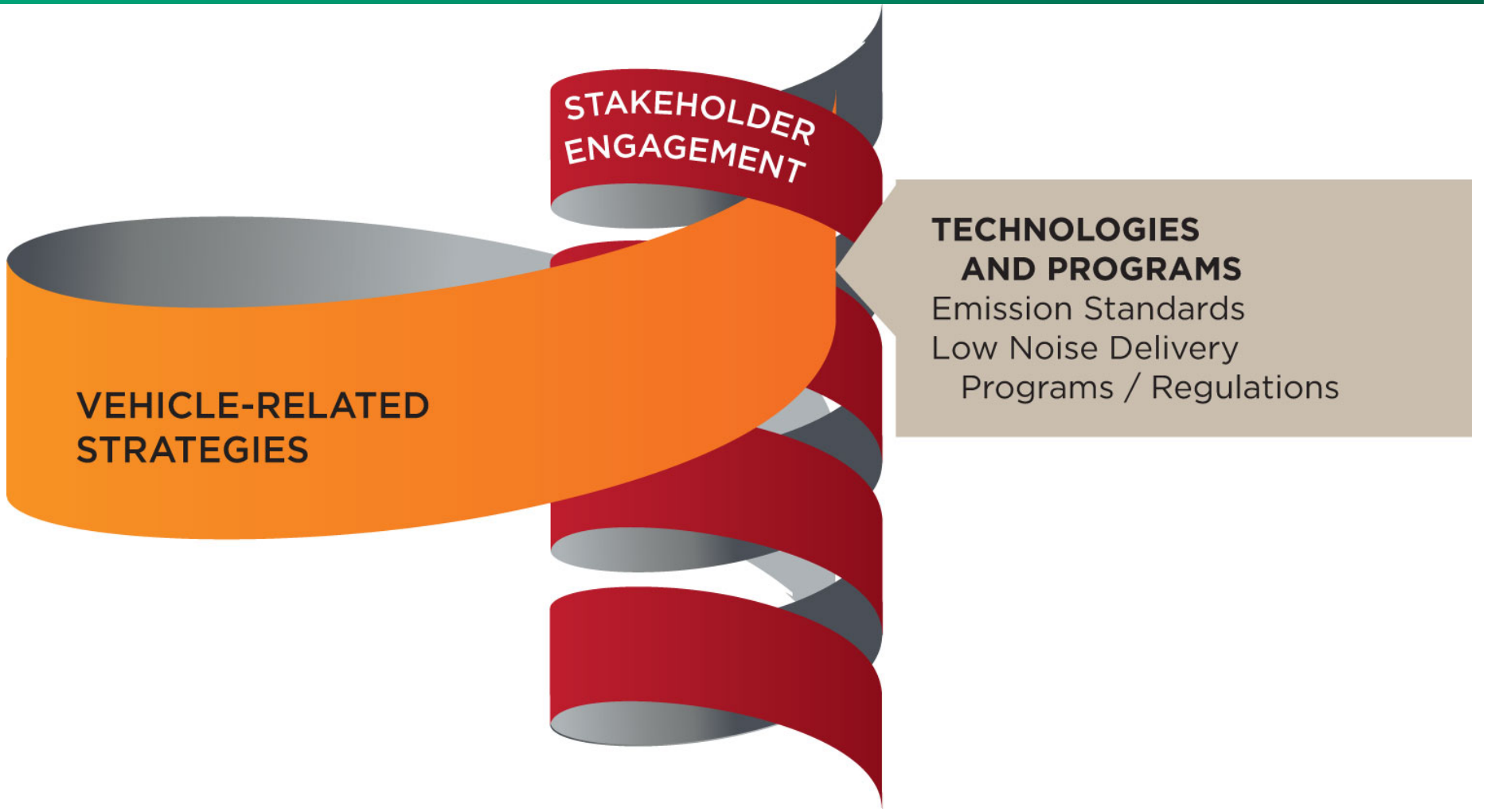
Timeshare of Parking Space



See P2P Webinar 10

3. Vehicle Related Initiatives

Vehicle Related Initiatives



Seek to improve environmental conditions by fostering use of technologies and practices that reduce the negative impacts related to freight vehicles

4. Traffic Management

Traffic Management

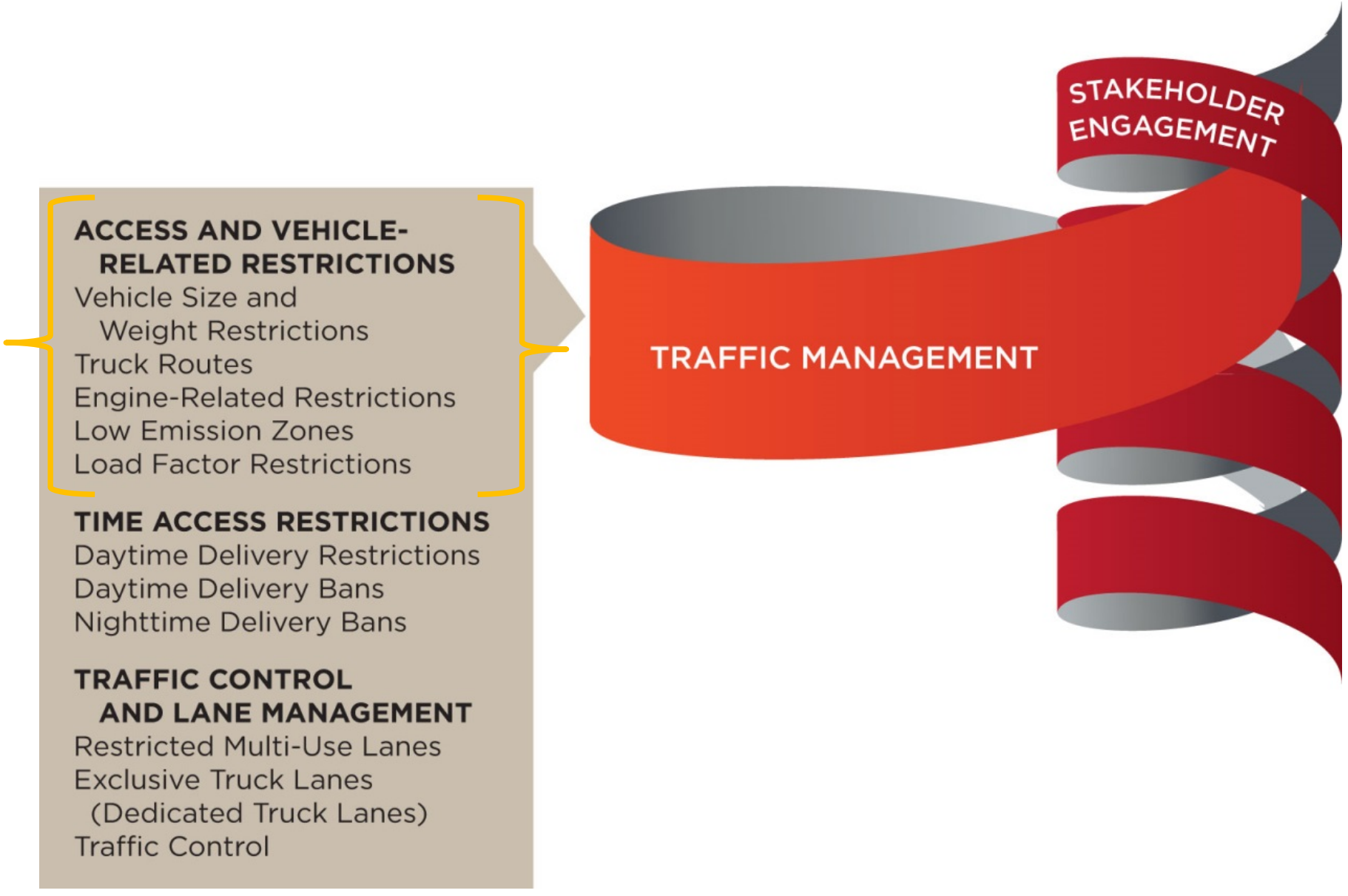
ACCESS AND VEHICLE-RELATED RESTRICTIONS
Vehicle Size and Weight Restrictions
Truck Routes
Engine-Related Restrictions
Low Emission Zones
Load Factor Restrictions

TIME ACCESS RESTRICTIONS
Daytime Delivery Restrictions
Daytime Delivery Bans
Nighttime Delivery Bans

TRAFFIC CONTROL AND LANE MANAGEMENT
Restricted Multi-Use Lanes
Exclusive Truck Lanes (Dedicated Truck Lanes)
Traffic Control

Define the conditions under which freight vehicles can circulate in the network

Traffic Management:
Access & Vehicle-Related Restrictions



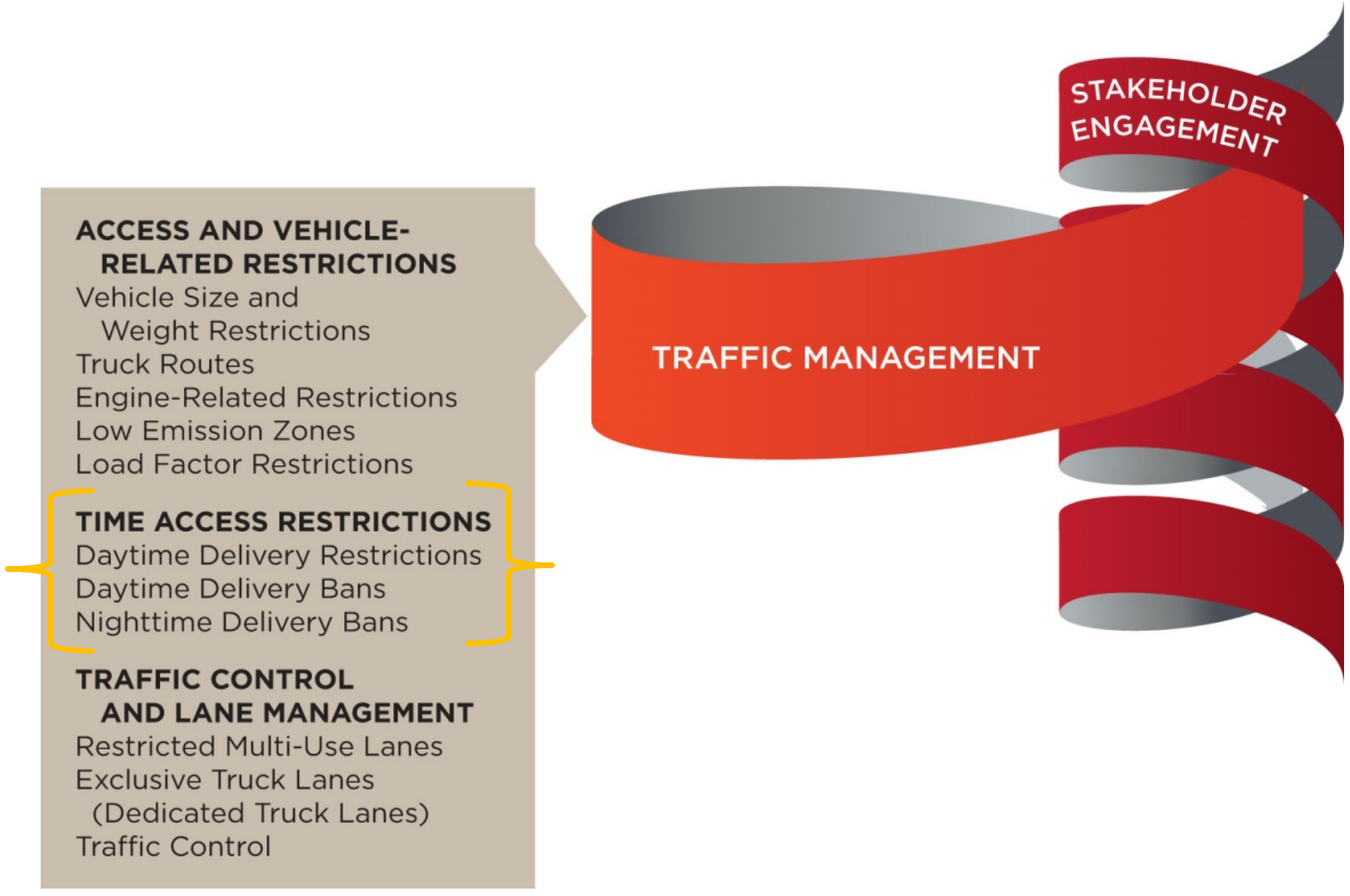
Vehicle Size and Weight Restrictions

Source: (11foot8 videos)

Effect of Large Trucks Ban in Sao Paulo

Courtesy of Professor Hugo Yoshizaki, University of Sao Paulo

Traffic Management: Time Access Restrictions

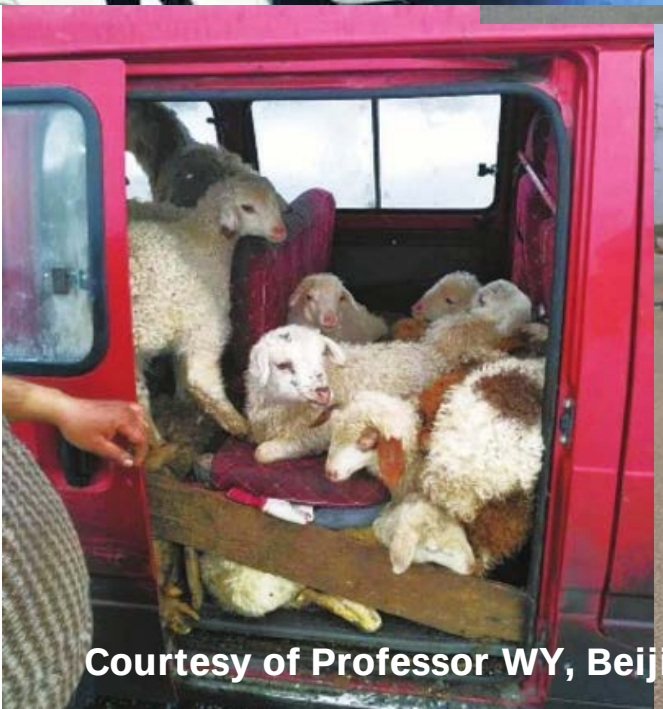


Time Access Restrictions

- Daytime Delivery Restrictions
- Daytime Delivery Bans
- Nighttime Delivery Bans

Examples:
Beijing, Shenzhen, and Changsha in China, Rome, Bogota, etc.

Effect of Daytime Delivery Van in Beijing



Courtesy of Professor WY, Beijing University of Technology

5. Pricing, Incentives, and Taxation

Pricing, Incentives, and Taxation

Use monetary/market/social signals to achieve public goals

6. Logistical Management

Logistical Management

CARGO CONSOLIDATION
Urban Consolidation Centers

INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Real-Time Information Systems
Dynamic Routing
Vertical Height Detection Systems

LAST MILE DELIVERY PRACTICES
Time Slotting of Pick-Ups & Deliveries at Large Traffic Generators
Driver Training Programs
Anti-Idling Programs
Pick-up/Delivery to Alternate Locations

Focuses on altering the way deliveries are made, from the logistical point of view

Urban Consolidation Centers

- Seek to reduce freight traffic by consolidating cargo
  - Overall costs higher than direct deliveries
  - Difficulty to find enough suitable space in urban areas
  - Shippers opposed because they lose facetime with customers
  - First tried in Manhattan (1940s-50s)
- Track record: More than 120 tried... 10 in operation

See P2P Webinars 3, 4, and 5

Typical UCC: CUDE in Málaga, Spain

CUDE: Centro Urbano de Distribution Ecológica

Last Mile Delivery Practices

CARGO CONSOLIDATION
Urban Consolidation Centers

INTELLIGENT TRANSPORTATION SYSTEMS (ITS)
Real-Time Information Systems
Dynamic Routing
Vertical Height Detection Systems

LAST MILE DELIVERY PRACTICES
Time Slotting of Pick-Ups & Deliveries at Large Traffic Generators
Driver Training Programs
Anti-Idling Programs
Pick-up/Delivery to Alternate Locations

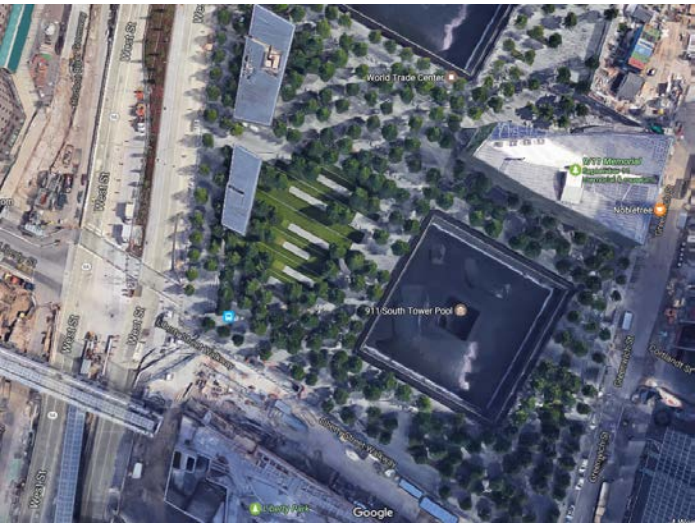
Source: Hong Kong Environmental Protection Department, 2011

Source: FREILOT, 2010

Time Slotting of Pick-Up/Deliveries

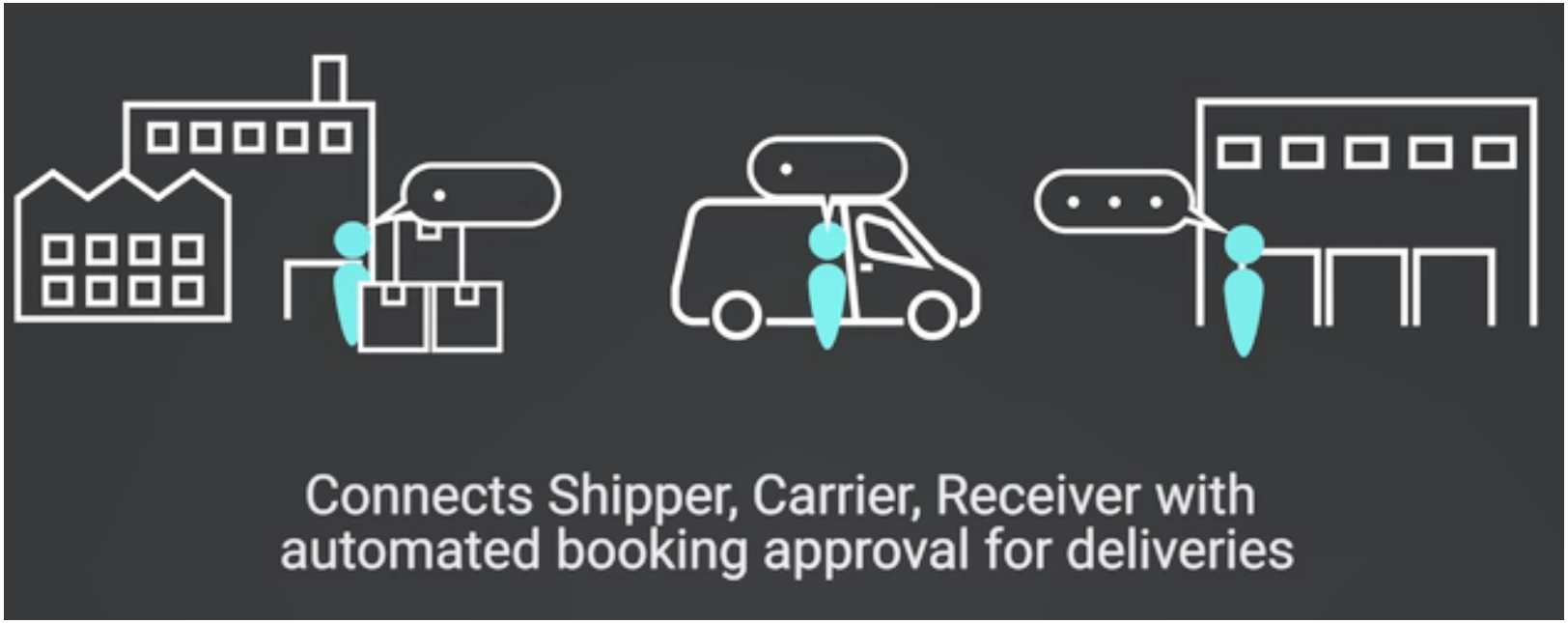
Example: World Trade Center Complex

- Complex receives hundreds of deliveries per day
- Entrance to complex located on West Side Highway
- Implemented system to reduce congestion and improve security



Large-scale Implementation

- Booking system (mandatory reservations for loading docks) is piloted in Australia
- MobileDOCK technology provides a secure, efficient location for carriers to book and execute deliveries.



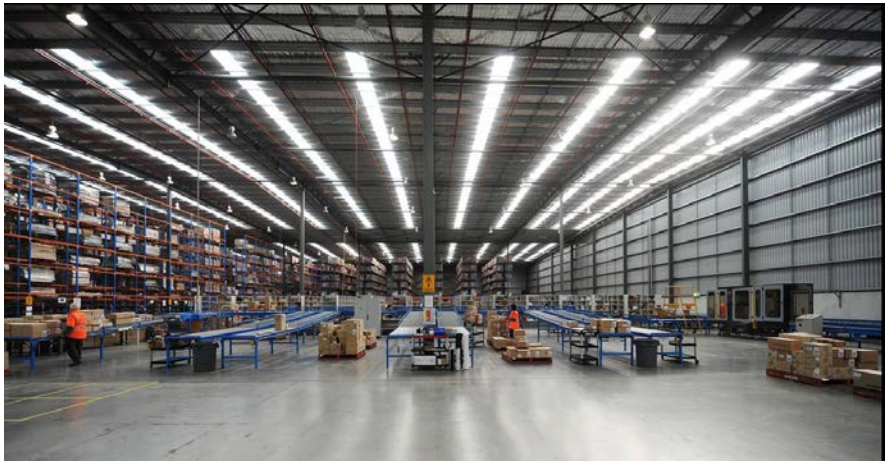
Source: MobileDock

Pick-Up/Deliveries to Alternate Locations

- Delivery Lockers (Amazon, DHL, UPS, USPS)
  - Major carriers are responding to e-commerce demand
  - Lockers typically located less than 2 miles away from average urban customer
- Drop Boxes
  - Allow customers to drop off at a more convenient location
  - UPS has 38,200 drop boxes in the U.S.
  - Packages picked up on set posted schedule

Collaborative Logistics

- "An emerging trend in transportation..." (The Wall Street Journal, 2015)
- Firms share trucks to reduce fuel costs and reduce delivery times in urban areas
- Same concept with sharing storage space
  - Airbnb of Warehousing
- Applications:
  - Tenjin Joint Distribution System in Fukuoka, Japan
  - Urban Logistics in Singapore: The Jurong Gateway Precinct



Source: The Wall Street Journal, 2015

7. Freight Demand/ Land Use Management

Demand/Land Use Management

Focuses on modifying the demand, instead of modifying the logistical activities or the traffic

DEMAND MANAGEMENT

Voluntary Off-Hour Delivery Program

Staggered Work Hours Program

Receiver-Led Delivery Consolidation Program

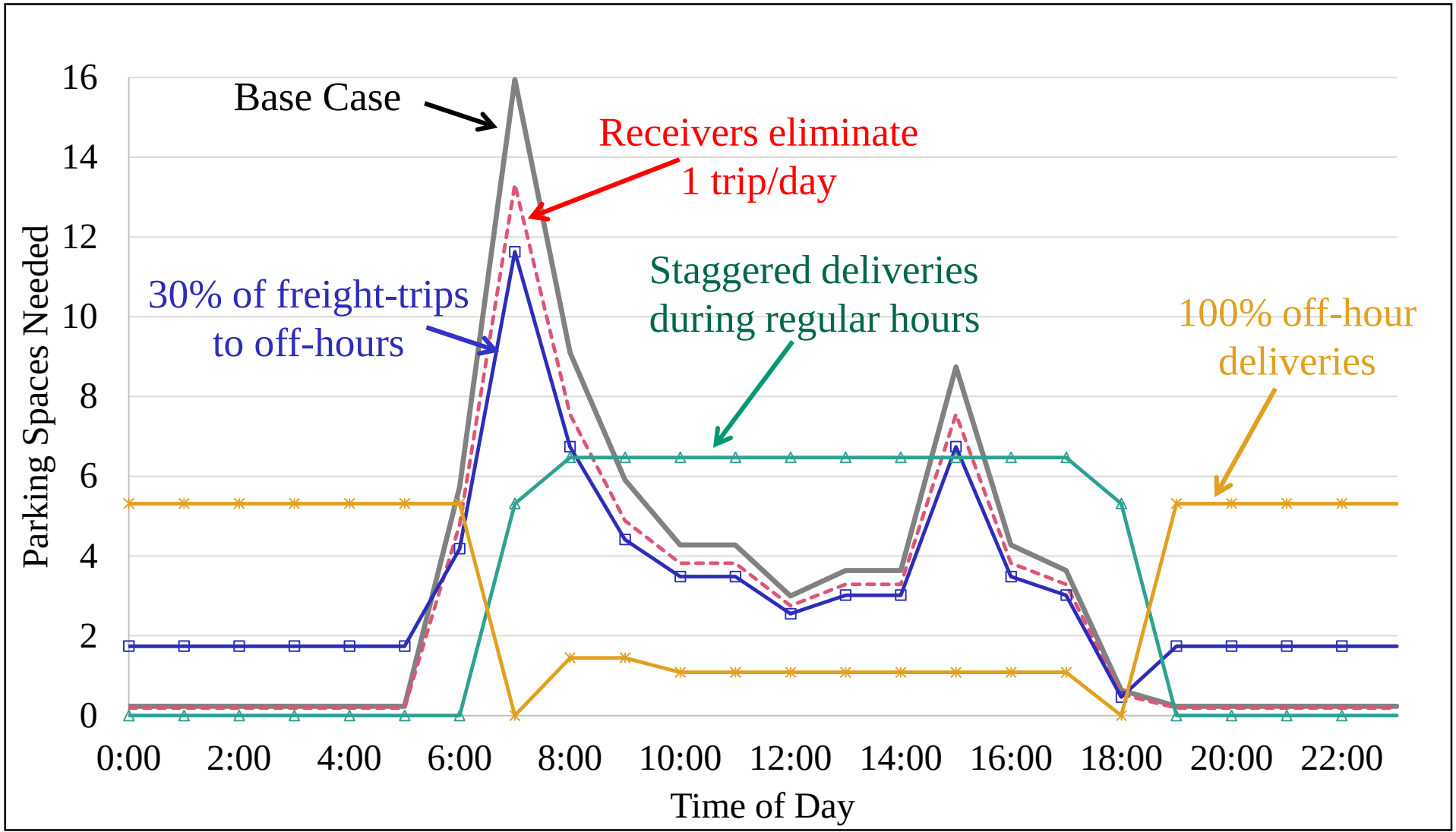
Mode Shift Programs

LAND USE POLICY

Relocation of Large Traffic Generators (LTGs)

Integrating Freight into Land Use Planning Process

Impacts of Freight Demand Management



See P2P Webinars 1, 13, and 14

Voluntary Off-Hour Delivery Programs

Voluntary Off-Hour Delivery Program

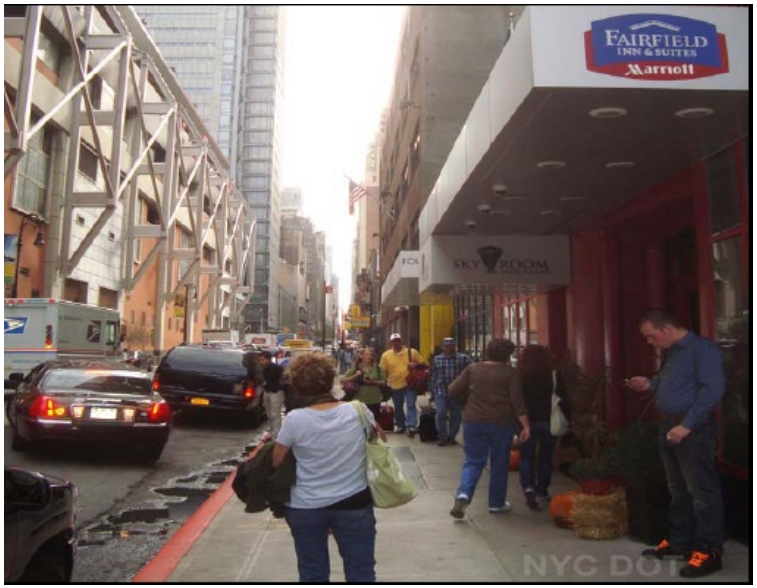
- To induce a shift to deliveries made during the off-hours (7PM to 6AM), by providing incentives to receivers for their commitment to accept off-hours deliveries (OHD)
- Purpose: reduce congestion and pollution during daytime hours

<u>Examples</u>:

- PierPass Program, California
- OHD, New York City

PIERPASS

Regular vs. Off-Hour Deliveries



Why Do We Need to Foster OHD?

- Markets find efficient outcomes, if they do not, there is a market failure → public sector intervention
- The market failure is the result of the unwillingness of receivers to accept OHD
- Increasing off-hour deliveries is beneficial to Society
- The solution is to either:
  - Compensate the receivers for additional costs, or
  - Develop technologies/systems to allow receivers to do OHD at lower costs (so that compensation could work)
- If there are night delivery bans, there is a chance of a government failure being created...

Staggered Work Hours

Staggered Work Hours Program

- Programs to diminish truck demand during peak periods by distributing receiving hours during the day
- Targets receivers and seeks to convince them to spread out the reception of deliveries
- This idea has not been pilot tested yet, thought there reasons to believe it could work

Receiver-Led Consolidation Program

The London Experience

- DSPs are required for new developments that are not consistent with London's strategic goals
- DSPs encourage managers of large buildings to quantify and reduce delivery traffic
  - Palestra Building: 20% reduction
  - Almo: 67% reduction
  - Emirates Stadium: major reduction
- However, implementation of DSPs are only "encouraged"

Receiver-Led Consolidation Program

- The receivers are encouraged to reduce the number of deliveries that they receive by:
  - Consolidating purchases
  - Asking a vendor to deliver the products of other vendors, etc
- The lower the number of deliveries received, the more productive the business becomes
- Helps save time spent receiving goods, and minimizes interruptions to business

Example:

- Transport for London - Delivery and Servicing Plans

Mode Shift Programs

Mode Shift Programs

See P2P Webinars 11, 12

- Aim: to encourage use of alternative modes to reduce the number of trucks in the city center
- Major obstacle: finding modal alternatives competing with trucks is not often possible
- Small scale implementations: it is possible to induce small changes to mode shifts in niche markets
  - The Petite Reine UCC in Rouen, France
  - MOVEBYBike in Gothenburg, Sweden
  - UPS freight bikes / B-line in Portland, Oregon

Land Use Management

Land Use Policy

- Regulates spatial concentration and distribution of economic activities related to freight
- The bulk of urban truck traffic is produced by small establishments in the food and retail sectors

1. Relocation of Large Traffic Generators
   - It has high risk for unintended consequences
2. Integration of Freight into Land Use Planning: Include freight in urban land use planning process.
   - First: understand the sources of conflict between freight and other land uses
   - Second: Develop strategies enabling compatible development

8. Stakeholder Engagement

Successful implementation requires active involvement and participation of key stakeholders

STAKEHOLDER ENGAGEMENT

Designate a 'Freight-Person' at Key Agencies

Create a Freight Advisory Committee (FAC)

Educate Elected Officials

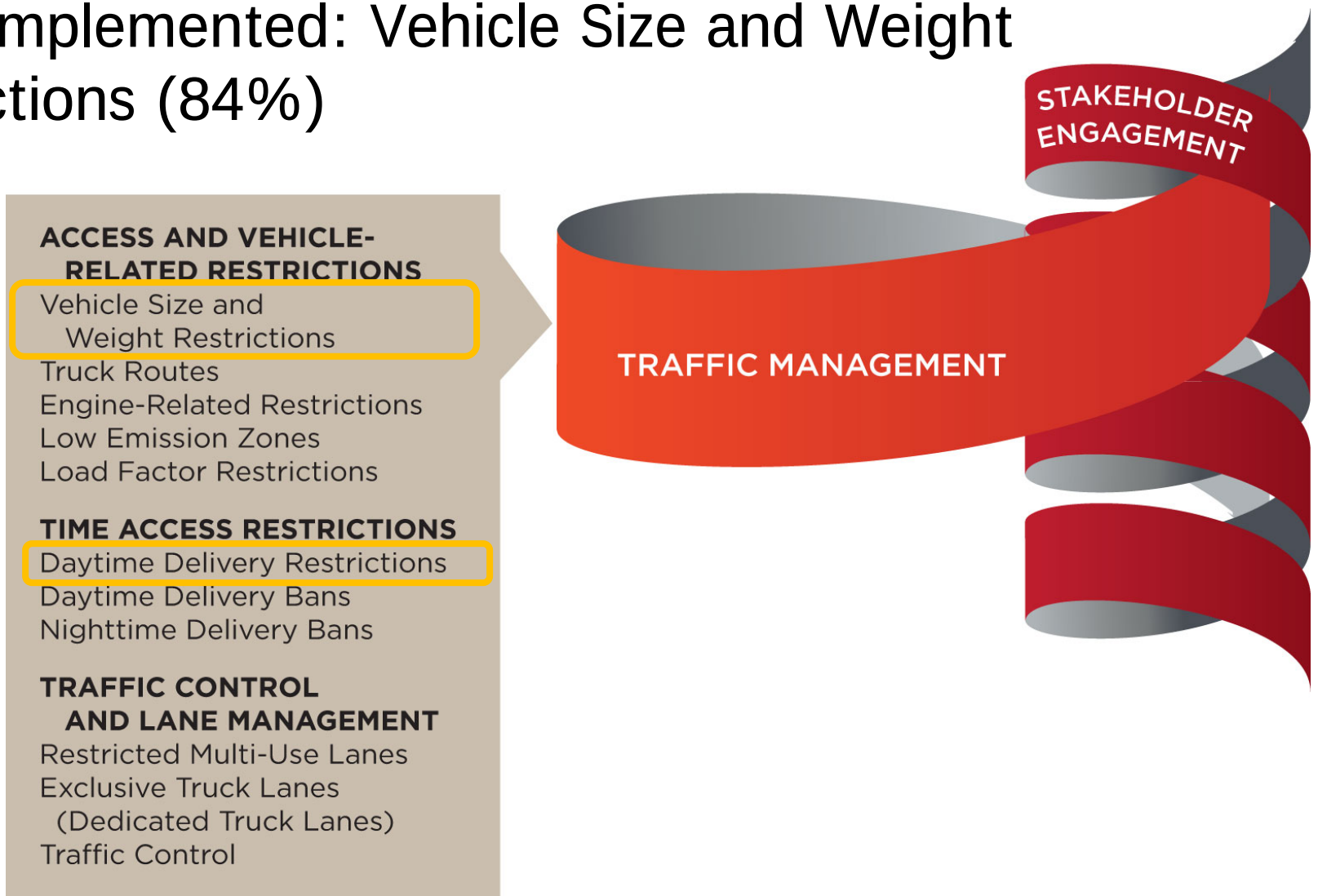
Create a Technical Advisory Committee (TAC)

Create a Freight Quality Partnership (FQP)

What is known about these initiatives?

Familiarity and Implementation (1)

- Most Familiar: Daytime Delivery Restrictions (93%)
- Most Implemented: Vehicle Size and Weight Restrictions (84%)



Familiarity and Implementation (2)

- Least Familiar: Operational Incentives for Electric / Low Emission Vehicles (45%)
- Least Implemented: Road Pricing (27%)

What about the impacts?

Analysis of Impacts (1/2)

- Positive Impacts of Initiatives
  - 63% →Improve Congestion – Significantly or Slightly
  - 18% →Reduce Emissions – Significantly or Slightly
  - 18% →Improve Livability – Mostly Slightly
- Negative Impacts of Initiatives
  - 63% →Increase Delivery Costs – Significantly or Slightly
  - 27% →No negative effect
  - 9% →Detriment in Livability – Slightly

Analysis of Impacts (2/2)

- No Positive Effect →Nighttime Delivery Bans (32%)
- No Negative Effect
  - Real Time Information Systems (94%)
  - Recognition Programs (90%)
- No Negative Effect (Stakeholder Engagement)
  - Educate Elected Officials (100%)
  - Develop Material and Hold Events to Raise Awareness about Freight (100%)
  - Provide Information about Urban Policies to the Private Sector (100%)
  - Designate a Freight-Person at Key Agencies (94%)
  - Provide a Platform for Stakeholders to Identify Problems and Solutions (94%)

Closing Remarks

Key Lessons

- Freight should be integrated into the planning process
- There is a wide range of initiatives
  - There are no magic bullets, multi-prong approaches are key
  - The history is clear, traditional approaches have not reduced congestion, why do we keep using them?
  - Every situation is different, local conditions matter
- Some underutilized initiatives have great transformative potential, e.g., freight demand management
- The NCFRP 33 materials are an entry point
  - Planners can use these tools to address freight issues within their jurisdiction
  - Planners expertise is important in choosing best alternatives

Questions?

Reference Materials:

Planning Guide: PDF version
http://onlinepubs.trb.org/onlinepubs/ncfrp/ncfrp_rpt_033.pdf

Planning Guide: Interactive version
http://coe-sufs.org/wordpress/ncfrp33/

Peer-to-Peer Exchange Program (P2P)
https://coe-sufs.org/wordpress/peer-to-peer-exchange-program/

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