tool kit

Thoroughfare Design for Trucks

In order to facilitate the movement of goods through the Atlanta metropolitan region, the ARC adopted the Atlanta Strategic Truck Route Master Plan (ASTRoMaP) in 2009. The result of the ASTRoMaP was the development of the region-wide priority truck route network to direct and manage freight movement and establish associated policies and guidelines.

The ASTRoMaP regional truck route network serves truck traffic through the Atlanta metro area.

The ASTRoMaP network illustrates that many of the Regional Thoroughfare Network (RTN) corridors are also freight corridors that need to be designed to accommodate truck traffic. Truck routes on the RTN require special consideration in their design, in planning for interaction between trucks and other modes of travel, and the zoning and uses for surrounding lands.

Roadway Design Considerations

Adequate Travel Lane Width

As described in the *Management and Design Guidelines for the Regional Thoroughfare Network*, roadway design for trucks includes lane widths of 11-12 feet where feasible, and larger turning radii. A variety of factors are considered when designing lane widths. Due to right-of way constraints and the presence of other modes of travel (pedestrians, bicycles), accommodating recommended truck lane widths may not be possible in urban areas.

Shoulder Width

Based on guidance from the AASHTO Green Book and the GDOT Design Manual, shoulders on those RTN thoroughfares with truck volumes greater than 250 vehicles per hour should be 12 feet wide and paved.

Speed Limit

Posted speed limits should be at least 45 MPH on truck routes. This speed limit is high enough to encourage use of the truck route by trucks and is unlikely to be found on local streets through residential areas.

Traffic Signals

The timing and coordination of signals on truck route thoroughfares should favor through traffic, allowing for fewer interruptions and greater throughput on the route. Similarly, where possible, these routes should be subject to access management policies in order to maximize the flow of through traffic while maintaining safety. For more information about Access Management, please see the *Access Management SRTP Toolkit*.

Appropriate Functional Class

Most high-traffic roadway types, including urban and rural freeways and their associated ramps, urban and rural primary arterials, and rural minor arterials are designed to handle semi trailer traffic. However, rural minor arterials, and urban and rural collectors and local roads may only be designed to accommodate single-unit trucks or even busses. Therefore, these roadways would not be considered appropriate functional class for truck routing, nor would redesign of these roads to accommodate truck traffic where alternative routes on appropriate classifications are available.

Design Speed

Roadway design speed should be at least 45 mph as well, with no extreme horizontal or vertical curves. There should be adequate sight distance on curves, at intersections and on driveway approaches.

Bridge Conditions

Bridges on truck routes should have adequate weight limits, and vertical clearance. Sidewalk widths should be wider and allow for more clearance on truck routes. Bridges should be considered for upgrade or replacement if functionally deficient.

At-Grade Railway Crossings

For safety reasons, at-grade railway crossings should be avoided on thoroughfares on the RTN and the ASTRoMaP network. Where possible, the crossing should be grade-separated. Where this is not possible, train-activated warning devices are recommended.

Steep Grades

For local and collector streets with more than 15% truck traffic, for rural arterials, and for rural and urban freeways, GDOT design standards set the general maximum vertical grade at 3% to 5%, depending on design speed and topography. The grade on Urban Arterials can range between 5% and 8%. In cases where long upgrades are steep enough that the speed reduction of slow-moving vehicles like trucks is greater than 10 mph, roadways should be redesigned or climbing lanes should be provided in order to allow other traffic to pass slow-moving trucks.

Clear Zone

The Federal Highway Administration (FHWA) defines a clear zone "the total roadside border area, starting at the edge of the traveled way, available for safe use by errant vehicles." Clear zones are free of fixed objects, with stable, flattened slopes in order to provide an opportunity for out-of-control vehicles to recover. Trucks can be best accommodated through the inclusion of the maximum clear zone possible. On local roads with curb, such as those found in urban areas, AASHTO recommends clear zones of seven to ten feet, while on roadways without curb, such as those found in rural areas, ten feet of clear zone is recommended.

Signage

To encourage use of the truck route network, appropriate signage should be posted along appropriate thoroughfares. Signage should make for easy wayfinding for people who are not necessarily familiar with the area. It should provide advance notice changes in the roadway, important junctions, and potential issues resulting from truck-challenging conditions.

Intersection Design Considerations

Turning Radii

At intersections, right-turning truck traffic requires a wide radius, far wider than passenger cars. The radius is considered to be the minimum path of a vehicle's inside wheels as it makes a right turn. For example, GDOT recommends a minimum radius of 15 feet for residential areas, 35 feet for commercial areas and 75 feet when an intersection is designed for trucks.

The wider radius can be accommodated through the construction of a wider turning radius at the intersection or through wider travel lanes or the presence of auxiliary lanes. On freight routes expected to carry truck traffic, intersections will usually use larger curb radii. In other areas, trucks and buses can maneuver through intersections in which curb-return radii are not sufficient, but they typically will need space to swerve out into the adjacent lanes. Where lane widths are 12 ft. or wider, and where bicycle lanes or on-street parking lanes are available on the receiving street, they may provide increased clearance at the corner for the truck's turn.

If large vehicles need to encroach into an opposing travel lane, a designer may also consider placing the stop line for opposing traffic further from the intersection. This allows large vehicles navigating a turn movement a degree of 'cushion' space in which to straighten their path in the correct lane.

Skewed Intersections

Intersections function optimally for all vehicle types when the roadways involved intersect at right angles. This is especially true for trucks. Skewed intersections along RTN/ASTRoMap thoroughfares should be redesigned where possible to achieve 90 degree angles. The GDOT Design Manual notes that the size of trucks can interfere with the fields of view of other drivers at skewed intersections. It also points out that the sharp angle turns associated with skewed intersections can be difficult for trucks to maneuver.

Interaction between Trucks and Other Modes of Travel

Freight movement along ASTRoMaP routes also found on the RTN should be accommodated and encouraged for the safety and efficiency of the entire network. In some cases, particularly in urban areas and town centers, truck traffic along these routes will mix with other modes of transportation, including pedestrians, and bicyclists. In these areas, consideration should be given to these other modes and the surrounding context.

Pedestrians

Thoroughfares in the RTN that were designed or have been reworked to be truck-friendly can create areas in which pedestrians may feel unwelcome or unsafe. For example, at the wider intersections created to accommodate truck turning movements, crosswalks may be longer and pedestrians may need longer crossing times. In urban areas and rural town centers, additional consideration should be given to pedestrians, even where there is available right of way for wider truck facilities. The location of crosswalks, median refuge islands, and curb extensions in these areas would aid pedestrians and slow truck traffic through these areas. In addition, for a discussion of how appropriate curb and turning radii can ease the conflict between truck and pedestrian traffic, see Section 3.5 of the *Management and Design Guidelines for the ARC Strategic Regional Thoroughfare Plan.*

Bicycles

In some cases, the presence of bicycle lanes on a roadway can provide trucks with additional room for turning, creating a mutual benefit from that shared area of the roadway. At the same time, trucks can encroach on the bicycle lane in right-turn movements and consideration should be paid to areas where trucks turn right across bicycle lanes.

Considerations for Local Governments

Zoning Considerations

Thoroughfares on the ASTRoMaP network are projected to handle high volumes of truck traffic. As such, they are generally incompatible with residential land uses. However, they provide ideal access to industrial and some agricultural areas. Zoning should account for the impacts of trucks on adjacent land uses and prohibit land uses sensitive to the noise and vibrations of truck traffic.

Site Design Considerations

Development plans should be reviewed in terms of their appropriateness for the regional truck route network:

- Building design should allow for truck access given the site's grades and elevations.
- Loading bay depth should be appropriate for trucks, and not require truck overhang into pedestrian through zone or into street right-of-way.
- Loading access should not be located in close proximity to the nearest intersection to avoid loading activities impacting intersection performance from queuing vehicles.
- Access that requires blind backing by trucks should be avoided.
- Curb cut design should be of minimal width in areas with high volume of pedestrian movements. The larger curb cuts suitable for trucks make pedestrian crossings longer and less attractive to pedestrian traffic.

Circulation Considerations

- Identify truck ingress and egress routes for commercial and industrial sites.
- Identify the required vehicle turning movements for truck access and exit routes.
- Identify truck routing impacts to adjacent land uses.
- Identify right-of-way constraints (e.g. street width, lane configurations, etc).
- Identify where required on-street parking should be removed to allow site ingress/egress and truck turning.
- Determine potential conflicts between trucks and bicycle and pedestrian facilities (i.e. bike lanes, pedestrian crosswalks, etc).

Resources

Georgia Department of Transportation, *GDOT Design Policy Manual*, Revised 04/2011
http://www.dot.state.ga.us/doingbusiness/PoliciesManuals/roads/designpolicies/Pages/DesignPolicyManual.aspx

Office of Transportation, City of Portland, *Designing for Truck Movements and Other Large Vehicles in Portland*, 07/2008.
http://portlandtransport.com/documents/truck_movement_report.pdf