



Florida Department of Transportation  
District 7

# Design Safety Prompt List

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## ***Introduction***

Welcome to the District 7 Design Safety Prompt Lists. The intent of these lists is to prompt designers to remember to consider some of the things that are sometimes overlooked in design projects: the little details that show up at the end of the project when it is then opened to traffic. In recent years, with updates to the AASHTO Green Book and the release of the Highway Safety Manual, we have seen a shift in thinking from nominal safety (meeting the standards) to substantive safety (real reductions in crashes, injuries, and fatalities). The prompt lists are designed to encourage thinking beyond “did I do it by the Design Standards?” to where we begin to ask “have I adequately provided a safe transportation experience for all road users?” While these lists are not all-inclusive of every issue that may be encountered, the hope is that the design team will consider the issues raised and adjust the design to provide more than just a “by-the-book” design, and provide instead a safer transportation system project.

## Arterials and Streets

**KEY POINT: Arterials typically feature closely spaced signalized intersections. Good access management and good traffic signal coordination and operations are essential for arterials to operate well.**

- Is the design speed close to the anticipated operating speed?
- Are there railroad crossings along the corridor? If so, will the railroad preempt traffic signals on the corridor? Is the design set up to minimize the likelihood of vehicles getting stuck on the tracks)?
- Are there school zones along the corridor? Have they been accounted for in the coordinated signal timing plans?
- Is there a fire station along the corridor? Is there an emergency signal? Will emergency vehicles preempt traffic signals?
- What types of transit runs along the corridor? How do they interface with other traffic on the corridor (separate bus bays, stations, etc.)? See Transit Prompt List.
- Are pedestrian and bicycle facilities provided on both sides off the corridor? Are there mid-block crossings? See Pedestrian Bicycle Prompt List.
- Are all modes of transport accommodated in the design (pedestrians, bicycles, cars, trucks, transit, etc.)?
- Is the alignment of the roadway curved such that visibility of traffic control devices could be an issue? Do we need advance warning signs or other supplemental devices?
- Will there be on-street parking along the corridor? If so, does it create sight distance concerns at some intersections or pedestrian / bicycle crossing locations?
- Are all roadway users given clear directions how and where they are to operate?
- Are the intersections (signalized and non-signalized) designed to accommodate all anticipated roadway users? See Intersection Prompt List.
- Are there median openings that should be closed to improve operations and safety on this corridor? Please note that this will require 6-months of notice to affected property owners.
- Has good landscaping been considered for the project that will not create sight distance issues?

## Interchanges

**KEY POINT:** Interchanges are designed to connect high-speed limited access roadways to other roadways and provide adequate facilities to safely accelerate or decelerate in order to minimize speed differential on the limited access facility.

- Does the interchange design present something that an unfamiliar motorist would not expect (e.g. left-hand exit, low-speed loop ramp, etc.)?
- Are the acceleration and deceleration lengths adequate for large trucks to accelerate or decelerate appropriately to minimize the speed differential on the limited access roadway?
- Are any of the on or off ramps located on curved mainline sections that would make the merge or diverge movements operate less efficiently? Can we provide a lengthened auxiliary lane to help?
- Do we have closely-spaced ramps or interchanges that create weaving areas? If so, what can we do to maximize the weaving length?
- Are shoulders consistently provided on all ramps to accommodate broken-down vehicles or for law enforcement activities?
- Does the ramp terminal intersection design match the surrounding land use (e.g. do we have a high-speed rural free-flow right turn design in a suburban or urban area with closely spaced signalized intersections)? If so, can we modify the design to reduce the speeds of the vehicles entering the surface street?
- Does the interchange design adequately accommodate all legal vehicles for that roadway type (from motorcycles through large trucks)?
- Are wrong-way movements physically discouraged at the ramp terminal intersections to minimize the possibility of head-on crashes on the high-speed roadway?
- Has good landscaping been considered for the project that will not create sight distance issues?
- See also the Intersection Prompt List for the ramp terminal intersections.

## Intersections

**KEY POINT:** Intersections are points of planned conflict; good design minimizes the impacts of the conflicts, and reduces the severity of crashes when they occur.

- Is right-of-way clearly assigned at the intersection?
- Are there peculiar geometric features at the intersection that approaching unfamiliar drivers should be warned about?
- Are there curved alignments (horizontal or vertical) on the approach to the intersection that impact the approaching motorists' ability to clearly see the intersection and the traffic control devices as they approach it? If so, what supplemental devices are needed?
- Are there lane drops or other lane continuity issues at the intersection? Are the motorists clearly warned of the issue in advance?
- Will special vehicles (farm vehicles, horses, horse & buggy, golf carts, NEVs) need to be accommodated at the intersection?
- Does the intersection design promote high-speed right turn movements that create problems for crossing pedestrians? If so, what is being done to correct this?
- Are the intersection controls appropriate for all anticipated road users?
- Is the design speed at the intersection consistent with the expected operating speed?
- Do all modes of transport (including bicycles and pedestrians) have clear direction as to how and where they are supposed to operate? See also Pedestrian / Bicycle Prompt List.
- Are there possible sight distance obstructions due to offset of opposing vehicle lanes?
- Are there lateral shifts in alignment as vehicles cross the intersection?
- Can approaching vehicles see their receiving lane or might the crown of the intersection obstruct it?
- Are there adjacent facilities that need to be coordinated with this intersection operation (RR crossing, multi-use trail crossing, etc.)?
- Are there movements that are prohibited at this intersection? If so, does the geometric design discourage those movements too, or are we doing all of the prohibitions through just signing and markings? Can anything be added to make it more difficult to make wrong way movements?
- Is on-street parking allowed? Will parked vehicles create sight distance concerns?
- Are channelization islands and median islands large enough to provide adequate pedestrian refuge?
- Is there landscaping at the intersection that may create sight distance issues?

NEV = Neighborhood Electric Vehicle

## Limited Access

**KEY POINT: Limited access roadways promote high-speed long-distance travel; design features are critical to minimize crash severity.**

- Are unusual geometrics (left-hand exits, tight loop ramps, etc.) appropriately communicated to drivers?
- Do we have exits, lane drops, transitions, or overhead lane assignment signing located on curves? If so, these can be confusing; can we relocate these slightly upstream or downstream to a more tangent section?
- Are slopes appropriate and recoverable?
- Are all roadside objects break-away or protected by barrier?
- Are all barrier ends the appropriate design for high-speed operating roadways?
- Have the concepts of lane continuity and lane balance been verified for the project?
- Does the project feature sound walls? If so, has access to fire hydrants on adjoining surface streets been incorporated in the wall design?
- Are any of the ramps built just to minimum standards? If so, do we need to go beyond the minimums to achieve a safer roadway condition?
- Is median barrier incorporated in the design? If so, are there cross-over locations for emergency vehicles?
- Are the shoulder widths adequate for disabled vehicles, emergency vehicles, enforcement operations, etc.?
- Are the shoulder widths consistent (even across bridges)?
- Is the design speed consistent with the expected operating speed?
- Are there bifurcations or other changes to the typical section?
- Is there appropriate landscaping and is it located outside of the clear zone or designed such that it does not create safety issues?

## Maintenance of Traffic

**KEY POINT:** Maintenance of Traffic (MOT) is one of the most critical elements of the design process. During MOT, all road users become unfamiliar drivers, in that the roadway environment is not what even the daily users are used to, so particular care must be used to clearly guide and direct all users through the work zone to make it safe for them and the workers.

- Is the MOT design speed close to the normal operating speed? If not, what is the critical design constraint that is limiting the speed? Is there some reasonable way we can address this concern and increase the design speed for the work zone?
- Are all roadway users (vehicles, bikes, pedestrians, etc.) given clear directions how and where they are to operate during each phase of construction?
- Are all transitions smooth and gradual without significant changes in cross slope? Look closely at MOT cross-sections for each phase.
- Is there a potential for water to pond in the travel lanes during some phases of MOT? Look closely at MOT cross-sections for each phase.
- How will work vehicles and material haul vehicles be interacting with normal vehicular traffic during each phase of MOT? Consider how workers and materials get in and out of work zone.
- Is there adequate buffer space (lateral and longitudinal) between the work area and the traffic space?
- Will the MOT plan interrupt or interfere with transit service delivery during any phase of construction? Can people get to the bus from the sidewalk (or temporary pedestrian path) and vice versa? Has the transit agency reviewed and commented on the plan?
- Similarly, are there school zones or school bus stops within the MOT plan? How will the MOT phases impact students getting on/off the bus and/or school bus operations?
- Are there railroad crossings within the MOT plan? If so, coordinate with the District Rail Office.
- Have provisions been included for emergency vehicle access during MOT operations? Consider if all lanes in one direction were blocked, how would emergency vehicles get to the scene?
- How are pedestrians and bicycles accommodated in each of the MOT phases? Are there phases where pedestrians would be expected to operate in unpaved areas? How would elderly or handicapped people function in these areas?
- How will traffic signals operate during each MOT phase? Will temporary detection be provided where lanes are shifted from their normal location or where existing detection has been disabled?
- Will there be temporary median closures during some phases of construction? If so, what will the displaced movements be expected to do? Will they be adequately handled at other locations?
- Will there be sight distance concerns for permitted left turning vehicles seeing over/around barrier wall in medians?
- Will there be sight distance concerns for side street vehicles seeing over/around barrier walls?
- If Portable Changeable Message Signs (PCMS) are called for in the plans, does the message convey something that could be done with a standard sign? Does a multi-phase PCMS message make sense if you read phase 2 before phase 1? Can the message be simplified?
- If nighttime work will be used/allowed, is there a potential for glare from the lighting units to impact motorists driving through the work zone, particularly in transition areas?

## Pedestrian/Bicyclist

**KEY POINT: To make roadways safer for bicyclists and pedestrians, their unique operating requirements should be expressly considered; it should not be an afterthought.**

- Are there sidewalk discontinuities within the project limits? This is a great chance to fix them.
- Are there transit stops within the project limits? Need to provide good pedestrian accommodation at all transit stops. See transit prompt list if applicable.
- For high-speed roadways, have the pedestrians been separated from the high-speed traffic to the maximum extent practical?
- Are there known specific pedestrian populations that need to be accommodated in this area (elderly, school children, blind, wheelchairs, etc.)?
- If mid-block pedestrian crossings are used, do they have median refuge (if applicable) and the appropriate warning devices?
- How are all three levels of bicyclist accommodated (A – advanced, B – basic, C – children)?
- Are bike paths continuous? If not, what are bikes supposed to do in these areas and how have we communicated that to the bicyclists?
- Are pedestrian and bicycle pathways clearly delineated throughout the project so that these road users know where and how they are expected to operate?
- If there are no designated bike / pedestrian paths, can bikes and/or pedestrians operate safely on the shoulders?
- Are there specific locations where we need to prohibit bicycle and/or pedestrian movements? If so, are the devices present to clearly communicate that to the users?
- Does the design provide a good linkage to other bicycle / pedestrian facilities?
- Will landscaping obstruct the visibility of pedestrians or bicyclists from approaching motorists? Visibility includes being able to see small children or wheelchairs.
- Is there on-street parking that may obstruct the visibility of crossing pedestrians?
- Are there known specific vehicular operating characteristics that create special concerns for bicyclists or pedestrians (i.e. high speeds, heavy volume of large trucks, right turn on red, etc.)? If so, have these been adequately addressed in the design?
- Has railing been provided for bicycles and pedestrians at appropriate locations?
- Do drainage inlets present trip hazards for pedestrians or wheel snagging hazards for bicycles?
- Are crossing locations clearly visible at night?

## Roadside

**KEY POINT: To make roadsides safer we should go beyond just meeting minimum design criteria where practical.**

### Rural Cross-Section

- Are the slopes gentle and recoverable, or will they force errant vehicles to the bottom of the ditch? What is waiting for them at the bottom of the ditch?
- Are hazards placed right at the edge of the clear zone? Is it practical to move them further from travel lanes?
- Are pedestrian and bicycle facilities (if applicable) located as far as practical from the travel lanes on high-speed roadways?
- Do traffic barriers and crash cushions meet NCHRP 350 or MASH criteria for the design speed of the roadway?
- Are guardrail lengths adequate to provide the desired protection?
- Is there adequate deflection space between guardrail and the hazard it is protecting?
- Does the guardrail (or other barrier) present hazards to other road users (pedestrians or bicyclists)?
- Were any specific safety concerns or crash patterns identified in the safety review for the project? If so, how has the design addressed those concerns?
- Can culvert ends be safely traversed by vehicles that have left the roadway?
- Does the project include short sections of curbing at rural intersections to achieve adequate clear zone? If so, can we do something different to achieve clear zone criteria without a “band-aid” in the design?
- Is vegetation within the R/W appropriate and in accordance with the design standards? Are there sight distance concerns with regards to vegetation?

### Urban / Suburban Cross-Section

- Are hazards placed right at the edge of the clear zone? Is it practical to move them further from travel lanes?
- Are pedestrian and bicycle facilities (if applicable) located as far as practical from the travel lanes on high-speed roadways?
- Is vegetation within the R/W appropriate and in accordance with the design standards? Are there sight distance concerns with regards to vegetation?
- Do additional curb drop locations need to be considered for mid-block pedestrian crossings (i.e. in the vicinity of transit stops)?
- Do curb inlet locations pose trip hazards for pedestrians or hazards for bicyclists?

## School Zones

**KEY POINT:** Excessively long school zones are seen as an unnecessary hindrance by motorists. School zones should be kept as compact as practical to ensure slow traffic in the vicinity of student crossing locations and school driveways.

- Are there clearly delineated pathways for school students and parents to walk in all the way from the school buildings to the sidewalk system of the adjoining roads?
- Are there sidewalks on the adjoining roadway? If not, can they be added to the project?
- Are bicycle facilities provided that connect to bike racks on the campus?
- Has the pedestrian and bicycle flow been designed to minimize their conflicts with bus or parent drop-off/pick-up traffic?
- Are parent drop-off/pick-up and bus driveways separated and located away from pedestrian/bicycle crossings to the greatest extent practical?
- Does the temporary school zone operation differ from the typical operation of the roadway? For example, is it a ONE WAY operation during AM and PM school operation and a two-way operation the rest of the day? If so, are additional traffic control devices needed outside the school zone to alert unfamiliar motorists of this temporary situation?
- Are temporary portable traffic control devices anticipated for the school zone? If so, do they meet MUTCD requirements?
- Has design been reviewed and commented on by appropriate school officials?
- Has adequate pedestrian clearance time been provided for the school children that may be crossing at nearby signalized intersections (i.e. use 2.8 ft/sec walk speed for elementary age children)?
- Will landscaping obstruct the visibility of the school children from approaching motorists?

## Traffic Control Devices

**KEY POINT:** Traffic control devices should complement the design and should not be used as a substitute for bad design; if there are too many warning signs or devices added, perhaps we need to modify the design to remove things that are being warned about.

- Are there traffic control devices that are no longer needed that can be removed due to the project? An example would be W8-5 signs (slippery when wet) are typically no longer needed after a resurfacing project.
- Do all significant changes in alignment have appropriate warning signs in advance?
- Are lane drops adequately signed and marked to provide as much advance notice as practical?
- Are there complicated or non-typical geometrics that might result in confusion? If so, are there adequate warnings to the motorist?
- Traffic control devices should accommodate all road users. Is there clear direction given all users (motorists, bicyclists, motorcyclists, pedestrians, school children, elderly, disabled etc.) that clearly indicates where and how they should be operating?
- Have all anticipated road users been considered (passenger vehicles, trucks, Intercity buses, transit vehicles, school buses, motorcycles, bicycles, golf carts, NEV, ATV, etc.)? Consider varying eye heights and vehicle capabilities and restrictions as appropriate.
- Will young, unfamiliar, or older road users be able to read, understand and take appropriate action?
- Do any of the critical traffic control devices have the potential for being impacted by morning or afternoon glare reducing their effectiveness?
- Are signal heads, signs, and beacons visible and properly positioned? (e.g., not obstructed by trees; poles; signs or large vehicles.)
- Are supplemental devices needed due to vertically or horizontally curved alignments? An example would be supplemental signs or signal heads for a curved approach to an intersection.
- Will any landscaping or vegetation create possible sight obstructions to any traffic control devices? Will there be maintenance issues related to keeping vegetation cut back from traffic control devices?

NEV = Neighborhood Electric Vehicle  
ATV = All Terrain Vehicle

## Transit

**KEY POINT: all transit stops are potential pedestrian crossings.**

- Has the project been developed in cooperation and coordination with the transit agency? Have they reviewed the plans and been able to provide comments?
- Are there paved connections between the vehicle loading area and the waiting area?
- Is there sidewalk continuity between the transit stop and adjacent pedestrian facilities?
- Would someone with mobility challenges (wheelchair, walker, etc.) be able to go from the sidewalk or bench to the transit vehicle without difficulty?
- Is the seating area at a safe and comfortable distance from vehicle and bicycle lanes?
- Are marked pedestrian crossings convenient to the transit stop?
- Is there a sufficient landing area provided to accommodate waiting passengers, boarding/alighting passengers, and through/bypassing pedestrian traffic at peak times?
- Do seats or benches (or people sitting on them) obstruct the sidewalk or reduce its usable width?
- Will the location of the transit stop create operational issues for other road users (sight distance obstruction, stopping sight distance, etc.)?
- Are transit landing areas offset appropriately with respect to the travel way?