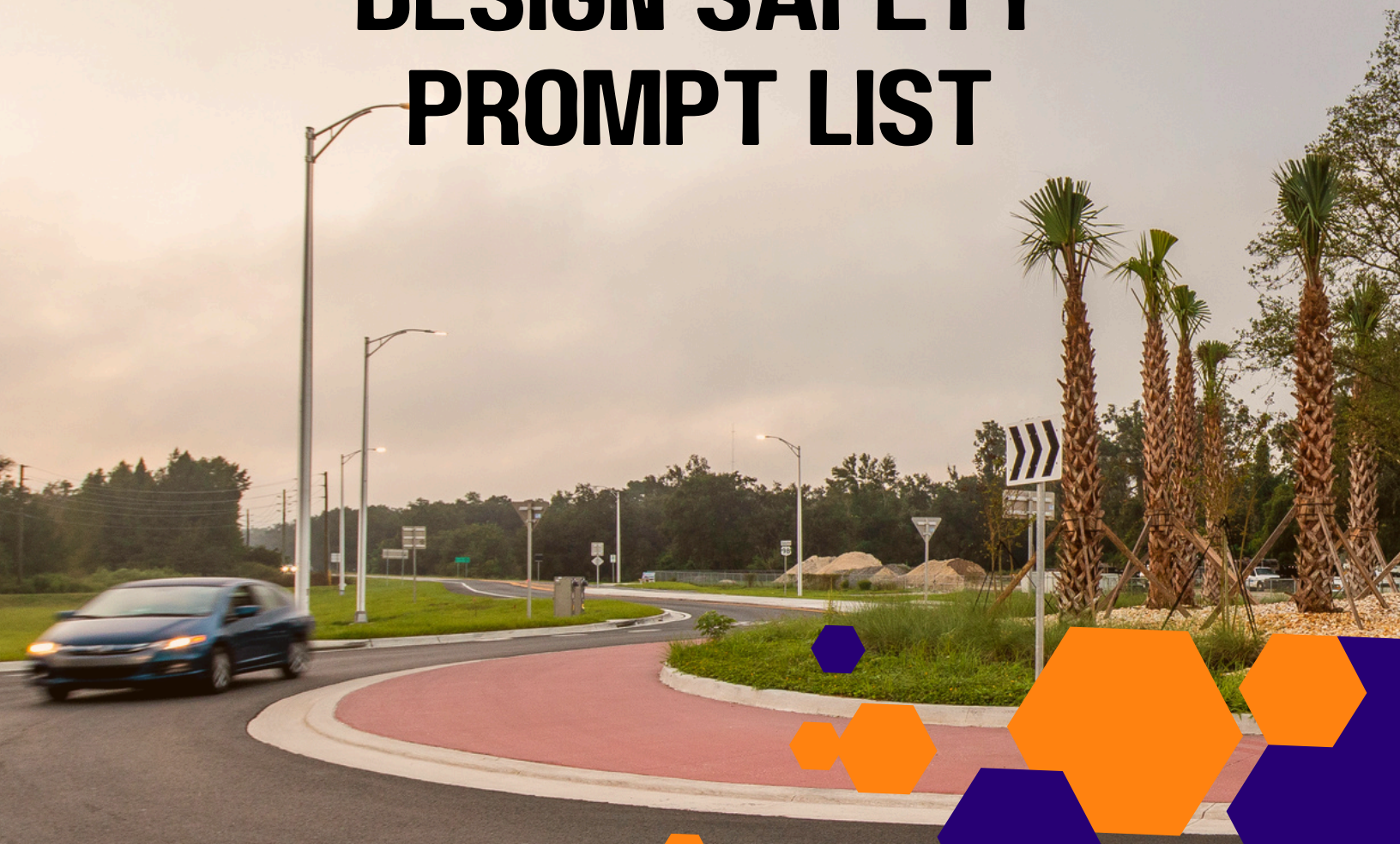
Florida Department of Transportation

District 7

DESIGN SAFETY PROMPT LIST



August 2024

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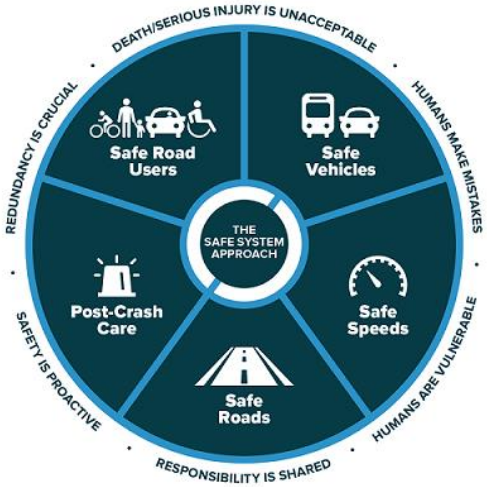
Introduction

Welcome to the District 7 Safety Prompt Lists. These lists aim to prompt consideration of items typically overlooked within projects, work zones, and construction sites - these are the little details that make all the difference in achieving Target Zero. The Department of Transportation's focus on communities, as well as utilization of a Safe System Approach can be found throughout the pages of this prompt list. The premise of the Safe System Approach is that humans make mistakes, but design choices and determinations can significantly improve the outcomes when crashes do occur by reducing the forces involved in a given crash.



No death or serious injury is acceptable.

Humans make mistakes.

Humans are vulnerable.

Responsibility is shared.

Safety is proactive.

Redundancy is crucial.

The prompt lists are designed to encourage thinking beyond the way it's always been done to where we begin to ask, "Have I provided a safe transportation experience for all users regardless of their mobility choice?" While these lists are not all-inclusive, the hope is that users will consider the issues raised and adjust their practices or design as much as practical within their constraints to facilitate zero fatalities and serious injuries across Florida.

Safety Considerations

The engineer of record is responsible for evaluating the unique safety challenges for all applicable users within the project area, regardless of a history of specific crashes. This includes on-site evaluations and reviews of behavior, risks, and surrogate safety measures. Understanding the users anticipated to utilize the facility is key, both during construction while considering workers, as well as users experiencing the final condition. A high-level list, which is not to be considered all inclusive, is included below highlighting potential user groups to consider during the field review and subsequent context-sensitive design processes.

- Pedestrians
- Bicyclists
- Motorcyclists
- Micromobility users
- Transit vehicles and users
- Freight vehicles
- Aging road users
- Children
- Vehicles
- Maintenance professionals

The Florida Department of Transporation (FDOT) takes a Complete Streets approach to planning, designing, and operating roadways on the state highway system outside of its limited access facilities. To understand the design and operations that would create a complete street for the given roadway, FDOT refers to the context classification of the roadway and the various criteria based on that classification. The resulting roadway is one that provides for the various mobility needs of the users expected on that facility from a context-sensitive design approach.

The list of improvement opportunities should be coordinated and provided in a memo format as part of the project scoping process in addition to what was potentially identified in desktop safety reviews or any other safety studies used for the project's development and incorporated into the project file via the preliminary project report for reference throughout the project's life.

Arterials & Collectors

KEY POINT: Arterials typically feature closely spaced signalized intersections in urban contexts but may also occur in suburban and rural areas. Good access management and traffic signal coordination and operations are essential for arterials to operate well.

- Are design/posted speeds consistent with the target speed and level of multimodal activity in the area? What speed management strategies may be implemented to align the operating speeds with target speeds?
- Are there railroad crossings along the corridor? If so, will the railroad preempt traffic signals on the corridor? Are railroad dynamic envelope pavement markings incorporated? Is the crossing designed to minimize the likelihood of vehicles getting stuck on the tracks?
- Are there school zones along the corridor? Are the signing and pavement markings designed according to the current Speed Zoning Manual? Have they been accounted for in the coordinated signal timing plans? Are appropriate pedestrian and bicycle facilities provided for students?
- 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 the transit vehicles interface with other traffic on the corridor (separate bus bays, stations, street car tracks, etc.)? Are appropriate crossing treatments (midblock or intersection-related) provided near the existing and proposed transit stops? See Transit Safety Prompt List.
- Are pedestrian and bicycle facilities provided on both sides of the corridor? Is the spacing between existing controlled, marked pedestrian crossings appropriate for the roadway context and surrounding land uses, or should additional crossings be considered? Do existing pedestrian treatments meet current standards (i.e., Do any existing Rectangular Rapid Flashing Beacons (RRFB) need to be replaced with Pedestrian Hybrid Beacons (PHB) or Midblock Pedestrian Signals (MPS))? See Pedestrian & Bicycle Safety Prompt List.
- Are there any airports or spaceports within 10 nautical miles of the project? If so, are appropriate federal regulations considered per FDOT Design Manual (FDM) Chapter 110 (Initial Engineering Design Process) requirements to protect the national airspace system when planning, designing, and constructing an FDOT project? This process includes checking the coordinates of the proposed structures with the Federal Aviation Administration (FAA) website tool to determine if further filing and coordination with the FAA is necessary. Examples include any lighting structures, signal structures, sign structures, utility structures, roadway structures, etc. located within 3 nautical miles of an airport.
- Are all modes of transport (pedestrians, bicycles, micromobility devices, cars, trucks, motorcycles, transit, etc.) accommodated in the design? How is each mode accommodated in the current roadway typical section, and can the typical section be optimized to better allocate space to safely accommodate all road users?

- Have provisions for a total typical section that considers left-turning vehicles, medians, and the needs of pedestrians and bicyclists been considered in selecting appropriate lane widths and cross sections based on safety considerations?
- Has the designer ensured that medians are wide enough to allow the design vehicle to safely make a selected maneuver and provide space for appropriate safety devices?
- Is the roadway's alignment curved or crested, making the visibility of traffic control devices an issue? Are advance warning signs or other supplemental devices needed to mitigate a sight-distance condition that can't be corrected within the project?
- Will there be on-street parking along the corridor? If so, does it create sight distance concerns at some intersections or pedestrian and bicycle crossing locations? Should parking be restricted close to intersections to improve visibility?
- Are all roadway users given clear directions on how and where they are to operate?
- Are vertical clearance requirements met for existing bridge structures, utilities, signal structures, overhead sign structures, and Intelligent Transportation System (ITS) structures?
- Are the intersections (signalized and non-signalized) designed to accommodate all anticipated roadway users? See Intersection Prompt List.
- Are there median openings that can be modified to increase the safety of the corridor by incorporating offset left-turn lanes? Would traffic separators in Two-Way Left-Turn Lanes be beneficial without limiting parcel access and help manage speeds? Can large median openings in rural areas be constrained without limiting parcel access to provide clearer pathways for vehicles?
- Are there median openings that should be closed or restricted to improve safety and operations on this corridor? Are there additional median openings closely spaced where a median closure/directionalization can help create a Restricted Crossing U-Turn (RCUT) corridor? Please note that median modifications that restrict an existing connection's movements will require a public meeting followed by a six-month processing period to gather and incorporate comments from affected property owners and other local stakeholders.
- Have driveways been reviewed for freight mobility and pedestrian safety? Can driveways be reduced or consolidated for multiple parcel use? Please note that this will require six months of notice to affected property owners, and approval from the local transportation agency.
- Have acceleration tapers been reviewed for removal to enhance safety by reducing poor gap selection choices and maintaining defined paths for bicyclists?
- Are there any locations providing network connectivity for all road users that may warrant additional evaluation through the Intersection Control Evaluation (ICE) process?

- Is there any lighting on the roadway? Does the corridor need to be evaluated for a lighting justification study if no lighting exists? Has existing lighting been evaluated to meet current standards? Is there an opportunity to include local power company lighting? Are crosswalks lit to meet vertical lighting criteria? Are there any wildlife-sensitive areas that require specific lighting criteria?
- Have wrong-way driving countermeasures been included as part of the signing and pavement marking design?
- Is any off-tracking present that would indicate the need for turn-lane extensions and/or median opening geometry revisions?
- Are any intersections or curves ideal candidates for the implementation of high friction surface treatment due to a history of run off the road crashes? Intersection candidates may exhibit significant rear-end crash severity or poor stopping behavior from vehicles relative to stop lines and crosswalks.
- Are audible and vibratory treatments (AVT) provided for edge and center lines on flush shoulder roadways with a posted speed of 50 mph or greater? This applies to two-lane and multilane sections.
- Are existing passing/no-passing zones evaluated per Chapter 11 of the Manual on Uniform Traffic Studies (MUTS) on two-lane rural roadways? Depending on the developments and increased frequency of driveways in the area, the evaluation may warrant converting some passing zones into no-passing zones.
- Are there any wet weather-related crashes that can be linked to potential hydroplaning risks that compromise safety? If so, develop appropriate mitigation strategies to reduce risk.
- Has traffic calming aimed at reducing speeds been primarily used in lower-speed urban areas and in speed transition areas such as near the urbanized limits of small towns? Have effective traffic-calming techniques been tailored to the nature of the identified problem and the specific location?
- Has consideration been given to how traffic calming may affect access and response times for fire vehicles, ambulances, and police vehicles, recognizing the importance of these emergency services?

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 the 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 (e.g.farm vehicles, horses, horse & buggy, golf carts, neighborhood electric vehicles (NEV)) 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 can done to correct this?
- Are there any Americans with Disabilities Act (ADA) issues with existing curb ramps, sidewalks, and crosswalks at the intersection that need to be corrected?
- Have pedestrian and bicycle crossing distances been minimized through the use of hardened centerlines, corner islands, reduced corner radii, near perpendicular channelized right-turn lanes, and/or curb extensions?
- Are there any missing crosswalks at the intersection? Will any existing geometric or drainage constraints prevent the provision of the missing crosswalks?
- Are the intersection controls appropriate for all anticipated road users?
- Are design/posted speeds consistent with the target speed and level of multimodal activity in the area?
- Do all modes of transport (including bicycles & pedestrians) have clear directions as to how and where they are supposed to operate? See also Pedestrian & Bicycle Safety Prompt List.
- Do turn lanes within the project corridor meet the required turn-lane lengths based on the design speed? If not, evaluate opportunities to extend the length to provide for adequate deceleration and queue lengths based on FDM Chapter 212 (Intersections).
- Have the intersections been analyzed and documented for sight distance issues? Do clear sight triangles exist at the intersection to ensure that approaching drivers are provided a sufficient view of the intersecting roadway to identify gaps in traffic and decide when it is safe to proceed?
- Are there possible sight distance obstructions due to the offset of opposing vehicle lanes?

- Based on the key vehicles in use at the intersection, should a passenger car or freight vehicle be utilized for sight distance calculations?
- Are there lateral shifts in alignment as vehicles cross the intersection? Are there lane shifts through intersections that meet the requirements for non-merging conditions? If the deflection can't be avoided, pavement markings should be used through the intersection to provide positive guidance to the motorist.
- Can approaching vehicles see their receiving lane, or might the crown of the intersection obstruct it?
- Are there adjacent facilities such as PHBs or MPSs, etc, that need to be coordinated with the intersection operation (railroad crossing, shared use path crossing, emergency signal, bus rapid transit, light rail, etc.)?
- Are there movements that are prohibited at this intersection? If so, does the geometric design discourage those movements too, or are all the prohibitions throughonly signing and markings? Can anything be added to make it more difficult to make wrong way movements?
- Are channelization islands and median islands large enough to provide adequate pedestrian refuge?
- Are advance street name signs and/or next signal signs present approaching intersections to aid unfamiliar and aging drivers? These signs can mitigate sideswipe and rear-end crashes by preventing last-minute lane changes.
- If major reconstruction of an existing signalized intersection is proposed (e.g., adding a left-turn lane to an approach, adding an intersection leg, and converting to a roundabout), has an ICE been completed to evaluate alternative intersections that offer the potential to improve safety and reduce delay at a lower cost.
- Where desired turning lane arrangements cannot be developed, have different traffic-control schemes such as turn prohibitions, special signal phasing, or other measures been considered?
- Has the use of a roundabout been evaluated at the intersection? Are the splitter islands designed for the target speed and design vehicles?
- Is adequate lighting provided at the intersection along the approaches and at each marked crosswalk?
- Are there any locations that should be considered for the application of high friction surface treatment due to significant rear-end crash severity or poor stopping behavior from vehicles relative to stop lines and crosswalks?
- Is there a clear sight line for the driver to a potential point of conflict, enabling the driver to take appropriate action?
- Is there landscaping at the intersection that may create sight distance issues?
- Is on-street parking allowed? Will parked vehicles create sight distance concerns?

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, the design should be modified to remove conditions that are being warned about.

- Are there traffic control devices that are no longer needed and can be removed due to the project? An example would be that "slippery when wet" (W8-5) signs are typically no longer needed after a project due to increased friction values and drainage improvements.
- Do all significant changes in alignment have appropriate advance warning signs?
- Are lane drops adequately signed and marked to provide as much advance notice as practical?
- Are there complicated or atypical geometrics that might result in confusion? If so, are there adequate warnings for the motorist?
- Has appropriate signal timing and phasing been considered to assist in achieving the desired target speed while accommodating all roadway users? Has more restrictive left-turn phasing been considered at locations with a history of left-turn crashes and/or a history of conflict between turning vehicles and vulnerable roadway users?
- Traffic control devices should accommodate all road users. Is there clear direction given to all users (motorists, bicyclists, motorcyclists, pedestrians, school children, elderly, disabled, etc.) that clearly indicate where and how they should be operating?
- Have all anticipated modes been considered (passenger vehicles, trucks, intercity buses, transit vehicles, school buses, motorcycles, bicycles, golf carts, NEV, micromobility devices, etc.)? Consider varying eye heights and vehicle capabilities and restrictions as appropriate.
- Was consideration given to the implementation of retroreflective strips on sign posts to emphasize the sign and enhance safety? Note that District Traffic Operations Engineer (DTOE) approval is required for signs other than wrong-way, one-way, and railroad signs.
- 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 to be negatively 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.)
- Was a nighttime field review conducted to check the reflectivity of the signs? For example, school crossing signs should be provided with fluorescent yellow-green diamond-grade sheeting for better visibility.

- Does the existing signal head have retroreflective backplates that contribute to reducing rear-end crash history at the signalized intersection? If not, can flexible backplates be added? Per the Traffic Engineering Manual (TEM) Chapter 3.9 guidelines, flexible backplates do not require a structural evaluation.
- Can five-section permissive-protected operation be replaced by four-section flashing yellow arrow operation? Four-section signal heads, even with no phasing changes, are proven to reduce left-turn crashes.
- Is there one signal head per through lane per approach for better visibility and reducing rear-end crash history at signalized intersections? Are these signal heads within the cone of vision per Manual on Uniform Traffic Control Devices (MUTCD) guidelines?
- 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.
- Are advance street name signs and/or next signal signs present approaching intersections to notify drivers about the upcoming intersection? These signs can mitigate sideswipe and rear-end crashes by preventing last-minute lane changes.
- Will any landscaping, poles, utilities, or cabinets create possible sight obstructions to any traffic control devices? Will there be maintenance issues related to keeping vegetation cut back from traffic control devices?
- Do internally illuminated overhead street name signs exist at the intersection? If not, can they be added?
- Have red and yellow clearance timings, including pedestrian clearance timings, been reviewed for compliance with the TEM, Institute of Transportation Engineers (ITE), and District 7 guidelines?

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?
- Are there any exits, lane drops, transitions, or overhead lane assignment signs located on curves? If so, these can be confusing; can they be relocated slightly upstream or downstream to a more straight section?
- Are slopes appropriate and recoverable?
- Are all roadside objects break-away or protected by barriers?
- Has any hydroplaning analysis been performed at locations with wet weather and run-off-the-road crash history? If so, what mitigation strategies will be considered to reduce the risk?
- Do traffic barriers, guardrail approach terminals, end anchorages, and crash cushions meet NCHRP 350 or MASH criteria for the design speed of the roadway?
- Have the concepts of lane continuity and lane balance been verified for the project?
- Does the project feature noise walls? If so, has access to fire hydrants on adjoining surface streets been incorporated in the wall design?
- Are any of the ramps built to minimum standards? If so, what can be designed beyond the minimum to achieve a safer roadway condition? Is it possible to implement components to exceed the minimum standards and enhance safety?
- Is the median barrier incorporated in the design? If so, are there cross-over locations for emergency vehicles?
- Does the highway have a minimum border width of 10 feet from the back of the roadside barriers to the public right of way along ramps and mainline sections? Sufficient access from the public right of way that is contiguous and unimpeded to the limited access facility for maintenance vehicles needs to be provided.
- Are the shoulder widths adequate for disabled vehicles, emergency vehicles, enforcement operations, etc.?
- Are 10-foot median or outside shoulders provided for Emergency Shoulder Use (ESU) as temporary travel lanes for hurricane evacuations on ESU routes? Are the shoulder widths consistent, including across bridges?
- Is the design speed consistent with the expected operating speed for the corridor?
- Are there bifurcations or other changes to the typical section?

- Is there a history of animal-related crashes along the corridor? If so, consider evaluation of the existing fence for potential implementation of fencing designed to prevent animal intrusion.
- Is there appropriate landscaping and is it located outside of the clear zone or designed such that it does not create safety issues?
- Is there existing lighting along the limited-access roadway? If not, was any lighting justification study conducted that warrants lighting?

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 to minimize speed differential on to and off of 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.)? Is additional advance signage required?
- Are the acceleration and deceleration lengths adequate for large trucks to minimize the speed differential for entering and exiting vehicles 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 a lengthened auxiliary lane be provided to help?
- Are ramps or interchanges closely spaced that create weaving areas? If so, what can be done 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. is it a high-speed rural free-flow right turn design in a suburban or urban area with closely spaced signalized intersections)? If so, can the design be modified to reduce the speeds of the vehicles entering the surface street?
- Does the interchange design adequately accommodate all potential roadway users, from vulnerable users to freight vehicles?
- Are wrong-way movements physically discouraged at the ramp terminal intersections to minimize the possibility of head-on crashes on the high-speed roadway? Are appropriate wrong-way countermeasures such as signage, pavement markings, and detection devices provided?
- Do route shield pavement markings exist in the lanes leading to interstate ramps per the TEM Chapter 4.2.3 guidelines? Route shield markings can help prevent wrong-way driving as drivers navigate arterials connected to limited-access facilities.
- Are appropriate controls provided for multilane ramps with pedestrian/bicycle crossings consistent with Public Right-of-Way Accessibility Guidelines (PROWAG)?
- Is a path provided for bicyclists on the arterial street to avoid complex transitions (keyhole lanes, weaving/merging movements, etc.) through the use of a bicycle ramp and wide sidewalk through the interchange?
- Has landscaping been considered for the project that will not create sight distance issues?

- Also see the Intersection Prompt List for design considerations for ramp terminal intersections.
- Per the TEM Chapter 2.26 guidelines, are advanced guide signs provided at major and intermediate interchanges?
- Are overhead arrow per lane guide signs provided where an option lane is present at freeway and multilane exit interchanges and splits to help all drivers, particularly aging drivers?
- Is there existing interchange lighting, including underdeck lighting, that meets the required illuminance per FDM lighting criteria?

Pedestrian & Bicyclist Safety

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

- Has the incorporation of pedestrian and bicycle facilities considered the type of roadway, anticipated operating speeds, and traffic volumes?
- Are there sidewalk discontinuities within the project limits? This is a great chance to fix them.
- Have minimum sidewalk widths for the context classification relative to the FDM requirements been provided?
- Was a field review performed to identify potential ADA improvements along sidewalk sections, at-grade railroad crossings, curb ramps, pedestrian signal push button locations, and crosswalk longitudinal grades?
- Are there transit stops within the project limits? Good pedestrian accommodation needs to be provided at all transit stops. See Transit Safety Prompt list, if applicable.
- Can the typical section of the roadway be optimized to better allocate roadway space to accommodate all roadway users and bicycle skill levels? For high-speed roadways, advanced bicyclists may prefer on-street facilities, while recreational bicyclists may prefer to be separated from the high-speed traffic to the maximum extent practical.
- Does the existing roadway footprint accommodate bicycle keyholes between the through and adjacent right-turn lanes?
- Are there known specific pedestrian populations that need to be accommodated in this area (elderly, school children, blind, wheelchairs, etc.)? For example, are accessible/audible pedestrian signal systems provided for hearing loss and visually challenged pedestrians where there is a concern/request to DTOE from the public, maintaining agencies, public agencies, or support groups?
- If midblock pedestrian crossings are used, do they have median refuge (if applicable) and the appropriate warning devices?
- What is the spacing between existing controlled pedestrian crossing locations? Is this appropriate for the roadway context classification and surrounding land uses?
- Have curb ramps and associated pedestrian poles been designed to optimize pedestrian use within the area? When consolidated curb ramps are used due to design constraints, has the use of raised concrete islands been evaluated to delineate pedestrian travel ways and deter vehicle off-tracking?
- Are there any trails, greenways, or bike boulevards on the intersecting local roadways along the corridor that may require additional crossing treatments?

- Are bicycle paths continuous and have adequate transitions been provided? If not, what are bicycles supposed to do in these areas and how has that been communicated to the bicyclists?
- Are pedestrian and bicycle pathways clearly delineated throughout the project?
- Are there specific locations where there is a 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 good connectivity to other bicycle/pedestrian facilities?
- Is there on-street parking that may obstruct the visibility of crossing pedestrians?
- Will landscaping or poles/utilities/cabinets obstruct the visibility of pedestrians or bicyclists from approaching motorists? Visibility includes being able to see small children or wheelchairs.
- Has the placement of objects been carefully considered to ensure they are away from the sidewalk and intersections, so they do not impede the flow of pedestrians or become barriers to the sight lines of drivers, bicyclists, and pedestrians at intersections?
- 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?
- Are pedestrian and bicycle conflicts with vehicles minimized at intersection locations through geometric improvements (corner radii reductions, bulbouts, corner islands, hardened centerlines, etc), providing signage such as R10-15A (turning vehicles stop for pedestrians) signs at intersection approaches, and signal timing strategies (protected left turns, right-turn on red restrictions, leading pedestrian intervals, flashing yellow arrow omit by pedestrian activation, etc)?
- Has pedestrian/bicycle railing been provided at appropriate locations to prevent drop-off hazards?
- Do drainage inlets present trip hazards for pedestrians or wheel snagging hazards for bicycles? Does the drainage design accommodate existing and future expected flows to prevent ponding within pedestrian and bicycle facilities (curb ramps, crosswalks, bicycle lanes, etc)?
- Are crossing locations clearly visible at night? Is lighting warranted for pedestrian sidewalks, shared use paths, and crossings?
- Is there a need for the green-colored pavement markings to be evaluated to enhance the conspicuity of bicycle-vehicular conflict areas?
- Are existing bicycle lanes and paved shoulders designated with bicycle lane messages per FDM Chapter 223 (Bicycle Facilities) requirements?

Transit Safety

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 provided the opportunity to comment?
- 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? Have multimodal facilities at the stop, such as an area for transit-provided bike racks, been coordinated with the transit agency?
- 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 significantly reduce its usable width, especially for low visibility or wheel-chaired users?
- 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?
- Are the transit stops properly lit?

Roadside Safety

KEY POINT: Making roadsides safer requires going beyond just meeting minimum design criteria, where practical.

Flush Shoulder Cross Section

- Are the slopes gentle and flatter within the clear zone 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? Is the implementation of safety edge a possibility to reduce overcorrection crashes?
- Has the use of traversable ditch designs been considered where narrow shoulders are used?
- 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 located to accommodate all skill levels? Advanced bicyclists may prefer on-street facilities, while recreational bicyclists may prefer to be separated to the maximum extent practical from the travel lanes.
- Do traffic barriers, guardrail approach terminals, end anchorages, and crash cushions meet NCHRP 350 or MASH criteria for the design speed of the roadway?
- Since some crashworthy terminals are designed to break away upon impact, allowing the vehicle to pass behind; has a clear area been provided behind the barrier to ensure the intended operation of these terminals?
- Are guardrail lengths adequate to provide the desired protection from the hazard? The Length of Need (LON) needs to be analyzed to determine the required barrier placement relative to hazards.
- Is there adequate deflection space between the guardrail and the hazard it is protecting (setback distance)?
- Does the guardrail (or other barrier) present hazards to other road users (pedestrians or bicyclists) or cause sight distance concerns?
- Have mitigation efforts included placing roadside objects (lights, sign poles, signals, etc.) farther from the edge of the pavement to prevent vehicles from colliding with them?
- Has consideration been given to removing or moving fixed objects instead of installing barriers in front of them? Barriers tend to be longer and closer to the roadway than the hazards they protect, making them likely to be hit.
- Have designers considered that when a barrier is hit, the maintenance crews and vehicles pose a further obstacle during repair, and the replacement of the barrier represents an added maintenance cost to the agency?

- 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 errant vehicles that have left the roadway?
- Does the project include short sections of curbing in flush shoulder intersections to meet clear zone standards? If so, what can be done differently to achieve clear zone criteria without a "band-aid" in the design?
- Is vegetation within the right of way appropriate and in accordance with design standards? Are there sight distance concerns related to vegetation?
- Have raised pavement markers been considered for narrow lanes or shoulders to enhance delineation of the roadway?
- Has the use of spiral transitions been considered, given that they have positively influenced the safety and operations of some curves?
- Have designers avoided design solutions that prioritize wider lanes over roadside and shoulder space? Such solutions may lead to decreased safety or be costly with little actual benefit, especially for lower volume roads where run off the road crashes are common, and highway capacity is not a major concern.
- Where narrower lanes are used, have designers considered lane widening at sharp horizontal curves?
- Have designers ensured proper center line and edge line delineation and considered using AVTs to alert drivers?
- Has the storage of disabled or stopped vehicles been considered? If a full, continuous shoulder not practical, have designers sought to provide intermittent full-width turnouts, especially on higher-volume, high-speed roads?
- Where burying utilities underground is not practical, have utility poles been located as far from the traveled way as possible?

Curbed Cross Section

- Are hazards placed at the edge of the clear zone? If so, is it practical to move them further from travel lanes?
- Are lateral offsets required for different design elements along the roadway per FDM Chapter 215 (Roadside Safety) in curbed roadway sections?
- Are pedestrian and bicycle facilities located as far as practical from the travel lanes?
- Have control zones for above-ground objects (such as signal poles) been analyzed, particularly within the intersection radii, considered high-risk areas for roadway departures?

- Is vegetation within the right of way appropriate and in accordance with the design standards? Are there sight distance concerns with regard to vegetation?
- Do additional curb ramp locations need to be considered for midblock pedestrian crossings (i.e. in the vicinity of transit stops)?
- Are there irregularities in the sidewalk surface?
- Are there abandoned driveways (drop curb segments) that need to be removed?
- 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 school zones along the project corridor in conformance with Chapter 15 of the Manual on Speed Zoning for Highways, Roads, and Streets in Florida, which discusses installing traffic control devices?
- Are there clearly delineated pathways for students and caregivers to walk 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 separate or minimize conflicts with bus or caregiver drop-off/pick-up traffic to the greatest extent possible?
- 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, or are specific turning movements restricted during certain hours? If so, are additional traffic control devices needed outside the school zone to alert unfamiliar motorists of this temporary condition?
- Are temporary portable traffic control devices anticipated to be used in the school zone? If so, do they meet MUTCD requirements?
- Has the design been reviewed and commented on by appropriate school officials?
- Has adequate pedestrian clearance time been provided for the school children who may be crossing at nearby signalized intersections and midblock crossing locations? Consider adjusting walking speed as appropriate to accommodate the site-specific pedestrian characteristics.
- Will landscaping obstruct the visibility of the school children from approaching motorists?
- Are the ramps for crosswalks adjacent to the school designed with adequate ramp sizes to accommodate a high volume of pedestrians and bicyclists?
- Have raised crosswalks or tabled intersections been considered in sections where the speed limit is at or below 30 mph?
- Is there an appropriate amount of roadway, sidewalk, and crosswalk lighting?

Temporary Traffic Control Plans & Work Zones

KEY POINT: Temporary Traffic Control Plans (TTCP) are one of the most critical elements of the design and construction process. During TTC, 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. This improves safety for workers and all users, regardless of mode of travel.

- Is the posted speed and the work zone speed the same? If the TTCP includes limited access facilities, ensure that the posted speed is no higher than 60 mph. Verify that the posted speed limit within the work zone is appropriate for the conditions.
- Are all roadway users (vehicles, bicycles, pedestrians, motorcyclists, etc.) given clear direction on 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 TTCP cross-sections for each phase.
- Is there a potential for water to pond in the travel lanes during any phases of the TTCP? Look closely at TTCP cross-sections for each phase.
- How will work vehicles and material haul vehicles interact with normal vehicular traffic during each phase of TTCP? Consider how workers and materials get in and out of the work zone and ensure appropriate signage is provided.
- Is there adequate buffer space (lateral and longitudinal) between the work area, any barrier walls, and the traffic space?
- Will the TTCP interrupt or interfere with transit service delivery during any phase of construction? Were the work zones coordinated with the transit agency regarding bus stops and operations during active work periods? Can riders get to the bus from the sidewalk (or temporary pedestrian path) and vice versa? Has the transit agency reviewed and commented on the plan? Are appropriate coordination notes provided in the plans?
- Are there school zones or school bus stops within the TTCP area? How will the TTCP phases impact students getting on/off the bus, school bus operations, or drop off/pick up locations?
- Are there railroad crossings within the TTCP plan? Is there potential for queueing on the tracks to occur? Review for possible adjustment of devices and signage to ensure motorists are not trapped on the tracks. If crossings are present, coordinate with the District Rail Office.
- Have provisions been included for emergency vehicle access in the TTCP? Consider if all lanes in one direction were blocked, how would emergency vehicles get to the scene?
- Are significant special events at local venues considered for lane closures?

- How are pedestrians and bicycles accommodated in each of the TTCP phases? Are all pedestrian detours reasonable in length? Consider if the average user would use it if it was raining or 100 degrees. Can elderly or handicapped users function without obstacles in these areas?
- How will traffic signals operate during each TTCP phase? Will temporary detection be required where lanes are shifted from their normal location or where existing detection has been disabled? Do clearance intervals need to be temporarily adjusted due to changes to the width of the intersection?
- Will traffic control officers/law enforcement officers be utilized when performing work at signalized intersections?
- Will there be temporary median closures during phases of construction? If so, what will the displaced movements be expected to do? Will they be adequately handled at other locations? Ensure adequate signage is in place.
- Will there be sight distance concerns for permitted left-turning vehicles seeing over/around barrier wall in medians? Will barrels or any other temporary devices obstruct the visibility of approaching motorcycles or vehicles? 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?
- Will the existing lighting system be maintained, or will temporary lighting be provided? Has coordination been done with the District during design regarding temporary lighting needs during construction?
- 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?
- Will operations create debris or millings scatter onto the shoulders or travel lanes? Consider including notes specifying additional sweeping operations to ensure shoulders and travel lanes are kept clear to provide safe surfaces for motorcyclists.
- Have all precautions been taken to avoid queueing within the work zone and sudden stops?
- Has the Traffic Device Installation Guideline Matrix been reviewed for projects modifying existing signalized intersections, midblock crossings, or projects introducing midblock crossings to ensure appropriate pedestrian access restrictions and construction and testing guidance?
- If the TTCP includes rigid pavement, incorporate contrasting pavement markings for key items, such as crosswalks, skip stripes, and lane lines to ensure visibility.
- Have commercial vehicle movements been considered in the TTCP? Are lane widths and radii adequate?

- If a closure of one or more lanes is necessary, is a lane closure duration of at least one ten-hour period per 24-hour work period provided? If not, has approval by the State Roadway Design Engineer been obtained?
- Are Motorist Awareness System (MAS) devices included in the advance TTC signage in sections with speeds greater than 55 mph and not protected by a barrier for lane closures lasting more than five days?