



# Illinois Department of Transportation

2300 South Dirksen Parkway / Springfield, Illinois / 62764

## BDE PROCEDURE MEMORANDUM

**NUMBER:** 18-05

**SUBJECT:** BDE Manual Revision – Chapters 32, 34, 35, and 36.

**DATE:** August 10, 2018

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Chapters 32, 34, 35, and 36 of the BDE Manual are being updated regarding intersection design. Please see the BDE Manual on-line to view the revisions.

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### Background

From 2006 to 2014, the Illinois Department of Transportation (IDOT) implemented modifications to ten right-turn approaches in the Peoria area. The changes were intended to improve the line of sight of right-turning passenger vehicles by reducing the skew of the approach angle, while allowing semi-tractor trailer trucks to make right-turns without encroachment. The purpose of this two-part study was to (1) perform site-specific effectiveness evaluations of the modified sites, and (2) conduct an area-wide crash causation analysis of right-turn crashes.

In the site-specific evaluation, driver behavior analyses and traffic crash-based safety analyses were performed to assess the safety performance of the modified right-turn lane design. The research results indicated that the right-turn angle of intersection, typically determined by corner island design, played a vital role in intersection safety. Recommendations were made regarding policy changes to corner island design that could improve intersection safety. This update to the BDE Manual is a culmination of the recommendations from those research efforts.

A second major modification to Chapter 36 includes the addition of policies regarding driveway, entrance, and minor sideroad design. Much of the new Section is based upon the Bureau of Operations document entitled, *Access to State Highways*, and the Joint Committee on Administrative Rules (JCAR). Minor enhancements to design guidance have been added where appropriate to supplement already existing policies. Additionally, verbiage was added explaining the process utilized to request access permits to State highways.

Specific changes to the Manual outlined in this Procedural Memorandum include the following:

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### **Chapter 32, Horizontal Curvature:**

- Revision made in Section 32-3.04(a), "Shoulder (High Side of Curve)", to reference a re-numbered figure in Chapter 36.

### **Chapter 34, Cross Section Elements:**

- Revision made in Section 34-2.04(c), "Curb Type Selection", regarding curb type selection on channelizing islands and medians. Specifically, the requirements in the first two bullet points under Item 5 do not apply to corner islands, which are always to be constructed using mountable curb. The selection of a specific gutter pan width was removed to coincide with verbiage on median and island curb types in Chapter 36. The appropriate gutter pan width used should be a function of drainage, available median width, and safety.
- Reference added to Section 34-3.04, "Median Selection", regarding where to find information on curb type selection for raised medians.

### **Chapter 35, Access Control/Access Management**

- Updated reference information in both the Introduction and Reference sections.
- Added new Section 35-2.04, "Access Restrictions Along Sideroads", discussing the potential for providing access restrictions along non-access-controlled side roads. These access restrictions can be utilized to help ensure the safety and operational integrity of the route long after construction or retrofit of the facility, especially in areas of projected rapid growth.

### **Chapter 36, Intersections**

- Updated reference information in both the Introduction and Reference sections specifically, and generally throughout the chapter as necessary.
- Added within Section 36-1.07, "Intersection Capacity Analysis", verbiage regarding the use of Highway Capacity Software (HCS) in the intersection design process, including intersection and corridor analyses, and saturated/oversaturated capacity analysis procedures specifically, and updated HCS discussions generally throughout the chapter.

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- Updated Section 36-1.09, "Pedestrians and Bicyclists", regarding pedestrians' and bicyclists' place in intersection design.
- Updated Figure 36-1.V regarding design vehicle selection to comply with recent legislation granting legal access of a WB-65 design vehicle to any public road facility in the State. The new legislation means a WB-65 should now, by policy, physically be able to traverse any intersection, including local street to local street intersections, through the utilization of possible encroachment. The amount of encroachment allowed is a function of risk, and should be reduced, or eliminated, as one climbs the hierarchy of functional classification. Also, as part of the design vehicle and encroachment section, the smallest design vehicle for arterial or collector street intersections with residential local streets has been increased, without allowing encroachment, from a single unit truck (SU) to a school bus (S-BUS) to better align with this new risk based encroachment approach.
- Updated Section 36-2.01(a), "Design Vehicle", to state that pedestrians and bicyclists, where present, should be treated as a design user of the intersection, and given the same consideration in the design process as the design vehicle.
- Updated Section 36-2.01(c), "Encroachment", to add discussion on allowing encroachment of the design vehicle into multi-lane designs when engineering judgment deems appropriate.
- Added new Section 36-2.01(f), "Visibility of Traffic Control Devices", to discuss when corner islands should be considered as part of a proposed intersection design. This resulted in the re-numbering of the summary of right-turn design procedures shown in Section 36-2.01(j).
- Added Section 36-2.01(i), "Stop Bar Locations", regarding the placement of proposed stop bar locations and adherence to the Illinois Supplement to the Manual on Uniform Traffic Control Devices (ILMUTCD).
- Incorporated right-turn approach angle of intersection discussion and revised standard corner island and radius return design to accommodate recent Illinois led research. Revised verbiage in Section 36-2.02, "Corner Islands", and inserted a new figure regarding corner island design, Figure 36-2.F, which caused the renumbering of all subsequent figures within the section. Updated Figure 36-2.G, "Details of Corner Islands", (formerly Figure 36-2.E) to incorporate the recommended design practices.

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- Updated Section 36-2.03, "Turning Roadways", to show provisions for both low/intermediate speed design and high-speed design turning roadways (Figure 36-2.H).
- Added verbiage to Section 36-3.03, "Left-turn Lane Design", incorporating safety best practices into the design process, including the benefits of using tapered and positive offset left-turn lanes.
- Added discussion on the design of offset right-turn lanes to Section 36-3.04, "Right-turn Lane Design", as well as example details of both tapered and parallel offset right-turn lane designs.
- Added new Section 36-7, "Driveways, Entrances, and Minor Sideroads", to reference and consolidate existing policy, to help guide the design of these facilities through the addition of supplemental information, and to discuss the Department's general access permitting process.
- Added verbiage to Section 36-8, "Intersection Design Near Railroads", regarding factors to consider during intersection planning.
- Added minor reference enhancements and updates throughout, including addition of relevant Bureau of Operations reference manuals.

Please see the BDE Manual on-line to review the changes.



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