

Texas Department of Transportation
Book 2 – Technical Provisions

IH 35E Managed Lanes Project

Attachment 11-1
Roadway Design Criteria

Table 1: Geometric Design Criteria

| | MAINLANES | Managed Lanes | FRONTAGE ROADS | RAMPS (Tollway) | RAMPS (Freeway) | DIRECT CONNECTORS | CROSSING STREETS |
|------------------------------|--|--|--|-------------------------------------|---|--|---|
| General | | | | | | | |
| Roadway Classification | Urban Freeway or Tollway | Urban Freeway or Tollway | Low Speed Urban Street | Tollway | Freeway | Urban Freeway or Tollway | Low Speed Urban Street |
| Design Speed | 70 mph / 65 mph ⁶ / 50 mph ⁵ | 70 mph / 65 mph ⁶ / 50 mph ⁵ | 40 mph / 35 mph ⁶ / 15 mph ⁶ | 70 mph / <u>50 mph</u> ⁵ | 40 mph / 35 mph ^{9 6} / 25 mph ⁶² | 50 / 40 ⁹ 40 ⁸ mph | 40 mph / 35 mph ⁶ / 30 mph ⁶ |
| Stopping sight distance | 730' / 645 ² / 425' | 730' / 645 ² / 425' | 305' / 250 ² / 80 ² | 730' / <u>425</u> ' | 305' / 250' / 155' | 425' / 305' | 305 ² / 250 ² / 200' |
| Maximum super-elevation rate | 6% | 6% | 4% | 6% | 6% | 6% | N/A |
| Min. Radius of Curvature | 2050' / 1660 ² / 835' | 2050' / 1660 ² / 835' | 490 ² 510 ² / 345 ² / 40 ² | 2050' / <u>835</u> ' | 510' / 380' / 185' | 835' / 510' | 675 ² / 465 ² / 300 ² 275 ² |
| Vertical Alignment | | | | | | | |
| Minimum Grade | 0.3% | 0.3% | 0.5 % | 0.5 % | 0.5 % | 0.5 % | 0.5 % |
| Maximum grade | 3.0 % / 3.0 ⁰ % / 64.0 ⁰ % | 3.0 % / 3.0 ⁰ % / 64.0 ⁰ % | 7.0 % | 3.0 % / <u>4.0</u> % | 74.0 ⁰ % | 6 ^{4.0} % | 79.0 ⁰ % |
| Crest (Min. K-Value) | 247 / 193 / 84 | 247 / 193 / 84 | 44 / 29 / 3 | 247 / <u>84</u> | 44 / 29 / 12 | 84 / 44 | 44 / 29 / 19 |
| Sag (Min. K-Value) | 181 / 157 / 96 | 181 / 157 / 96 | 64 / 49 / 10 | 181 / <u>96</u> | 64 / 49 / 26 | 96 / 64 | 64 / 49 / 37 |

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|--|---------------------|--|--|--------------------|-----------------|-------------------|------------------------|
| Cross Section | | | | | | | |
| Lane width | 11' | 12' | 2-11'lanes | 14'-12' | 14' | 14' | 12' |
| Shoulder Width (min.) | | | | | | | |
| Inside Shoulder | 2' | 10 ^{7,8} and 2' (see Draft Interim Schematic) | none | 4' ⁴ | 4' ⁴ | 4' ⁴ | Curb / none |
| Outside Shoulder | 10' | 10 ^{7,8} and 2' (see Draft Interim Schematic) | 5' | 8'-4' | 8' ⁴ | 8' ⁴ | Curb / none |
| Curb offset | N/A | N/A | Uncurbed Sections: N/A Curbed Sections: 5' ¹⁰ | N/A | N/A | N/A | N/A |
| Cross-slope (typical) | 2.5 % | 2.5 % | | | | | |
| Managed Lanes | 2.5 % | 2.5 % | | | | | |
| General Purpose Ln | | | | | | | |
| - Inside 2 lanes | 2.5 % | 2.5 % | 2.0 % | 2.0 % | 2.0 % | 2.0 % | 2.0 % |
| - Outside lanes | 2.5 % | 2.5 % | 2.0 % | 2.0 % | 2.0 % | 2.0 % | 2.0 % |
| -Shoulders | 2.5 % | 2.5 % | 2.0 % | 2.0 % | 2.0 % | 2.0 % | 2.0 % |
| Clear Zone | | | | | | | |
| Distance from edge of travel lane unless noted otherwise | 30' | 30' | Uncurbed sections: 10' (measured from edge of travel lane) Curbed sections: 3' (measured from face of curb) | 16' | 16' | N/A | Refer to notes 2 and 3 |
| Side slopes: | | | | | | | |
| -within clear zone | 6:1 usual (4:1 Max) | 6:1 usual (4:1 Max) | 6:1 (4:1 Max) | 6:1 (4:1 Max) | 6:1 (4:1 Max) | 6:1 (4:1 Max) | 6:1 (4:1 Max) |
| - outside clear zone | 3:1 max | 3:1 max | 3:1 max | 3:1 max | 3:1 max | 3:1 max | 3:1 max |

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|------------------------|--|--|---|---------------------------------|---------------------------------|---------------------------------|---|
| Vertical Clearance | | | | | | | |
| Roadway | 16'-6" Min. (For ultimate bridges) 14'-6" Min. (For existing bridges to be widened) | 16'-6" Min. (For ultimate bridges) 14'-6" Min. (For existing bridges to be widened) | 16'-6" Desirable 14'-6" Min. | 16'-6" Desirable 14'-6" Min. | 16'-6" Desirable 14'-6" Min. | 16'-6" Desirable 14'-6" Min. | Existing clearance |
| Railroad | 23'-0" | 23'-0" | 23'-0" | 23'-0" | 23'-0" | 23'-0" | 23'-0" |
| Electrified light Rail | 26' | 26' | 26' | 26' | 26' | 26' | 26' |
| Overhead Signs | 17'-6" | 17'-6" | 17'-6" | 17'-6" | 17'-6" | 17'-6" | 17'-6" |
| Pedestrian | 17'-6" | 17'-6" | 17'-6" | 17'-6" | 17'-6" | 17'-6" | 17'-6" |
| Design Vehicles | WB-62 | WB-62 | WB-62 | WB-62 | WB-62 | WB-62 | As noted in Attachment 11-1, Table 2 |
| Driveway Radius | N/A | N/A | 30' min commercial, 15' min. residential | NA | NA | NA | 30' min commercial, 15' min. residential |

Notes:

- Design criteria lower than shown above will not be allowed without TxDOT approval
- See Attachment 11-1, Table 2 for crossing street functional classification
- The face of the new bridge columns shall be located 6 feet or more from the face of curb
- To mitigate restrictions on the design imposed by sight distance, it is acceptable to position the 8-foot shoulder on the inside of the curve and the 4-foot shoulder on the outside of the curve.
- TxDOT will allow the reduction of the Design Speed for the Mainlanes, ~~and~~ Managed Lanes, and Managed Lane ingress / egress ramps for the station ranges listed in Table 1A: Design Speed for Mainlanes and Managed Lanes. No Design Speed reductions will be allowed for other station ranges without TxDOT approval.
- ~~These design speeds / criteria correspond to the vertical alignment design exceptions listed in 11.2.4.1~~
- ~~Developer shall provide a minimum 14' immediately downstream from each tolling gantry to allow for enforcement areas.~~
- ~~Developer shall coordinate with local entities during final design to ensure adequate enforcement zones are provided~~
- IH 35E SB to SH 121 WB Direct Connector only
- These design speeds apply only to the ramps listed in Table 1B below
- Developer shall include curb on newly constructed and reconstructed frontage road sections as needed to match existing frontage road section.

Table 1A: Design Speed for Mainlanes, ~~and~~ Managed Lanes, and Managed Lane Ingress / Egress Ramps

| STATION | STATION | DESIGN SPEED |
|---------|---------|------------------|
| 550+00 | 728+00 | 50 mph |
| 728+00 | 767+00 | 70 mph [50 mph*] |
| 767+00 | 1253+00 | 50 mph |
| 1253+00 | 1524+75 | 70 mph |
| 1524+75 | 1632+00 | 50 mph |
| 1632+00 | 1646+00 | 70 mph |
| 1646+00 | 1688+00 | 50 mph |
| 1688+00 | 1703+00 | 70 mph |
| 1703+00 | 1986+00 | 50 mph |
| 1986+00 | 1997+00 | 70 mph |
| 1997+00 | 2120+00 | 50 mph |

**Applies to Package 3 and Package 4*

Table 1B: Ramps with Design Speeds Below 40 MPH

| <u>Ramp Name</u> | <u>DESIGN SPEED</u> |
|------------------|---------------------|
| <u>AF, CF</u> | <u>25 mph</u> |
| <u>E</u> | <u>35 mph</u> |

Table 2: Crossing Street Function Classification

| Intersecting Street | Jurisdiction | Function Classification / Roadway Classification | Design Speed (MPH) | Position (over / under) | Design Vehicle | SBNB U-Turn | Sidewalk & Min. Usable Width ³ | Curb and Gutter | WB Offsets to face of curb | WB thru lanes | Turn lanes | EB thru lanes | EB Offsets to face of curb | Curb and Gutter | Sidewalk & Min. Usable Width ³ | Clear Zone for Cross Street Thru Lanes | NBSB U Turn | Bike / Ped. Accommodation? | Pedestrian Rail protection barrier? |
|--------------------------|--------------|--|--------------------|-------------------------|----------------|-------------|---|-----------------|---|--------------------|----------------------------|--------------------|--|-----------------|---|--|-------------|----------------------------|-------------------------------------|
| 4 th St. | Carrollton | Collector Urban | 30 | Under | WB-62 | N | N | Curb, no gutter | 0 | 1 (18') | NA | 1 (18') | 0' | Curb, no gutter | N | 3' From face of curb | N | N | N |
| Main W. | Carrollton | Collector Urban | 30 | Under | WB-62 | N | N | Curb, no gutter | 0 | 1 (14.5') | NA | 1 (14.5') | 0' | Curb, no gutter | N | 2.5' From face of curb | N | N | N |
| Belt Line Road | Carrollton | Arterial Urban | 30 | Under | WB-62 | Y | Y (6.5') (5' at Walls) | Y | 0' | 3 (11') | median with turn bays | 3 (11') | 0 | Y | Y (6.5') (5' at Walls) | 3' From face of curb | Y | N | N |
| N. Broadway St. | Carrollton | Collector Urban | 30 | Over | WB-62 | N | Match Existing | Match Existing | 0' | 2 (11') | NA | 2 (11') | 0' | Match Existing | Match Existing | Match Existing | N | N | N |
| Dickerson Pkwy. | Carrollton | Arterial Urban | 30 | Over | WB-62 | N | Y (6') (WB Only) | Y (WB Only) | Offset to inside curb – 2' Offset to outside curb – 2' | 2 (14') | median with turn bays | 2 (14') | Offset to inside curb – 2' Offset to outside barrier – 2' | N | N | 3' From face of curb | N | N | N |
| Round Grove Rd. (FM3040) | Lewisville | Arterial Urban | 30 | Over | WB-62 | N | Y (6') | Y | 2' | 2 (12') 1 (14') | 2 (12') with curbed median | 2 (12') 1 (14') | 2' | Y | Y (6') | 3' From face of curb | N | N | N |

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|--|--------------|--|--------------------|-------------------------|----------------|-------------|---|-----------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|-----------------|---|--|-------------|----------------------------|-------------------------------------|
| Corporate Dr. | Lewisville | Arterial Urban | 30 | Under | WB-62 | N | Y (Variable) | Y | 2' | 2 (12') 1 (14') | 4 (12') with curbed median | 2 (12') 1 (14') | 2' | Y | Y (Variable) | 3' From face of curb | N | N | N |
| Fox Ave. | Lewisville | Collector Urban | 30 | Over | WB-62 | N | Y (Variable) | Y | 0'-1' | 2 (11') | NA | 2 (11') | 0'-1' | N | Y (Variable) | 3' From face of curb | N | N | N |
| FM 1171 / Main St. | Lewisville | Arterial Urban | 30 | Over | WB-62 | N | Y (4') | Y | 0' | 2 (11') 1 (10') | 2 (11') with curbed median | 2 (11') | 0' | Y | Y (4') | 3' From face of curb | N | N | N |
| FM 407 / Lake Park Rd. (Construction to be completed by others) | Lewisville | Arterial Urban | 30 | Under | WB-62 | Y | Y (Variable) | Y | 0' | 2 (12') | 4 (12') with curbed median | 2 (12') | 0' | Y | Y (Variable) | 3' From face of curb | Y | N | N |
| Garden Ridge Blvd. | Lewisville | Arterial Urban | 30 | Under | WB-62 | N | Y (Variable) | Y | 0' | 2 (12') | 2 (12') with curbed median | 2 (12') | 0' | Y | Y (Variable) | 3' From face of curb | N | N | N |
| Highland Village | Lewisville | Collector Urban | 30 | N/A | WB-62 | N | Y (Variable) | Y | 0' | 2 (12') | N/A | N/A | 0' | Y | Y (Variable) | 3' From face of curb | N | N | N |

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|------------------------------------|--------------|--|--------------------|-------------------------|----------------|-------------|---|-----------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|-----------------|---|--|-------------|----------------------------|-------------------------------------|
| County Ln. / Denton Dr. | Lake Dallas | Collector Urban | 30 | Under | WB-62 | N | Y (Variable) | Y | 0' | 2 (12') | 2 (12') with curbed median | 2 (12') | 0' | Y | Y (Variable) | 3' From face of curb | N | N | N |
| Turbeville Rd. / Hurley Dr. | Lake Dallas | Collector Urban | 30 | Under | WB-62 | N | N | N | 0' | 1 (12') 1 (16') | 2 (18') (partial) | 1 (12') 1 (16') | 0' | N | N | N/A | N | N | N |
| Corinth Pkwy. | Corinth | Collector Urban | 30 | Under | WB-62 | N | Y (6') | Y | 0' | 1 (12') 1 (16') | 4 (11') | 1 (12') 1 (16') | 0' | Y | Y (6') | 3' From face of curb | N | N | N |
| Post Oak | Corinth | Arterial Urban | 30 | Over | WB-62 | N | Y (Variable) | Y | 2' | 1 (12') 1 (16') | 4 (11') | 1 (12') 1 (16') | 2' | Y | Y (Variable) | 3' From face of curb | N | N | N |
| N. Texas Blvd. | Denton | Arterial Urban | 30 | Over | WB-62 | N | Y (Variable) | Y | 0' | 2 (12') | 4 (11') | 1 (12') 1 (14') | 2' | Y | Y (15') | 3' From face of curb | Y | N | N |

1. Notes: Bridge columns shall be 6' (min.) from face of curb
 2. Crossing streets not indicated to include sidewalks shall be laid out (including structural elements) to not preclude sidewalk construction in the future
 3. Sidewalks shall be designed in accordance with applicable standards and Section 20.3.2