**GENERAL NOTES**

1. All details shown on this index for removal of organic and plastic materials apply unless otherwise shown on the plans.

2. Utilization of excavated materials shall be in accordance with Index No. 505, unless otherwise shown on the plans.

3. Where organic or plastic material is undercut, backfill shall be made of suitable material in accordance with Index No. 505, unless otherwise shown on the plans.

4. The term 'Plastic Material' used in this index in conjunction with removal of plastic soil is as defined under soil classifications for Plastic (P) and High Plastic (H) in Index No. 505.

5. The term 'Organic Material' as used on this index is defined as any soil which has an average organic content test result which exceeds seven (7.0) percent, or an individual organic content test result which exceeds seven (7.0) percent. Organic material shall be removed as shown on this index and the plans unless directed otherwise by the District Geotechnical Engineer. 

6. The normal depth of side ditches shall be 3' below the shoulder point except in special cases.

7. In municipal areas, where underdrain is to be constructed beneath the proposed pavement, the grade of the underdrain filter material will not extend above the bottom of the stabilized section of the subgrade. Gradation of the filter material shall conform to FDOT specifications. Minimum grade on underdrain pipe shall be 0.2%.

8. See Index No. 506 for miscellaneous earthwork details.

**DESIGN NOTES**

1. At locations where organic material or other soft soil deposits persists to such depth that removal is impractical, the construction of a geosynthetic foundation over those soils should be considered. The Engineer of Record should request guidance from the District Geotechnical Engineer and make a geosynthetic foundation design in accordance with Index No. 501 when pursuing geosynthetic alternatives.

2. The designer shall take into consideration the expectation of roadway widening to the outside, and where widening is anticipated specify in the plans the limits of removal of organic and plastic materials necessary to accommodate anticipated widening.

**REMOVAL OF ORGANIC MATERIAL**

**IN RURAL CONSTRUCTION**

**WITH OVERBURDEN - HALF SECTION**

- Outer Roadway
- Control Line Set by Normal Shoulder Point
- Whether or Not Shoulder Gutter Is Used
- Control Line Set by Normal Shoulder Point
- Outer Roadway
- Overlying Material
- Organic Material
- Bottom Of Organic Material — Limit For Minimum Removal

**IN URBAN CONSTRUCTION**

**WITH OVERBURDEN - HALF SECTION**

- Outer Roadway
- Control Line Set by Normal Shoulder Point
- Whether or Not Shoulder Gutter Is Used
- Control Line Set by Normal Shoulder Point
- Outer Roadway
- Overlying Material
- Organic Material
- Bottom Of Organic Material — Limit For Minimum Removal

**WITHOUT OVERBURDEN - HALF SECTION**

- Outer Roadway
- Control Line Set by Normal Shoulder Point
- Whether or Not Shoulder Gutter Is Used
- Control Line Set by Normal Shoulder Point
- Outer Roadway
- Overlying Material
- Organic Material
- Bottom Of Organic Material — Limit For Minimum Removal
REMOVAL OF ORGANIC AND PLASTIC MATERIAL

TYPICAL CUT SECTION

Note: When this detail is applied to minor collectors and local facilities, the undercut may be reduced to 18".

REMOVAL OF PLASTIC MATERIAL ON DIVIDED FREEWAYS, ARTERIALS AND MAJOR COLLECTORS HAVING FLUSH MEDIANS, AND ON UNDIVIDED ARTERIALS AND MAJOR COLLECTORS

MISCELLANEOUS DETAILS

TYPICAL CUT SECTION ON TANGENT

At locations where plastic material is being removed, the side ditches must be at least as deep as the undercut plane.

TYPICAL CUT SECTION ON SUPERELEVATION

Where paved side ditches are used in areas of removal of plastic material, the top of the ditch pavement must be no higher than the undercut plane.

HALF SECTION

NOTES:

Refer to roadway cross sections to determine whether minimum or preferable removal is used.

* Where frequency of median breaks indicates that it is impractical to leave plastic material in the median, the designer may elect to indicate total removal of this material. If during construction it becomes apparent, due to normal required construction procedures, that it is impractical to leave the plastic material in the median, total removal of this material shall be approved by the Engineer.

REMOVAL OF PLASTIC MATERIAL AND LOCATION OF UNDERDRAIN IN URBAN CONSTRUCTION

REMOVAL OF PLASTIC MATERIAL

Note: For GENERAL NOTES see Sheet 1.
GENERAL NOTES

1. Roadway dimensions are representative. Subgrade dimensions and control lines are standard. The details shown on this index do not supersede the details shown in the plans or on Index Nos. 500 or 506.

2. Plastic (P) soils may be placed above the existing water level (at the time of construction) to within 4 feet of the proposed base. It should be placed uniformly in the lower portion of the embankment for some distance along the project rather than full depth for short distances.

3. High Plastic (M) soils excavated within the project limits may be used in embankment construction as indicated on this Index. High Plastic soils are not to be used for embankment construction when obtained from outside the project limits.

4. Select (S) soils having an average organic content of more than two and one-half (2.5) percent, or having an individual test value which exceeds four (4) percent, shall not be used in the subgrade portion of the roadway. Select (S), Plastic (P), or High Plastic (H) soils having an average organic content of more than five (5) percent, or an organic content individual test result which exceeds seven (7) percent, shall not be used in the portion of embankment inside the control line, unless written authorization is provided by the District Geotechnical Engineer. Average organic content shall be determined from the test results from a minimum of three randomly selected samples from each stratum or stockpile of a particular material. Tests shall be performed in accordance with AASHTO T 267 on the portion of a sample passing the No. 4 sieve.

5. Highly organic soils, composed primarily of partially decayed organic matter, often dark brown or black in color with an odor of decay, and sometimes fibrous, shall be designated as muck. Further, any stratum or stockpile of soil which contains pockets of highly organic material may be designated as muck (M). Highly organic soils shall not be used within the subgrade or embankment portion of the roadway, with the exception of muck used as a supplement to construct a finish soil layer as described in Section 162 of the FDOT Standard Specifications.

DESIGN NOTES

1. The designer shall take into consideration the expectancy of roadway widening to the outside, and where widening is anticipated, specify in the plans the location of the future widening control line for utilization of High Plastic (H) soils and/or soils classified as organic material in the embankment.

2. The designer shall take into consideration the position of the drainage swales in the portion of the embankment where Plastic (P) soils, High Plastic (H) soils, or soils classified as organic material would be allowed. The designer shall limit the use of Plastic (P) soils, High Plastic (H) soils, and/or soils classified as organic material to locations that will not inhibit the infiltration of stormwater from the swales.

Classification listed left to right in order of preference.

** Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction. They may be used in the subgrade portion of the roadway when approved by the District Materials Engineer. A-2-4 material placed below the existing water level must be nonplastic and contain less than 15% passing the No. 200 U.S. Standard sieve.

* For cut sections this dimension may be reduced to 24". See Index No. 500. For minor collectors and local facilities this dimension may be reduced to 18".
DIVIDED ROADWAYS

DESIGN NOTE
1. Concrete pavement is to be placed over 4" of Asphalt Treated Permeable Base (ATPB) or Cement Treated Permeable Base (CTPB) as identified in the plans. This will be placed on a separator layer using 2" Type SP. This will be placed on a working platform using 12" of Type B Stabilization.

UNDIVIDED ROADWAY

RIGID PAVEMENT - TREATED PERMEABLE BASE OPTION

SYMBOl      SOIL                      CLASSIFICATION (AASHTO M 145)
S            Select         A-1, A-2, A-2-4 **
H            High Plastic  A-2-5, A-2-7, A-5 or A-7 (ALL WITH LL > 50)
M            Muck          A-8

Classification listed left to right in order of preference.

** Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction. They may be used in the subgrade portion of the roadway when approved by the District Materials Engineer. A-2-4 material placed below the existing water level must be nonplastic and contain less than 15% passing the No. 200 U.S. Standard sieve.

* For cut sections this dimension may be reduced to 24"; see Index No. 500. For minor collectors and local facilities this dimension may be reduced to 18".
DIVIDED ROADWAYS

DESIGN NOTE

1. Concrete pavement is to be placed over Optional Base Group 2 Type B-12.5 only Asphalt Base as identified in the plans. This will be placed on a working platform using 12" of Type B Stabilization.

UNDIVIDED ROADWAY

SYMBOL  SOIL  CLASSIFICATION (AASHTO M 145)

S  Select  A-1, A-3, A-2-4**


H  High Plastic  A-2-5, A-2-7, A-5 or A-7 (ALL WITH LL > 50)

M  Muck  A-8

Classification listed left to right in order of preference.

See General Notes Nos. 4 & 5 for utilization of soils classified as organic material or muck.

** Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction. They may be used in the subgrade portion of the roadway when approved by the District Materials Engineer. A-2-4 material placed below the existing water level must be nonplastic and contain less than 15% passing the No. 200 U.S. Standard sieve.

* For cut sections this dimension may be reduced to 24". For minor collectors and local facilities this dimension may be reduced to 18".

RIGID PAVEMENT - ASPHALT BASE OPTION
**SYMBOL**  | **SOIL CLASSIFICATION (AASHTO M 145)**  
---|---
S | Select A-1, A-3, A-2-4 **
S+ | Special Select A-3 *** With Minimum Average Lab Permeability of 5 x 10^-5 cm/sec (0.14 ft./day) as per FM 1-7215
H | High Plastic A-2-5, A-2-7, A-5 Or A-7 (ALL WITH LL>50)
M | Muck A-8

Classification listed left to right in order of preference.

---

**Note:** SPECIAL SELECT SOIL OPTION may be used only when approved in writing by the District Materials Engineer and shown in the plans.

---

**When allowed by the plans, some types of A-2-4 material may be approved in writing by the District Materials Engineer. This material must meet the minimum lab permeability requirement, be nonplastic, and not exceed 12% passing the No. 200 U.S. Standard sieve.

**Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction. A-2-4 material placed below the existing water level must be nonplastic and contain less than 12% passing the No. 200 U.S. Standard sieve.

---

3" of #57 or #89 Coarse Aggregate Mixed Into Top 6".
**NOTES**

1. All material in the shaded area is excess base to be removed.
2. The cost for removal of excess base material shall be included in the contract unit price for base.
3. Payment for base shall be calculated using normal width.

**REMOVAL OF EXCESS BASE MATERIAL**

**MEDIAN STABILIZING DETAILS**

1. When the median has curb or curb and gutter, stabilize 4" back of curb.
2. When the median has shoulder with no curb or curb and gutter, stabilize to normal shoulder width.
3. See the details above for stabilizing requirements at crossroads.
4. Stabilize entire area under all paved traffic islands.
5. Stabilize full width under all traffic separators.
6. Select material as defined on Index No. 505. For minor collectors and local facilities the depth of select material thickness may be reduced from 24" to 18".
SHOULDER ON HIGH SIDE: A shoulder slope of 0.06 downward from the edge of travel way will be maintained until a 0.07 break in slope at the pavement edge is reached due to super-elevation of the pavement. As the pavement superelevation increases, the 0.07 break in slope will be maintained and the shoulder flattened until the shoulder slope reaches the minimum of 0.02 downward from the edge of travel way. Any further increase in pavement super-elevation will necessitate slopeing the inside half of the shoulder toward the travel way and the outer half outward. This shall be 0.02 for super-elevation 0.06-0.09 and both at 0.03 for super-elevation 0.10. For shoulders with paved widths 5 feet or less see Special shoulder Super-elevation Transitions.

SHOULDER ON LOW SIDE: Maintain 0.06 drop across inside shoulder until pavement cross slope reaches 0.06. For pavement cross slopes greater than 0.06, shoulder to have same slope as pavement.

SHOULDER CONSTRUCTION WITH SUPER-ELEVATION

NOTE: These details apply to both paved and grassed shoulders. For median shoulders use 0.05 in lieu of 0.06.

DESIGN SUPER-ELEVATION RATES FOR RURAL HIGHWAYS, URBAN FREeways AND HIGH SPEED URBAN HIGHWAYS
DESCRIPTION:

SUPERELEVATION RURAL HIGHWAYS, URBAN FREEWAYS AND HIGH SPEED URBAN HIGHWAYS

07/01/14

SUPERELEVATION TRANSITION L (Varies 100' Min.)

Straight Line Transition Outside Edge Of Pavement

0.8 L

Tangent

0.2 L

Curve

Full Superelevation

Outside Part Edge

Outer Roadway

Profile Grade

Crown Point

Outer Roadway

Profile Grade

Crown Point

Inner Roadway

Outside Part Edge

Inner Roadway

Outside Pav't Edge

Outer Roadway

Outside Pav't Edge

Inner Roadway

NORMAL CROWNED SECTION

SECTION A-A

SUPERELEVATION SECTION LT. & RT.

Profile Grade

Crown Point

Both Roadways

Outer Roadway

Crown Point

Both Roadways

Inner Roadway

Profile Grade

Crown Point

Both Roadways

Outside Pav't Edges-Both Roadways

8-LANE PAVEMENT WITH ONE LANE SLOPED TO MEDIAN
SUPERELEVATION RATES (e) FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS

\[ e_{\text{max}} = 0.05 \]

### GENERAL NOTES

1. Maximum rate of superelevation for urban highways and high-speed urban streets shall be 0.05.

2. Superelevation shall be obtained by rotating the plane successively about the break points of the section until the plane has attained a slope equal to that required by the chart. Should the rotation traverse the entire section and further superelevation be required, the remaining rotation of the plane shall be about the low edge of the inside travel lane. Crown is to be removed in the auxiliary lane to the outside of the curve only when the adjoining travel lanes require positive superelevation.

3. When positive superelevation is required, the slope of the gutter on the high side shall be a continuation of the slope of the superelevated pavement.

4. In construction, short vertical curves shall be placed at all angular profile breaks within the limits of the superelevation transition.

5. The variable superelevation transition length “L” shall have a minimum value of 50 feet for design speeds under 40 MPH and 75 feet for design speeds of 40 MPH or greater.

6. Roadway sections having lane arrangements different from those shown, but composed of a series of planes, shall be superelevated in a similar manner.

7. For superelevation of lower speed urban streets, see the FDOT Manual of Uniform Minimum Standards For Design, Construction And Maintenance For Streets And Highways. For superelevation of curves on rural highways, urban freeways and high speed urban highways, see Index No. 510.

### TABULATED VALUES

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**NORMAL CROWN**

**TRACKING RULES**

- **Dmax.** = 20° 00'
- **NC** = Normal Crown
- **RC** = Reverse Crown
- **e** = 0.05

### DESIGN STANDARDS

- For superelevation of urban highways and high-speed urban streets, see Index No. 510.

**SUPERELEVATION URBAN HIGHWAYS AND STREETS**

- When the speed curves and the degree of curve or radius lines intersect above this line, the pavement is to be superelevated (positive slope) at the rates indicated at the lines intersecting points.
- When the speed curves and the degree of curve or radius lines intersect between these limits, the pavement is to be superelevated at the rate of 0.02 (positive slope).
- When the speed curves and the degree of curve or radius lines intersect below this line, the pavement is to have normal crown (typically 0.02 and 0.03 downward slopes).

**SUPERELEVATION FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS**

- a. When the speed curves and the degree of curve or radius lines intersect above this line, the pavement is to be superelevated (positive slope) at the rates indicated at the lines intersecting points.
- b. When the speed curves and the degree of curve or radius lines intersect between these limits, the pavement is to be superelevated at the rate of 0.02 (positive slope).
- c. When the speed curves and the degree of curve or radius lines intersect below this line, the pavement is to have normal crown (typically 0.02 and 0.03 downward slopes).
SUPERELEVATION TRANSITION SECTIONS
FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS
PROFILE

TWO LANES EACH DIRECTION

PROFILE

TWO LANES EACH DIRECTION WITH MEDIAN AND AUXILIARY LANE

Note:
The sections and profiles shown are examples of superelevation transitions. Similar schemes should be used for roadways having other sections.

EXAMPLE SUPERELEVATION SECTIONS AND PROFILES
FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS
### BASE THICKNESS AND OPTION CODES

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<th>Structural Range</th>
<th>Base Group Pay Item Number</th>
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<th>Cemented Coquina, LBR 100</th>
<th>Shell Rock, LBR 100</th>
<th>Base Run Shell, LBR 200</th>
<th>Recycled Concrete Aggregate, LBR 200</th>
<th>Graded Aggregate Base</th>
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</table>

### GENERAL NOTES

1. Where base options are specified in the plans, only those options may be bid and used.
2. In situations where the designer requires the use of a single base option, as shown in the plans, bid and use as optional base.

### GENERAL USE OPTIONAL BASE GROUPS AND STRUCTURAL NUMBERS

**For granular subbase, the construction of both the subbase and Type B-12.5 will be bid and used as Optional Base. Granular subbases include Limerock, Cemented Coquina, Shell Rock, Bank Run Shell, Recycled Concrete Aggregate and Graded Aggregate Base. The base thickness shown is Type B-12.5. All subbase thicknesses are 4" minimum.**

**For restrictions on the use of Recycled Concrete Aggregate – see Specifications Section 911.**

Ø To be used for widening, three feet or less.

△ Based on minimum practical thicknesses.

□ For restrictions on the use of RAP Base – see Standard Specifications.
### Limited Use Optional Base Groups and Structural Numbers

**Note:** These base materials may be used on FDOT projects when approved in writing by the District Materials Engineer and shown in the plans.

Based on minimum practical thicknesses.

*Than 1,000,000 Axle Loads (ESAL) Greater*

**Not Recommended For 20 Year Design**

Accumulated 18 kip Equivalent Single Axle Loads (ESAL) Greater Than 1,000,000

#### Base Group and Structural Numbers

<table>
<thead>
<tr>
<th>Base Group</th>
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<th>Base Number</th>
<th>Pay Item Number</th>
<th>LBR</th>
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For Additional Information Refer To FDOT Rules Chapters 14-96 And 14-97.

GENERAL NOTES

1. For definitions and descriptions of access connection "Categories" and access "Classifications" of highway segments, and for other detailed information on access to the State Highway System, refer to FDOT Rule Chapter 14-96, "State Highway System Access Management Classification System And Standards.

2. For this index the term 'turnout' applies to that portion of driveways or side roads adjoining the outer roadway. For this index the term "connection" encompasses a driveway or side road and their appurtenant islands, separators, transition tapers, auxiliary lanes, travelway flares, drainage pipes and structures, crossovers, sidewalks, curb cut ramps, signage, pavement marking, required signalization, maintenance of traffic or other means of access to or from controlled access facilities. The turnout requirements set forth in this index do not provide complete intersection design, construction or maintenance requirements.

3. The location, positioning, orientation, spacing and number of connections and median openings shall be in conformance with FDOT Rule Chapter 14-97.

4. On Department construction projects all driveways not shown on the plans shall be reconstructed at their existing location in conformance to these standards, or, in conformance to permits issued during the construction project.

5. Driveways shall have sufficient length and size for all vehicular maneuvering, stacking, maneuvering, standing and parking to be carried out completely beyond the right of way line. Except for vehicles stopping to enter the highway, the turnout areas and drives within the right of way shall be used only for moving vehicles entering or leaving the highway.

6. Connections with expected daily traffic over 4000 vpd shall be constructed as intersecting side roads. The design requirement of this index and that of the local government will be used to select appropriate connection widths, radial and intersection design, subject to the approval of the Department. For connections with expected daily traffic less than 4000 vpd, the Department will determine if a drop curb or radius returns are required in accordance with existing or planned connections. Where radius returns apply, the design requirements of this index and that of the local government will be used to select appropriate connection widths, radial and intersection design, subject to the approval of the Department.

7. Any connection requiring or having a specified median opening with left turn storage and served directly by that opening shall have radial returns. Where multiple numbers of multi-unit vehicles will use the connection, the connection width and radial shall be increased and auxiliary lanes, tapers, lane flares, separators and/or islands constructed, as determined by the Department to be necessary for safe turning movements.

8. Where a connection is intended to align with another connection across the highway, the through lanes shall align directly with the corresponding through lanes.

9. For new connections and for connections on all new construction and reconstruction projects, pavement materials and thicknesses shall meet the requirements applicable to either that detailed for "Urban Flared Turnouts", or, that described in "Table 515-1" for connections that are intended to daily accommodate either multi-unit vehicles or single unit vehicles exceeding 30' in length, returns with 50' radii shall be used, unless otherwise called for in the plans or otherwise stipulated by permit. Where large numbers of multi-unit vehicles will use the connection, the connection width and radial shall be increased and auxiliary lanes, tapers, lane flares, separators and/or islands constructed, as determined by the Department to be necessary for safe turning movements.

10. The responsibility for the cost of construction or alteration to an access connection shall be in accordance with FDOT Rule Chapter 14-98.

DESIGN NOTES

1. Prior to the adoption of FDOT Rules Chapters 14-96 and 14-97, connections to the State Highway System were defined and permitted by Classes. Connections have been redefined by Categories under Rule 14-96; and, the term "Class" has been applied to State Highway System access segments, as defined under Rule 14-97.

NOT INTENDED FOR FULL INTERSECTION DESIGN

SUMMARY OF GEOMETRIC REQUIREMENTS FOR TURNOUTS
**Design Notes for Urban Flared Turnouts**

**1.** Driveways indicated as 'Adverse Applications' are those with slopes that can cause overhang drag for representative standard passenger vehicles under fully loaded conditions; or, those with slopes that can cause drivers who are leaving the roadway to slow or pause to the extent that traffic demand volumes will be impeded.

**2.** Driveways indicated as 'Marginal Applications' are those with slopes that can cause overhang drag for representative standard passenger vehicles under fully loaded conditions when the driveway is located on the low side of fully superelevated roadways.

**3.** Driveways indicated as 'General Applications' are those with slopes that can readily accommodate representative standard passenger vehicles and those that can accommodate representative standard trucks, vans, buses and recreational vehicles operating under normal crown and superelevation conditions.

**4.** The standard flared driveways on this index may not accommodate vehicles with low beds, low undercarriage or low appendage features. Where such vehicles are design vehicles, driveways shall have site specific flare designs or Category III designs.

**5.** Maintenance of pavement shall extend out to the right of way or 2' beyond the back of sidewalk, whichever distance is less.

**6.** The maintenance and operation of highway lighting, traffic signals, associated equipment, and other necessary devices shall be the responsibility of a public agency.

**7.** All pavement markings on the State highways, including acceleration and deceleration lane markings, and signing installed for the operation of the State highway shall be maintained by the Department.

**8.** All signing and marking installed for the operation of the connection (such as stop bars and stop signs for the connection) shall be the responsibility of the permittee.

**9.** All sidewalk surfaces crossing driveways with a cross slope shown in this index to be 0.02 shall be 0.02 Maximum.

---

**Urban Flared Turnouts**

**1.** Driveways indicated as 'Adverse Applications' are those with slopes that can cause overhang drag for representative standard passenger vehicles under fully loaded conditions; or, those with slopes that can cause drivers who are leaving the roadway to slow or pause to the extent that traffic demand volumes will be impeded.

**2.** Driveways indicated as 'Marginal Applications' are those with slopes that can cause overhang drag for representative standard passenger vehicles under fully loaded conditions when the driveway is located on the low side of fully superelevated roadways.

**3.** Driveways indicated as 'General Applications' are those with slopes that can readily accommodate representative standard passenger vehicles and those that can accommodate representative standard trucks, vans, buses and recreational vehicles operating under normal crown and superelevation conditions.

**4.** The standard flared driveways on this index may not accommodate vehicles with low beds, low undercarriage or low appendage features. Where such vehicles are design vehicles, driveways shall have site specific flare designs or Category III designs.

**5.** Maintenance of pavement shall extend out to the right of way or 2' beyond the back of sidewalk, whichever distance is less.

**6.** The maintenance and operation of highway lighting, traffic signals, associated equipment, and other necessary devices shall be the responsibility of a public agency.

**7.** All pavement markings on the State highways, including acceleration and deceleration lane markings, and signing installed for the operation of the State highway shall be maintained by the Department.

**8.** All signing and marking installed for the operation of the connection (such as stop bars and stop signs for the connection) shall be the responsibility of the permittee.

**9.** All sidewalk surfaces crossing driveways with a cross slope shown in this index to be 0.02 shall be 0.02 Maximum.
See 'DESIGN NOTES FOR URBAN FLARED TURNOUTS'.

* GENERAL* APPLICATIONS

MARGINAL* APPLICATIONS ON LOW SIDE OF FULLY SUPERELEVATED ROADWAY (REFER TO MODIFICATIONS ON SHEET 4)

ADVERSE* APPLICATIONS (REFER TO MODIFICATIONS ON SHEET 4)

SIDEWALK ADJACENT TO CURB

SIDEWALK WITH UTILITY STRIP ON 0.02 SLOPE

SIDEWALK WITH UTILITY STRIP ON 0.04 SLOPE

DRIVEWAY SECTIONS ON CURBED FACILITIES WITH SIDEWALKS
MODIFICATIONS OF 'ADVERSE' AND 'MARGINAL' APPLICATIONS

SIDEWALK ADJACENT TO CURB
SIDEWALK WITH UTILITY STRIP ON 0.02 SLOPE

SIDEWALK WITH UTILITY STRIP ON 0.04 SLOPE

* See 'DESIGN NOTES FOR URBAN FLARED TURNOUTS'.
Typical Half Section For Low Volume/Residential Connections

Typical Half Section For Higher Volume Connections

Width (See Sheet 1)

Point Of Connection As Shown On The Plans

Or As Determined By The Engineer During Construction

Or As Stipulated By Permit.

Shoulder

5' Min For Private Connections

6' Min For Side Roads

10' Std.

Shoulder Line

Edge Of Travel Way

Sod

R/W Line

Shoulder Line

Roadway Shoulder,

Turnout Taper Or

Turnout Auxiliary Lanes

Travel Way

Existing Or Proposed Drive

F.L. Rdwy. Ditch

Drainage Pipe –

FL

L

Varies

Varies-Determined By Slope Intercept

Varies

Varies

Varies

Varies

Varies-Determined By Slope Intercept

DRAINAGE SECTION

Shoulder

Sod (See Opposite)

Sod (See Index 273)

F.L. Rdwy. Ditch

Edge Of Roadway

Pavement At Graded Connections

In Accordance With Index No. 516

Or As Shown In The Plans Or

In Accordance With Index No. 516

5' Pavement At Graded Connections

As Stipulated By Permit.

Or As Determined By The Engineer During

Point Of Connection As Shown On The Plans

Limits Of Clearing and Grubbing

LIMITS OF CLEARING & GRUBBING,
STABILIZING AND BASE AT INTERSECTIONS

INTERSECTIONS NOTES:

○ Return Radius Point or Transition Point.

○ 8' Or Match Exist. Stabilization Limits (8' Min.).

DRIVE ENTRANCES NOTES:

○ Drainage pipe size and length shall be that shown on the plans, or as stipulated by permit, or as determined by the Engineer during construction.

The size shall be at least that established by the FDOT District, but not less than 15" diameter or equivalent. For minimum cover over drainage pipe see Index No. 205. Pipe arch or elliptical pipe may be required to obtain necessary cover. At minimal cover applications a modified pavement apron is permitted. See PERMISSIBLE PAVEMENT MODIFICATION Index No. 213. For spacing between adjacent pipe end treatments see Index No. 213.

○ Stable material may be required for graded turnouts to private property as directed by the Engineer in accordance with Section 102-B of the Standard Specifications.

○ The 5' pavement at graded connections is not required where there is paved shoulder 4' or more in width. The 5' pavement requirement may be waived for connections serving one or two homes or field entrances with less than 20 trips per day, or 5 trips per hour as approved by permit or by the Engineer, or when not itemized in the plans.

Paved turnouts shall be constructed for all paved connecting facilities. The connecting point will be determined by the Engineer.

Paved turnouts shall be constructed for all business, commercial, industrial or high-volume residential graded connecting facilities. The connecting point shall be 30' from edge of travel way or at R/W line, whichever is less.

Paved turnouts shall be constructed for all connecting facilities over 4000 vehicles per day. The connecting point shall be at the R/W line.

See "Summary Of Geometric Requirements For Turnouts" chart for return radius lengths and supplemental information.

○ Return Radius Point or Place Point.
### Material Types and Thicknesses in Driving Areas for Rural and Urban Connections

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<th>Materials</th>
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<td>Optional Base (See Index No. 514)</td>
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1. Minimum thickness.
2. All materials shall be approved by the Department prior to being placed.
3. Connection structure other than traffic lanes. See Notes 1 and 2 below.
4. Travel way flares (bypass lanes), auxiliary lanes serving more than a single connection, and all median crossovers including their auxiliary lanes and/or transition tapers. See Notes 1 and 2 below.

### Notes
1. The pavement should be structurally adequate to meet the expected traffic loads and should not be less than that shown above, except as approved by the Department for graded connections. Other Department-approved equivalent pavements may be used at the discretion of the Engineer. For additional information see Index No. 514.
2. Auxiliary lanes and their transition tapers shall be the same structure as the abutting travel way pavement thickness or any of the roadway structures tabulated above, whichever is thicker.
3. If an asphalt base course is used for a turnout, its thickness may be increased to match the edge of travel way pavement thickness in lieu of a separate structural course. 6" of Portland cement concrete will be acceptable in lieu of the asphalt base and structural courses. See Notes 4 and 5 below.
4. A structural course is required for flexible pavements when they are used for auxiliary lanes serving more than a single connection.
5. Connections paved with Portland cement concrete shall be Class NS concrete at least 6" thick. The Department may require greater thickness when called for in the plans or stipulated by permit. Materials and construction shall conform with FDOT Standard Specifications Sections 347, 356 and 522.
6. The Department may require other pavement criteria where local conditions warrant.

### PAVEMENT STRUCTURE FOR TURNOUTS AND AUXILIARY LANES

**TABLE 515-1**

### Notes
1. Auxiliary lane pavements and crossover pavements shall be maintained by the Department.
2. Department maintenance of turnout pavement extends 9' from edge of the travel way or to the edge of paved shoulder, whichever is greater. The remainder of any turnout paved area on the right of way shall be maintained by the owner or his authorized agent. As a function of routinely reworking shoulders, the Department may grade and shape existing material on unpaved areas beyond the maintained pavement.
3. Control and maintenance of drainage facilities within the right of way shall be solely the responsibility of the Department, unless specified differently by Department permit.
4. The maintenance and operation of highway lighting, traffic signals, associated equipment, and other necessary devices shall be the responsibility of a public agency.
5. All pavement markings on the State highways, including acceleration and deceleration lane markings, and signing installed for the operation of the State highway shall be maintained by the Department.
6. All signing and marking installed for the operation of the connection (such as stop bars and stop signs for the connection) shall be the responsibility of the permittee.

### Limits of Construction and Maintenance for Rural Connections
G-Grade (%) A: Algebraic Difference In Grades (%) L: Transition (See Tabulated Lengths); A ≤ 14% - Transition Not Required
A > 14% - Straight Or Rounded Transition Required

RURAL TURNOUT PROFILES

Definitions
G-Grade (%) A: Algebraic Difference In Grades (%) L: Transition (See Tabulated Lengths); A ≤ 14% - Transition Not Required
A > 14% - Straight Or Rounded Transition Required

URBAN TURNOUT PROFILES

When restoring or reconstructing existing commercial turnout connections on new construction and reconstruction projects, the maximum 10% commercial grade may be exceeded provided this does not create adverse roadway operational or safety impacts. This shall be approved by the District Design Engineer and supported by documented site specific findings.

STORMWATER RUNOFF AND PROFILE OPTION NOTES

1. Turnouts shall neither cause water to flow on or across the roadway pavement, nor cause water ponding or erosion within the State right of way. On all rural turnouts the transition (L) nearest the roadway shall be sloped or crowned to direct stormwater runoff to the roadside ditch. Inlets, fences or other appropriate runoff control devices shall be constructed as necessary to properly direct and control the stormwater runoff on urban turnouts.

2. The Option 1 profile is intended for locations where roadway, turnout taper and auxiliary lane stormwater runoff volumes are relatively small. The Option 2 profile is intended for locations where runoff volumes are relatively small and/or where there is no roadside ditch.

RECOMMENDED TURNOUT PROFILE TRANSITION LENGTHS (L) (FT.)

ROADWAY PAVEMENT SLOPES AND SLOPES OF ABUTTING RURAL TURNOUT SURFACES (G2)

SUPERELEVATION SECTIONS

TURNOUT PROFILES

2016
DESIGN STANDARDS

TURNOUTS

INDEX
NO.
515

SHEET
NO.
7 of 7

LAST
07/01/12
REVISION

DESCRIPTION:
For Drainage Pipe And Mitered End Section Requirements See Index No. 515.

Existing Graded Connections To Be Paved In Accordance With Index No. 515. Existing Paved Connections To Be Paved With A Structural Course To The Limits Specified For "Rural Turnout Construction" Index No. 515, Unless Otherwise Called For In The Plans Or Directed By Engineer.

See "Summary Of Geometric Requirements For Turnouts" Index No. 515 For Return Radii Lengths.

Payment for feathering friction course is to be included in the unit price for Asphaltic Concrete Friction Course.

Payment for structural course is to be included in roadway resurfacing pay item.

The contract unit price for Turnout Construction includes the cost for excavation and base.

Payment for structural course is to be included in roadway resurfacing pay item.

6. Payment for feathering friction course is to be included in the unit price for Asphaltic Concrete Friction Course placed on the roadway. Feathered areas will not be included in measured quantities. Feathering is not required for FC-5 friction course.

NOTES:

1. Turnouts are to be constructed or resurfaced for low volume (single family, duplex, farm, etc.) residential connections as directed by the Engineer.

2. Turnout construction is not required for low volume residential connections where roadway shoulders are paved.

3. Additional structural strength may be required if heavy truck loads are anticipated.

4. The contract unit price for Turnout Construction includes the cost for excavation and base.

5. Payment for structural course is to be included in roadway resurfacing pay item.

6. Payment for feathering friction course is to be included in the unit price for Asphaltic Concrete Friction Course placed on the roadway. Feathered areas will not be included in measured quantities. Feathering is not required for FC-5 friction course.

GENERAL NOTES:

1. Turnouts are to be constructed or resurfaced for low volume (single family, duplex, farm, etc.) residential connections as directed by the Engineer.

2. Turnout construction is not required for low volume residential connections where roadway shoulders are paved.

3. Additional structural strength may be required if heavy truck loads are anticipated.

4. The contract unit price for Turnout Construction includes the cost for excavation and base.

5. Payment for structural course is to be included in roadway resurfacing pay item.

6. Payment for feathering friction course is to be included in the unit price for Asphaltic Concrete Friction Course placed on the roadway. Feathered areas will not be included in measured quantities. Feathering is not required for FC-5 friction course.
RAISED RUMBLE STRIPS AT INTERSECTIONS

PLAN

INSET A

THERMOPLASTIC SET

ASPHALT SET

SECTION AA FOR THERMOPLASTIC AND ASPHALT RUMBLE STRIP SETS

** May be decreased in urban areas with low operating speeds.

RAISED RUMBLE STRIPS AT INTERSECTIONS

RAISED RUMBLE STRIPS

INDEX

NO.

517

SHEET

1 of 1

REVISED

07/01/16

DESCRIPTION:

2016 DESIGN STANDARDS

RAISED RUMBLE STRIPS

REV NO.

NO.

INDEX

SHEET

1 of 1

REVISED

07/01/16

DESCRIPTION:

2016 DESIGN STANDARDS

RAISED RUMBLE STRIPS
Shoulder ground-in rumble strips shall be constructed on limited access facilities.

2. The skip array is the standard array. The continuous array shall be constructed in advance of bridge ends for a distance of 1000', or back to the gore recovery area for mainline interchange bridges; and constructed at other specific locations as called for in the plans.

3. Ground-in rumble strips are to be constructed in accordance with Section 546 of the Specifications. 

4. When friction course extends more than 8' beyond the edge of the travel lane, the extended friction course shall be bladed off back to the 8' line, prior to rumble strip grinding.

Note: Arrows indicate direction of travel and not the number of lanes nor width of median shoulder pavement.
SHOULDER RUMBLE STRIPS

NTS
RIGID PAVEMENT WITH FLEXIBLE PAVEMENT SHOULDER

NTS
RIGID PAVEMENT WITH RIGID PAVEMENT SHOULDER

Flexible Shoulder Pavement

Edge of Travel Lane

Pavement Edge Strip

Concrete Shoulder Pavement

Profiled Thermoplastic Markings

See INSET A

See INSET B

ISOMETRIC - LONGITUDINAL CUT
INSET A

ISOMETRIC - LONGITUDINAL CUT (RIGID PAVEMENT)
INSET B

Shoulder 12'-0" 12'-0" Shoulder

Lanes

Ground-in Rumble Strips For Flexible Pavement

Shoulder 12'-0" 12'-0" Shoulder

2'-0"

2'-0" 1'-0" 2'-0" 16" 6" 24" 24" 6"
**Rumble Strip (Typ.)**

**CONTINUOUS ARRAY RUMBLE STRIP**
(For All Centerlines)

**SKIP ARRAY RUMBLE STRIP**
(For All Edge Lines)

**GENERAL NOTES:**

1. Construct ground-in rumble strips centered on the proposed centerline or edge line markings in accordance with Specification Section 546.
2. The rumble strip depth detailed on this sheet is for use on dense-graded flexible pavement only.
3. Use the Skip Array Rumble Strip for edge line rumble striping and use the Continuous Array Rumble Strip for center line rumble striping.

**SECTION C-C**
RUMBLE STRIP DEPTH

1/8" Min. TO 1/2" Max.
**STAIR TREAD AND RISER DETAILS**

* The greatest riser height within the flight of steps shall not exceed the smallest by more than 1/2. **

* The greatest tread depth within the flight of steps shall not exceed the smallest by more than 1/8.

1. **Tread**
   - 11' Min.
   - 16' Max.
   - 9" Pitch
   - 12' Max.
   - 4' Min.

**R = 1/2" Max.**

- **Length of Intermediate Landing**
  - 1'-0"

- **#3 Bars @ 12" ctrs. (2" Min. Cover)**
- **#3 Bar Each Nosing (1'/2" Cover)**

**ELEVATION**

- **Length of Landing**
  - 5'-0" Min.
  - 6'-0" Max. between landings

- **Max Landing Slope**
  - 2%

- **Max Landing Cross-Slope**
  - 2%

- **#4 Bars @ 12" ctrs. (2" Min. Cover)**

- **#3 Bars @ 12" ctrs. (2" Min. Cover)**

- **#3 Bar Each Nosing (1'/2" Cover)**

**NOTE:** Provide a maximum of 12 risers between landings.

**SECTION A-A**

- **Cheekwall**
  - 8" Cheekwall
  - 8" Cheekwall

- **Handrail (Typ.)**
- **Landing**
- **Steps**

**SECTION B-B**

- **Cheekwall**
- **Handrail (Typ.)**

**SECTION C-C**

- **Cheekwall**
- **Handrail (Typ.)**
DETAIL A
TWO THRU LANES

SECTION AA

DETAIL B
THREE APPROACH LANES - TWO THRU LANES

EXIT TERMINALS
SINGLE - LANE RAMPS

RAMP TERMINALS

FLEXIBLE PAVEMENT THICKNESS TRANSITION
Shoulder Line

4' Shoulder Pavt.

10' Shoulder Pavt.

2' Shoulder Pavt.

Pavement

2' Shoulder Pavt.

Shoulder Gutter

(See General Note No. 4)

Traffic Condition "C"

Width Corresponds To Case II Traffic Condition "B"

Ramp Width Case I Traffic Condition "C"

Flexible Pavement Thickness Transition

Flexible Pavement

See Inset Below For Shoulders With Gutter

Shoulder Gutter

(See General Note No. 4)

Width Corresponds To Case II Traffic Condition "B"

Ramp Width Case I Traffic Condition "C"

Flexible Pavement

See Inset Right For Shoulders Without Gutter

GENERAL NOTES

1. Taper-Type exit and entrance terminals as detailed shall not be used on ramps for which a speed of 50 MPH or greater cannot be maintained. For such ramps, parallel deceleration and acceleration lanes shall be used in place of tapers with lengths set according to AASHTO.

2. a. PCC Pavement Projects:
   Where shoulder pavement adjacent to shoulder gutter is less than 6' wide, it shall be identical to the adjacent roadway pavement beginning with the transverse joint nearest the point of 6' width.
   b. Flexible Pavement Projects:
   Where shoulder pavement used in conjunction with shoulder gutter is less than 6' uniform width, it shall be identical to the adjacent roadway pavement.

3. For concrete pavement joint details and layouts at entrance and exit ramp terminals see Index No. 305.

4. Shoulder gutter applications will be determined by drainage design.

INSET
THREE THRU LANES - APPROACH AUXILIARY LANE

EXIT TERMINALS

TWO-LANE RAMPS

SECTION WHEN SHOULDER GUTTER USED

SECTION AA
ACCELERATION LANE WITH SHOULDER GUTTER

ACCELERATION LANE WITHOUT SHOULDER GUTTER

DECELERATION LANE WITH SHOULDER GUTTER

DECELERATION LANE WITHOUT SHOULDER GUTTER

SHOULDER TREATMENT

AT SPEED CHANGE LANES AT FREEWAY RAMP TERMINALS

FREEWAY RAMP TERMINALS
For Median Widths Greater Than 22
Curb Is To Be Used Only As Required
For Channelization Of Traffic

See Index No. 301 For Deceleration Length (L1) Queue Length

SIGNALIZED OR UNSIGNALIZED
LEFT TURN CONTROL

RAMP TERMINALS ON CURVES

UN Signalized

ENTRANCES

see drawing 0

Standard cross road exit terminal. To be used when roadway alignment is tangent. 

Parallel cross road exit terminals. Recommended when exit is partially hidden over the crest of vertical curve or when turning roadway speed is less than 60% of the thru roadway speed, or for the combinations of horizontal alignment shown elsewhere on this sheet.

FOOTNOTES:

W Normal shoulder pavement width.

* Adjust for grades if greater than 2% (See Exhibit 10-71, AASHTO).

RAMP TERMINALS

CROSSROAD TERMINALS

UN Signalized

ENTRANCES

Standard cross road entrance terminals. To be used when roadway alignment is tangent and no bridges are located within the merging lane.

Parallel cross road entrance terminals. Recommended when a bridge is located within the merging lane, turning roadway speed is less than 60% of thru roadway speed or for the combinations of horizontal alignment shown elsewhere on this sheet.

See Drawing 0

UN Signalized

Exits

See Drawing 0

Standard cross road exit terminal. To be used when roadway alignment is tangent.

Parallel cross road exit terminals. Recommended when exit is partially hidden over the crest of vertical curve or when turning roadway speed is less than 60% of thru roadway speed, or for the combinations of horizontal alignment shown elsewhere on this sheet.

See Drawing 0

UN Signalized

Exits

NOTE: Ramp terminals on curves should be avoided when possible.
4-LANE WITH TWO-WAY LEFT-TURN LANES

<table>
<thead>
<tr>
<th>DESIGN SPEED (MPH)</th>
<th>( T_d ) (FEET)</th>
<th>( T_a ) (FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(&lt;30)</td>
<td>1:25</td>
<td>1:30</td>
</tr>
<tr>
<td>30-45</td>
<td>50' (± 1:4)</td>
<td>1:40</td>
</tr>
</tbody>
</table>

Note: For locations with relocatable control poles minimum taper rates for lane drop \( (T_a) \) will be 1:20.

GENERAL NOTE

1. For pavement markings refer to Index No. 17346.

4-LANE UNDIVIDED FLARED - SYMMETRICAL

INTERSECTIONTurns AND STORAGE
**LEFT SIDE WIDENING**

**CENTERED WIDENING**

**RIGHT SIDE WIDENING**

---

**FLARED & PAINTED LEFT TURNS FOR 2-LANE 2-WAY ROADWAYS**

<table>
<thead>
<tr>
<th>Design Speed (mph)</th>
<th>L_d (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>180</td>
</tr>
<tr>
<td>40</td>
<td>200</td>
</tr>
<tr>
<td>50</td>
<td>220</td>
</tr>
<tr>
<td>60</td>
<td>240</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design Speed (mph)</th>
<th>L_d (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>180</td>
</tr>
<tr>
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</tr>
<tr>
<td>50</td>
<td>220</td>
</tr>
<tr>
<td>60</td>
<td>240</td>
</tr>
</tbody>
</table>
4-LANE DIVIDED TO 4-LANE UNDIVIDED

\[ L = \frac{WS}{2} \geq 45 \text{ mph} \]
\[ L = \frac{WS'}{120} < 45 \text{ mph} \]

4-LANE DIVIDED TO 2-LANE UNDIVIDED

\[ L = 125 \times 45 \text{ mph} \]
\[ L = \frac{WS}{5} < 45 \text{ mph} \]

4-LANE UNDIVIDED TO 2-LANE UNDIVIDED

LANE DIVERGENCE AND CONVERGENCE FOR CENTERED ROADWAYS

\[ S = \text{Design speed (mph)} \]
\[ L = 12S \geq 45 \text{ mph} \]
\[ L = \frac{S^2}{5} < 45 \text{ mph} \]
Connect To Existing Pavement

CONNECTING FLARE WITH PAVED SHOULDERS TO EXISTING ROADWAY WITHOUT PAVED SHOULDERS

CONNECTING ROADWAY WITH PAVED SHOULDERS TO EXISTING SYMMETRICAL FLARE WITHOUT PAVED SHOULDERS

CONNECTING ROADWAY WITH PAVED SHOULDERS TO EXISTING ASYMMETRICAL FLARE WITHOUT PAVED SHOULDERS

PAVED SHOULDER TREATMENT AT TRANSITIONS AND CONNECTIONS

FLARED - PAVED SHOULDERS

S=Design speed (mph)
LEFT ROADWAY CENTERED ON APPROACH ROADWAY

TWO LANE TO FOUR LANE TRANSITION

1. The transition details as represented on sheets 5 thru 8 are intended as guidelines only. The transition lengths, curve data, nose radii and offsets are valid only for tangent alignment, design speeds ≤ 45 mph, the median widths and lane widths shown.

2. Approach lane departures (Δ = 5°) are suitable for design speeds up to 60 mph. Interior curves (D = 1°) are suitable for normal crown for design speeds up to 50 mph. Merging curves (D ≥ 5°) will require superelevation.

3. The geometrics of these schemes are associated with the standard subsectional spacing for side roads, but in any case will require modification to accommodate side road location, multilane and/or divided side roads, oblique side roads, crossover widths, storage and speed change lane requirements, and, other related features.
LEFT ROADWAY CENTERED ON THRU ROADWAY

FOUR LANE TO TWO LANE TRANSITION
RIGHT ROADWAY CENTERED ON APPROACH ROADWAY

TWO LANE TO FOUR LANE TRANSITION

\[ L = WS \text{ for speeds } = 45 \text{ mph} \]
\[ L = \frac{WS^2}{S^2} \text{ for speeds } \leq 40 \text{ mph} \]

Where:
\[ W = \text{Width of lateral transition in feet.} \]
\[ S = \text{Design speed.} \]
RIGHT ROADWAY CENTERED ON THRU ROADWAY

FOUR LANE TO TWO LANE TRANSITION

\( L = WS \) for speeds \( \geq 45 \) mph
\( L = \frac{WS^2}{60} \) for speeds \( \leq 40 \) mph

Where:

\( W = \) Width of lateral transition in feet
\( S = \) Design speed.
NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for semi-trailer inside tracking and for 4' minimum clearance between trucks making opposing movement. The depicted design only applies where roads and streets intersect at 90° to the mainline and have centerlines common with the opposing road or street. Swept paths are by AutoTURN 4.0 for the AASHTO 2001 SU and WB-40 tractor-semi-trailer.

SWEPT PATH LEGEND:

**WB 40**  
**SU**
NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for semi-trailer inside tracking and for minimum clearance between trucks making opposing movement. The depicted design only applies where roads and streets intersect at 90° to the mainline and have centrines common with the opposing road or street. Swept paths are by AutoTURN 4.0 for the AASHTO 2001 WB-50 tractor-semi-trailer.

40' MEDIAN  4-LANE DIVIDED • PARALLEL TURN BAY • 2001 AASHTO WB-50
NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for semi-trailer inside tracking and for 4' minimum clearance between trucks making opposing movement. The depicted design only applies where roads and streets intersect at 90° to the mainline and have centerlines common with the opposing road or street. Swept paths are by AutoTURN 4.0 for the AASHTO 2001 SU and WB-40 tractor-semitrailer.

NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for semi-trailer inside tracking and for 4' minimum clearance between trucks making opposing movement. The depicted design only applies where roads and streets intersect at 90° to the mainline and have centerlines common with the opposing road or street. Swept paths are by AutoTURN 4.0 for the AASHTO 2001 SU and WB-40 tractor-semitrailer.

SWEPT PATH LEGEND:

WB-40 Expected In Storage

* Add 70' For Each Additional WB-40 Expected In Storage

40' MEDIAN • 4-LANE DIVIDED • TAPERED TURN BAY • 2001 AASHTO SU & WB-40

DIRECTIONAL MEDIAN OPENINGS

INDEX NO. 527

SHEET NO. 3 of 3
**NOTES**

Keynotes on sheet 2.

**FLOOR**

6' reinf. concrete slab
w/ WWR 6x6-W1.4xW1.4

Drop footing at slab
perimeter & interior posts see keynotes.

Harden & broom finish slab surface.

**STRUCTURE**

Posts: 8 x 8 PT

Beams: 4 x 6 PT

Framing: 4x PT as described.

Misc members: 1x and 2x as described.

**ROOF**

3"x6" T&G wood decking.

30# asphalt Imregnated fiberglass felt
underlayment.

Standing seam metal roof (24 GA Steel or
0.032 Alum.) w/ Kynar 500 finish.

Structure, decking and roofing shall be
designed to withstand 130 mph wind load.

**BUILDING CODE**

Picnic pavilions shall be constructed
according to the requirements of the
appropriate sections of the "Florida

**PICNIC TABLES**

Picnic tables and benches shall be 8"x8"
with heavy galvanized pipe frames and
recycled plastic wood seats and table tops.

All tables shall be of walk thru design
suitable for exterior locations. Paveions
shall meet the requirements of the
Americans With Disabilities Act (ADA)
accessibility guidelines. A minimum of 20%
of picnic tables to meet ADA.
KEYNOTES ON SHEET 2.

CONCRETE
Concrete: FDOT Class 2.
Reinforcing Bars: ASTM A615, Grade 60.
Vapor Barrier: Black 6-Mil Polyethylene.

STEELE
Galvanized Steel Plate: Steel Plate ASTM A36 or A509.
Provide galvanizing in accordance with the requirements of ASTM A123.
Galvanized Fasteners: High-Strength bolts and nuts, ASTM A125 in accordance with Specification Section 962.
Galvanize shapes after fabrication, make field repairs to galvanizing in accordance with Specification Section 562.

WOOD
Comply with American Institute For Timber Construction AITC 108, “Standard For Heavy Timber Construction.”
For solid wood decking, comply with AITC 112, “Standard For Tongue And Groove Heavy Timber Standard.”
Species: Douglas Fir, Hem-fir, or Southern Pine, at fabricator’s option.
Preservative Treatment: Pressure treat fabricated members with waterborne solution for above ground use, complying with AWPA U1, category UC3B above ground exposed.
Wood Decking: Predrill decking at 30” centers for lateral spiking to adjacent units. Spikes to be 8” spikes galvanized common.

SPECIFICATIONS

CONCRETE
Concrete: FDOT Class 2.
Reinforcing Bars: ASTM A615, Grade 60.
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Wood Decking: Predrill decking at 30” centers for lateral spiking to adjacent units. Spikes to be 8” spikes galvanized common.
Mailbox production standards, lists of approved manufacturers and suppliers shall be included in the contract unit price for Mailbox, Each. The Contractor shall dispose of mailboxes and supports in areas provided by him.

Reuse of existing mailboxes by the Contractor will not be a requirement under this design standard. The Contractor shall furnish and install one mailbox in accordance with this design standard at each mail patron delivery location and maintain the box throughout the contract period. The Contractor shall apply box numbers to each patron box in accordance with identification specifications of the Domestic Mail Manual of the U. S. Postal Service, where local street names and house numbers are authorized by the Postmaster as a postal address, the Contractor shall inscribe the house number on the box; if the box is located on a different street from the patrons residence, the Contractor shall inscribe the street name and house number on the box.

The Contractor shall coordinate removal of the patrons existing mailboxes. Immediately after installing the new mailboxes the Contractor must notify each patron by Certified Mail that removal of the existing mailboxes must be accomplished in 21 days after receipt of notice. Patrons shall have the option of removing their existing mailboxes or having the mailboxes in place for removal by the Contractor. Removal by the Contractor shall include in the contract unit price for Mailbox, Each. The Contractor shall dispose of mailboxes and supports in areas provided by him.

Reuse of existing mailboxes by the Contractor will not be required under any construction project. However, where an existing mailbox meets the design requirements of this standard and is structurally and functionally sound, the Contractor at his option may elect to reuse the existing mailbox in lieu of constructing a new mailbox. Any use of existing mailboxes must be approved by the Engineer.

Mailboxes shall be located on the right-hand side of the roadway in the direction of the delivery route, except on one-way roads and streets where they may be placed on the left-hand side.

Mailboxes on rural highways shall be set with the roadside face of the box, off-side from the edge of the traveled way a minimum distance of the greater of the following:

- Shoulder width plus 8' to 12'
- 10 ft for ADT over 10,000 vpd
- 10 ft for ADT 100 to 10,000 vpd
- 6 ft for ADT under 100 vpd
- 2' for speed and ADT under 100 vpd

When a mailbox is installed within the limits of guardrail it should be placed behind the guardrail whenever practical.

Mailboxes on curved highways, roads and streets shall be set with the face of the box between 6' and 12' back of curb. If the sidewalk abuts the curb or if an unusual condition exists which makes it difficult or impractical to install or serve boxes at the curb, the Contractor with concurrence of the local postal authority may be permitted to install all mailboxes at the back edge of the sidewalk, where they can be served by the carrier from the sidewalk.

Mailboxes shall be set with the bottom of the box between 42" and 48" above the street surface of the sidewalk, where they can be served by the carrier from the sidewalk.

Support posts shall not be fitted nor installed with surface mount base plates.

At driveway entrances mailboxes shall be placed on the far side of the driveway in the direction of the delivery route. At intersecting roads mailboxes shall be located 100' or more from the centerline of the intersecting road on the far side in the direction of the delivery route, with the distance increased to 200' when the route volume exceeds 400 vehicles per day.

Wood and steel support posts for both single and double mailbox mountings shall be embedded no more than 24" into the ground.

Concrete, block, brick, stone or other rigid foundation structure or entasement, either above or below the shoulder groundline, will not be permitted for mailboxes on rural highways. On urban roads and streets where mailboxes support posts are set within rigid pavement back of curb, the support posts shall be separated from the pavement by a minimum of 7" of expansion material.

Support posts shall not be installed with surface mount base plates.

Steel support posts shall have an external finish equal to or better than two coats of weather resistant, air dried or baked, paint or enamel. Surface(s) shall be cleaned of all loose scale prior to finishing. The Postal Service prefers that posts be painted white, but other colors may be used when approved by the Engineer. Where galvanized posts are used painting is not required.

Mounting brackets, plates, platforms, shelfs and accessory hardware surface finishes are to be suited to support post finish.

The location of NDCBUs is the sole responsibility of the Postmaster for the delivery route under consideration.

Neighborhood Delivery and Collection Box Units (NDCBUs) are a specialized multiple mailbox installation that must be located outside the highway and street clear zones. The location of NDCBUs is the sole responsibility of the Postmaster for the delivery route under consideration.

Lightweight newspaper receptacles may be mounted below the mailbox on the side of the support post in conformance with the USPS Domestic Mail Manual. The mail patron shall be responsible for newspaper receptacle installation and maintenance.

Wood and steel support posts for both single and double mailbox mountings shall be embedded no more than 24" into the ground.
# Description:

- **Nominal 2" Ø (2.375"") Steel Pipe Schedule 40 or Resistance Welded, ASTM A569 & A669, Min. 50,000 psi Yield Strength.** See General Notes for Finish Requirements.

## Steel Pipe and Wood Support Posts

- **Steel Shelf**: 1 Nut (2 Req'd), 2 Washers, 1 Lockwasher, "Hex Bolt, 3/16" x 4 3/8"
- **Steel Platform**: 1 Nut (2 Req'd), 2 Washers, 1 Lockwasher, "Hex Bolt, 3/16" x 4 3/8"
- **Steel Anti-Twist Plate (Flange To Inside)**
- **Steel Clamp**: 1 Lockwasher, 1 Nut (6 Req'd)
- **Muffler Clamp**: 1 Lockwasher, 1 Nut (6 Req'd)

## Dimensions

- **Top View**: Various dimensions indicated for different parts of the structure.

## Notes

- **Note**: See General Notes for finish requirements.
**TRACTOR CROSSINGS**

**REINFORCED CONCRETE**

**TYPE A**

**SECTION AA**

**Note:** Class I concrete is to be used unless otherwise noted in plans or special provisions.

**GENERAL NOTES**

1. Tractor crossing shall be paid for under the contract unit price for Tractor Crossing, EA.

**TREATED TIMBER**

**TYPE B**

**PLAN**

**SECTION BB**

**Note:** Tractor crossing to be constructed to match pavement cross slope.

The number of mats required will vary with the pavement width. A sufficient number of mats will be used so that the tractor crossing will extend a minimum of four feet (4') beyond roadway shoulders.

**REV DESCRIPTION:**

**INDEX NO.** 535

**SHEET NO.** 1 of 1

**REVISION NO.** 01/01/00

**DESCRIPTION:**

**2016 DESIGN STANDARDS**

**TRACTOR CROSSINGS**
Threaded or Socket Type Cap. Stamp or label with Installation Date, Location and Identification Number. (when Socket Type Cap is used drill 5/8" diameter holes and secure with wire. Threaded Type Caps to be hand tightened.)

2½ Steel or PVC Schedule 40 Pipe (Casing). Casing to be installed in 5' sections, as required. Threaded or Socket Type Fittings (PVC Socket Type shown) PVC casing sections not permitted below steel sections

1" Iron Pipe (Marker) lower pipe section to be 4'-6" in length. Added pipe sections to be 5'-0" in length.

Iron Pipe unthreaded this end

Oakum Seal

Iron Pipe Cap

2"x6" Treated Timber (See Detail Above)

1/2 Dia. Bolt, Nut & Washer. Deform thread or use Jam Nut

1/2" Dia. x 1 1/2" Hex Head Bolt, Nut & Washer. Deform thread or use Jam Nut

Threaded or Socket Type Cap.

Casing to be installed in 5' sections, as required. Threaded or Socket Type Fittings (PVC Socket Type shown) PVC casing sections not permitted below steel sections

Coupling (As Required)

Cement when Socket Type Coupling used

Iron Coupling (As Required)

Top Of Surcharge

Fill Within 2' Of Stem Shall Be Compacted By Hand To Required Density

Top Of Strata To Be Surcharged

Plate To Be Sealed (Level) After Clearing And Grubbing & Demucking Operations And Prior To Placing First Fill Lift

NOTES:

1. Elevation of the top of each length of marker pipe shall be determined as soon as it is installed and also immediately before the next length of marker pipe is added.

2. Settlement plate locations shall be flagged and protected from construction vehicles and equipment. If settlement plates are disturbed, they shall be replaced in kind.

3. Oakum used to construct seal should not have a mesh covering (plastic or other synthetic material).

4. The settlement plates shall be paid for under the contract unit price for Settlement Plate Assembly, AS.

STEM AND PLATE OPTIONS

INSTALLATION
**1" - 3 1/2" CALIPER TREE PLANTING**

1. All dimensions 6" and less are exaggerated for illustrative purposes only.
2. Plant containers shall be removed prior to planting. If plants are not container grown, remove a minimum of the top 3/4 of burlap, fabric, or wire mesh. Never lift or handle the tree by the trunk.
3. The uppermost root on all trees shall be covered by less than 1" of soil. Use hand tools to carefully remove all excess soil. The top of root ball shall be set 1"-2" above finish grade and set plumb to the horizon. If planting pit is too deep, remove the tree and firmily pack additional soil in the bottom of the planting pit to raise the rootball. After positioning the tree in the planting pit, slice through rootballs with 3 or 4 vertical slices (top to bottom) equally distributed around the tree.
4. Backfill shall be loosened existing soil. Remove rocks, sticks, or other deleterious material greater than 1" in any direction prior to backfilling. Water and tamp to remove air pockets. If existing soils contain excessive sand, clay, or other material not conducive to proper plant growth, contact Engineer prior to planting.
5. Soil rings shall be constructed of existing soil at the outer edge of the planting pit, with a height of 3' and gently sloping sides. Do not pile soil on top of rootball.
6. Mulch shall be a 3' deep layer placed to the edge of the trunk flare, around the base of shrub, or solidly around groundcover. Never pile mulch against the tree trunk.
7. Straps shall be minimum 1" wide nylon or polypropylene. All wood stakes or anchors shall be located beyond the edge of soil ring and located below finished grade, unless otherwise specified.
8. Sabal Palms may be hurricane cut. All other palms must have fronds tied with biodegradable twine. Palm trunks shall have no burn marks, scars, or sanding.
9. All dimensions provided for wood materials are nominal.
10. When a permanent, subsurface, or drip irrigation system is provided, a soil ring is not required. Mulch to edge of planting pit.
11. Alternate tree bracing and guying systems approved by the Engineer may be used in lieu of the tree bracing and guying methods detailed on the Index. Alternate tree protection systems approved by the Engineer may be used in lieu of the tree protection barricade detailed on the index.
12. Remove aboveground guying systems at the end of the establishment period.

**GENERAL NOTES:**

1. Straps shall be minimum 1" wide nylon or polypropylene. All wood stakes or anchors shall be located beyond the edge of soil ring and located below finished grade, unless otherwise specified.
2. Sabal Palms may be hurricane cut. All other palms must have fronds tied with biodegradable twine. Palm trunks shall have no burn marks, scars, or sanding.
3. All dimensions provided for wood materials are nominal.
4. When a permanent, subsurface, or drip irrigation system is provided, a soil ring is not required. Mulch to edge of planting pit.
5. Alternate tree bracing and guying systems approved by the Engineer may be used in lieu of the tree bracing and guying methods detailed on the Index. Alternate tree protection systems approved by the Engineer may be used in lieu of the tree protection barricade detailed on the index.
6. Remove aboveground guying systems at the end of the establishment period.
CABBAGE PALM PLANTING
FOR UP TO 24' CLEAR TRUNK

WOOD BATTEN DETAIL

NOTE: For all other palms, use detail provided by landscape architect in contract plans.

MULTI-TRUNK TREE PLANTING
**TREE PROTECTION BARRICADE**

- **Wood 2 x 4 Posts**
- **Wood 1 x 4 Stringers, Nail Wood Stringers Securely To Wood Posts.**
- **Tree Trunk**

*Dimension Varies Per Critical Protection Zone*

**GROUND COVER/SHRUB PLANTING ON SLOPE**

- **Shrub Or Ground Cover Planting**
- **Bedline Or Edge Of Sidewalk**

- **Maximum Mature Maintained Spread Of Plants**
- **Spacing Per Plans**

**GROUND COVER/SHRUB LAYOUT DETAIL**

- **2 x 4 Minimum Posts**
- **12 Maximum Spacing**
- **6 Minimum Height**
- **2 Minimum Depth**
- **Existing Undisturbed Soil**

**NOTES:**
- Critical Protection Zone: The Area Surrounding A Tree Within A Circle Described By A Radius Of One Foot For Each Inch Of The Tree Trunk Diameter At 5' Above Finished Grade. For Groups Of Trees, Place Barricades Between Trees And Construction Activity.
- Tree Protection Barricades Shall Be Located To Protect A Minimum Of 75% Of The Critical Protection Zone.

**GROUND COVER/SHRUB PLANTING**

- **Existing Soil**
- **Existing Soil Backfill**
- **Planting Pit 2 Times Width Of Rootball**

**NOTE:** Slope Provided As Rise:Run.
1. The information shown on this index is intended solely for the purpose of clear sight development and maintenance at intersecting highways, roads, streets, and driveways, and is not intended to be used to establish roadway and roadside safety except as related to clear sight corridors. An analysis of sight distance shall be documented for all intersections.

2. For the purpose of this Index, Minor Road is defined as all intersecting highways, roads, streets, and driveways.

3. Details are based on the AASHTO ‘A Policy On Geometric Design Of Highways And Streets, 2007, CHAPTER 9, INTERSECTION SIGHT DISTANCE, CASES A and B, and Department practices for channelized median openings (left turns from major roads).

4. The minimum driver eye lookout of 14.5' from the edge of the traveled way may be adjusted on any intersection leg only when justified by a documented, site specific field study of vehicle stopping position and driver eye position.

5. For SIGNALIZED INTERSECTIONS sight distances should be developed based on AASHTO ‘Case D-Intersections With Traffic Signal Control’. At signalized intersections, the first sight distance on one approach should be visible to the driver of the first vehicle stopped on each of the other approaches. Left turning vehicles should have sufficient sight distance to select gaps in oncoming traffic and complete left turns. Apart from these sight conditions, there are generally no other approach or departure sight distances needed for signalized intersections. However, if the traffic signal is to be placed on a two-way flashing operation (i.e. flashing yellow on the major road approaches and flashing red on the minor road approaches) under off peak or nighttime conditions, then the appropriate departure sight triangles for Case B, both to the left and to the right, should be provided for the minor road approaches. In addition, if right turns on a red signal are to be permitted from any approach, then the appropriate departure sight triangle to the left for Case B2 should be provided to accommodate right turns from that approach.

6. Where curvature, superelevation, adverse sight profiles or other conditions preclude the use of standard tree sizes and spacing, plans showing the proposed alignment and design for refreshment or shading purposes must be documented and the size and location of trees in medians detailed in the plans.

7. Intersection sight distance values are provided for Passenger Vehicles, SU Vehicles and Combination Vehicles. Intersection sight distance based on the Passenger Vehicle is suitable for most intersections. Where substantial volumes of heavy vehicles enter the major road, such as from ramp terminals with stop control or roadways serving truck terminals, the use of tabulated values for SU Vehicles or Combination Vehicles should be considered.

---

**DESIGN NOTES**

1. Details apply to both rural and urban intersections under stop sign control or flashing beacon control. For full signal controlled intersections see Design Note No 4. At intersections listed in the Department’s High Crash Intersection Report, designers shall give attention to keeping to a minimum, objects that distract or affect sight distance.

2. Sight distance D applies to normal and skewed intersections (intersecting angles between 60° and 120°), and where vertical and/or horizontal curves are not present. Sight distance D’ is measured along the major road from the center of the intersection to the center of the near approach lane (right or left) of the major road. Distances D₁ and D₂ are measured from the centerline of the entrance lane of the minor road to the center of the near approach lane (right or left) of the major road. Distance D₃ is measured from the centerline of the entrance lane of the minor road to a point on the median clear zone limit or horizontal clearance limit for the far side road of the major road.

3. A. The limits of clear sight define a corridor throughout which a clear sight window must be preserved. See WINDOW DETAIL, Sheet 2.

**GENERAL NOTES**

4. Clear sight must be provided between vehicles at intersection stop locations, and vehicles on the major road within dimension D.

5. Since observations are made in both directions along the line of sight, the reference datum between roadways is 3.4’ above respective pavements.

6. Barrier systems within intersection sight corridors, where penetration into the sight window might occur, shall be located to provide the least adverse affect practical.

7. The corridor defined by the limits of clear sight is a restricted planting area. Drivers of vehicles on the intersecting roads and vehicles on the major road must be able to see each other clearly throughout the limits of D₁ and D₂. If in the Engineer’s judgement, landcaping interferes with the line of sight corridor prescribed by these standards the Engineer may rearrange, relocate or eliminate plantings. Plants within the restricted areas are limited to selections as follows:

---

**DESIGN STANDARDS**

**DESIGN STANDARDS**


2. Minimum diameter of 18' can be installed with sod; pavers; gravel, mulch; ground covers or other Department-approved material. The clear sight window must be in conformance with the WINDOW DETAIL modified to attain the height requirements listed in ‘Ground Covers’ above.

3. Size and spacing shall conform to the Tree Spacing Table.

4. Requirements for placement within medians at median openings and at unsignalized and signalized intersections:


   b. Where left turns from the major road are permitted, no trees shall be located within the distance D₂. Sheet 2 of 6; and not less than the distances called for in (c) or (d), as applicable.

   c. For safety, these additional setbacks are required:

      1. where no left turn lane is present, size and spacing shall conform to the Tree Spacing Table. No trees shall be permitted within 100’ of the restricted median nose (measured from the edge of pavement).

      2. Where left turn lanes are present, the following requirements apply:

         a. For low speed facilities (design speed less than 50 mph), size and spacing shall conform to the Tree Spacing Table. No trees shall be permitted within 100’ of the restricted median nose (measured from the edge of pavement).

         b. For high speed facilities (design speed 50 mph or greater), no trees shall be permitted within 200’ of the restricted median nose. Beyond this limit, size and spacing shall conform to the Tree Spacing Table.

---

**DESIGN STANDARDS**

**DESIGN STANDARDS**

1. Trees and palms shall be placed so as to be clearly visible to the driver of the first vehicle stopped at the stop bar located when viewed by the mainline driver beginning at distance ‘d’ (see SHADOW DIAGRAM, Sheet 2).

2. Trees with diameters ≤ 11’1” spaced at intervals providing a 2 second full view of entering vehicle at stop bar location when viewed by the mainline driver beginning at distance ‘d’ (see PERCEPTION DIAGRAM, Sheet 2).

3. Trees with diameters ≤ 11” intermixed with trees with diameters > 11” 18’ apart to be spaced on trees with diameters > 11’1” spaced at 18’.

4. For any other conditions the tree sizes, spacings and locations shall be detailed in the plans; see Design Note 5.

---

**DESIGN STANDARDS**

**DESIGN STANDARDS**

1. Details apply to both rural and urban intersections under stop sign control or flashing beacon control. For full signal controlled intersections see Design Note No 4. At intersections listed in the Department’s High Crash Intersection Report, designers shall give attention to keeping to a minimum, objects that distract or affect sight distance.

2. Sight distance D applies to normal and skewed intersections (intersecting angles between 60° and 120°), and where vertical and/or horizontal curves are not present. Sight distance D’ is measured along the major road from the center of the intersection to the center of the near approach lane (right or left) of the major road. Distances D₁ and D₂ are measured from the centerline of the entrance lane of the minor road to the center of the near approach lane (right or left) of the major road. Distance D₃ is measured from the centerline of the entrance lane of the minor road to a point on the median clear zone limit or horizontal clearance limit for the far side road of the major road.

3. A. The limits of clear sight define a corridor throughout which a clear sight window must be preserved. See WINDOW DETAIL, Sheet 2.

**GENERAL NOTES**

4. Clear sight must be provided between vehicles at intersection stop locations, and vehicles on the major road within dimension D.

5. Since observations are made in both directions along the line of sight, the reference datum between roadways is 3.4’ above respective pavements.

6. Barrier systems within intersection sight corridors, where penetration into the sight window might occur, shall be located to provide the least adverse affect practical.

7. The corridor defined by the limits of clear sight is a restricted planting area. Drivers of vehicles on the intersecting roads and vehicles on the major road must be able to see each other clearly throughout the limits of D₁ and D₂. If in the Engineer’s judgement, landcaping interferes with the line of sight corridor prescribed by these standards the Engineer may rearrange, relocate or eliminate plantings. Plants within the restricted areas are limited to selections as follows:

---

**DESIGN STANDARDS**

**DESIGN STANDARDS**


2. Where left turns from the major road are permitted, no trees shall be located within the distance D₂. Sheet 2 of 6; and not less than the distances called for in (c) or (d), as applicable.

3. For safety, these additional setbacks are required:

   1. Where no left turn lane is present, size and spacing shall conform to the Tree Spacing Table. No trees shall be permitted within 100’ of the restricted median nose (measured from the edge of pavement).

   2. Where left turn lanes are present, the following requirements apply:

      a. For low speed facilities (design speed less than 50 mph), size and spacing shall conform to the Tree Spacing Table. No trees shall be permitted within 100’ of the restricted median nose (measured from the edge of pavement).

      b. For high speed facilities (design speed 50 mph or greater), no trees shall be permitted within 200’ of the restricted median nose. Beyond this limit, size and spacing shall conform to the Tree Spacing Table.

---

**DESIGN STANDARDS**

**DESIGN STANDARDS**

1. Trees and palms shall be placed so as to be clearly visible to the driver of the first vehicle stopped at the stop bar located when viewed by the mainline driver beginning at distance ‘d’ (see SHADOW DIAGRAM, Sheet 2).

2. Trees with diameters ≤ 11’1” spaced at intervals providing a 2 second full view of entering vehicle at stop bar location when viewed by the mainline driver beginning at distance ‘d’ (see PERCEPTION DIAGRAM, Sheet 2).

3. Trees with diameters ≤ 11” intermixed with trees with diameters > 11” 18’ apart to be spaced on trees with diameters > 11’1” spaced at 18’.

4. For any other conditions the tree sizes, spacings and locations shall be detailed in the plans; see Design Note 5.
**SIGHT DISTANCE AT INTERSECTIONS**

**DRAWING NO.**

**SCALE**

**DATE**

**DESIGNER**

**LAYOUT**

**REVIEW**

**CHECK**

**REV.**

**ENGINEER**

**DESIGN STANDARDS**

**INDEX NO.**

**SHEET NO.**

**DESCRIPTION:**

**NOTES:**

* Lines for 'Limit of Clear Sight' are opposite hand when major road near lane traffic moving left (e.g., one-way left).

---

**CHANNELIZED DIRECTIONAL MEDIAN OPENINGS**

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<th>2 Lanes Crossed</th>
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**NOTES:**

* The dh values in this table were established by the method referenced in Design Note 2, and are applicable to urban, predominantly curbed roadways with design speeds of 45 mph or less and meeting the restricted conditions defined in Index No. 700. For horizontal clearance (HC) of 6', the values for dh may be determined by the equation dh = dh (i/w+12). For roadways with nonrestricted conditions, dh and dh should be based on the geometry for the left turn storage and on clear zone widths (See Index No. 700).

For wide medians where the turning vehicle can approach the through lanes at or near 90°, use dh values from tables on sheets 5 or 6. (The clear sight line origin is assumed to be 14'-6" from the edge of the near lane.)
SIGHT DISTANCE AT INTERSECTIONS

4 LANE UNDIVIDED

PICTORIAL

Areas Free Of Sight Obstructions
NOTE: See Sheet 2 for intersecting roadway origin of clear sight and quadrant corner clips.
**MEDIAN 22' OR LESS**

<table>
<thead>
<tr>
<th>Design Speed (m)</th>
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**SINGLE-UNIT TRUCK (SU)**

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**INTERMEDIATE SEMI-TRAILERS (WB-40 & WB-50)**

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**NOTES FOR 4-LANE DIVIDED ROADWAY**

1. See Sheet 2 for origin of clear sight line on the minor road.
2. Values shown in the tables are the governing (controlling) sight distances calculated based on AASHTO Case B – Intersection with Stop Control on the Minor Road.

**LICENSE**

Areas Free Of Sight Obstructions

---

**MEDIAN 30' OR LESS**

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**MEDIAN 35'-50'**

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**LEGEND**

- **V** - For Restricted Conditions
- **CZ** - For Nonrestricted Conditions

**INSET A**

**Vehicle Type**

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**SIGHT DISTANCES (d) & (d_r) AND RELATED DISTANCES (d_L, d_v, d_m & d_vL) (FEET)**

**4 LANE DIVIDED ROADWAY**
MEDIAN 22' OR LESS

<table>
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MEDIAN 25-64' MEDIAN

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SIGHT DISTANCES (d), (dv), (dx) AND RELATED DISTANCES (dL, dL, dm & dL) (FEET)

PLAN

PICTORIAL

Where the Median is Sufficiently Wide for the Design Vehicle To Pause in the Median (Vehicle Length Plus 6' Min.) the Clear Line of Sight To the Right (dL) is Measured From the Vehicle Where the Median is Sufficiently Wide for the Design Vehicle To Pause in the Median (Vehicle Length Plus 6' Min.) the Clear Line of Sight To the Right (dL) is Measured From the Vehicle where the Median is Sufficiently Wide for the Design Vehicle To Pause in the Median (Vehicle Length Plus 6' Min.) the Clear Line of Sight To the Right (dL) is Measured From the Vehicle Paused Location, i.e., Not From the Cross Road Inspector Position. Distances dL & dL Do Not Apply.

INSET A

LEGEND

Area Free of Sight Obstructions

INTERMEDIATE SEMI-TRAILERS (WB-40 & WB-50)

<table>
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<tr>
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NOTES FOR 6-LANE DIVIDED ROADWAY

1. See Sheet 2 for origin of clear sight line on the minor road.
2. Values shown in the tables are the governing (controlling) sight distances calculated based on 'AASHTO Case B - Intersection with Stop Control on the Minor Road'.
CROSSING SURFACES

<table>
<thead>
<tr>
<th>Type</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Concrete</td>
</tr>
<tr>
<td>R</td>
<td>Rubber</td>
</tr>
<tr>
<td>RA</td>
<td>Rubber/Asphalt</td>
</tr>
<tr>
<td>TA</td>
<td>Timber/Asphalt</td>
</tr>
</tbody>
</table>

GENERAL NOTES

1. The Railroad Company will furnish and install all track bed (ballast), crossties, rails, crossing surface panels and accessory components. All pavement material, including that through the crossing, will be furnished and installed by the Department or its Contractor, unless negotiated otherwise.

2. When a railroad grade crossing is located within the limits of a highway construction project, a transition pavement will be maintained at the approaches of the crossing to reduce vehicular impacts to the crossing. The transition pavement will be maintained as appropriate to protect the crossing from low clearance vehicles and vehicular impacts until the construction project is completed and the final highway surface is constructed.

3. The Central Rail Office will maintain a list of currently used Railroad Crossing Products and will periodically distribute the current list to the District Offices as the list is updated.

4. The Railroad Company shall submit engineering drawings for the proposed crossing surface type to the Construction Project Engineer and/or the District Rail Office for concurrence along with the list of Railroad Crossing Products. The approved engineering drawings of the crossing surface type shall be made a part of the installation agreement.

5. Sidewalks shall be constructed through the crossing between approach sidewalks of the crossing. Sidewalks shall be constructed with appropriate material to allow unobstructed travel through the crossing in accordance with ADA requirements.

6. All asphalt shall be installed in accordance with Index No. 514 and Section 300 of the Standard Specifications.

7. The Department will participate in crossing work that requires adjustments to rail outside of the crossing, no more than 50 feet from the edge of the travel way.

STOP ZONE FOR RUBBER CROSSING

<table>
<thead>
<tr>
<th>Design Speed (mph)</th>
<th>Zone Length (Distance From Stop)</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 or Less</td>
<td>25'</td>
</tr>
<tr>
<td>50 - 55</td>
<td>35'</td>
</tr>
<tr>
<td>60 - 65</td>
<td>50'</td>
</tr>
<tr>
<td>70</td>
<td>60'</td>
</tr>
</tbody>
</table>

Notes:

1. Type R Crossings are NOT to be used for multiple track crossings within zones for an existing or scheduled future vehicular stop. Zone lengths are charted above.

2. Single track Type R Crossings within the zones on the chart may be used unless engineering or safety considerations dictate otherwise.
**TYPICAL CROSSING MATERIAL REPLACEMENT AT RR CROSSINGS**

**SECTION VIEW**

- Friction Course
- Overbuild Existing Rdwy, Past
- Type SP Asphalt (500 lb/SY)
- Ballast
- Filter Fabric (Optional With RR Company)

**HALF PLAN**

**ROADWAYS WITH FLUSH SHOULDERS**

- Shoulder Line
- Shoulder Pavement
- Edge Of Travel Way
- Beveled Edge (1:4 Slope)

**CROSSED ROADWAY**

- Railroad Signal, Gate Or Signal And Gate
- Utility Strip
- Sidewalk
- Concrete Curb And Gutter
- Shoulder Pavement
- Shoulder Pavement In Lieu Of Curb
- Shoulder Pavement In Lieu Of Curb And Sidewalk

**VERTICAL ROADWAY ALIGNMENT THROUGH A RAILROAD CROSSING**

To prevent low-clearance vehicles from becoming caught on the tracks, the crossing surface should be at the same grade as the top of the rails for a distance of 2 feet outside the rails. The surface of the highway should also not be more than 3 inches higher or lower than the top of the nearest rail at a point 30 feet from the rail unless track super-elevation makes a different level appropriate. Vertical curves should be used to traverse from the highway grade to a level plane at the elevation of the rails. Rails that are super-elevated, or a roadway approach section that is not level, will necessitate a site specific analysis for rail clearances.

**VERTICAL ROADWAY ALIGNMENT THROUGH A RAILROAD CROSSING**

- RR Crossing Varies (Full Depth Asphalt/Rubber Shown)
- Cap Of Expansion Material (When Required By Crossing Type)
- Friction Course
- Overbuild Existing Rdwy, Past
- Type SP Asphalt (500 lb/SY)
- Ballast
- Filter Fabric (Optional With RR Company)

**HALF PLAN**

**CURBED ROADWAYS**

- Shoulder Pavement
- Shoulder Pavement In Lieu Of Curb And Sidewalk
- Shoulder Pavement
- Shoulder Pavement When Crossing Materials Do Not Extend Beyond Lip Of Gutter
- Beveled Edge (1:4 Slope)

**DESCRIPTION:**

- Flexible Pavement
- Pavement
- Pavement
- Pavement
- Pavement
- Pavement

**REVISION**

- Sheet No.
- Index No.
- 2 of 2

**DESIGN STANDARDS**

- 2016
- RAILROAD CROSSING
- 560

**INDEX:**

- No. 17882

**NOTE:**

- For location of railroad signals, gates or signals and gates see Index No. 17882