

# **Transportation Technical Manual for Subdivision and Site Development Projects**

October 2021

# Accommodation Statement

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**HILLSBOROUGH COUNTY**

**TRANSPORTATION TECHNICAL MANUAL FOR  
SUBDIVISION AND SITE DEVELOPMENT PROJECTS**

**APPROVED**

**APPROVED:** \_\_\_\_\_

|   |                |
|---|----------------|
| Michael Williams, PE<br>County Engineer | Date           |
|   | 11/08/21       |
|   | Effective Date |

## PREFACE

This manual contains current information for designing and submitting transportation plans for proposed projects to be constructed in unincorporated Hillsborough County. This manual is a readily useable reference document written in specific, concise technical language and is a compilation of existing regulations, policy statements, and engineering requirements. The manual was created to ease coordination of projects, and when applicable, facilitate the planning, design and construction of projects in conformance to the County's standards and requirements.

As material specifications, technical criteria and County policies change to meet new needs and changing technology, it will become necessary to revise and update this manual. The County's procedure for making revisions which includes issuing technical bulletins, accepting public comments, and requesting design exceptions can be previewed on the County's website at [HCFLGov.net](https://www.hcflgov.net). In addition, you can submit comments and suggestions for changes to the manual using the online "Comment on Public Utilities/Public Works Technical Publications" form located on the County's [website](#).

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## **SECTION 1.0 GENERAL**

### **1.1 SCOPE**

The requirements addressed in this manual apply to all public and private roads, bridges and other multimodal transportation facilities in Hillsborough County (County). All streets within and contiguous to a proposed development must be coordinated with other existing and planned roadway systems. For additional information, refer to Land Development Code (LDC), particularly Article VI.

### **1.2 AUTHORITY OF INSPECTORS**

- 1.2.1 County inspectors may inspect all construction and the preparation, fabrication, or manufacture of materials. The inspector is not authorized to revoke, alter, or waive any requirements of the specifications, but is authorized to call to the attention of the Contractor and/or the Engineer any failure of work or materials to conform to the approved plans or specifications. The inspector will have the authority to reject materials or suspend the work until any questions of issue can be referred to and decided upon by the Public Works Administration (PWA) Construction Services Section Manager.
- 1.2.2 The inspector must in no case act as foreman or perform other duties for the Contractor, nor interfere with the management of the work. Any advice that the inspector may give must in no way be construed as binding to the Construction Services Section Manager or releasing the Contractor from carrying out the intent of the plans and specifications.

### **1.3 COMMERCIAL SITES**

All commercial sites must meet the applicable requirements of this manual and be submitted to Development Services Department (DSD) for review and approval.

### **1.4 ON-SITE ROADWAYS**

- 1.4.1 All roads designed within a subdivision, commercial, or private site must be submitted to DSD for review.
- 1.4.2 On-site local, collector, and arterial roads must meet the applicable requirements of this manual. The criteria established by the PWA is the latest FDOT design criteria and Hillsborough County preferences identified in Transportation Design Bulletins located on [the County's website](#). The road designs must also meet the intent of the Vision Zero policies adopted by Hillsborough County.
- 1.4.3 All plans submitted to DSD will be reviewed by PWA for conformance to design criteria for the design items listed in Section 12.1.3 of this manual.

### **1.5 OFF-SITE ROADWAY IMPROVEMENTS**

All off-site roadway improvements that will be located within the County right-of-way, such as new roads, new signals, auxiliary turn lanes, sidewalks, shared use paths, golf cart paths, pedestrian paths and public transportation facilities, must be designed to the appropriate Hillsborough County and Florida Department of Transportation (FDOT) standards. See Section 12 for additional information and guidance on these types of improvements.

## **1.6 FUNCTIONAL CLASSIFICATION**

Functional classification is the grouping of highways by the character of service and connectivity provided. Roads within Hillsborough County right-of-way are defined by their functional classification as either locals, collectors, or arterials. The Hillsborough County Roadways Functional Classification Map designates which roads are arterials or collectors. Since roads are continuously being added, new collectors or arterials will not be shown on the map until a future publication date. Local roads are not shown on this map.

The functional classification for each type of road in a development must be determined early in the design process by the EOR. The functional classification selection must be submitted to DSD for approval.

## **1.7 DESIGN CRITERIA**

1.7.1 Design criteria for local roads within a subdivision and site development will be governed by the FDOT Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways, commonly known as the Florida Greenbook. All arterial and collector roads within subdivisions and site developments will be governed by the standards identified in Section 12.1 of this manual.

1.7.2 A Design Exception (DE) is an approval issued by the County when the proposed design elements are below both the County standards, identified in Section 1.7.1, and American Association of State and Highway Transportation Officials (AASHTO) new construction criteria for the controlling design elements subsequently listed.

The 10 Controlling Design Elements for collector and arterial roads are:

- Design Speed
- Lane Width
- Shoulder Width
- Horizontal Curve Radius
- Superelevation Rate
- Stopping Sight Distance
- Maximum Grade
- Cross Slope
- Vertical Clearance
- Design Loading Structural Capacity

The 2 Controlling Design Elements for local roads are:

- Design Speed
- Design Loading Structural Capacity

1.7.3 A Design Deviation Memorandum (DDM) is an approval issued by the County when the proposed design elements, other than the Controlling Design Elements, do not meet the criteria contained in this manual and the Florida Greenbook.

1.7.4 The EOR is responsible for identifying and documenting a DE and DDM in the early stages of the design process. The level of detail for a DE or DDM should be commensurate with the complexity of the design element and the relevance of information to engineering decisions. Sufficient detail and explanation must be provided to those reviewing the request to justify approval. Each DE and DDM request must be submitted independently unless the controlling elements work in concert with one another. The EOR should request a Land Development PreSubmittal Conference to discuss the need for a DE or DDM

- 1.7.5 Documentation for Approval of Design Exception
  - 1.7.5.1 Complete Approval Cover Letter (See Appendix H).
  - 1.7.5.2 Project Description:
    - a) General project information, location map, existing roadway characteristics, project limits, Section Township Range, objectives, and obstacles.
    - b) Associated or future limitations that exist because of public or legal commitments.
  - 1.7.5.3 Project Schedule:
    - a) Anticipated project completion date.
    - b) Discussion of whether the deficiency is a temporary or permanent condition.
    - c) Future work planned or programmed to address the condition.
  - 1.7.5.4 Exception Criteria:
    - a) Specific design criteria that will not be met (TTM, AASHTO, Florida Greenbook) and a detailed explanation of why the criteria or standard cannot be complied with or is not applicable.
    - b) Proposed value for the project or location and why it is appropriate.
    - c) Plan view, plan sheet, or aerial photo of the location with right of way lines and parcel lines of adjacent property shown.
    - d) Photo of the area of the deficiency.
    - e) Typical sections and/or cross-sections.
    - f) Station location.
  - 1.7.5.5 Alternative Design Considered
    - a) Meeting AASHTO or Florida Greenbook criteria, partial correction, and the no-build (existing) condition.
  - 1.7.5.6 Impacts of the Exception:
    - a) Safety Performance:
      - Anticipated impact on safety, long and short-term effects and of any anticipated cumulative effects.
      - Summary of the most recent 5-year crash history including any pertinent crash reports.
    - b) Operational Performance:
      - Description of the anticipated impact on operations (long- and short-term effects) and any anticipated cumulative effects.
      - Summary of the amount and character of traffic using the facility.
      - Compatibility of the design with adjacent sections of roadway.
      - Effects on capacity and Level of Service (proposed criteria vs. AASHTO)
    - c) Right-of-way
    - d) Community
    - e) Environment
    - f) Usability by all modes of transportation
  - 1.7.5.7 Anticipated Costs:
    - a) Description of anticipated costs (design, right-of-way, construction, maintenance).
    - b) Provide a benefit-cost (B/C) ratio, where applicable (Florida Greenbook, Chapter 14 Section E, Benefit/Cost Analysis).
  - 1.7.5.8 Mitigation Measures
    - a) Practical mitigation measures or alternatives that were considered and any selected treatments implemented on the project.

- 1.7.5.9 Summary and Conclusions
- 1.7.5.10 Final Conclusion and Recommendation

- 1.7.6 Documentation for Approval of Design Deviation Memorandum
  - a) Complete Approval Cover Letter (See Appendix H).
  - b) Design criteria versus proposed criteria.
  - c) Reason the design criteria is not appropriate.
  - d) Justification for the proposed criteria.
  - e) Review and evaluation of the most recent 5 years of crash history where appropriate.
  - f) Background information which documents or justifies the request.

## **1.8 TRAFFIC**

- 1.8.1 Existing and proposed traffic volumes are to be determined on adjacent roads and at up and downstream intersections providing access to the development. Proposed traffic volumes generated by the development must also be determined and included in the traffic analysis. The results must be summarized in a traffic analysis report early in the planning and design process and signed and sealed by a registered Florida engineer. This report must meet the requirements of the PWA and/or DSD, who must approve the traffic report for each development. When a proposed master development is planned, a traffic analysis report that covers all phases and stages must be submitted as a part of the master development.
- 1.8.2 Traffic Volume Thresholds for Internal Subdivision Roadways (On-site): Roadways constructed to serve internal subdivision traffic must comply with the following access classifications:
  - 1.8.2.1 For developments which generate less than 5,000 trips a day, the class of roadways that provides access to an existing public roadway must be at least a two-lane undivided roadway. Refer to Drawing Numbers TS-3 and TS-7.
  - 1.8.2.2 For developments which generate 5,000 to less than 10,000 trips a day, the class of roadways that provides access to an existing public roadway must be at least a two-lane undivided roadway providing separation of the lanes at required locations or a two-lane divided roadway. Refer to Drawing Numbers TS-4, TS-5, TS-7 and TS-8.
  - 1.8.2.3 For developments which generate 10,000 to less than 20,000 trips a day, the class of roadways that provides access to an existing public roadway must be at least a four-lane divided roadway. Refer to Drawing Number TS-6.
  - 1.8.2.4 For developments which generate 20,000 trips a day and greater, a four-lane divided collector roadway must be provided. Refer to Section 12.0 of this manual for additional information on design standards and the process for typical section approval.
  - 1.8.2.5 For residential developments with 10 or fewer lots developed under the Minor Subdivision process may utilize a design consisting with Drawing Numbers TS-9 or TS-10.
- 1.8.3 Traffic Calming
  - 1.8.3.1 Local, collector, and arterial roads within residential and commercial development projects are to be designed with speed management measures and traffic calming features as recommended in reports by the FDOT Design Manual, Florida Greenbook and the Federal Highway Administration (FHWA). Some common speed management measures and traffic calming features include, but are not limited to; roundabouts, chicanes, median island with lane narrowing, lane repurposing, raised crosswalk with pedestrian

activated signals, and buffered or protected bike lanes. The above measures can be used to reduce the potential for vehicle, pedestrian and bicycle crashes to help achieve Vision Zero policies and to effectively maintain low speeds. All roadway, sidewalk and bicycle path designs must consider effective speed management measures and traffic calming features in an effort to enhance public safety.

- 1.8.3.2 Traffic calming features (measures) are required on on-site roadway systems in accordance with the Hillsborough County LDC – Article V, Development Options.
- 1.8.4 Free Flow Right-Turn Lanes into Dedicated Driveways
  - 1.8.4.1 This section addresses exclusive right-turn lanes that can accommodate turning volumes into a dedicated driveway providing there is no possible left-turn movement into the driveway and said driveway is not part of a plus intersection with an intersecting street or other driveway.
  - 1.8.4.2 Free flow turn lanes should be separated by either a triangular raised or painted divisional island from the through movements.
  - 1.8.4.3 To be considered a free flow lane, the required receiving and queuing lane must be on-site and be a minimum of 150 feet of un-obstructive roadway. The break to stop distance of the right-turn lane must be measured from the begin taper to the beginning of the turning radius.

## 1.9 PUBLIC TRANSIT

- 1.9.1 Roads classified as local collectors and arterials in Hillsborough County must make provisions for future public transit facilities. These facilities must conform to the requirements of the HART Transit Friendly Planning and Design Handbook.
- 1.9.2 HART Bus Bay/Pad Standards
  - 1.9.2.1 HART should be notified to obtain their latest bus bay details and required facilities at bus terminals. Refer to the following publications for additional information:
    - a) [Hillsborough County Typical Bus Shelter Scenarios](#)
    - b) [FDOT Accessing Transit - Design Handbook for Florida Bus Passenger Facilities, Version III, 2013](#)
    - c) [FDOT Accessing Transit - Interim Updates Since 2013 Publication, April 2017](#)

## 1.10 VIOLATION AND ENFORCEMENT

In any instance in which any land is, or is proposed to be, used in violation of this Manual, the County Attorney may, in addition to other remedies provided by law, institute injunction, abatement or any appropriate action or actions to prevent, enjoin, or abate unlawful use. In addition, upon a finding by the County Administrator that any provision of this Manual or related ordinances has been violated, all development and building permits issued to the violator and for the site in violation will be suspended or held in abeyance. Permits may be withheld from the violator or for development on the site in violation, until the violation has been corrected to the satisfaction of the County Administrator. The County Administrator may also present their findings to the State Board of Professional Regulation and/or to the Hillsborough County Code Enforcement Board.

## **SECTION 2.0 DESIGN ELEMENTS**

### **2.1 ROADWAY DESIGN AND CONSTRUCTION CRITERIA**

Roadway design and construction criteria must conform to the criteria contained herein, as well as the referenced criteria contained in the following publications in English units. In the event that there are conflicting requirements, the most stringent design criteria/standard/specification must be met. All publications listed below must be the latest editions available at the time of submission of final plan documents.

- American Association of State Highway and Transportation Officials (AASHTO) – A Policy on Geometric Design of Highways and Streets
- AASHTO – Roadside Design Guide
- AASHTO – Guide for the Development of Bicycle Facilities
- AASHTO – Load and Resistance Factor Design (LRFD) Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals
- AASHTO – Standard Specifications for Highway Bridges
- U.S. Department of Transportation, Federal Highway Administration – Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)
- Americans with Disabilities Act (ADA)
- American Concrete Institute (ACI) Building Code Requirements and Specification for Masonry Structures
- ACI Building Code Requirements for Structural Concrete
- Transportation Research Board (TRB) – Highway Capacity Manual
- ITE – Trip Generation Manual
- ITE and FHWA – Traffic Calming: State of the Practice Informational Report
- Florida Accessibility Code for Building Construction
- FDOT Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (referred to as the Florida Greenbook)
- FDOT –Design Manual(FDM)
- FDOT – Design Standards for Construction Operations on the State Highway System (referred as “FDOT Design Standards”) and associated Design Standard Revisions
- FDOT – Flexible Pavement Design Manual
- FDOT – Rigid Pavement Design Manual
- FDOT – Traffic Engineering Manual
- FDOT – Median Handbook
- FDOT – Manual on Uniform Traffic Studies
- FDOT – Standard Specifications for Road and Bridge Construction. The submittal of a Contractor Quality Control (CQC) plan is not mandatory; however, Hillsborough County reserves the right to ask for documentation indicating that quality control was provided as required.
- FDOT – Supplemental Specifications and Special Provisions for Road and Bridge Construction Standard Specifications
- FDOT – Soils and Foundation Handbook
- FDOT – Florida Intersection Design Guide
- FDOT – Complete Streets Handbook
- FDOT – Rail Handbook
- FDOT – Structures Manual



- FDOT – CADD Manual
- FDOT – Highway Landscape Design Guide
- Typical Sections, TND Typical Sections and Typical Details Drawings in this manual
- Hillsborough County Public Works Specifications for Construction
- Hillsborough County Stormwater Management Technical Manual
- Hillsborough County Water, Wastewater and Reclaimed Water Technical Manual
- Hillsborough County Water and Wastewater Technical Specifications
- Hillsborough County Utility Accommodations Guide and Rights-of-Way Use Procedure Manual
- Hillsborough County Residential Traffic Control Handbook
- Hillsborough County LDC
- Hillsborough County Development Review Procedures Manual
- Hillsborough County Metropolitan Planning Organization's (MPO) Pedestrian & Bicycle High Crash Areas Strategic Plan for Unincorporated Hillsborough County Roads (2012)
- HART Transit Friendly Planning and Design Handbook
- National Cooperative Highway Research Program (NCHRP) Report 672 Roundabouts: An Informational Guide

## **2.2 RIGHT-OF-WAY**

Right-of-way for all roadways must be exclusive to Hillsborough County and have no exceptions or lessed out/platted areas for any purpose between right-of-way lines, unless specifically agreed to by PWA.

### **2.2.1 Minimum Standards**

2.2.1.1 Minimum right-of-way widths must be provided as listed in the following table. Additional right-of-way may be required in order to provide for elements such as:

- Ditch depths greater than two feet
- Width of depressed medians greater than six feet to accommodate special stormwater management features
- Special ditches or water courses to bypass stormwater from off-site
- Curvature of the road that results in superelevation that will require more fill and longer slope tie-downs
- Cut or fill other than shown to meet existing ground, more right-of-way to account for tree or shrub planting strips wider than provided in this manual
- Special environmental provisions, special width for utilities
- Future widening and expansion
- Setback requirements for sight distance and clear zone
- Medians (including adequate width for expected addition of through lanes and left-turn storage lanes)
- Auxiliary lanes, adequate pedestrian and bicycle facilities
- Public transit facilities, utilities, stopping and passing sight distances
- Adequate stormwater management facilities and development of adequate intersections with minimum sight distances

**Table 2-1: Minimum Right-of-Way Widths**

| <b>Road Classification</b>   | <b>Drawing</b> | <b>Minimum Right-of-Way</b> |
|--|----------------|-----------------------------|
| Recommended Utility Locations  | TS-1           | Varies                      |
| Shared Use Paths   | TS-2           | 26' -35'                    |
| Local Urban Roads (2-Lane Undivided)                                     | TS-3           | 50' -54'                    |
| Urban Collectors (2-Lane Undivided)                                      | TS-4           | 64'                         |
| Urban Collectors (2-Lane Divided)  | TS-5           | 86'                         |
| Urban Collectors (4-Lane Divided)  | TS-6           | 110'                        |
| Local & Collector Rural Roads (2-Lane Undivided)                         | TS-7           | 96'                         |
| Rural Collectors (2-Lane Divided)  | TS-8           | 122'                        |
| Low Volume Public Roads (Subdivision with less than or equal to 10 Lots) | TS-9           | 84'                         |

- 2.2.1.2 Hillsborough County, per the provisions of the LDC, encourages the use of Traditional Neighborhood Development (TND) roads. The following typical sections are approved for use on Hillsborough County TND roads. Minimum right-of-way widths must be provided as listed in the following table.

**Table 2-2: TND Minimum Right-of-Way Widths**

| <b>Road Classification</b>           | <b>Drawing</b> | <b>Minimum Right-of-Way</b> |
|--------------------------------------|----------------|-----------------------------|
| Alleys                               | TND-1          | 20'                         |
| Local Urban Lanes                    | TND-2          | 52'                         |
| Local Urban Streets                  | TND-3          | 69'                         |
| Type 1 Boulevards (Urban Collectors) | TND-4          | 128'                        |
| Type 2 Boulevards (Urban Collectors) | TND-5          | 110'                        |
| Avenues (Urban Collectors)           | TND-6          | 104'                        |
| Main Streets (Urban Collectors)      | TND-7          | 82'                         |

## 2.2.2 Existing Roads

- 2.2.2.1 If an existing County road is required to incorporate design features such as standard lane widths, bicycle lanes/paved shoulders, shared use paths, sidewalks, utilities, ditches, auxiliary lanes, etc., additional right-of-way may be required. If right-of-way is needed and the development is directly adjacent to the roadway then the right-of-way needed for the improvements is to be dedicated and conveyed to Hillsborough County. If the development is not directly adjacent to the roadway where the improvements are required and additional right-of-way is needed then the improvements required must be determined in meetings with the County to include DSD and PWA as described in Section 12.
- 2.2.2.2 When existing roads serve as the access road(s) to new developments, the road(s) must comply with the required level of the classification based on existing and proposed average daily trips to the extent feasible. Refer to Section 12 for additional information.



- 2.2.3 Intersections: The provisions for right-of-way and set back requirements at intersections must be determined utilizing Section 5 Intersection Design of this manual.

## **2.3 SUBSOIL INVESTIGATION FOR ROADWAYS**

- 2.3.1 A geotechnical engineering consultant firm accredited by AASHTO, CMEC or FHWA approved in the State of Florida must perform a signed and sealed subsoil investigation report. This report must be in accordance with the requirements of the FDOT Soils and Foundation Handbook except as noted by this section. This report must be submitted for review and approval with the roadway plans and must include the following:
- 2.3.1.1 Groundwater: The seasonal high groundwater elevation and boring locations shall be shown on the plan and profile sheets. The definition of "seasonal high groundwater" must be per the Hillsborough County Stormwater Management Technical Manual.
  - 2.3.1.2 Soil Classification
    - a) The soil classification for each stratum must be in accordance with AASHTO M-145. The soil classification testing must be in accordance with FDOT Soils and Foundation Handbook.
    - b) Test borings must be taken to a minimum depth of eight feet below the existing grade. The borings must be a maximum of 200-foot intervals, or at 100-foot intervals, staggered, for divided roadways. There must be no less than one boring per street. Additional borings must be taken as necessary to determine limits of unsuitable material. Depth and horizontal limits of muck areas must be determined and shown on the plans. Unsuitable material must be removed and replaced in accordance with FDOT Standard Plans 120-001 and 120-002.

## **2.4 CLEARING AND GRUBBING**

All roadway rights-of-way must be cleared and grubbed in accordance with the FDOT Standard Specifications for Road and Bridge Construction, and the Landscaping Section of this manual. Selective clearing and grubbing is allowed, provided that preserved vegetation, including trees, is in accordance with the landscaping standards of this manual.

## **2.5 DESIGN PERIOD**

The minimum design period for all new road construction projects in Hillsborough County must be 20 years from date of opening.

## **2.6 DESIGN VEHICLE**

- 2.6.1 The design vehicle selected for geometric design should be one with dimensions and minimum turning radii larger than almost all the vehicles in its class. Design vehicles are listed in Table 3-2 of the Florida Greenbook and Chapter 2 of AASHTO.
- 2.6.2 If the total vehicles of those classes larger than passenger vehicles that are most likely to use a particular road or collector is five percent of the total traffic, that class should be used as a design control. The decision as related to selection of a design vehicle should be based on a careful engineering study and reasonable estimate of the type of situation and volume of expected traffic as this parameter affects the following design criteria:
- 2.6.2.1 Horizontal and vertical clearance
  - 2.6.2.2 Alignment

- 2.6.2.3 Lane widening on curves
  - 2.6.2.4 Shoulder width requirements
  - 2.6.2.5 Turning and intersection radii
  - 2.6.2.6 Intersection sight distance
  - 2.6.2.7 Median opening width
  - 2.6.2.8 Maximum grades
  - 2.6.2.9 Return Radii
  - 2.6.2.10 Control Radii
- 2.6.3 See Section 5 Intersection Design for minimum requirements on return radii on local roads, collectors, and arterials and associated design vehicle requirements at intersections.

## 2.7 HORIZONTAL ALIGNMENT

- 2.7.1 Design Speed
- 2.7.1.1 The design speed of local roads, collectors, and arterials is an extremely important parameter in establishing the geometric design criteria for these types of facilities. The proper selection of this element is highly critical in establishing a safe and high-quality path for the drivers, pedestrians and bicyclists on a given roadway.
  - 2.7.1.2 According to the Florida Greenbook, the primary basis for the selection of the design speed should be a rational prediction of the probable maximum operating speed (by approximately 90 percent of the vehicles) on the road. Design speed is defined as the maximum safe speed that can be maintained over a given section of road/highway when weather, light, and traffic conditions are such that the design features of the road/highway govern. The design speed will be set equal to the posted speed for Hillsborough County Transportation Projects.
  - 2.7.1.3 The maximum design speeds for local roads, collectors and arterials must not exceed the values shown in the following table unless approved by the County Engineer:

**Table 2-3: Maximum Design Speeds for Local Roads, Collectors and Arterials**

| Road Classification                            | Maximum Design Speed |
|--|----------------------|
| Local Urban Roads (2-lane Undivided)           | 35 MPH               |
| Urban Collectors, Arterials (2-Lane Undivided) | 40 MPH               |
| Urban Collectors, Arterials (2-Lane Divided)   | 45 MPH               |
| Urban Collectors, Arterials (4-Lane Divided)   | 45 MPH               |
| Local Rural Roads (Undivided)                  | 50 MPH               |
| Rural Collectors, Arterials (2-Lane Undivided) | 50 MPH               |
| Rural Collectors, Arterials (2-Lane Divided)   | 50 MPH               |

- 2.7.1.4 Design speed is used to determine the geometric design features of a roadway. It is determined by taking into consideration the topography, operating speed, adjacent land use, and the functional classification of the road. Local subdivision roads may be designed in a way to effectively reduce the operating speed, such as ninety degree turns, as long as proper sight and stopping distances are provided and they are used throughout the subdivision or expected by the driver..

- 2.7.2 Roadway Transitions and Tapers: When redirection of through lanes to transition from one type of roadway to another becomes necessary, the required deflection angles, transition lengths and tapers must be provided as per Chapter 212 of the FDOT Design Manual. However, the table in this Standard that is identified as “Minimum Under Restraints” must not be used for transitions on new roadways. See Section 12 of this manual for additional information for off-site and existing County roadways.
- 2.7.3 Deflection of Through Lanes through Intersections: The maximum deflection for through lanes through intersections must meet the requirements of the Chapter 210.8.1 of Part 2 of the FDOT Design Manual. Table 212.7.1 in Part 2 of the FDOT Design Manual is not applicable for deflection of through lanes through intersections for new development.
- 2.7.4 Horizontal Curves: The minimum permitted radii (maximum degree of curvature) for rural/urban arterials and collectors should reference the FDOT Design Manual. The Florida Greenbook should be referenced for local roads. The minimum centerline radius for an urban subdivision street is 50 feet. The EOR must use good engineering judgment and ensure proper sight and stopping distance when using a 50-foot radius due to the reduced speed needed to make the turn safely.
- 2.7.5 Superelevation: Superelevation rates and transitions requirements must be per Section 210.9 of Part 2 of the FDOT Design Manual.

## **2.8 VERTICAL ALIGNMENT**

- 2.8.1 Criteria
  - 2.8.1.1 The designer must closely coordinate the vertical and horizontal alignments. This aspect has proven to provide a higher level of safety and quality. The vertical alignment must provide the highest sight distance possible with the use of gentle grades. The minimum design speed for vertical alignment must not be less than 30 mph regardless of horizontal alignment constraints.
  - 2.8.1.2 The minimum standard roadway base clearance required above the Seasonal High Groundwater Table (SHGWT) Elevation for roadway base courses is provided in Table 12-1 of the Hillsborough County Stormwater Management Technical Manual.
- 2.8.2 Grades: The minimum road grade must be 0.30% for all local roads, collectors, and arterials. Refer to Table 3-16 of the Florida Greenbook for maximum grades. Maximum changes in grade without the use of a vertical curve must be designed per Table 3-17 of the Florida Greenbook.
- 2.8.3 Vertical Curves: Vertical curves are required when the algebraic difference between two grades exceed the values listed in the Florida Greenbook, Table 3-17. Vertical geometry must meet or exceed the values in the Florida Greenbook for stopping sight distance (Table 3-18 and Figure 3-3) and passing sight distance (Table 3-19). Sag vertical geometry must meet or exceed the operational values in Figure 3-4 of the Florida Greenbook.
- 2.8.4 At-Grade Intersections
  - 2.8.4.1 When a proposed roadway is tied into an existing County road at a proposed at-grade intersection, the intersection including the existing County road must be rebuilt to provide a smooth transition between the two roads. This intersection must be “plateaued” to provide a smooth transition between the two roadways. The “plateauing” of intersections must meet the requirements of Section 3.8 of the FDOT Florida Intersection

Design Guide. The coordination of the cross sections of two intersecting roadways must be carefully analyzed; the design should insure a smooth cross slope transition between the two roads. Adequate drainage must be provided at this intersection. The intersection must be designed to accommodate future signalization.

2.8.4.2 See Section 5 of this manual for additional requirements.

## **2.9 SIDEWALKS**

- 2.9.1 Sidewalk and curb ramp design must adhere to ADA requirements, the Florida Accessibility Code for Building Construction, FDOT Standard Plans, and applicable design criteria in the FDM. The following direction in Sections 2.9.2 through 2.9.7 will supersede the FDM design criteria.
- 2.9.2 Sidewalks must extend to the roadway at all intersections. Curb ramps are required at all locations where the sidewalk meets the road.
  - 2.9.2.1 Midblock crossings on all roads must be approved by the Technical Services Division.
- 2.9.3 Sidewalk widths and thicknesses on local, collector, and arterial roads
  - 2.9.3.1 Sidewalk widths on collector and arterial roads must meet the design criteria established in the FDOT Design Manual Section 222 Pedestrian Facilities. The standard thickness of a sidewalk on arterial and collector roads is six inches.
  - 2.9.3.2 Sidewalk widths on local roads must be five feet or greater. The standard thickness of a sidewalk on local roads is four inches, except for sidewalks at driveways, curb ramps, and on maintenance berms of retention/detention ponds, where the thickness must be six inches. Where access to the pond for maintenance purposes crosses this sidewalk, the thickness must be six inches for a minimum length of 20 feet centered on the access. The manner of how the access will be identified is subject to approval by County staff. This location must be clearly identified in the plans.
- 2.9.4 Sidewalks, curb ramps, and handicap ramps must be constructed of Portland Cement Concrete, Class I. Materials and construction methods must conform to the latest version of the FDOT Standard Specifications for Road and Bridge Construction.
- 2.9.5 Detectable warning surfaces must meet all FDOT criteria including the latest versions of Standard Plans Index 522-002, Standard Specifications Section 527, and the Approved Products List (APL). The preferred color for curb ramp detectable warning surfaces is red. Should the background color of the sidewalk surface be red, a contrasting color must be approved by the County prior to installation.
- 2.9.6 When street trees are to be provided by the LDC or other regulation/criteria, sidewalk protection at the trees is required. The length of the required protection must be five feet on either side of the centerline (longitudinally) of the required tree. For additional information, refer to Tree Protection Details TD-16.
- 2.9.7 Sidewalks are required on both sides of the road. Exceptions to this requirement must be expressly permitted by the County LDC and reviewed and approved by the County Engineer.

## **2.10 DEAD END STREETS**

- 2.10.1 All dead-end streets that are greater than 150 feet must be designed to meet the requirements for a fire truck turnaround and meet LDC criteria. The maximum length for a dead-end street must be 1000 feet, unless otherwise approved.
- 2.10.2 Cul-de-sacs must be constructed at the end of dead-end streets. When the length of the street is 150 feet or less, the cul-de-sac can be constructed in accordance with the Cul-De-Sac Typical Detail TD-4, Sheet 1 of 2. However, when the length of a dead-end street is greater than 150 feet, the cul-de-sac must be constructed in accordance with the Cul-De-Sac Typical Detail TD-4, Sheet 2 of 2, which meets the fire code for fire truck turnarounds.
- 2.10.3 Where a street is to be continued when adjacent property is subdivided, or during phased construction, a temporary "T" type turnaround will be required when the street is 150 feet or more in length as measured from the nearest intersection. The "T" type turnaround will be constructed in accordance with the Temporary Dead End Treatment Typical Details and must be clearly delineated per FDOT Standard Plans 700-109.

## **2.11 BUFFER WALLS**

- 2.11.1 General: Buffer walls must be constructed along all arterial and collector roadways that abut all residential land uses that are processed through the Subdivision and/or Site Development Regulations of the LDC. For additional information, refer to Buffer Wall/Berm Typical Details drawing in this manual. Buffer wall design should consider connectivity of pedestrians between developments and public facilities providing sidewalks and shared use paths at appropriate locations. Appropriate points of connection must be coordinated with the adjacent off-site property.
- 2.11.2 Horizontal Location
  - 2.11.2.1 Buffer walls, including footings, must be parallel to and outside of the right-of-way.
  - 2.11.2.2 In order to provide for the safe functional use of the sidewalk, a flat grass area measuring a minimum of two feet in width must be maintained between the outer edge of sidewalks and the closest portion of the buffer wall structure.
  - 2.11.2.3 Where permanent easements are parallel to and contiguous to the road right-of-way, all structural elements of the buffer wall must be outside of the easement.
- 2.11.3 Ownership and Maintenance: Hillsborough County will not be responsible for any maintenance or liability associated with the buffer walls. Buffer walls must be owned and maintained by the property owner of the parcel on which it is located or by a Property/Homeowner's Association.
- 2.11.4 Aesthetics: The walls must be limited to six feet in height, unless otherwise noted by the Hillsborough County LDC or any applicable conditions of zoning. When residential projects are proposed to abut each other, adjacent to the same collector or arterial roadway, or if a new project is proposed which would abut an existing project that has a buffer wall, the proposed wall must be visually compatible with the existing wall. If the development is to have a different exterior appearance for the new wall, then the Director of DSD must approve the change. In cases where buffer walls are separating a new development from an existing, lower density development, the style of the wall must be compatible with the existing community.

- 2.11.5 Alternate Buffer
  - 2.11.5.1 As an alternative to buffer walls, vegetated berms will be considered.
  - 2.11.5.2 The berm must have a maximum height of six feet, maximum side slopes of four feet, horizontal to one-foot vertical, and a top width of five feet.
  - 2.11.5.3 The berm must be sodded with grass or other suitable vegetation as approved by the DSD.
- 2.11.6 Realignment due to Environmental Considerations: When alignment of buffer walls must be modified to clear protected trees as determined by the requirements of the Natural Resources and Landscaping Regulations of the Hillsborough County LDC, the footer or buffer walls and the toe of slope of vegetated berms must clear the trees as approved by the DSD.
- 2.11.7 Stormwater Management: Buffer walls and vegetated berms must be designed so as not to interfere with the proper functioning of existing or proposed stormwater management systems. For erosion and sedimentation control criteria, refer to Hillsborough County Stormwater Technical Manual.
- 2.11.8 Structural: Buffer walls may consist of concrete masonry units, cast-in-place concrete, or precast concrete and must be designed in accordance with the applicable ACI Building Code (ACI-530 for masonry structures and ACI-318 for concrete). Other wall types may be used subject to approval of the County Engineer, or through PD Zoning. Buffer walls must be designed to retain the soil resulting from a difference in ground line elevations on each side of the wall. Buffer wall calculations and plans must be signed and sealed by a Professional Engineer licensed in the State of Florida.

## **2.12 PEDESTRIAN AND BICYCLE FACILITIES**

- 2.12.1 Pedestrian and bicycle facilities must be provided on all collector and arterial roads unless approved otherwise. The application of pedestrian and bicycle facilities on County roadways will reduce the potential for vehicular, pedestrian and bicycle crashes to help achieve the Vision Zero policies adopted by Hillsborough County.
- 2.12.2 All pedestrian facilities must be designed in accordance with Section 2.9 – Sidewalks, of this manual. Bicycle Facilities must be designed to meet the standards in the latest editions of the FDOT Design Manual Section 223 Bicycle Facilities and the AASHTO's Guide for the Development of Bicycle Facilities.
- 2.12.3 All shared use paths must be designed to meet the standards in the latest edition of the FDOT Design Manual Section 224 Shared Use Paths.
- 2.12.4 The minimum width for a shared use path will be 12 feet.

## **2.13 UTILITIES**

- 2.13.1 Utility locations must be per the Recommended Utility Location Typical Section drawing in this manual.
- 2.13.2 Manholes must be located within median areas for divided roadways unless approved otherwise. If approved to be in the roadway area, manholes must be placed outside the normal wheel path including bicycles.



## **2.14 RAILROAD GRADE CROSSING**

- 2.14.1 The purpose of this section is to establish guidelines for new railroad grade crossings in Hillsborough County. All railroad grade crossings must be constructed according to current FDOT standards. Coordination with the railroad owner is mandatory prior to design.
- 2.14.2 New public grade crossings must be permitted through the FDOT Rail Office per Section 335.141, Florida Statutes and Rule 14-57.012, Florida Administrative Code. Elements of design such as profile and alignment; drainage; sight distances; lighting; traffic control device and signal selection and placement; and traffic signal preemption must conform to the latest revisions of the FDOT Standard Plans, FDOT Rail Handbook, AASHTO A Policy on Geometric Design of Highways and Streets, FHWA Manual on Uniform Traffic Control Devices, and the railroad standard criteria for grade crossings.

## **2.15 TESTING AND MATERIAL CERTIFICATION**

- 2.15.1 Testing
- 2.15.1.1 An Independent Testing Consultant accredited by AASHTO, CMEC or FHWA approved and licensed by the State of Florida must perform all tests specified within this manual. Hillsborough County may elect to observe the testing consultant performing tests in an accredited field and testing laboratory. All soil surveys, certifications, design mixes, and test reports must be submitted by the EOR on a timely basis during the construction process to PWA Construction Services Section.
- 2.15.1.2 Hillsborough County reserves the right to also perform tests or call for the developer to perform tests as deemed necessary by the County inspector.
- 2.15.1.3 Testing must be in accordance with the Testing Schedule of this manual, applicable FDOT Standard Specifications for Road and Bridge Construction, special provisions and supplements to the FDOT Standard Specifications for Road and Bridge Construction and Technical Specifications.
- 2.15.2 Material Certification
- 2.15.2.1 Material suppliers must provide proof of certification that the following items in this section and the testing schedule of this manual are in compliance with the requirements of this manual and the FDOT Standard Specifications for Road and Bridge Construction:
- a) Base Material (other than soil cement and crushed concrete base)
  - b) Prime and Tack Coat
  - c) Superpave Asphaltic Concrete
  - d) Concrete
  - e) Pipe (Other than Utility Pipe)
  - f) Pavement Markings (Striping)
- 2.15.2.2 The EOR must submit all material certifications to the Construction Services Section of PWA on a timely basis during the construction process and prior to final acceptance of construction.

## **SECTION 3.0 CROSS SECTION ELEMENTS**

### **3.1 LANE WIDTHS**

- 3.1.1 The minimum lane width must be 11 feet for commercial, collector, and arterial roads that provide bike lanes. Ten feet is the minimum lane width for local residential roads. The minimum lane width must be 12 feet for commercial urban streets and rural roads when no bike lanes or paved shoulders (five feet or less) are provided. All new urban collector roads must provide seven-foot buffered bicycle lanes, unless otherwise approved. See applicable Hillsborough County Typical Sections.
- 3.1.2 The minimum lane widths for auxiliary turn lanes must be the same width as the adjacent through lane. All right-turn lanes must provide for a keyhole lane between the through lane and the turn lane.

### **3.2 MEDIANS**

- 3.2.1 General
  - 3.2.1.1 Raised medians must be curbed and conform to the FDOT Standard Plans. All concrete traffic separators for left-turn lanes must meet the requirements of FDOT Standard Plans 520-020.
  - 3.2.1.2 Medians must meet the requirements of the FDOT Median Handbook and Table 3-6 Basic Median Functions and their Required Width in the FDOT Florida Intersection Design Guide.
- 3.2.2 Entrance: Entrance medians or islands within the road right-of-way must conform to the Entrance Median and Guardhouse Typical Details.
- 3.2.3 Landscaping: Landscaping in medians must meet the requirements of Section 10 in this manual. Medians and islands must not be designated as park or recreation areas. A dedication and maintenance agreement is required when landscaping is to be placed in a public road(s) right-of-way. Medians and islands may be landscaped. The landscaping in these areas must comply with the requirements of this section for clear zone and sight distance. These areas must be dedicated to an established maintenance entity. There must be an approved County maintenance agreement in place before landscaping is allowed in County right-of-way. All landscaping is to be within dedicated right-of-ways.
- 3.2.4 Concrete Separators: Concrete separators must be designed to accommodate pedestrians as a refuge area at crossings. A six-foot wide area is considered the minimum for this purpose. If a separator less than four feet wide is proposed, a design exception must be submitted. A two-foot separator is allowed for a special directional median opening without an exception. It is preferred that all separators be either Type I or Type II with the flatter type “E” curb in lieu of Type IV or Type V which is the raised type “F” curb. All designs and construction methods must be per the FDOT Standard Plan 520-020.



### **3.3 CURB AND CURB AND GUTTER**

#### **3.3.1 General**

- 3.3.1.1 Hydraulic design must be in compliance with all the provisions of the Hillsborough County Stormwater Management Technical Manual.
- 3.3.1.2 Details of concrete curb and concrete curb and gutter must conform to Hillsborough County Typical Details for Miami curb and the FDOT Standard Plans as applicable. County Standard Type I, II & III Inlets, as shown in TD-18, may be used as allowed in the Hillsborough County Stormwater Management Technical Manual.
- 3.3.1.3 Materials and installation must conform to the FDOT Standard Specifications for Road and Bridge Construction.
- 3.3.1.4 When curb or curb and gutter replacement is required, it must be replaced in 10-foot sections.

- 3.3.2 Stabilization and Compactions: All curbs and gutters must be placed on either a foundation of Type B stabilized subgrade with a minimum LBR value of 40, Type C stabilized subgrade with a minimum Florida Bearing Value of 75 for curb pads only when utilizing soil cement base or a 4-1/2-inch asphalt base curb pad with a Type B stabilized subgrade (See FDOT Design Manual for details). All curbs and curb and gutters must be stabilized to a minimum of four inches from back of curb. Refer to Typical Section Drawings of this manual and FDOT Standard Plan No. 160-001 for curb and curb and gutter stabilization details.

### **3.4 ROADSIDE CLEAR ZONE OR RECOVERABLE TERRAIN**

- 3.4.1 The roadside clear zone is that area of recoverable terrain outside the travel lanes available for use by errant vehicles. The roadside clear zone of intersecting roads must be carried through intersections.
- 3.4.2 The width of clear zone and recoverable terrain for rural roadways varies depending on the design speed. The clear zone width for urban roadways must be four feet from face of curb. However, when using “Miami” type curb, the minimum clear zone width must be four feet from the back of curb.
- 3.4.3 Horizontal clearance to trees, light poles, utility installations, signal poles, control cabinets for signals, and bridge piers are to meet the more stringent requirements of this manual and Part 2, Chapter 215 of FDOT Design Manual.

### **3.5 VERTICAL CLEARANCE**

Minimum vertical clearance with the exception of structures over water must conform to Part 2, Chapter 224.8 of FDOT Design Manual.

### **3.6 PAVEMENT CROSS SLOPES**

- 3.6.1 The minimum pavement cross slope for travel lanes on local roads, collectors and arterials must be 0.02 ft./ft. The change in cross slope between adjacent through lanes must not exceed 0.04 ft./ft.
- 3.6.2 The change in cross slope between travel lanes and shoulder pavement must not exceed 0.07ft/ft.

### **3.7 ROADSIDE SLOPES**

Roadside slopes for local roads, collectors and arterials must be per the Typical Sections in this manual. Side slopes within the clear zone that are 1:3 or steeper must not be used without a guardrail or longitudinal barrier. The design of guardrail, crash cushions and barriers must be in accordance with the AASHTO Roadside Design Guide and FDOT Design Standard Plans.

## **SECTION 4.0 ROADSIDE DESIGNS**

### **4.1 DITCHES**

- 4.1.1 Design: Roadway drainage design must comply with the criteria as set forth in the Hillsborough County Stormwater Management Technical Manual.
- 4.1.2 Side drain Requirements
  - 4.1.2.1 Placement: Access connection permits must be obtained from DSD prior to the placement of any side drain associated with driveway access for existing commercial sites and for new and existing residential lots. New commercial development access points are included as part of the Right-Of-Way Use Permit processed during the site development review process.
  - 4.1.2.2 Mitered End Sections: A mitered end section must be placed at each end of a side drain and must be constructed in accordance with applicable FDOT clear zone requirements and Design Standard Plans.

### **4.2 GRASSING AND MULCHING, SODDING**

- 4.2.1 Curb and Gutter Section: In residential and industrial subdivisions where building construction is not imminent, areas located between the back of curb and the right-of-way line, that are disturbed by construction must be grassed and mulched or sodded in accordance with the Typical Sections and the FDOT Standard Specifications for Road and Bridge Construction. A two-foot minimum sod strip staggered in two rows must be placed along the back of curb and around all structures.
- 4.2.2 Rural Section: All right-of-way, outside the roadway area, must be grassed and mulched with the exception of a two-foot eight-inch sod strip at the edge of pavement/shoulder pavement in accordance with the Typical Sections and the FDOT Standards Specifications for Road and Bridge Construction.

### **4.3 LANDSCAPING AND TREE PRESERVATIONS**

Public and private road rights-of-way may contain preserved or planted vegetation, including trees, provided that the preserved or planted vegetation, including trees, is in accordance with the landscaping standards of this manual.

## **SECTION 5.0 INTERSECTION DESIGN**

### **5.1 GENERAL**

- 5.1.1 The design of intersections in Hillsborough County must meet or exceed the requirements of this section, Chapter 3, Section C.9 of the Florida Greenbook and the Florida Intersection Guide. The most stringent requirement in these standards must be utilized in the design of intersections.
- 5.1.2 Intersecting streets must be arranged so as to intersect as nearly as possible at right angles. The maximum deflection for through lanes through intersections must meet the requirements of FDOT Design Manual, Part 2, Chapter 210.8.1. However, Table 212.7.1 in Part 2 of the FDOT Design Manual is not applicable for deflection of through lanes through intersections for new development.
- 5.1.3 Channelizing islands for intersections, when required, must meet the requirements of Section 3.11 of the FDOT Florida Intersection Design Guide.
- 5.1.4 Driveways that have or are anticipated to have a significant amount of daily traffic (greater than 400 vehicles per day) must be designed as intersections with radial returns and no drop curbs.
- 5.1.5 Sidewalk locations and curb ramps at intersections must meet the requirements of Section 2.9 of this manual. For additional details refer to applicable standards and Typical Details drawings in this manual.
- 5.1.6 Intersections and intersection improvements must be designed with consideration for pedestrian and bicycle features. Curb inlets, including inlet transitions, must not be located within handicap drop curb locations. Inlets should not be placed within curb returns.
- 5.1.7 Intersection improvements that result in four or more lanes of traffic including turn lanes must have a minimum six-foot traffic separator to provide for a pedestrian refuge area.
- 5.1.8 Sidewalk curb ramps, traffic separators, median construction, crosswalks, all associated striping and signalization features must be replaced or relocated as necessary when improvements are made at existing intersections.

### **5.2 RIGHT-OF-WAY REQUIREMENTS**

- 5.2.1 Sight distance must be provided at all intersections by either providing rounded right-of-way lines or straight corner cuts in accordance with sight distance triangles. Rounded right-of-way lines at all roads intersecting with a collector road must have a minimum 25-foot radius or as otherwise required by traffic conditions or geometric requirements.
- 5.2.2 Stopping sight distance requirements must be considered by the EOR in the determination of the minimum right-of-way to be provided at roadway intersections for local roads, collectors, and arterials. The EOR must design to the sight distance requirements of FDOT Design Manual and the requirements of this section. Additional right-of-way may be needed to provide for sight distance at intersections with curved roadways.

### 5.3 MINIMUM RETURN RADII REQUIREMENTS

Minimum return radii are largely dependent upon the design vehicle. The designer must verify and confirm the turning movement of the design vehicle in consideration for the intersection that is being designed. Additionally, it is recommended that street corner radii in residential areas be reduced to minimize speeds and create a safe and walkable environment for pedestrians. Verify selected design vehicle can negotiate turning movement without encroachment onto adjacent curbs and sidewalks. Encroachment into adjacent lanes may be permissible on low-volume roads.

**Table 5-1: Minimum Return Radii**

| Type of Development | Type of Design Vehicle | Roadway Classification | Minimum Radius |
|---------------------|------------------------|------------------------|----------------|
| Residential         | P, SU                  | Local Road             | 25'            |
|                     | P, SU                  | Collector Road         | 35'            |
|                     | P, SU, WB-40, WB-50    | Arterial Road          | 50'            |
| Commercial          | P, SU, WB-40, WB-50    | Local Road             | 35'            |
|                     | P, SU, WB-40, WB-50    | Collector Road         | 50'            |
|                     | P, SU, WB-40, WB-50    | Arterial Road          | 50'            |

### 5.4 CONTROL RADII

The control radii requirements for minimum turning paths at intersections must be determined using Table 3-13 of the FDOT Florida Intersection Design Guide.

### 5.5 INTERSECTION SIGHT DISTANCE REQUIREMENTS

The minimum required sight distance requirements at intersections for various design speeds and vehicles must be determined using Chapter 210 of the FDOT Design Manual and Figures 3-3 and 3-4 of the Florida Greenbook. The more stringent design standard must be used to determine the sight distance at intersections.

### 5.6 AUXILIARY LANES

Auxiliary lanes must be provided at subdivisions and commercial sites when warranted in accordance with the LDC. The criteria for the minimum length of auxiliary lanes and tapers at intersections must be determined by criteria in Chapter 212 of the FDOT Design Manual. Queue lengths for required turn lanes must, at a minimum, be equal to the value required by the analysis outputs. Notwithstanding the foregoing, turn lanes are to be sized as depicted in Table 5-2 below:

**Table 5-2: Minimum Queue Lengths\***

| Turn Lane Type | Project Location          |                           |
|----------------|---------------------------|---------------------------|
|                | Within Urban Service Area | Within Rural Service Area |
| Left           | 100                       | 50                        |
| Right          | 50                        | 50                        |
| Freeflow Right | 0                         | 0                         |

\*Unless otherwise required by analysis

## **5.7 MEDIAN OPENINGS**

- 5.7.1 Opening widths for medians are dependent on several factors such as control radii, width of traffic separators and the skew angle of side streets. Openings at divided side streets will vary with side street median widths. The length of a median opening must not be less than 40 feet.
- 5.7.2 Whenever possible, driveways must be located at existing median openings.
- 5.7.3 All new median openings must provide adequate left-turn storage to existing and proposed driveways and roadways.

## **5.8 DRIVEWAYS**

- 5.8.1 Driveway design must conform to Part 6.04 Access Management of the LDC and the criteria described in this manual. Driveways located on local roads will be constructed using Driveway Typical Details TD-7. Refer to Section 12.12 of this manual for driveways located on collector and arterial roads.
- 5.8.2 Profiles: Driveway profiles must conform to the requirements of FDM Chapter 214 Driveways and FDOT Standard Plan 522-003.
- 5.8.3 Thickness Requirements
  - 5.8.3.1 All concrete driveway aprons and driveways must be a minimum of six inches thick and must only be constructed with Class I concrete.
  - 5.8.3.2 The use of curbs on driveways will require pedestrian (accessible) ramps where the sidewalk meets the driveways.
  - 5.8.3.3 Expansion joints are required where the apron meets back-of-curb and sidewalks meet the driveway apron, unless poured monolithically.
- 5.8.4 Limits of Construction
  - 5.8.4.1 All driveways must be constructed from the edge of the roadway pavement to the right-of-way line.
  - 5.8.4.2 County lift station driveways must be constructed from the back of curb, or edge of pavement, to the lift station. Grading and site work is to be per Specification 333003 of the Hillsborough County Water, Wastewater and Reclaimed Water Technical Specifications.

## SECTION 6.0 PAVEMENT MARKINGS AND SIGNING

### 6.1 GENERAL

- 6.1.1 Pavement markings and signing plans must be submitted for any roadway with two or more lanes and as required for entrance ways, etc. Pavement markings, signal and signing plans and materials must meet Traffic Operations and Traffic Engineering requirements and conform to all criteria herein, including those applicable specifications contained in the latest edition of the following publications:
- FDOT – Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (Florida Greenbook)
  - US Department of Transportation, Federal Highway Administration – Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)
  - FDOT – Standard Specifications for Road and Bridge Construction AASHTO – A Policy on Geometric Design of Highways and Streets
  - FDOT – Design Standards for Construction Operations on the State Highway System (FDOT Design Standards) and associated Design Standard Revisions
  - Hillsborough County Roadway Maintenance Division Standards
  - Hillsborough County Public Works Standard Specifications for Construction
- 6.1.2 Supplemental criteria for post mounted street name sign fabrication and installation are as follows:
- 6.1.2.1 Background color must be green reflective sheeting, Type III, for public roadways. The street name legend size must be seven-inch, type “C” font with the first letter of each name capitalized followed by lower case lettering which must be 5-1/2 inch modified. The block number legend must be four-inch type “C” font and appear in the lower right of the sign. The street name extension must be abbreviated (i.e., “AVE”, “DR”, “ST”, “BLVD”) must be all capitalized, four-inch, type “C” font and appear in the upper right of the sign. Directional extensions (i.e., north, south, east, west) must be abbreviated with the first letter of the direction (i.e., “N”, “S”, “E”, “W”) in capitalized, six-inch, type “C” font and appear before the name of the street. All legend and border color must be white reflective sheeting, Type III. The border must be 3/4-inch wide at the perimeter of the sign. Reflective sheeting must comply with FDOT Standard Specifications for Road and Bridge Construction, Section 994.
- 6.1.2.2 The sign blades must be aluminum, 12 inches by 30 inches minimum to 12 inches by 48 inches maximum, with sign length variances in six-inch increments (i.e., 30-inch, 36-inch, 42-inch, and 48-inch). Sign blade length must be the minimum required incremental length to accommodate the required lettering with 1-1/2-inch clearance at both ends of the street name. Sign blade material must be in accordance with FDOT Standard Specifications for Road and Bridge Construction, Section 700.
- 6.1.2.3 All signs must be mounted on approved U channel, galvanized, 2.5 lb./ft., posts in accordance with FDOT Standard Specifications for Road and Bridge Construction, Section 700 and installed in accordance with the publications listed above.
- 6.1.2.4 For fabrication details refer to the Typical Details Drawing for post mounted street name signs.
- 6.1.2.5 Typical installation for street name signs at two multi-lane facilities is at the northeast and southwest corners on separate posts from the stop signs.



- 6.1.2.6 All traffic stop signs and street name signs must be mounted on separate posts from each other.
- 6.1.3 Internally illuminated street name signs must follow FDOT fabrication and installation standards and details.
  - 6.1.3.1 For fabrication and structural details, refer to the Typical Details for Internally Illuminated Street Name Signs.
  - 6.1.3.2 All approaches must have street name signs.
  - 6.1.3.3 Concrete or steel strain poles, overhead street name signs must be mounted on sign bracket arms attached to the strain pole in accordance with the FDOT Design Standards.
  - 6.1.3.4 Mast arm installations, overhead street name signs must be attached to the mast arm in accordance with the FDOT Standard Plans.
- 6.1.4 Supplemental criteria for pavement markings are as follows:
  - 6.1.4.1 All pavement markings must be alkaline base thermoplastic compound following FDOT Standard Specifications.
  - 6.1.4.2 All bike markings must be preformed thermoplastic.
  - 6.1.4.3 Raised pavement markers (RPMs) must be included with all markings and must use a bituminous adhesive material and follow FDOT Standard Plans

## **6.2 TRAFFIC CONTROL DEVICES AND STREET SIGNS**

- 6.2.1 The developer is to be responsible for the installation and associated costs for required traffic control devices including but not limited to signals, pavement markings and signing.
- 6.2.2 After receiving approval for street names and block assignments from the appropriate reviewing agency based on the final plat review, the developer is to be responsible for the purchase and installation of all signals, pavement markings and signage approved through the subdivision and site development review processes.
- 6.2.3 All required traffic control devices must be properly installed. Prior to acceptance of infrastructure improvements for subdivision developments, or certificates of occupancy (C.O.'s) for commercial developments, PWA must approve signing and pavement markings and the signalization and appurtenances.

## **6.3 PRIVATE DEVELOPMENTS**

- 6.3.1 Private developments is to be subject to the same requirements listed in Section 6.2.
- 6.3.2 Street marker signing for private roads must have the same requirements as signing for public roads (See Section 6.1); however, private road background color must be blue reflective sheeting, Type III, with the legend "PRIVATE ROAD" in all capitalized, two-inch, white, type "C" font centered under the street name.



## **SECTION 7.0 SIGNALIZATION**

### **7.1 GENERAL**

- 7.1.1 Mast arm designs must be utilized along urban roadways with curb and gutter for the installation of traffic signals, overhead signs and advance overhead flashing school signs.
- 7.1.2 Either concrete or steel strain poles (span box design) may be used with the approval of the PWA if one or more of the following conditions exist:
  - 7.1.2.1 Lack of sufficient right-of-way or excessive cost.
  - 7.1.2.2 Schedule would be affected due to design and/or delivery time.
  - 7.1.2.3 The relocation of utilities would not be cost effective.
  - 7.1.2.4 The width of the intersecting roadway would require excessively long mast arms.

### **7.2 DESIGN**

- 7.2.1 The design must be in accordance with the AASHTO "LRFD Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals", FDOT Standard Plans and FDOT Standard Specifications for Road and Bridge Construction and Hillsborough County's Public Works Standard Specifications for Construction.
- 7.2.2 Approved mast arm shapes must include one of the following:
  - 7.2.2.1 Tapered tubular shaft
  - 7.2.2.2 Swaged step-tapered shaft
  - 7.2.2.3 Sixteen-sided tapered shaft
  - 7.2.2.4 Tubular shaft (constant diameter)
- 7.2.3 The latest FDOT Mast Arm, General Notes, Mast Arm details and Pole Schedule must be utilized and made part of the plan set. The end of the mast arm must extend to the inside edge of the left-turn lane closest to the median.
- 7.2.4 Structural design to assume wind loading due to back plates including future left-turn phases and one additional traffic sign. All traffic signal heads must have tunnel visors and back plates with reflective yellow borders.
- 7.2.5 Lighting will not be placed on the mast arm structure. Signalized intersections must include street lighting on separate poles. Lighting design must include vertical illuminance calculations for pedestrian visibility as identified in FDOT Design Manual Chapter 231 for Lighting.
- 7.2.6 All signalized intersections must include LED signals, LED countdown international symbol pedestrian signals, advance street name signs, and internally illuminated LED street name signs on all roadway approaches that do not service an isolated area.
- 7.2.7 All signals must include interconnect communications. Fiber optic cable is the standard required by Hillsborough County Traffic Engineering.
- 7.2.8 All signalized intersections must provide pedestrian crosswalks and associated pedestrian signal equipment on every street approach to the intersection.

## SECTION 8.0 PAVEMENT DESIGN

### 8.1 GENERAL

- 8.1.1 The EOR must submit a signed and sealed flexible pavement design report with sufficient documentation, which includes but not limited to calculations, plan sheets, documentation of any variances or coordination with local municipalities, design high water (DHW) elevation, projected Design Year AADT of proposed roadway, Design Year 18-kip (Equivalent Single Axle Loads) ESALD calculations, LBR test results and a quality control checklist, to DSD for review and approval.
- 8.1.2 The standards denoted in this section represent the minimum requirements that must be met for flexible pavement design for new construction within Hillsborough County. For new collector roadways and widening existing roadways reference Section 12 of this manual.
- 8.1.3 Superpave asphalt is required on all roads that are within Hillsborough County jurisdiction. No substitutions will be allowed for other mixes.
- 8.1.4 Pavement design for new construction must be in accordance with the criteria as set forth in the FDOT Flexible Pavement Design Manual with the following exceptions:
- 8.1.4.1 The Required Structural Number (SNR) for any pavement design must not be less than 2.3 for local residential roads and 2.5 for all other classifications of roadways.
  - 8.1.4.2 The structural coefficient for any Class II Crushed Concrete to be used in a proposed base must not exceed 0.18 per inch.
  - 8.1.4.3 The structural coefficient for in-situ or in-place roadbed soils having an existing or stabilized Limerock Bearing Ratio (LBR) minimum value of 20 beneath a proposed soil cement base must not exceed 0.04 per inch. A copy of the LBR test results must be submitted when using the 0.04-layer coefficient for in-place or in-situ soil beneath a proposed soil cement base.
  - 8.1.4.4 The structural coefficient for Recycled Asphalt Pavement (RAP) Base having a minimum LBR of 40 must not exceed 0.08 per inch. A copy of the LBR test results must be submitted when using the 0.08-layer coefficient for a proposed RAP base.
  - 8.1.4.5 The use of a Performance Grade (PG) binder may permit the ground tire rubber requirement to be omitted from friction courses.
  - 8.1.4.6 Equivalent AC grades of asphalt may be used in lieu of PG binders.
  - 8.1.4.7 Reliability factor (%R) for new construction on local roads must not be less than 80.
  - 8.1.4.8 The following pavement designs, which do not require underdrain with at least one-foot clearance of the SHGWT from the bottom of the base at the low edge of pavement, may be used with documentation proving that the in-situ or in place soil has a LBR of 20 or higher in lieu of a signed and sealed flexible pavement design in accordance with the FDOT Flexible Pavement Design Manual. It should be noted that in addition to this thicker pavement structure for one-foot base clearance, significant construction problems are likely and dewatering may be required to achieve compaction.:
    - a) The structural course must be a minimum of 1 ½ inches, optional base group 5 (including crushed concrete) and 12 inches of type “B” stabilization (LBR 40).
    - b) The structural course must be a minimum of 1 ¾ inches with 11 inches of soil cement (300 psi, plant mixed) and 12 inches compacted in place soils (LBR 20) as the stabilization

- 8.1.5 Any variation of pavement design or materials not conforming specifically to the guidelines set forth herein and/or the FDOT Flexible Pavement Design Manual must require a prior written approval from the County Engineer.

## **8.2 STABILIZED SUBGRADE FOR FLEXIBLE PAVEMENT**

- 8.2.1 Stabilized subgrade must meet the requirements of Section 160 of the FDOT Standard Specifications for Road and Bridge Construction and as noted below.
- 8.2.2 All proposed subgrades with the exception of those beneath a proposed soil cement base must have a minimum LBR of 40 and meet the density requirements outlined in APPENDIX E: Testing Schedule. The proposed depth must not be less than the depths noted below for the specific roadway classification:

**Table 8-1: Stabilized Subgrade Minimum Thickness**

| Type of Development | Roadway Classification | Stabilized Subgrade Minimum Thickness |
|---------------------|------------------------|---------------------------------------|
| Residential         | Local Road             | 6"                                    |
|                     | Collector Road         | 12"                                   |
| Commercial          | Local Road             | 12"                                   |
|                     | Collector Road         | 12"                                   |

- 8.2.2.1 The subgrade for soil cement must be proof rolled with suitable compaction equipment to meet the density requirements outlined in APPENDIX E: Testing Schedule for a minimum depth of 12 inches. The subgrade beneath a proposed soil cement base must have a minimum (LBR) of 20. Any existing soil meeting the density and LBR criteria specified above may remain in place and the associated structural value utilized in the proposed pavement design.

## **8.3 BASE COURSES FOR FLEXIBLE PAVEMENT**

- 8.3.1 All base courses must meet the general requirements of Section 285 of the FDOT Standard Specifications for Road and Bridge Construction and FDOT Design Standard 514 as well as the specific specification requirements for each particular type of base course to be used. The approved base courses for use are as follows: limerock, shell, plant produced soil cement, crushed concrete, recycled asphalt pavement (RAP) and asphalt. In no case must the soil bearing value or density be less than that specified in the FDOT Standard Specifications for Road and Bridge Construction. The base course thickness for each road classification must not be less than those specified in the following table:

**Table 8-2: Minimum Base Course Thickness**

| Type of Development | Roadway Classification | Base Course Minimum Thickness |
|---------------------|------------------------|-------------------------------|
| Residential         | Local Road             | 6"                            |
|                     | Collector Road         | 8"                            |
| Commercial          | Local Road             | 8"                            |
|                     | Collector Road         | 8"                            |

- 8.3.2 Limerock Base: Must meet the requirements of Section 200 of the FDOT Standard Specifications for Road and Bridge Construction
- 8.3.3 Shell Base: Must meet the requirements of Section 285 of the FDOT Standard Specifications for Road and Bridge Construction
- 8.3.4 Plant Produced Soil Cement Base
- 8.3.4.1 The use of mixed-in place soil cement is prohibited. Plant produced soil cement base must meet the requirements of Section 285 of the current FDOT Standard Specifications for Road and Bridge Construction and as noted below. Soil cement base must only be used for on-site local roads and is not to be used on collectors or arterials whether they are onsite or offsite.
- 8.3.4.2 The design mix (300 PSI) must be prepared by an Independent testing laboratory accredited by AASHTO, CMEC or FHWA approved in the State of Florida. The design mix submittal must be submitted to DSD.
- 8.3.4.3 180 psi, which is sixty percent (60%) of the design compressive strength of 300 psi, must be achieved in seven days. If this criterion is not met, the material must be removed and replaced.
- 8.3.4.4 Test cores must be taken after seven days to verify thickness. The average core thickness must not exceed the specified design thickness by more than one inch. Individual cores must not be deficient by more than one-half inch from the specified design thickness.
- 8.3.4.5 Prior to paving, there must be a 14-day curing time unless a geo-textile membrane is utilized.
- 8.3.5 Superpave Asphalt Base: Type B-12.5 Asphaltic Concrete must meet the requirements of Section 234 of the FDOT Standard Specifications for Road and Bridge Construction.
- 8.3.6 Reclaimed Asphalt Pavement (RAP) Base: Must meet the requirements of Section 283 of the FDOT Standard Specifications for Road and Bridge Construction
- 8.3.7 Crushed Concrete Base: Must meet the requirements for crushed concrete base as specified in the Guidelines for Technical Specifications in the APPENDIX of this manual

## **8.4 STRUCTURAL COURSES FOR FLEXIBLE PAVEMENT**

- 8.4.1 Structural courses for flexible pavements is to be Type SP Superpave Asphaltic Concrete. The requirements of Section 330 and 334 of the Hillsborough County Specifications must be met. Incidental items such as prime and tack coats must conform to the FDOT Standard Specifications for Road and Bridge Construction.

- 8.4.2 The design mix for Asphaltic Concrete must be prepared by an accredited testing laboratory (CMEC, AASHTO or FHWA Approved in the State of Florida) and conditionally verified by the FDOT Central Bituminous Laboratory or its designee prior to use in the field.
- 8.4.3 Structural courses must meet the following minimum thickness requirements:

**Table 8-3: Minimum Asphaltic Concrete Structural Course Thickness Requirements**

| Type of Development | Roadway Classification | Asphaltic Concrete Structural Course |
|---------------------|------------------------|--------------------------------------|
| Residential         | Local Road             | 1 ½"                                 |
|                     | Collector Road         | 2"                                   |
| Commercial          | Local Road             | 2 ½"                                 |
|                     | Collector Road         | 2 ½"                                 |

- 8.4.4 It is recommended that on multiple lift structural courses, the top structural lift of Asphaltic Concrete be laid at a minimum spread rate of 105 lb/sy or one inch in thickness.
- 8.4.5 Valid plant assignment sheets are to be submitted by the EOR to PWA, Construction Management Section prior to commencing production. Testing frequencies during production must be in accordance with the Testing Schedule of this manual.

## 8.5 FRICTION COURSE

All proposed friction courses must meet the requirements of the FDOT Flexible Pavement Design Manual, Section 337 of the FDOT Standard Specifications for Road and Bridge Construction and as noted in Table 8-4.

**Table 8-4: CQC Friction Course Requirements**

| Design Speed   | Two-Lane Roads       | Multi-Lane Roads     |
|--|----------------------|----------------------|
| Local Roads with AADT less than 3000 vpd or that are less than 1000' in length | SP Structural Course | SP Structural Course |
| 35 mph thru 45 mph   | FC-9.5 or FC-12.5    | FC-9.5 or FC-12.5    |
| 50 mph or Greater  | FC-9.5 or FC-12.5    | FC-5                 |

## 8.6 ALTERNATE PAVEMENTS

- 8.6.1 Portland Cement Concrete Pavement
- 8.6.1.1 Concrete pavement design for new construction must be in accordance with the criteria as set forth in the FDOT Rigid Pavement Design Manual.
- 8.6.1.2 Concrete pavement must meet the requirements of Section 350 of the FDOT Standard Specifications for Road and Bridge Construction and FDOT Design Standards 287, 305 and 505.
- 8.6.2 Bomanite Pavement: Bomanite Pavements must meet the requirements for Portland Cement Concrete Pavement. The developer or his authorized representative must submit to the DSD's Engineering Review Team specifications confirming adherence to these regulations for approval. Bomanite Pavements must only be used on roads with design speeds less than 35 mph.

- 8.6.3 Architectural Pavers: Architectural Pavers may be used subject to the approval of the County. The developer or his authorized representative must submit PWA, for approval, manufacturer's literature and technical specifications regarding the structural strength, skid resistance, and subgrade requirements per Section 526 of FDOT Standard Specifications for Road and Bridge Construction. Architectural pavers must only be used on roads with design speeds less than 35 mph.
- 8.6.4 White Topping at Existing Intersections: The use of White topping at intersections is subject to review and approval of the PWA. White topping may be used at existing intersections where significant rutting has been observed or in areas where the anticipated volume of trucks to utilize the roadway will be significant. The use of a White topping option will require the submission of documentation that the contractor has two years of experience in laying the proposed White topping alternative and the specialty engineer has two years of experience in designing the said White topping alternative. The EOR must submit a copy of technical specifications to the PWA, for approval, for this type of construction prior to use on County roads.
- 8.6.5 Stamped Asphalt: Stamped asphalt may be placed at commercial and residential roads, crosswalks in subdivisions, subdivision entrances, sidewalks and driveways as long as the following criteria are met: The asphalt surface layer must have a minimum thickness of 1.5 inches consisting of the appropriate type mixture that meets Hillsborough County design standards. Stamped asphalt utilized on sidewalks must meet latest ADA standards. The contractor performing this type of work must be an experienced applicator of stamped asphalt for a minimum of two years. All stamped asphalt must be constructed and maintained by the subdivision association. Stamped asphalt replaced by Hillsborough County will be replaced with standard county asphalt pavement.

## **8.7 DESIGN REQUIREMENTS**

- 8.7.1 The following design requirements must be taken into account during the design and construction process:
- 8.7.2 The EOR must sign and seal and submit all technical specifications for use with pavement designs to PWA prior to use on a project.
- 8.7.3 Any in-place soil below the proposed base having been designated as a Group Classification of A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7 and A-8 must be removed and replaced with suitable material in accordance with the depths and limits shown in the FDOT Standard Plans 120-001 and 120-002.
- 8.7.4 For Design Criteria on Roadway Base Clearance and Low Edge of Pavement Elevation refer to Chapter 12, Table 12-1 of the Stormwater Management Technical Manual.
- 8.7.5 The EOR must submit all proposed mix designs that are to be utilized on a project prior to production and placement of the said material to the PWA's Construction Services Manager for review and approval. The EOR is to provide a copy of the approved mix designs to the County inspector assigned to that specific project.
- 8.7.6 During construction, all material certifications and approved mix designs are to be submitted on a timely basis and in accordance with FDOT Standard Specifications for Road and Bridge Construction by the EOR to the PWA's Construction Services Manager for review, and for As-Built records.

- 8.7.7 The standards/criteria contained within this section address only the minimum typical pavement design situations, as it is impractical to attempt to define rules that would apply to every conceivable situation.



## **SECTION 9.0 BRIDGE DESIGN**

### **9.1 DEFINITION**

- 9.1.1 A bridge is defined as a structure with a span greater than or equal to 20 feet between abutments, spring lines of arches, or inside faces of outboard stems for multiple cells. When the span ranges from 20 feet to 24 feet, an order of magnitude cost comparison will be made to determine if a bridge or culvert is the chosen structure type based on lowest cost. Spans greater than 24 feet will be designated as a bridge.
- 9.1.2 The County does not consider the following items to be a bridge:
- 9.1.2.1 Any individual pipe or series of pipes crossing a road.
  - 9.1.2.2 Culverts with a span between inside faces of outboard stems less than 20 feet.

### **9.2 OBJECTIVES**

Hillsborough County maintains, rehabilitates and, if necessary, replaces bridges within the County under its jurisdiction. Bridge design and construction, whether initiated by the County or a developer, must comply with the same latest design and construction specifications and possess the same quality and standards as set forth in the following criteria.

### **9.3 DESIGN SPECIFICATIONS**

- 9.3.1 Bridge design must be in accordance with the AASHTO Standard Specifications for Highway Bridges and the FDOT Structures Manual.
- 9.3.2 The bridge design live load must be HS25-44; however, the engineer must verify the bridge adequacy for all Florida legal loads (SU2, SU3, SU4, C3, C4, C5 and ST5).
- 9.3.3 For example, SU2 is a two-axle single unit truck, and C3 is a three-axle tractor-trailer combination truck.
- 9.3.4 Concrete covers will be in accordance with the FDOT Structures Manual. Any deviations or additions must be submitted to the County Engineer at [PW-CEIntake@hillsboroughcounty.org](mailto:PW-CEIntake@hillsboroughcounty.org) for review and approval as a design exception.
- 9.3.5 No vehicular timber bridges are allowed.

### **9.4 CONSTRUCTION SPECIFICATIONS**

Construction must conform to the FDOT Standard Specifications for Road and Bridge Construction.

### **9.5 TESTING**

Testing must be performed and reports must be submitted to PWA's Construction Services as required by the specifications. Material specifications, methods of sampling, and testing procedures must conform to ASTM Standard Specifications.



## **9.6 PLANS PREPARATION**

- 9.6.1 Bridge plans must be prepared and assembled in accordance with the FDOT Design Manual.
- 9.6.2 Bridge plans must be prepared and submitted in two stages: preliminary plans and final plans. In each stage, plans must be submitted to the PWA, via DSD, for review and approval.
- 9.6.3 The bridge design calculations and plans must be signed, sealed and dated by a Professional Engineer licensed in the State of Florida who practices as a Structural Engineer.

## **9.7 PEDESTRIAN WALKWAYS**

- 9.7.1 Pedestrian walkways must be designed in accordance with the AASHTO Guide Specifications for the Design of Pedestrian Bridges and the AASHTO Standard Specifications for Highway Bridges. Construction must conform to the FDOT Standard Specifications for Road and Bridge Construction. Testing and plans preparation must be as stipulated in Sections 9.5 and 9.6 above.
- 9.7.2 The cross slope of the walkway is to be preferably flat, but must not exceed two percent. The walkway must meet ADA requirements.
- 9.7.3 Pedestrian walkways must have a minimum railing height of three feet, six inches. When walkways are to be used by both pedestrians and bicyclists, the minimum railing height must be four feet.

## **SECTION 10.0 LANDSCAPING AND TREE PRESERVATION**

### **10.1 GENERAL**

- 10.1.1 Landscape design, vegetation planting, and tree preservation provisions must conform to the requirements of the Natural Resources Section of the LDC, FDOT Highway Landscape Design Guide, FDOT Rule Chapter 14-40, “Highway Landscape Improvements”, LDC's Landscape and Buffering Section and the Guidelines for Landscaping Hillsborough County Roadways, and the requirements of this manual. The most stringent design standard must be used.
- 10.1.2 Major tree preservation and the minimizing of the removal of trees that will not conflict with the standards of this manual are considered an important concept in landscape design by Hillsborough County.
- 10.1.3 The preparation of landscape plans in Hillsborough County must be signed and sealed by a Florida registered Landscape Architect in conformance with Chapter 481 of the Florida Statutes.
- 10.1.4 The Florida Highway Landscape Guide and provisions as noted in this manual must be used in the design of roadway projects to coordinate the application of approved roadway design standards in the development of roadway landscape plans.

### **10.2 HORIZONTAL CLEARANCE**

- 10.2.1 The horizontal clearance for trees is that they must be located outside the clear zone. There can be no fixed objects within the limits of the horizontal clearance area that would prevent an errant vehicle from recovering. In roadway landscape design, all plantings within the horizontal clearance area must have a trunk diameter of four inches or less when measured six inches above the ground when at maturity. Horizontal clearance and clear zone criteria are based on the type of highway design (rural or urban) and the design speed of the highway.
- 10.2.2 Urban Roads and Collectors: Reference Part 2, Chapter 215 of the FDOT Design Manual for horizontal clear zone requirements on local urban roads and collectors.
- 10.2.3 Rural Roads and Collectors
  - 10.2.3.1 Reference Part 2, Chapter 215 of the FDOT Design Manual for horizontal clear zone requirements on local rural roads and collectors.
  - 10.2.3.2 When trees are installed along the outer roadside of rural highways, they must be outside the horizontal clearance area.
- 10.2.4 Intersection Clear Site Requirements
  - 10.2.4.1 Clear-sight distance is required at intersections, median openings and driveways connections. These distances must be provided per the requirements of Chapter 210 of the FDOT Design Manual.
  - 10.2.4.2 The sight datum line for clear-sight windows at intersections is established from the point of the driver's eye on the side street to the point of the driver's eye on the main highway. The design location for the end of the datum line on the side street is 3.5 feet above the pavement at the driver's stop location 20 feet from the through lane. The design location for the end of the datum line on the main highway is 3.5 feet above the pavement at the

point being checked. A clear-sight window must be maintained five feet above and 1.5 feet below the site datum line. See the Landscaping Clear Site Window for Medians Typical Details drawings in this manual for clear sight window standards.

### **10.3 VERTICAL CLEARANCES**

All sidewalks and pedestrian crossing areas should be maintained free of all obstructions and growth. See Landscaping Vertical Clearances and Clear Site Window for Medians Typical Details drawings in this manual for vertical clearance standards.

### **10.4 TREE PRESERVATION**

- 10.4.1 **Tree Well/Aeration Systems:** A tree well/aeration system is used when the proposed finished grade within the critical root zone exceeds the natural grade by eight inches or more. The critical root zone represents that portion of a tree's root system equivalent to an area of a one-foot radius for each inch diameter of the tree's trunk measured 4.5 feet above the natural grade (i.e. a 12-inch diameter tree has a critical root zone of 12 feet radius from the tree's trunk). See additional guidelines on tree well/aeration systems in the Tree Protection, Typical Details.
- 10.4.2 **Retaining Wall:** A retaining wall is used when the proposed finished grade within a tree's critical root zone is below the natural grade. The installation of a retaining wall must be placed no nearer the tree's trunk than three times the trunk diameter measured at 4.5 feet above the natural grade and when no more than 30% of the tree's root system will be severed. Prior to the finished grade adjustments and retaining wall installation, prune the tree's roots with a Dosko root cutter or equivalent where the retaining wall is to be installed. See additional guidelines on retaining walls in the Tree Protection Typical Details.
- 10.4.3 **Pervious Pavement:** Pervious pavement may be applied when the proposed finished grade within a tree's critical root zone does not exceed the natural grade by more than eight inches with predominantly sandy textured fill. Various pervious materials such as paver bricks, turf block and porous concrete are acceptable. Curbing proposed at the perimeter of the pavement material must be designed to not sever the root system the pervious pavement is to protect. Extruded curb, pin curbs or other similar designs are necessary to minimize root disturbance. See additional guidelines on pervious pavement in the Tree Protection Typical Details.
- 10.4.4 **Cantilevering:** Bridging the root system of protected trees may be necessary for the installation of buffer walls or other similar vertical structures.
- 10.4.5 **Root Pruning:** Root pruning is to be an important consideration when land alteration activity is proposed within a tree's critical root zone. Root pruning must be effectively performed to promote desired wound wood production and to discourage a root's infection by root-rotting fungi. Effective root pruning represents a clean, even cut and discourages a torn, jagged result.
- 10.4.6 **Tree Protection Barriers:** Refer to the guidelines on tree protection barriers in the Tree Protection Typical Details drawings in this manual.
- 10.4.7 **Tree Pruning:** All tree pruning must conform to the pruning standards as specified in the Tree Protection Typical Details drawings in this manual and the National Resources Section of the LDC. These standards refer to the American National Standards Institute (ANSI) A-300 Pruning Standards.

- 10.4.8 Sidewalk Protection from Street Trees: When street trees are required to be provided by the LDC or other regulation/criteria, sidewalk protection at the tree are required. The length of the required protection must be five feet on either side of the centerline (longitudinally) of the required tree. For additional information, refer to Sidewalk Protection Options Typical Details drawing in this manual.

## **SECTION 11.0 CONSTRUCTION PLANS SUBMITTAL**

### **11.1 SUBMITTAL PROCESS**

The County has implemented an electronic submittal process. The “Electronic Submittal Process for Site Development Plans” can be found online at [HCFLGov.net](https://www.hcflgov.net) (under Departments, Development Services, Land Development).

### **11.2 SUBMITTAL REQUIREMENTS**

- 11.2.1 All submittals must be provided in digital format. CAD files are to be converted to Adobe file format (.pdf) and set to print at 24 inches by 36 inches. Other formatting procedures and requirements are described on the above website. Initial submittals are scheduled by appointment through the DSD and assigned a Case Manager that will process and follow the project from beginning to end. Re-submittals are submitted through the PGM Store online using the Optix system and for now hard copies are still required to be turned in through the DSD. The standard sheet size for construction plans submitted to the County for review must be 24 inches by 36-inches. Work sheets and data sheets used in preliminary design work and reviews are not limited to any size, except that which is convenient to handle.
- 11.2.2 The following statement must be shown on the Cover Sheet: Construction must be in accordance with the Hillsborough County LDC; Stormwater Management Technical Manual; Transportation Technical Manual for Subdivision and Site Development Projects; Water, Wastewater and Reclaimed Water Manual; the FDOT Standard Specifications; and FDOT Standard Plans.
- 11.2.3 Final record drawings must be submitted in accordance with Hillsborough County Specifications, Section 01300.

## **SECTION 12.0 ON-SITE COLLECTORS AND OFF-SITE ROADS**

### **12.1 GENERAL**

12.1.1 This section provides general guidance for the design and plans production of roads designated as collectors and arterials, whether on-site or off-site. The governing design criteria for Hillsborough County roads classified as collectors and arterials are the latest versions of the following:

- Hillsborough County Public Works Standards for Construction
- Hillsborough County preferences specified by applicable Hillsborough County Transportation Design Bulletins
- Hillsborough County, Stormwater Technical Manual
- All other Hillsborough County manuals
- FDOT Design Manual (FDM)
- FDOT Standard Plans for Road and Bridge Construction
- FDOT Standard Specifications for Road and Bridge Construction
- All other FDOT manuals

12.1.2 Transportation improvements on roads designated as collectors and arterials must meet all DRI, concurrency, developer agreements, zoning conditions, Hillsborough County's LDC, and the design criteria specified in Section 12.1.1 of this manual, and submitted to DSD for processing. Where a safety-related discrepancy exists between the requirements of a zoning condition and the criteria established by the PWA, the County Engineer will determine the most appropriate criteria.

12.1.3 Design of the following project types will be submitted through DSD to TSD for review:

- Signals
- Rectangular Rapid Flashing Beacons (RRFBs)
- Roundabouts
- Mid-block crossings
- Intelligent Transportation Systems (ITS)
- Lighting (Intersections and Corridors)
- School Zones
- Bridges
- Addition of/modification to thru or turn lane at County-signalized intersection
- Addition of/modification of Ped push button/pole at new/relocated curb ramps

### **12.2 OFF-SITE ROAD DESIGN CRITERIA**

All roads classified as collectors and arterials, whether it be on-site or off-site, must be designed in accordance with the design criteria specified in Section 12.1.1 of this manual. The Florida Greenbook criterion does not apply to County roads designated as arterials or collectors. The design criteria for these facilities must be submitted for review to the DSD and the PWA along with the formal submission of the plans. Refer to Section 12.1.3 of this manual for plans that must be reviewed by PWA's Technical Services Division.

### **12.3 DESIGN COORDINATION**

12.3.1 Prior to starting a design, it is highly recommended that the EOR meet with the PWA to obtain critical design and plans production guidelines required by the County. The intent of this pre-design

meeting is to allow the EOR to confirm specific design criteria in order to move forward with the design and to prevent unnecessary re-submittals. Such things as design speed, layout, potential design exceptions, typical section requirements, bike lanes, pavement design, pavement milling and resurfacing requirements, required check list, etc. are discussed and agreed upon. Checklists of required data for various stages of design are available and presented at these meetings. Following are the recommended minimum number of meetings:

- 12.3.1.1 Simple Projects: For simple projects, it is recommended that a pre-design or no later than 60% design completion meeting be held. A minimum of one meeting is recommended.
- 12.3.1.2 Complex or Large Projects: For complex or large projects, it is recommended that a preliminary layout and design criteria coordination meeting, a pre-submittal meeting prior to the 60% submittal and a final 100% submittal meeting (depending on the complexity of the project) be held. A minimum of two meetings are recommended.
- 12.3.1.3 The above are minimum recommendations; The EOR can request as many meetings as necessary to establish and confirm any County requirements or discuss review comments concerning the roadway improvements.

## **12.4 DESIGN EXCEPTIONS AND DESIGN DEVIATIONS MEMORANDUMS**

- 12.4.1 A Design Exception (DE) or Design Deviation Memorandum (DDM) is an approval issued by the County to permit variations from applicable standards submitted by the EOR. The DE or DDM may be granted based on a signed and sealed report explaining the rationale used and the compelling reasons for a change in the criteria. The DE and DDM procedures are presented in Sections 1.7.2 thru 1.7.6 of this manual.
- 12.4.2 Off-site design exceptions are intended for roads currently in Hillsborough County jurisdiction. All DE and DDM requests are to be submitted to DSD for processing. All off-site requests must be submitted to the County Engineer at [PW-CEIntake@hillsboroughcounty.org](mailto:PW-CEIntake@hillsboroughcounty.org) for approval.

## **12.5 TYPICAL SECTION**

The typical sections found in this manual, while applicable to off-site improvements in some instances, should not be used for off-site roadway projects. A typical section package must be prepared for off-site roads. The appropriate typical sections for a project are to be determined during the design coordination meeting. A typical section must be provided for each proposed road. Separate typical sections must be developed for a road where the typical section elements vary significantly to warrant the need of additional typical sections.

## **12.6 PLANS**

- 12.6.1 Plans for off-site work that is permitted separately from the on-site must follow the requirements of Section 12.6.
- 12.6.2 Plan Set Format: In order to be considered for review, the construction plan set must be prepared in accordance with the format specified below:
- 12.6.3 Construction plan set sheets will be assembled in the following order:
  - Key sheet
  - Design criteria
  - Geometric layout/project layout (one master site plan)



- Drainage maps
- Survey – reference points (if pertinent information is not placed in geometric layout/project layout sheets)
- Summary of quantities
- General notes
- Typical section
- Roadway plan and profile sheets
- Intersection details
- Special details/special profiles
- Drainage structure sheets
- Cross sections/driveway half sections
- Signing and pavement marking plans
- Signalization plans
- Lighting plans
- Utility plans/adjustments (if pertinent information is not placed in plan and profile sheets)
- Landscape plans
- Mitigation plans
- Structural plans (board walk, box culverts, etc.)
- Roadway soil survey
- Sediment and Erosion Control Plan

12.6.4 A complete index of off-site plan sheets must be placed on the left of the cover sheet (key sheet) under the heading “Index of Roadway Plans”. For an extensive list of what is required for inclusion in a plan set, see Part 3 of the FDOT Design Manual.

12.6.5 The baseline (BL) survey and/or centerline (CL) of construction must be established and tied to the State Plane Coordinates.

12.6.6 Cross Section Elements (Off-Site Only)

12.6.6.1 Cross sections must depict the existing ground conditions with all its elements and the proposed conditions with all its elements. The sections are to be perpendicular to the construction centerline (Construction CL) or survey baseline (Survey BL). Existing elements are to be shown with dashed lines and the proposed elements are to be shown with solid lines.

12.6.6.2 Cross sections are to be provided as needed and at critical locations. Cross section preparation is to follow the latest FDOT Design Manual . The required information will include, but is not limited to, existing and proposed pavement, curb, sidewalks; normal and seasonal high-water elevations; soil borings; special ditch bottom elevations; existing underground utilities; existing and proposed right-of way lines and easements.

## 12.7 RIGHT-OF-WAY COORDINATION

12.7.1 The developer may be required to dedicate and convey additional right-of-way along the off-site roadway to safely accommodate the necessary improvements required due to the developments impact, ensuring that adequate border width or the necessary design requirements are satisfied.

12.7.2 The developer must determine the existing right-of-way, including maintained right-of-way, within

the limits of the proposed project by obtaining preliminary maps, tax assessor maps, record maps and property ownership maps from the County's Real Estate Department. Additional coordination with the PWA may be necessary for maintain right-of-way limits.

- 12.7.3 Right-of-way plan/construction drawings are to be submitted to the Survey Division in order to verify the process by which the right-of-way was determined and that the right-of-way is properly depicted on the construction drawings. The developer must receive concurrence from the County Surveyor prior to the submission of the plans to the DSD/PWA.
- 12.7.4 Proposed right-of-way lines must clearly be shown and labeled on the proposed design plans and updated throughout the design phase.

## **12.8 PUBLIC WORKS REVIEW**

- 12.8.1 The PWA Review Checklist should be completed by the EOR and included with the off-site plans submittals. These check lists can be obtained from PWA at any time or during the recommended pre-design meeting. It is recommended that plans be submitted for review at 30% to 60% (preliminary) and 100% (final) stages depending on the complexity of the roadway improvements. The EOR may choose to submit plans at any design stage, but the plans must be clearly labeled as preliminary or final. Plans labeled as preliminary do not need to be signed and sealed.
- 12.8.2 Prior to commencing construction within Hillsborough County Right-of-Way, video document the existing site conditions in accordance with Hillsborough County Specifications, Section 01385.

## **12.9 PAVEMENT DESIGN**

- 12.9.1 Pavement design must be in accordance with the criteria as set forth in the latest FDOT Flexible Pavement Design Manual with the following options:
  - 12.9.1.1 Option 1: Provide a detailed analysis based on traffic counts or forecasted counts for new collector roads following the guidelines in the FDOT Flexible Pavement Design Manual latest edition.
  - 12.9.1.2 Options 2: Perform cores and match the existing pavement as described in the Flexible Pavement Design Manual latest edition (For widening only).
  - 12.9.1.3 Option 3: The following pavement design may be used in lieu of options 1 and 2 (For widening only): The combined friction course and structural course must be a minimum of four inches, optional base group 9 (including crushed concrete) and 12 inches of type "B" stabilization (LBR 40).
- 12.9.2 Superpave Requirement: Superpave asphaltic concrete is required on all roads. No substitutions will be allowed for other mixes.
- 12.9.3 Roadway Base: Crushed concrete (LBR 150) is allowed for use on all roads. Soil cement base will not be permitted on off-site roads.

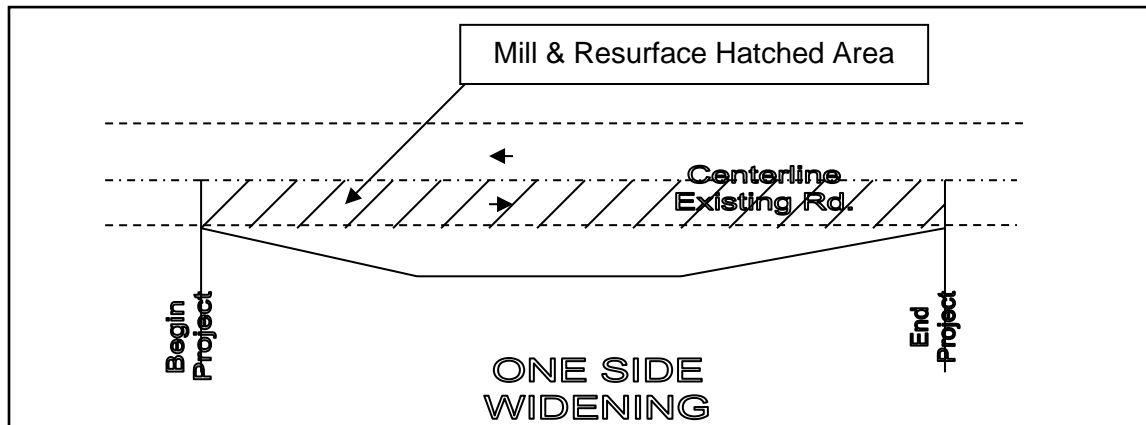
## **12.10 MILLING AND RESURFACING PROCEDURE**

- 12.10.1 Pavement cores may be required to determine the condition of the existing pavement (i.e. severe cracking is present) for off-site milling and resurfacing projects before any recommendations are made.

12.10.2 The following cases are applicable:

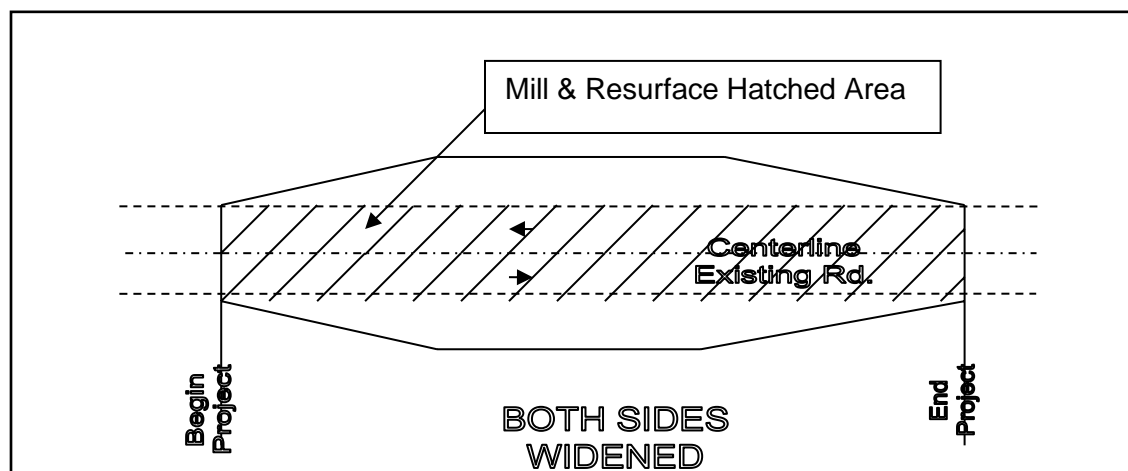
12.10.2.1 Widening on One Side: When widening is done on one side of an existing roadway then a minimum of 1½-inch milling and resurfacing is required between the begin and end limits of the project from outside EOP to center line of the existing roadway.

**Figure 12-1: Widening on One Side**



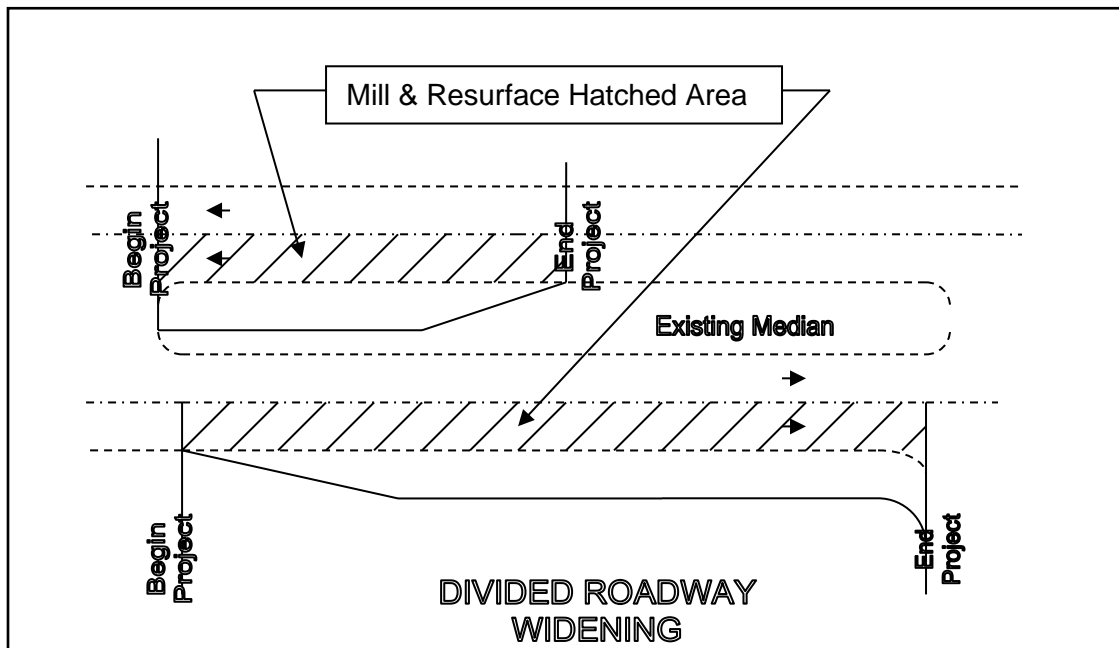
12.10.2.2 Widening on Both Sides: When widening is done on both sides of an existing roadway, a minimum of 1½-inch milling and resurfacing is required between the begin and end limits of the project for the entire width of the existing roadway.

**Figure 12-2: Widening on Both Sides**



- 12.10.2.3 Widening on a Divided Roadway: When widening is done adjacent to an existing divided roadway, a minimum of 1½-inch milling and resurfacing is required between the begin and end limits of the project for the adjacent lane. This includes proposed widening in the median area (left-turn lanes).

**Figure 12-3: Widening on a Divided Roadway**



- 12.10.2.4 For proposed improvements adjacent to existing roads that have been recently resurfaced, (three years or less at time of permitting and five years or less at time of construction) milling and resurfacing one foot of the adjacent lane (a minimum of one inch) may be considered. The PWA will have final determination.
- 12.10.2.5 When existing thermoplastic striping that crosses or is in the center of the lane is to be removed then a minimum of 1½-inch milling and resurfacing is required between the begin and end limits of the project for the entire width of that lane.
- 12.10.2.6 For conditions other than those depicted above, resurfacing limits will be at the discretion of and determined by the PWA.
- 12.10.2.7 The County reserves the right to increase the milling depth and required asphalt thickness in the design phase if existing conditions of the roadway warrant the need.

## 12.11 SURVEY MONUMENTATION

If the off-site construction operation destroys any baseline or centerline monumentation, it will be the developer's responsibility to re-establish it in the field.

## **12.12 DRIVEWAY CONNECTION PROFILES**

Driveway profiles will be developed for each off-site driveway impacted as part of the construction improvements. The profiles will be included at each submittal and will address how driveway connections will be made to existing adjacent properties. Driveway profiles are to be developed utilizing the guidelines in FDM Chapter 214 Driveways and FDOT Standard Plan 330-001 and 522-003.

## **12.13 STRIPING REMOVAL**

12.13.1 When removing striping from existing pavement, the following conditions may apply:

- 12.13.1.1 Condition 1: When the existing pavement markings or pavement messages are not within the wheel path of the travel lanes, grinding methods may be used for removal of the pavement markings up to 1,500 feet or as approved by the County. (Examples: skip & edge lines).
- 12.13.1.2 Condition 2: When the existing pavement markings are over the entire travel lane, then a one-inch layer of milling and resurfacing is required to remove pavement markings and maintain the coefficient of friction of the pavement. (Examples: Pavement turn arrows, messages & cross hatched areas).

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# APPENDIX A: ENGINEER OF RECORD CERTIFICATION

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## ENGINEER OF RECORD CERTIFICATION

I, \_\_\_\_\_, hereby certify that I am associated with the firm  
of \_\_\_\_\_ which has been retained by  
\_\_\_\_\_. I certify that I will function as the Engineer of Record  
for \_\_\_\_\_ Subdivision. I certify that I am licensed by the State of Florida as a Professional  
Engineer. I certify that I am licensed to perform engineering assignments in the discipline of Civil Engineering. I  
certify that my practice of Civil Engineering is covered by professional liability insurance in an amount not less than  
one hundred thousand dollars (\$100,000.00).

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_

\_\_\_\_\_  
Signature

Florida Professional Engineer No. \_\_\_\_\_

Affix Seal



---

# APPENDIX B: ENGINEER OF RECORD CERTIFICATION (CHANGE OF ENGINEER OF RECORD)

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## ENGINEER OF RECORD CERTIFICATION (CHANGE OF ENGINEER OF RECORD)

I, \_\_\_\_\_, hereby certify that I am associated with the firm of \_\_\_\_\_, which has been retained by \_\_\_\_\_. I certify that as of this date I will function as the Engineer of Record for \_\_\_\_\_ Subdivision.

I certify that I am licensed by the State of Florida as a Professional Engineer. I certify that I am licensed to perform engineering assignments in the discipline of Civil Engineering. I certify that my practice of Civil Engineering is covered by professional liability insurance in an amount not less than one hundred thousand dollars (\$100,000.00). The Engineer of Record for this subdivision prior to this date was \_\_\_\_\_, associated with the firm of \_\_\_\_\_ which was retained by \_\_\_\_\_.

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_

\_\_\_\_\_  
Signature

Florida Professional Engineer No. \_\_\_\_\_

Affix Seal

---

# APPENDIX C: ENGINEER OF RECORD CERTIFICATION OF CONSTRUCTION COMPLETED

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## ENGINEER OF RECORD CERTIFICATION OF CONSTRUCTION COMPLETION

I, \_\_\_\_\_, hereby certify that I am associated with the  
firm of \_\_\_\_\_, which has been retained by  
\_\_\_\_\_

I certify that construction of \_\_\_\_\_

Subdivision has been completed in substantial compliance with the Hillsborough County Land Development Code, Stormwater Management Technical Manual, Transportation Technical Manual for Subdivision and Site Development Projects, Water, Wastewater and Reclaimed Water Technical Manual, the FDOT Standard Specifications for Road and Bridge Construction, the FDOT Standard Plans, and the approved plans and specifications. I certify that these Record “As Built” Drawing plans have recorded any substantial design deviations due to field conflicts.

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_

\_\_\_\_\_  
Signature

Florida Professional Engineer No. \_\_\_\_\_

Affix Seal

No County agreement, approval, or acceptance is implied by this Record Drawing certification.

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# APPENDIX D: CONTRACTOR'S AFFIDAVIT

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## **CONTRACTOR'S AFFIDAVIT**

I/We as Contractor for the construction of the street, stormwater, water, wastewater and reclaimed water facilities for \_\_\_\_\_ Subdivision, having been first duly sworn, depose

and say: That all of the material used in the construction of the streets, stormwater, water, wastewater and reclaimed water facilities meet the requirements of the Hillsborough County Land Development Code, Stormwater Management Technical manual, Hillsborough County Transportation Technical Manual for Subdivision and Site Development Projects, Water, Wastewater and Reclaimed Water Technical Manual, the FDOT Standard Specifications for Road and Bridge Construction, FDOT Standard Plans, and the approved plans and specifications.

By \_\_\_\_\_

**SIGNATURE**

Print name & title: \_\_\_\_\_

\_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_

\_\_\_\_\_

Notary Public - State of Florida at Large

My commission expires: \_\_\_\_\_

**AFFIX SEAL**

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# APPENDIX E: TESTING SCHEDULE

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## TESTING SCHEDULE

| Item   | Test   |  | Test Frequency                                   |
|--|--|--|--|
| Embankment   | Optimum Moisture/Maximum Dry Density of soil (proctor) as determined by AASHTO T180.   |  | Per Soil Type                                    |
|  | Density Test within Right-of-Way (R.O.W.).   | 98% of Maximum Dry Density as determined by AASHTO T180. | One per 500' horizontally, in one-foot lifts (1) |
|  | Density Test Outside of R.O.W.   | 95% of Maximum Dry Density as determined by AASHTO T180. | One per 500' horizontally, in one-foot lifts (1) |
|  | Gradation (Sieve Analysis) AASHTO TO27.  |  | Per Soil Type                                    |
| Utility Trench Backfill – over pipelines and around structures from R.O.W. line to R.O.W. line | Optimum Moisture/Maximum Dry Density of soil by AASHTO T180.   |  | Per Soil Type                                    |
|  | 98% of Maximum Dry Density (proctor). Soil mix by AASHTO T180.   |  | (1)(2)   |
| Utility Trench Backfill – over pipelines and around structures outside R.O.W. line             | Optimum Moisture/Maximum Dry Density (proctor). Soil Mix by AASHTO T180.   |  | Per Material Type                                |
|  | 95% of Maximum Dry Density as determined by AASHTO T180.   |  | (1)(2)   |
| Stabilized Subgrade  | Limerock Bearing Ratio (LBR) as per FM 5-515.  |  | Per Soil Type                                    |
|  | Minimum 40 LBR.  |  | Per Material Type (3)                            |
|  | Minimum 20 LBR (For Soil Cement Only).   |  | Per Material Type                                |
|  | Subgrade to be used under soil cement must have a minimum 20 LBR.  |  | Per Material Type                                |
|  | Moisture/Maximum Dry Density of soil (proctor). Proctor as per FM 5-515.   |  | Per Material Type                                |
|  | 98% of Maximum Dry Density as determined by FM 5-515. No tolerance.<br>Soil Cement - 97% of Maximum Dry Density as determined by AASHTO-T134. No tolerance |  | (3)(4)   |
| Base (Other than soil cement or crushed concrete)  | Limerock Bearing Ratio (FM 5-515).<br>Minimum LBR 100.   |  | Per Material Type/Per Source                     |
|  | 98% of Maximum Dry Density as determined by FM 5-515. No tolerance.  |  | (3)(4)   |

## TESTING SCHEDULE (Continued)

| Item                  | Test   | Test Frequency  |
|-----------------------|--|---|
| Soil Cement Base      | Mix Design   | Per Material Type   |
|                       | Moisture/Maximum Dry Density of soil (proctor) AASHTO T134             | Per Material Type   |
|                       | 97% of Maximum Dry Density as determined by AASHTO T134. No tolerance. | (3)(4)  |
|                       | Compressive Strength of Specimens                                      | One set of three per material type daily  |
|                       | Cores Thickness Test   | (3)   |
| Crushed Concrete Base | Gradation  | Per Type of Material/Source (5)   |
|                       | Abrasion per FM 1-T096   | Per Type of Material/Source   |
|                       | Limerock Bearing Ratio (LBR) as per FM 5-515. Minimum LBR 150.         | Per Type of Material/Source   |
|                       | 100% of Maximum Dry Density as determined by FM 5-515. No tolerance.   | (4)   |
| Concrete              | Temperature (ASTM C1064)   | One per set of cylinders  |
|                       | Slump (ASTM C143)  | One per set of cylinders  |
|                       | Air Content (ASTM C231 or C173 as applicable)                          | One per set of cylinders  |
|                       | Compressive Strength Cylinders (ASTM C31 and C39)                      | One set of four (6x12) inch or one set of five (4x8) inch cylinders for 100 cubic yards or fraction thereof, per class of concrete. Tested as follows:<br>1 at 7 days, 2 at 28 days, and 1 as reserve tested 56 days is necessary.<br>Three cylinders must be tested at 28 days if 4x8 inch cylinders are used. |

## TESTING SCHEDULE (Continued)

| Item              | Test  | Test Frequency   |
|-------------------|---|--|
| Superpave Asphalt | Mix Design  | One per FDOT Approved type   |
|                   | Temperature   | (6)  |
|                   | Maximum Specific Gravity (FM 1-T209)  | As per Section 330 of the Hillsborough County Public Works Standard Specifications for Construction. |
|                   | Extraction/Gradation (FM5-563/FM 1-T030)  |  |
|                   | Thickness.<br>No core is to be less than the specified thickness.   | Three cores per production day.  |
|                   | Straightedge (FM 5-509)   | (7)  |
|                   | Bulk Specific Gravity (MF 1-T166)<br>90% of Lab Density for Local Roadways (Remove and Replace if not met); and<br>92% of Lab Density for Collectors and Arterials (Remove and Replace if not met). | (3)  |

- (1) Recommend testing methods: FM 1-T238, FM- T204, ASTM D6938, and ASTM D2937.
  - (2) Tests must be located no more than 500 feet apart. Tests must be performed on each lift, except that tests must not be further apart than one foot vertically. Field Densities must be taken over all road crossings. Field Densities for Sanitary Lines must be staggered to include results over service laterals. There must be a minimum of one test series for each one foot of lift over pipeline between manholes. Tests around structures must be spiraled in one-foot lifts. For all type pipe, fill to be compacted beneath the haunches using suitable tampers. For pipe less than 24 inches in diameter, backfill in appropriate lifts and test from the top of the pipe and every one foot vertically thereafter. For pipe 24 inches to 72 inches in diameter, backfill in appropriate lifts and test from the springline and every one-foot vertically thereafter. For pipe larger than 72 inches, tests must begin one foot above the base of the trench.
  - (3) Tests must be located no more than 500 feet apart. There must be no less than one test per street. No core must be less than specified minimum thickness.
  - (4) Testing for the subgrade and base compaction must be located no more 500 feet apart and must be staggered to the left, right, and on the centerline of the roadway. Hillsborough County may reserve the right to sample and test any material utilized in the construction of the roadway. Testing must be in accordance with the Testing Schedule of this manual and applicable FDOT Standard Specifications for Road and Bridge Construction. Inspection of the subgrade and base must be conducted by the Engineer of Record, the County Inspector, and must be approved by the Project Manager prior to the base and asphalt construction respectively.
- Note:* Hillsborough County reserves the right to sample and test any material during construction.
- (5) Materials requirements as per latest of Section 204 of the Hillsborough County Public Works Standard Specifications for Construction.
  - (6) Continuous for the five first loads if the temperature is within the master range take a temperature measurement every five (5) loads thereafter.
  - (7) For local roads, within residential subdivision projects, the straightedge test will be required only if requested by Hillsborough County. For other type of road and projects the straightedge test is require as per Section 330 of the Hillsborough County Public Works Standard Specifications for Construction.

## HILLSBOROUGH COUNTY SOIL & MATERIAL FINAL TEST REPORT PACKAGES

One bound (in book format) and one electronic (pdf) final project test report package must be submitted in the following format, with required documentation as appropriate. Plans showing the test locations, along with the test numbers, must be identified with each section. The plans can be a pdf of the construction plans where the test report information is added or it can be a color scanned pdf copy.

- **COVER** – Include project name, Hillsborough County project ID, location and contact information.
- **SIGNED AND SEALED CERTIFICATE** – Must be signed and sealed by Geotechnical Engineer and include a verification statement that testing requirements of the Hillsborough County technical manuals have been achieved or exceeded. If testing requirements were not, a description of deficiencies must be noted.
- **SECTION 1** – Excavation and embankment requirements, materials testing, proctors of materials, earth work test results, and offsite fill material testing.
- **SECTION 2** – All tests for the installation of the sanitary sewer system.
- **SECTION 3** – All tests for the potable and reclaimed water systems.
- **SECTION 4** – All tests for the installation of the storm water system.
- **SECTION 5** – Tests for the sub grade material followed by the buildup placement in the roadways tests.
- **SECTION 6** – Reports for the materials to be used in the road base, followed by the reports for the buildup of the road base. Mix designs must also be included.
- **SECTION 7** – Roadway surface material tests, followed by the tests done during the buildup of the roadway surfaces, including asphalt mix design, extraction/gradation, bulk specific gravity (core density), and thickness reports.
- **SECTION 8** – All concrete tests for curbs, storm structures, walls, etc.

Refer to Testing Schedule for required frequency of tests.

The rolling straight edge report must be submitted separately with as-builts.

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# APPENDIX F: GUIDELINES FOR TECHNICAL SPECIFICATIONS

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## GUIDELINES FOR TECHNICAL SPECIFICATIONS

The following guidelines should not be used arbitrarily. These specifications should be reviewed/accepted by a professional engineer knowledgeable in each applicable subject area prior to concurrence or use.

### A. Crushed Concrete Base

The work specified under this Section consists of the construction of roadway base utilizing crushed concrete on prepared subgrade, in conformity with the lines, grades, notes and typical cross sections shown in the Plans, and as directed by the EOR.

The construction of Crushed Concrete Base must conform to the requirements of this Section, or, in lieu thereof, such requirements as may be established by the EOR during construction. The EOR must have full authority to modify the provisions of this Section as deemed necessary, in his opinion, to meet field conditions and requirements.

#### Materials

Must meet the following gradation requirements:

#### Composition

Base material must conform to the following gradation:

| Sieve Size | Percent by Weight Passing |
|------------|---------------------------|
| 2"         | 100                       |
| 1 1/2"     | 95-100                    |
| 3/4"       | 65-90                     |
| 3/8"       | 45-75                     |
| No. 4      | 35-60                     |
| No. 10     | 25-45                     |
| No. 50     | 5-25                      |
| No. 200    | 0-10                      |

Material for Crushed Concrete Base must consist only of crushed concrete pavement (Class II or greater) and such additive materials as may be approved by the EOR for the purpose of facilitating construction and achieving the desired characteristics of the finished in-place product. Material that shows a significant tendency toward adverse chemical or physical change on exposure to moisture will not be acceptable. The material must be free of any Ferrous Metals.

#### Mechanical and Physical Properties

The material must not contain lumps, balls, or pockets of sand or clay material in size or quantity sufficient to be detrimental to the proper bonding, finishing, or strength of the crushed concrete base. The specific mechanical and physical properties of crushed concrete aggregate and any additive materials permitted in the construction of Crushed Concrete Base under this contract must be determined on the basis of test results as the work progresses. The finished in-place product must provide at least an LBR of 150 or greater.

#### 1. TESTING OF BASE COURSE

Tests for base thickness and density must be located no more than five hundred (500) feet apart and must be staggered to the left, right, and on the centerline of the roadway. There must be no less than three (3) tests per street. Test reports for thickness, bearing, and density must be submitted by the EOR to the County for as-built records. Hillsborough County reserves the right to sample and test base material. All testing must be in accordance with the Testing Schedule.

2. PRIME AND TACK COATS

All bases must be primed in accordance with the Florida DOT Standard Specifications for Road and Bridge Construction (except for the requirements of QCQ). Tack coat material and construction methods must conform to the Florida DOT Standard Specifications for Road and Bridge Construction (except for the requirements of QCQ).

3. INSPECTION

Subgrade and base inspections must be conducted by the Engineer of Record and the County Inspector prior to surface course construction.

4. CONSTRUCTION

Placement and Spreading of Material

The material must be transported to the point where it is to be used, over crushed concrete previously placed where possible, and dumped at the end of the preceding spread. Hauling over the subgrade, or dumping on the subgrade for further placement operations, will be permitted only when, in the opinion of the EOR, such procedures will not adversely affect the integrity of the completed base and subgrade.

Spreading must be accomplished by mechanical spreaders capable of producing an even distribution of the crushed concrete aggregate. Spreading by other means must be permitted only where and as directed by the EOR.

Base Courses

The minimum thickness of the Crushed Concrete Base constructed under this contract must be as shown on the plans, and must be constructed in one course for six inches (6") and two courses for eight inches (8") or greater.

Compacting and Finishing Requirements

After spreading is completed the crushed concrete must be uniformly compacted, with water being added as required, to a density of not less than one hundred percent (100%) of the maximum density as determined by APPENDIX E: Testing Schedule. During final compaction operations, if the blading of any areas is necessary to obtain the true grade and cross section, the compacting operations for such areas must be completed prior to the performance of density tests on the finished base.

Priming and Maintaining

The prime coat must be applied only when the base meets the required moisture and density requirements. At the time of priming, the base must be firm, unyielding, and in such condition that no undue distortion will occur. The Contractor will be responsible for insuring that the true crown and template of the base are maintained, with no rutting or other distortion, and that the base meets all requirements at the time the surface course is applied.

Correction of Defects



All defects in materials and construction must be corrected by the Contractor, at his expense, and to the satisfaction of the Engineer, as the work progresses. All segregated areas of fine or coarse crushed concrete must be removed and replaced with properly graded crushed concrete.

Testing

The Contractor is to be responsible for all testing performed in connection with the construction of the base.

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## APPENDIX G: LIST OF DRAWINGS

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## LIST OF DRAWINGS

**NOTE:** Use [this link](#) to access all Standard County Index Drawings online.

### Typical Sections

|             |   |
|-------------|---|
| TS-1 .....  | Recommended Utility Locations   |
| TS-2 .....  | Shared Use Paths  |
| TS-3 .....  | Local Urban Roads (2 Lane Undivided)  |
| TS-4 .....  | Urban Collectors (2 Lane Undivided)   |
| TS-5 .....  | Urban Collectors (2 Lane Divided)   |
| TS-6 .....  | Urban Collectors (4 Lane Divided)   |
| TS-7 .....  | Local & Collector Rural Roads (2 Lane Undivided)                                |
| TS-8 .....  | Rural Collectors (2 Lane Divided)   |
| TS-9 .....  | Low Volume Public Roads (Minor Subdivisions with Less Than or Equal to 10 Lots) |
| TS-10 ..... | Low Volume Private Road (Minor Subdivisions with 10 Lots or Less)               |

### TND Typical Sections

|             |                                     |
|-------------|-------------------------------------|
| TND 1 ..... | Alleys                              |
| TND 2 ..... | Local Urban Lanes                   |
| TND 3 ..... | Local Urban Streets                 |
| TND 4 ..... | Type 1 Boulevard (Urban Collectors) |
| TND 5 ..... | Type 2 Boulevard (Urban Collectors) |
| TND 6 ..... | Avenues (Urban Collectors)          |
| TND 7 ..... | Main Streets (Urban Collectors)     |

### Typical Details

|                      |   |
|----------------------|---|
| TD-1 (1 of 2) .....  | Disabled Parking / Pavement Marking                                       |
| TD-1 (2 of 2) .....  | Disabled Parking / Signing  |
| TD-2 .....           | Parking Lot Configuration   |
| TD-3 .....           | Temporary Dead End Treatment  |
| TD-4 (1 of 2) .....  | Cul-de-sac at End of Road (Up to 150 feet in Length)                      |
| TD-4 (2 of 2) .....  | Cul-de-sac (Mandatory for Dead End Roads Greater than 150 feet in Length) |
| TD-5 (1 of 3) .....  | Miami Curb Section  |
| TD-5 (2 of 3) .....  | Miami Curb Transition   |
| TD-5 (3 of 3) .....  | Miami Curb Drainage   |
| TD-6 .....           | Intersection Valley Gutter  |
| TD-7 .....           | Driveway  |
| TD-8 .....           | Sidewalk Curb Ramps at Intersections                                      |
| TD-9 .....           | Entrance Median, Guardhouse and Electronic Entry                          |
| TD-10 .....          | Buffer Wall / Berm  |
| TD-11 (1 of 2) ..... | Pedestrian Walkway  |
| TD-11 (2 of 2) ..... | Pedestrian Walkway  |
| TD-12 (1 of 1) ..... | Post Mounted Street Name Signs  |
| TD-13 (1 of 4) ..... | Internally Illuminated Street Name Signs                                  |
| TD-13 (2 of 4) ..... | Sign Bracket Arm (One-Way)  |
| TD-13 (3 of 4) ..... | Sign Bracket Arm (Two-Way)  |
| TD-13 (4 of 4) ..... | Sign Bracket Arm (Sign Panel)   |
| TD-14 (1 of 6) ..... | Sign Locations  |

## LIST OF DRAWINGS (CONTINUED)

|                        |   |
|------------------------|---|
| TD-14 (2 of 6) .....   | Sign Locations  |
| TD-14 (3 of 6) .....   | Sign Locations  |
| TD-14 (4 of 6) .....   | Sign Locations  |
| TD-14 (5 of 6) .....   | Sign Locations  |
| TD-14 (6 of 6) .....   | Sign Locations  |
| TD-15 (1 of 2) .....   | Landscaping Clear Sight Window for Medians                            |
| TD-15 (2 of 2) .....   | Landscaping Vertical Clearances                                       |
| TD-16 (1 of 7) .....   | Tree Protection   |
| TD-16 (2 of 7) .....   | Tree Protection   |
| TD-16 (3 of 7) .....   | Tree Protection   |
| TD-16 (4 of 7) .....   | Tree Protection   |
| TD-16 (5 of 7) .....   | Tree Protection   |
| TD-16 (6 of 7) .....   | Tree Protection   |
| TD-16 (7 of 7) .....   | Sidewalk Protection from Street Trees                                 |
| TD-17 .....            | Directional Turns   |
| TD-18 (1 of 14) .....  | Type I, II and III Inlets General Notes                               |
| TD-18 (2 of 14) .....  | Type I Inlet (Offset from Curb) Plan and Elevation                    |
| TD-18 (3 of 14) .....  | Type II Inlet (Offset from Curb) Plan and Elevation                   |
| TD-18 (4 of 14) .....  | Type III Inlet (Offset from Curb) Plan and Elevation                  |
| TD-18 (5 of 14) .....  | Type I, II and III Inlet (Offset from Curb) Sections and Details      |
| TD-18 (6 of 14) .....  | Type I Inlet (1 of 3) (Adjacent to Curb) Plan & Elevation             |
| TD-18 (7 of 14) .....  | Type I Inlet (2 of 3) (Adjacent to Curb) Details and Slab Reinforcing |
| TD-18 (8 of 14) .....  | Type I Inlet (3 of 3) (Adjacent to Curb) Details and Slab Reinforcing |
| TD-18 (9 of 14) .....  | Type II Inlet (1 of 2) (Adjacent to Curb) Plan and Elevation          |
| TD-18 (10 of 14) ..... | Type II Inlet (2 of 2) (Adjacent to Curb) Slab Reinforcing            |
| TD-18 (11 of 14) ..... | Type III Inlet (1 of 2) (Adjacent to Curb) Plan and Elevation         |
| TD-18 (12 of 14) ..... | Type III Inlet (2 of 2) (Adjacent to Curb) Slab Reinforcing           |
| TD-18 (13 of 14) ..... | Type II & III Inlet (1 of 2) (Adjacent to Curb) Sections and Details  |
| TD-18 (14 of 14) ..... | Type II & III Inlet (2 of 2) (Adjacent to Curb) Sections and Details  |
| TD-19 (1 of 1) .....   | Parking Facility Criteria for Model Dwelling Units and Sales Offices  |

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# APPENDIX H: DESIGN EXCEPTION / DESIGN DEVIATION MEMORANDUM APPROVAL COVER LETTER

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# Hillsborough County Florida

## DEVELOPMENT SERVICES DEPARTMENT

PO Box 1110, Tampa, FL 33601-1110  
813-635-5400 | Fax: (813) 272-5811

**SUBJECT:** APPROVAL COVER LETTER ☐ DESIGN EXCEPTION ☐ DESIGN DEVIATION MEMORANDUM

**TO:** \_\_\_\_\_ **DATE:** \_\_\_\_\_  
County Engineer

County Street Name and/or Road Number: \_\_\_\_\_

Project Description (limits): \_\_\_\_\_

Project Identification Number: \_\_\_\_\_

Context-Based Classification: \_\_\_\_\_

**TYPE OF CONSTRUCTION:** (check all that apply)

Residential Subdivision

Commercial Subdivision

Private Property

**DESIGN EXCEPTION FOR THE FOLLOWING ELEMENT:** (check one)

Design Speed

Horizontal Curve  
Radius

☐

Maximum Grade

Design Loading  
Structural Capacity

☐

Lane Widths

Superelevation Rate

☐

Cross Slope

☐

Shoulder Widths

Stopping Sight  
Distance

☐

Vertical Clearance

**DESIGN DEVIATION MEMORANDUM FOR THE FOLLOWING ELEMENT:**

Include statement identifying location, project limits, key controlling criteria, existing roadway characteristics, and required criteria versus proposed criteria:

Attach all supporting documentation to this form in accordance with Section 1.7 of the Transportation Technical Manual for Subdivision and Site Development Projects.

**SIGNATURES AND APPROVALS:**

Recommended by / Date:

Approved by / Date:  
(For Design Exceptions Only)

\_\_\_\_\_  
Responsible Professional Engineer

\_\_\_\_\_  
Michael J. Williams, Professional  
Engineer. County Engineer