SECTION I

ROADWAY DESIGN CRITERIA

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All roadway design standards shall be in conformance with the Town of Davie Land Development Code, Broward County Highway Construction and Engineering Division (BCHCED) minimum standards and Florida Department of Transportation (FDOT) Roadway Design Standards/Florida Green Book.

1.1 General Roadway Design:

1.1.1 The following minimum standards shall be applied to all plats or site plans submitted for the zoning districts governed by these regulations.

1.1.2 Road right-of-way width: 50 feet for standard "urban" roadway, 40 feet for "rural" roadway. Road right-of-way utilization includes ¼ section line (40')and ½ section line (80'). Typical roadway cross section can be found in Section V, Pavement and Roadway Details.

1.1.3 Maximum run between high points and low points shall be three hundred (300) feet.

1.1.4 Minimum pavement width: 24 feet (except in a Rural Lifestyle area where 22 feet is allowed).

1.1.5 Sidewalks shall be provided on both sides of the road right-of-way. However, under certain circumstances, sidewalk may be provided on one side.

1.1.6 Minimum turning radii for public roadways shall be design based upon A.A.S.H.T.O. guidelines for the appropriate design vehicle and best engineering practices. Special attention needs to be observed when designing the emergency response design including minimum distance and radius for the Town of Davie fire truck vehicles. Pavement radius shall be 25 feet minimum at street intersections.

1.1.7 Street trees shall be provided on both sides of the road right-of-way based upon a submitted street tree planted plan approved at time of site plan approval.

1.1.8 Minimum distance between access points on off-site public roads: Two hundred and fifty (250) feet. Access points shall not include common and residential driveways along public and private roads. Typical driveway spacing detail can be found in Section V, Pavement and Roadway Details.

1.1.9 Developments where there is no connecting access through adjacent communities or to adjacent streets and are less than twenty (20) dwelling units, may utilize a

public road right-of-way at a 40-foot minimum cross-section with sidewalks required on one side.

1.1.10 All provisions for handicap parking and access shall be in accordance with Chapter 553 of Florida Statutes "accessibility by handicap persons" and the latest edition of "Accessibility Requirements Manual" by the Department of Community Affairs Florida Board of Building Codes and Standards and in accordance with American Disabilities Act (ADA).

1.1.11 Site triangles design must conform and meet FDOT Roadway Design Standards and the Town of Davie Land Development Code Sec. 12-205.

1.1.12 Adequate emergency access must be provided through a designated route approved by the Town of Davie Engineering Department and Fire Rescue. Typical Cul De Sac and Emergency Access Road detail can be found in Section V, Pavement and Roadway Details.

1.1.13 Property, public or private, if damaged during construction, or removed for the convenience of the work, shall be replaced or repaired to original condition or better at the expense of the Contractor within seven (7) Calendar days from the time that the damage occurs, in a manner acceptable to the Consultant, prior to the final acceptance of the work. Such property shall include, but is not limited to, signalization equipment, and miscellaneous hardware removed from the construction site, driveways, walkways, walls, fences, landscaping (trees, shrubs, lawns, etc.), irrigation systems, footings, underground utilities and traffic and street signs.

Roadway Design Criteria Table

TABLE I

Design Criteria	**Major/Minor Arterial**	**Major Collector Road**	**Minor Collector Road**	**Urban Road**	**Rural Road**
Right-of-Way Width (feet)	**	80	60	50	40
Minimum Longitudinal Grade (%)	*	0.4%	0.4%	0.4%	0.4%
Design Speed (mph)	*	35-45	20-40	25-30	15-20
Minimum Center Line Radii for Horizontal Curves (feet)	***	300	300	150	150

*Reference Broward County minimum standards for major/minor arterials.

1.2 Cul-de-Sacs and Dead-end Streets:

1.2.1 Dead-end streets shall be prohibited, except where appropriate as a stub to future roadway extension, or when designed with a turnaround area.

1.2.2 No more than twenty (20) percent of all new homes within residential development shall be located on cul-de-sac and "dead-end" streets.

1.2.3 Cul-de-sacs shall not exceed 600 feet in length when measured from the centerline of the branching intersection.

A. Cul-de-sacs shall have a minimum turnaround paved area of 100 feet in diameter. Auto-turn simulations shall be submitted for applicable design vehicle to conform vehicle turnaround capabilities.

1.3 Alleys:

1.3.1 Alleys may be provided to serve residential, business, commercial and industrial areas and shall be a minimum of thirty (30) feet in width.

1.3.2 Changes in direction of the alignment of an alley shall be made on a centerline radius of not less than seventy-five (75) feet.

1.3.3 Dead-end alleys shall be prohibited where possible, but if unavoidable shall be provided with adequate turnaround and facilities for service trucks at the dead-end, with a minimum external diameter of ninety (90) feet of right-of-way, or as determined to be adequate by the Engineering Department.

1.3.4 At intersections with streets or other alleys, a corner chord right-of-way based on not less than a 25-foot radius shall be provided by dedication or, if acceptable, to the Development Services Department, Grant of Easement.
(Ord. No. 90-4, § 7, 2-21-90; Ord. No. 91-33, 9-4-91)

1.4 Design criteria for local streets by development type:

The design of local streets shall comply with the requirements of the provisions specified in the Town of Davie Code of Ordinances, Chapter 12: Land Devlopment Code, Article XI: Development Review Procedures.

1.5 Design Elements of On-Site Circulation System:

Car parking stalls, parking aisles, driveways, reservoir areas and entrances are the basic functional elements of the on-site circulation system. Additional elements including, but not being limited to, perimeter roads, rear collector roads, service roads within the proposed development, left-turning lanes, acceleration lanes, traffic lights and frontage roads in the public right-of-way immediately adjacent to the proposed development may also be required. The following regulations shall apply:

1.5.1. *Parking Stalls and Aisles:*
Design of parking stalls and aisles shall be in conformance with the Town Code of Ordinances, Chapter 12 – Land Development Code.

A. The minimum size (in feet) of a parking stall space shall be as follows:

(a) Standard space - Ten (10) feet by eighteen (18) feet.
(b) Parallel space - Nine (9) feet by twenty-three (23) feet.
(c) Handicap space - Twelve (12) feet by eighteen (18) feet with a five-foot accessway, except that where two (2) handicapped spaces abut each other, they may jointly use the paved accessway.
(d) Parallel handicap space - Twelve (12) feet by twenty-three (23) feet.
(e) Compact space - Nine (9) feet by fifteen (15) feet.

B. If specifically designated and identified with pavement or curb markings for compact cars only, twenty-five (25) percent of the number of parking stalls required may be compact spaces.

C. All required parking stalls shall have direct and unobstructed access from a parking aisle. Each required parking stall shall be accessible without driving over or through any other parking stall or loading area. No parking stall shall directly abut a driveway.

D. No parking stall shall be designed to permit backout parking on public rights-of-way, nor shall parking stalls be located so as to required backing onto a sidewalk, pedestrian crosswalk or other area of high pedestrian concentration.

E. Parking stalls which abut a landscaped area shall be designed with bumpers, guards, wheel stops or continuous curbing. When surfaced with grass or lawn, the area between the bumpers, guards, wheel stops or continuous curbing shall not apply towards the amount of required landscaping.

F. When a row of parking stalls is immediately adjacent to a driveway, a minimum backup distance of twenty-five (25) feet is required between the property line and the first stall as shown in Figure 12-205A.

G. No point of parking stall or aisle shall be closer than five (5) feet to any building or property line.

H. Parking stalls shall be connected to a parking aisle. No parking stall shall directly abut a driveway.

I. No parking aisle or system of parking aisles in a parking lot shall connect more than sixty (60) parking stalls.

J. If an internal circulation plan requires emergency vehicles, garbage trucks or trucks moving to or from a loading area to use a parking aisle, that parking aisle shall be at least twenty-four (24) feet wide.

K. Access for emergency fire vehicles shall meet the requirements of the development review committee.

L. All off-street parking areas shall be so arranged and marked as to provide for orderly, safe loading, unloading, parking and storage of vehicles with individual parking stalls clearly defined with directional arrows and traffic signs provided as necessary for traffic control.

M. Acceptable plans, must illustrate that proper consideration had been given to the surrounding street plan, traffic volumes, proposed street improvements, vehicular street capacities, pedestrian movements and safety.

N. Development plans incorporating drive-through facilities shall demonstrate adequate stacking capacity within the drive-through lane so as not to interfere with on-site circulation.

O. No parking stall which is situated in front of an overhead doorway shall be counted toward fulfilling the parking requirements set forth in this code.

P. Handicap parking spaces required by this chapter, the South Florida Building Code, as amended, or Florida Statutes, as amended, shall be identified in accordance with Figure 12-205B.

1.5.2 *Geometric Dimensions:* Parking stalls and aisles in self-parking facilities shall be designed according to the dimensions in the applicable detail.

1.5.3. *Parking Driveways:*

A. All parking aisles shall connect to a driveway.

B. A parking lot which exceeds sixty (60) parking stalls shall be designed with at least one (1) two-way directional driveway loop system connecting the entrance to the parking stalls and the principal building.

C. The minimum distance from a driveway to a structure or property line shall be five (5) feet.

D. Access dimension guidelines:

Dimension at street; width:
(a) Minimum (one-way): Fifteen (15) feet.
(b) Minimum (two-way): Twenty-five (25) feet.
Maximum: Thirty-five (35) feet.

Turn radius:
(a) Minimum: Ten (10) feet.
(b) Maximum: Thirty (30) feet.

E. Any off-street parking facility shall have either driveway approaches of sufficient width to allow for two-way traffic or one-way driveways connected to aisles, parking areas or maneuvering areas in such a manner as to permit traffic to both enter and leave the property, facing forward, at the same time. A driveway that is only wide enough for one-way traffic shall not be used for two-way access.

1.5.4 *Circulation Design:* A parking lot abutting a trafficway shall be designed for full circulation. A parking lot abutting a street other than a trafficway may be designed for partial circulation.

1.5.5 *Parking and Loading Areas to be Curbed:* Except for one and two family dwellings, all parking and loading areas shall be constructed with a six (6) inch raised curb or bumper blocks along sidewalks, safety islands, driveways, sight distance triangles and other places as needed, unless determined to be unnecessary by a finding of the Site Plan Development Review Committee and approval by the Council that, given the particular circumstances of the site, such curb can be eliminated in certain areas without creating safety hazards. The raised curb shall be constructed in such a manner as to facilitate proper drainage and prevent vehicles from crossing sidewalks or other pedestrian walkways other than by means of approved driveway approach.

1.5.6 *Sight Distance:* When an accessway intersects a public right-of-way or when the subject property abuts the intersection of two (2) or more public rights-of-ways, all improvements, including landscaping within the triangular areas described below, shall provide unobstructed cross-visibility at a level between three (3) feet and six (6) feet, provided, however, trees or palms having limbs and foliage trimmed in such a manner that no limbs or foliage extend into the cross-visibility area shall be allowed, provided they are located so as not to create a traffic hazard. Landscaping, except required grass or ground cover shall not be located closer than six (6) feet from the edge of any accessway pavement. The triangular areas above referred to are:

A. The areas of property on both sides of an accessway formed by the intersection of each side of the accessway and the public right-of-way line with two (2) sides of each triangle being twenty-five (25) feet in length from the point of intersection and third side being a line connecting the ends of the other two (2) sides.

B. The area of property located at a corner formed by the intersection of two (2) or more public rights-of-way with two (2) sides of the triangular area being forty (40) feet in length along the abutting public right-of-way lines, measured from their point of intersection and the third side being a line connecting the ends of the outer two (2) lines.

TABLE II. MINIMUM AISLE DIMENSIONS AT VARIOUS PARKING ANGLES

A Parking Angles (degrees)	B Aisle Width (in feet)
0	13
20	12
22.5	12
30	13
40	13
45	16
50	16
60	19
70	20
75	23
80	24
90	24

Note: Dimensions are for one-lane, one-way direction movement. Two-way direction or two-lane, one-way direction movement requires a minimum aisle of twenty-four (24) feet regardless of parking angle.

1.6 Roadway Pavement Design:

1.6.1 All pavement designs shall be in accordance with the Broward County Highway Construction and Engineering Division (BCHCED) minimum standards, Florida

Department of Transportation (FDOT) and the Town of Davie Engineering Design Standards.

A. Asphaltic concrete surface courses shall be designed for the appropriate roadway classification, usage, and projected trips per day. Asphaltic concrete surfaces include: FDOT type SI and Type SIII. For the required thicknesses, please refer to the Table VII below.

B. Limerock of the Miami formation shall be used, having a minimum percentage of carbonates of calcium and magnesium of 70% and a minimum Load Bearing Ratio (LBR) of 100. All limerock bases must be constructed in lifts with a maximum thickness of 6 inches. The base material shall be compacted to a minimum density of 98% of maximum dry density as determined by AASHTO-180. For the required thicknesses, please refer to the table below.

C. Subgrade: The entire width of the right-of-way must be demucked before the construction of the roadways begins. No FDOT materials of classes A-5, A-7 and A-8 shall be allowed. All material supporting the roadway and shoulder shall have a minimum LBR of 40. The top 12 inches of the subgrade layer of undisturbed soil shall be compacted to a minimum density of 98% of the maximum dry density as determined by AASHTO-180. For the required thicknesses, please refer to the Table VI below.

1.6.2 Paving Standards

All thicknesses given in this section are measured as final, compacted, in place.

A. Asphalt Requirements

1. The maximum paving application tolerance is ¼"

2. Asphaltic concrete surface courses shall be designed for the appropriate roadway classification, usage, and projected trips per day.

3. Prior to placement of asphalt a design mix for the asphalt including gradation of all material, content of mix, Marshall Stability and laboratory density shall be provided to the Town Engineer for review and approval. Density testing shall be in compliance with FDOT Standard Specification for Road and Bridge Construction (latest edition)

4. After asphalt is placed, the Contractor shall obtain from an independent testing laboratory at minimum intervals of 300 feet, core borings of the asphalt to determine: thickness and density, Marshall Stability, Sieve Analysis of Aggregate and Bitumen content of Asphalt.

B. Base Course Requirements

All public roadways are to have a compacted base. Recommended materials are lime rock or aggregate base course per FDOT although other materials are available for consideration upon approval of the Town Engineer. Certified laboratory test results for the specifications described herein shall be mandatory prior to dedication of any right-of-way.

1. The graded aggregate base material shall be of uniform quality throughout, substantially free from vegetative matter, shale, lumps and clay balls and shall have a Limerock Bearing Ratio value not less than 100. The material retained on the No. 10 sieve shall be composed of aggregate meeting the following requirements:
   Soundness Loss, Sodium, Sulfate: AASHTO T 104- 15%
   Percent Wear: AASHTO T 96 (Grading A)

2. All limerock shall be primed and compacted to 98% of the modified proctor density, AASHTO T-180, and be installed on a stabilized subgrade. In addition, a minimum LBR of 100 is required.

3. Certification from a testing laboratory shall be submitted to the Town Engineer indicating that the material used for the base meets the specified criteria and contains less than 1% by weight asbestos and a minimum of 70 percent of calcium and magnesium.

4. After the base is completed, the Contractor shall obtain from an independent testing laboratory at minimum intervals of 300 feet, cores to determine base thickness and density. The tests shall be submitted to the Town Engineer for approval.

C. Subgrade Requirements

All public roadways are required to have a compacted sub grade to support the base course. If the in place soil can not meet or exceed limerock bearing ratio specifications listed below, the entire sub grade must be stabilized to do so.

1. All sub-grades shall meet or exceed 98% modified proctor density AASHTO T-180. In addition, a minimum L.B.R. of 40 will be required of all roadway sub grades.

2. All sub-grades are to be a minimum of 6 inches beyond the base course layer where curbing is omitted.

3. After the subgrade is complete the Contractor shall obtain from an independent testing laboratory at minimum intervals of 300 feet, density and limerock bearing ratio tests on the sub-grade. The tests shall be submitted to the Town Engineer for approval.

D. Concrete Paving Requirements

Portland cement concrete roadway is an acceptable alternative to asphaltic concrete pavement as approved by the Town Engineer. The pavement design and installation must be per the FDOT Rigid Pavement design manual dated January 2006 or current update.

TABLE III. PAVEMENT DESIGN TABLE

Road Designation	Asphalt	Subgrade	Limerock
Driveways/Driving Aisles and Parking Lots	Two (2) lifts - 3/4" Type S-III	12"	6"
Rural/Urban Local	One (1) lift – 1 ½" Type S-I	12"	8"
Minor Collector	One (1) lift – 1 ½" Type S-I	12"	8"
Collector	One (1) lift – 1 ½" Type S-I	12"	8"
Minor/Major Arterial	One (1) lift – 1 ½" Type S-I	12"	8"

1.7 Sidewalk and Swales Design:

1.7.1 *Sidewalks:*

A. Sidewalks shall have a minimum widths of 4 feet for rural streets, 5 feet for urban and collectors and 6 feet for major/minor arterials. A subbase test must be conducted to verify adequate stabilization.

B. All sidewalks shall be installed with the public right-of-way.

C. All sidewalks shall be designed in accordance with the Town's Engineering Design standards.

D. Sidewalks shall have a minimum thickness of 4 inches, 6 inches at driveways, a minimum 28 day strength of 3,000 p.s.i., and a maximum allowable slump of 4 inches.

E. Sidewalks shall have a maximum cross slope of 2 %, and minimum cross slope of 1% towards the swale or gutter and shall be given a transverse hair broom finish.

F. All provisions for handicap parking and access shall be in accordance with Chapter 553 of Florida Statutes "accessibility by handicap persons" and the latest edition of "Accessibility Requirements Manual" by the Department of Community Affairs Florida Board of Building Codes and Standards and in accordance with American Disabilities Act (ADA).

1.7.2 *Swales:*

A. Paved swales and/or the installation of impervious stabilizing material within the swales shall be prohibited. Typical driveway detail in swale can be found in Section V, Pavement and Roadway Details.

B. All swales shall be sodded, and the bottom of the swales, measured from the top of turf, shall between be at least 6 inches below the adjacent edge of the road pavement.

C. Swales shall have a minimum uniform longitudinal slope of 0.40%. The swales shall have sodded side slope of a maximum 4:1 horizontal to vertical ratio. Additional design criteria may be referred to the Town of Davie Code of Ordinances, Chapter 21: Streets, Sidewalks and other Public Places.

1.8 Traffic Calming:

1.8.1 Speed Tables:

A. Standard speed tables shall have a length of 22 feet consisting of 6 feet ramps on each side, and a 10 feet flat top. The maximum height of the speed table shall be a maximum of 3 inches.

B. Speed table may be considered as traffic calming device if warranted and installed in alignment with the Institute of Transportation Engineers and the Federal Highway Administration Best Practices. The Town of Davie has established a speed table policy and procedures. Justification for traffic calming installation needs to be established prior to approval.

Installation requires a minimum of 67% approval of the affected property owners or the homeowners association where applicable. The "Affected Owners" for installation on a public roadway shall be defined as the homeowners located within a half of mile band width perpendicular to the centerline of the roadway in each direction of the proposed installation.

C. Typical Traffic Calming Construction detail, Pavement Marking and Signage Detail and Grading Detail for the Enhanced Speed Table can be found in Section V, Pavement and Roadway Details.

1.8.2 *Brick Pavers:*

The use of brick pavers for crosswalks for speed reduction and traffic calming in high pedestrian usage areas is encouraged. However, the size and type of brick pavers to be used must obtain approval from the Town's Planning and Zoning group.

1.8.3 *Guardrails:*

A. Guardrails shall be designed and constructed in conformance with FDOT and Broward County Engineering Standards.

B. Guardrails shall be provided in areas where the roadway's edge of a pavement is closer than 28 feet from the top of bank of a canal, lake or other waterways. The guardrail shall be installed along the full length of such pavement, at a minimum clear sight distance of 4 feet. The Town reserves the right to request the installation of guardrails in areas of general safety concern or based on past traffic incidents within the Town.

1.8.5 *Curbs and Gutters:*

A. All curb types and gutter shall be designed in accordance with Town's standard details.

B. The limerock under curbs and gutters can have a calcium carbonate content of 60%.

1.8.6 *Roundabouts:*

A. Roundabouts shall be designed in conformance with FDOT design standards.

B. Roundabouts shall be reviewed and approved by a roundabout professional engineer.

1.9 Lighting Standards:

Street lighting design shall be in conformance with the Town of Davie Land Development Code Chapter 12, Article VIII, Sections 12-260 and 12-261.

1.9.1 *Illumination Standards:* The table below illustrates the minimum illumination standards per Town of Davie Criteria. The figures are given in footcandles, corresponding to one (1) lumen per square foot at grade level.

TABLE IV. ILLUMINATION STANDARDS TABLE

TYPE	COMMERCIAL	INDUSTRIAL	RESIDENTIAL	UNIFORMITY MAX./MIN
Major and Expressway	2	1.4	1	"12:1"
Collector	1.2	0.9	0.6	"12:1"
Local Streets and Alley	1	0.6	0.5	"12:1"

1.9.2 Light Pole Standards:

All poles within the Town's right-of-ways shall be concrete or aluminum poles with a minimum height of 12 feet. In residential developments FP&L approved fiberglass light poles may be used for private streets. The fiberglass poles shall have a minimum height of 12 feet, and the base must be protected with a "pole guard" cage against degradation from weed-eaters and grass trimmers.

Typical Lightpole detail in swale can be found in Section V, Pavement and Roadway Details.

1.10 Roadway Markings and Signage:

All pavement markings shall be thermoplastic and installed in accordance with Broward County "Traffic Engineering Standards and Specifications" and the FDOT Standard Specification's Section 711.

All signage shall be in accordance with Broward County Traffic Engineering Division standards and the FHWA issued "Manual on Uniform Traffic Control Devices" (MUTCD), current edition.

1.11 Maintenance of Traffic:

An approved Maintenance of Traffic (MOT) Plan shall be required any time work is being performed within the road Right of Ways. The approved MOT shall be on site prior to and during the entire operation. A MOT certified representative of the contractor must be present on site the entire time the MOT is setup. A MOT shall conform to; unless otherwise noted in the Broward County Minimum Standards, the most restrictive

requirements of the latest edition of the FDOT Design Standards 600 Series and the Manual on Uniform Traffic Control Devices (MUTCD). An approved Maintenance of Traffic Plan, a stamped approved plan, and a copy of the permit must be onsite at all times. The MOT is valid for the duration of the permit or completion of the project, whichever comes first.

The Town of Davie Maintenance of Traffic plan checklist along with the Broward County Maintenance of Traffic (MOT) Instructions/Requirements and Submittal Form must be complied with prior to submitting the MOT for review by the Town of Davie. The MOT plans should incorporate site safety provisions per the FDOT 600 series standard index including barricades, guards, etc.

1.12 Roadway Level of Service (LOS):

All public roads within the Town of Davie; including local, County, State and Federal roads shall be required to operate at LOS D or better on a peak hour basis.

The LOS of road segments operating below LOS D according to the Broward County Trips Model as of June 27, 2006 and those segments operating below LOS D as shown on the Existing LOS Analysis of the Traffic Circulation Element of the current Comprehensive Plan shall not be permitted to delineate below 110% capacity of the roadway at LOS D on an AADT basis except as provided in the Town of Davie Land Development code.

For street systems, capacity analysis is the primary tool applied to measure the impact of any traffic increase on a given roadway section or intersection. Capacity analysis for a given section of roadway or intersection is determined by using procedures and methodologies outlined in the *Highway Capacity Manual 2000* (HCM) produced by the Transportation Research Board. Capacity analysis defines the quality of traffic operation for an intersection using a grading system called Level of Service (LOS). The LOS is defined in terms of average vehicle delay and is a measure of driver discomfort, frustration, fuel consumption and lost travel time. Levels of service A-F have been established with A representing the best service and F the worst service. Generally, LOS A through D is considered acceptable for urban and rural conditions.

Level of Service: Development activities shall not be approved unless there is sufficient available capacity to sustain the following level of service for transportation systems as established in the Traffic Circulation Element of the Town Comprehensive Plan. The minimum level of service standard for all transportation facilities is "D" according to the current Florida Department of Transportation standards.

Determination of Project Impact: The traffic impact of a proposed development shall be determined in accordance with the Town Land Development Code.

Measurements: The measurement of highway capacities may be determined in the form of engineering studies in accordance with the Town Land Development Code.