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I

TRANSPORTATION PLANNING

A. General

The purpose is to provide standards for the planning of transportation improvements. These standards are intended to be supplemental to Section 9.04.00, Transportation Systems and Section 9.05.00, Access Management. In cases of discrepancy between these standards and sections of the Land Development Regulations, the interpretation of the appropriate sections shall prevail over the interpretation of these standards.

B. Access and Access Management

1. Driveways

The choice of the proper location of driveways must involve consideration of the amount of the conflict which can be expected to occur both within the parking area and on the abutting streets. The number of driveways for any individual site shall be the minimum required to adequately serve the needs of the property or development. The following shall serve as guidelines for the number of driveways that will be permitted per site:

- a. Parcels with frontage of 100 feet or less will be limited to one driveway.
- b. A single access point per site is preferred. However, there should be no more than two driveways per road frontage for any individual site.
- c. Multiple driveways may be permitted with the approval of the County Manager or designee, provided that only the minimum number of driveways required to adequately serve the needs of the proposed development shall be permitted.

The area to which the driveway provides access shall be of sufficient size and design to allow all necessary functions for loading, unloading, parking, circulation, and standing to be carried out on private property completely off the road right-of-way.

- a. Parking areas shall be so designed and marked as to provide for orderly and safe movement and storage of vehicles and pedestrians.

- b. Driveways shall be so arranged, constructed and maintained that automobiles, trucks, trailers and other vehicles will not stand upon any part of the right-of-way while they are being loaded, unloaded, serviced or parked.
- c. No design shall be permitted which requires any vehicle to back out onto public right-of-way except for single family residences. Single family residential driveways shall not be permitted which would require vehicles to back out onto arterial and collector roadways.
- d. Facilities with drive-in windows must be so designed that waiting vehicles do not extend into the street or right-of-way. A by-pass lane shall be required for all such facilities.

No new residential development shall create any lots or parcels for single family or duplex residential uses having direct access on an Arterial or Major Collector road.

Where lots are developed fronting on existing County roads, the County may require the use of joint driveways in order to minimize the number and maximize the spacing of access connections. Where joint driveways are required in new developments, the driveway aprons shall be installed during the road construction and shall be considered as part of the construction requirements for the subdivision.

2.

Turn Lanes

Turn lanes consist of left turn lanes and right turn lanes (deceleration lanes). Turn lanes shall be installed on the road which is being accessed at the proposed entrance(s) to the development, as deemed necessary by the County Manager or Designee. The County Manager or Designee may also require turn lanes at adjacent or nearby intersections in lieu of, or in addition to, turn lanes at the development entrances.

Conditions which are to be considered in determining the need for turn lanes include the following:

- a. If the property accessing the road is projected to generate 500 or more vehicle trips per day, or 50 or more vehicle trips in any hour;
- b. If a traffic analysis indicates that turn lanes

would be necessary to maintain capacity on fronting roads and/or on adjacent or nearby intersections.

- c. If entrances are proposed at locations where grade, topography, site distance, traffic, or other unusual conditions indicate that turn lanes would be needed for traffic safety.

The need for turn lanes to accommodate right turn movements and left turn movements shall be based upon anticipated traffic distribution and projected turning movement volumes among other considerations, including traffic safety.

c. *Traffic Analysis*

1. Small Site and Preliminary Analysis

These guidelines apply to the traffic impact analysis for small sites (less than 100 peak hour/peak direction trips) and for a preliminary traffic analysis for larger sites. These are only guidelines and circumstances, such as location or aggregate impacts, might change the requirements as listed. Therefore, a pre-study meeting is needed between the County and the developer to set the actual scope of work and parameters. The study should be done as early as practical to avoid unnecessary delays or changes to plans later on.

The Lake County Planning Department has on line the FSUTMS transportation model, base year 1989, for Lake County. Data from the county model will be made available if desired. Consultants are encouraged to use FSUTMS in the modeling.

The following is a recommended outline for a small site or preliminary traffic analysis. The submitted report should, at a minimum, address the information included in the outline.

I. INTRODUCTION AND SUMMARY

- A. Purpose of Report and Study Objectives

II. PROPOSED DEVELOPMENT

- A. Land Use and Intensity
- B. Location (including location map)
- C. Hours of Peak Impact

D. Basic Site Access

E. On-Site Circulation

F. Phasing and Buildout Years

III. AREA CONDITIONS

A. Study Area

This shall include, at a minimum, the roadways which will provide access to the proposed project and roadways within 2,500 feet from the projects access points.

B. Study Area Land Use

1. Existing, proposed and approved land uses
2. Existing access management, driveways and intersections in the immediate vicinity of the project.

C. Site Accessibility

1. Existing area roadway system

IV. PROJECTED TRAFFIC

Forecast years: At completion of each phase and a buildout

Need: Daily and adjacent roadway peak hour

A. Site Traffic

Traffic generated by the development determined as follows:

1. Trip generation

a. Latest Edition ITE (Institute of Transportation Engineers) Trip Generation Rates using:

1. Average trip rate for small developments
2. Equations for large developments, if desired
3. Indicate which used

b. If the proposed land use is uncommon and reliable trip rates are unavail-

able use the trip generation procedures outlined in the Lake County Road Impact Fee Ordinance, trip rate/length study.

- c. Estimate the internal/external split and percent of pass-by trip capture
 1. All assumptions must be approved
 2. Special care should be used in the development of internal traffic because most trip generation sources include internal trips
 3. Special care should also be taken for "Trip-Capturing Development", which is defined as "any development, including in-fill development, with a specified geographic area which:
 - a. provides employment opportunities to the area
 - b. meets the needs for neighborhood retail and shopping
 - c. meets the needs for community commercial space
 - d. internally captures a significant portion of the residentially generated trips for employment, shopping, recreation and other amenities

V. TRAFFIC ANALYSIS (Intersection and Roadways)

A. Site Access

1. Location
2. Road design
3. Site distance
4. Site circulation and parking including access management

VI. IMPROVEMENT ANALYSIS

A. Access Management Techniques

Compliance with FDOT Rule Chapter 14-97 and Lake County's Access Management Requirements, where applicable

B. Evaluation

VII. FINDINGS

A. Site Accessibility

B. Traffic Impacts

C. Need for Any Improvements

VIII. RECOMMENDATIONS AND CONCLUSIONS

A. Site Access, Circulation Plan and Access Management

B. Roadway Improvements

1. On-site

2. Off-site

3. Phasing of Improvements

2.

Traffic Impact Analysis

These guidelines apply to the traffic impact analysis for larger developments (greater than 100 peak hour/peak direction trips). These are only guidelines and circumstances, such as location or aggregate impacts, might change the requirements as listed. Therefore, a pre-study meeting is needed between the County and the developer to set the actual scope of work and parameters. The study should be done as early as practical to avoid unnecessary delays or changes to plans later on.

The potential impact of a site is directly related to its size and intensity of land use which determines trip generation. The higher the trip generation the more detailed a site impact study needs to be in order to accurately determine its impact on the existing infrastructure, present necessary improvements and to meet concurrency requirements.

The Lake County Planning Department has on line the FSUTMS transportation mode, base year 1989, for Lake County. Data from the County model will be made available if desired. Consultants are encouraged to use FSUTMS in the modeling.

The following is a recommended outline for a traffic impact analysis. The submitted report should, at a minimum, address the information included in the outline.

I. INTRODUCTION AND SUMMARY

A. Purpose of report and Study Objectives

B. Executive Summary

1. Site location and study area
2. Development description
3. Principal findings
4. Conclusions
5. Recommendations

II. PROPOSED DEVELOPMENT

A. Land Use and Intensity

B. Location (including location map)

C. Site Plan Description

D. Zoning

E. Hours of Peak Impact

F. Basic Site Access

G. On-Site Circulation

H. Phasing and Buildout Years

III. AREA CONDITIONS

A. Study Area

1. Area of influence

2. Area of significant traffic impact

- a. This shall include, at a minimum, the roadways which will provide access to the proposed project and roadways within 2,500 feet from the projects access points.

b. Carried out to point where site traffic generates

1. Less than 10% of roadways design capacity for (peak hour/peak direction) and

2. Less than 10% of intersection design capacity as defined in the 1985 Highway Capacity Manual

B. Study Area Land Use

1. Existing, proposed and approved land uses

2. Existing access management, driveways and intersections in the immediate vicinity of the project.

3. Existing zoning (only for projects with greater than 500 peak hour/peak direction trips)

C. Site Accessibility

1. Area roadway system

a. Existing

b. Key intersections

c. Planned road/traffic operation improvements

1. State

2. County

2. Existing traffic volumes and conditions (some data available through Lake County Planning Department, Public Works, and FDOT)

a. Daily

b. Peak Hour

c. Peak period directional counts on roadways

d. Peak period turning movement counts at intersections

- e. Identification of peak season
- f. Accident data when available

IV. PROJECTED TRAFFIC

Forecast years: At completion of each phase and a buildout

Need: Daily and adjacent roadway peak hour

A. Site Traffic

Traffic generated by the development determined as follows:

1. Trip generation

a. Latest Edition ITE (Institute of Transportation Engineers) Trip Generation Rates using:

- 1. Average trip rate for small developments
- 2. Equations for large developments, if desired
- 3. Indicate which used

b. If the proposed land use is uncommon and reliable trip rates are unavailable use the trip generation procedures outlined in the Lake County Road Impact Fee Ordinance, trip rate/length study.

c. Estimate the internal/external split and percent of pass-by trip capture

- 1. All assumptions must be approved
- 2. Special care should be used in the development of internal traffic because most trip generation sources include internal trips
- 3. Special care should also be taken for "Trip-Capturing Development", which is defined as "any development, including in-fill development, with a specified geographic area which

a. provides employment opportun-

ities to the area

- b. meets the needs for neighborhood retail and shopping
- c. meets the needs for community commercial space
- d. internally captures a significant portion of the residentially generated trips for employment, shopping, recreation and other amenities

d. The directional split of peak hour traffic characteristics shall be derived from data presented in the ITE Trip Generation Manual unless more reliable local data can be obtained

2. Trip distribution

Use of existing distribution in area is recommended where feasible, otherwise use gravity model or look at similar projects

3. Trip Assignment

B. Projected Background Traffic

Equals (=) Through Traffic + traffic from approved developments in the area

1. Through traffic growth rates -

Lake County Planning Department has prepared as a guideline Historical Average Daily Traffic, 1980-1989, and Traffic Growth Rate Guide for Lake County, December, 1989. Other methods, such as traffic model projections, will be considered.

2. Approved development traffic

- a. Method of projections
- b. Trip generation
- c. Trip distribution
- d. Trip assignment

3. Projected background traffic volumes
Future through traffic plus approved
development traffic

C. Total Traffic

Equals (=) Site traffic + (Projected Back-
ground Traffic)

Equals (=) Site Traffic + (Through Traffic
+ Approved Development Traffic)

V. TRAFFIC ANALYSIS (Intersection and Roadways)

A. Site Access to Development

1. Location
2. Road design
3. Sight distance
4. Site circulation and parking including
access management

B. Capacity and Level of Service (LOS)

For: Projected Background Traffic (B
above) and
Total Traffic = Site Traffic + Projected
Background Traffic (C above)

1. Roadways (peak hour and daily)
 - a. LOS per Lake County's Traffic Cir-
culation Element Policies 2-1.1 and
2-1.2
 - b. Traffic Circulation Element Policy 2-
1.3
Development of Level of Service
Maximum Volumes

Lake County, in coordination with
FDOT, shall develop generalized daily
level of service maximum volumes
(based on 1985 Highway Capacity
Manual) for arterial, collector and
local roadways within its jurisdic-
tional limits. Maximum volumes shall
be annual average daily traffic
volumes (based on peak hour volumes)
and shall be sensitive to the local

dynamics of the County. Until such time, the County shall use the most recent maximum volumes suggested by FDOT. During this period, detailed capacity analysis can be presented by a qualified registered engineer to refine generalized capacities for specific roadways. Such analysis shall be consistent with the 1985 Highway Capacity Manual and be consistent with methods acceptable by FDOT.

c. Rule of Thumb

1. FDOT's Generalized Tables in the Level of Service Standards and Guidelines Manual, February, 1989 or latest version, best for all state roads
2. ART-ALL 2 and LOS software can be used for county roads

d. Link analysis from "c" above

1. For roadway links which have a peak hour LOS A or B, no further analysis is needed
 2. For roadway links which have LOS C or below, FDOT's software ART-ALL 2 and LOS should be used, if not previously used, to determine actual LOS
- e. For critical links when engineering analysis required the 1985 Highway Capacity Manual should be utilized

2. Intersection (peak hour)

- a. Critical movements and LOS need to be determined
- b. CINCH and the Highway Capacity Manual Software are the preferred software
- c. Significant impact is achieved when the site traffic adds at least 10% to the critical movement
- d. PM peak will be required for an intersection; AM peak will also be

required if the intersection has more than 100 right turns during the PM peak hour

- e. When the development's peak hour traffic occurs outside the adjacent roadways AM or PM peak hours, an additional analysis for the peak hour of the generation should be conducted

VI. IMPROVEMENT ANALYSIS

Consideration of modifications to key intersections or road links to include widening, signalization, signal timing/phasing changes, channelization modifications, changes in ingress/egress points, or the number of entrances, additional lanes, etc. necessary to maintain acceptable LOS for both roadway segments and intersections. Other factors such as access related improvement costs, ease of implementation, possible citizen reaction, acceptability to state/local official should also be considered. In some instances, several analyses may be needed to evaluate their pros and cons. Occasionally, a significant change in land use type or density may be necessary.

- A. Improvements Necessary to Accommodate Projected Background Traffic (only for projects with greater than 500 peak hour/peak direction trips)
- B. Additional Improvements to Accommodate Site Traffic
- C. Traffic Signals (only for projects with greater than 500 peak hour/peak direction trips)
- D. Access Management Techniques

Compliance with FDOT Rule Chapter 14-97 and Lake County's Access Management Requirements, where applicable

- E. Status of Improvements Already Funded, Programmed, or Planned (only for projects with greater than 500 peak hour/peak direction trips)
- F. Evaluation

VII. FINDINGS

- A. Site Accessibility
- B. Traffic Impacts
- C. Need for Any Improvements
- D. Fair Share Analysis of Improvements

VIII. RECOMMENDATIONS AND CONCLUSIONS

- A. Site Access, Circulation Plan and Access Management
- B. Roadway Improvements
 - 1. On-site
 - 2. Off-site
 - 3. Phasing of Improvements

D. Road Classification

1. Arterial Roads

An arterial road is a route providing service which is relatively continuous and of relatively high traffic volume, long average trip length, high operating speed and of high mobility importance.

Arterial roads are grouped into the following sub-categories:

Principal Arterial
Minor Arterial

The classification of roads as arterials shall be based upon criteria established by the Florida Department of Transportation utilizing their most recent, adopted functional classification system.

2. Collector Roads

A collector road is a route providing service which is of relatively moderate traffic volume, moderate trip length and moderate operating speed. Collector roads collect and distribute the traffic between local roads and arterial roads and serves as a linkage between land access and mobility needs.

Collector roads are grouped into the following subcategories:

Major Collector
Minor Collector

The classification of roads as collectors shall be based upon criteria established by the Florida Department of Transportation utilizing their most recent, adopted functional classification system.

3. Local Roads

A local road is a route providing service which is of relatively low traffic volume, short average trip length or minimal through traffic movements and numerous connections with relative ease of access for abutting property.

Local roads are grouped into the following subcategories:

Feeder/Distributor
Neighborhood Collector
Local Street

The classification of roads as locals shall be based upon the following criteria:

a. Feeder/Distributor

A Feeder/Distributor road functions as a link between developments or small communities and higher volume roadways, as well as provides a relatively high degree of access to abutting property. A Feeder/Distributor provides a connection from a local area onto collectors and arterials and conversely provides a route to distribute traffic from collectors and arterials into the local area. Feeder/Distributors should be generally designed to carry between 1,500 to 4,000 vehicles per day.

b. Neighborhood Collectors

A neighborhood collector road functions as a collector of traffic within a neighborhood, development or small community and provides an access point onto higher volume roadways. It also provides a high degree of access to abutting property. Neighborhood collectors within subdivisions collect and distribute the traffic from within the development to the access points connecting to the county or state road system. Neighborhood collectors should be

generally designed to carry between 500 to 1,500 vehicles per day.

c. Local Streets

A local street primarily functions to serve the adjacent property for access with minimal through traffic. Local streets provide a connection between abutting properties and higher volume roads. Local streets should be generally designed to carry between 100 to 500 vehicles per day.

E. *Bicycle and Pedestrian Use*

1. Bicycle Use

Developments which are required to provide for bicycle traffic may utilize bike paths, roadway accommodation or a combination of these and any other approved facility type. The improvements which are proposed to address bicycle traffic are to be included in the construction plans of the development.

Bike paths are separate facilities from the roadway located in separate easements or rights-of-way and are used to accommodate bicycle traffic. Bike paths may be included in a system integrating both bicycle and pedestrian traffic; however, the pathways must be clearly delineated to avoid conflicts between cyclists and pedestrians.

Roadway accommodation is a means in which bicycle traffic is integrated into the roadway with motorized traffic. Roadway accommodation may be accomplished by one of the following:

Paved Shoulders - Paved shoulders are utilized on swale section roadways. This approach entails paving a portion of shoulder area directly adjacent to the motorized travel lanes and delineating the two areas with a white edge stripe.

Wide Curb Lanes - Wide curb lanes are utilized on curb and gutter section roadways. This approach provides additional pavement width on the curb lanes to allow room for cyclists to travel in the roadway between the vehicles and the curb. No additional delineation or striping is required.

Bicycle Lanes - Bicycle lanes are additional travel lanes which are dedicated for bicycle use and are

clearly delineated as such. Bicycle lanes are one-way facilities and carry traffic in the same direction as adjacent motor vehicle traffic.

2.

Pedestrian Use

Developments which are required to provide for pedestrian traffic may utilize sidewalks, pedestrian walkways, mulched footpaths or a combination of these and any other approved facility type. The improvements which are proposed to address pedestrian traffic are to be included in the construction plans of the development.

Pedestrian walkways and mulched footpaths are separate facilities from sidewalks, located in separate easements or rights-of-way and are used to accommodate pedestrian traffic. Walkways may be included in a system integrating both pedestrian and bicycle traffic; however, the pathways must be clearly delineated to avoid conflicts between pedestrians and cyclists.

II

DESIGN STANDARDS

A. General

The purpose is to provide standards for the design of transportation improvements. These standards are intended to be supplemental to Section 9.04.00, Transportation Systems and Section 9.05.00, Access Management. In cases of discrepancy between these standards and sections of the Land Development Regulations, the interpretation of the appropriate sections shall prevail over the interpretation of these standards.

B. Access and Access Management

1. Driveways

a. Location

Driveways shall not be permitted in the radius return of an intersection.

No driveway shall be permitted with its nearest edge closer than 100 feet from the edge of the nearest right-of-way line of an intersecting road classified as collector or arterial. This requirement may be modified by the County Manager or Designee for single family residential driveways on lots with limitations due to historic plats.

Driveway radii are to be constructed within the limits of the frontage boundary of the property for which they serve. However, compliance with this requirement does not allow a reduction in the minimum radius criteria.

On roads with curb and gutter, valley gutters shall be required in driveways and shall be placed in line with the gutter line.

No driveway shall be located within three feet of a stormwater inlet except in the case of residential driveways on local streets.

Improvements to the public road to which any driveway would connect will be required when necessary to ensure safe and adequate ingress and egress to the site.

Single family residential driveways, except joint driveways, shall be located such that there is a

minimum of 10 feet between the property corner and the edge of the driveway.

All driveways shall be paved to the edge of the right-of-way; however, single family driveways shall be paved a minimum depth of 10 feet from the edge of the pavement.

b. Width

The minimum width of single family residential driveways shall be ten (10) feet.

The minimum and maximum widths of commercial driveways shall be as specified below:

	Minimum	Maximum
One-Way	18	24*
Two-Way	20	36*

*or as required for multi-lane driveways

All driveway widths shall be measured at the throat.

c. Angle

All driveways shall be constructed at a right angle (90 degree) to the street or roadway whenever possible.

This requirement may be waived for one-way driveways, provided that the angle chosen represents improved ingress or egress compared to a right angle driveway and does not adversely affect the driver's sight distance.

d. Radii

The standard minimum radius for single family residential driveways shall be 8 feet. Single family residential driveways may utilize 8 foot long by 4 foot wide flares on either side in lieu of a radius.

The standard minimum radius for non-single family residential driveways shall be 35 feet. Driveways designed for truck traffic shall have a minimum radius of 50 feet.

The County Manager or Designee may require 50 foot radii on any driveway when deemed necessary for traffic safety.

A radius of less than thirty-five (35) feet may be

approved upon the applicant's demonstration that the smaller radius is more appropriate for the particular parcel of property being served and that the traffic flow on the street being accessed is not impaired.

Driveway radii shall be designed and constructed to connect tangentially at the edge of the road pavement and at the edge of the driveway lane.

2. Turn Lanes

Turn lanes shall consist of storage lanes and tapers. Typical configurations of turn lanes are included in Section V, Typical Details.

Right Turn Lane - The desirable lengths of tapers and storage are based on the design speed of the road and are as follows:

<u>Design Speed of Roadway</u>	<u>Standard Length of Taper</u>	<u>Standard Length of Storage</u>	
		<u>Stop Condition</u>	<u>Free Right</u>
30 MPH	150 ft	50 ft	50 ft
35 MPH	170	105	80
40 MPH	190	135	110
45 MPH	210	165	140
50 MPH	230	195	170
55 MPH	250	210	200

Left Turn Lane - The desirable lengths of storage and tapers are based on the design speed of the road and are as follows:

<u>Design Speed of Roadway</u>	<u>Standard Length of Taper</u>	<u>Standard Length of Storage</u>
30 MPH	150 ft	100 ft
35 MPH	170	105
40 MPH	190	135
45 MPH	210	165
50 MPH	230	195
55 MPH	250	210

The length of taper for left turn lanes is based upon the assumption that the lateral shift of through traffic is equal in both directions (i.e. six foot lateral movement for both directions of traffic). In cases where the lateral shift for one direction of traffic exceeds six feet, the length of taper shall be extended proportion-

ately utilizing the following formula: New length of taper = (standard length of taper) X (maximum lateral shift) divided by 6. The new length of taper shall be calculated to the nearest ten foot increment. The total length of taper shall be based upon the maximum length required and shall be symmetrical about the centerline.

The County Manager or Designee may increase the standard lengths if deemed necessary for purposes of continuity with design speeds, traffic safety, and consistency with existing improvements. The County Manager or Designee may decrease the standard lengths due to physical limitations.

If either terminus of the proposed auxiliary lane section is within standard taper length from existing auxiliary lane terminus then a total 36 foot section may be required to eliminate weaving or "Hour Glass" sections.

In cases involving state roads where these standards conflict with those of the Florida Department of Transportation, the standards of the F.D.O.T. shall apply.

3. Service and Frontage Roads

Service and frontage roads, as required in section 9.05.00, Access Management, shall be built utilizing the same construction standards as other county roads. The road design shall be as follows:

Two-Lane, Two-Way Road - Two 11 foot lanes with two 6 foot stabilized shoulders and drainage swales as needed to accommodate runoff. Curb and gutter section roads shall have 11 foot lanes measured exclusive of curb and gutters.

One-Lane, One-Way Road - One 14 foot lane with two 6 foot stabilized shoulders and drainage swales as needed to accommodate runoff. Curb and gutter section roads shall have 14 foot lanes measured exclusive of curb and gutters.

Two-Lane, One-Way Road - Two 11 foot lanes with two 6 foot stabilized shoulders and drainage swales as needed to accommodate runoff. Curb and gutter section roads shall have 11 foot lanes measured exclusive of curb and gutters.

The drainage system for a frontage road should be coordinated with the drainage system of the adjoining site. Portions of the frontage road right-of-way may be utilized for a combined stormwater management system

accommodating runoff from both the frontage road and the adjoining site if approved by the County Manager or Designee. However, in such cases, a maintenance easement and agreement shall be dedicated over the stormwater management system.

The drainage system for a frontage road in a dedicated, public right-of-way may be combined with the drainage system of the fronting roadway if deemed to be practical and desirable by the County Manager or Designee. In cases where the fronting roadway is a state road, this would additionally require the approval of the Florida Department of Transportation.

4. Paved Access

Subdivisions shall have paved access constructed to county road standards from the entrance of the development to the nearest publicly maintained paved road, or private paved road constructed to county standards, and of sufficient function and capacity to accommodate the increased traffic.

Should adequate paved access not exist, it shall be the responsibility of the developer to make all improvements necessary to provide paved access.

Site plans shall have paved access as required for subdivisions. However, the County Manager or Designee may waive this requirement if deemed to be infeasible or burdensome.

C. Road Design

Unless otherwise explicitly stated in these regulations, road design shall be based upon applicable Florida Department of Transportation Standards (Green Book, etc.) that are in place at the time.

1. Private roads

Private roads shall be designed and constructed according to the standards included in these regulations.

2. Intersections

New road or commercial connections on roads designated as arterials or major collectors shall comply with the spacing standards included in Section 9.050.00, Access Management. New road or commercial connections on roads designated as minor collectors or feeder/distributors shall not be located less than 500 feet apart.

Connections shall be aligned wherever possible to provide

full intersections; offset intersections will not be acceptable. The minimum intersection offset distance shall be as follows:

<u>Classification</u>	<u>Minimum Offset</u>
Arterial	As required in Sec. 9.05.00
Major Collector	As required in Sec. 9.05.00
Minor Collector	500 feet
Feeder/Distributor	500 feet
Neighborhood Collector	250 feet
Local Street	150 feet

Roads shall be laid out to intersect as nearly as possible at right angles (90 degrees) or radial, and no road shall intersect any other road at less than sixty (60) degrees.

Multiple intersections involving the juncture of more than two (2) roadways or driveway approaches shall be prohibited.

Curved roads shall have a minimum tangent of one hundred (100) feet at intersections.

Sight distance shall be provided at all intersections by either providing rounded right-of-way lines or straight corner cuts (sight distance triangles). Right-of-way at subdivision intersection shall be rounded with a minimum twenty-five (25) foot radius, or as otherwise required by traffic conditions or geometric requirements.

Roads shall be designed and constructed both horizontally and vertically to comply with applicable Florida Department of Transportation Standards for minimum sight distance at intersections.

Minimum pavement corner radius shall be 35 feet. A radius of 50 feet shall be used on high volume roads (>3000 ADT) or roads with a horizontal design speed in excess of 35 mph.

3. Corner Clearance

On roads which are not subject to the requirements of Section 9.05.00, Access Management, new connections shall not be located with its nearest edge less than 100 feet from the nearest edge of the road. This requirement may be adjusted by the County Manager or Designee if property dimensions prohibit compliance. In all cases, new connections shall be located as far from the intersection as possible.

4. Cul-de-sacs

The maximum length of a cul-de-sac road shall be 1,320 feet.

The minimum pavement diameter of cul-de-sacs shall be 80 feet.

The maximum diameter for a median in the center of a cul-de-sac shall be 30 feet.

Minimum reverse curve radius shall be 25 feet.

5. Horizontal Alignment

a. Design Speed

Unless otherwise directed by the County Manager or Designee, horizontal alignment shall be based upon the following minimum design speeds:

<u>Classification</u>	<u>Min. Design Speed</u>
Arterial	As required by FDOT
Major Collector	55 MPH
Minor Collector	55 MPH
Feeder/Distributor	45 MPH
Neighborhood Collector	35 MPH
Local Street	25 MPH

b. Horizontal Curves

Whenever a street changes direction or connecting street lines deflect from each other by more than ten (10) degrees, there shall be a horizontal curve. Minimum centerline radii for horizontal curves shall be as follows:

<u>Classification</u>	<u>Minimum Radius</u>
Arterial	As required by FDOT
Collector	1500 feet
Feeder/Distributor	750 feet
Neighborhood Collector	350 feet
Local street	200 feet

A tangent shall be introduced between reverse curves, the length of which shall be based upon the following table:

<u>Classification</u>	<u>Minimum Tangent Length</u>
Arterial	As required by FDOT
Collector	400 feet

Feeder/Distributor	300 feet
Neighborhood Collector	200 feet
Local Street	100 feet

6. Vertical Alignment

a. Design Speed

Unless otherwise directed by the County Manager or Designee, vertical alignment shall be based upon the following minimum design speeds:

<u>Classification</u>	<u>Min. Design Speed</u>
Arterial	As required by FDOT
Major Collector	55 MPH
Minor Collector	55 MPH
Feeder/Distributor	45 MPH
Neighborhood Collector	35 MPH
Local Street	25 MPH

b. Grades

Minimum grades for roads with curb and gutter shall be 0.30%. Minimum grades for roads with swales shall be 0.40%. Maximum grades for roads shall be 8.0%.

The County Manager or Designee may allow exceptions to grading requirements in cases involving severe topography. However, in no case shall the maximum grade exceed 10%.

c. At-Grade Intersections

The gradient of all approaches within 100 feet of intersections shall not exceed 3%.

d. Vertical Curves

Vertical curves shall be required where the algebraic difference in intersecting grades equals or exceeds the following values:

<u>Street Classification</u>	<u>Algebraic Difference</u>
Local	1.00%
Collector	0.80%

All vertical curves shall be of sufficient length to provide a safe stopping sight distance compatible to the design speed of the roadway. Minimum length of all vertical curves shall be 100 feet.

7.

Pavement Width

a. Standard Pavement Width

Standard pavement widths shall be measured exclusive of curbs and gutters and shall be based upon the following table:

<u>Classification</u>	<u>Motorized Traffic</u>	
	<u># of Lanes</u>	<u>Lane Width</u>
Arterial	As required by FDOT	
Major Collector	2-5	12 ft
Minor Collector	2-3	12 ft
Feeder/Distributor (low bicycle volume)	2	12 ft
Feeder/Distributor (high bicycle, low truck vol.)	2	10 ft
Neighborhood Collector	2	10-12 ft
Local Street	2	9-10 ft

The minimum lane width on a two-lane divided road shall be 16 feet.

<u>Classification</u>	<u>Bicycle Traffic</u>	
	<u>Swale</u>	<u>Curb & Gutter</u>
	<u>Paved Shldr Wdth</u>	<u>Add'l Curb Lane Wdth</u>
Arterial	As required by FDOT	
Major Collector	3 ft*	2 ft*
Minor Collector	3 ft*	2 ft*
Feeder/Distributor (low bicycle volume)	0 ft	0 ft
Feeder/Distributor (high bicycle, low truck vol.)	2 ft	2 ft
Neighborhood Collector	varies/depends on use	
Local Street	0	0
Heavy Duty Non-resident.	0	0

*To be included on roadways identified for improvement in an adopted Lake County Bicycle/Pedestrian Plan.

b. Lane Width Based Upon ADT

Lane widths for neighborhood collector roads and local streets shall be based upon the following table:

<u>Average Daily Traffic (ADT)</u>	<u>Lane Width</u>
0 - 300	9 ft
301 - 800	10 ft
801 - 1200	11 ft
1201 - 1500	12 ft

c. Multi-Use Quality Development (MUQD) Standards

Pavement widths shall be according to Sections a and b above. Additionally, the pavement width shall be increased by 8 feet for each side of the road with on-street parallel parking stalls.

Minimum pavement radii at intersections shall meet the following:

<u>Design Speed</u>	<u>Minimum Pavement Radii</u>	
	<u>With Side Prkg.</u>	<u>W/O Side Prkg.</u>
15-20 MPH	15 ft	25 ft
25-35 MPH	25 ft	35 ft

Deviation from the minimum requirements may be allowed by the County Manager or Designee if it can be demonstrated that the proposed design allows for safe movement of traffic without creating potential vehicle conflicts which could result in accidents or injuries. Any reductions in the minimum standards does in no way imply that Lake County assumes liability for the approved design.

8. Roads Within Flood Prone Areas

The minimum centerline elevation for roads within flood prone areas shall be as follows:

<u>Classification</u>	<u>Height above 100-yr Flood Elevation</u>
Arterial	As required by FDOT
Major Collector	2.50 ft
Minor Collector	2.00 ft
Feeder/Distributor	1.50 ft
Neighborhood Collector	1.00 ft
Local Street	0.50 ft

9. Medians, Islands, and Guardhouses

Medians and islands within the road right-of-way are prohibited unless it can be demonstrated to the County Manager or Designee that it is an integral part of the

proposed transportation system and will not create a traffic safety hazard. Medians, islands, and islands in cul-de-sacs shall not be designated as parks or recreation areas. Medians, islands, and islands in cul-de-sacs may be landscaped if approved by the County Manager or Designee.

When an island in a cul-de-sac, or entrance median is proposed:

- a. The area is to be included as part of the road right-of-way, but the maintenance shall be the responsibility of the lot owners. Dedication of maintenance shall be to a specific entity, i.e. a homeowners association. The County shall have the ability to modify, alter, or remove all or portions of the island or median as necessary for roadway improvements or improvements for traffic safety.
- b. The median plans shall be included in the subdivision construction plans.
- c. Guardhouses within the right-of-way shall be subject to the approval of the County Manager or Designee. Guardhouses shall not be used to restrict access to publicly dedicated roads. If a guardhouse is proposed, the guardhouse plans and construction shall meet the approval of the Building Department. Plans for the guardhouse shall be included in the road construction plans.

The minimum median width for divided boulevards shall be 8 feet.

D. *Design Within Rights-of-Way*

1. *Bicycle and Pedestrian Use*

a. *Bicycle Paths*

Bicycle paths are to be designed utilizing standards found in the latest edition of the Florida Department of Transportation Bicycle Facilities Planning & Design Manual.

Bicycle paths should be a minimum of 10 feet wide for two-way traffic. A width of 8 feet may be allowed due to site constraints if approved by the County Manager or Designee. One-way bicycle paths should be a minimum of 5 feet wide. Pathways which combine bicycle and pedestrian traffic shall be a minimum of 12 feet wide and properly marked to segregate pedestrians and cyclists.

A minimum 2 foot graded area shall be maintained adjacent to both sides of the pavement.

When bicycle paths are located adjacent to roadways there shall be a minimum 5 foot separation from the edge of roadway pavement to the edge of bicycle path pavement. When bicycle paths are located adjacent to canals, ditches, or other significant depressions, a minimum 7 foot separation from the edge of the bicycle path pavement to the top of slope shall be required. This separation area shall be graded with a cross-slope no greater than 5%.

b. Paved Shoulders

The minimum width of paved shoulders is dependent upon the classification of the roadway; however, no paved shoulder, for purposes of bicycle use, shall be less than 2 feet wide.

c. Wide Curb Lanes

Wide curb lanes shall be utilized only on roads with a minimum lane width of 12 feet.

d. Bicycle Lanes

Bicycle lanes are to be designed utilizing standards found in the latest edition of the Florida Department of Transportation Bicycle Facilities Planning & Design Manual.

Bicycle lanes shall be designed as one-way facilities and shall flow in the same direction as the adjacent motor vehicle traffic.

Bicycle lanes shall be a minimum of 4 feet wide. However, on roadways with on-street parking, the minimum bicycle lane width shall be 5 feet and the lane shall be located between the motor vehicle lane and the parking lane.

e. Sidewalks

Sidewalks shall be installed as required in Section 9.04.04, Bicycle and Pedestrian Provisions.

Sidewalks shall be generally located along the inside edge of the right-of-way line. Deviations from this standard may be allowed to accommodate existing topography (trees, etc.) or as part of an approved streetscaping plan.

Sidewalks may be constructed by the developer at the time of road construction or by the individual lot owner at the time of building construction. However, the developer shall construct sidewalks, as part of road construction, in areas that do not front individual lots.

All sidewalks shall have a minimum width of 5 feet except for those along local streets which shall have a minimum width of 4 feet.

Sidewalks shall include ramps where utilized with curb and gutter section roads.

f. Pedestrian Walkways

Pedestrian walkways should be a minimum of 5 feet wide. Pathways which combine bicycle and pedestrian traffic shall be a minimum of 12 feet wide and properly marked to segregate pedestrians and cyclists.

A minimum 2 foot graded area shall be maintained adjacent to both sides of the pavement.

g. Mulched Footpaths

Mulched footpaths should be a minimum of 4 feet wide.

A minimum 2 foot graded area shall be maintained adjacent to both sides of the pathway.

2.

Street Lighting

Street lighting, when proposed, shall be located within the right-of-way according to the Utility Accommodation requirement of the Right-of-Way Utilization section of these standards.

Street lights shall be located on separate utility poles specifically for that purpose.

3.

Street Trees

Street trees may be planted along the right-of-way line provided that the spacing is not less than 50 feet on center. Street trees may be located elsewhere within the right-of-way if part of an approved streetscaping plan. Minimum spacing may be reduced if approved by the County Manager or Designee.

For acceptable species and planting criteria refer to Section 9.02.00, Landscaping Standards.

4.

Stormwater Discharge into Rights-of-Way

The outfall of stormwater management systems into the public rights-of-way may be allowable provided that the following are met:

- a. The stormwater management system complies with the criteria of Section 9.06.00, Stormwater Management.
- b. The outfall does not constitute an appreciable change in the nature of the discharge into the right-of-way.
- c. The downstream drainage system within the right-of-way is of sufficient capacity to accommodate the discharge and that the discharge will not appreciably add to or contribute to an existing drainage problem.

If necessary, the developer shall provide any improvements needed to allow the downstream drainage system to accommodate the outfall discharge.

E.

Traffic Safety

1.

Pavement Marking and Signing

Pavement marking and signing shall be included on the construction plans for any road. Pavement markings and signing design shall conform to all criteria herein, as well as applicable criteria contained in the following publications:

Florida DOT - Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways, latest edition.

U.S. Department of Transportation, Federal Highway Administration - Manual of Uniform Traffic Control Devices for Streets and Highways, latest edition.

Other references or publications as directed by the County Manager or Designee.

All legs of an intersection which are to be regulated in a stop condition shall include a stop sign, a stop bar and a double yellow centerline stripe a length of at least 100 feet from the stop bar.

Regulatory and warning signs (speed limit, curve signs, etc.) shall be included on the construction plans and shall be installed as part of construction.

All intersections shall include street name signs, the location of which is to be identified on the construction plans. Street name signs may be placed atop the post of stop signs if such location is visible from all directions of the intersection.

2.

Signals

Traffic signal design for intersections involving County roads shall be based upon site specific conditions and shall proceed under close coordination with the County.

Installation of a traffic signal, including a flashing beacon, on County roads shall be subject to the approval of the County Manager or Designee. Approval shall be based upon a signal warrant analysis utilizing Florida Department of Transportation warrant criteria in use at the time.

III

CONSTRUCTION STANDARDS

A.

General

The purpose is to provide standards for the construction of transportation improvements. These standards are intended to be supplemental to Section 9.04.00, Transportation Systems and Section 9.05.00, Access Management. In cases of discrepancy between these standards and sections of the Land Development Regulations, the interpretation of the appropriate sections shall prevail over the interpretation of these standards.

Unless otherwise indicated in these regulations, construction shall comply with the latest edition of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction. The County Manager or Designee shall make the interpretation of these specifications in cases where they are unclear or where there is a conflict due to a difference in understanding of the intent of the specifications.

B.

Road Construction

1.

Clearing and Grubbing

All rights-of-way shall be completely cleared and grubbed for their entire width. Selective clearing and grubbing in order to preserve desirable, existing landscape may be allowed provided that the final determination of areas to be cleared and grubbed is made by the County Manager or Designee.

Trash, brush, trees, etc. may be burned within the right-of-way limits provided that all necessary burn permits are secured. Should the burning of debris cause severe smoke, air pollution or generally create a nuisance, the County Manager or Designee may require the contractor to dispose of the debris in another manner.

2.

Earthwork

In areas where unsuitable materials (muck, peat, clay, rock, etc.) are uncovered, the contractor shall over-excavate to a depth approved by the County and shall backfill with a suitable material in an approved manner as directed by the County Manager or Designee.

Materials used in fill areas shall be suitable for that use. If the suitability of the material is uncertain,

final determination shall be made by the County Manager or Designee.

Fill areas shall be constructed in 6 inch lifts.

Hauling equipment which is loaded beyond the capacity of any paved road or structure, or any hauling equipment loaded beyond the legal load limit, is not permitted. The contractor shall restore any roads, public or private, damaged by his equipment, to its original condition. This requirement shall apply to all phases of construction.

3. Bridges, culverts, storm sewers, ditches and pipes

a. Bridges

Bridges shall be constructed of precast concrete, prestressed concrete, cast-in-place concrete, composite concrete and steel, or steel.

Bridge design shall conform to the design criteria of the latest edition, AASHTO Standard Specifications for Highway Bridges.

Prior to design of bridges, the developer's engineer shall submit design load criteria to the County for approval.

Materials and methods of construction shall conform to the Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.

b. Culverts

The following is a list of minimum standards for culverts:

1. Material: reinforced concrete
2. Minimum size: eighteen (18) inches or equal.
3. Minimum cover: one and one-half ($1\frac{1}{2}$) inches below base.
4. End treatment: headwall, inlet, manhole, or mitered end section required, each end.

Asphalt coated corrugated metal pipe, corrugated aluminum pipe, or smooth bore corrugated polyethylene pipe may be allowed where it does not cross under roads.

The size of the culvert should be based upon the anticipated peak flow for the appropriate design storm.

c. Storm Sewers

The following is a list of minimum standards for storm sewers:

1. Material: reinforced concrete, asphalt coated corrugated metal, corrugated aluminum pipe, or smooth bore corrugated polyethylene pipe. Only reinforced concrete pipe shall be allowed under roads.
2. Minimum size: Fifteen (15) inches or equal.
3. Minimum cover: one and one-half ($1\frac{1}{2}$) inches below base.
4. Junctions: inlet or manhole required at each change of alignment, grade, size, or material. Maximum length between manholes shall be 300 feet for pipe sizes of 18 inches or less, 400 feet for pipes up to 42 inches, and 500 feet for 42 inches and above.
5. End treatment: inlet, manhole, headwall, or mitered end sections.

d. Ditches

The following is a list of minimum standards for roadside ditches:

1. Three-foot minimum bottom width.
2. Two-foot minimum depth, below shoulder.
3. Maximum front slope-3:1.
4. Maximum back slope-2:1.

NOTE: See typical road section details for standard swale sections.

e. Pipes

Pressurized PVC pipe laid under roadways, with the exception of local streets, shall be encased. An acceptable alternative shall be the utilization of ductile iron pipe without encasement.

4. Inlets, manholes, and mitered end sections

Inlets, manholes, and mitered end sections shall be constructed in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

Storm sewer manholes shall have poured inverts.

Ditch bottom inlets shall have open throats. Inlets shall be placed such that the throat shall be at or above the ditch or swale bottom.

5. Groundwater and road underdrains

Roads shall be designed such that the high groundwater elevation is at least 6 inches below the bottom of the subgrade. In cases where this is unattainable, road underdrains may be utilized with the approval of the County Manager or Designee. Underdrain design shall be subject to the approval of the County Manager or Designee.

If road underdrains are installed which discharge into the stormwater management system, the retention/detention system shall be designed to accommodate the additional flow and volume due to the groundwater discharge.

6. Sodding and Seeding and Mulching

a. Sodding

Two strips of sod shall be placed along the edge of pavement on all roads.

Swale checks shall be completely sodded along their length and from the edge of pavement to the right-of-way line.

Roads which exceed a grade of 3% shall be sodded from edge of pavement to the edge of the right-of-way to prevent excessive erosion and sedimentation. This requirement may be temporarily waived by the County Manager or Designee provided that the developer shall maintain the road section and shall promptly clean up any erosion or sedimentation to the County's satisfaction. Additionally, all sod shall have been placed and the stormwater management system shall be free of sedimentation prior to the release of the maintenance bond and assumption of maintenance by the County for public roads or within two years of road construction for private roads.

The contractor shall be responsible for watering and maintaining the viability of the sod for a period of two weeks after installation. Any sod which dies within this period shall be replaced at no cost to the County.

All grassed areas within existing County or State rights-of-way that are disturbed by construction shall be resodded to the County's satisfaction.

b. Seeding and Mulching

All unpaved areas of the right-of-way that are not required to be sodded shall be seeded and mulched.

Seeding and mulching shall be distributed on a per acre basis. The mix for a one acre area shall include: 30 pounds of Bermuda (one-half hulled/one-half unhulled), 80 pounds of Bahia, 550 pounds of fertilizer and from October 1 through March 31 50 pounds of millett shall be included. A clean, weed-free mulch shall be used.

Proper watering shall be included for two weeks from the completion of the seeding and mulching.

7.

Bicycle and Pedestrian Improvements

a. Bicycle Paths

The pavement section for bicycle paths shall be one of the following:

1. 4" of Type II asphaltic concrete laid directly on a compacted subgrade.

or

2. 1½" of Type II asphaltic concrete overlaying a 4" compacted limerock base laid on a compacted subgrade.

or

3. 4" - 3000 PSI concrete reinforced with 10-10x6"x6" mesh laid on a compacted subgrade. Saw cut traverse joints shall be included to control cracking. Joints shall be cut on the same day as the pour and shall be spaced a length equal to the width of the bicycle path.

Bicycle paths shall be marked with paint as opposed to thermoplastic.

b. Paved Shoulders

New Roads - Paved shoulders shall be constructed by adding the paved shoulder width to the roadway pavement width. The paved shoulder shall be delineated from the travel lane by the placement of an edge stripe.

Existing Roads - Paved shoulders shall be constructed in the same manner as turn lanes.

c. Sidewalks

Sidewalks shall be constructed as follows:

Sidewalks shall be 4" - 3000 PSI concrete. The depth shall be 6" at driveways. Saw cut traverse joints shall be included to control cracking. Joints shall be cut on the same day as the pour and shall be spaced a length equal to the width of the sidewalk.

d. Pedestrian Walkways

The pavement section for pedestrian walkways shall be one of the following:

1. 4" of Type II asphaltic concrete laid directly on a compacted subgrade.

or

2. 1½" of Type II asphaltic concrete overlaying a 4" compacted limerock base laid on a compacted subgrade.

or

3. Walkways shall be 4" - 3000 PSI concrete laid on a compacted subgrade and shall be reinforced with 10-10x6"x6" mesh if the walkway is to be wider than 5 feet. Saw cut traverse joints shall be included to control cracking. Joints shall be cut on the same day as the pour and shall be a length equal to the width of the walkway.

e. Mulched Foot Paths

Mulched foot paths shall be cleared and compacted and shall have 3" of mulch placed along its entire area.

8.

Driveways

a. Single family residential driveway

Clay road - no apron required, however, depending upon roadside drainage, a driveway culvert may be required. Minimum driveway culvert size is 15" diameter or equivalent. The minimum length of culvert shall be 20 feet.

Paved road - 6" limerock base with 1" asphalt or 6" - 3,000 PSI concrete reinforced with 10-10x6"x6" mesh constructed from the property line to the edge of existing pavement. Depending upon roadside drainage, a driveway culvert with mitered end sections may be required. Minimum driveway culvert size is 15" diameter or equivalent. The minimum length of culvert including mitered end section shall be 30 feet.

b. Non-single family residential driveway

Clay road - minimum 12" thick stabilized clay apron from edge of road to the property line or apparent right-of-way line. Depending upon roadside drainage, a driveway culvert with mitered end sections may be required. Minimum driveway culvert size is 15" diameter or equivalent. The minimum length of culvert including metered end sections shall be 40 feet.

Paved road - 8" limerock base with 1" asphalt or 6" - 3,000 PSI concrete reinforced with 10-10x6"x6" mesh constructed from the property line to the edge of existing pavement. Depending upon roadside drainage, a driveway culvert with mitered end sections may be required. Minimum driveway culvert size is 15" diameter or equivalent. The minimum length of culvert including metered end sections shall be 40 feet.

9.

Turn lanes

Turn lanes shall be constructed as a widening of existing pavement. When left turn lanes are constructed, the entire roadway shall be overlaid from end of taper to end of taper. The County Manager, or Designee may waive the overlay requirement if the road is scheduled for construction within one (1) year of the installation of the turn lanes(s). If deemed necessary, the County Manager or Designee may require an overlay with the installation of a right turn lane.

Road widening for the installation of turn lanes shall be constructed according to the following:

Base - 12" limerock placed in two - 6" lifts and compacted to a 98% density.

Asphalt - 2" type S-1 asphalt to match the existing pavement.

Overlay - 50 lbs/sy type 2 leveling course and 1" friction course

All turn lanes shall be marked with thermoplastic striping and reflective buttons.

C. *Pavement Construction*

1. *Subgrade*

The following are minimum standards for the stabilized subgrade:

Width: The subgrade shall be two (2) feet wider than the base course (one (1) foot each side) and in the case of curb and gutter shall extend six (6) inches behind the curb.

Depth: The subgrade shall have a minimum depth of 12 inches.

Compaction: The subgrade shall be compacted to 98% density having a minimum Florida Bearing Value (FBV) of 50 pounds per square inch.

Care of Subgrade: Trucks will be allowed on finished subgrade to dump base course, but contractor will be required to level out ruts. In the event the trucks cause too much damage to the subgrade, the County Manager or Designee may require dumping, spreading, and hauling on the base course.

2. *Shoulders*

The following are minimum standards for shoulders:

Width: Shoulders shall be eight feet wide. A reduction in the width requirement may be allowed if approved by the County Manager or Designee.

Depth: Shoulders shall have a minimum depth of six inches.

Compaction: Shoulders shall be compacted to a minimum Florida Bearing Value of 50 pounds per square inch.

Grading: Shoulders shall be graded with a minimum cross-slope of $\frac{1}{4}$ inch/foot.

3. Base Course

The following are minimum standards for the base course:

Material: Ocala limerock or soil cement are acceptable material types for the road base. Other materials may be used if approved by the County Manager or Designee. Soil cement may not be utilized on heavy duty roads without specific approval by the County Manager or Designee.

Width: All bases shall be one (1) foot wider (six (6) inches each side) than the finished surface.

Depth: The base shall have a minimum depth of six inches. Heavy duty roads shall have a base with a minimum depth of eight inches placed in two lifts.

Compaction: Limerock base shall be compacted to a minimum 98% density as determined by AASHTO T-180.

Strength: Soil cement base shall have a seven day design compressive strength of at least 300 PSI.

Forms: No form boards will be required unless, in the opinion of the County Manager or Designee, the contractor is not taking precautions to obtain the full depth at the edges.

Grading: The base shall be graded and rolled to conform to the grade and cross-slope of the finished roadway.

Prime Coat: Prime coat shall be applied to all base courses, and sand sealed.

4. Wearing Surface

The following are minimum standards for pavement wearing surface:

Material: Type III asphaltic concrete shall be used for the road wearing surface. Other asphalt types may be used if required by the County Manager or Designee.

Depth: Roads shall have a minimum 1 inch depth of wearing surface. The minimum depth may be increased if required by the County Manager or Designee.

Heavy Duty Roads: Heavy duty roads shall have a wearing surface consisting of two inches of S-1 asphaltic concrete overlaid with a one inch friction course. The type of material to be used for the friction course shall be determined by the County Manager or Designee.

Grading: Road surfaces shall be graded with a minimum cross-slope of $\frac{1}{4}$ inch/foot.

5.

Curb and Gutter

The width of curb and gutter shall be a minimum of twenty-four (24) inches and shall be either Florida Department of Transportation type F (standard curb and gutter) or Miami type, depending upon the flow to be handled. FDOT type D (simple vertical curbing) will not be acceptable. FDOT type A (mountable median curb) may be used around median dividers on the high side of pavement. There shall be a stabilized subgrade beneath all curb and gutter.

No water valve boxes, meters, portions of manholes, or other appurtenances of any kind relating to any underground utilities shall be located in any portion of a curb and gutter section.

The curb and gutter flow line grades shall run parallel to the road centerline grade. The minimum allowable flow line grade of curbs and gutters shall be 0.30%, except in intersections where flatter grades shall be allowable.

Joints shall be sawed (unless an alternate method is used) at intervals of ten (10) feet, except where shorter intervals are required for closures, but, in no case, less than four (4) feet. Joints shall be cut on the same day that the curb and gutter is poured.

All cross-street valley gutters shall be constructed of concrete.

6.

Decorative Pavement

The use of decorative pavement shall be subject to the approval of the County Manager or Designee. The County shall not assume the maintenance of decorative pavement sections. Maintenance shall be the responsibility of a homeowners association or other acceptable entity.

The County shall have the right to modify, alter, or remove all or a portion of the decorative pavement as necessary for roadway improvements or improvements for traffic safety.

Bomanite Pavement - Bomanite pavements shall meet the requirements for concrete pavement in the Florida Department of Transportation Standard Specifications for Road and Bridge Construction. The developer shall submit to the County, for approval, manufacturers specifications confirming adherence to these regulations.

Paving Bricks - The use of paving bricks shall be subject to the approval of the County. The developer shall submit to the County, for approval, manufacturers literature and technical specifications regarding the structural strength, skid resistance and subgrade requirements.

7. Clay Roads

New clay roads shall not be brought into the County Maintenance System. These standards are only for the improvement of the easements required for large lot splits.

The following are minimum standards for clay roads:

Width: Clay roads shall have a minimum width of 20 feet.

Depth: The minimum depth of clay shall be six inches.

Compaction: The road shall be mixed to a depth of 8 inches (6 inches of clay and 2 inches of native soil, if sand) and compacted. If native soil is not sand, 2 inches of sand may be brought in and mixed with the clay or a mixture of 75% clay and 25% sand may be brought in pre-mixed. The sand-clay mixture ratio requirements may be adjusted upon the direction of the County Manager or Designee.

Grading: The road shall be graded to provide positive drainage. The minimum cross-slope shall be $\frac{1}{2}$ inch/foot.

8. Testing

Testing shall be provided as part of construction and shall be at no cost to the County. Testing shall be performed by an independent engineering testing laboratory certified in the State of Florida.

The following are minimum testing requirements:

Subgrade - Testing for the subgrade thickness, bearing value and density shall be located no more than five hundred (500) feet apart and shall be staggered to the

left, right and on the centerline of the roadway. The County may also require additional test location as directed by the County Manager or Designee. There shall be no less than one (1) test per road. Testing shall be in accordance with applicable FDOT, AASHTO, or ASTM standards. Certified test results shall be submitted to the County for approval prior to proceeding with the base course.

Limerock Base - Testing for the base thickness and density shall be located no more than 500 feet apart and shall be staggered to the left, right and on the centerline of the roadway. The County may also require additional test locations as directed by the County Manager or Designee. There shall be no less than one test per road. Testing shall include: modified proctor maximum density, in-place field density and thickness. Testing shall be in accordance with applicable FDOT, AASHTO, or ASTM standards. Certified test results shall be submitted to the County for approval prior to proceeding with the wearing surface.

Soil - Cement base - Testing for the base thickness and strength shall be located no more than 500 feet apart and shall be staggered to the left, right and on the centerline of the roadway. The County may also require additional test locations as directed by the County Manager or Designee. There shall be no less than one test per road. Testing shall include: test cores taken after seven days to verify thickness and testing to verify a minimum seven day compressive strength of 300 PSI. Testing shall be in accordance with applicable FDOT, AASHTO, or ASTM standards. Certified test results shall be submitted to the County for approval prior to proceeding with the wearing surface.

Wearing Surface - Testing for wearing surface thickness shall be located no more than 500 feet apart and shall be staggered to the left, right and on the centerline of the roadway. The County may also require additional test locations as directed by the County Manager or Designee. There shall be no less than one test per road. Testing shall include: certified design mix submitted for approval prior to placing asphalt, extractions taken in field at least one per day and corings to verify thickness. Testing shall be in accordance with applicable FDOT, AASHTO, or ASTM standards. Certified test results shall be submitted to the County for approval.

- D. *Traffic Safety*
- 1. *Pavement Marking and Signing*

All pavement marking and traffic control signs shall be in place prior to final inspection. The installation of traffic control devices shall be at no cost to the County. All materials and installation shall conform to the specifications of the Manual of Uniform Traffic Control Devices.

If, at any time prior to final acceptance, an unforeseen need becomes apparent for signing or pavement markings that were not shown on the approved plans, the County may require additional sign(s) or markings in the interest of public safety and as a condition of County acceptance.

All pavement marking shall be thermoplastic except for on bike paths and bike lanes which shall be standard paint for pavement marking.

All regulatory signs shall have "high intensity" facings or better.

Stop signs on local streets shall be 30 inches and 36 inches on all others and shall be placed on round, aluminum posts. A larger stop sign may be required at the direction of the County Manager or Designee.

Road name signs shall be 9 inches high with a length of 24 inches minimum to 36 inches maximum.

IV

RIGHT-OF-WAY UTILIZATION

A. *General*

The purpose is to control the utilization of the public rights-of-way and public easements lying within the County in the interest of public health, safety, and welfare of the citizens and inhabitants of Lake County. It is the intent to promote good engineering practices which will assure the maximum utilization of the public rights-of-way and public easements by all the citizens with the lowest life cycle cost to all due to safety, operation, and maintenance. All right-of-way utilization activities shall be reported to the U.N.C.L.E. Underground Utilities Notification Center at least 72 hours prior to commencement.

B. *Applicability*

All construction and maintenance performed within the public rights-of-way and public easements under the jurisdiction of Lake County, unless specifically exempt, are within the purview of this code, regardless of size or extent.

C. *General Regulations*

1. Consideration shall be given to aesthetics by all right-of-way users to avoid unnecessary appurtenances. In all cases, full consideration shall be given to sound engineering principles and economic factor.
2. Only one pole line will be permitted on each side of the right-of-way. No pole lines shall be placed within median areas of roadways or driveways.
3. Only single-pole support systems will be permitted within the rights-of-way. Any exception must be amply justified and approved by the County Manager or Designee.
4. Open cutting of existing roadway pavement shall generally not be allowed, but may be considered under one or more of the following conditions:
 - a. Subsurface obstructions.
 - b. Limited space for jacking pits.
 - c. Condition of roadway surface, including imminent resurfacing and rebuilding.
 - d. Where facility design prohibits.

In any analysis of a request for open cutting, primary consideration shall be given to the safety and convenience of the public. Open cutting shall not be allowed on newly paved or resurfaced roadways for five (5) years.

5. Where open cutting has been permitted, replacement of fill, base, and surface will be in accordance with this code, the latest State of Florida Department of Transportation specifications, or the County's standard procedures, and/or special provisions as applicable. When traffic is to be placed on a cut area, a temporary patch with a smooth all-weather surface must be provided.
6. Attachments to structures such as bridges shall be carefully reviewed and may be considered under one or more of the following conditions:
 - a. Will not create a potential hazard;
 - b. Will not affect the integrity of the structure;
 - c. Will not adversely affect aesthetics of the structure;
 - d. Will not hinder maintenance operations;
 - e. Will not block the view of traffic control devices;
 - f. Shall maintain minimum ground clearance of 18 feet.
7. Where attachments are permitted, the following criteria must be adhered to:
 - a. No maintenance will be accomplished from any structure. Maintenance must be without hindrance to the public.
 - b. The utility line must maintain clearance equal to that of the structure.
 - c. Where possible, the utility line should be in conduit so that maintenance can be accomplished from ends of structure.
 - d. Material used for casing and attachments shall be such that it will not require routine maintenance such as painting, etc. This will include case iron, galvanized steel, stainless steel, aluminum, concrete, etc.

- e. No consideration will be given to approving flammable fluid pressure lines unless the lines are designed in accordance with and meet the requirements of applicable State and Federal regulations.
- f. All lines carrying flammable transmittants shall be attached in such a manner so as not to extend below the bottom elevation of supporting beams of the bridge structure, and so that the line will have minimum exposure to vehicular damage.
- g. All attachments to structure will be reviewed in respect to their contribution to any corrosive damage which would lessen the structural integrity of the structure. The attachment should be effectively isolated from the structure so as not to induce corrosion into the structure.
- h. If other locations are reasonable, attachment to the structure will not be allowed. Each attachment will be considered on its own merits.

8.

All public rights-of-way and public easements shall be restored to their original condition as far as practical, in keeping with the code, and in a manner satisfactory to the County. The following guidelines are established for this purpose:

- a. All traffic detours will be restricted to the limits of rights-of-way with necessary flagmen and marking devices. A traffic detour or lane closure shall require specific approval by the County Manager or Designee.
- b. All utility construction and maintenance shall be performed with proper shoring, barricades, and maintenance of traffic signage in accordance with the Manual of Uniform Traffic Control Devices, with regulations of the Florida Industrial Safety Board, and the Florida Department of Transportation Safety Manual.
- c. Proper repairs of open cuts shall be in accordance with the County's standard procedures.
- d. Temporary patches shall be topped with asphaltic material and maintained so as to provide a smooth, all-weather surface at all times. Permanent replacements of the temporary patch shall be made as soon as all work on the installation is completed.
- e. Shoring will be required where necessary to protect existing pavement, and must be properly protected

and removed.

- f. All excavated material in excess of the quantity required for backfill, and unusable material shall be disposed of at the permittee's expense, and not placed within the limits of the public right-of-way or easement unless so directed by the County.
 - g. At such locations where County signs and reflectors will interfere with proposed construction, the permittee or his designee will notify the County twenty-four (24) hours in advance of starting work. All signs and reflectors will be removed or relocated only by County forces. Any signs or reflectors damaged, destroyed, removed, or relocated will be replaced at the expense of the permittee. No private signs of any type will be permitted within the right-of-way.
 - h. Trees and/or shrubs destroyed during construction are subject to being replaced by the permittee as directed by the County. All debris shall be removed by the permittee at his expense. All vegetation shall be provided the maximum protection practicable.
 - i. All jack and bore crossings will be a continuous operation at each location at the proper location and depth. Any deviation from the above will be sufficient grounds for work stoppage, plugging the line with concrete, and replacement of a line at the proper location;
 - j. Grassing and mulching operations are to begin as soon as fine grading and weather conditions permit, as directed by the County. Any yards or part of the right-of-way in front of private property that has a grass mat shall be re-sodded with like sod;
 - k. The indiscriminate cutting of trees or disfiguring of any feature of scenic value shall not be permitted. This includes other methods such as the use of herbicides. The necessary trimming or cutting of trees by utility companies in the interest of public safety or continuity of utility service shall not be considered indiscriminate where such utilities cannot bypass the obstruction. This shall not be construed to mean that existing pole lines must be relocated to comply with the above.
9. All landscaping within public rights-of-way and public easements shall comply with the following provisions:

- a. In order for the County to allow the non-county installation of right-of-way or easement landscaping, a statement in writing as to who will be responsible for the maintenance of the project including watering, fertilizing, pruning, etc., will be required. This statement shall come from the adjacent property developer/owner, the appropriate homeowners association, or civic organization;
- b. The permittee shall not hold the County responsible for any damage to the plants during subsequent right-of-way construction;
- c. Plants in a median island within one hundred (100) feet of a median opening shall provide a clear sight distance between two (2) and seven (7) feet above the ground. Conditions may require the above one hundred (100) foot length to be extended for safety considerations.
- d. No rock boulders, utility facilities, stationary signs, or above ground monuments shall be allowed in the medians.
- e. Persons and equipment maintaining the project are to carry out their work in such a manner as not to obstruct vision or traffic flow.
- f. Plantings shall be maintained at all times to prevent being a hazard in the safe operation of a vehicle, which includes the sight distance of drivers. Landscaping which creates a hazard to safe vehicle operation may be maintained, modified and/or removed at the discretion of the County.
- g. Trees planted within the right-of-way on high speed (50 M.P.H. and above) and high volume roadways shall be thirty (30) feet from the edge of the pavement or at the right-of-way line. Each location will be reviewed for any special requirements by the County.
- h. Sprinkler heads and irrigation systems installed adjacent to public roadways and sidewalks shall be designed to insure public safety and shall not spray water over or on the roadway or sidewalk area. They shall not be operated during high pedestrian or vehicular travel times. On non-curbed streets, the sprinkler head shall be located adjacent to the right-of-way line or on public property to prevent damage by parked vehicles.

10.

Any utility, structure, vegetative material or other type of object within the right-of-way which causes or contributes to the deterioration of the road shoulder,

swale or other roadway systems, or which creates a hazard to safe vehicle operation shall be subject to removal at the discretion of the County.

D. *Utility Accommodation*

1. The placement of utilities within the public rights-of-way and public easements shall be placed in accordance with all applicable codes and current industry standards.
2. The following general provisions, including the proper sight distance requirements, shall be followed:
 - a. Light and utility poles shall be located at least eighteen (18) feet from edge of pavement or at right-of-way line. Poles are permitted to within twelve (12) feet from edge of pavement, provided a frangible base is used, or behind a barrier. A minimum distance of six (6) feet will be required from the edge of pavement on deceleration and acceleration lanes. Where design permits, fourteen (14) foot clearance shall be used.
 - b. Non-single family mail boxes, fire hydrants, and other miscellaneous utility structures should be located at the right-of-way line or at least eighteen (18) feet from the edge of pavement. Fire hydrants shall be placed no closer to the roadway than eight (8) feet unless otherwise approved by the County Manager or Designee.
 - c. Single family mail boxes shall be constructed and installed in a manner that does not endanger the public.
 - d. Underground utilities parallel to roadways shall maintain a minimum vertical clearance of thirty-six (36) inches below the top of the roadway pavement and existing top of ground, including ditch grade.
 - e. Underground crossings shall maintain a minimum vertical clearance of thirty-six (36) inches below the top of roadway pavement and top of ground, including ditch grade.
 - f. Aerial crossings shall be in accordance with the National Electrical Safety Code, and shall maintain a minimum of eighteen (18) feet over roadways. They shall not interfere with existing or planned signal installation.

3. Devices such as signal-strain poles, above ground enclosures, and other items whose construction and size would cause extensive damage to a vehicle if struck are to be located according to the standards for utility poles.
4. Where possible, excavation will not be allowed within four (4) feet of the edge of the pavement. Situations which cannot meet this requirement shall require the approval of the County Manager or Designee.
5. These criteria shall not be applied to a minor segment of an existing utility installation in such a manner as to result in misalignment of the installation or adjustment of the entire installation.
6. The roadside clearances for above ground utility facilities shall be consistent with those clearances applicable to other obstacles on the type of highway involved, reflecting good engineering and economic considerations.
7. In exposed areas, fragile or breakaway poles and light standards should be considered to the extent practical. Where location is not exposed, consideration can be given to other type standards.

E. *Operational Safety*

The County may issue a "stop work" order upon any permittee who is committing or creating unsafe acts which may create a public hazard or who is not complying with the provisions of the permit and this code. The order shall remain in effect until such time as these matters are corrected.

