
SPIKOWSKI PLANNING ASSOCIATES

1617 Hendry Street, Suite 416
Fort Myers, Florida 33901-2947

telephone: (239) 334-8866
fax: (239) 334-8878

e-mail: bill@spikowski.com
web site: www.spikowski.com

March 17, 2005

Mary Gibbs, Director
Lee County Department of Community Development
P.O. Box 398
Fort Myers, Florida 33902-0398

RE: GREATER PINE ISLAND'S "910 RULE"

Dear Mary:

Lee County is now implementing the "910 Rule" in Lee Plan Policy 14.2.2 and we understand there are differing opinions as to how this rule should be implemented.

We do not agree with one opinion, which is that no practical effects will be felt by applicants for residential orders until the levels of service described in Policy 14.2.1 have been reached (as opposed to those described within Policy 14.2.2). However, in order to understand the effects of such an interpretation, we have conducted some research that you will find to be critical, because there was a technical flaw in the software that FDOT had supplied to Lee County for converting the level-of-service grades into actual traffic counts. Please review the attached memorandum for further details.

Once this software flaw is corrected, it appears that there will be no need to determine which of the differing opinions about the "910 Rule" should prevail inasmuch as the practical effects are about the same. I would like to sit down with you and other county staff members to discuss this matter after you have reviewed the attached material. (The software "patch" can be obtained from Mohsen Salehi or directly from Professor Scott S. Washburn at the University of Florida.)

Sincerely,

William M. Spikowski AICP

cc: David Loveland, Lee County DOT
Scott S. Washburn, University of Florida



*Salehi Consulting Services/4786 Harbour Cay Blvd
Ft. Myers, Florida 33919
Tel: (239) 994-1320/Fax: (239) 433-1092
MnSalehiAICP@aol.com*

Memo

To: Bill Spikowski
From: Mohsen Salehi
Date: March 4, 2005
Subject: Lee Plan Policy 14.2.1 & HCM 2000 Based FDOT HighPlan Software

Lee County has formally acknowledged that traffic counts on Pine Island Road exceed the 910 threshold established in Lee Plan Policy 14.2.2, with the latest published figures indicating a count of 937.¹

However, some county staffers have expressed the opinion that the “910 Rule” will have little practical effect on the issuance of further residential development orders because they read Policy 14.2.1² as controlling over Policy 14.2.2.³ Policy 14.2.1 refers to levels of service

¹ *Concurrency Management: Inventory and Projections, 2003/2004–2004/2005, page 6*

² *“POLICY 14.2.1: The minimum acceptable level-of-service standard for Pine Island Road between Burnt Store Road and Stringfellow Boulevard is hereby established as LOS "D" on an annual average peak hour basis and LOS "E" on a peak season, peak hour basis. This standard shall be measured at the county's permanent count station on Little Pine Island and using the methodology described in the 1985 Highway Capacity Manual, Special Report 209.”*

³ *“POLICY 14.2.2: In order to recognize and give priority to the property rights previously granted by Lee County for about 6,675 additional dwelling units, the county will keep in force effective development regulations which address growth on Pine Island and which implement measures to gradually limit future development approvals. These regulations will reduce certain types of approvals at established thresholds prior to the capacity of Pine Island Road being reached, measured as follows at the permanent count station on Little Pine Island at the western edge of Matlacha:*

- *When traffic on Pine Island Road reaches 810 peak hour, annual average two-way trips, the regulations will restrict further rezonings which would increase traffic on Pine Island Road through Matlacha. These regulations shall provide reasonable exceptions for minor rezonings on infill properties surrounded by development at similar intensities and those with inconsequential or positive effects on peak traffic flows through Matlacha, and may give*

that are expressed differently than Policy 14.2.2: “LOS “D” on an annual average peak hour basis and LOS “E” on peak season, peak hour basis.” Lee DOT is also recommending that these levels of service be evaluated using the newer 2000 Highway Capacity Manual (2000 HCM) methodology, as opposed to the 1985 HCM that is cited in Policy 14.2.1.

You asked to me to research the meaning of the levels of service in Policy 14.2.1 in case this interpretation of the “910 Rule” becomes official county policy. In addition, you asked what would be the implications of changing Policy 14.2.1 to refer to the 2000 HCM instead of the 1985 HCM, because Lee County DOT is proposing to make such a change in an upcoming amendment to Policy 14.2.1.

One would expect these assignments to be quite simple, but that has not turned out to be the case.

In a July 30, 2004, Memo to Lee DOT indicated the levels of service in Policy 14.2.1 to result in a figure of 1130 (using 1985 HCM) and 1300 (using 2000 HCM) for determining annual average peak hour two-way (copy attached). I contacted Lili Wu of Lee DOT to find out how these figures had been generated. He provided me a printout showing the 1300 value (based on 2000 HCM software provided by Florida DOT, HighPlan version 1.0); no printout for 1985 HCM showing the 1130 value was available. It is my understanding that Lee DOT runs the software once to determine the resulting values, then prints out the results and uses the printed values in their subsequent work for concurrency and other purposes.

I then obtained this same HighPlan software from the FDOT web site and ran it to verify and understand the Lee DOT results. The version of the software I downloaded was newer than the one used by Lee County (version 1.2 vs. version 1.0). Since both versions were based on the same formulas, the results should have been the same, but they were not. Most strikingly, this model produces a different result after the input values were “saved,” indicating a technical flaw or bug in the model itself.

I brought this problem to FDOT and subsequently their consultant Prof. Washburn’s attention. He acknowledged that “there was definitely an issue with the functioning of the analysis type...”. He further sent me a “patch” (i.e., an application file, highplan.exe, to fix the problem that I had brought to his attention). He also mentioned: “I am not sure we will be doing an official update on the FDOT website as I have been working on a separate version that will likely replace this version in the near future.” I “patched” the software only to encounter other minor problems that are as yet unresolved, but which should little practical effect.

Transportation professionals would not knowingly use a model that produces incorrect results. Unfortunately these models are somewhat like black boxes, so the “correct” result is sometimes not immediately apparent.

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- preference to rezonings for small enterprises that promote the nature and heritage of Greater Pine Island.*
- *When traffic on Pine Island Road reaches 910 peak hour, annual average two-way trips, the regulations shall provide restrictions on the further issuance of residential development orders (pursuant to chapter 10 of the Land Development Code), or other measures to maintain the adopted level of service, until improvements can be made in accordance with this plan. The effect of these restrictions on residential densities must not be more severe than restricting densities to one-third of the maximum density otherwise allowed on that property.*
- The 810 and 910 thresholds were based on 80% and 90% of level-of-service “D” capacity calculated using the 1965 Highway Capacity Manual, as documented in the 2001 Greater Pine Island Community Plan Update. These development regulations may provide exceptions for legitimate ongoing developments to protect previously approved densities for final phases that have a Chapter 177 plat or site-plan approval under Ordinance 86-36.”*

Based on my analysis and my e-mail exchanges with Professor Washburn, I believe the correct value for interpreting Policy 14.2.1 is 940⁴ (or 950⁵) for LOS “D” on an annual average, peak hour basis. With or without the “patch” supplied by Prof. Washburn, Lee DOT staff are more than likely to arrive at results similar to my results using the latest version available (1.2) on the FDOT website. Marginal differences are to be expected if yet-to-be-published 2004 Traffic Count Report data is utilized, even with adjustments made for converting weekday to weekly (i.e., full –week) peak flow.

Assuming my analysis is correct, the values generated for Policy 14.2.1 are quite close to the 910 figure in Policy 14.2.2 and even closer to the 937 actual traffic count as report in the latest concurrency report. As a result, it may end up making little or no practical difference how the county (or the courts) ends up interpreting the relationship between Policies 14.2.1 and 14.2.2.

Also, since we cannot identify any working software for the 1985 HCM, it should make no practical difference whether Policy 14.2.1 is amended to refer to the 2000 HCM or not. There should be no issues with using the 2000 HCM to compute values as long as the errors in the earlier versions of the FDOT software, as acknowledged by FDOT consultant Prof. Washburn, are taken into account.

Please let me know if further explanation or clarification is needed.

⁴ Using Lee County DOT values for K factor and D factor

⁵ Using FDOT default values for AADT, K factor, and D factor as recommended on page 114 of the FDOT 2002 Quality/Level of Service Handbook

Memo

To: Mary Gibbs, Community Development Director

From: David Loveland, Manager, Transportation Planning

Date: July 30, 2004

Subject: **CONVERSION OF 2003 TRAFFIC COUNTY ON PINE ISLAND ROAD TO ANNUAL AVERAGE PEAK HOUR TWO-WAY CONDITION**

I am writing to clarify the unofficial estimate of traffic on Pine Island Road, based on the conversion of the annual average daily traffic (AADT) count from Lee County DOT's 2003 Traffic Count report. As you know, the comprehensive plan establishes some thresholds regarding how rezonings and development orders on Pine Island should be reviewed, which are 810 and 910 *annual average*, peak hour, *two-way* trips. That is a unique and unusual measure of conditions, since we use *peak season*, peak hour, *peak direction* trips for the statement of conditions on all other County roads.

Typically my staff provides the conversion to annual average, peak hour two-way trips for the western end of Pine Island Road, and to peak season, peak hour, peak direction trips for all other roads to your staff sometime after the Traffic Count is published, and your staff uses those numbers, with the addition of traffic from projects with approved building permits, to estimate existing conditions for the annual concurrency management report. Based on the 2003 Traffic Count report as published in February, 2004, the AADT for Pine Island Road at Matlacha Pass (Permanent Count Station #3) is 11,500 trips (this is a rounded number). The AADT represents an annual average condition in both directions for a typical day, with that average calculated from the counts for every day of the year at the permanent count station. Since the AADT already represents annual average, two way conditions, it simply has to be converted from a daily condition to a peak hour condition to get to the measure used for the 810/910 standard. Since we use the p.m. peak hour for all other road measurement standards (instead of the a.m. peak hour), my staff simply applied the p.m. peak hour factor published in report for Permanent Count Station #3 of 8% (also a rounded number). This resulted in an estimate of 920 annual average, peak hour, two-way trips, over the 910 threshold.

However, after further review and internal discussion, it was noted that the 8% peak-to-daily ratio was as a percent of *weekday* traffic, exclusive of weekend conditions. As noted above, the AADT comes from traffic counted 7 days a week, 365 days a year. To be more technically appropriate, the peak-to-daily ratio should be based on a full-week condition. DOT's Traffic Section reviewed the permanent count station information and pulled the full-week p.m. peak hour information, resulting in a 7.8% peak-to-daily ratio instead of 8%. They also provided us the non-rounded AADT number of 11,543. Applying the more appropriate peak-to-daily ratio to

the non-rounded AADT number, we get an estimate of annual average, peak hour, two-way trips on the western end of Pine Island Road of 900, under the 910 threshold. Nevertheless, considering the amount of variability in measuring traffic, the threshold has essentially been reached in all practicality. It may also be more clearly reached in the concurrency report, with traffic added from approved building permits.

A table that shows the annual average, peak hour, two-way calculation is attached. Because Policy 14.2.2 of the Lee Plan refers to maintaining the adopted level of service standard once the 910 threshold is officially reached, and Policy 14.2.1 states that the adopted level of service standard is "D" on an annual average, peak hour basis and "E" on a peak season, peak hour basis, as measured using the 1985 Highway Capacity Manual method, the table also includes conversions to peak season, peak hour conditions. We've also included two-way and peak direction estimates for both conditions, since Policy 14.2.1 doesn't specify which of those is part of the standard. Included in the table is a volume-to-capacity (V/C) calculation as well; a V/C ratio exceeding 1.00 would indicate that the standard is being exceeded.

We would note that the reference to the 1985 Highway Capacity Manual method is outdated, since that manual is no longer published, and the FDOT software we use to calculate capacities has been updated to reflect the newer 2000 Highway Capacity Manual methods. Therefore we have also included a table showing the same conversions and V/C ratio calculations but using the newer capacity calculations. It would be our recommendation that Policy 14.2.1 be updated to instead refer to the 2000 Highway Capacity Manual and the 2002 Florida Department of Transportation Quality Level of Service Handbook.

Please let me know if you need additional information.

cc: Tim Jones, Chief Assistant County Attorney
Donna Marie Collins, Assistant County Attorney
Pete Eckenrode, Development Services Director
Paul O'Connor, Planning Director
Mike Carroll, Concurrency Manager
Scott Gilbertson, DOT Director
Steve Jansen, DOT Traffic Section

**CONVERSION OF 2003 AADT FOR PERMANENT COUNT STATION #3
(PINE ISLAND ROAD @ MATALCHA PASS)**

	CONVERTED COUNT	CAPACITY BASED ON 1985 HCM METHODOLOGY CAPACITY @ LOS	V/C RATIO
Annual Average Peak Hour Two-Way (basis for 810/910 rule) 2003 AADT x Full-Week Peak Hour Factor =	900	1130	0.80
Annual Average Peak Hour Peak Direction 2003 AADT x Full-Week Peak Hour Factor x Annualized Directional Split =	500	680	0.73
Peak Season Peak Hour Two-Way 2003 AADT x 100th Highest Hour (K-100) Factor =	1097	2140	0.51
Peak Season Peak Hour Peak Direction 2003 AADT x 100th Highest Hour (K-100) Factor x Seasonal Directional Split =	614	1290	0.48

	CONVERTED COUNT	CAPACITY BASED ON 2000 HCM METHODOLOGY CAPACITY @ LOS	V/C RATIO
Annual Average Peak Hour Two-Way (basis for 810/910 rule) 2003 AADT x Full-Week Peak Hour Factor =	900	1300	0.69
Annual Average Peak Hour Peak Direction 2003 AADT x Full-Week Peak Hour Factor x Annualized Directional Split =	500	750	0.67
Peak Season Peak Hour Two-Way 2003 AADT x 100th Highest Hour (K-100) Factor =	1097	1620	0.68
Peak Season Peak Hour Peak Direction 2003 AADT x 100th Highest Hour (K-100) Factor x Seasonal Directional Split =	614	940	0.65

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People

 Faculty- ([Short Listing](#), [Division Listing](#))

 University of Florida
 Civil and Coastal Engineering

Scott S. Washburn
Assistant Professor
Division: Transportation

Office Phone: (352) 392-9537 x1453

Location: 518-C Weil Hall

Email Address: swash@ce.ufl.edu
Personal Page: www.ce.ufl.edu/~swash

Education

Ph.D. University of Washington 1999
 M.S.C.E. University of Washington 1993
 B.S.C.E. University of Washington 1991

Years of Service on this Faculty

Appointment Date, August 1999
 August 1999-Present, Assistant Professor

Industry Experience

Transportation Solutions, Inc., 1994-95, 1999
 HNTB, 1997
 David Evans & Associates, 1992-93

Professional Registration

Professional Engineer (Civil Engineering), Washington
 (Registration No. 36105)
 License issued on 6/22/99

Principal Publications of Last Five Years

[Principles of Highway Engineering and Traffic Analysis, 3rd Edition](#). Mannering, Kilareski, and Washburn. John Wiley and Sons, Inc.

Washburn, Scott S., Ellis, Ralph E., Broadwell, Ann. Evaluation of an Alternative Lighting System for Coastal Roadways. Accepted for publication in ITE Journal on the Web (2004).

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Updated June 28, 2004