ADDENDUM L

ENGELHARDT HAMMER & ASSOCIATES

REPORT

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Planning • Engineering • Landscape Architecture

June 14, 2004

Mr. Woody Hanson, MAI
Hanson Real Estate Advisors, Inc.
2233 Second Street
Fort Myers, FL 333901-3051

Re: Analysis & Issues Related to Greater Pine Island Community Plan Update

Dear Mr. Hanson:

Pursuant to your request, we have completed our analysis of specific aspects of the Greater Pine Island Community Plan Update (GPICPU) to assist you in your economic analysis of the impacts of that proposed plan. Specifically, we have completed our research regarding the 810 / 910 Rule and the density recapture model. Research conducted for the 810 / 910 Rule focused primarily on the methods used to establish the rule, changes, or advances in analysis techniques since the rule was established and possible considerations that should be given to amending the Lee Plan in order to provide relief. Research conducted for the density recapture model referred primarily to relevant language approved by the Greater Pine Island Land Use Plan Implementation Committee (the Committee) for adoption by the Lee County Board of County Commissioners (BOCC).

I. 810 / 910 RULE

The 810 / 910 Rule was developed to control the amount of future growth on Greater Pine Island by controlling the level of traffic on Pine Island Road. The rule represents 80 percent and 90 percent, respectively, of the total peak hour, annual average two-way trips of a road capacity for Pine Island Road at level-of-service (LOS) "D." The corresponding 100 percent roadway capacity at LOS "D" of 1,010 trips was calculated using the 1965 Highway Capacity Manual (HCM), written by the Transportation Research Board (TRB).

The 810 / 910 Rule is applied and the roadway capacity is measured at the County's permanent count station along Pine Island Road, on Little Pine Island. According to the Lee Plan, this standard is measured using the methodology described in the 1985 HCM (also known as Special Report 209). Therefore, the threshold was established utilizing 1965 methodology, whereas the on-going measurement for compliance is conducted

utilizing 1985 methodology. The LOS for other roadways within the County is measured utilizing current methodology, as included in the 2000 HCM (also referred to as HCM2000).

Differences in the 1965, 1985 and 2000 HCM's

The Institute of Transportation Engineers (ITE) Journal article titled, "Capacity and Level-of-Service Concepts in the Highway Capacity Manual (April, 1987)", highlights changes in the HCM from the 1965 to the 1985 edition. The ITE Journal article titled, "The Year 2000 Highway Capacity Manual (June, 2002)", highlights changes in the HCM from the 1985 edition to the 2000 edition. Some of the changes noted in these articles are described below. In addition, the manuals were reviewed directly for changes to the relevant sections regarding capacity and LOS.

Rate of flow vs. full-hour volume

The 1985 and 2000 HCM's deal with *hourly rates of flow* during a peak 15-minute interval within the analysis hour, while the 1965 HCM deals with *full-hour volumes*. The later methodology can be more accurate in analyzing potential traffic breakdowns as the roadway condition approaches capacity.

Broader range of variables/factors in determining capacity

The 1965 HCM vehicular capacity for a given roadway is influenced by a number of roadway and traffic factors. Such factors include: lane width, lateral clearance, shoulders, auxiliary lanes, surface conditions, alignment, grades, trucks, buses, lane distribution, variations in traffic flow and traffic interruptions. These factors help to adjust the fundamental capacity value associated with a roadway under ideal conditions.

The factors used in the updated 1985 HCM are similar, however, expanded. The updated list of factors include: the type of facility and its development environment (uninterrupted flow, medians, urban, rural), lane width, lateral clearance, shoulder width, design speed, no passing zones, horizontal alignments, vertical alignments, lane use and directional distribution, directional split of traffic, vehicle types (trucks, recreation vehicles, buses) and traffic control devices (traffic lights, turning restrictions, stop signs).

The 2000 HCM uses many of the same variables as the 1985 manual, however, some of the assigned values as well as the analysis procedures have been updated. Two classes of two-lane highways are included for separate analysis: *Class I* facilities for relatively higher speed routes with more urban characteristics, and *Class II* facilities for less urban or scenic/recreational routes. Furthermore, under certain roadway conditions, directional analysis can be done in addition to the regular two-way approach.

Capacity criteria for two-lane highways

The 1985 HCM increased the vehicular capacity criteria of the 1965 HCM for two-lane highways by 40% from 2,000 to 2,800 passenger cars per hour; however, this capacity level assumes ideal conditions. Also, the 1985 HCM contains a broader range of variables to be considered in analyzing capacity. The 2000 HCM further increases the base capacity to 3,200 passenger cars per hour for a 50/50 directional split, two-way analysis. For a directional analysis, the base capacity is set at 1,700 passenger cars per hour.

Measures of LOS

Density is a new measure used in the 1985 HCM to measure LOS; however, it is primarily used on multilane, uninterrupted flowing highways. *Delay* is another new measure used in the updated manual. More specifically, *percent time delay* is a concept applied to two-lane, two-way rural highways to measure the effects of a slow-moving lead vehicle on following vehicles and their ability to pass. This is considered the principal operational problem on such roadways.

Speed as a measure of capacity has changed in regard to methodology. "Operating speed" from the 1965 HCM – used to determine the maximum safe speed at which a vehicle could travel in a given traffic stream – was replaced by "average speed" and "average running speed" in the 1985 Highway Capacity Manual. The new measures are averages of distance over time.

In the 1965 HCM, the LOS for "two- and three-lane highways" was evaluated using the basic elements of minimum operating speed and maximum volume-to-capacity ratio. The 1985 HCM uses percent time delay, average travel speed and capacity utilization to evaluate "two-lane highways" as the measure of effectiveness for LOS.

LOS has been further redefined in the 2000 HCM. For Class I two-lane highways it is defined as a function of the *average travel speed* and *percent time spent following* (*PTSF*). For Class II two-lane highways it is simply *PTSF*. PTSF is nearly the same as the former percent time delay as used in the 1985 HCM – with only a few value changes.

Amending the Lee Plan

810 / 910 Rule

Three different HCM's are cited in the Lee Plan for years 1965, 1985 and 2000[1]. The later, 2000 HCM is cited in the Transportation section of the Lee Plan as the basis for calculating LOS. Specific to the subject location along Pine Island Road, two different HCM's are cited. The GPICPU has proposed amending a policy of the Lee Plan to cite the 1965 HCM as the basis for calculating the 810 and 910 thresholds for LOS "D." Meanwhile, the Lee Plan currently states in Policy 14.2.1 that the minimum acceptable LOS standard for Pine Island Road (in the subject location) will be measured using the methodology described in the 1985 HCM. While these statements are not facially inconsistent, they are confusing in that one manual is used to calculate the standards while a newer, 20-year updated manual is used for the methodology in taking the actual measurements. Nevertheless, staff from the Lee County DOT claim that the 2000 HCM is the manual used throughout the County to calculate LOS and to determine capacity. Finally, both of these manuals (1965 and 1985) are outdated as, according to the TRB, the latest, 2000 HCM is the industry standard that is currently used today.

Consideration should be given to amending the appropriate policies of the Lee Plan to use one HCM instead of three as is currently the case. This would help to improve the Lee Plan's overall implementation by adopting a single HCM that can be used as the basis for applying methods and standards related to roadway capacity. Specifically, the 2000 HCM should be considered as the single manual used and referred to, as it contains the most recent up-to-date methodologies and industry standards used.

[1] This includes the proposed update language of the GPICPU.

Consideration should also be given to changing the 810 / 910 Rule to an "80% / 90% Rule." The original standard represents specific traffic figures as calculated using the 1965 HCM. These figures correlate to 80 percent and 90 percent of the total peak hour, annual average two-way trips at a road capacity at LOS "D". If the Lee Plan is amended to refer to a single, updated HCM as proposed above, the 810 and 910 figures most likely will not correspond to calculations based on current methodology. Therefore, changing the 810 / 910 Rule to a "80% / 90% Rule" would maintain the intent of the policy applied to regulating future development on Pine Island based on traffic volume along Pine Island Road.

Sustainable Development Proposals

Consideration should be given to amending the Lee Plan and/or the LDC to allow destination and neighborhood-oriented commercial, office and retail service areas that could be expected to alleviate traffic on Pine Island. Such service areas may consist of uses such as medical offices, neighborhood convenience stores, bank branches, hardware stores, gas stations and small grocery stores. The objective of the proposal is to provide limited land uses that would give Pine Islanders greater convenience to obtain goods and services without crossing the bridge to the mainland. At the same time, uses and services that are oriented more toward the convenience of Pine Islanders would not likely encourage patronage trips from the mainland. As a result, overall traffic to and from the island on Pine Island Road could be improved.

Feasible Traffic Solutions

Alternative Connections to Pine Island

No economically feasible alternative traffic solutions exist for connecting Pine Island to the mainland. The cost of such an undertaking would include new roadway and bridge construction, which would result in wetland crossing and open water crossing (of at least a mile). This option is currently prohibitive based on cost and feasibility of obtaining environmental permits.

Widening Pine Island Road

Besides the existing bridge width constraints between Pine Island and the mainland, Pine Island Road through Matlacha is also constrained. In fact, the County has designated this segment of roadway through Matlacha as "constrained," as identified in Table 2(a), *Constrained Roads*, of the Lee Plan. Lee Plan Objective 22.2, *Constrained Roads,* states that constrained roadways will not be widened. Widening and adding lanes to other segments of Pine Island Road without doing the same through Matlacha would only create bottleneck conditions for traffic approaching the constrained area (as well as crossing the bridges).

Matlacha is a Lee County-designated historic district. Many of the buildings along Pine Island Road in the district abut the right-of-way directly or are located very close to it. According to a 1982 estimate cited in the GPICPU, widening the existing right-of-way to 90 feet (from 66 feet) would result in as many as 75 businesses and homes being altered or removed. This endeavor would be cost prohibitive.

Working within the existing 66-foot wide right-of-way conditions through Matlacha, it may be possible to increase the number of lanes from two to three. The additional lane could function as a two-way left turn lane or a reversible lane to accommodate the heavier directional flow of traffic during the AM and PM hours. However, adding a traffic lane

would require road widening, which could exacerbate the problems of pedestrian circulation and parking for business and homes in an area with little room for adjustment.

It is physically possible to reconstruct this segment of Pine Island Road within the 66-foot right-of-way into a four lane road; however, this configuration would not allow for left-turn bays and would eliminate existing, much need parking currently within the right-of-way used by stores and homes, as many of the buildings are located along or near the right-of-way edge. Regardless of any of these measures taken to increase the number of lanes through Matlacha, such actions would still be limited to the constraints of the adjacent two-lane bridges.

II. DENSITY RECAPTURE MODEL

The *density recapture model* of the Lee Plan, Policy 1.4.7 and associated Land Development Code (LDC) Section 34-655, as approved by the Committee to be sent to the BOCC for adoption, affects permitted dwelling unit densities based on the percentage of preserved or restored native upland habitats. The model is a sliding scale allowing increases in density per increases in preservation and restoration. If no land is preserved or restored accordingly, a maximum of one (1) dwelling unit per ten (10) acres is permitted. A maximum density of one (1) dwelling unit per one (1) acre would be permitted if 70 percent of the land were preserved or restored to native upland habitat.

This sliding scale does not address farmland preservation[2]. Therefore, farmers are subject to the same requirements as non-farmers when preparing land for development. However, most farmed lands do not have native upland habitats remaining. Thus, a farmer desiring to develop his/her farm into a residential subdivision would be allowed to develop at one (1) dwelling unit per ten (10) acres without taking any preservation or restoration measures. For an increase in density, a farmer would need to restore upland areas by re-creating native habitats that had been typical of Greater Pine Island. The greater percentage of farmland restored to native habitat (or any land restored for that matter), the greater residential density permitted.

Restoration Requirements for Increased Density

The Committee-approved language of the LDC sets requirements for restoring native habitats. In addition, standards must be followed for plant-type species and hydrologic conditions as set forth in the *Multi-Species Recovery Plan for South Florida*, published by the *U.S. Fish & Wildlife Service*. This document is a reference source describing native habitats found on Greater Pine Island. The general requirements of the LDC are as follows:

- Correct interruptions of original water flows and assure proper hydrology appropriate for the benefit of restored native habitats
- Prepare site including removal of non-native vegetation, roller chopping, bush hogging, prescribed burning, herbiciding, etc. as necessary

[2] Although native habitat is required for restoration, a portion of existing farmland can be included toward the overall area contributed for restoration. Proposed language in the Land Development Code (LDC), Section 34-655 (d)(1)b.3. would allow up to 10% of the preserved or restored area to consist of commercial or non-commercial agricultural land.

- Plant native pine trees at 50 – 200 trees per acre, depending on species and habitat
- Fertilize at the time of planting and weed control for at least two years following
- Plant midstory shrubs and understory plants in groupings or clusters with an average spacing of three (3) feet on at least 50 percent of the acreage being restored

The Cost of Restoration

On March 4, 2004, the Committee approved implementation language for the associated policy to be sent to the BOCC for adoption. Included in the Committee's approval was a suggestion to the BOCC that an independent evaluation of the costs of restoration and maintenance be done by the County or another agency.

We researched and analyzed the cost of fulfilling the requirements as a part of the total cost of restoration. Habitat restoration cost analysis attempted to include all aspects of the restoration methodology as outlined above.

Design and Permitting

The initial step in the restoration process is a requirement to restore the original topography of the pre-farming condition and to create a hydrological condition that is conducive to the sustainability of the desired native habitat. This phase of the restoration is certainly the most time consuming and costly.

Most of the farms on the island have an elaborate system of ditches and dikes to accommodate the predevelopment runoff onto the property and to control saltwater intrusion from impacting the water balance of the property. Large on-site retention systems are designed to detain and treat farm runoff before it leaves the property. These water control features are all part of individual stormwater management permits issued by the South Florida Water Management District (SFWMD). These permits include extensive requirements for ongoing monitoring and maintenance of the systems.

Restoration of the farmland to its original topography and hydrological condition would require a significant modification of the original SFWMD permit, as well as major earthwork to remove the existing system of ditches and dikes. It would also require the design of a habitat that met the requirements of the GPICPU restoration standards. The coordinated efforts of both an engineering consultant and an environmental consultant would be required to design and permit the habitat restoration as well as modification of the previously permitted stormwater system.

The existing farmlands have all been laser-leveled and have been improved with elaborate underground irrigation systems. The existing irrigation systems would have to be removed, redesigned to accommodate the design of the restored habitat, and reinstalled to reflect the desired random/cluster planting pattern specified for the recreated habitat.

The original soil profile of the farmland has been altered through years of farming and plantings. Proper design of the desired habitat type would require contouring of the soil surface to create a soil mix that would support the desired plantings. In addition, the final ground level of the restoration area would need to be surveyed and engineered to

create a topography that would adequately drain all areas of the tract of land to support the desired upland habitat.

The combination of the design, permitting, and physical alteration of the site from its current condition to the desired final restoration condition is an extremely costly endeavor. Costs for these tasks could range from $10,000 to $30,000 per acre. These cost estimates are based on actual costs expended for similar permitting and earthwork tasks.

Native Pine Trees

As a part of the requirements for habitat restoration, native pine trees must be planted at a density between 50 and 200 trees per acre. The most common native pine on Pine Island is *slash pine*. The requirements allow them to be planted as seedlings, as opposed to planting a larger, more maturely developed tree.

For the most part, landowners can take two different approaches to completing this planting obligation: purchasing and planting with assistance from the Florida Division of Forestry, or purchasing and planting privately through a nursery and hiring planters (or landscapers) to plant the seedlings. The cost of each approach is outlined separately below.

Planting with the Florida Division of Forestry

We contacted the Division's *Andrews Nursery* located in Chiefland directly for information. According to staff at *Andrews Nursery*, the Division will sell the pine tree seedlings to landowners and assist with planting. The cost to purchase the seedlings ranges from only 4 to 12 cents each, depending on the quantity ordered, with a minimum quantity of 250 seedlings. The seedlings are normally about 4 to 6 inches tall at planting. The Division usually will only plant in large quantities and usually plants at least 50,000 seedlings per job. Furthermore, they typically don't plant on less than ten acres. Planting by hand typically costs from $60 to $70 per acre. Planting by machine (which has a lower rate of growing success) typically costs from $30 to $50 per acre. Planting with the more accurate hand-method at the minimums necessary would cost an average of about $85 per acre. Although the Division claims reliable and fast growth, anecdotal experiences from some land owners claim success rates much lower.

Planting with a private nursery and planters

We contacted the nursery and landscape company, *Big Tree, Inc.*, located in Fort Myers directly for information. According to the estimating department at Big Tree, the cost for slash pines would run about $1.25 per seedling. (The seedling size could not be exactly determined, but would probably range near the size typical from Andrews Nursery.) To purchase approximately 100 seedlings, deliver and install across one acre would cost approximately $1,000.

Native Midstory Shrubs and Understory Plants

As a part of the requirements for habitat restoration, native midstory shrubs and understory plants must be planted in groupings or clusters on at least 50 percent of the acreage being restored. While the requirements aren't specific in quantity, we conferred with Spikowski Planning Associates in Fort Myers – the planning consulting firm assisting with the language of the GPICPU – that this would likely amount to approximately 75 plants per acre. At least five plants from a list of eight species must be

used. The requirements permit planting of containerized plants or tubelings (of not less than 4.5 inches in depth). Unlike the native pines, the Florida Division of Forestry currently does not have a program to assist with this obligation.

We contacted the native plant restoration company, *Central Florida Native Flora, Inc.*, located in San Antonio, Florida for information. According to the company, the cost to fulfill this obligation would be about $400 - $500 per acre. This would include a variety of five one-gallon container plants from the list of eight species in pots about six inches in diameter and six inches deep.

Chemical control

The GPICPU requires that native plants must be fertilized to insure their survivability and the planted area must be herbicided to prevent the intrusion of weeds. This must be done for a period of at least two years. The cost of the materials and the labor to complete this task would be in the range of at least $2500 per year.

Annual Monitoring Reports

Our office researched the cost of conducting the necessary field work and reporting by a qualified professional in order to gather an estimate of cost to satisfy the annual monitoring requirements. We contacted Rosanne Clementi of *Southeast Environmental Solutions, Inc.* located in Plant City for information. They determined that the total cost would be approximately $6,000 per acre, over three years; or $2,000 per acre, annually.

Total Cost

Overall, we determined the total cost of restoration to range from approximately $20,000 to $40,000 per acre.

Criteria and Timing for Restoration Approval and Success

In order to begin development, a bond can be posted prior to restoration – as with many other assurance guarantees typically required with development to assure compliance. As previously mentioned, annual monitoring reports are required for a minimum of three (3) years that show an 80 percent minimum survival rate for the required number of each species planted. A finding can be issued by the director that the restoration has been successfully completed after acceptable reviews of the monitoring reports.

The guarantee of preservation must include a perpetual conservation easement granted to a government body or agency or to a qualified charitable corporation or trust. The ownership of the permanently preserved native habitats can be transferred to a homeowners' or condominium association or may be retained by the original landowner (or another private party). If the landowner wishes to retain ownership they must present legal documents for review and approval by the County that demonstrate the ability to carry out the ongoing management of such areas.

Please contact our office with any questions or concerns.

Sincerely,

Ethel Hammer

Ethel D. Hammer
Principal

Cc: Scott M. Swearengen

EDH/sms