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April 17, 2015

Lakeside of Charlotte County Condominium Association, Inc.
c/o 1st Choice Condo Management Services, Inc.
22079 Kimble Avenue
Port Charlotte, Florida 33952
admin@1stchoicecondo.com

Attention: Ms. Brenda Binder

Reference: **PAVEMENT EVALUATION**
LAKESIDE CONDOMINIUMS
25275 RAMPART BOULEVARD
Punta Gorda, Florida

Dear Ms. Binder:

Universal Engineering Sciences has completed an evaluation of the existing pavement at the Lakeside Condominium complex off Rampart Boulevard in Punta Gorda, Charlotte County, Florida. The scope of the pavement evaluation was planned in conjunction with and authorized by Lakeside of Charlotte County Condominium Association, Inc.

I. PURPOSE AND SCOPE

We understand the association is evaluating the viability and costs associated with the on-going maintenance and future rehabilitation of the pavement areas at the Lakeside Condominium complex off Rampart Road in Punta Gorda. Universal Engineering Sciences was retained to evaluate the existing pavement with respect to observed deficiencies, areas requiring immediate repair or maintenance, remaining life expectancy, measures to maintain and extend the serviceability of the existing pavement and recommendations to rehabilitate or reconstruct the pavement in the future to re-establish the long term performance and serviceability of the parking and drive areas.

II. BACKGROUND INFORMATION

We understand the original building and pavement areas at the complex were constructed around 1984. Further, the pavement was overlaid about ten years ago. The pavement sections used in multi-family residential construction typically consists a light duty section for the parking stall areas and a heavy duty section for the entrance and interior drive areas. A typical light duty pavement section used in residential type construction in this area consists of 1 to 1.5 inches of asphaltic concrete, 6 inches of base and 6 inches of stabilized subgrade (native subgrade or fill soils mixed with shell and rock to improve strength and stability). In some cases, a heavy duty section is used in the main drives within a multi-family residential development. A heavy duty pavement section is normally comprised of 2 inches of asphaltic concrete, 8 inches of base and a 8 to 12 inch stabilized subgrade layer. These typical sections are based on a design life of 15 to 20 years and traffic volume and vehicle loads consistent with a multi-family residential

development.

III. PAVEMENT CHARACTERISTICS

The pavement at the Lakeside Condominiums generally consists of a main north-south central drive of varying width with adjoining parking stalls in front of the buildings. Additionally, there are three small drives/parking areas extending to the east off the main north-south drive. The pavement areas drain from the perimeter to the low point in the center of the drives where a series of grate inlets are present to collect storm water run-off. The pavement areas are subject to predominantly automobile and light truck traffic with occasional delivery vehicles. There are three dumpsters within the complex which are emptied twice a week by a more heavily loaded garbage trucks.

IV. EXPLORATORY PROCEDURES

Our field exploration generally included two task areas.

Initially, an UES engineer visited the site and walked over the pavement surfaces noting any deficiencies, ancillary items which may affect the pavement condition, previously patched or overlayed sections and locating representative areas to determine the pavement thickness and composition.

The existing pavement thickness and composition were determined by extracting cores at eight (8) locations throughout the parking and drive areas using a 6 inch I.D. diamond impregnated core barrel. The asphaltic concrete, base and stabilized subgrade were visually classified and the thicknesses of the various components were measured. The presence and thickness of the stabilized subgrade was based on the soil underlying the base containing sufficient quantity of shell or rock to achieve a Limerock Bearing Ratio of 40 (required for a stabilized subbase material). This determination was based on a visual estimate. Verification of the limerock bearing ratio of the subgrade soils was beyond the scope of our evaluation.

V. FINDINGS

In this section of the report, we have summarized the findings of our field exploration.

A. Visual Observations

Based on our walk over and visual observations, we would generally classify the overall pavement in the Lakeside Condominium complex as being in a poor to fair condition. This qualitative visual condition assessment of the pavement was based on: the presence of widespread age related cracking, and pavement joint deterioration. The following is a brief summary of the deficiencies observed during our pavement walk over.

- There are widespread random block type cracks present throughout the drive and parking areas. We attribute most of this type of cracking to the age of the asphaltic concrete layers. As asphalt cement ages, it releases volatiles which cause the asphaltic concrete pavement to become more brittle inhibiting the ability to expand and contract with temperature cycles.

- Deterioration was present along some of the pavement joints. Generally, the compaction of the asphalt layer is lower at the interface of two paving lanes which over time fail prematurely (in relation to the main pavement) from raveling or cracking.

- No significant areas of alligator cracking, rutting or displacement indicative of a subgrade or base failure were evident. There was some minor alligator cracking in previous patch areas present immediately adjacent to the grate inlet in the low point of the pavement. The cracking is likely the result of saturated base due to accumulation of surface run off in these low areas.

Representative photographs of these deviations are enclosed in Appendix A to this report.

B. Pavement Cores

The core results indicate the original pavement section likely consisted of 1 inch of Type II or III asphaltic concrete and a 6 to 8-inch bank run shell base. A well defined stabilized subgrade layer was not encountered below the base layer at the core locations. Soil which may meet the LBR and gradation requirements for a stabilized subgrade was evident below the base at a few of the core locations. However, we believe the soil layer in question is a fill soil that happened to have shell fragments, rather than a well defined stabilized subgrade layer. The thickness of the shell base layer varied from 6 to 8 inches. As reported to us, the pavement section appears to have been overlaid once since originally constructed. An approximately 1 inch layer of what appeared to be S-3 asphaltic concrete was present above the original asphalt layer.

Although the thickness of the original asphalt layer was less than 1.5 inches, the average existing pavement section including the combined or total asphalt thickness (original and overlays) would meet the low end of the thickness and composition of a typical pavement section for a multi-family residential parking/drive areas.

The detailed core test results and a site plan depicting the core locations are enclosed in Appendix B.

IV. EVALUATION AND RECOMMENDATIONS

The original pavement at the Lakeside Condominium complex is currently around 30 years old and well beyond the end of it's design life. The overlay has extended the design life, but the overlay is at least 10 years old. As such, complete reconstruction of the pavement section to re-establish the serviceability and design life is recommended in the near future. Asphaltic concrete becomes more brittle with age and begins to exhibit stress cracks resulting from temperature cycles or traffic loads as the material becomes less flexible. Surface water infiltration begins to enter the underlying base and subgrade soil layers through these cracks resulting in degradation and loss of strength in these supporting layers. Development of pot holes and severe alligator cracking are the end result of this process as the pavement approaches or exceeds the design life.

As previously indicated, we believe the majority of the widespread, random block type cracking evident through the pavement areas is the result of the age and brittleness of the asphalt layers. The magnitude and extent of the cracking generally increases with age as the asphalt becomes more brittle. Although severely cracked, currently there are no significant areas of base or subgrade failure indicating substantial water infiltration into the base. However, we anticipate base failure could occur in the future if the cracking continues to propagate.

We believe the life of the existing pavement can be extended several years, until such time that complete reconstruction is undertaken by implementing an interim rehabilitation program. Although severely cracked, the existing pavement appears to be in a serviceable condition and does not appear to negatively impact vehicle or pedestrian traffic for the residences. The purposes of the rehabilitation program will be to slow the deterioration of asphaltic surface layer and to slow the degradation of the underlying base due to surface water intrusion. For the pavement at this site, we recommend the placement of a sand slurry surface treatment/seal coat to extend the current pavement life. The slurry seal should consist of a quick setting asphalt emulsion, fine aggregate, mineral filter, additives and water. The slurry should be spread with a squeegee in a manner that fills the existing cracks to the extent possible.

Additional repairs may be necessary on an annual or semi-annual basis. The length of time the pavement life can be extended is dependent upon the extent to which the existing cracks can be sealed from surface water infiltration, but we anticipate complete reconstruction could be deferred for a period of 2 to 5 years.

At some point in time the existing pavement will need to be reconstructed. Reconstruction, which would restore the original design life of the pavement, would consist of milling up the existing asphaltic concrete, repairing any soft or unsuitable sections of the underlying base, and reinstalling a asphaltic concrete surface course. The extent of base and subgrade repair will depend upon how well the existing base and subgrade are protected from water intrusion until reconstruction occurs. In areas where the existing base is removed during reconstruction, the existing base should be replaced with 8 inches of FDOT shell, shellrock or limerock base compacted to 98 percent of the Modified Proctor maximum dry density. On a preliminary basis, we recommend a minimum of 2 inches of FDOT fine SP-12.5 or coarse type SP-9.5 structural course asphaltic concrete mix be used for pavement reconstruction. A prime coat should be applied to the surface of the exposed base layer prior to the placement of the new asphaltic concrete layer.

The decision to continue with periodic repairs and rehabilitation or to reconstruct the pavement is normally based on a wide range of economic considerations. However, reconstruction should be initiated if areas of alligator cracking or rutting as a result of surface water infiltration into the base becomes apparent and before the condition becomes widespread.

- **CLOSURE**

We appreciate the opportunity to be of source to you on this project. Should you have any questions concerning this report, or if we may be of further assistance, please do not hesitate to contact our office.

Respectfully Submitted,
UNIVERSAL ENGINEERING SCIENCES, INC.
Certificate of Authorization #549

LINDSEY N. WEAVER
LICENSE
NO. 41790
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

Lindsey N. Weaver, P.E. #41790
Regional Manager

cc: Lakeside Condominium Association – Mr. John Follas (jfollas@comcast.net)

APPENDIX A

Photo#1- Typical Random Block Type Cracking

Photo#2- Typical Random Block Type Cracking

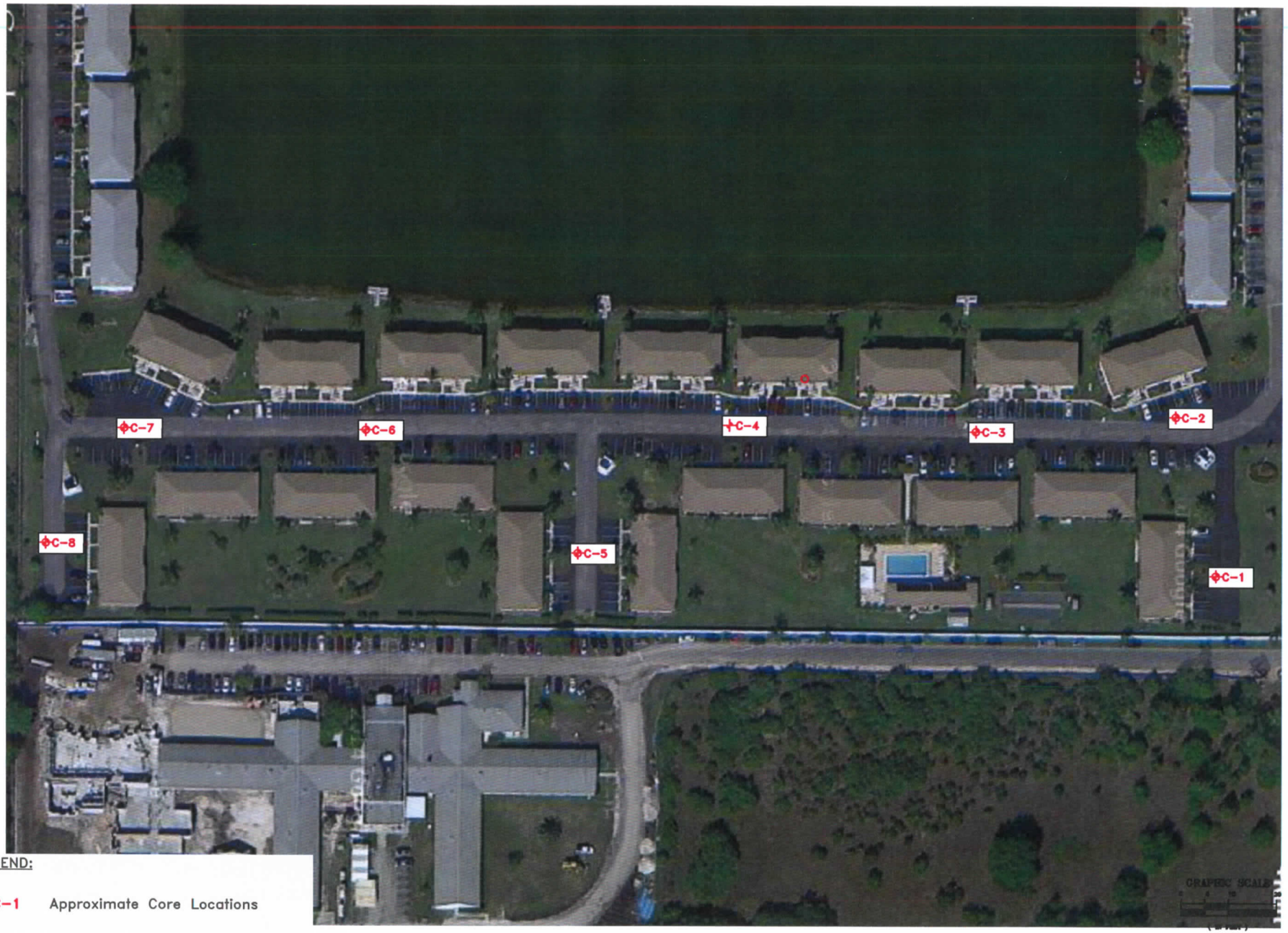
Photo#3- Typical Open Pavement Joint

Photo#4- Typical Open Pavement Joint

Photo#5- Patch in Low Point in Pavement Adjacent to Grate Inlet

Photo#6- Cracking Near Low Point in Pavement Next to Grate Inlet

APPENDIX B



LEGEND:

C-1 Approximate Core Locations

CLIENT: LAKESIDE OF CHARLOTTE CONDOMINIUM ASSOCIATION

DRAWN BY:	KCAB	DATE:	APR 14, 2015
REVIEWED BY:	LW	DATE:	APR 14, 2015
REPORT NO:		SCALE:	NOT TO SCALE
PROJECT NO:	0510-15000315-0000		

LAKESIDE CONDOMINIUMS PAVEMENT AREAS
DRIVES AND PARKING AREAS
DEEP CREEK, PORT CHARLOTTE COUNTY, FLORIDA

CORE LOCATION PLAN

UNIVERSAL ENGINEERING SCIENCES

APPENDIX:
B

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Project No.: 0510.15000315.0000
Report No.: 196740
Date: 4/08/15

5971 Country Lakes Drive • Fort Myers, FL 33905 • (239) 995-1997 • Fax (239) 313-2347

REPORT OF ASPHALT AND BASE THICKNESS

CLIENT: Lakeside of Charlotte Condominium Association, Inc.
c/o 1st Choice Condo Management Services, Inc.
22079 Kimble Avenue
Port Charlotte, Florida 33952

PROJECT: Lakeside Condominiums Pavement Areas, Deep Creek, Florida

SAMPLED BY: M. Kays

DATE: 3/25/15

AREA TESTED: Drives and Parking Areas

TEST #	LOCATION	ASPHALT THICKNESS (Inches)			BASE THICKNESS (Inches)
		Top Layer	Bottom Layer	Total	
1	See Core Location Plan	1.1"	0.8"	1.9"	6.5"
2	See Core Location Plan	0.8"	1.1"	1.9"	8.0"
3	See Core Location Plan	1.1"	0.7"	1.8"	7.5"
4	See Core Location Plan	0.9"	1.1"	2.0"	8.0"
5	See Core Location Plan	1.5"	0.6"	2.1"	8.0"
6	See Core Location Plan	0.8"	1.4"	2.2"	7.5"
7	See Core Location Plan	0.5"	1.0"	1.5"	7.0"
8	See Core Location Plan	1.2"	1.1"	2.3"	6.0"
	Average	1.0"	1.0"	2.0"	7.3"

NOTE:

1. Bottom layer of asphalt appeared to be an old FDOT Type II or III.
2. Top layer of asphalt appears to be a fine S-3 Mix.
3. The base appeared to be Bank Run Shell.
4. A well defined stabilized subgrade layer was not evident below the base.