INFRASTRUCTURE CONDITION SURVEY

RIVER OAKS LANDING
HOMEOWNERS ASSOCIATION
ORANGE COUNTY, FLORIDA

UES PROJECT NO. 0110.2301090.0000
UES REPORT NO. 2047277

PREPARED FOR:
River Oaks Landing HOA
c/o ROL Board
P.O. Box 782308
Orlando, Florida 32878-2308

PREPARED BY:
Universal Engineering Sciences, LLC
3532 Maggie Boulevard
Orlando, Florida 32811

October 18, 2023

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River Oaks Landing HOA
c/o ROL Homeowners Board
P.O. Box 782308
Orlando, Florida 32878-2308

Attention: River Oaks Landing Homeowners Association Board
board@riveroakslandinghoa.com

Reference: **Infrastructure Condition Survey**
River Oaks Landing
Orange County, Florida
UES Project No. 0110.2301090.0000
UES Report No. 2047277

Dear Board Members:

Universal Engineering Sciences, Inc. (UES) has conducted an evaluation of the condition of the River Oaks Landing infrastructure and components. The purpose of the survey is to provide a report describing the various related components of the property, their current physical conditions, functionality, and to note observed deficiencies or conditions that may warrant remediation. This project is located off of Rouse Road, south of University Boulevard in Orange County, Florida.

This report contains information resulting from our visual assessment of the current conditions of the roadways, sidewalks, retention/detention ponds, and drainage system exclusive to the community. Included is a discussion of remedial measures appropriate to the concerns that may be noted.

We appreciate the opportunity to have worked with you on this project, and look forward to our continued working relationship. Please do not hesitate to contact us if you have any questions, or if we may be of further assistance.

Respectfully Submitted,
UNIVERSAL ENGINEERING SCIENCES, INC.
FBPE Registry No. 00000549

Stephen E. Linhares
Sr. Project Manager - Construction Services

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10/20/2023 15:33:57 EDT

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cc: Email board@riveroakslandinghoa.com
Attachments: Report
Appendices A-1 (observations), B-1 (photographs), C-1 (observation location plan)

SEL/MI/lnb

1.0 Introduction And Scope

1.1. General

In this report, we present the results of our evaluation of the current conditions of the roadways, sidewalks, retention/detention ponds, and drainage system. We have divided this report into the following sections:

- 1.0 Introduction and Scope – Description of the project; outline of services performed
- 2.0 Observations and Findings – Summary of conditions observed
- 3.0 Conclusions and Recommendations – Recapitulation of noted observations; suggested courses of action
- Appendices – The appendices include a tabled log of noteworthy observations with *general* recommendations and also general observations of typical conditions, correlative photographs of noted observations, and an Observation Location Plan which depicts the approximate locations of noted observations within the community.

1.2. Project Description

The infrastructure of River Oaks Landing was developed approximately twenty-six years ago. The purpose of this infrastructure condition survey is to evaluate whether the development's infrastructure is functioning as intended and for the community to establish monetary reserve amounts to pay for necessary future maintenance and replacement needs based upon information that may be provided in this report. The evaluation of the infrastructure is based on a nonintrusive, visual assessment of the community roadways, sidewalks, retention/detention ponds, and drainage system as a basis for future maintenance and repair expenditures for the items mentioned. Our written descriptions, conclusions, and recommendations are based solely on our observations of the previously listed components and our experience with similar projects. At the completion of our field survey, we have prepared a report of our findings which includes the following information:

- Summary of the infrastructure's observed conditions
- Identification of potential problems within the community common areas and infrastructure
- Identification of any other concerns, as appropriate

2.0 Observations and Findings

2.1 Community Walls and Signage

The community entrance is along the west side of Rouse Road, south of University Boulevard. The screen walls extend north and south of the main entrance along the east property boundary, and are constructed with brick, together with intermediate brick columns. Overall, there were no overt indications of settlement, distress, or failure, and the wall(s) appeared to be in relatively good condition and well maintained, with the exception of a wall end that appears to be 'leaning' at the north community sign (Observation #2) and a damaged column foundation (Observation #4). Additional noted observations regarding the screen walls pertain to large trees or foliage planted near or growing against the wall (Observation #'s 1, 3, and 5). Plantings and trees that grow too close or in contact with the wall can cause damage to the wall over time or during inclement, gusty weather due to impacts or shoving.

2.2 Roadways

The roadways of River Oaks Landing are approximately twenty-six years old, and structurally, appeared to be in fair condition relative to age at the time of this evaluation. Based on historic aerial imagery, a *seal coat* was last applied around late 2019, and appeared to holding up exceptionally well. There were no overt indications of wide spread structural failure, or debonding of the asphalt from the base. The site drainage appeared to be sufficient in depositing runoff waters to roadside gutters and drainage features, unless noted otherwise.

Observations made relating to the roadway condition(s) included *oxidation*, *raveling* of the asphalt surface – mostly obscured by seal coating, asphalt *patches*, and wide *cracks/reflective cracks*. The following are brief explanations of the types of pavement distresses that commonly occur as asphalt roadways age, and such as what was observed during our evaluation:

- **Oxidation** affects the asphalt surface due to exposure to the environment over time. As the surface oils oxidize, the oils or binders begin to evaporate and the surface begins to fade to a whitish gray appearance. As the oils dry out, the asphalt loses its ductility (flexibility) and cracking and raveling will begin. Measures to inhibit the effects of oxidation include topical treatments such as seal coating, or pavement rejuvenation.

  The overall condition of the roadways exhibited surface oxidation, evident by the extent of 'micro' cracking, also, the frequency of block cracking observed, edge degradation, and the onset of raveling apparent through the seal coating in some areas.

- **Raveling** is the progressive disintegration of the asphalt layer from the surface downward as a result of the wearing of the asphalt binder and dislodgement of aggregate particles over time. Specifically, this is loss of bond between coarse aggregate particles and the asphalt binder, and occurs typically due to age.

- **Patches** are areas of pavement that have been replaced with new material to repair the existing pavement due to settlement, potholes, etc. Patches typically occur at utility cuts and where previous localized pavement repairs have been performed. Sometimes, patches can reflect continuing conditions such as depressions which may be an indication that the repair was insufficient and/or that the issue causing the failure has not been resolved.

- **Cracks/Reflective cracks** are attributed to aging and drying shrinkage of the asphalt layer or the reflection of underlying thermal/shrinkage cracks in cementitious base materials (soil cement). Asphalt cracks can allow moisture infiltration into the pavement components and subgrade resulting in instability and failure. Once cracks have formed they will rapidly increase in width as the crack walls succumb to continued drying out and raveling, and drainage scour.

  There were numerous asphalt cracks observed throughout the community. Many of the cracks were significantly wide, and some had vegetation growing in them. Cracks less than ½ inch wide are usually considered low severity and can usually be treated with an asphaltic crack sealant. Cracks with widths greater than ½ inch; especially where numerous, are considered high severity cracks and typically require removal and replacement (overlay). We would consider the majority of observed cracks to be moderate in severity and typical to the age of the asphalt and type base material. However, the 'micro' cracking observed was pervasive throughout the community, and is an indication that the asphalt is nearing the end of its *useful life*.

2.3 Groundwater and Surface Water

We did not observe any overt indications of poor drainage, perched surface water, or groundwater conditions that may adversely affect the roadways, except where noted. The majority of the site drainage appeared to be sufficient in depositing runoff waters to roadside gutters and drainage features. There are a few areas listed in our observations where the curb gutter and roadway are depressed and trapping water.

We were advised that flooding associated with Hurricane Ian (2022) had occurred within the northwest quadrant of the community as a result of the adjacent Little Econlockhatchee River exceeding its estimated '100 year flood elevation'. We did not observe any overt indications of resulting impacts on the community infrastructure at the time of this survey.

2.4 Sidewalks

The sidewalks within River Oaks Landing were found to be in overall good condition. We observed only a few areas that exhibited a condition classified as "stub toes", where differential vertical movement causes one section of sidewalk to be higher than the adjacent section. This condition is generally caused by either partial settlement (over or near utilities) or heaving (invasive tree roots) and is a potential trip hazard which can be a liability and should be repaired when observed and noted. Repairs consist of removal and replacement of sidewalk panels or mechanical surface grinding depending on the severity of the condition and grade lines of adjacent panels.

2.5 Storm Drainage System

Site drainage within the community was observed to be generally in good condition. Throughout the project, gutters and storm structures were visually inspected. The structures were checked for indications of leaks, settlement near the structure or in the roadway where pipe runs may potentially exist, and sediment and/or debris deposits in the structure bottoms. We also looked for physical damage to the structures themselves. All of the structures were observed to be clean of debris and sediments, and we did not observe any stagnant water levels within the structures.

Ground depressions were observed over a storm pipe run in a sloped green space leading to the wet pond. There did not appear to be any accretions of soil down-slope of the depressions that may indicate erosion. This condition was noted previously (2020), and appears to be worsening.

During this survey, we noted that there are (3) storm water structures (I-5A, I-5B, and I-5C) situated between yards along Lots 34 through 39 in the northwest quadrant of the community. Were only able to locate structure I-5A, and it was found buried approximately 1-foot below existing grade (Observation #'s 21a and 21b).

2.6 Retention/Detention System

The community storm water management consists of a "dry" pond area, a "wet" pond area, and drainage swale, all situated along the west side of the community. The dry pond portion appeared to be well maintained and manicured, with no anomalous conditions observed, aside from natural tree/shrub growth encroachment. The wet pond portion is partially bound by a soil berm along the west side, with the remainder encompassed by a terraced slope constructed with 3 segmental wall tiers, and an operational fountain in the center of the pond. All pond components (structures, planned vegetation, fountain, etc.) were found to be in good overall condition – some items are not accessible for up close visual assessment. Considerable erosion or soil loss from surface runoff or subsurface roof drains, and unleveled grading was noted in our previous survey report (2020). These conditions appeared to have been improved. However, we have currently noted some continued conditions related to erosion from roof drainage/piping and outfalls.

3.0 Conclusions and Recommendations

3.1 Community Walls and Signage

The signage walls and screen walls are accessible from the outside only and were observed to be in relatively good condition and appear to have been recently power washed. There were no overt indications of settlement, rotation, or distress observed, with the exception of a 'leaning' wall panel at the north community sign and damaged column foundation south of the entrance. A licensed wall contractor should be enlisted to examine these locations and make the necessary repairs. The intended service life and actual useful life is dependent upon regular maintenance, and outside influences that may attribute to subsidence, rotation, or degradation. The walls and signage should be pressure washed at least every 3 years to prevent advanced staining and deterioration of coatings, and sealed (especially the top-side surfaces) at least every 6 years. Mortar joint re-tooling should be performed when warranted to inhibit moisture related damage and degradation. Large trees and roots that may affect the wall should be limbed and/or removed. Homeowners should routinely inspect their respective portions of the walls for any visible issues or conditions and proactively address removing, pruning, or limbing plantings that may affect the walls.

3.2 Roadways

Asphalt pavements in Florida typically have a design service life span of around 20 years. The actual useful life expectancy is dependent upon factors that may adversely affect the pavement system such as environmental conditions, drainage, contaminants/spills, as well as measures or treatments that can extend the useful life of the pavement such as surficial coatings (sealcoats) and pavement dressing conditioners (PDC rejuvenation). A successive surface seal coating has been applied to the roadways and as recently as around 2019.

Based on our observations and findings, and aside from isolated conditions, the majority of the roadway components appear to be structurally sound regarding the base course and asphalt bond to base. However, we believe asphalt re-surfacing of the subdivision roadways is necessary within the next year or so as the recently applied seal coating diminishes due to the likelihood for adverse effects on the underlying base course. At this time, all open and wide asphalt cracks should be sealed with an asphaltic joint/crack sealer to inhibit moisture intrusion into the base layer and that can potentially affect the bond of the asphalt to the base layer. Prior to any resurfacing, representative roadway cores should

be performed to establish current remaining asphalt thicknesses for determining allowable depth(s) of milling and thickness of overlay (typically 1 inch). The actual square yardage estimate and cost per square yard for milling and resurfacing (including striping, reflectors, gate loops, etc.) should be provided by reputable paving contractors.

Pertaining to protection of the pavements after resurfacing, and as a means to extend the useful life, we recommend that pavement rejuvenation be utilized to maintain and protect the roadways over time in lieu of seal/slurry coatings. A rejuvenation product can extend the useful life of the roadway wearing surfaces by sealing and protecting the pavement from age related deterioration and fuel/oil spills, while suspending the aging process by revitalizing the asphalt's oils and improving ductility and durability. We do not recommend application of a surface sealing product (sealcoating).

The Florida Department of Transportation has developed a specification that outlines the application of a material that is comprised of coal-tar oils and coal-tar distillates, combined with a maltenous-type rejuvenator. This material is named Pavement Dressing Conditioner (PDC) rejuvenator/sealer. When applied to an asphalt pavement, PDC will penetrate, seal and protect the pavement from the deterioration that results from fuel spills and water damage and oxidation, as well as improve ductility and durability while revitalizing the oils within the asphalt. Application of PDC rejuvenator/sealer will suspend the aging process of asphalt, and the application frequency can be expanded by several years after each subsequent application. However, a PDC is not currently recommended to be applied to pavements which have already received seal coat treatments. Initiation of using a PDC should be within approximately 18 months after new asphalt has been placed and/or as determined by a qualified pavement rejuvenation expert. In milling and overlay operations, PDC may also be used as the bond (tack) coat medium between old and new asphalt; as it will "fuse" the layers together.

3.3 Groundwater and Surface Water

We did not observe any overt indications of perched surface or groundwater conditions that would likely affect the roadways; unless otherwise noted, and the site drainage appeared to be sufficient in depositing runoff waters to roadside gutters and drainage features. There were a few areas noted where the concrete gutter and edge of pavement are low causing water to pool. These areas should be addressed and leveled properly when resurfacing is performed. These locations are noted in our observation log and on the observation plan because they are impacting the integrity of the roadway, and are comprised of approximately 175 to 190 lineal feet of curb line.

3.4 Sidewalks

The sidewalks within River Oaks Landing were found to be in overall good condition. Based on our current observations, recent corrections by way of surface grinding have been made to mitigate conditions that may contribute to potential trip hazards. However, we observed several areas that in our opinion should be addressed and repaired at this time due to unevenness and the potential for trip hazards. These locations are noted in our observation log and on the observation plan, and are comprised of approximately 250 square feet.

3.5 Storm Drainage System

The drainage conditions within the community are generally in good condition and appear to be performing as intended. The structures were found to be clean of debris and sediments at the time of our visit and we did not observe standing water within the structures. Large amounts of debris can block the drainage structures and should be removed when noted. All inlets should be checked and cleaned on a regular basis to remove accumulated debris from the throats and inlets. Structures and pipes should be inspected and cleaned by a qualified, reputable specialty contractor on a 3 to 5 year schedule or as warranted. Where ground depressions were noted above a storm pipe run (Observation #18), we recommend pipe inspection be performed by a specialty contractor to determine the presence of any leaks that may be causing soil migration into the pipe(s). There is another area in the roadway that

has been previously patched and that appears to have continuing surface settlement/deformation (Observation #9) that we also recommend to have the pipe run inspected.

Additionally, we recommend that the (3) noted storm water structure inlets (Observation #21) be found and uncovered so that they can function as designed. Recovery of these structures will likely require some localized re-grading and sod placement.

3.6 Retention/Detention System

The retention/detention pond systems were found to be generally well maintained, aside from continual localized erosion around the tiered segmental wall systems. Roof gutter drains that transect the walls appear to be the primary cause of localized subsidence in the wall backfill. Voids behind the segmental wall(s) should be filled and leveled with sand or rock (removed from bags), and all displaced blocks and loose or missing cap blocks should be properly replaced and secured.

4.0 Limitations

The information provided herein represents a *visual* assessment of the described components within the community, which did not include any invasive (destructive) evaluation of as-built conditions of said components. While our noted observations may be considered sufficient for diagnosis of conditions that may warrant remedial measures and repairs, and as a basis for a financial analysis and funding plan to offset ongoing deterioration and maintenance aspects, this report should not be considered a 'Reserve Study'. A 'Reserve Study', and/or operating funds financial analysis should be provided by a qualified independent consultant such as a Professional Reserve Analyst (PRA).

Appendices

Appendix A
Observation Logs ..... A – 1

Appendix B
Observation Photographs ..... B – 1

Appendix C
Observation Location Plan ..... C - 1

Appendix A

Observation Log

OBSERVATION NO.	OBSERVATIONS	CORRECTIVE RECOMMENDATION
1	Screen Wall – Vegetation growth against wall	Remove, prune, or limb as needed
2	Screen Wall – wall panel end (at signage) is leaning/rotating	Enlist licensed wall contractor to examine/repair
3	Screen Wall – Vegetation growth against wall	Remove, prune, or limb as needed
4	Screen Wall – broken column foundation	Enlist licensed wall contractor to examine/repair
5	Screen Wall – large tree limbs grown against wall	Remove, prune, or limb as needed
6	Roadway/Gutter – frequently holding water, impacting roadway +/-20 lf	Remove and replace at proper grade
7	Roadway – sanitary manhole apron failing	Remove and replace
8	Sidewalk – stub toes +/-68 sf	Remove and replace or grinding
9	Roadway/Gutter – frequently holding water, impacting roadway +/-14 lf, roadway patch settling +/-112 sf	Remove and replace at proper grade, enlist specialty contractor to inspect utility/pipe for leaks
10	Sidewalk – stub toes +/-16 sf	Remove and replace or grinding
11	Roadway/Gutter – frequently holding water, impacting roadway +/-45 lf	Remove and replace at proper grade
12	Sidewalk – stub toes +/-16 sf	Remove and replace or grinding
13	Sidewalk – stub toes +/-16 sf	Remove and replace or grinding
14	Sidewalk – stub toes +/-20 sf	Remove and replace or grinding
15	Roadway/Gutter – frequently holding water, impacting roadway +/-20 lf	Remove and replace at proper grade
16	Roadway/Gutter – frequently holding water, impacting roadway +/-30 lf	Remove and replace at proper grade
17	Roadway/Gutter – frequently holding water, impacting roadway +/-45 lf	Remove and replace at proper grade
18	Storm Utility – worsening depressions over storm pipe run, no indication of erosion	Enlist specialty contractor to inspect utility/pipe for leaks
19	Wet Pond – segmental walls continued erosion, displacement	Maintain as necessary
20	Wet Pond – segmental wall erosion from roof drains	Maintain/backfill as necessary
21	Storm Water – inlet structures buried/grown over	Uncover and relevel grade(s), examine for necessary repairs

Observation Log

OBSERVATION NO.	GENERAL OBSERVATION
A	Roadway – entrance area, edge failure, surface raveling and cracking
B	Roadway – surface raveling, alligator/micro cracking
C	Roadway - surface raveling, alligator/micro cracking, deformation
D	Roadway – surface raveling and widespread cracking
E	Dry Pond – generally well maintained
F	Wet Pond – generally well maintained
G	Wet Pond - control structure/weir appears to be in good condition
H	Storm Water – typically condition of storm water structure (manhole)

End of noted observations

Appendix B

Observation Photographs

OBSERVATION 1

OBSERVATION 2

OBSERVATION 3

OBSERVATION 4

OBSERVATION 5

OBSERVATION 6

Observation Photographs

OBSERVATION 7

OBSERVATION 8

OBSERVATION 9

OBSERVATION 10

OBSERVATION 11

OBSERVATION 12

Observation Photographs

OBSERVATION 13

OBSERVATION 14

OBSERVATION 15

No

OBSERVATION 16

OBSERVATION 17

OBSERVATION 18

Observation Photographs
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OBSERVATION 19

OBSERVATION 20

OBSERVATION 21a

OBSERVATION 21b

OBSERVATION A

OBSERVATION B

Observation Photographs
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OBSERVATION C

OBSERVATION D

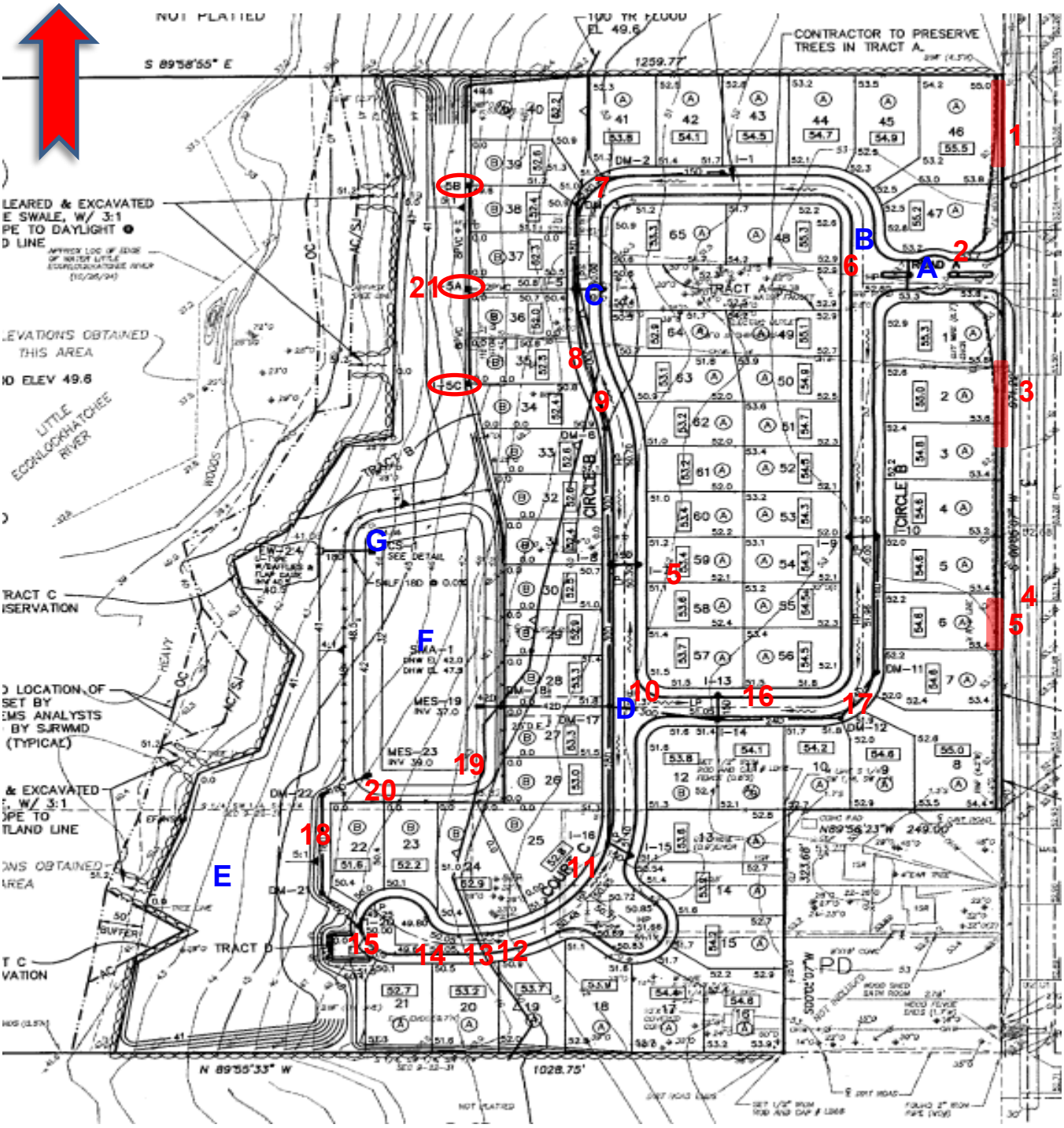
OBSERVATION E

OBSERVATION F

OBSERVATION G

OBSERVATION H

Appendix C



Infrastructure Condition Survey
River Oaks Landing
Orlando, Orange County, Florida

Observation Location Plan

DRAWN BY: SEL	DATE: 10/18/2023	REVIEWED BY: MI	DATE: 10/20/2023
SCALE: NTS	PROJECT NO. 0110.2301090.0000	REPORT NO. 2047277	PAGE NO. C-1