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MEMORANDUM

TO: MR. G.P. WHITE, GENERAL MANAGER, PECAN PLANTATION HOMEOWNER'S ASSOCIATION

FROM: ELLEN MCDONALD, PH.D., P.E.

SUBJECT: RESULTS OF PLANTATION DRIVE ANALYSIS

PROJECT: 806-0105

DATE: APRIL 3, 2003

CC: JIM ALTSTAETTER, P.E., APAI; JARAD STOCKTON, EIT, APAI

This memo summarizes the results of the analysis of culvert capacities along Plantation Dr. from Monticello Dr. to Glen Burnie Blvd., along Village Road between Plantation Dr. and Monticello Dr., and on the newly constructed portion of Orchard Dr. to a point just north of Nutcracker Dr.

APAI's review found no problems with the previously calculated design flows (by the Wallace Group) in the basins impacting the culverts defined above. One site visit was made to gather information about these culverts and the surrounding basins. From the site visit it was found that there were several discrepancies between the size, quantity and location of culverts as compared with what was indicated in the drawings provided to APAI by the Wallace Group. All noted discrepancies have been corrected in the drawings. Copies of the corrected drawings are included as an attachment to this memo. All culverts considered in this analysis are labeled with a number in bold face on the attached drawings.

During the site visit it was also observed that a number of the culverts contained large amounts of sediment. Several culverts were more than half full of sediment at the entrance. Sedimentation is likely to continue to be a problem due to the minimal amount of vegetation and relatively flat terrain in this area. Culvert siltation can be mitigated by increasing the vegetative cover in the basin upstream of the culvert and/or by constructing a basin or check dam upstream of the culvert, which can be used to capture the sediment before it reaches the culvert entrance. In the absence of these mitigation measures, routine maintenance of these culverts is required for them to operate at their full capacity. Even with mitigation measures in place, some routine maintenance will be required. The recommendations provided in this memo are based on the assumption that all culverts are kept free of debris and silt.

Based on the analysis of culvert capacities, APAI found that culverts were significantly undersized at three locations. The recommended improvements are listed below. All culverts are assumed to be CMP and to be constructed at a minimum of a 1% slope.

OK with new grading

1. Location PLA#6: Currently there is one 18-inch CMP culvert at this location. APAI recommends adding two additional culverts, one 24-inch and one 18-inch. It should also be noted that the contours indicate that the existing culvert, which crosses Village Road, is not located at the low point along this road. Assuming these contours are accurate, the Homeowner's Association may want to consider placing the additional culverts further down Village Road (approximately 400 feet from the intersection with Plantation Dr) in order to avoid ponding in this area.

marginal

2. Location PLA#10: Currently there are four 18-inch CMP culverts at this location. APAI recommends installing one additional 18-inch culvert here to provide adequate capacity for the 15-year storm event.

3. Location ORC#1: Currently there is one 18-inch CMP culvert at this location. APAI recommends installing one additional 18-inch culvert here to provide adequate capacity for the 15-year storm event.

In addition to the above recommendations, calculations indicate that the culverts at PLA#8 and PLA#9 are operating right at capacity for the 15-year storm event. Therefore, APAI does not recommend upgrades at these locations unless they have been observed to be problem areas in the past or appear to be causing flooding in the future. If upgrades are performed, it is recommended that one additional 18-inch culvert be added at each location. Without upgrades, it is particularly important to maintain these culverts such that they are free of sediment and debris, as any reduction in cross-sectional area could critically limit their capacity in a major storm.



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MEMORANDUM

TO: MR. G.P. WHITE, GENERAL MANAGER, PECAN PLANTATION HOMEOWNER'S ASSOCIATION

FROM: ELLEN MCDONALD, PH.D., P.E.

SUBJECT: DRAINAGE STUDY PROGRESS REPORT

PROJECT: 806-0102

DATE: FEBRUARY 7, 2003

CC: JIM ALTSTAETTER, P.E., APAI; JARAD STOCKTON, EIT, APAI

This memo summarizes the progress to date of Alan Plummer Associates, Inc (APAI) with respect to the drainage study for the Pecan Plantation Homeowner's Association (PPHA). As requested by PPHA, APAI has performed the following tasks:

1. *Review of previous drainage study performed by the Wallace Group for PPHA:* APAI has completed its review of this study. In general, it is APAI's opinion that the methodology and calculations used to develop basin discharge flows in the Wallace study are sound. However, some spreadsheet errors (likely due to improper copying and pasting of cells) were found in the calculations for several basins. These errors resulted in design flows that were too low and were corrected when noted. As future problem areas are addressed, these calculations will be reviewed in detail for each problem area, prior to providing recommendations for improvements.
2. *Evaluation of culvert capacities for Ravenswood Road:* As requested by PPHA, APAI performed a detailed review of computed culvert capacities along the stretch of Ravenswood Road that is currently being resurfaced. This stretch runs along the northeast portion of Pecan Plantation within Basins H, G and E. In order to evaluate these culvert capacities, APAI performed a detailed check of the Wallace assumptions and calculations for determining the basin discharge flows. Based on this review and information obtained from a site visit, the following recommendations were made to the PPHA:

Discharge Location	Existing Culvert(s)			Recommended Additional Culvert		
	Quantity	Size (in)	Material	Quantity	Size (in)	Material
E3*	1	30	RCP	1	36	CMP
E15*	1	18	RCP	1	24	CMP
G8	1	24	RCP	1	12	CMP/RCP
H17	2	30	CMP	1	18	CMP/RCP

* Recommendation provided in Wallace Group study

Note that improvements for culverts E3 and E15 were recommended by the Wallace Group and have already been installed.

During the site visit to the Ravenswood Road area, it was discovered that a number of the culvert materials provided to APAI by the Wallace Group were in error. Therefore, prior to performing further detailed analyses within problem areas, verification of culvert material in these problem zones is recommended.

Several additional observations were made during APAI's site visit to Pecan Plantation. There are numerous driveway culverts which were observed to be silted in, significantly reducing their capacity. Depending on their location, these could be contributing to problems in some areas. Providing homeowners with some education on the importance of keeping driveway culverts clear of silt and debris is recommended. In addition, it is equally important to educate homeowners, onto whose property larger discharge culverts drain, regarding the importance of keeping the discharge channels clear of brush and debris so that the downstream channel is not limiting the drainage capacity. Proper maintenance of culverts and channels is an extremely important component of a successful drainage system.



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MEMORANDUM

TO: MR. G.P. WHITE, GENERAL MANAGER, PECAN PLANTATION HOMEOWNER'S ASSOCIATION

FROM: ELLEN MCDONALD, PH.D., P.E.

SUBJECT: RESULTS OF WOODLAWN/BELLCHASE ANALYSIS

PROJECT: 806-0104

DATE: FEBRUARY 7, 2003

CC: JIM ALTSTAETTER, P.E., APAI; JARAD STOCKTON, EIT, APAI

This memo summarizes the results of the analysis of culvert capacity at the intersection of Woodlawn Ave. and Bellchase Rd. performed for the Pecan Plantation Homeowner's Association. As part of the analysis, a detailed review of the previous calculations performed by the Wallace Group for the contributing drainage basins was carried out.

APAI's review resulted in some modifications to the previously calculated times of concentration in two of the contributing basins. After incorporating these modifications, the computed 15-year flow to the culverts at the Woodlawn/Bellchase intersection was approximately 52 cfs. Assuming a slope of 1%, the two existing 24-inch RCP culverts have a capacity of about 45 cfs.

In order to provide adequate capacity to carry the 15-year flow, APAI recommends that an additional culvert be installed at this location. If an RCP culvert is used, an 18-inch diameter is required. If a CMP culvert is used, a 24-inch diameter is required. These recommendations are based on a minimum culvert slope of 1%.

Geep White

From: ✓ Ellen McDonald [ellen@apaienv.com]
Sent: Thursday, February 06, 2003 12:53 PM
To: ✓ geep@pecanplantation.net
Subject: accounting catch-up

Geep:

In part due to Jim's accident, we have gotten a little behind on accounting for the drainage project. As you recall, we were to set up a separate task order for each task associated with the project. Up until now, the only task we had set up was a \$4000 task to cover meetings.

I have created three new task orders based on the work we have done or that is in progress. In summary, these are:

General review of previous drainage study: \$4000
Culvert evaluation, Ravenswood Rd: \$3000
Culvert evaluation, Woodlawn and Bellchase: \$2000

We have already sent you one invoice for approximately \$1099.46 which should be applied to the meetings task, for the kickoff meeting.

I am going to put the new task order documents in the mail to you today. Please let me know if you have any questions about this.

We should have recommendations for the Woodlawn/Bellchase task in the next few days. Let us know what "hotspot" you would like us to address next.

Ellen

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Geep White

From: Ellen McDonald [ellen@apaienv.com]
Sent: Thursday, January 30, 2003 9:08 AM
To: geep@pecanplantation.net
Cc: Jim Altstaetter; Jarad Stockton
Subject: Re: Requested Inverts

Geep,

Thanks for getting the inverts. Our calculations indicate that the two existing 30-inch culverts at H17 are flowing right at capacity for the 15-year storm. Based on our discussion with Wes about this location, we would recommend adding another 18-inch CMP here.

Therefore, our final recommendations for the Ravenswood stretch currently being repaved are:

G8: 12-inch (CMP or RCP)
H17: 18-inch (CMP or RCP)

These should be installed at a minimum of a 1% slope.

Please let me know if you have further questions regarding these recommendations. We have already begun looking at the Woodlawn/Bellchase problem area and should have some recommendations with respect to that area next week.

Ellen

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>>> "Geep White" <geep@pecanplantation.net> 01/29/03 04:05PM >>>
The inverts for the two culverts at H17 are:

660.08 - 660.51
659.85 - 660.57

Hope this is what you need. If not, let me know.

Geep

Geep White

From: Ellen McDonald [ellen@apaienv.com]
Sent: Wednesday, January 29, 2003 2:18 PM
To: geep@pecanplantation.net
Cc: Jim Altstaetter; Jarad Stockton
Subject: Ravenswood culvert analysis

Geep,
Jarad and I really enjoyed our "tour" yesterday. Thank you again for taking time to show us around- please pass our thanks on to Wes as well.

As it turns out, the information we collected was extremely valuable, and quite critical to the calculations. We discovered that the pipe material data (RCP, CMP, etc.) provided to us by Wallace were incorrect for most of the culverts along Ravenswood that we looked at yesterday. Consequently, nearly all of our calculations changed significantly. The road plans you provided us yesterday appeared to have the correct pipe materials listed, at least for the culverts we looked at. Therefore, for our revised calculations we used their data rather than Wallace's for all of the culvert materials along the stretch of Ravenswood which is being repaved.

Our revised calculations indicate that there are two areas with potential capacity problems (in addition to E3 and E15 which have already been addressed). These are G8 and H17. G8 was on the "questionable" list I provided you earlier. H17 (2 culverts) was not on the previous list because our data indicated that the culverts were RCP, whereas they are actually CMP. I believe H17 is the "grand canyon" crossing you were referring to, which is currently being filled in downstream of the culverts. However, we are concerned that the invert elevation data for H17 is incorrect. Based on the data in the road plans, the culvert slope is about 0.1%, which is extremely small in comparison to most of the other culverts along this road. I would expect the slope to be in the range of 1-2%. Verification of this slope would be helpful in determining if, and by how much the existing culverts are undersized. Would it be possible for someone on your staff to verify the invert elevations of the H17 culverts?

At G8, our calculations indicate that the existing 24-in culvert is slightly undersized. We would recommend adding an additional 12-inch culvert at this location. At this size, either CMP or RCP will provide adequate capacity.

Please let me know if you are able to verify the elevations at H17 for us.

Thank you,
Ellen

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Geep White

From: Ellen McDonald [ellen@apaienv.com]
Sent: Tuesday, January 21, 2003 10:59 AM
To: geep@pecanplantation.net
Cc: Jim Altstaetter; Jarad Stockton
Subject: Site visit/surveying

Geep,

Jarad Stockton and I are planning to come survey the culverts in question that we discussed on the phone next Tuesday, January 28th. This would also be a good opportunity for us to take a general look around the whole area.

We will plan to arrive at about 9AM. Please let us know what procedure we need to follow to get in.

I spoke with Mr. Bell this morning and told him that we would pass our recommendations on to you when they are ready.

Ellen

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