CDM

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February 25, 2009

Mr. Steve Morgan
Florida Department of Environmental Protection
Southwest District Office
13051 N. Telecom Parkway
Temple Terrace, FL 33637

Subject: Response to FDEP Letter Dated February 12, 2009

Dear Mr. Morgan:

Pasco County and CDM have received your letter dated February 12, 2009. As discussed with your office, the Florida Department of Environmental Protection's (FDEP's) Bureau of Waste Management, and the FDEP Office of General Counsel, Pasco County remains concerned that the provisions of rule 62-4.055(3), F.A.C. have not been followed. Pasco County preserves its rights under the aforementioned rule. That notwithstanding, we are providing this response to your comments dated February 12, 2009, in the spirit of continued cooperation with the FDEP.

RESPONSES TO FDEP COMMENTS DATED FEBRUARY 12, 2009

Comment 1.a. does not require a response. Appendix F of the original application, prepared by PSI, was never intended to serve as an analysis of sinkhole development potential.

Comment 1.b.1. requests an evaluation of the potential for sinkhole development including 1) loose sands and other anomalies and identifies sufficient measures to modify the foundation.

Response: CDM has reviewed the existing data in more detail to further evaluate the potential for sinkhole activity within the geographic footprint of the proposed A-4 Ash Cell. This included further study of the SPT borings and ground penetrating radar (GPR) data presented in the 1987 Jammal & Associates report. It also included a review of the results of geotechnical borings that were advanced within the footprint of the proposed A-4 Ash Cell by PSI in September 2005.

Based on a review of the data from the borings that have been advanced throughout the West Pasco County Waste site, the lithologies present at the site consist of varying thickness of sandy material overlying clayey materials of varying thickness and

consistency, which in turn overlie weathered limestone. As described by Jammal in the 1987 report, the limestone surface is "rugged". As expected in a mature or ancient Karst terrain, both the nature and thickness of unconsolidated deposits that overlie the rugged limestone surface vary with location. The unconsolidated deposits beneath the West Pasco site consist, in descending order, of sandy clay, sand, and clay with a typical total thickness between 30 and 40 feet. However, the unconsolidated deposits were greater than 50 feet thick in Boring B-4 and only 13 feet thick in Boring C-40.

The GPR surveys performed by the United States Department of Agriculture (USDA) in May (fast speed surveys) and October (slow speed surveys) of 1986 were conducted throughout the West Pasco site. There are two N-S survey lines (approximately 700 feet apart) and one E-W survey line that extend through the footprint of the proposed A-4 Ash Cell.

The results of the borings performed in the late 1980s within and in the vicinity of the footprint of proposed A-4 Ash Cell (Borings D-40, E-40, E-45+60, D+400-44, C+400-44, D+400-36, and C+400-36) and the six borings advanced within the footprint in 2005 (B-1, B-2, B-3, B-4, B-5, and B-6) were re-evaluated to determine if evidence exists to indicate the presence of sinkholes in this area of the site. Although conditions such as SPT rod drops by weight of hammer (indicating loose or soft zones), loss of circulation during drilling, a GPR anomaly, and thick units of unconsolidated deposits were identified in association with some of these borings, these conditions were observed at several locations at the site and by themselves don't necessarily indicate the potential for sinkhole activity. Further analysis of these conditions is provided below.

Interpretation of Thin Zones

Although thin zones of loose or soft material were identified by small rod drops with the weight of the SPT hammer (a 4' drop @ 25' bls in boring E-40 four feet above the top of limestone, a one foot drop @ 22' bls in boring D-40 at the top of limestone, and a one foot drop @ 35' bls in boring C+400-36), these conditions were observed in several of the borings performed throughout the site and may only represent the presence of soft material deposited in the low lying areas of the undulating surface of the limestone and not the presence of sinkhole activity.

Interpretation of Lost Circulation Zones

Although lost circulation zones (zones where drilling fluids were completely or partially lost) were encountered in most of the borings, this condition was encountered in nearly all of the borings that were advanced, and is commonly encountered when drilling in Karst areas. These zones were generally above the top of the limestone and, according to Jammal, probably indicate zones of secondary permeability within the unconsolidated deposits and not necessarily the presence of sinkhole features.

Interpretation of GPR Anomalies

GPR anomalies were identified and soil borings were advanced at 18 locations during the Jammal investigations. Only one GPR anomaly was identified in the footprint of the A-4 Cell. Evaluation of the data from boring E-45+60, completed at this location, indicated that there were no rod-drops. However, loss of circulation was noted immediately above the weathered limestone surface at a depth of 15 feet bls. The depth to competent limestone was 16 feet bls at this location. Given the shallow depth to the top of limestone, development of a sinkhole at this location is not expected, especially after construction of the landfill cell prevents future percolation of rainfall through the sediments beneath the landfill.

Interpretation of Thick Sand Units

Clayey units between the shallower sandy materials and the underlying weathered limestone were encountered in all of the borings within and in the vicinity of the footprint of the proposed A-4 Ash Cell that were advanced to the top of the limestone. Although clayey materials were not encountered in boring B-4, this boring was not advanced to the top of the limestone (all of the borings performed within the A-4 footprint in 2005 were only advanced to 50 feet bls to characterize geotechnical properties - not sinkhole formation potential.) While the top of the limestone at this location must be deep compared to the surrounding area (generally, the top of limestone is encountered from 20 to 45 feet bls in this area of the site), the fact that blow counts recorded during the advancement of boring B-4 were as high or higher than blow counts recorded within the sandy materials in other borings advanced at the site, and the fact that there were no lost circulation zones encountered, are indications that the thick sand unit is not due to the presence of sinkhole activity.

Comparison of PSI Borings to Previous Jammal Findings

Comparison of the boring logs indicates that the stratigraphy identified in the PSI borings B-1 through B-6 is consistent with that identified in the Jammal borings in the part of the Hays Road site that Jammal determined to be appropriate for landfill development. Based on CDMs review of the data as requested, there is no reason to disagree with Jammal's conclusions that the A-4 Cell footprint is within a favorable landfill development area. Therefore, there is no reason to modify either the design of the A-4 Cell or the proposed construction methods that have been approved and implemented for the previous cells that were based in part on Jammal's conclusions.

Comment 1.b.2) requests an evaluation of the data generated as part of the 1987 Jammal report.

Response: CDM has reviewed the Jammal report and found it to be a comprehensive evaluation of the site with respect to potential sinkhole development. The evaluation included additional, detailed review of Jammal borings D-40, E-40, E-45+60, D+400-44, C+400-44, D+400-36, and C+400-46. CDM concurs with Jammal's conclusion that the potential for sinkhole development in the part of the Hays Road site that Jammal determined to be appropriate for landfill development is slight. Any subsidence that may occur will likely be slow and result in broad shallow depressions.

Comment 1.b.3) requests an evaluation of sinkhole occurrences since the 1987 Jammal report.

Response: Information in the FDEP sinkhole database indicates that two sinkholes have been identified within one mile of the proposed A-4 Ash Cell. One was identified subsequent to Power Plant Site Certification approval. Additional information is provided as Attachment 1 to this letter.

Comment 1.b.4) requests an evaluation of additional subsurface investigation conducted as part of this post certification submittal.

Response: As stated above, CDM has reviewed the Jammal data and data from the 2005 PSI geotechnical investigation of the A-4 Ash cell. Comparison of the boring logs indicates that the stratigraphy identified in the PSI borings is consistent with that identified in the Jammal borings in the part of the Hays Road site that Jammal determined to be appropriate for landfill development.

Comment 1.b.5) requests that additional investigations at the site be conducted, if deemed necessary.

Response: No additional investigations are deemed necessary to further define sinkhole formation potential in the immediate vicinity of the A-4 Ash Cell.

Comment 1.b.6) requests an evaluation of proposed construction details that address the findings in Comments (1) through (5) above.

Response: CDM has reviewed the Jammal data and data from the 2005 PSI geotechnical investigation of the A-4 Ash cell. Comparison of the boring logs indicates that the stratigraphy identified in the PSI borings is consistent with that identified in the Jammal borings in the part of the Hays Road site that Jammal determined to be appropriate for landfill development. As stated above, because CDM concurs with the conclusions reached by Jammal, there is no reason to modify either the design of the A-4 Cell or the proposed construction methods that have been approved and implemented for the previous solid waste disposal cells.

Comment 1.c. requests that all available data from all borings completed in the footprint of the A-4 Cell be included in the evaluation.

Response: CDM reviewed the following borings within the footprint and the immediate vicinity of the A-4 Cell:

Jammal	PSI
D-40	B-1
E-40	B-2
E-45+60	B-3
D+400-44	B-4
C+400-44	B-5
D+400-36	B-6
C+400-36	

Comment 1.d. states that the February 12, 2009, CDM letter does not provide documentation that demonstrates that the subsurface conditions and sinkhole potential have not changed since the 1987 Jammal report

Response: Evaluation of the stratigraphic data from the PSI soil borings are consistent with those documented in the Jammal report. Evaluation of groundwater level data in recent biennial monitoring reports indicate that the potentiometric surface of the Floridan

aquifer fluctuates with precipitation and that the average water level elevations are similar to the water levels measured by Jammal in November 1986. Based on our analysis, there is no evidence to suggest that the subsurface conditions or the potential for sinkhole formation has changed since the 1987 Jammal Report. If anything, the construction of cells A-1, A-2, A-3, SW-1, and SW-2 have *decreased* the potential for sinkhole formation as stated on page 44 of the Jammal Report: "... with construction of the liner and landfill, Floridan aquifer natural recharge will be significantly reduced in the landfill area, reducing the natural potential for sinkhole activity in the landfill area, and slowing solutioning processes indentified in the greater depths in some of the deep SPT borings in the favorable area." Cells A-1, A-2, A-3, SW-1, and SW-2 have all been constructed and operated with no evidence of geologic subsidence.

In summary, CDM agrees with the findings of the 1987 Jammal Geotechnical/Hydrogeologic Study, which concluded that the proposed location of the A-4 Ash cell is suitable for landfill development.

Thank you for your consideration of this additional information and analysis. As stated earlier in this letter, we are providing this response to your comments dated February 12, 2009, in the spirit of continued cooperation with the FDEP. Pasco County remains concerned that the provisions of rule 62-4.055(3), F.A.C. have not been followed and Pasco County preserves its rights under the aforementioned rule. If you have any questions, please let me know.

Sincerely,

David R. Rojas, P.G. # 2362
Environmental Geologist
Camp Dresser & McKee Inc.

cc: John Power, Pasco County

Attachment 1: Letter Report dated January 26, 2009

ATTACHMENT 1

Letter Report dated January 26, 2009

CDM

1715 N. Westshore, Suite 875
Tampa, Florida 33607
tel: 813 281-2900
fax: 813 288-8787

January 26, 2009

Mr. Steve Morgan
Florida Department of Environmental Protection
13051 N. Telecom Parkway
Temple Terrace, FL 33637

Subject: Sinkhole Potential

Dear Mr. Morgan:

As a follow-up to our discussion yesterday, please find as Attachment 1 to this letter, **Figure 1** identifying known sinkholes located within a 1 mile radius of the West Pasco Landfill. The data used to prepare this figure was obtained from the Florida Department of Environmental Protection's website. As shown in Figure 1, there is one sinkhole that has been identified subsequent to the Power Plant Siting Board's approval of the site as a Class I landfill. This sinkhole is best characterized as a broad, gently-sloping depression, similar in nature to the sinkholes identified in the original geotechnical investigation that was submitted in support of the County's November 1987 application for Power Plant Site Certification.

For your reference, I have also attached as Attachment 2 an excerpt from the above referenced geotechnical investigation related to "Future Sinkhole Potential Over (the) Landfill Area." As noted on the highlighted text, the geotechnical investigation identified "the occurrence of very shallow depressions forming over very long periods of time." Given the stated mechanisms of sinkhole formation discussed in the geotechnical investigation, the report goes on to conclude:

> "In view of the apparent site conditions and the various factors associated with sinkhole formation, we consider the potential sinkhole related risks to the integrity of the proposed landfill to be slight over the favorable area identified ..."

The unusual configuration of the landfill buildout footprint is intentional because the area was selected (and ultimately approved by the FDEP) with emphasis on the findings of the geotechnical investigation, which indicated that the selected area had the lowest potential for sinkhole formation of the entire 800 acre site. The geotechnical investigation included significant subsurface investigation techniques including ground penetrating radar (GPR) and Standard Penetration Test (SPT) borings. Further, site construction techniques included

proactive deep dynamic compaction to collapse limestone voids, even though no such features were identified by either the GPR or SPT tests. The site was subject of arguably the most extensive geotechnical investigation ever conducted for a landfill facility.

I trust that the information contained herein and in Attachment 1 and Attachment 2 is consistent with our discussion. If additional information is required, please do not hesitate to contact me at (813) 281-2900

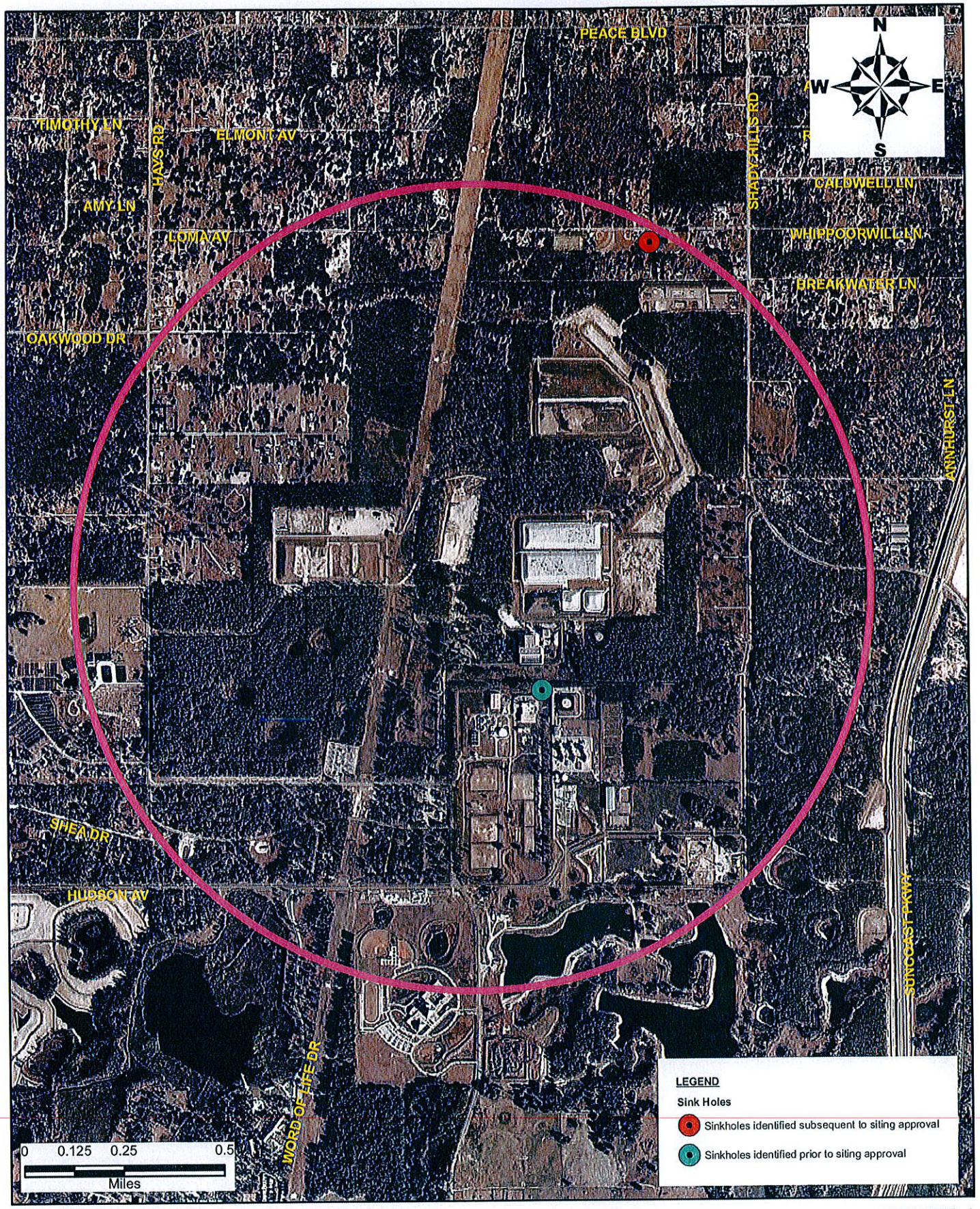
Very truly yours,

Jason M. Gorrie, P.E.
Principal Engineer
Camp Dresser & McKee Inc.

cc: John Power, Pasco County

ATTACHMENT 1

Sinkholes Located within 1 mile of West Pasco Landfill



Aerial Source: ESRI 2008

FIGURE-1
SINKHOLES LOCATED WITHIN 1 MILE
RADIUS OF WEST PASCO LANDFILL
PASCO COUNTY, FLORIDA

CDM

ATTACHMENT 2

Excerpt from Geotechnical Investigation

5.8 Favorable Areas of Site For Stormwater Disposal

At this time, no preliminary stormwater management plans are available; however, we are providing our general thoughts relative to this matter. Considering the natural low depressional areas located, in general, in the northeast and southwest portions of the site, it is reasonable to ultimately direct treated stormwater towards these lower areas. Detention/retention facilities could be constructed adjacent to selected depressional areas that could provide ultimate discharge after some pretreatment. In the northeast and southwest areas of the site, a significant thickness of upper sand aquifer (Strata 3, 4, 5 and 6) is present to promote positive horizontal exfiltration from new stormwater detention/retention basins. If possible, the primary stormwater management features should be planned in these areas.

The groundwater data provided herein should be utilized in the design and selection of control levels in the retention/detention ponds. Although no permeability testing was performed on the sand strata, we anticipate that permeability values on the order of 10 to 20 feet/day would be appropriate for the materials of Strata 3 and 4, and 1 to 7 feet/day for Strata 5 and 6 materials. After preliminary stormwater plans are available, some permeability testing of the sands and additional test borings should be performed.

5.9 Future Sinkhole Potential Over Landfill Area

The proposed Pasco County landfill site and adjacent areas exhibit Karst features typical of west central Florida. The land surface is a gently rolling terrain dotted by numerous topographically-closed depressions. Within the boundaries of the project site, land surface depressions are more common in the western portion and especially in the southwest corner where apparently perennial ponds occur.

Although numerous sinkholes and other Karst-related features exist within the project site and near vicinity, the standard penetration test borings drilled for this investigation did not encounter significant voids in the underlying limestones. This fact, and the general configuration of most of the on-site land surface depressions suggest that sinkholes in the area are primarily caused by areal solution of the limestone surface and subsequent progressive subsidence of the land surface over a relatively long period of time.

Researchers described this type of Karst process forming specific types of features known as limestone-solution sinkholes. Researchers attribute this process to areas where a relatively thin cover of overburden is overlying a limestone surface that is jointed and fractured. Researchers report that in general, the northern portion of west central Florida, including northwest Pasco County, is characterized by the occurrence of shallow, broad sinkholes that develop progressively over fairly long periods of time. The subsidence rate observable at the land surface occurs roughly at the same rate as the dissolving of the limestone by aggressive recharge waters.

Sinkholes and resultant Karst topographic features of the land surface have been intermittently active during the various geologic periods subsequent to deposition of the carbonate bedrocks. During the Pleistocene Age, the sea level has risen and fallen relative to current datum as water was stored and released in glacial and interglacial periods. It is commonly believed that the most recent maximum sea level regression occurred about 18,000 years ago when sea level was approximately 300 feet or more below today's level.

The Karst processes operating in west central Florida must have been more active in the past during low sea level stands. The drowned Karst features along the present coast line and offshore are solid evidence of past intense solution erosion of the region's limestone foundation. It is very likely that most of the sinkholes in the region were formed in the past and that these processes have slowed considerably with the onset of a transgressive, or rising sea which is continuing today.

An assessment of the potential for formation of new sinkholes within the proposed favorable landfill area is presented in this report, based on the geomorphologic history of the region, together with evaluations of site-specific geologic and hydrogeologic data collected during the project investigation. Data collected and utilized in our assessment consisted of:

1. Geologic logs prepared from test borings drilled throughout the project site.
2. Groundwater elevations measured in installed observation wells.
3. Ground penetrating radar (GPR) surveys.
4. Review of type, occurrence and distribution of existing sinkholes and related features within the project site boundaries.
5. Land surface fracture trace/lineament map of the area and vicinity that was developed for the Pasco County Public Works Department by FDOT, a portion of which was traced over the USGS map illustrated on Sheet 3 in Appendix D.

Geologic logs of the numerous test borings drilled within the project site indicate that:

1. The surface of the limestone bedrock, likely the Tampa Limestone, is fairly rugged in relief. This surface marks a lithologic change between the Miocene carbonates of the Tampa or Suwannee Limestone and the predominant clay lithology of the overlying Miocene Hawthorn Formation.
2. The Hawthorn Formation is apparently present throughout most of the site overlying the limestone surface. The Hawthorn here is comprised of deposits of very plastic clays.
3. The Pleistocene to Recent Age quartz sand deposits are relatively thin and generally medium-dense throughout the site.
4. The Hawthorn clay deposits, while apparently continuous throughout most of the site, may be missing in the extreme northern portion along the north property boundary.

Measured water levels in wells installed throughout the site, indicate that the water table surface above the Hawthorn clay deposits ranged in altitude from about +30 to +40 feet above MSL. Based on the potentiometric surface maps of the underlying Floridan Aquifer prepared by SWFWMD (Plate 2, Appendix A), the difference in head between the Floridan and overlying water table aquifer is relatively small, on the order of 5 feet as an average.

The lowest measured points on the water table surface occurred along the north and northeast margin of the site. Water table elevations of less than +30 feet above MSL were measured in wells in these areas. Geologic data, discussed above, suggests that the clay deposits covering the limestone may be missing in areas along the northern site boundary. A very similar hydrogeologic feature was noted at the Cross Bar Ranch well field, located about three to four miles due east. Reseachers attributed the feature to a pinching-out of the primary confining bed over the Floridan Aquifer in a south-to-north direction through the well field.

The September 6, 1986 water level measurements also indicate that excess precipitation recharging the upper sand watertable aquifer within the project area builds groundwater mounds in the central part of the site, as indicated on the watertable contour maps, Sheets 12 and 13. The map data and groundwater contours suggest that groundwater throughout most of the site moves east and west towards areas of lower water table elevation.

Geoelectric signatures generated from the GPR surveys identified interpreted potential geologic anomalies at certain locations along the survey lines. Some locations were drilled by Standard Penetration Test (SPT) methods to correlate the GPR signatures with actual geologic logs and samples. The SPT data indicate that the GPR responses may reflect density differences in the sedimentary beds overlying the limestone surface. The SPT data did not indicate noticable voids and cavities, either in the sand and clay deposits or in the underlying limestones.

The topographic map of the project site indicates numerous, small surface depressions within the project site. Two distinct types, or forms, of depressions are noted: small,

rounded depressions with relatively steep slopes, mainly in the southwest corner of the site, and; very shallow, gently-sloping depressions occurring primarily in the interior portion of the site. Most of the land surface depressions within the site are of the latter category. These depressions are generally very shallow, perhaps two to three feet deep on average and relatively broad, ranging up to several acres in area.

Within the proposed landfill area, a linear relationship between land surface depressions and other geomorphic features was not particularly noted during review of aerial photographs and U.S. Geological Survey 7-1/2 minute quadrangle maps. Other major lineament features were not observed in the immediate vicinity of the proposed landfill, as evident on Sheet 3 in Appendix D.

Given the above considerations, the predominant sinkhole-forming process operating at the proposed project site appears to be very slow dissolution of calcium carbonate at the surface of the limestone bedrock. The result is the occurrence of very shallow depressions forming over very long periods of time. The primary hydrogeologic factors controlling the process are: 1.) the existence of a nearly continuous clay layer covering the limestone surface throughout the interior or favorable portion of the site, and 2.) the small head difference between the water table and Floridan Aquifer. Collected data suggests that active recharge to the Floridan Aquifer limestones, a prerequisite for formation of new sinkholes, occurs away from the project favorable boundaries. The clay deposits of the Hawthorn Formation apparently form an effective aquatard, or semi-confining bed, throughout nearly all of the favorable area.

In view of the apparent site conditions and the various factors associated with sinkhole formation, we consider the potential sinkhole related risks to the integrity of the proposed landfill to be slight over the favorable area identified on Sheets 2 and 3. The apparent hydraulic gradient driving water to the Floridan Aquifer limestones is relatively small throughout the site and the potential for erosion or ravelling of the unconsolidated deposits into limestone voids is low. The noticable lack of significant cavities in the limestones

penetrated at test boring locations further reduces the potential for significant sinkhole risk to the landfill. In addition, with construction of the liner and landfill, Floridan Aquifer natural recharge will be significantly reduced in the landfill area, reducing the natural potential for sinkhole activity in the landfill area, and slowing solutioning processes identified at the greater depths in some of the deep SPT borings in the favorable area.

Sinkholes formed by catastrophic collapse of caverns in the limestone are considered to be uncommon in the project area. The relatively thin overburden covering the limestone formations, together with the apparent small head difference between the water table and potentiometric surface are two factors supporting the formation of surface depressions as a slow on-going process directly related to solution activity at the limestone surface. Sinkholes of this type tend to develop slowly, over long periods of time and may be typically on the order of 1 to 3 feet deep near the center and 10 to 20 feet in diameter. The potential to generate catastrophic, short-period failure sinkholes is considered to be very low.

6.0 GROUNDWATER QUALITY MONITORING PROGRAM

6.1 Well Inventory

To satisfy DER requirements discussed at one of our earlier meetings with them, a water supply well inventory was conducted within a one mile radius of the proposed Hays Road site boundaries. In addition, wells located within a two mile radius of the site were also located. Computer printouts of consumptive use permits (CUPS) and well construction lists for the area were obtained from the Southwest Florida Water Management District (SWFWMD). Also, a list of monitoring wells within the two mile radius that are still used by the United States Geological Survey (USGS) was also obtained. The USGS well locations, as well as the SWFWMD CUPS well locations, are shown approximately located on the USGS map (Sheet 1) and on a