**DOCUMENT RECEIVED IN ELECTRONIC FORMAT FOLLOWS:**

- **GEOSYNTEC TRANSMITTAL PAGE SHOWING FDEP DATE-RECEIVED STAMP**

- **EXPENSE VOUCHER SUBMITTAL PAGE**

Geosyntec consultants

13101 Telecom Drive, Suite 120
Tampa, Florida 33637
PH 813.558.0990
FAX 813.558.9726
www.geosyntec.com

15 August 2012



Mr. Tom Lubozynski, P.E.
Program Manager, Solid and Hazardous Waste
Florida Department of Environmental Protection
Central District Office
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803-3767

**Subject: Response to First Request for Additional Information**
**Permit Application to Construct Phases I and II**
**Vista Landfill, Class III (Facility ID 87081)**
**Apopka, Florida**
**(Permit No. SC48-0165969-014)**

Dear Mr. Lubozynski:

Transmitted herewith is one copy of the Response to First Request for Additional Information (RAI), which was prepared by Geosyntec Consultants on behalf of Vista Landfill, LLC, a wholly owned subsidiary of Waste Management Inc., of Florida.

If you or your staff have any questions or need additional information, please feel free to contact the undersigned.

Sincerely,

Victor M. Damasceno, Ph.D., P.E.
Project Engineer

Copies to: Sheree Grant, Waste Management Inc. of Florida

Transmittal_FDEP.doc

# VOUCHER SUBMITTAL

TO: Corporate Accounting
0FROM: Vallie Strickland

The following expense vouchers are submitted on 8/15/2012 for payment. Please acknowledge receipt of these vouchers by signing below.

| Voucher Number | Amount Paid to Employee | Direct Bill Amount | Employee Name | Date Input |
|---|---|---|---|---|
| T05655 | 664.16 | | Kwasi Badu-Tweneboah | 08/16/2012 |
| T05666 | | 88.00 | Rick Hastie | |
| T05667 | 50.00 | | April Brandon | |
| T05668 | 50.00 | | April Brandon | |
| T05669 | 253.40 | | Jim Linton | |
| T05670 | 147.68 | | Jim Linton | |
| T05671 | 65.28 | | Jim Linton | |
| T04672 | 69.50 | | Jim Linton | |
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WASTE MANAGEMENT

**VISTA LANDFILL, LLC**
242 W. Keene Road
Apopka, FL 32703

August 14, 2012

Mr. Thomas Lubozynski, P.E.
Waste Program Administration
Florida Department of Environmental Protection
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803

Subject: Solid Waste Permit Application to Construct Phase I and II
**Vista Landfill, Class III Facility, WACS #87081**
242 W. Keene Road, Apopka, Orange County, Florida
FDEP Permit Application No. SC48-0165969-019
First Request for Additional Information (Dated August 7, 2012) Responses

Dear Mr. Lubozynski:

Please find enclosed the Vista Landfill, LLC response document for the subject facility prepared by Geosyntec Consultants, Victor M. Damasceno, Ph.D., P.E., Engineer of Record.

If you have any questions during your review, please feel free to contact me at 407-902-1469, sgrant@wm.com or Victor Damasceno at 813-379-4394, VDamasceno@Geosyntec.com.

Sincerely,

Sheree Grant
Waste Management Inc. of Florida (WMIF) Market Area Engineer

C: Jay Davoll, P.E. City of Apopka Engineer and Community Development Director
Deborah Perez, Vista Landfill, LLC District Manager
Paul Bermillo, WMIF Environmental Protection Manager
Victor Damasceno, Ph. D., P.E., Geosyntec Engineer of Record

Geosyntec consultants

13101 Telecom Drive, Suite 120
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14 August 2012

Mr. F. Thomas Lubozynski, P.E.
Waste Program Administrator
Florida Department of Environmental Protection
Central District Office
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803-3767

Subject: Response to First Request for Additional Information
Vista Landfill, Class III (WACS #87081)
Permit Application No. SC48-0165969-019
Orange County, Florida

Dear Mr. Lubozynski:

Geosyntec Consultants (Geosyntec) has prepared this letter to respond to the Florida Department of Environmental Protection's (FDEP's) first request for additional information (RAI-01) regarding the Permit Application to Construct Phases I and II of the Vista Landfill Class III facility (Vista LF facility) located in Apopka, Florida. This response to RAI-01 is submitted to FDEP on behalf of Vista Landfill LLC (Vista Landfill), a wholly owned subsidiary of Waste Management Inc. of Florida (WMIF). The permit application was received by FDEP on 12 July 2012 and is referred to in this letter as "Report." The RAI was addressed to Ms. Sheree Grant of WMIF in a letter dated 7 August 2012. A copy of this RAI is included as Attachment A of this response letter.

As part of the RAI, FDEP requested a meeting to discuss the RAI to ensure that the response submittal would be as complete as possible. This meeting was held on 8 August 2012 between WMIF, Geosyntec, and FDEP. The 8 August 2012 meeting is referred to hereafter as "meeting". All FDEP comments from RAI-01 were discussed during this meeting and the responses provided herein have been prepared based on the outcome of these discussions.

Each FDEP comment has been provided below in italic font followed by the corresponding response in normal font. In this response, deletions to the original document have been shown with a strikethrough and additions have been shown with an underline.

## RESPONSE TO FDEP COMMENTS

***FDEP Comment #1***

1. *Based on the review of the Report, the Department interprets the construction permit application to encompass the following:*
    a. *Reduce the total landfill permitted footprint from 102 to 94 acres.*

b. *Options for the bottom liner design for Phases I and II, cells 3 – 8. The bottom liner design and leachate collection system (from top to bottom) will be one of the following options:*

***Option 1**: Geocomposite with one central leachate corridor (This design is the currently permitted liner and leachate collection system.)*

- *2-ft thick liner protective layer*
- *Double-sided drainage geocomposite layer*
- *60-mil thick textured HDPE geomembrane*
- *6-inch thick compacted subbase layer*

***Option 2**: Sand Drainage Layer with one central leachate corridor*

- *1-ft thick liner protective layer*
- *8-oz separation geotextile layer*
- *1-ft thick sand drainage layer with a hydraulic conductivity $>1.6\times10^{-2}$ cm/s*
- *60-mil thick textured HDPE geomembrane*
- *6-inch thick compacted subbase layer*

***Option 3**: Sand Drainage Layer with one central leachate corridor and two leachate collection galleries per cell*

- *1-ft thick liner protective layer*
- *8-oz separation geotextile layer*
- *1-ft thick sand drainage layer with a hydraulic conductivity $> 7.5\times10^{-3}$ cm/s*
- *60-mil thick textured HDPE geomembrane*
- *6-inch thick compacted subbase layer*

***Option 4**: Sand Drainage Layer with one central leachate corridor and four leachate collection galleries per cell (that is, two galleries on either side of the central leachate corridor)*

- *1-ft thick liner protective layer*
- *8-oz separation geotextile layer*
- *1-ft thick sand drainage layer with a hydraulic conductivity $> 4.5\times10^{-3}$ cm/s*
- *60-mil thick textured HDPE geomembrane*
- *6-inch thick compacted subbase layer*

*Is the Department's understanding of the construction permit application correct? If yes, provide a separate drawing for each of the above options (the drawings should be similar to*

*Drawing 6 in the report). The drawings should refer to the corresponding details on drawings 14 and 17. If no, please describe each design and make sure there is a separate drawing for each one.*

*It is our understanding that the design of the leachate collection galleries width may vary. This was not described in the application. The width of the leachate collection galleries should be presented and discussed at the Department requested meeting.*

**Response # 1:**

FDEP's understanding of the construction permit application is correct; there are four potential layouts for the leachate collection system at the Vista LF facility, two of which are conceptual (i.e., Options 3 and 4). The permit drawings submitted with the 12 July 2012 Permit Application have been revised and replacement sheets are provided as Attachment B of this letter as agreed upon during the meeting. Two additional sheets (6A and 6B) have been prepared and are included with the revised replacement sheets in Attachment B.

As discussed during the meeting, the leachate collection gallery design varies with each cell based on the drainage length and properties of the sand. Therefore, the cross sections provided in the revised permit drawings have been updated to provide a conceptual design for the galleries (i.e., no dimensions for the width of the leachate collection galleries are provided). A minor permit modification will be submitted to FDEP for approval prior to cell construction should WMIF choose to pursue Options 3 or 4. Note that, as stated during the meeting Cell 3 will be constructed using Option 1.

***FDEP Comment #2***

2. *Page 9 of the engineering report, section 3.7.2 Horizontal Separation, states "…the minimum horizontal separation between waste placed in the proposed landfill and the landfill property boundary exceeds the 100-foot setback requirement…" This statement is incorrect. The distance between the eastern property boundary and the edge of cell 4 is less than the required 100-foot setback for which variance SWVA No. 00-02 is in place. Please acknowledge.*

**Response # 2:**

WMIF acknowledges FDEP's Comment #2.

***FDEP Comment #3***

3. *Page 10 of the engineering report, section 3.8.2 Landfill Liner and Leachate Collection System Description, states "It is noted that Vista Landfill will monitor ground water elevations for future phases of landfill development in an effort to refine the seasonal high ground water elevation contours and thereby potentially re-establish base grade*

*elevations for future cells." Any change in base grade elevations for unconstructed cells will require a permit modification. If the elevations will increase the depth of the waste, a new settlement analyses might be required. This will be a specific condition of the permit.*

**Response # 3:**

FDEP's comment is duly noted.

***FDEP Comment #4***

4. *Page 15 of the engineering report, section 7.2 Long-Term Care and Closure Costs, states "The reduction of the landfill footprint results in reduced closure area yielding a reduction of the currently approved closure cost…WMIF recognizes that an updated financial assurance will be required following the construction of Cell 3…" The Department agrees. Please note, Department approval of the cost estimate and the corresponding financial mechanism for future cells must be in place prior to waste acceptance.*

**Response # 4:**

The existing financial mechanism for closure and long-term care for the Vista LF facility provides financial assurance for Cells 1 through 4. Note that, this permit application requests reduction of the footprint, specifically for Cells 3 and 4. As discussed in the meeting, the existing financial assurance includes Cells 1 through 4 and is considered conservative and appropriate because the estimate is based on a larger footprint than will be constructed. Therefore, an updated financial assurance will not be submitted at this time.

***FDEP Comment #5***

5. *Appendix D, page 24 section 5.6 Conformance Testing, states "If soils are obtained from off site borrow sources, visual inspection and conformance tests shall be performed at the source location or as the materials arrive at the Vista Landfill, Class III site." Transportation can have a significant affect on the homogeneity of soils and the moisture content. The Department recommends for those soils where particle size distribution or moisture content is a critical component for the functionality of such soils, the conformance tests be conducted both at the source location and again upon delivery to the landfill.*

**Response # 5:**

All conformance tests for the Vista LF facility are performed pursuant to ASTM Standards at the frequencies specified in Table 5-1 of the Construction Quality Assurance Plan. Per ASTM standards, tests are performed on representative, homogenized samples. As discussed and agreed upon in the meeting, the effects due to transportation can be neglected. Therefore, WMIF would

like to keep the option to perform the conformance tests at the source location or as the materials arrive at the Vista LF facility, as currently stated in the Construction Quality Assurance plan (Appendix D of the Report).

***FDEP Comment #6***

6. *Appendix D, page 46 and 47, discusses the surface preparation and placement of GCL over soil. In this project, GCL will be placed over geomembrane. Review sections 7.4 and 7.5 and add/revise as necessary for GCL placement over geomembrane.*

**Response # 6:**

As presented on Sheets 14, 16, and 17 of the Permit Drawings, the geosynthetic clay liner (GCL) is placed over soil. Therefore, no revision is required for Appendix D.

***FDEP Comment #7***

7. *Appendix D, Appendix A CQA Forms and Log, the CQA Forms and Log were not made part of the submittal. Please submit the forms and log.*

**Response # 7:**

The CQA Forms and Logs are provided as Attachment C of this letter.

***FDEP Comment #8***

8. *Drawing 6, Leachate Collection System Plan, depicts a temporary leachate transmission system force main. Provide a plan for how the temporary main will be decommissioned which addresses the following:*
    a. *Describe how the temporary main will be drained.*
    b. *Will the temporary main be capped and left in place or cut and removed?*
    c. *When will the temporary main be decommissioned (that is, describe the events or operating conditions that lead up to the time when the main will be decommissioned, not the time frame when this will occur)?*

*This plan can be either a stand alone document or made part of the drawing notes.*

**Response # 8:**

A note describing the decommissioning of the temporary leachate transmission system force main has been added to Sheets 6, 6A, and 6B of the Permit Drawing set. The updated/replacement drawing sheets are provided as part of Attachment B. Note that, as discussed during the meeting, the temporary leachate transmission system force main will be a dual-containment (i.e. 3-in. diameter HDPE primary (carrier) pipe and 6-in. diameter containment) piping system in lieu of the 6-in. diameter HDPE primary pipe described in Sheet

17 of the Permit Drawings. Detail 18 "Temporary Leachate Transmission System Force main" on Sheet 17 has been updated to reflect this change.

***FDEP Comment #9***

9. *Drawing 6, Leachate Collection System Plan, depicts a leachate collection gallery transition into the leachate collection corridor. The leachate collection gallery makes a 90° turn at the toe of the slope and again at the leachate collection corridor. Will these turns impede the cleaning of the leachate collection pipeline? How will the leachate collection pipeline be cleaned beyond these turns? Please note, it is required to have the entire leachate collection system flushed or inspected by video recording for a new cell prior to waste acceptance and a minimum of every 5 years thereafter (Rule 62-701.500(8)(h), F.A.C.).*

**Response # 9:**

The leachate collection gallery (burrito drain) is designed such that the perforated pipe acts as an added measure to facilitate leachate flow into the sump area. As discussed during the meeting, because the purpose of the perforated pipe installed in the burrito drain is to provide a redundancy and expedite collection and removal of leachate through the burrito drain, jet cleaning or video inspection should not be required for the pipe within the burrito drains.

***FDEP Comment #10***

10. *Drawing 14, Liner System Details, depicts the anchor trench detail for the perimeter berm (detail 5) and the anchor trench detail for the intercell berm over flow (detail C). The following are comments and questions regarding the anchor trench design.*
    a. *Detail C depicts the geocomposite extending to the edge of the berm. Exposed geocomposite, as depicted on detail C, may be a violation of the site's Title V Air permit since it has the potential to be a landfill gas emission pathway. Please consult with the applicable Air Program to determine compliance with all air regulations. The Solid Waste Program recommends wrapping the end of the geocomposite drainage layer with the underlying geomembrane to eliminate a potential pathway for landfill gas and odors.*
    b. *Detail C depicts the geocomposite extending to the edge of the berm and references detail 5; detail 5 depicts the geocomposite extending down into the anchor trench with the geocomposite. Which design is correct?*

**Response # 10:**

Detail 5 "Anchor Trench at Crest of Perimeter Berm" of Sheet 14 is the correct design. Section C "Intercell Berm Over Flow" on Sheet 14 has been revised and updated accordingly. The respective replacement sheet is provided in Attachment B.

***FDEP Comment #11***

11. *Revise drawing 16 Detail G of Sheet 6 to show the leachate collection pipe coming in to the sump from the right. As the collection pipe enters the sump area, its bottom should be at the same elevation as the bottom of the cell. Also, include a detail of the sump area which shows the burrito drains entering the sump.*

**Response # 11:**

As shown on Detail 9 "Leachate Collection Sump" on Sheet 16, the cross section represented by Section G "Leachate Collection Riser at Sump" does not "cut" through the leachate collection pipe. Section G is intended to detail the leachate collection riser at the sump and provide detail for the discharge pipe. As discussed during the meeting, the leachate collection pipe is masked by the drainage gravel; therefore, not visible. Note that, as shown in Section E "Leachate Collection Sump" on Sheet 16, the bottom elevation of the leachate collection pipe is consistent with the bottom elevation of the cell.

As previously stated, and discussed during the meeting, the details for the burrito drains presented with the subject permit application are conceptual. Should WMIF pursue Options 3 or 4, a detail of the sump area showing the burrito drains entering the sump will be provided with the respective minor permit modification – as discussed in the response to FDEP Comment #1.

***FDEP Comment #12***

12. *Drawing 16, Detail F: As the leachate collection pipe goes through the sump area, it continues up the sideslope on the left. (This is the depiction in Detail F for the riser trench.)*
    a. *At what point does the leachate collection pipe make the bend to go up the sideslope? As close as possible to the sideslope or before in order to have a gentler radius of curvature?*
    b. *If this pipe will be used for video inspection and cleanout, how gentle does the radius of curvature need to be to ensure the cleaning and inspection equipment can get to the end of the cell?*
    c. *Show the radius of curvature for the leachate collection pipe as it enters the sump area and continues up the side slope. How and at what angle will the leachate pipe transition from horizontal to up the side slope? This should be depicted in a detail.*
    d. *At what elevation (how far above the top of the sump area) does the leachate collection pipe change from perforated to solid piping?*

**Response # 12.a:**

The leachate collection pipe transitions to the side slope through use of a bend (elbow), located at the toe-line near the sump, depicted as the transition from perforated to solid shown on Detail 9 “Leachate Collection Sump”, Sheet 16.

**Response # 12.b:**

Pursuant to conversation with representatives from Florida Jet Clean, and e-mail conversation provided in Attachment D, due to the internal diameter of the pipe, video inspection is performed using an explosion-proof push-rod camera system that is capable of overcoming up to a 45° bend. The transition between the cell bottom and the side slopes is approximately 33°, well below the 45° maximum limit for the equipment.

**Response # 12.c:**

The transition for the leachate collection pipe from the sump area and up the side slope is achieved through a 33° field-fabricated bend (elbow). As discussed during the meeting, a detail depicting the transition from the sump area to the side slope is not required.

**Response # 12.d:**

The transition from perforated to solid piping occurs at the 33° bend (discussed in Response #12 b and c) located along the toe-line depicted as the transition from perforated to solid shown on Detail 9 “Leachate Collection Sump”, Sheet 16.

***FDEP Comment #13***

13. *Drawing 17, Detail 16 Leachate Collection Cleanout Pipe, does this pipe extend up each side of the cell (i.e., cell 3 and 4 on both the north and south sides) as depicted in drawing 6?*

**Response # 13:**

Two cleanout pipes are required due to inspection distance limitations (approximately 500 feet from each cleanout pipe) associated with the explosion-proof push-rod camera system used to perform the video inspections at the Vista LF facility.

***FDEP Comment #14***

14. *Drawing 3 depicts the relic sinkhole in the area where cells 1 and 5 join. The groundwater contour lines indicate the flow of groundwater is toward this relic sinkhole. How will the installation of liner for each cell affect the flow of groundwater? How will the groundwater flow pattern change as waste is filled into each cell? Will any change in the groundwater flow affect the construction of the base of each cell?*

**Response # 14:**

CDM prepared two reports entitled "Buttrey 2 Class III Landfill Confinement Restoration – Southern Plug" and "Buttrey Development Two LLC. Class III Landfill Expansion Confinement Restoration – Northern Plug Area" dated December 2003 and July 2004, respectively. Copies of the referenced reports excerpts are provided in Attachment E and show that the Vista LF facility contains two relic sinkholes (i.e., north of Cells 1 and 2, and south of Cells 3 and 4). The area where Cells 1 and 5 join does not contain a relic sinkhole. The installation of the liner for each cell is not expected to affect the groundwater flow and/or flow pattern – as discussed during the meeting. Therefore, the construction of the base of each cell will not affect groundwater flow.

***FDEP Comment #15***

15. *Drawing 14, what is the purpose of the intercell berm overflow? Is it a potential pathway for leachate to escape the lined area?*

**Response # 15:**

The intercell berm overflow is implemented and required due to the elevation difference between the intercell berm for Cells 3 and 4, and the south perimeter berm. As discussed during the meeting, the original intercell berm elevation (e.g., without the overflow structure) is greater than the elevation of the adjacent perimeter berm (positive elevation difference). This positive elevation difference provides a potential pathway for leachate to flow outside of the lined area. The intercell berm overflow is designed to create a negative elevation difference between the intercell berm (between Cells 3 and 4) and the perimeter berm (i.e., the perimeter berm elevation is higher than the intercell berm), impeding leachate flow outside of the lined area.

**CLOSURE**

If you have any questions or require additional information, please do not hesitate to contact Ms. Sheree Grant of WMIF at (407) 902-1469, SGrant@wm.com, or the undersigned at (813) 558-0990.

Sincerely,

VICTOR M. DAMASCENO LICENSE No 72966 STATE OF FLORIDA PROFESSIONAL ENGINEER

Victor M. Damasceno, Ph.D., P.E.
Project Engineer 14 August 2012
P.E. Number 72966

Kwasi Badu-Tweneboah, Ph.D., P.E.
Associate

Attachments

Copies to: Sheree Grant, WMIF

# ATTACHMENT A

Copy of RAI

Florida Department of Environmental Protection
Central District
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803-3767

Rick Scott
Governor

Jennifer Carroll
Lt. Governor

Herschel T. Vinyard Jr.
Secretary

August 7, 2012

E-Mail
sgrant@wm.com

Ms. Sheree Grant
Vista Landfill, LLC
242 West Keene Road
Apopka, Florida 32703

OCD-SW-12-300

Orange County – SW WACS # 87081
Vista Landfill, Class III
First Request for Additional Information
Permit Application No. SC48-0165969-019

Dear Ms. Grant:

Victor M. Damasceno, Ph.D., P.E., of Geosyntec Consultants, submitted on your behalf, "Solid Waste Permit Application to Construct Phases I and II at the Vista Landfill, Class III Facility." It was dated July 10, 2012 and received July 12, 2012. We have assigned Permit No. SC48-0165969-019 to the application.

The application is incomplete. Please provide the information listed on the attached sheet promptly. Evaluation of your application will be delayed until all the requested information has been received. In order to ensure the next submittal will be as complete as possible, the Department requests that we have a meeting to discuss the submittal. Please contact Kim Rush to schedule a meeting time and date. She can be reached at kim.rush@dep.state.fl.us or 407-897-4314.

Pursuant to Section 120.60(2), Florida Statutes, the Department may deny an application, if the applicant, after receiving timely notice, fails to correct errors and omissions, or supply additional information within a reasonable period of time. Accordingly, please provide the additional information within 30 days of the date you receive this letter. Submit three copies of the requested information to the Department and reference the above permit application number in your correspondence.

If you have any questions, please contact Kim Rush at (407) 897-4314 or by e-mail at kim.rush@dep.state.fl.us.

Sincerely,

F. Thomas Lubozynski, P.E.
Waste Program Administrator

FTL/kr

Enclosure

cc:
Victor Damasceno, PhD, P.E. – Geosyntec Consultants, vdamasceno@geosyntec.com

Note that all references to "Report" in the following text refer to the document entitled, "Solid Waste Permit Application to Construct Phases I and II at the Vista Landfill, Class III Facility," with supporting documents prepared by: Victor M. Damasceno, Ph.D., P.E., of Geosyntec Consultants, dated July 10, 2012.

1. Based on the review of the Report, the Department interprets the construction permit application to encompass the following:
    a. Reduce the total landfill permitted footprint from 102 to 94 acres.
    b. Options for the bottom liner design for Phases I and II, cells 3 – 8. The bottom liner design and leachate collection system (from top to bottom) will be one of the following options:

    **Option 1**: Geocomposite with one central leachate corridor (This design is the currently permitted liner and leachate collection system.)
    - 2-ft thick liner protective layer
    - Double-sided drainage geocomposite layer
    - 60-mil thick textured HDPE geomembrane
    - 6-inch thick compacted subbase layer

    **Option 2**: Sand Drainage Layer with one central leachate corridor
    - 1-ft thick liner protective layer
    - 8-oz separation geotextile layer
    - 1-ft thick sand drainage layer with a hydraulic conductivity $\geq 1.6 \times 10^{-2}$ cm/s
    - 60-mil thick textured HDPE geomembrane
    - 6-inch thick compacted subbase layer

    **Option 3**: Sand Drainage Layer with one central leachate corridor and two leachate collection galleries per cell
    - 1-ft thick liner protective layer
    - 8-oz separation geotextile layer
    - 1-ft thick sand drainage layer with a hydraulic conductivity $\geq 7.5 \times 10^{-3}$ cm/s
    - 60-mil thick textured HDPE geomembrane
    - 6-inch thick compacted subbase layer

    **Option 4**: Sand Drainage Layer with one central leachate corridor and four leachate collection galleries per cell (that is, two galleries on either side of the central leachate corridor)
    - 1-ft thick liner protective layer
    - 8-oz separation geotextile layer
    - 1-ft thick sand drainage layer with a hydraulic conductivity $\geq 4.5 \times 10^{-3}$ cm/s
    - 60-mil thick textured HDPE geomembrane
    - 6-inch thick compacted subbase layer

    Is the Department's understanding of the construction permit application correct? If yes, provide a separate drawing for each of the above options (the drawings should be similar to

Drawing 6 in the report). The drawings should refer to the corresponding details on drawings 14 and 17. If no, please describe each design and make sure there is a separate drawing for each one.

It is our understanding that the design of the leachate collection galleries width may vary. This was not described in the application. The width of the leachate collection galleries should be presented and discussed at the Department requested meeting.

2. Page 9 of the engineering report, section 3.7.2 Horizontal Separation, states "…the minimum horizontal separation between waste placed in the proposed landfill and the landfill property boundary exceeds the 100-foot setback requirement…" This statement is incorrect. The distance between the eastern property boundary and the edge of cell 4 is less than the required 100-foot setback for which variance SWVA No. 00-02 is in place. Please acknowledge.

3. Page 10 of the engineering report, section 3.8.2 Landfill Liner and Leachate Collection System Description, states "It is noted that Vista Landfill will monitor ground water elevations for future phases of landfill development in an effort to refine the seasonal high ground water elevation contours and thereby potentially re-establish base grade elevations for future cells." Any change in base grade elevations for unconstructed cells will require a permit modification. If the elevations will increase the depth of the waste, a new settlement analyses might be required. This will be a specific condition of the permit.

4. Page 15 of the engineering report, section 7.2 Long-Term Care and Closure Costs, states "The reduction of the landfill footprint results in reduced closure area yielding a reduction of the currently approved closure cost…WMIF recognizes that an updated financial assurance will be required following the construction of Cell 3…" The Department agrees. Please note, Department approval of the cost estimate and the corresponding financial mechanism for future cells must be in place prior to waste acceptance.

5. Appendix D, page 24 section 5.6 Conformance Testing, states "If soils are obtained from off site borrow sources, visual inspection and conformance tests shall be performed at the source location or as the materials arrive at the Vista Landfill, Class III site." Transportation can have a significant affect on the homogeneity of soils and the moisture content. The Department recommends for those soils where particle size distribution or moisture content is a critical component for the functionality of such soils, the conformance tests be conducted both at the source location and again upon delivery to the landfill.

6. Appendix D, page 46 and 47, discusses the surface preparation and placement of GCL over soil. In this project, GCL will be placed over geomembrane. Review sections 7.4 and 7.5 and add/revise as necessary for GCL placement over geomembrane.

7. Appendix D, Appendix A CQA Forms and Log, the CQA Forms and Log were not made part of the submittal. Please submit the forms and log.

8. Drawing 6, Leachate Collection System Plan, depicts a temporary leachate transmission system force main. Provide a plan for how the temporary main will be decommissioned which addresses the following:
    a. Describe how the temporary main will be drained.
    b. Will the temporary main be capped and left in place or cut and removed?
    c. When will the temporary main be decommissioned (that is, describe the events or operating conditions that lead up to the time when the main will be decommissioned, not the time frame when this will occur)?

    This plan can be either a stand alone document or made part of the drawing notes.

9. Drawing 6, Leachate Collection System Plan, depicts a leachate collection gallery transition into the leachate collection corridor. The leachate collection gallery makes a 90˚ turn at the toe of the slope and again at the leachate collection corridor. Will these turns impede the cleaning of the leachate collection pipeline? How will the leachate collection pipeline be cleaned beyond these turns? Please note, it is required to have the entire leachate collection system flushed or inspected by video recording for a new cell prior to waste acceptance and a minimum of every 5 years thereafter (Rule 62-701.500(8)(h), F.A.C.).

10. Drawing 14, Liner System Details, depicts the anchor trench detail for the perimeter berm (detail 5) and the anchor trench detail for the intercell berm over flow (detail C). The following are comments and questions regarding the anchor trench design.
    a. Detail C depicts the geocomposite extending to the edge of the berm. Exposed geocomposite, as depicted on detail C, may be a violation of the site's Title V Air permit since it has the potential to be a landfill gas emission pathway. Please consult with the applicable Air Program to determine compliance with all air regulations. The Solid Waste Program recommends wrapping the end of the geocomposite drainage layer with the underlying geomembrane to eliminate a potential pathway for landfill gas and odors.
    b. Detail C depicts the geocomposite extending to the edge of the berm and references detail 5; detail 5 depicts the geocomposite extending down into the anchor trench with the geocomposite. Which design is correct?

11. Revise drawing 16 Detail G of Sheet 6 to show the leachate collection pipe coming in to the sump from the right. As the collection pipe enters the sump area, its bottom should be at the same elevation as the bottom of the cell. Also, include a detail of the sump area which shows the burrito drains entering the sump.

12. Drawing 16, Detail F: As the leachate collection pipe goes through the sump area, it continues up the sideslope on the left. (This is the depiction in Detail F for the riser trench.)
    a. At what point does the leachate collection pipe make the bend to go up the sideslope? As close as possible to the sideslope or before in order to have a gentler radius of curvature?
    b. If this pipe will be used for video inspection and cleanout, how gentle does the radius of curvature need to be to ensure the cleaning and inspection equipment can get to the end of the cell?

c. Show the radius of curvature for the leachate collection pipe as it enters the sump area and continues up the side slope. How and at what angle will the leachate pipe transition from horizontal to up the side slope? This should be depicted in a detail.
d. At what elevation (how far above the top of the sump area) does the leachate collection pipe change from perforated to solid piping?

13. Drawing 17, Detail 16 Leachate Collection Cleanout Pipe, does this pipe extend up each side of the cell (i.e., cell 3 and 4 on both the north and south sides) as depicted in drawing 6?

14. Drawing 3 depicts the relic sinkhole in the area where cells 1 and 5 join. The groundwater contour lines indicate the flow of groundwater is toward this relic sinkhole. How will the installation of liner for each cell affect the flow of groundwater? How will the groundwater flow pattern change as waste is filled into each cell? Will any change in the groundwater flow affect the construction of the base of each cell?

15. Drawing 14, what is the purpose of the intercell berm overflow? Is it a potential pathway for leachate to escape the lined area?

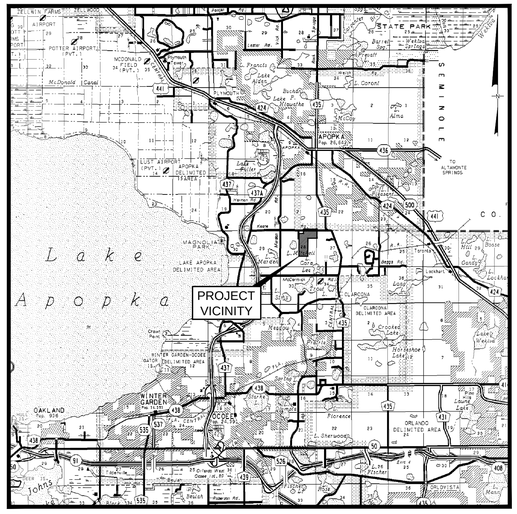
# ATTACHMENT B

Permit Application Drawings: Replacement Sheets

# PERMIT APPLICATION DRAWINGS

## VISTA CLASS III LANDFILL

### 242 WEST KEENE ROAD
### APOPKA, FLORIDA 32703 USA
### JULY 2012




VICINITY MAP

0 2 4

SCALE IN MILES

| LIST OF DRAWINGS | | |
|---|---|---|
| SHEET | TITLE | REVISION |
| 1 | TITLE SHEET | 1 |
| 2 | AERIAL PHOTOGRAPH | 0 |
| 3 | EXISTING CONDITIONS | 0 |
| 4 | SITE DEVELOPMENT PLAN | 0 |
| 5 | BASE GRADING PLAN | 0 |
| 6 | LEACHATE COLLECTION SYSTEM PLAN OPTIONS 1 AND 2 | 1 |
| 6A | LEACHATE COLLECTION SYSTEM PLAN OPTION 3 | 0 |
| 6B | LEACHATE COLLECTION SYSTEM PLAN OPTION 4 | 0 |
| 7 | FINAL COVER SYSTEM GRADING PLAN | 0 |
| 8 | LANDFILL CROSS SECTIONS | 0 |
| 9 | CONCEPTUAL STORM WATER MANAGEMENT PLAN | 0 |
| 10 | LANDFILL DEVELOPMENT PHASING PLAN I | 0 |
| 11 | LANDFILL DEVELOPMENT PHASING PLAN II | 0 |
| 12 | LANDFILL DEVELOPMENT PHASING PLAN III | 0 |
| 13 | ENVIRONMENTAL MANAGEMENT PLAN | 0 |
| 14 | LINER SYSTEM DETAILS | 1 |
| 15 | PERIMETER BERM AND ACCESS ROAD DETAILS | 0 |
| 16 | LEACHATE COLLECTION SUMP PLAN AND DETAILS | 0 |
| 17 | LEACHATE COLLECTION SYSTEM DETAILS | 1 |
| 18 | FINAL COVER SYSTEM DETAILS | 0 |
| 19 | STORM WATER MANAGEMENT DETAILS I | 0 |
| 20 | STORM WATER MANAGEMENT DETAILS II | 0 |
| 21 | LEACHATE MANAGEMENT SYSTEM PROCESS DIAGRAM LEGEND | 0 |
| 22 | LEACHATE MANAGEMENT SYSTEM MECHANICAL FLOW DIAGRAM | 0 |
| 23 | LEACHATE MANAGEMENT SYSTEM PROCESS AND INSTRUMENTATION DIAGRAM | 0 |


LOCATION MAP

0 0.5 1.0

SCALE IN MILES


## DETAIL IDENTIFICATION LEGEND

2 / 4 — Detail Number; Sheet on which above Detail is Presented

Detail Number 2 / Sheet on which above Detail was First Referenced 2 — DETAIL: TITLE OF DETAIL
SCALE: 1" = 1'
XREF: FILENAME

Example: Detail Number 2 Presented on Sheet No. 4 was Referenced for the First Time on Sheet No. 2.

Note: Above System also applies to Section Identifications.

WASTE MANAGEMENT

Geosyntec consultants

**PREPARED FOR:**

VISTA LANDFILL, L.L.C.
242 WEST KEENE ROAD
APOPKA, FLORIDA 32703 USA
PH: 407.886.2920

**PREPARED BY:**

GEOSYNTEC CONSULTANTS
13101 TELECOM DRIVE - SUITE 120
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PERMIT DRAWING

| REV | DATE | DESCRIPTION | DRN | APP |
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WASTE MANAGEMENT
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TITLE: TITLE SHEET

PROJECT: PERMIT APPLICATION DRAWINGS

SITE: VISTA CLASS III LANDFILL
APOPKA, FLORIDA

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SIGNATURE
14 August 2012
DATE
VICTOR DAMASCENO - LICENSE NO. 72966

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| CHECKED BY: | VMD | FILE: | FL2066.01P011 |
| REVIEWED BY: | KBT | DRAWING NO.: | |
| APPROVED BY: | VMD | | 1 OF 23 |

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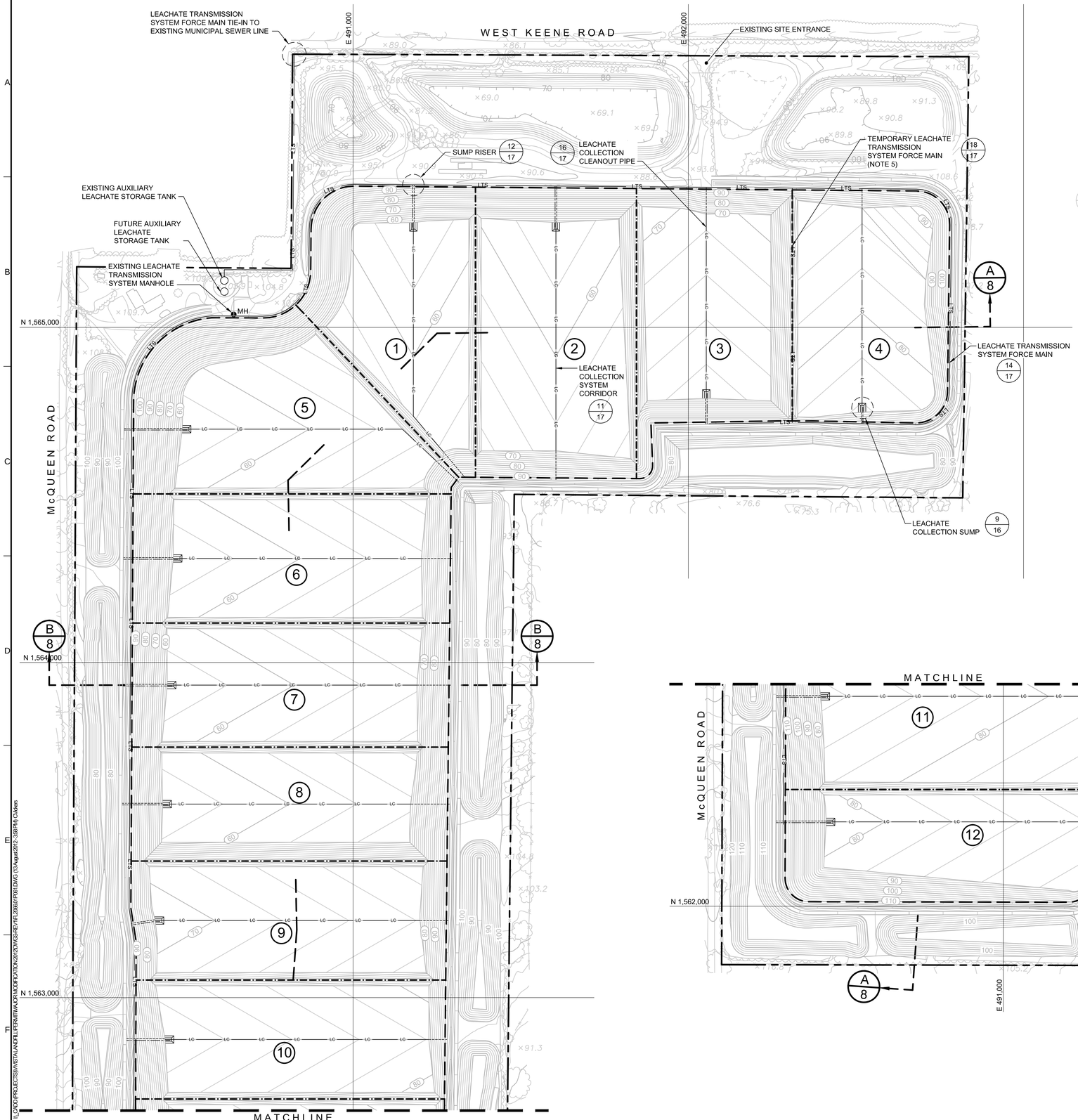


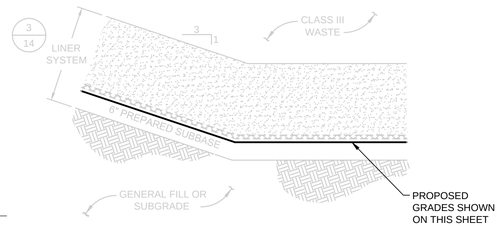


## LINER SYSTEM KEY DETAIL

SCALE: NTS

XREF: FL1229.02X062

NORTH

150 75 0 150

SCALE IN FEET

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- LIMIT OF WASTE
- INTERCELL BOUNDARY
- 80 — EXISTING GROUND CONTOUR (NOTE 1 AND 2)
- TREE LINE
- FENCE
- 86.3 — SPOT ELEVATION
- 3 — CELL NUMBER
- 80 — TOP OF PREPARED SUBBASE
- LC — LEACHATE COLLECTION PIPE
- LEACHATE RISER PIPE
- LEACHATE COLLECTION CLEANOUT RISER PIPE
- LTS — LEACHATE TRANSMISSION SYSTEM FORCE MAIN
- MH — LEACHATE TRANSMISSION SYSTEM MANHOLE

MAPPING NOTES:

1. CONTOURS - NINETY (90) PERCENT OF THE ELEVATIONS DETERMINED FROM THE SOLID LINE CONTOURS OF THIS TOPOGRAPHIC MAP HAVE AN ACCURACY WITH RESPECT TO TRUE ELEVATION OF ONE-HALF (1/2) CONTOUR INTERVAL OR BETTER AND THE REMAINING TEN (10) PERCENT OF SUCH ELEVATIONS ARE NOT IN ERROR BY MORE THAN ONE CONTOUR INTERVAL IN DENSELY WOODED AREAS WHERE HEAVY BRUSH OR TREE COVER FULLY OBSCURES THE GROUND AND THE CONTOURS ARE SHOWN AS DASHED LINES, THEY HAVE BEEN PLOTTED AS ACCURATELY AS POSSIBLE FROM THE STEREOSCOPIC MODEL, WHILE MAKING FULL USE OF SPOT ELEVATIONS OBTAINED DURING GROUND CONTROL SURVEYS AND ALL SPOT ELEVATIONS MEASURED PHOTOGRAMMETRICALLY IN PLACES WHERE THE GROUND IS VISIBLE.
2. THE TOPOGRAPHIC MAP WAS COMPILED BY PICKETT AND ASSOCIATES USING PHOTOGRAMMETRIC METHODS. CONTOURS PORTRAYED AS DASHED OR BROKEN LINES REPRESENT AREAS OF DENSE VEGETATION AND SHOULD BE CONSIDERED APPROXIMATE. THIS MAP HAS NOT BEEN FIELD VERIFIED. PRIOR TO USE AS A BASIS FOR DESIGN / CONSTRUCTION, IT SHOULD BE FIELD VERIFIED.
3. DATE OF PHOTOGRAPHY: 1 JANUARY 2012
4. GRID COORDINATES ARE BASED ON FLORIDA EAST STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983 (NAD 83). ELEVATIONS ARE BASED IN NATIONAL GEODETIC VERTICAL DATUM 1929 (NGVD 29).
5. THE TEMPORARY LEACHATE TRANSMISSION SYSTEM FORCE MAIN SHALL BE DECOMMISSIONED AFTER CONSTRUCTION OF THE LINER SYSTEM AND PRIOR TO PLACING WASTE IN CELL 4, AT WHICH TIME THE FINAL LEACHATE TRANSMISSION SYSTEM FORCE MAIN WILL BE INSTALLED. DECOMMISSIONING ACTIVITIES SHALL PROCEED AS FOLLOWS: (I) TURN OFF THE CELL 3 SUMP PUMP (II) CUT THE TEMPORARY LEACHATE TRANSMISSION SYSTEM FORCE MAIN A MINIMUM OF 10 FEET FROM THE CREST OF THE NORTH AND SOUTH PERIMETER BERMS SUCH THAT ANY LEACHATE WITHIN THE TRANSMISSION SYSTEM IS ALLOWED TO DRAIN INTO CELL 3; (III) DISPOSE OF THE TEMPORARY LEACHATE TRANSMISSION FORCE MAIN IN CELL 3; (IV) REPLACE THE CONNECTION BETWEEN THE FINAL AND TEMPORARY LEACHATE TRANSMISSION SYSTEMS WITH A STRAIGHT FLANGED CONNECTOR JOINING THE LEACHATE TRANSMISSION SYSTEM FROM CELL 3 TO CELL 4 AND DISPOSE OF THE NORTH AND SOUTH TEMPORARY FORCE MAIN SECTIONS IN CELL 3; AND (V) TURN ON THE CELL 3 SUMP PUMP.

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APOPKA, FLORIDA 32703
PH: 407.886.2920

TITLE: LEACHATE COLLECTION SYSTEM PLAN OPTIONS 1 AND 2

PROJECT: PERMIT APPLICATION DRAWINGS

SITE: VISTA CLASS III LANDFILL
APOPKA, FLORIDA

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14 August 2012
DATE

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| APPROVED BY: | VMD | | |

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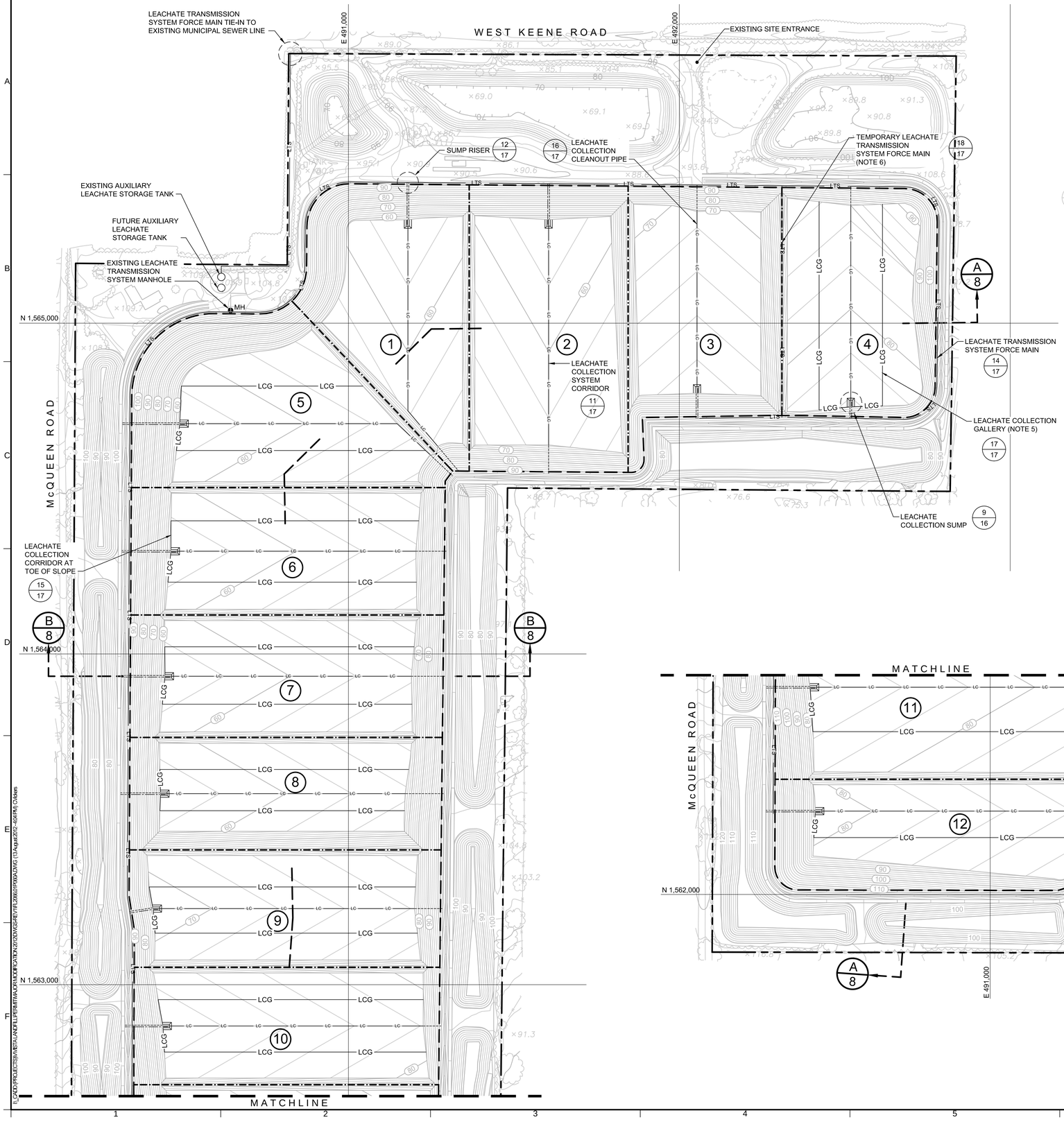


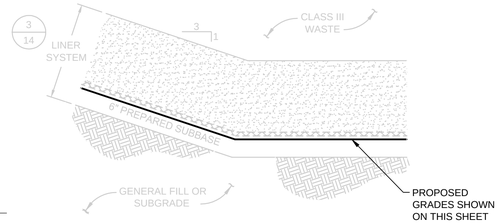


## LINER SYSTEM KEY DETAIL

SCALE: NTS

XREF: FL1229.02X062

NORTH

150 75 0 150

SCALE IN FEET

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- LIMIT OF WASTE
- INTERCELL BOUNDARY
- 80 — EXISTING GROUND CONTOUR (NOTE 1 AND 2)
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- FENCE
- 86.3 — SPOT ELEVATION
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- LCG — LEACHATE COLLECTION GALLERY (NOTE 5)

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TITLE: LEACHATE COLLECTION SYSTEM PLAN OPTION 3

PROJECT: PERMIT APPLICATION DRAWINGS

SITE: VISTA CLASS III LANDFILL
APOPKA, FLORIDA

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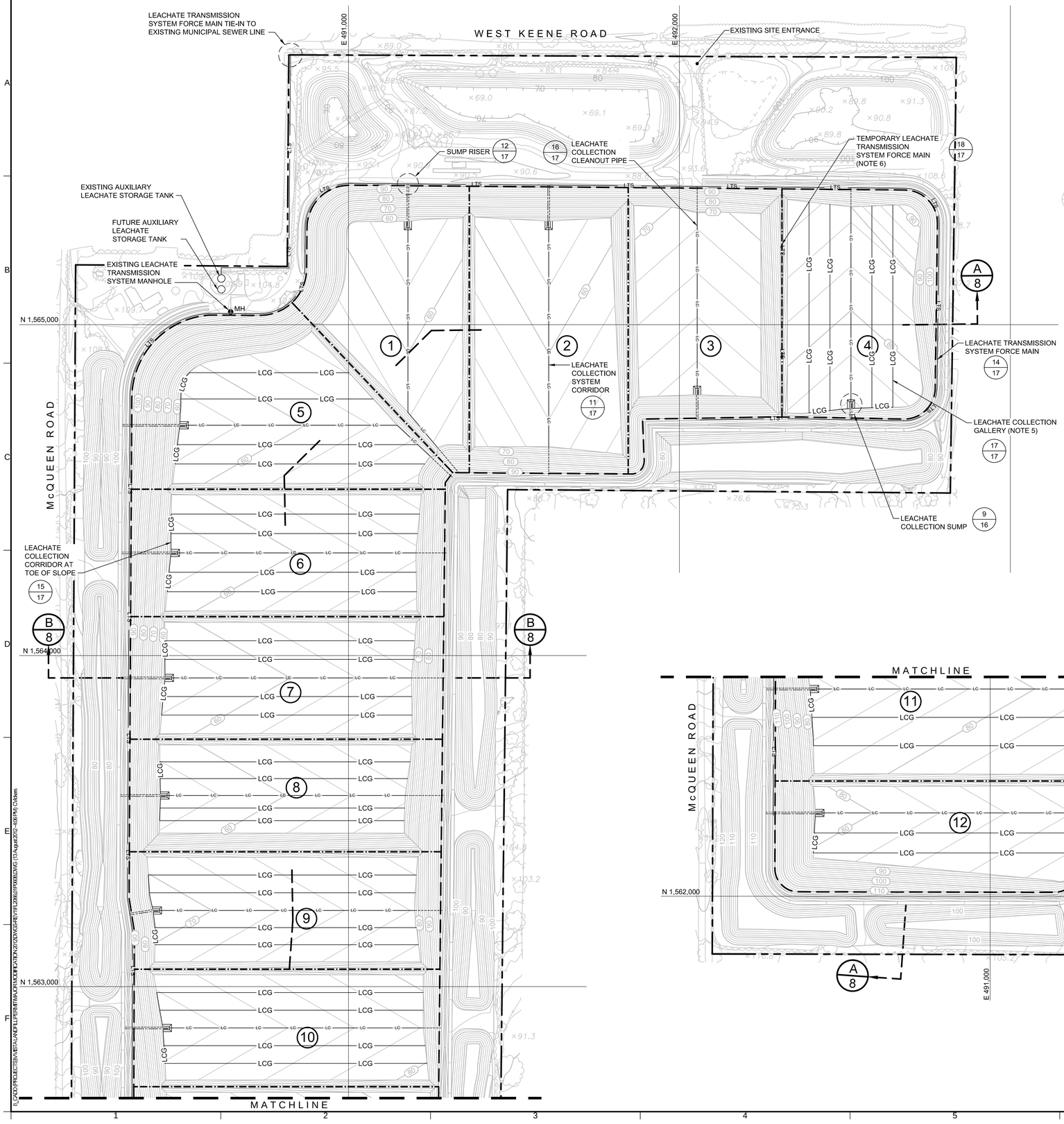


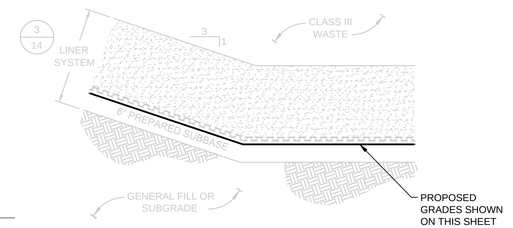


## LINER SYSTEM KEY DETAIL

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XREF: FL1229.02X062

NORTH

150 75 0 150

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Geosyntec consultants
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AUTHORIZATION NUMBER 4321

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APOPKA, FLORIDA 32703
PH: 407.886.2920


TITLE: LEACHATE COLLECTION SYSTEM PLAN OPTION 4

PROJECT: PERMIT APPLICATION DRAWINGS

SITE: VISTA CLASS III LANDFILL APOPKA, FLORIDA

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14 August 2012

DATE

VICTOR DAMASCENO - LICENSE NO. 72966

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| CHECKED BY: | VMD | FILE: | FL2066.01P060B |
| REVIEWED BY: | KBT | DRAWING NO.: | 6B OF 23 |
| APPROVED BY: | VMD | | |

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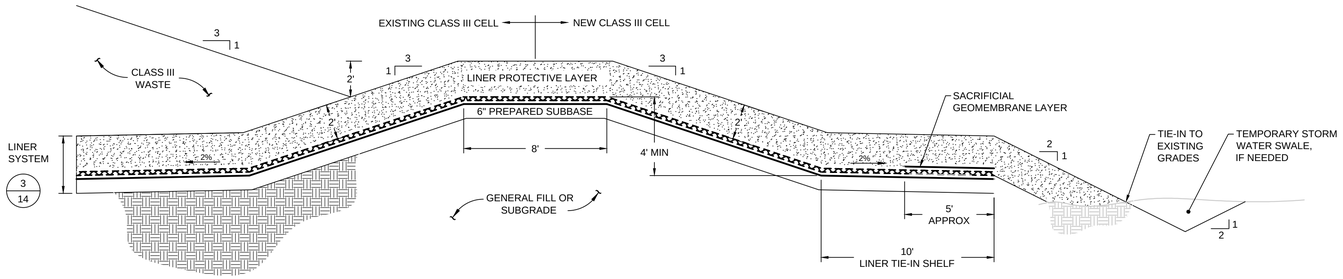
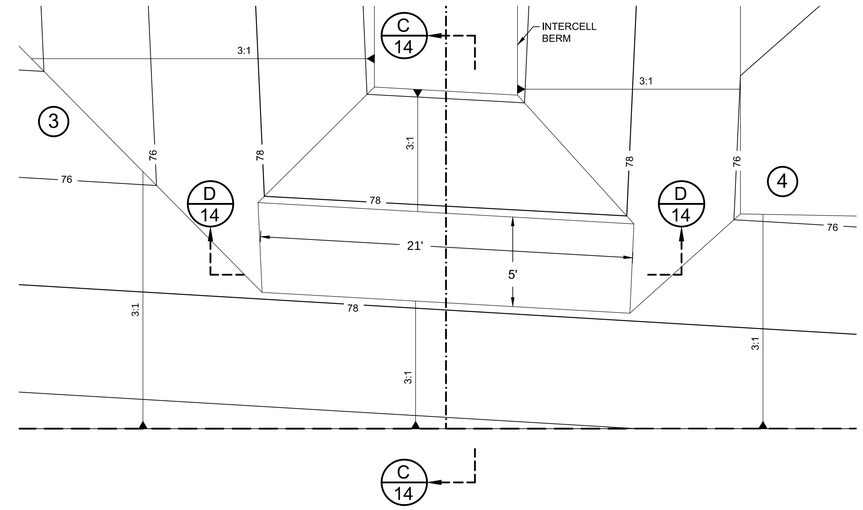
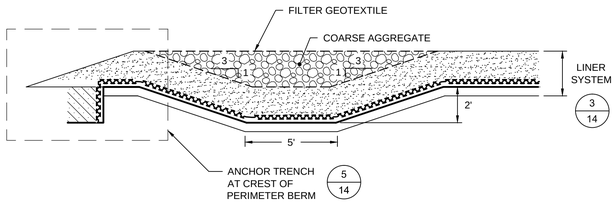


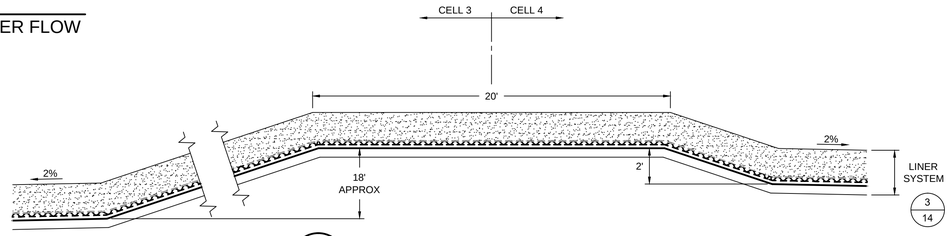

1/5 DETAIL (TYPICAL)
LINER SYTEM AT INTERCELL BERM
SCALE: 1" = 4'
XREF: FL2066.01X005



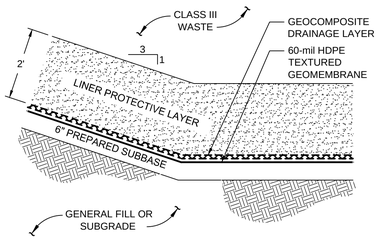

2/5 PLAN DETAIL
INTERCELL BERM OVER FLOW
SCALE: 1" = 4'



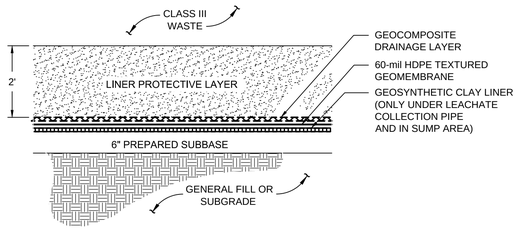

C/14 SECTION
INTERCELL BERM OVER FLOW
SCALE: 1" = 4'
XREF: FL2066.01X0043



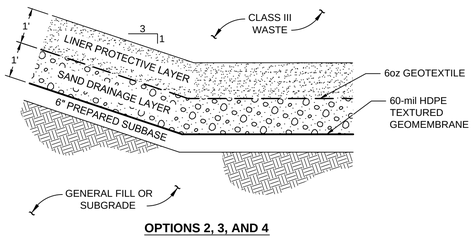

D/14 SECTION
INTERCELL BERM OVER FLOW
SCALE: 1" = 4'
XREF: FL2066.01X0044



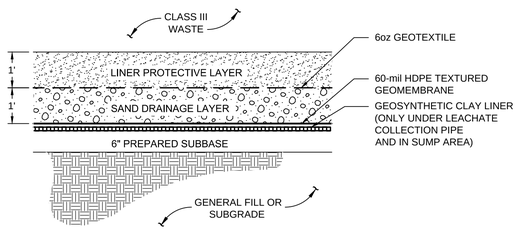

**OPTION 1**




**OPTION 1**



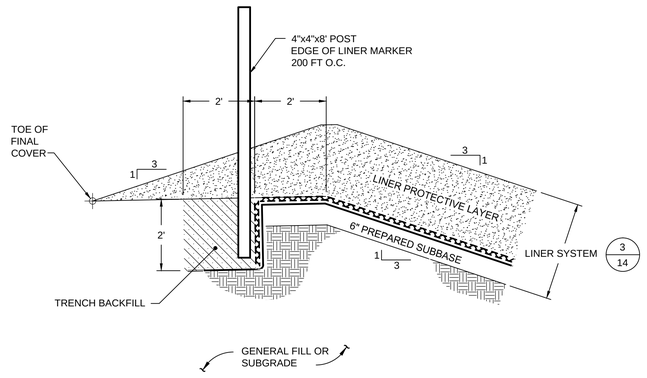

**OPTIONS 2, 3, AND 4**




**OPTIONS 2, 3, AND 4**

3/5 DETAIL (TYPICAL)
LINER SYSTEM
SCALE: 1" = 2'
XREF: FL2066.01X037

4/5 DETAIL (TYPICAL)
LINER SYSTEM AT LEACHATE COLLECTION PIPES & SUMP
SCALE: 1" = 2'
XREF: FL2066.01X006




5/5 DETAIL (TYPICAL)
ANCHOR TRENCH AT CREST OF PERIMETER BERM
SCALE: 1" = 2'
XREF: FL2066.01X007

NOTES:

1. DETAILS ARE DRAWN TO SCALE AS NOTED EXCEPT FOR THE GEOSYNTHETICS WHICH ARE SHOWN AT AN EXAGGERATED SCALE FOR CLARITY.

| REV | DATE | DESCRIPTION | DRN | APP |
|---|---|---|---|---|
| 0 | AUG 2012 | REVISED PER FDEP COMMENTS, RAI NO.1 | JWO & CMV | VMD |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AUTHORIZATION NUMBER 4321

WASTE MANAGEMENT
242 WEST KEENE ROAD
APOPKA, FLORIDA 32703
PH: 407.886.2920


TITLE: LINER SYSTEM DETAILS

PROJECT: PERMIT APPLICATION DRAWINGS

SITE: VISTA CLASS III LANDFILL
APOPKA, FLORIDA

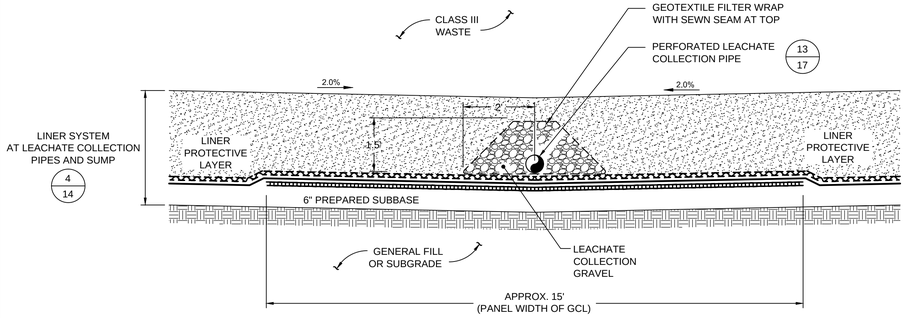
THIS DRAWING IS ISSUED FOR PERMITTING ONLY AND MAY NOT BE USED FOR CONSTRUCTION

SIGNATURE
14 August 2012
DATE
VICTOR DAMASCENO - LICENSE NO. 72966

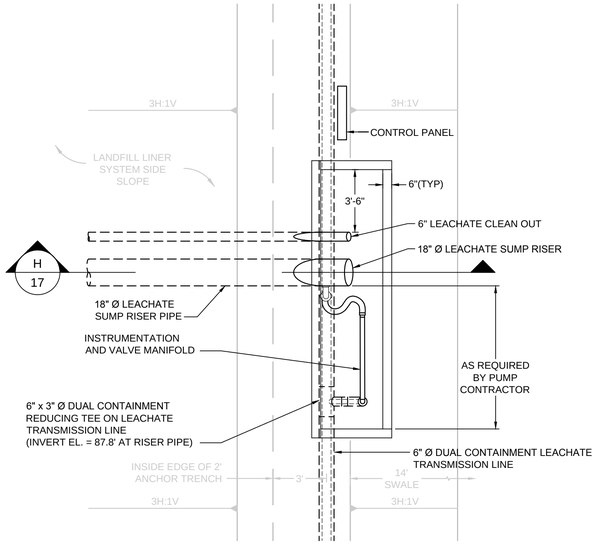
VICTOR M. DAMASCENO LICENSE No 72966 STATE OF FLORIDA PROFESSIONAL ENGINEER

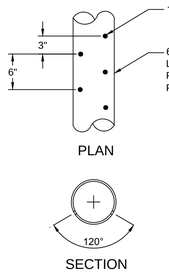
| | | | |
|---|---|---|---|
| DESIGN BY: | VMD & JWO | DATE: | AUGUST 2012 |
| DRAWN BY: | JWO & CMV | PROJECT NO.: | FL2066 |
| CHECKED BY: | VMD | FILE: | FL2066.01P141 |
| REVIEWED BY: | KBT | DRAWING NO.: | 14 OF 23 |
| APPROVED BY: | VMD | | |

PERMIT DRAWING

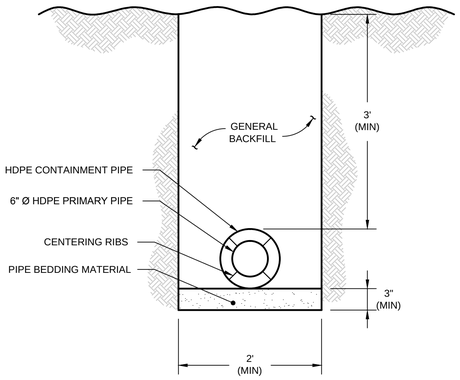



**11/6 DETAIL**
## LEACHATE COLLECTION SYSTEM CORRIDOR
SCALE: 1" = 2'
XREF: FL2066.01X012

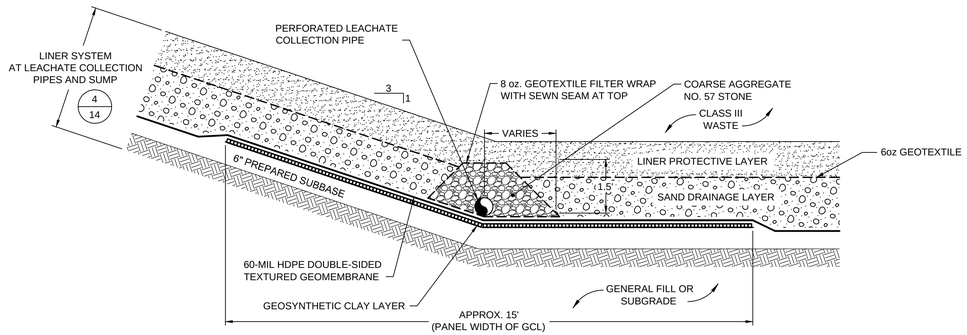



**13/16 DETAIL (TYPICAL)**
## PERFORATED LEACHATE COLLECTION PIPE
SCALE: NTS
XREF: FL2066.01X010

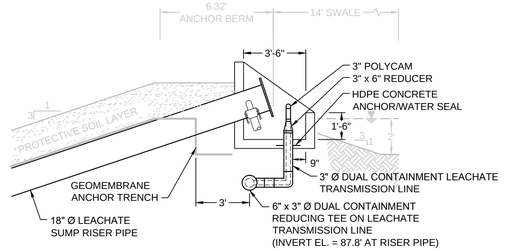


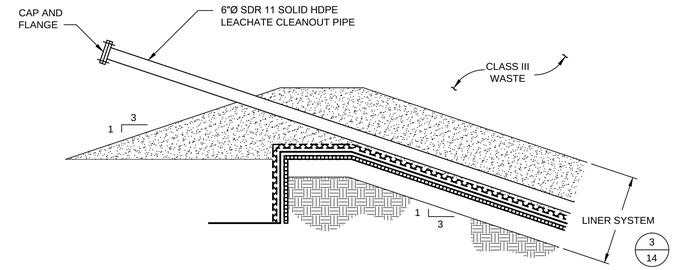

**14/6 DETAIL**
## LEACHATE TRANSMISSION SYSTEM FORCE MAIN
SCALE: 1" = 1'
XREF: FL2066.01X032



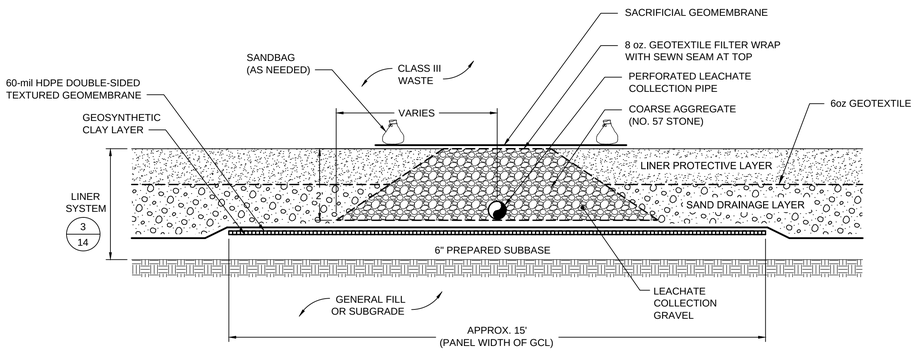

**15/6 DETAIL (CONCEPTUAL - OPTIONS 3 AND 4)**
## LEACHATE COLLECTION CORRIDOR AT TOE OF SLOPE (NOTES 2 AND 4)
SCALE: 1" = 2'
XREF: FL2066.01X046

**12/6 PLAN VIEW**
## SUMP RISER
SCALE: 1" = 4'
XREF: FL2066.01X051



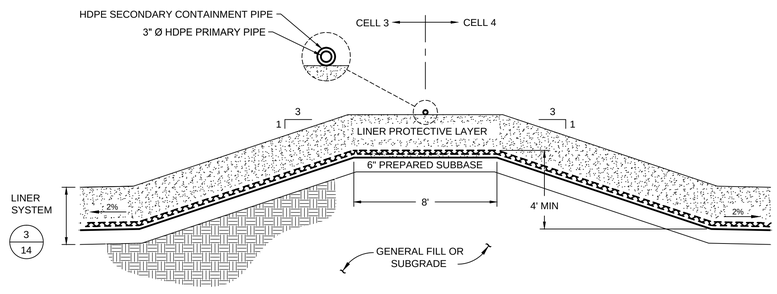




**16/6 DETAIL (TYPICAL)**
## LEACHATE COLLECTION CLEANOUT PIPE
SCALE: 1" = 2'
XREF: FL2066.01X013




**17/6 DETAIL (CONCEPTUAL - OPTIONS 3 AND 4)**
## LEACHATE COLLECTION GALLERY (NOTES 3 AND 4)
SCALE: 1" = 2'
XREF: FL2066.01X057

**H/17 SECTION**
## SUMP RISER
SCALE: 1" = 4'
XREF: FL2066.01X052




**18/6 DETAIL (TYPICAL)**
## TEMPORARY LEACHATE TRANSMISSION SYSTEM FORCE MAIN
SCALE: 1" = 4'
XREF: FL2066.01X056

NOTES:

1. DETAILS ARE DRAWN TO SCALE AS NOTED EXCEPT FOR THE GEOSYNTHETICS WHICH ARE SHOWN AT AN EXAGGERATED SCALE FOR CLARITY.
2. LEACHATE COLLECTION CORRIDOR AT TOE OF SLOPE SHALL BE USED ONLY WHEN LEACHATE COLLECTION GALLERY (I.E. BURRITO DRAINS) ARE USED.
3. LEACHATE COLLECTION GALLERY DIMENSIONS ARE CONCEPTUAL AND SHALL BE DETAILED IN THE CONSTRUCTION DRAWINGS.
4. THE DESIGN OF THE LEACHATE COLLECTION CORRIDOR SHOWN HEREIN IS CONCEPTUAL. DIMENSIONS FOR THE LEACHATE COLLECTION CORRIDOR SHALL BE SUBMITTED FOR APPROVAL PRIOR TO IMPLEMENTING OPTIONS 3 OR 4.

| REV | DATE | DESCRIPTION | DRN | APP |
|---|---|---|---|---|
| 0 | AUG 2012 | REVISED PER FDEP COMMENTS, RAI NO.1 | JWO & CMV | VMD |

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AUTHORIZATION NUMBER 4321

WASTE MANAGEMENT
242 WEST KEENE ROAD
APOPKA, FLORIDA 32703
PH: 407.886.2920

TITLE: LEACHATE COLLECTION SYSTEM DETAILS

PROJECT: PERMIT APPLICATION DRAWINGS

SITE: VISTA CLASS III LANDFILL
APOPKA, FLORIDA

THIS DRAWING IS ISSUED FOR PERMITTING ONLY AND MAY NOT BE USED FOR CONSTRUCTION

VICTOR M. DAMASCENO LICENSE No 72966 STATE OF FLORIDA PROFESSIONAL ENGINEER

SIGNATURE
14 August 2012
DATE
VICTOR DAMASCENO - LICENSE NO. 72966

| | | | |
|---|---|---|---|
| DESIGN BY: | VMD & JWO | DATE: | AUGUST 2012 |
| DRAWN BY: | JWO & CMV | PROJECT NO.: | FL2066 |
| CHECKED BY: | VMD | FILE: | FL2066.01P171 |
| REVIEWED BY: | KBT | DRAWING NO.: | |
| APPROVED BY: | VMD | | 17 OF 23 |

PERMIT DRAWING

# ATTACHMENT C

CQA Forms and Logs

# APPENDIX A

# CQA FORMS AND LOG

Geosyntec
consultants

## DAILY FIELD REPORT

PROJECT: _____

LOCATION: _____ PROJECT NO.: _____ TASK NO.: _____

DESCRIPTION: _____ Date: _____

COPY TO: _____ PER: _____

Geosyntec
consultants

## WEEKLY FIELD REPORT

PROJECT: _____

LOCATION: _____ PROJECT NO.: _____ TASK NO.: _____

DESCRIPTION: _____ WEEK ENDING: _____

COPY TO: _____ PER: _____

Geosyntec consultants

**TRANSMITTAL LETTER**

PROJECT: _____

LOCATION: _____ PROJECT NO.: _____ TASK NO.: _____

DESCRIPTION: _____ DATE: _____ day _____ month _____ year

ATTENTION: _____

ADDRESS: _____

| | | | |
|---|---|---|---|
| ☐ FOR APPROVAL | ☐ DRAWINGS | ☐ TEST RESULTS | ☐ _____ |
| ☐ FOR COMMENTS | ☐ PHOTOS | ☐ DOCUMENTS | ☐ _____ |
| ☐ AS REQUESTED | ☐ LOGS | ☐ CONTRACTS | ☐ _____ |

| NO. OF COPIES | DRAWING NUMBER | DESCRIPTION | DATE |
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REMARKS

COPY TO: _____ FROM: _____

Geosyntec consultants

**CHANGE ORDER (CO)** **REFERENCE NO.:** _____

PROJECT: _____

LOCATION: _____ PROJECT NO.: _____ TASK NO.: _____

DESCRIPTION: _____ DATE: _____ day _____ month _____ year

FINANCIAL IMPACT:

☐ NOT APPLICABLE ☐ COST $ _____ ☐ SAVINGS $ _____

SCHEDULE IMPACT:

☐ NOT APPLICABLE ☐ DELAY EST. DAYS _____ ☐ SAVINGS EST. DAYS _____

REFERENCES: _____

SPECIFICATION SECTION: _____

CQA PLAN SECTION: _____

MATERIAL TYPE: _____

ITEM BEING CHANGED OR ADDED: _____

REASON FOR CHANGE: _____

EFFECTIVE DATE OF CHANGE: _____ day _____ month _____ year

FINANCIAL AND SCHEDULE CONSIDERATIONS: _____

DECISION: ☐ APPROVED ☐ DENIED

_____ _____

OWNERS REPRESENTATIVE DATE CQA REPRESENTATIVE DATE

_____

PROJECT MANAGER DATE

COPY TO: _____

# CERTIFICATE OF ACCEPTANCE
# SUBGRADE SURFACE

| INSTALLER | PROJECT |
|---|---|
| NAME: _____ | NAME: _____ |
| ADDRESS: _____ | _____ |
| _____ | LOCATION: _____ |
| _____ | _____ |
| INSTALLER AUTHORIZED REPRESENTATIVE: _____ | _____ |
| | _____ |
| | OWNER: _____ |

I, The undersigned, duly authorized representative of _____ do hereby accept the surface on which the geosynthetics will be installed and shall be responsible for maintaining the suitability of this surface, in accordance with the project specifications. (i.e., The contractor shall not install the geosynthetics until the subgrade surface is acceptable. Installation of the geosynthetics will be considered acceptance of the subgrade.)

PRIMARY: ☐ SECONDARY: ☐ OTHER: _____

| DATE | PANEL NOS. | SIGNATURE |
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Geosyntec consultants

**DESTRUCTIVE TEST LOG**

PROJECT: _____

LOCATION: _____ PROJECT NO.: _____ TASK NO.: _____

DESCRIPTION: _____ YEAR: _____

INSTALLER: _____ ☐ PRIMARY ☐ SECONDARY ☐ OTHER _____

SAMPLE DISTRIBUTION: ☐ INSTALLER ☐ LABORATORY ☐ ARCHIVE ☐ OTHER _____

MINIMUM TEST REQUIREMENTS: FUSION: PEEL: _____ SHEAR: _____ ☐ ppi

EXTRUSION: PEEL: _____ SHEAR: _____ ☐ psi

| SAMPLE DATA | | | | | | | FIELD DATA | | | | | | | LABORATORY DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D.S. NO. | TRACK[1] | | LOCATION | | MACHINE NO. | OPER. ID | AVG. PEEL | | AVG. SHEAR | PASS | FAIL | SAMPLE DATE | QA ID | RESULT DATE | AVG. PEEL | | AVG. SHEAR | PASS | FAIL | RE-TEST | QA ID |
| | SINGLE | DOUBLE | SEAM | DIST. | | | INSIDE | OUTSIDE | | | | | | | INSIDE | OUTSIDE | | | | | |
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NOTES: (1) TRACK TYPES: E = EXTRUSION F = FUSION

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**MATERIAL INVENTORY**

PROJECT: _____

LOCATION: _____ PROJECT NO.: _____ TASK NO.: _____

DESCRIPTION: _____ YEAR: _____

MATERIAL TYPE: _____ MANUFACTURER: _____

| INVENTORY | | | Q.A. CONFORMANCE | | | | | Q.C. DOCUMENTS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | BATCH / ROLL NUMBER | QA ID | DATE SAMPLED | SAMPLE NO. | PASS | FAIL | QA ID | DATE REC'VED | DATE CHECKED | PASS | FAIL | QA ID |
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AVERAGE ROLL WIDTH: _____ (ft) AVERAGE ROLL LENGTH _____ (ft)

NUMBER OF ROLLS ABOVE: _____ CUMULATIVE NUMBER OF ROLLS: _____

CUMULATIVE AREA: _____ ($ft^2$) NO. OF CONFORMANCE TESTS (page/total): _____/_____

COMMENTS: _____

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**PANEL LAYOUT DETAIL**

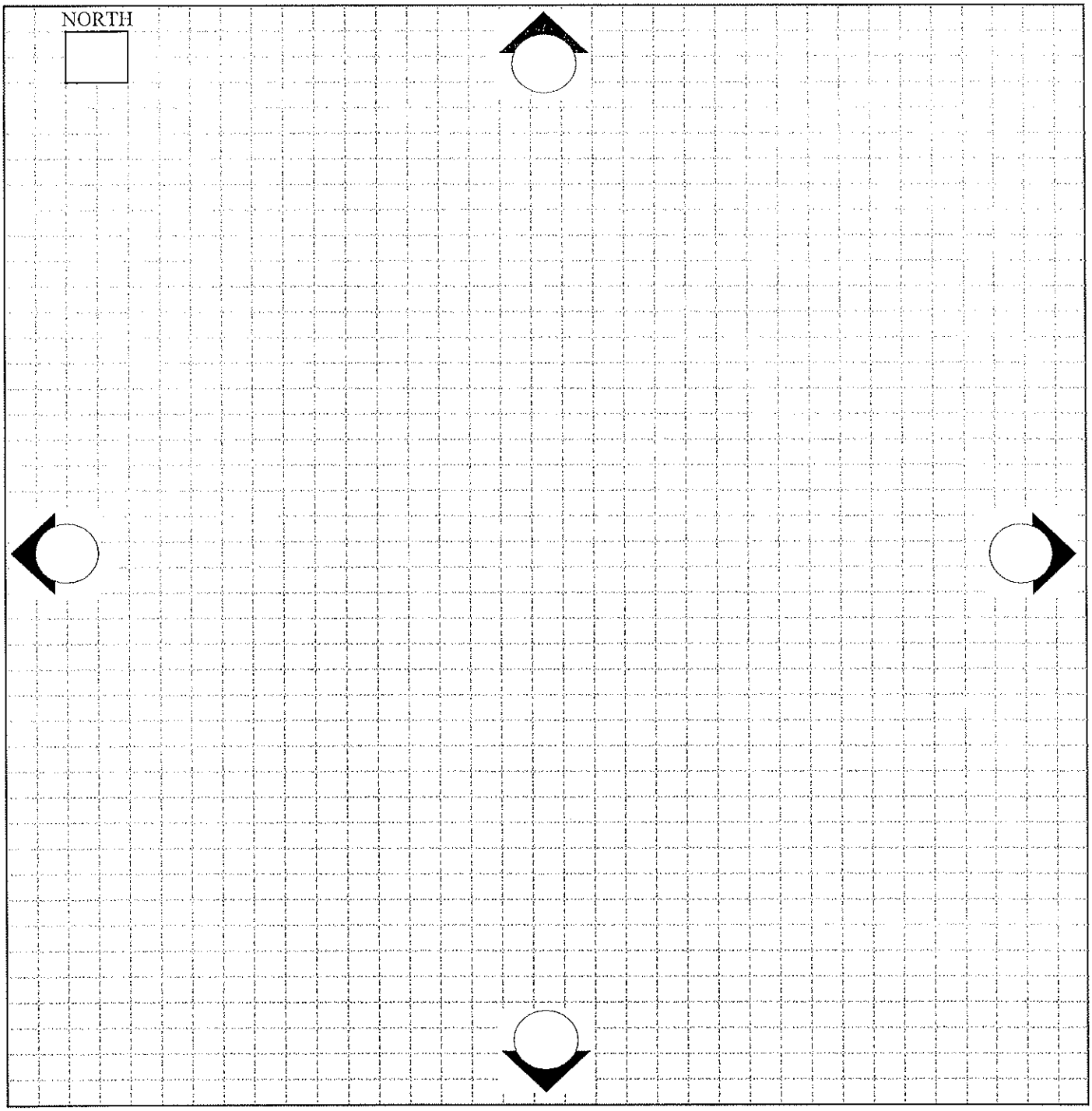
PROJECT: _____

LOCATION: _____ PROJECT NO.: _____ TASK NO.: _____

DESCRIPTION: _____ YEAR: _____

INSTALLER: _____ PRODUCT TYPE: _____

☐ PRIMARY ☐ SECONDARY ☐ OTHER _____ QA ID: _____



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**PANEL PLACEMENT LOG**

PROJECT: _____

LOCATION: _____ PROJECT NO.: _____ TASK NO.: _____

DESCRIPTION: _____ YEAR: _____

PRIMARY ☐ SECONDARY ☐ OTHER: _____ PRODUCT TYPE: _____

| PANEL NO. | BATCH / ROLL NO. | DATE (day/mo) | TIME | PLACEMENT LOCATION COMMENTS | WIDTH | LENGTH | QA ID |
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APPROXIMATE AREA: THIS PAGE: _____ $FT^2$ ACCUMULATED: _____ $FT^2$

NOTES: _____

Geosyntec consultants

**PRODUCTION SEAM SUMMARY LOG**

PROJECT: _____

LOCATION: _____ PROJECT NO.: _____ TASK NO.: _____

DESCRIPTION: _____ YEAR: _____

PRIMARY: ☐ SECONDARY: ☐ OTHER: _____

NDT SPECIFICATIONS: AIR TEST: _____ psi ± _____ psi for _____ minutes VACUUM TEST: _____ psi for minimum _____ seconds

| PRODUCTION SEAM | | | | LOCATION | | | | | NONDESTRUCTIVE TEST | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE (day/mo) | TIME | MACHINE NO. | OPER. ID | SEAM NO. | BEGIN | END | ACTUAL SEAM LENGTH (ft) | QA ID | LOCATION (ft) | TEST DETAILS | OPER. ID | PASS | FAIL | ACTION | QA ID |
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TOTALS: FUSION: _____ (ft) CUMULATED FUSION: _____ (ft)

EXTRUSION: _____ (ft) CUMULATED EXTRUSION: _____ (ft)

COMMENTS: _____

Geosyntec consultants

**REPAIR SUMMARY LOG**

PROJECT: _____

LOCATION: _____ PROJECT NO.: _____ TASK NO.: _____

DESCRIPTION: _____ YEAR: _____

INSTALLER: _____ ☐ PRIMARY ☐ SECONDARY ☐ OTHER _____

| REPAIR NO./ CODE[1] | REP. TYPE[3] | DATE | LOCATION[2] | | | | SIZE[2] | | | WELDER ID | | QA ID | NON-DESTRUCTIVE TESTING | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SEAM | PANEL | DIST. | OFFSET | LENGTH | WIDTH | DIA. | MACH. NO. | OP. ID | | DATE | OP. ID | PASS | FAIL | ACTION | QA ID |
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NOTES: (1) REPAIR NUMBERS SHALL BE NUMBERED SEQUENTIALLY, REPAIR CODES: P = PATCH C = CAP S = ANCHOR TRENCH EXTENSION (SKIRT) DS = DESTRUCTIVE SAMPLE G = GRIND & WELD T = TOPPING ALONG FUSION SEAM R = RECONSTRUCTION (2) LOCATION & SIZE SHALL BE INDICATED IN FEET (3) REAIR TYPES: E = EXTRUSION F = FUSION

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consultants

**TRIAL SEAM LOG - EXTRUSION**

PROJECT: ____________________

LOCATION: ____________________ PROJECT NO.: ________ TASK NO.: _____

DESCRIPTION: ____________________ YEAR: ________

SPECIFICATIONS: PEEL: ________ SHEAR: ________ ☐ ppi ☐ psi

TENSIOMETER DESCRIPTION: ____________________ SERIAL NO.: ____________

| TRIAL SEAM NO. | DATE (day/mo) | TIME | MACHINE NO. | OPER. ID | MAT. DESCR. (1) | PREHEAT TEMP. (°C / °F) | BARREL TEMP. (°C / °F) | PEEL | SHEAR | PASS | FAIL | RETEST NO. | QA ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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NOTE: (1) MATERIAL DESCRIPTION REFERS TO EITHER SMOOTH/SMOOTH (S/S); SMOOTH/TEXTURED (S/T); OR TEXTURED/TEXTURED (T/T).

REVIEWED BY:_______ SHEET_____OF_____

Geosyntec consultants

**TRIAL SEAM LOG - FUSION**

PROJECT: _____

LOCATION: _____ PROJECT NO.: _____ TASK NO.: _____

DESCRIPTION: _____ YEAR: _____

SPECIFICATIONS: PEEL: _____ SHEAR: _____ ☐ ppi ☐ psi

TENSIOMETER DESCRIPTION: _____ SERIAL NO.: _____

| TRIAL SEAM NO. | DATE (day/mo) | TIME | MACHINE NO. | OPER. ID | MAT. DESCR. (1) | WEDGE TEMP. (°C / °F) | MACHINE SPEED SETTING | PEEL | SHEAR | PASS | FAIL | RETEST NO. | QA ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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NOTE: (1) MATERIAL DESCRIPTION REFERS TO EITHER SMOOTH/SMOOTH (S/S); SMOOTH/TEXTURED (S/T); OR TEXTURED/TEXTURED (T/T).

Geosyntec consultants

WASTE MANAGEMENT

**DETERMINATION OF DENSITY (DRIVE CYLINDER)** (ASTM D 2937)

PROJECT: _____

LOCATION: _____ PROJECT NO.: _____ TASK NO.: _____

DESCRIPTION: _____ DATE: _____ day _____ month _____ year

SOURCE: _____

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: FILL ☐ SUBGRADE ☐ SUBBASE ☐ CLAY ☐ OTHER: _____

% COMPACTION: _____ MOISTURE CONTENT RANGE: _____

TEST LOCATION: _____ TEST NO. _____

FIELD TEST DATA -- ASTM D2937 QA ID: _____

CYL HT 1 (IN): _____ CYL HT 2 (IN): _____ CYL DIA 1 (IN): _____ CYL DIA 2 (IN): _____

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | CYLINDER NO.: VOLUME [1] | (cf) | #DIV/0! | E | WET UNIT WEIGHT = D/A | (lbs) | #DIV/0! |
| B | WEIGHT OF SAMPLE & CYLINDER | (lbs) | | F | DRY UNIT WEIGHT = E/(1 + (T/100) | (pcf) | #DIV/0! |
| C | WEIGHT OF CYLINDER | (lbs) | | G | PERCENT COMPACTION = F/L | (%) | #DIV/0! |
| D | WEIGHT OF WET SAMPLE = B - C | (lbs) | 0.00 | H | PASS/FAIL | | |

NOTE 1. CYLINDER VOLUME IS OBTAINED BY MEASURING THE HEIGHT AND DIAMETER, OF FOUR EQUALLY SPACED POINTS, TO AN ACCURACY OF 0.01-IN., AND CALCULATING THE VOLUME USING AVERAGE HEIGHT AND DIAMETER

FIELD MOISTURE CONTENT -- ASTM D2216 QA ID: _____

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| O | WT. OF TARE NO. | (gm) | | R | WT. OF WATER = P - Q | (lbs) | 0.0 |
| P | WT. OF WET SOIL & TARE | (gm) | | S | WT OF DRY SOIL = Q - O | (pcf) | 0.0 |
| Q | WT. OF DRY SOIL & TARE | (gm) | | T | MOISTURE CONTENT = (R/S)X100 | | #DIV/0! |

PROCTOR TEST DATA [L] MAXIMUM DRY UNIT WT. (pcf) _____ (M) OPT. MOIST. CONTENT (%) _____

COMPARISION WITH NUCLEAR GAUGE - ASTM D 6938 QA ID: _____

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| U | DELTA MOISTURE CONTENT = T - X | | #DIV/0! | X | FDT MOISTURE CONTENT | (%) | |
| V | FDT WET UNIT WT. | (pcf) | | Y | FDT DRY UNIT WT. | (pcf) | |
| W | DELTA DRY UNIT WT. = F - Y | | #DIV/0! | | | | |

COMMENTS

Geosyntec consultants

**FIELD NUCLEAR MOISTURE/DENSITY TEST LOG** **(ASTM D 6938)**

PROJECT: _____

LOCATION: _____ PROJECT NO.: _____ TASK NO.: _____

DESCRIPTION: _____ DATE: _____ day _____ month _____ year

SPECIFICATION REQUIREMENTS: MATERIAL SOURCE: _____

MATERIAL TYPE: ☐ FILL ☐ SUBGRADE ☐ SUBBASE ☐ CLAY ☐ OTHER: _____ MAX. LIFT THICKNESS: _____ (in.)

MINIMUM COMPACTION: _____ (%) ☐ ASTM D 698 ☐ ASTM D 1557 MOISTURE CONTENT RANGE: - _____ to + _____ of OPT.

NUCLEAR GAUGE TYPE: _____ GAUGE SERIAL NO.: _____ CORRECTION FACTOR: Y= _____

| TEST NO. | TEST LOCATION | PROBE DEPTH / LIFT NO. | LABORATORY RESULTS | | | FIELD TEST RESULTS | | | | | | RE-TEST NO. | RE-TEST | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SAMPLE NO. | OMC (%) | MAX. DRY UNIT WT. (pcf) | FIELD MOISTURE CONTENT[1] (%) | WET UNIT WT (pcf) | DRY UNIT WT (pcf) | PERCENT COMPACT. (%) | PASS | FAIL | | PASS | FAIL |
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NOTES: (1) FIELD MOISTURE CONTENT = GAUGE READING/CORRECTED MOISTURE

COMMENTS: _____

CHECKED BY: _____

Geosyntec
consultants

**NUCLEAR GAUGE STANDARD COUNT LOG** **(ASTM D 6938)**

PROJECT: ______________________________

LOCATION: ______________________ PROJECT NO.: __________ TASK NO.: ______

DESCRIPTION: ______________________________ YEAR: ________

NUCLEAR GAUGE MODEL: ______________ SERIAL NO.: ______________

DATE ARRIVED ON-SITE: ______________ DATE DEPARTED SITE: ______________

DATE OF MOST RECENT LEAK TEST: ______________________________

| DATE (day/mo) | MOISTURE COUNT (≤ 2%) | DENSITY COUNT (≤ 1%) | PASS | FAIL | QA ID |
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| DATE (day/mo) | MOISTURE COUNT (≤ 2%) | DENSITY COUNT (≤ 1%) | PASS | FAIL | QA ID |
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**CONSTRUCTION QUANTITIES**

PROJECT: _____

LOCATION: _____ PROJECT NO.: _____ TASK NO.: _____

DESCRIPTION: _____ YEAR: _____

CELL QUANTITIES: CELL AREA: _____ $ft^2$ 0.0 acres

STRUCTURAL FILL VOLUME: _____ $yd^3$ NO. OF SF SOURCES: _____

CLAY LINER THICKNESS: _____ ft CLAY LINER VOLUME: 0 $yd^3$ NO. OF LIFTS: _____

NO. OF CL SOURCES: _____

PROTECTIVE COVER THICKNESS: _____ ft PROTECTIVE COVER VOLUME: 0 $yd^3$

NO. OF PC SOURCES: _____

TESTING QUANTITIES:

CLAY LINER / COMPACTED SOIL LAYER

| TEST DESCRIPTION | TEST METHOD ASTM | TEST FREQUENCY 1 per | UNIT | TESTS REQ. PER LIFT | TOTAL TESTS REQUIRED |
|---|---|---|---|---|---|
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PROTECTIVE COVER

| TEST DESCRIPTION | TEST METHOD ASTM | TEST FREQUENCY 1 per | UNIT | TOTAL TESTS REQUIRED |
|---|---|---|---|---|
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DRAINAGE AGGREGATE

| TEST DESCRIPTION | TEST METHOD ASTM | TEST FREQUENCY 1 per | UNIT | TOTAL TESTS REQUIRED |
|---|---|---|---|---|
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**FIELD SAND CONE DENSITY TEST** (ASTM D 1556)

PROJECT: _____

LOCATION: _____ PROJECT NO.: _____ TASK NO.: _____

DESCRIPTION: _____ DATE: _____ day _____ month _____ year

SPECIFICATION REQUIREMENTS:

MATERIAL TYPE: ☐ FILL ☐ SUBGRADE ☐ SUBBASE ☐ CLAY ☐ OTHER: _____

% COMPACTION: _____ MOISTURE CONTENT RANGE: - _____ to + _____ of OPT.

TEST LOCATION: _____ TEST NO.: _____

FIELD TEST DATA - ASTM D 1556 QA ID: _____

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | BULK UNIT WT. OF SAND[1] | (pcf) | | H | WT. OF WET SOIL & TARE FROM HOLE | (lbs) | |
| B | INITIAL WT. OF SAND & JAR | (lbs) | | I | TARE NUMBER | | |
| C | FINAL WT. OF SAND & JAR | (lbs) | | J | WT. OF TARE | (lbs) | |
| D | WT. OF SAND IN FUNNEL & HOLE (=B-C) | (lbs) | 0 | K | WT OF WET SOIL FROM HOLE (=H-J) | (lbs) | 0 |
| E | WT. OF SAND IN FUNNEL[2] | (lbs) | | L | WET UNIT WT. (=K/G) | (pcf) | #DIV/0! |
| F | WT. OF SAND IN HOLE (=D-E) | (lbs) | 0 | M | DRY UNIT WT. (=L/[1+(U/100)]) | (pcf) | #DIV/0! |
| G | VOLUME OF HOLE (=F/A) | (ft3) | #DIV/0! | N | PERCENT COMPACTION (=M/V) | (%) | #DIV/0! |

NOTES

(1) USE CALIBRATION FORM

(2) THE WEIGHT OF SAND IN FUNNEL (E) IS OBTAINED BY WEIGHING THE SAND, A MINIMUM OF THREE TIMES, IN THE APPARATUS BEFORE AND AFTER THE APPARATUS HAS BEEN TURNED OVER ON THE BASE PLATE ALONG A FLAT SURFACE WITH THE SAND BEING EXPENDED.

FIELD MOISTURE CONTENT - ASTM D 2216 QA ID: _____

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| O | TARE NUMBER | | | S | WT. OF WATER (=Q-R) | (g) | 0 |
| P | WT. OF TARE | (g) | | T | WT. OF DRY SOIL (=R-P) | (g) | 0 |
| Q | WT. OF WET SOIL & TARE | (g) | | U | MOISTURE CONTENT (=[S/T]x100) | (%) | #DIV/0! |
| R | WT. OF DRY SOIL & TARE | (g) | | | | | |

PROCTOR TEST DATA

MAXIMUM DRY UNIT WT. [V]: _____ (pcf) OPTIMUM MOISTURE CONTENT: _____ (%)

COMPARISON WITH NUCLEAR MOISTURE/DENSITY GAUGE - ASTM D 6938 QA ID: _____

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| W | FIELD DENSITY TEST (FDT) NUMBER | | | Z | FDT DRY UNIT WT. | (pcf) | |
| X | FDT WET UNIT WT. | (pcf) | | AA | DELTA DRY UNIT WT. (=M-Z) | | #DIV/0! |
| Y | FDT MOISTURE CONTENT | (%) | | BB | DELTA MOISTURE CONTENT (=U-Y) | | #DIV/0! |

COMMENTS

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consultants

**SOIL SAMPLE LOG**

PROJECT: _____

LOCATION: _____ PROJECT NO.: _____ TASK NO.: _____

DESCRIPTION: _____ YEAR: _____

| SITE SAMPLE NO. | LAB SAMPLE NO. | VISUAL DESCRIPTION | SOURCE (LOCATION/DEPTH) | MATERIAL TYPE | DATE SAMPLED (day/mo) | TEST METHODS | QA ID |
|---|---|---|---|---|---|---|---|
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NOTES: _____

CHECKED BY: _____

Geosyntec consultants

**DRIVE CYLINDER (DC) AND FIELD DENSITY TEST (FDT) COMPARISON**

PROJECT: _____ PROJECT NO.: _____ TASK NO.: _____

LOCATION: _____ DATE: _____ day _____ month _____ year

SOURCE: _____ TROXLER SERNO: _____ TROXLER ID: _____

| A Drive Cyl. Number | B Drive Cyl. Wet Density | C Drive Cyl. Moisture | D Drive Cyl. Dry Density | E FDT Wet Density | F FDT Moisture | G FDT Dry Density | H Wet Density Variation | I Moisture Variation | J Dry Density Variation |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

# ATTACHMENT D

Florida JetClean e-mail Communication

## Victor Damasceno

**From:** Ralph Calistri <floridajetclean@yahoo.com>
**Sent:** Tuesday, August 07, 2012 4:39 PM
**To:** Victor Damasceno
**Subject:** Question Regarding Vista Landfill New Cell Design

Per our telephone conversation I confirm that we can use our explosion-proof push-rod camera system in the 6" HDPE pipe that you referenced to pass through the designed 3:1 bend and still cover the ~510' pipe length through the available access points at both ends of the pipe. This camera system can pass through a 45 degree bend. The design will also pose no issues for the jetcleaning equipment.

Please contact us with any additional questions at 800-226-8013.

Thank you.

Ralph Calistri - Florida Jetclean

# ATTACHMENT E

"Buttrey 2 Class III Landfill Confinement Restoration – Southern Plug" and "Buttrey Development Two LLC. Class III Landfill Expansion Confinement Restoration – Northern Plug Area" Reports

CDM

# City of Apopka

## Buttrey 2 Class III Landfill
## Confinement Restoration – Southern Plug

December 10, 2003

# *Letter Report*

CDM
2301 Maitland Center Parkway, Suite 300
Maitland, Florida 32751
tel: 407 660-2552
fax: 407 875-1161

December 10, 2003

Mr. R.J. Davoll, P.E.
City Engineer
City of Apopka
City Hall, 120 E. Main Street
Apopka, Florida 32704

Subject: Buttrey 2 Class III Landfill
Confinement Restoration – Southern Plug

Dear Mr. Davoll:

Attached are two (2) copies of a letter report which summarizes the Quality Assurance work performed for the installation of the Confinement Restoration Clay Liner for the Southern plug area of the Buttrey Landfill 2. This letter report documents the testing performed during the placement of the clay liner to provide confinement restoration of the southern plug area. The location of the southern plug is shown on **Figure 1.**

The scope of work for providing Quality Assurance of the Confinement Restoration generally consisted of the following:

- Camp Dresser & McKee Inc. (CDM) participated in a Preconstruction Meeting for the clay liner installation.
- CDM performed site visits to observe the progress of the clay liner construction. CDM will coordinate with the field technician from Nodarse in observing the progress of the work.
- Nodarse & Associates assisted CDM with field and laboratory testing of the clay liner material as the liner was installed.
- Nodarse & Associates assisted CDM in preparation of a Quality Assurance Report summarizing the clay liner testing results.
- CDM provided project management services.

A Preconstruction Meeting was held at the Buttrey Landfill on June 12, 2002. At this meeting, the role of each person was discussed as well as the general progression of the work. Minutes of the Preconstruction Meeting are included as **Attachment 1**.

CDM visited the Buttrey site four times during the liner installation. On each occasion, the progress of the clay liner installation and the equipment used to complete the work was observed. The operation proceeded in accordance with the plan outlined at the Preconstruction Meeting. The Contractor did have considerable difficulty with controlling the moisture content of the clay source material. Separate lay down areas were utilized to dry out the clay material prior to installation. Because of the significant amount of rainfall that occurred during the period of installation from June 2002 to May 2003 progress was slow.

Enclosed as **Attachment 2** is a summary of the test results of the in place clay liner. The most important test results are those which verify the performance of the liner such as the thickness and hydraulic conductivity for each lift. The test results indicate that at each test location for depth, the thickness exceeded the required 6"compacted lift. This is the case for each of the 5 lifts. The hydraulic conductivity tests indicate that the in-place hydraulic conductivity of the clay was lower than the required $1x10^{-7}$ cm/sec. for every test. In many cases, the hydraulic conductivity was significantly lower than the required value.

The average permeability of the installed liner over the area plugged is $5.2x10^{-8}$ cm/sec. The average lift thickness which was placed was 7.6 inches thick. If the thickness and permeability test results over the area plugged are converted to a permeability of $1x10^{-7}$ cm/sec the installed clay liner in place would be equivalent to 6.1 feet thick. There were some test results (plasticity index, liquid limit, compaction, *etc.*) which did not meet the specified value, but are not critical to the final performance of the clay liner. These test results are indicated by an asterisk in the summary table.

Attachment 2 also contains the maps which show the locations of the samples which were tested. In addition, Attachment 2 includes the final map of the finished top of the clay confinement. This map indicates the final top elevation of the clay confinement at each location. This map was provided by Buttrey.

**Attachment 3** contains the entire record of the soil test results.

Based on periodic site observation and upon review of the testing data provided by Nodarse and Associates, it is CDM's opinion that the confinement restoration has been performed in accordance with the permit requirements.

Please call me if you have any questions or need additional information.

Very truly yours,

12/10/03

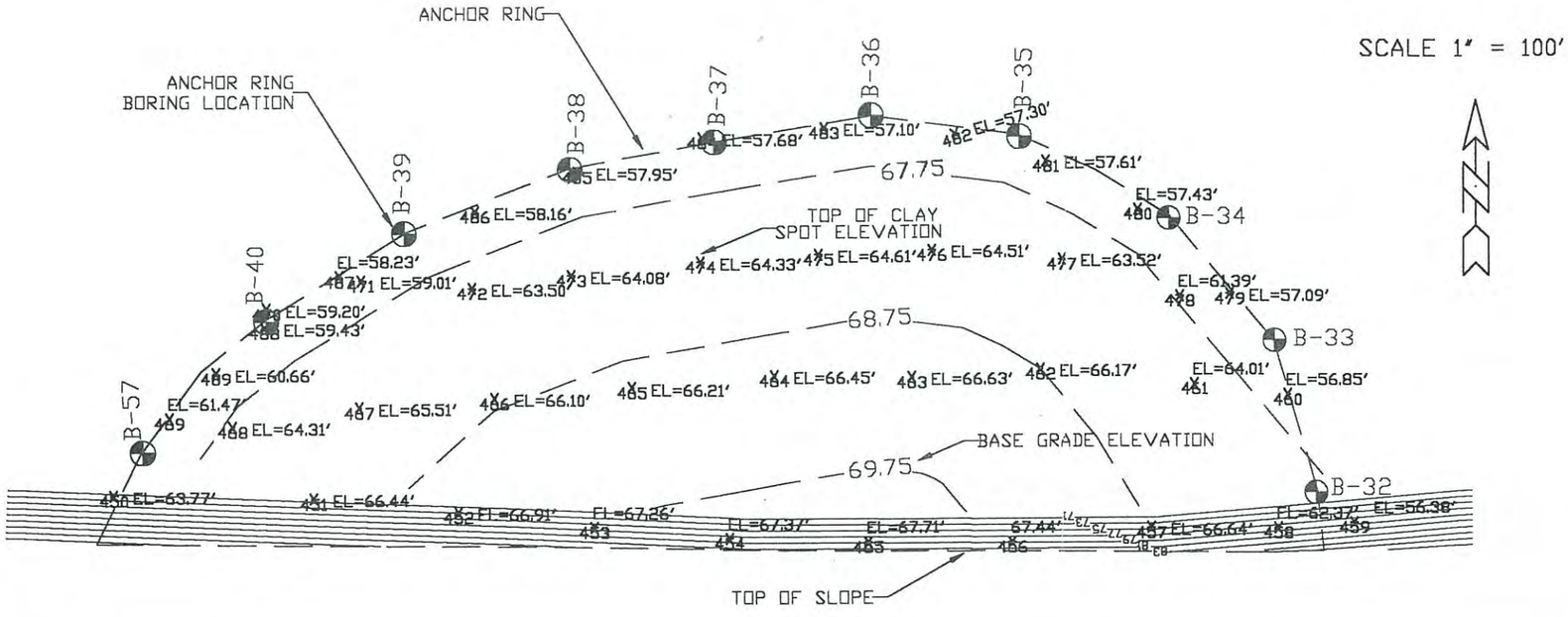
John G. Ladner. P.E. 037969
Camp Dresser & McKee Inc.

C: Jim McDonald, Orange County Environmental Protection Division
John Buttrey, Bishop & Buttrey LLC
William Craven, CDM

File: 22312-38764/E 110/E622.4/DN 4

# Figures and Attachments

# SPECIFIC PURPOSE SURVEY SHOWING THE TOP OF CLAY SPOT ELEVATIONS FOR THE CONFINEMENT RESTORATION OF THE SOUTHERN AREA.




SCALE 1" = 100'

NOTES:

1. SPOT ELEVATIONS REPRESENT THE TOP OF THE CLAY BELOW THE APPROVED BASE GRADE ELEVATIONS. MINIMUM VERTICAL DISTANCE BETWEEN THE TOP OF CLAY AND BASE GRADE ELEVATION IS TWO FEET.

2. BASE GRADE ELEVATIONS REPRESENT THE MINIMUM ELEVATION (NGVD) FOR THE LANDFILL PLACEMENT OF TRASH.

PREPARED FOR: CITY OF APOPKA

DATE JUNE 2003 JOB NO. _____

FIELD BOOK _____ PAGE _____

TYPE OF WORK SPECFIC PURPOSE

PARTY CHIEF M.P.

SHEET 1 OF 1

| DRAWN BY EC<br>SCALE 1" = 100' | FILE<br>C:\R14\DESIGN\PIT12SL\SOUTH_PLUG |
|---|---|

*PREPARED BY*
*BISHOP & BUTTREY, INC.*
BASED ON BOUNDARY SURVEY
& TOPOGRAPHIC SURVEY
PREPARED BY ACCURITE SURVEYING

Ed Chesney 10/28/03
FOR BISHOP & BUTTREY, INC.
ED CHESNEY, P.E. 51888

KEENE ROAD DISPOSAL CLASS III LANDFILL
CONFINEMENT RESTORATION SOUTHERN AREA

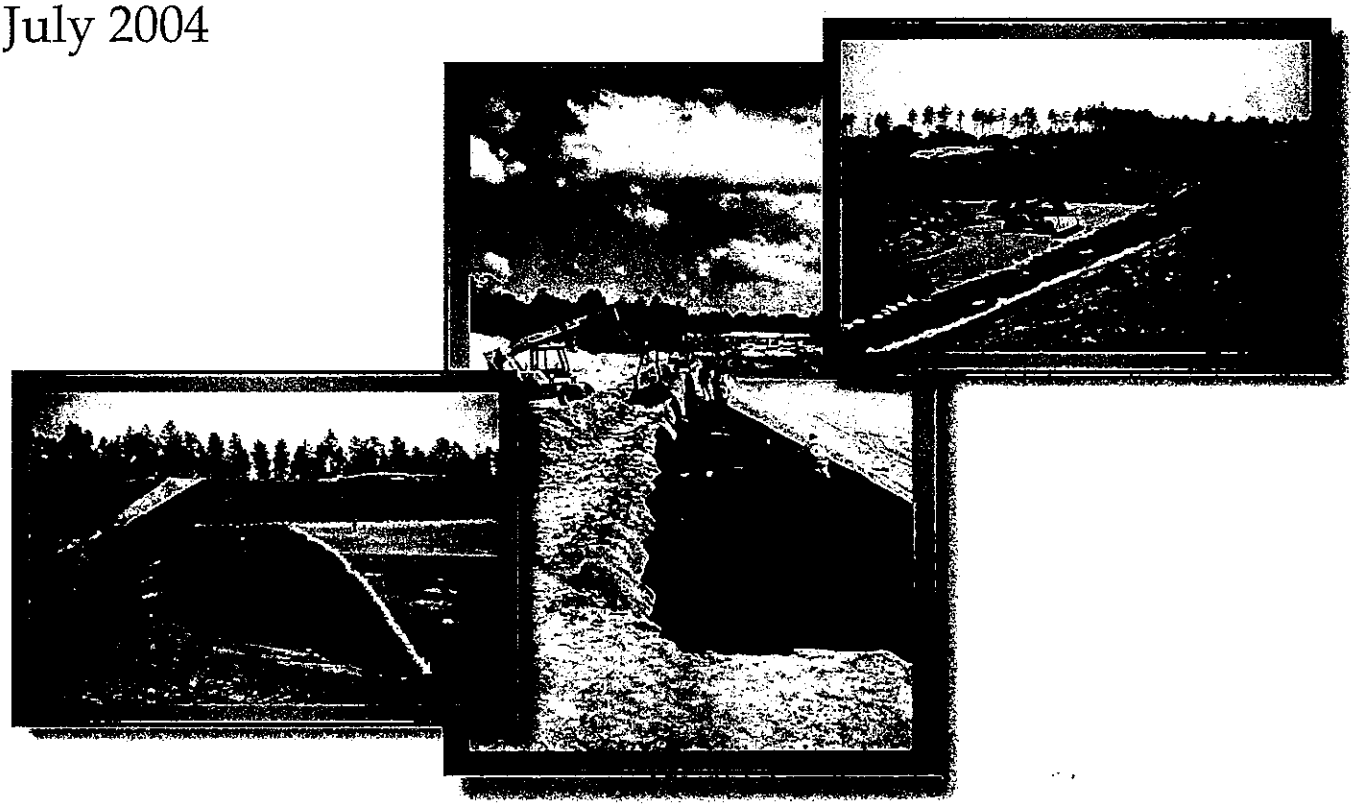
BUTTREY DEVELOPMENT LLC

CDM

# City of Apopka, Florida

## Buttrey Development Two LLC.
## Class III Landfill Expansion
## Confinement Restoration - Northern Plug Area

July 2004



# *Report*

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July 28, 2004

Mr. R.J. Davoll, P.E., City Engineer
City of Apopka
City Hall, 120 E. Main Street
Apopka, Florida 32704

Subject: Construction Quality Assurance Report
Buttrey Development Two, Class III Landfill Expansion
Confinement Restoration – Northern Plug Area

Dear Mr. Davoll:

This letter report is transmitted per Amendment No. 1 to Task Order No. 2003-1 of CDM's Master Services Agreement with the City. The report summarizes the quality control procedures specified and documented during the installation of the high density polyethylene (HDPE) geosysnthetic liner over the northern confinement restoration area. CDM performed the following quality assurance tasks related to the confinement restoration:

- Reviewed geosynthetic liner manufacturers' roll certification reports for compliance with the project specifications for liner materials.
- Conducted a Preconstruction Meeting for the geosynthetic liner installation.
- Provided full-time on-site inspection services during liner installation to observe the progress and document the quality of the geosynthetic liner installation.
- Coordinated the geotechnical laboratory testing activities of Nodarse & Associates, Inc. to provide an independent verification of field quality assurance tests performed by the liner installation contractor.
- Coordinated the geosynthetic liner laboratory testing services of Ardaman & Associates, Inc.
- Apprised the liner installation contractor of geosynthetic laboratory test results and verified that the liner installation contractor implemented quality assurance procedures as stipulated in the City-approved project contract documents.

- Upon completion of the liner installation and acceptance of the installation, made periodic site visits to observe the progress of the Buttrey Landfill operations crew to place the protective layer of sand fill over the geosynthetic liner.

The parties involved in the design, manufacturing, construction, testing and inspection of the geosynthetic liner installation were as follows:

*Manufacturers and Suppliers:*

| | |
|---|---|
| 60 mil Smooth HDPE Geomembrane | GSE Lining Technology, Inc. |
| 60 mil Textured HDPE Geomembrane | GSE Lining Technology, Inc. |

*Construction Management:*

| | |
|---|---|
| General Contractor (Owner) | Bishop & Buttrey, Inc. |
| Geomembrane Installer | Environmental Fabrics, Inc. |
| Independent Testing Laboratories | Nodarse & Associates, Inc./ Ardaman & Associates, Inc. |
| Design Engineer | Bishop & Buttrey, Inc. |
| Independent Inspection | Camp Dresser & McKee Inc./ City of Apopka |

The installation of the geomembrane was performed in two phases. The phases of construction, geomembrane panel placement and corresponding destructive sample locations are shown on the Panel Placement Map located in Attachment 1.

*Quality Assurance Testing Performed*

The following section describes the quality assurance testing performed. A summary of the testing requirements is included in Attachment 24. Any exceptions to the requirements, as specified, have been noted in the summary of results. The quality assurance testing which was performed is summarized below:

- In-place density tests were performed for the liner subgrade.
- Geomembrane conformance testing was performed for thickness, density tensile properties at yield and break, tear resistance, carbon black content, and carbon black dispersion.
- Non-destructive tests were performed on all field seams over the full length of each seam including vacuum testing and air pressure testing.

- Destructive samples were collected and field tested for peel strength and shear strength prior to sending the samples to the laboratory.

- Laboratory testing was performed for peel strength and shear strength. The results were evaluated to confirm a minimum of four test specimens met the acceptable values allowed in the HDPE Goemembrane Liner Specification (Attachment 24).

*Summary of Results*

The following section summarizes project testing results. Any exceptions to the requirements, as specified, have been noted below:

- Liner subgrade in-place density tests were performed by Nodarse & Associates, Inc. for Phase I and II of the project. The subgrade was accepted by the HDPE geomembrane installer, Environmental Fabrics, Inc.

- The geomembrane conformance test results for the geomembrane shipped to the site indicated the material meets the requirements for thickness, tear resistance, tensile properties, density, carbon black content and carbon black dispersion.

- All nondestructive testing of seams was witnessed by CDM. The testing included both air pressure testing of the double track fusion welded seams and the vacuum testing of extrusion welded seams.

- During Phase I of the geomembrane installation, two destructive test samples failed to meet peel strength test requirements (DT -20 and DT – 21). As outlined in the specification additional samples were collected and tested a distance of 10 feet on either side of the failing tests. Samples collected for destructive test DT-20 (DT-20A and DT-20B) passed both peel and shear strength tests. Test specimen DT-21A collected south of DT-21 passed peel and shear strength tests. It should be noted that only three tests could be performed for shear strength; however, all three results were well above the minimum requirement (120 lb/in). Test specimen DT-21B collected north of DT-21 failed the peel test. A sample was again collected 10 ft north of failing test DT-21B, but failed field test requirements. As a result, another sample was collected 25 ft north of DT-21B and an additional sample at the beginning of the seam (northern corner of panel P-69). One other sample (DT-22) was collected on the next seam installed by the same machine and welder. All of these samples passed peel and shear tests. Cap strips were used to patch and cover the entire length of the seam between panels P-68 and P-69 from destructive test sample DT-21D to DT- 21A.

- All destructive test samples for Phase II of the geomembrane installation passed laboratory test requirements for peel and shear strength.

Copies of all geomembrane material conformance and field quality control tests results including trial welds, nondestructive testing and, destructive sampling reports are provided as attachments to this letter report.

The following quality assurance documentation is provided for your information and records:

- Attachment 1 – Confinement Restoration Northern Area Location Map
- Attachment 2 –Liner Roll Certifications (60-mil Smooth HDPE)
- Attachment 3 –Liner Roll Certifications (60-mil Textured HDPE)
- Attachment 4 – Geomembrane Conformance Testing Reports by Ardaman & Associates, Inc.
- Attachment 5 – Liner Subgrade Compaction Test Reports by Nodarse & Associates, Inc. and Topographic Survey
- Attachment 6 - Preconstruction Meeting Minutes and Sign-in Sheet
- Attachment 7 – EFI Panel Placement Figure and Log
- Attachment 8 – EFI Geomembrane Field Trial Seam Log
- Attachment 9 – EFI Geomembrane Seam Log
- Attachment 10 – EFI Seam Air Pressure Test Log
- Attachment 11 – EFI Geomembrane Repair/Vacuum Test Log
- Attachment 12 – EFI Geomembrane Destructive Seam Test Log
- Attachment 13 – CDM Material Receiving Log
- Attachment 14 – CDM Subgrade Surface Acceptance

- Attachment 15 – CDM Daily CQC Reports
- Attachment 16 – CDM Trial Weld Log
- Attachment 17 – CDM Daily Panel Placement Log
- Attachment 18 – CDM Daily Seaming Log
- Attachment 19 – CDM Destructive Sample Log
- Attachment 20 – CDM Seam Inspection Log, Air Pressure Testing
- Attachment 21 – CDM Seam Inspection Log, Vacuum Testing
- Attachment 22 – Field Seam Destructive Test Result Reports by Ardaman & Associates, Inc.
- Attachment 23 – Construction Progress Photographs
- Attachment 24 – Testing Requirements and Geomembrane Liner Specification

Based on the documented quality control procedures used during the installation of the HDPE Geomembrane, it is CDM's opinion that the confinement restoration of the northern plug area has been constructed in a manner that meets the quality standards for this project.

Very truly yours,

7/28/04

John G. Ladner, P.E.
Florida Registration No. 37969
Camp Dresser & McKee Inc.

7/28/04

William J. Craven, P.E.
Florida Registration No. 59294
Camp Dresser & McKee Inc.

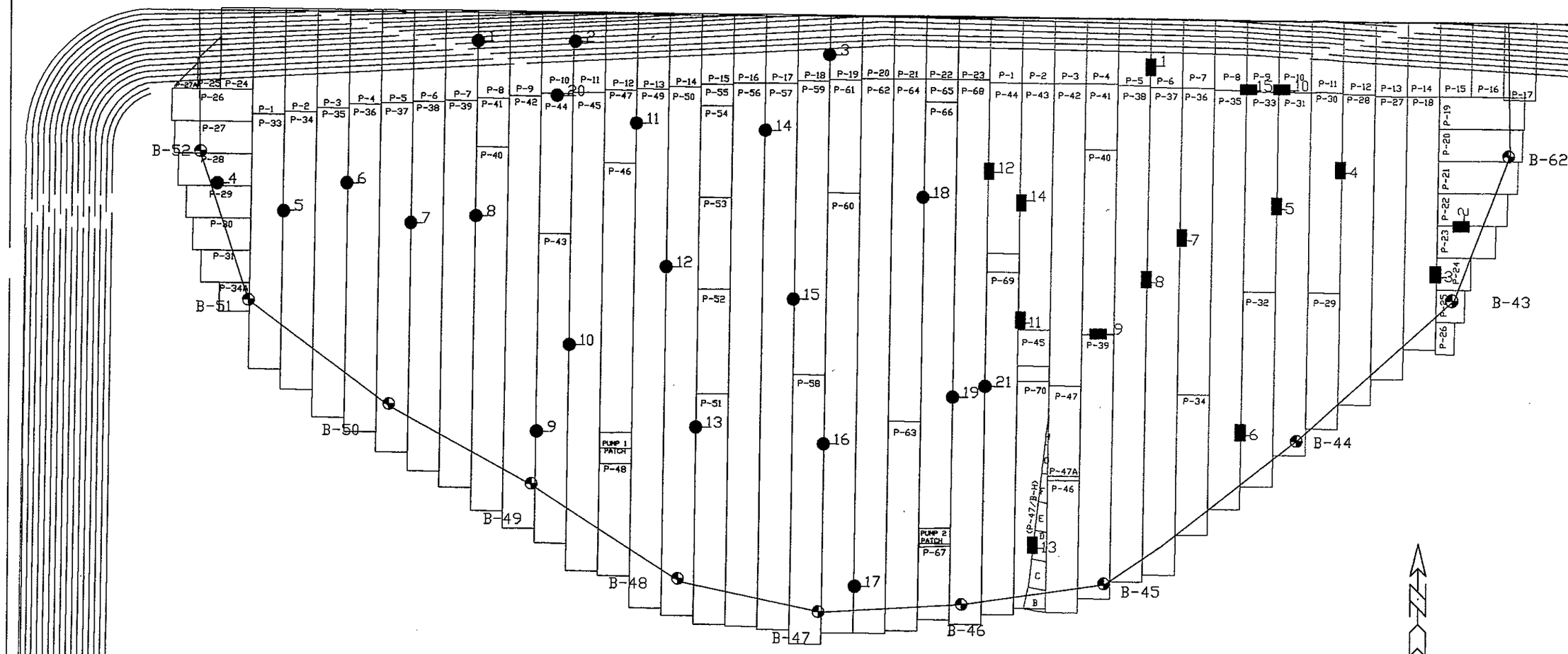
Attachments

C: Arnaldo Mercado, Orange County EPD, w/attachment
John Buttrey, Bishop & Buttrey LLC, w/attachment
File: 22312-38764/E 110/E622.4/DN 4

# PANEL PLACEMENT MAP- PHASE 1 & PHASE 2
# INCLUDING LINER TEST LOCATIONS

PHASE 1 - IN BLUE
PANELS (P-1 - P-70)

PHASE 2 - IN GREEN
PANELS (P-1 - P-47H)




scale: 1" = 75'

●10 DESTRUCT TEST LOCATION PHASE 1

■7 DESTRUCT TEST LOCATION PHASE 2

B-48 ◔ ANCHOR RING BORING LOCATION DEFINING LIMITS OF CONFINEMENT RESTORATION

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