

Document Received in Electronic Format Follows:

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Permit Data Form

History Sheet

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Transmittal Sheet with date received stamp

PERMIT DATA FORM

CHECK IF NEW: _____

☒ MOD ☐ NEW ☐ RENEWAL

0199726

SITE WAFR # AIR # _____

SITE/WAFER/FACILITY NAME: JED SWF

PROJECT NAME: _____

DESC: _____

TYPE CODE: SO SUBCODE: 1M

CHECK IF GP ☐ EXEMPT ☐ NPDES ☐

CORRECT FEE: \$5000 -

PROCESSOR: *ghe*

AMOUNT RCV'D: \$000 -

AMOUNT REFUND: _____

MONIES DUE: _____

RED ___ YELLOW ___ GREEN ___ NO PERMIT REQ ___

HISTORY SHEET

SITE/WAFR/AIR#: 49-0199726018 TYPE: 20 SUBTYPE: 171

SITE/WAFR/AID:

NAME:

Oak Hammock

PROJECT

NAME:

[illegible]

THE FACE OF THIS DOCUMENT HAS A COLORED BACKGROUND ON WHITE PAPER - THE BACK CONTAINS AN ARTIFICIAL WATERMARK - HOLD AT AN ANGLE TO VIEW

IESI Corporation

2301 Eagle Parkway, Suite 200
Fort Worth, TX 76177

(817) 632-4000

Fleet Maine, N.A.
South Portland, ME
52-153/112

Check # 101889552

Check Date

2/8/2011

Check Amount

*****\$5,000.00

**** Void after 120 days ****

**** Not valid over \$50,000 without two manual signatures ****

Five Thousand and 00/100----- USD

PAY TO THE ORDER OF FLORIDA DEPT. OF ENVIRONMENTAL PROTEC

Stephen Moody

Authorized Signature

BORDER CONTAINS MICROPRINTING

OK # 101889552

TRANSMITTAL

Date	10-Mar-11	Job No.	FL1858.01
Attention	Mr. Thomas Lubozynski		
Re:	Partial Closure Permit Application JED Solid Waste Management Facility		

RECEIVED
MAR 11 2011
DEP Central Dist.

These are transmitted as checked below:

☐ Return corrected prints

Signed *Craig R. Browne, P.E.*

10 March 2011

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

Subject: Intermediate Permit Modification Application for Final Closure
Of Upper Side Slopes and Top Areas of Cells 1 through 4, Phase 1
Permit Nos. SC49-0199726-004 and SO49-0199726-005
J.E.D. Solid Waste Management Facility
Omni Waste of Osceola County, LLC

Dear Mr. Lubozynski:

Transmitted herewith are four copies (3 hardcopies and 1 compact disk) of an intermediate permit modification application for final closure of the upper side slopes and top areas of Cells 1 through 4, Phase 1 (i.e., Partial Closure – Event 2) at the J.E.D. Solid Waste Management Facility (JED Facility). This intermediate permit modification application was prepared by Geosyntec Consultants and is being submitted on behalf of Omni Waste of Osceola County, LLC (Omni).

JED is presently authorized to construct and operate under FDEP solid waste permits SC49-0199726-004 and SO49-0199726-005, respectively, and subsequent modifications. Under the currently permitted design, waste may be placed up to an elevation of 330 ft, NGVD at side slopes of 3 horizontal to 1 vertical (3H:1V) with 15-ft wide benches every 40 vertical feet. This intermediate modification application is being submitted to permit the closure of a portion of the side slopes and top slopes of Cells 1 through 4 that have (or will soon) reach final permitted waste elevations.

Mr. F. Thomas Lubozynski, P.E.

10 March 2011

Page 2

A check in the amount of \$5,000 is also enclosed with this intermediate permit modification application. If you or your staff has any questions or need additional information, please feel free to contact Mr. Mike Kaiser of Waste Services, Inc. at (904) 673-0446, mkaiser@wsii.us, or the undersigned.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Craig R. Browne', with a stylized, flowing script.

Craig R. Browne, P.E.
Project Engineer

Enclosures

Copy: Mike Kaiser, Waste Services, Inc.

Applicant:



Omni Waste of Osceola County, LLC

1501 Omni Way
St. Cloud, Florida 34773

**PARTIAL LANDFILL CLOSURE –
APPLICATION FOR AN INTERMEDIATE
PERMIT MODIFICATION**

J.E.D. SOLID WASTE MANAGEMENT FACILITY

**1501 Omni Way
St. Cloud, Osceola County, Florida 34773**

Prepared by:

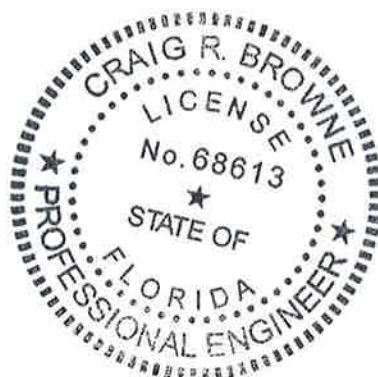
Geosyntec


consultants

13101 Telecom Drive, Suite 120
Temple Terrace, FL 33637
Cert. of Authorization No. 4321

Project No. FL1858

March 2011





Craig Browne, P.E.
Florida Registration No. 68613
Date: 3/10/2011

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Appendix B	Construction Drawings
Appendix C	Technical Specifications
Appendix D	Partial Closure Cost Estimate

1 INTRODUCTION

1.1 Terms of Reference

Geosyntec Consultants (Geosyntec) has prepared this partial landfill closure design report as part of an intermediate modification to the existing Florida Department of Environmental Protection (FDEP) solid waste permit (Permit Nos. SC49-0199726-004 and SO49-0199726-005) for the J.E.D. Solid Waste Management Facility (JED Facility), a Class I landfill located in Osceola County, Florida (west of highway U.S. 441, approximately 6.5 miles south of Holopaw). The JED Facility is owned and operated by Omni Waste of Osceola County, LLC (Omni).

This intermediate modification application is submitted to the FDEP Central District on behalf of Omni, and was developed to comply with the requirements of Chapter 62-701 of the Florida Administrative Code (F.A.C.). FDEP Form 62-701.900(1), *Application for a Permit to Construct, Operate, Modify or Close a Solid Waste Management Facility* has been used to verify the completeness of this report, and is included as Appendix A. Those items for which responses have not substantially changed from previous submittals to FDEP have been marked on the application form in Appendix A as “N/C” for no change.

Construction Drawings titled “Partial Landfill Closure Construction – Event 2, Phase 1 Disposal Area” show plans, cross-sections, and details associated with the partial landfill closure, and are included in Appendix B. These Drawings are intended to provide sufficient detail for approval and construction. Technical specifications for construction materials associated with the partial landfill closure are provided in Appendix C of this report.

This report was prepared by Dr. Victor M. Damasceno and Mr. Craig R. Browne, P.E., of Geosyntec. Professional engineer certification is provided on the cover sheet of this report, on the FDEP Form 62-701.900(1), on the cover page of the technical specifications, and on each sheet of the Construction Drawings.

1.2 Purpose and Scope

The JED Facility has an approved closure plan, including a construction quality assurance (CQA) plan and financial assurance mechanism, under Permit Modification Nos. SC49-0199726-006 and SO49-0199726-007), for final closure of the facility. This intermediate permit modification application has been prepared to modify the existing permits to facilitate partial closure of the facility. The purpose of this report is to describe the landfill closure design that will be implemented to partially close the upper side slope and top slope areas of the Phase 1 disposal area at the JED Facility. It is the intent of this report to address all the applicable parts of the FDEP Form 62-701.900(1) in accordance with all the applicable provisions of Chapter 62-701, F.A.C., specifically Rules 62-701.500 and 600.

1.3 Report Organization

In accordance with Rule 62-701.600, F.A.C., the remainder of this report describes the partial landfill closure design and supporting documentation, i.e., Construction Drawings and Technical Specifications. Details regarding the proposed final cover system design are provided in Section 2.

2 PARTIAL CLOSURE DESIGN

2.1 Introduction

In accordance with Rule 62-701.600(3), F.A.C., the closure design for the JED Facility was developed to provide the final cover system design that applies to the entire landfill. Areas of the side slopes of the Phase 1 disposal area were partially closed in 2009 and include side slopes from the toe of Cells 1 – 4 up to an approximate elevation of 180 feet National Geodetic Vertical Datum (NGVD). This partial closure event was certified by the FDEP on March 16, 2010. This report describes the closure of the additional areas of the Phase 1 disposal area (i.e., portion of the side slope and top deck). The Construction Drawings provided in Appendix B present the existing site topography, final cover grades, sections and details regarding this partial closure event of the JED Facility.

2.2 Construction Quality Assurance Plan

The partial closure of the JED Facility will be constructed using industry standard construction practices and the facility approved construction quality assurance (CQA) plan. In accordance with Rule 62-701.600(3)(f)1, F.A.C., the CQA Plan for construction activities associated with final closure, including final cover system construction, was submitted as part of a permit application titled “Major Modification Application for Vertical Expansion of the J.E.D. Solid Waste Management Facility, Phases 1 through 3” dated September 2007, which is on file with FDEP. This CQA Plan is adequate to complete the closure activities described herein.

2.3 Technical Specifications

The partial closure of the JED Facility will be constructed with quality materials. The technical specifications for all construction materials, including the final cover system geosynthetics and soils are presented in Appendix C of this report.

2.4 Final Cover System Design

In accordance with Rule 62-701.600(3)(f)2, F.A.C. and the approved closure plan of Permit Modification Nos. SC49-0199726-006 and SO49-0199726-007, final cover will be placed over the entire surface of each solid waste disposal unit within 180 days after final waste placement. The final cover system along the side slopes of Phase 1 at the JED Facility will be constructed after final waste grade elevations are achieved and in accordance with the design details of Permit Modification Nos. SC49-0199726-006 and SO49-0199726-007. The partial closure of the JED Facility involves construction of the final cover system from an elevation of approximately 180 ft NGVD to the maximum elevation of approximately 272 ft, NGVD. The landfill partial closure will have side slopes graded at 3H:1V, with 15-ft wide benches at elevations 218 and 258 ft, NGVD. Drainage swales will be constructed along the landfill benches to collect and divert surface

water runoff via downdrains to the storm water ponds and ditches at the toe of the landfill slope. This will help minimize erosion at the surface of the landfill cover system.

In accordance with Rule 62-701.600(3)(g), F.A.C., the proposed final cover system on the landfill side slopes is presented in the Construction Drawings and consists of, from top to bottom:

- a 0.5-ft thick vegetative layer;
- a 1.5-ft thick cap protective layer (vegetative support layer);
- a geocomposite drainage layer;
- a 40-mil thick polyethylene (PE) geomembrane; and
- a 1-ft thick intermediate cover layer.

The proposed final cover system on the top deck consists of, from top to bottom:

- a 0.5-ft thick vegetative layer;
- a 1.5-ft thick cap protective layer (vegetative support layer);
- a 40-mil thick polyethylene (PE) geomembrane; and
- a 1-ft thick intermediate cover layer.

The following sections discuss the various components of the approved final cover system.

2.5 Final Cover System Materials

2.5.1 Vegetation

The surface of the final cover system will be vegetated either by hydroseeding, sodding, or other equivalent method. The minimum requirements of the grass seed and sod are presented in the Technical Specifications attached as Appendix C to this report.

2.5.2 Vegetative and Cap Protective Layers

The upper 6 inches of the final cover system will consist of a soil suitable to sustain a good stand of grass. The cap protective layer below the vegetative layer will consist of 18 inches of permeable soil.

2.5.3 Geocomposite and Geomembrane Layers

A geocomposite drainage layer underlain by a 40-mil PE geomembrane will be used in combination to provide a lateral drainage layer and barrier layer, respectively, to reduce infiltration of storm water through the final cover system into the waste. This geosynthetic combination will be utilized along the landfill side slopes. Specified property values for the geocomposite and 40-mil geomembrane layers are provided in the Technical Specifications attached as Appendix C to this design report. The specified geomembrane meets the requirements of Rule 62-701.600(3)(g)(4), F.A.C.

2.5.4 Intermediate Cover Layer

A 1-ft thick soil layer will be constructed below the geomembrane to provide a suitable foundation layer for placement of the final cover geomembrane. The intermediate cover layer will consist of general fill, and will be placed on top of the daily cover layer.

2.6 Surface Water Drainage System Design

The relevant features of the surface water drainage system for the JED Facility partial closure are presented in the Construction Drawings. In accordance with the approved FDEP Environmental Resources Permit (ERP) Nos. ERP49-0199752-001-EI through ERP49-0199752-003-EI and ERP49-0199752-004-EM, drainage swales will be incorporated along the side slopes of the landfill as indicated in the Construction Drawings to collect and convey surface-water runoff, and minimize the formation of erosion rills and gullies in the vegetative layer. The down drain pipes will convey storm water from the side slope benches to the storm water ponds and ditches at the toe of the landfill. The down drain pipes will be 18-inch diameter double-wall corrugated HDPE pipes (smooth inside) buried within the 2-ft thick vegetative and protective cover layers of the final cover system.

2.7 Gas Management System

The gas management system at JED Facility was designed in accordance with Rule 62-701.530, F.A.C. Details regarding the location of landfill gas extraction wells are provided in the Construction Drawings. No changes to the FDEP approved gas management system design are proposed in this report.

Features of the gas management system such as well heads and valves will penetrate through the final cover system. Details regarding the landfill gas system penetrations are provided in the Construction Drawings.

2.8 Final Cover System Construction Procedure

The surface of the intermediate cover layer will be graded and compacted to prepare a smooth base for placement of the final cover geomembrane. The geomembrane layers will cover the side and top slope areas of Cells 1 through 4 up to the final permitted elevations and will tie-in to the existing closed areas as shown in the Construction Drawings.

2.9 Certification of Closure Construction Completion

In accordance with Rule 62-701.600(6), F.A.C., a certification of partial closure construction completion, signed and sealed by a professional engineer independent of the contractor, will be submitted to FDEP upon completion of the partial landfill closure. All substantial deviations, if any, from the approved design will be noted.

2.10 Final Cover Maintenance

In accordance with Rule 62-701.600(3) (f)4, F.A.C., a stockpile of cover material for long-term care erosion control, filling areas of subsidence, maintaining berms, and general maintenance of the facility will be maintained on-site. Additional cover material, if required, will be obtained from local borrow sources. The partial landfill closure area will be periodically inspected and maintained, as needed, by Omni.

2.11 Financial Assurance

Omni has executed a financial funding mechanism in the form of an insurance certificate for the final closure and long-term care of JED Facility. In accordance with Rules 62-701.630(3) and (4), F.A.C., final closure and long-term care cost estimates for Cells 1 through 7 have been previously approved by FDEP. No changes to the currently approved final closure and long-term care cost estimate are proposed in this partial closure report. However, a revised financial assurance cost estimate will be submitted for review and approval by the FDEP as a minor modification of the JED Facility's permit to construct and operate to allow for a reduction in the closure costs requiring financial assurance based on this partial closure event.

2.12 Closure Cost Estimate

Per FDEP Form 62-701.900(1), Part A.15, a closure cost estimate has been developed for the proposed partial landfill closure at JED. The closure costs are estimated to be approximately \$1,400,000 as detailed in Appendix D. It is noted that the unit costs presented in Appendix D are based on average bid prices for the previous (2009) partial closure event.

APPENDIX A
FDEP Form 62-701.900(1)



Florida Department of Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

DEP Form #: 62-701.900(1), F.A.C.

Form Title: Application to Construct, Operate, Modify, or
Close a Solid Waste Management Facility

Effective Date: January 6, 2010

Incorporated in Rule: 62-701.330(3), F.A.C.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

APPLICATION TO CONSTRUCT, OPERATE, MODIFY, OR CLOSE A SOLID WASTE MANAGEMENT FACILITY

APPLICATION INSTRUCTIONS AND FORMS

Northwest District
160 Governmental Center
Pensacola, FL 32502-5794
850-595-8360

Northeast District
7825 Baymeadows Way, Ste. B200
Jacksonville, FL 32256-7590
904-807-3300

Central District
3319 Maguire Blvd., Ste. 232
Orlando, FL 32803-3767
407-894-7555

Southwest District
13051 N. Telecom Pkwy
Temple Terrace, FL 33637
813-632-7600

South District
2295 Victoria Ave., Ste. 364
Fort Myers, FL 33901-3881
239-332-6975

Southeast District
400 North Congress Ave.
West Palm Beach, FL 33401
561-681-6600

INSTRUCTIONS TO APPLY FOR A SOLID WASTE MANAGEMENT FACILITY PERMIT

I. General

Solid Waste Management Facilities shall be permitted pursuant to Section 403.707, Florida Statutes,(FS) and in accordance with Florida Administrative Code (FAC) Chapter 62-701. A minimum of four copies of the application shall be submitted to the Department's District Office having jurisdiction over the facility. The appropriate fee in accordance with Rule 62-701.315, FAC, shall be submitted with the application by check made payable to the Department of Environmental Protection (DEP).

Complete appropriate sections for the type of facility for which application is made. Entries shall be typed or printed in ink. All blanks shall be filled in or marked "not applicable" or "no substantial change". Information provided in support of the application shall be marked "submitted" and the location of this information in the application package indicated. The application shall include all information, drawings, and reports necessary to evaluate the facility. Information required to complete the application is listed on the attached pages of this form.

II. Application Parts Required for Construction and Operation Permits

- A. Landfills and Ash Monofills - Submit Parts A through S
- B. Asbestos Monofills - Submit Parts A,B,C,D,E,F,I,K,M, O through S
- C. Industrial Solid Waste Disposal Facilities - Submit Parts A through S

NOTE: Portions of some Parts may not be applicable.

NOTE: For facilities that have been satisfactorily constructed in accordance with their construction permit, the information required for A, B and C type facilities does not have to be resubmitted for an operation permit if the information has not substantially changed during the construction period. The appropriate portion of the form should be marked "no substantial change".

III. Application Parts Required for Closure Permits

- A. Landfills and Ash Monofills - Submit Parts A,B,L, N through S
- B. Asbestos Monofills - Submit Parts A,B,M, O through S
- C. Industrial Solid Waste Disposal Facilities - Submit Parts A,B, L through S

NOTE: Portions of some Parts may not be applicable.

IV. Permit Renewals

The above information shall be submitted at time of permit renewal in support of the new permit. However, facility information that was submitted to the Department to support the expiring permit, and which is still valid, does not need to be re-submitted for permit renewal. Portions of the application not re-submitted shall be marked "no substantial change" on the application form.

V. Application Codes

S	-	Submitted
LOCATION	-	Physical location of information in application
N/A	-	Not Applicable
N/C	-	No Substantial Change

VI. LISTING OF APPLICATION PARTS

PART A:	GENERAL INFORMATION
PART B:	DISPOSAL FACILITY GENERAL INFORMATION
PART C:	PROHIBITIONS
PART D:	SOLID WASTE MANAGEMENT FACILITY PERMIT REQUIREMENTS, GENERAL
PART E:	LANDFILL PERMIT REQUIREMENTS
PART F:	GENERAL CRITERIA FOR LANDFILLS
PART G:	LANDFILL CONSTRUCTION REQUIREMENTS
PART H:	HYDROGEOLOGICAL INVESTIGATION REQUIREMENTS
PART I:	GEOTECHNICAL INVESTIGATION REQUIREMENTS
PART J :	VERTICAL EXPANSION OF LANDFILLS
PART K:	LANDFILL OPERATION REQUIREMENTS
PART L :	WATER QUALITY AND LEACHATE MONITORING REQUIREMENTS
PART M:	SPECIAL WASTE HANDLING REQUIREMENTS
PART N:	GAS MANAGEMENT SYSTEM REQUIREMENTS
PART O:	LANDFILL CLOSURE REQUIREMENTS
PART P:	OTHER CLOSURE PROCEDURES
PART Q:	LONG-TERM CARE
PART R:	FINANCIAL ASSURANCE
PART S:	CERTIFICATION BY APPLICANT AND ENGINEER OR PUBLIC OFFICER

**STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
APPLICATION FOR A PERMIT TO CONSTRUCT, OPERATE, MODIFY OR CLOSE
A SOLID WASTE MANAGEMENT FACILITY**

Please Type or Print

PART A. GENERAL INFORMATION

1. Type of disposal facility (check all that apply):

- | | |
|--|--|
| <input checked="" type="checkbox"/> Class I Landfill | <input type="checkbox"/> Ash Monofill |
| <input type="checkbox"/> Class III Landfill | <input type="checkbox"/> Asbestos Monofill |
| <input type="checkbox"/> Industrial Solid Waste | |
| <input type="checkbox"/> Other Describe: | |

NOTE: Waste Processing Facilities should apply on Form 62-701.900(4), FAC;
Land Clearing Disposal Facilities should notify on Form 62-701.900(3), FAC;
Compost Facilities should apply on Form 62-701.900(10), FAC; and
C&D Disposal Facilities should apply on Form 62-701.900(6), FAC

2. Type of application:

- ☐ Construction
☐ Operation
☐ Construction/Operation
☒ Closure
☐ Long-term Care Only

3. Classification of application:

- | | |
|----------------------------------|---|
| <input type="checkbox"/> New | <input type="checkbox"/> Substantial Modification |
| <input type="checkbox"/> Renewal | <input checked="" type="checkbox"/> Intermediate Modification |
| | <input type="checkbox"/> Minor Modification |

4. Facility name: J.E.D. Solid Waste Management Facility

5. DEP ID number: 89544 (WACS) County: Osceola

6. Facility location (main entrance):
1501 Omni Way, St. Cloud, FL 34773

7. Location coordinates:

Section: 11,13,14,17 & 18 Township: 28S Range: 32E & 33E

Latitude: 28° 3' 32" Longitude: 81° 5' 46"

Datum: WGS84 Coordinate Method: DGPS

Collected by: Johnston's Surveying Company/Affiliation: Johnston's Surveying

8. Applicant name (operating authority): Omni Waste of Osceola County, LLC
- Mailing address: 1501 Omni Way St. Cloud FL 34773
Street or P.O. Box City State Zip
- Contact person: Mike Kaiser Telephone: (904) 673-0446
- Title: Regional Engineer
- mkaiser@wsii.us
E-Mail address (if available)
9. Authorized agent/Consultant: Geosyntec Consultants
- Mailing address: 13101 Telecom Drive, Suite 120 Temple Terrace FL 33637
Street or P.O. Box City State Zip
- Contact person: Craig Browne, P.E. Telephone: (813) 558-0990
- Title: Project Engineer
- cbrowne@geosyntec.com
E-Mail address (if available)
10. Landowner (if different than applicant): _____
- Mailing address: _____
Street or P.O. Box City State Zip
- Contact person: _____ Telephone: () _____
- _____ E-Mail address (if available)
11. Cities, towns and areas to be served:
Primarily Osceola, Brevard, Indian River, Okeechobee, Orange, Polk, Volusia, Sumter, Lake, Seminole,
Pasco, Hillsborough, Hardee, and Highlands Counties. Other Florida counties are served as waste
streams are available.
- _____
- _____
12. Population to be served:
Current: 5,800,000 (approx.) Five-Year
Projection: 6,000,000 (approx.)
13. Date site will be ready to be inspected for completion: March 2012
14. Expected life of the facility: _____ years
15. Estimated costs: (See Permit App.,
Appendix D)
Total Construction: \$ N/A Closing Costs: \$ 1,400,000
16. Anticipated construction starting and completion dates:
From: 10/1/2011 To: 2/28/2012
17. Expected volume or weight of waste to be received:
_____ yds³/day 6,000 tons/day _____ gallons/day

PART B. DISPOSAL FACILITY GENERAL INFORMATION

1. Provide brief description of disposal facility design and operations planned under this application:
This intermediate modification application is being submitted for the closure of the upper side slopes and top-deck areas of Phase 1, Cells 1-4. The modification includes construction of the final cover system (soil and geosynthetics) and tie-in to the existing final cover system temporary anchor trench at an elevation of approximately 180 ft, NGVD.
2. Facility site supervisor: Matt Orr
Title: Site Manager Telephone: (407) 891-3720
morr@wasteservicesinc.com
E-Mail address (if available)
3. Disposal area: Total 264 acres; Used 89 acres; Available 175 acres.
4. Weighing scales used: ☒ Yes ☐ No
5. Security to prevent unauthorized use: ☒ Yes ☐ No
6. Charge for waste received: _____ \$/yds³ 35 \$/ton
7. Surrounding land use, zoning:
- | | |
|--|--|
| <input type="checkbox"/> Residential | <input type="checkbox"/> Industrial |
| <input checked="" type="checkbox"/> Agricultural | <input type="checkbox"/> None |
| <input type="checkbox"/> Commercial | <input type="checkbox"/> Other Describe: |
8. Types of waste received:
- | | |
|--|--|
| <input checked="" type="checkbox"/> Household | <input checked="" type="checkbox"/> C & D debris |
| <input checked="" type="checkbox"/> Commercial | <input checked="" type="checkbox"/> Shredded/cut tires |
| <input checked="" type="checkbox"/> Incinerator/WTE ash | <input type="checkbox"/> Yard trash |
| <input checked="" type="checkbox"/> Treated biomedical | <input type="checkbox"/> Septic tank |
| <input checked="" type="checkbox"/> Water treatment sludge | <input checked="" type="checkbox"/> Industrial |

<input type="checkbox"/> Air treatment sludge	<input checked="" type="checkbox"/> Industrial sludge
<input type="checkbox"/> Agricultural	<input checked="" type="checkbox"/> Domestic sludge
<input checked="" type="checkbox"/> Asbestos	<input checked="" type="checkbox"/> Other Describe:
Waste tires, auto shredder waste, and industrial liquid waste for solidification	

9. Salvaging permitted: ☐ Yes ☒ No

10. Attendant: ☒ Yes ☐ No Trained operator: ☒ Yes ☐ No

11. Trained spotters: ☒ Yes ☐ No Number of spotters used: Minimum of 1 per work face

12. Site located in: ☒ Floodplain ☐ Wetlands ☐ Other:

13. Days of operation: Monday - Saturday

14. Hours of operation: Mon-Fri: 6am to 5pm and Sat: 6am to 2pm

15. Days Working Face covered: Each working day

16. Elevation of water table: 79 ft. Datum Used: NGVD 1929

17. Number of monitoring wells: 63

18. Number of surface monitoring points: 2

19. Gas controls used: ☒ Yes ☐ No Type controls: ☒ Active ☐ Passive

Gas flaring: ☒ Yes ☐ No Gas recovery: ☒ Yes ☐ No

20. Landfill unit liner type:

<input type="checkbox"/> Natural soils	<input type="checkbox"/> Double geomembrane
<input type="checkbox"/> Single clay liner	<input checked="" type="checkbox"/> Geomembrane & composite (Cells 5 - 21)
<input type="checkbox"/> Single geomembrane	<input checked="" type="checkbox"/> Double composite (Cells 1 - 4)
<input type="checkbox"/> Single composite	<input type="checkbox"/> None
<input type="checkbox"/> Slurry wall	<input type="checkbox"/> Other Describe:
Additional GCL below primary geomembrane in the sump areas in Cells 5 through 21.	

21. Leachate collection method:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Collection pipes | <input checked="" type="checkbox"/> Sand layer |
| <input checked="" type="checkbox"/> Geonets (geocomposite) | <input type="checkbox"/> Gravel layer |
| <input type="checkbox"/> Well points | <input type="checkbox"/> Interceptor trench |
| <input type="checkbox"/> Perimeter ditch | <input type="checkbox"/> None |
| <input type="checkbox"/> Other Describe: | |

22. Leachate storage method:

- | | |
|--|---|
| <input type="checkbox"/> Tanks | <input checked="" type="checkbox"/> Surface impoundments with flexible storage containers |
| <input type="checkbox"/> Other Describe: | |

23. Leachate treatment method:

- | | |
|---|---|
| <input checked="" type="checkbox"/> Oxidation | <input type="checkbox"/> Chemical treatment |
| <input type="checkbox"/> Secondary | <input type="checkbox"/> Settling |
| <input type="checkbox"/> Advanced | <input type="checkbox"/> None |
| <input type="checkbox"/> Other | |

Oxidation performed through aeration at leachate storage area ponds.

24. Leachate disposal method:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Recirculated | <input type="checkbox"/> Pumped to WWTP |
| <input checked="" type="checkbox"/> Transported to WWTP | <input type="checkbox"/> Discharged to surface water/wetland |
| <input type="checkbox"/> Injection well | <input type="checkbox"/> Percolation ponds |
| <input type="checkbox"/> Evaporation | <input type="checkbox"/> Spray Irrigation |
| <input type="checkbox"/> Other | |

25. For leachate discharged to surface waters:

Name and Class of receiving water:

N/A

26. Storm Water:

Collected: ☒ Yes ☐ No

Type of treatment:

Dry and wet retention for landfill and dry retention for access road

Name and Class of receiving water:

Bull Creek, Class III

27. Environmental Resources Permit (ERP) number or status:

Current ERP Numbers are ERP49-0199752-001-EI (Phase 1 Individual), ERP49-0199752-002-EI (Conceptual), ERP-49-0199752-003-EI (Phase 2 Individual), and ERP49-0199752-004-EM (Phase 3 Individual).

PART C. PROHIBITIONS (62-701.300, FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1. Provide documentation that each of the siting criteria will be satisfied for the facility; (62-701.300(2), FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2. If the facility qualifies for any of the exemptions contained in Rules 62-701.300(12) through (18), FAC, then document this qualification(s).
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3. Provide documentation that the facility will be in compliance with the burning restrictions; (62-701.300(3), FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4. Provide documentation that the facility will be in compliance with the hazardous waste restrictions; (62-701.300(4), FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5. Provide documentation that the facility will be in compliance with the PCB disposal restrictions; (62-701.300(5), FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6. Provide documentation that the facility will be in compliance with the biomedical waste restrictions; (62-701.300(6), FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	7. Provide documentation that the facility will be in compliance with the Class I surface water restrictions; (62-701.300(7), FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	8. Provide documentation that the facility will be in compliance with the special waste for landfills restrictions; (62-701.300(8), FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	9. Provide documentation that the facility will be in compliance with the liquid restrictions; (62-701.300(10), FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	10. Provide documentation that the facility will be in compliance with the used oil and oily waste restrictions; (62-701.300(11), FAC)

PART D. SOLID WASTE MANAGEMENT FACILITY PERMIT REQUIREMENTS, GENERAL (62-701.320, FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
<input checked="" type="checkbox"/>	App. A _____	<input type="checkbox"/>	<input type="checkbox"/>	1. Four copies, at minimum, of the completed application form, all supporting data and reports; (62-701.320(5)(a), FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	PART D CONTINUED
<input checked="" type="checkbox"/>	Attached _____	<input type="checkbox"/>	<input type="checkbox"/>	2. Engineering and/or professional certification (signature, date and seal) provided on the applications and all engineering plans, reports and supporting information for the application; (62-701.320(6),FAC)
<input checked="" type="checkbox"/>	Included _____	<input type="checkbox"/>	<input type="checkbox"/>	3. A letter of transmittal to the Department; (62-701.320(7)(a),FAC)
<input checked="" type="checkbox"/>	Included _____	<input type="checkbox"/>	<input type="checkbox"/>	4. A completed application form dated and signed by the applicant; (62-701.320(7)(b),FAC)
<input checked="" type="checkbox"/>	Included _____	<input type="checkbox"/>	<input type="checkbox"/>	5. Permit fee specified in Rule 62-701.315, FAC in check or money order, payable to the Department; (62-701.320(7)(c),FAC)
<input checked="" type="checkbox"/>	Included _____	<input type="checkbox"/>	<input type="checkbox"/>	6. An engineering report addressing the requirements of this rule and with the following format: a cover sheet, text printed on 8 1/2 inch by 11 inch consecutively numbered pages, a table of contents or index, the body of the report and all appendices including an operation plan, contingency plan, illustrative charts and graphs, records or logs of tests and investigations, engineering calculations; (62-701.320(7)(d),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	7. Operation Plan and Closure Plan; (62-701.320(7)(e)1,FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	8. Contingency Plan; (62-701.320(7)(e)2,FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	9. Plans or drawings for the solid waste management facilities in appropriate format (including sheet size restrictions, cover sheet, legends, north arrow, horizontal and vertical scales, elevations referenced to NGVD 1929) showing; (62-701.320(7)(f),FAC)
<input checked="" type="checkbox"/>	Partial Closure Drawings _____	<input type="checkbox"/>	<input type="checkbox"/>	a. A regional map or plan with the project location in relation to major roadways and population centers;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	b. A vicinity map or aerial photograph no more than 1 year old showing the facility site and relevant surface features located within 1000 feet of the facility;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	c. A site plan showing all property boundaries certified by a Florida Licensed Professional Surveyor and Mapper; and
<input checked="" type="checkbox"/>	Partial Closure Drawings _____	<input type="checkbox"/>	<input type="checkbox"/>	d. Other necessary details to support the engineering report, including referencing elevations to a consistent, nationally recognized datum and identifying the method used for collecting latitude and longitude data.

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	PART D CONTINUED
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	10. Documentation that the applicant either owns the property or has legal authority from the property owner to use the site; (62-701.320(7)(g),FAC)
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	11. For facilities owned or operated by a county, provide a description of how, if any, the facilities covered in this application will contribute to the county's achievement of the waste reduction and recycling goals contained in Section 403.706,FS; (62-701.320(7)(h),FAC)
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	12. Provide a history and description of any enforcement actions taken by the Department against the applicant for violations of applicable statutes, rules, orders or permit conditions relating to the operation of any solid waste management facility in this state; (62-701.320(7)(i),FAC)
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	13. Proof of publication in a newspaper of general circulation of notice of application for a permit to construct or substantially modify a solid waste management facility; (62-702.320(8),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	14. Provide a description of how the requirements for airport safety will be achieved including proof of required notices if applicable. If exempt, explain how the exemption applies; (62-701.320(13),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	15. Explain how the operator and spotter training requirements and special criteria will be satisfied for the facility; (62-701.320(15), FAC)

PART E. LANDFILL PERMIT REQUIREMENTS (62-701.330, FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1. Regional map or aerial photograph no more than 5 years old showing all airports that are located within five miles of the proposed landfill; (62-701.330(3)(a),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2. Plot plan with a scale not greater than 200 feet to the inch showing; (62-701.330(3)(b),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	a. Dimensions;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	b. Locations of proposed and existing water quality monitoring wells;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	c. Locations of soil borings;

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	PART E CONTINUED
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	d. Proposed plan of trenching or disposal areas;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	e. Cross sections showing original elevations and proposed final contours which shall be included either on the plot plan or on separate sheets;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	f. Any previously filled waste disposal areas;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	g. Fencing or other measures to restrict access.
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3. Topographic maps with a scale not greater than 200 feet to the inch with 5-foot contour intervals showing; (62-701.330(3)(c),FAC):
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	a. Proposed fill areas;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	b. Borrow areas;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	c. Access roads;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	d. Grades required for proper drainage;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	e. Cross sections of lifts;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	f. Special drainage devices if necessary;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	g. Fencing;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	h. Equipment facilities.
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4. A report on the landfill describing the following; (62-701.330(3)(d),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	a. The current and projected population and area to be served by the proposed site;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	b. The anticipated type, annual quantity, and source of solid waste, expressed in tons;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	c. Planned active life of the facility, the final design height of the facility and the maximum height of the facility during its operation;

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>
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PART E CONTINUED

- | | | | | |
|--------------------------|-------|--------------------------|-------------------------------------|---|
| <input type="checkbox"/> | _____ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | d. The source and type of cover material used for the landfill. |
| <input type="checkbox"/> | _____ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 5. Provide evidence that an approved laboratory shall conduct water quality monitoring for the facility in accordance with Chapter 62-160,FAC; (62-701.330(3)(g),FAC) |
| <input type="checkbox"/> | _____ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 6. Provide a statement of how the applicant will demonstrate financial responsibility for the closing and long-term care of the landfill; (62-701.330(3)(h),FAC) |

PART F. GENERAL CRITERIA FOR LANDFILLS (62-701.340,FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>
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- | | | | | |
|--------------------------|-------|--------------------------|-------------------------------------|--|
| <input type="checkbox"/> | _____ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 1. Describe (and show on a Federal Insurance Administration flood map, if available) how the landfill or solid waste disposal unit shall not be located in the 100-year floodplain where it will restrict the flow of the 100-year flood, reduce the temporary water storage capacity of the floodplain unless compensating storage is provided, or result in a washout of solid waste; (62-701.340(3)(b),FAC) |
| <input type="checkbox"/> | _____ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 2. Describe how the minimum horizontal separation between waste deposits in the landfill and the landfill property boundary shall be 100 feet, measured from the toe of the proposed final cover slope; (62-701.340(3)(c),FAC) |

PART G. LANDFILL CONSTRUCTION REQUIREMENTS (62-701.400,FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>
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- | | | | | |
|--------------------------|-------|-------------------------------------|-------------------------------------|---|
| <input type="checkbox"/> | _____ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 1. Describe how the landfill shall be designed so that solid waste disposal units will be constructed and closed at planned intervals throughout the design period of the landfill and shall be designed to achieve a minimum factor of safety of 1.5 using peak strength values to prevent failures of side slopes and deep-seated failures; (62-701.400(2),FAC) |
| <input type="checkbox"/> | _____ | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 2. Landfill liner requirements; (62-701.400(3),FAC) |
| <input type="checkbox"/> | _____ | <input checked="" type="checkbox"/> | <input type="checkbox"/> | a. General construction requirements; (62-701.400(3)(a),FAC): |
| <input type="checkbox"/> | _____ | <input checked="" type="checkbox"/> | <input type="checkbox"/> | (1) Provide test information and documentation to ensure the liner will be constructed of materials that have appropriate physical, chemical, and mechanical properties to prevent failure; |

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	PART G CONTINUED	
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(2)	Document foundation is adequate to prevent liner failure;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(3)	Constructed so bottom liner will not be adversely impacted by fluctuations of the ground water;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(4)	Designed to resist hydrostatic uplift if bottom liner located below seasonal high ground water table;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(5)	Installed to cover all surrounding earth which could come into contact with the waste or leachate.
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	b. Composite liners; (62-701.400(3)(b),FAC)	
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(1)	Upper geomembrane thickness and properties;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(2)	Design leachate head for primary LCRS including leachate recirculation if appropriate;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(3)	Design thickness in accordance with Table A and number of lifts planned for lower soil component.
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	c. Double liners; (62-701.400(3)(c),FAC)	
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(1)	Upper and lower geomembrane thicknesses and properties;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(2)	Design leachate head for primary LCRS to limit the head to one foot above the liner;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(3)	Lower geomembrane sub-base design;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(4)	Leak detection and secondary leachate collection system minimum design criteria ($k \geq 10$ cm/sec, head on lower liner ≤ 1 inch, head not to exceed thickness of drainage layer);
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	d. Standards for geosynthetic components; (62-701.400(3)(d),FAC)	

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>		PART G CONTINUED
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(1)	Factory and field seam test methods to ensure all geomembrane seams achieve the minimum specifications;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(2)	Geomembranes to be used shall pass a continuous spark test by the manufacturer;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(3)	Design of 24-inch-thick protective layer above upper geomembrane liner;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(4)	Describe operational plans to protect the liner and leachate collection system when placing the first layer of waste above 24-inch-thick protective layer.
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(5)	HDPE geomembranes, if used, meet the specifications in GRI GM13 and LLDPE geomembranes, if used, meet the specifications in GRI GM17;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(6)	PVC geomembranes, if used, meet the specifications in PGI 1104;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(7)	Interface shear strength testing results of the actual components which will be used in the liner system;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(8)	Transmissivity testing results of geonets if they are used in the liner system;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(9)	Hydraulic conductivity testing results of geosynthetic clay liners if they are used in the liner system;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>		e. Geosynthetic specification requirements; (62-701.400(3)(e),FAC)
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(1)	Definition and qualifications of the designer, manufacturer, installer, QA consultant and laboratory, and QA program;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(2)	Material specifications for geomembranes, geocomposites, geotextiles, geogrids, and geonets;

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(3) Manufacturing and fabrication specifications including geomembrane raw material and roll QA, fabrication personnel qualifications, seaming equipment and procedures, overlaps, trial seams, destructive and nondestructive seam testing, seam testing location, frequency, procedure, sample size and geomembrane repairs;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(4) Geomembrane installation specifications including earthwork, conformance testing, geomembrane placement, installation personnel qualifications, field seaming and testing, overlapping and repairs, materials in contact with geomembrane and procedures for lining system acceptance;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(5) Geotextile and geogrid specifications including handling and placement, conformance testing, seams and overlaps, repair, and placement of soil materials and any overlying materials;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(6) Geonet and geocomposite specifications including handling and placement, conformance testing, stacking and joining, repair, and placement of soil materials and any overlying materials;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(7) Geosynthetic clay liner specifications including handling and placement, conformance testing, seams and overlaps, repair, and placement of soil material and any overlying materials;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	f. Standards for soil liner components (62-710.400(3)(f),FAC):
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(1) Description of construction procedures including overexcavation and backfilling to preclude structural inconsistencies and procedures for placing and compacting soil component in layers;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(2) Demonstration of compatibility of the soil component with actual or simulated leachate in accordance with EPA Test Method 9100 or an equivalent test method;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(3) Procedures for testing in-situ soils to demonstrate they meet the specifications for soil liners;

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	PART G CONTINUED
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(4) Specifications for soil component of liner including at a minimum:
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(a) Allowable particle size distribution, Atterberg limits, shrinkage limit;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(b) Placement moisture and dry density criteria;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(c) Maximum laboratory-determined saturated hydraulic conductivity using simulated leachate;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(d) Minimum thickness of soil liner;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(e) Lift thickness;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(f) Surface preparation (scarification);
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(g) Type and percentage of clay mineral within the soil component;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(5) Procedures for constructing and using a field test section to document the desired saturated hydraulic conductivity and thickness can be achieved in the field.
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	g. If a Class III landfill is to be constructed with a bottom liner system, provide a description of how the minimum requirements for the liner will be achieved.
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. Leachate collection and removal system (LCRS); (62-701.400(4),FAC)
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	a. The primary and secondary LCRS requirements; (62-701.400(4)(a),FAC)
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(1) Constructed of materials chemically resistant to the waste and leachate;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(2) Have sufficient mechanical properties to prevent collapse under pressure;

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	PART G CONTINUED
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(3) Have granular material or synthetic geotextile to prevent clogging;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(4) Have method for testing and cleaning clogged pipes or contingent designs for rerouting leachate around failed areas;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	b. Other LCRS requirements; (62-701.400(4)(b) and (c),FAC)
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(1) Bottom 12 inches having hydraulic conductivity $\geq 1 \times 10^{-3}$ cm/sec;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(2) Total thickness of 24 inches of material chemically resistant to the waste and leachate;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(3) Bottom slope design to accommodate for predicted settlement and still meet minimum slope requirements;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(4) Demonstration that synthetic drainage material, if used, is equivalent or better than granular material in chemical compatibility, flow under load and protection of geomembrane liner.
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. Leachate recirculation; (62-701.400(5),FAC)
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	a. Describe general procedures for recirculating leachate;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	b. Describe procedures for controlling leachate runoff and minimizing mixing of leachate runoff with storm water;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	c. Describe procedures for preventing perched water conditions and gas buildup;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	d. Describe alternate methods for leachate management when it cannot be recirculated due to weather or runoff conditions, surface seeps, wind-blown spray, or elevated levels of leachate head on the liner;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	e. Describe methods of gas management in accordance with Rule 62-701.530, FAC;

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	PART G CONTINUED
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	f. If leachate irrigation is proposed, describe treatment methods and standards for leachate treatment prior to irrigation over final cover and provide documentation that irrigation does not contribute significantly to leachate generation.
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. Leachate storage tanks and leachate surface impoundments; (62-701.400(6), FAC)
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	a. Surface impoundment requirements; (62-701.400(6)(b), FAC)
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(1) Documentation that the design of the bottom liner will not be adversely impacted by fluctuations of the ground water;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(2) Designed in segments to allow for inspection and repair as needed without interruption of service;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(3) General design requirements;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(a) Double liner system consisting of an upper and lower 60-mil minimum thickness geomembrane;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(b) Leak detection and collection system with hydraulic conductivity ≥ 1 cm/sec;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(c) Lower geomembrane placed on subbase ≥ 6 inches thick with $k \leq 1 \times 10^{-5}$ cm/sec or on an approved geosynthetic clay liner with $k \leq 1 \times 10^{-7}$ cm/sec;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(d) Design calculation to predict potential leakage through the upper liner;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(e) Daily inspection requirements and notification and corrective action requirements if leakage rates exceed that predicted by design calculations;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(4) Description of procedures to prevent uplift, if applicable;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(5) Design calculations to demonstrate minimum two feet of freeboard will be maintained;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(6) Procedures for controlling vectors and off-site odors.

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	PART G CONTINUED
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	b. Above-ground leachate storage tanks; (62-701.400(6)(c),FAC)
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(1) Describe tank materials of construction and ensure foundation is sufficient to support tank;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(2) Describe procedures for cathodic protection if needed for the tank;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(3) Describe exterior painting and interior lining of the tank to protect it from the weather and the leachate stored;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(4) Describe secondary containment design to ensure adequate capacity will be provided and compatibility of materials of construction;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(5) Describe design to remove and dispose of stormwater from the secondary containment system;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(6) Describe an overfill prevention system such as level sensors, gauges, alarms and shutoff controls to prevent overfilling;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(7) Inspections, corrective action and reporting requirements;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(a) Overfill prevention system weekly;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(b) Exposed tank exteriors weekly;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(c) Tank interiors when tank is drained or at least every three years;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(d) Procedures for immediate corrective action if failures detected;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(e) Inspection reports available for department review.
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	c. Underground leachate storage tanks; (62-701.400(6)(d),FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	PART G CONTINUED	
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(1)	Describe materials of construction;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(2)	A double-walled tank design system to be used with the following requirements;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(a)	Interstitial space monitoring at least weekly;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(b)	Corrosion protection provided for primary tank interior and external surface of outer shell;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(c)	Interior tank coatings compatible with stored leachate;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(d)	Cathodic protection inspected weekly and repaired as needed;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(3)	Describe an overfill prevention system such as level sensors, gauges, alarms and shutoff controls to prevent overfilling and provide for weekly inspections;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(4)	Inspection reports available for department review.
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>		d.Schedule provided for routine maintenance of LCRS; (62-701.400(6)(e),FAC)
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>		6.Liner systems construction quality assurance (CQA); (62-701.400(7),FAC)
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	a.	Provide CQA Plan including:
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(1)	Specifications and construction requirements for liner system;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(2)	Detailed description of quality control testing procedures and frequencies;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(3)	Identification of supervising professional engineer;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(4)	Identify responsibility and authority of all appropriate organizations and key personnel involved in the construction project;

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	PART G CONTINUED
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(5) State qualifications of CQA professional engineer and support personnel;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(6) Description of CQA reporting forms and documents;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	b. An independent laboratory experienced in the testing of geosynthetics to perform required testing;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. Soil Liner CQA (62-701.400(8)FAC)
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	a. Documentation that an adequate borrow source has been located with test results or description of the field exploration and laboratory testing program to define a suitable borrow source;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	b. Description of field test section construction and test methods to be implemented prior to liner installation;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	c. Description of field test methods including rejection criteria and corrective measures to insure proper liner installation.
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	8. Surface water management systems; (62-701.400(9),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	a. Provide a copy of a Department permit for stormwater control or documentation that no such permit is required;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	b. Design of surface water management system to isolate surface water from waste filled areas and to control stormwater run-off;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	c. Details of stormwater control design including retention ponds, detention ponds, and drainage ways;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	9. Gas control systems; (62-701.400(10),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	a. Provide documentation that if the landfill is receiving degradable wastes, it will have a gas control system complying with the requirements of Rule 62-701.530, FAC;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	10. For landfills designed in ground water, provide documentation that the landfill will provide a degree of protection equivalent to landfills designed with bottom liners not in contact with ground water; (62-701.400(11),FAC)

PART H. HYDROGEOLOGICAL INVESTIGATION REQUIREMENTS (62-701.410(1), FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1. Submit a hydrogeological investigation and site report including at least the following information:
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	a. Regional and site specific geology and hydrogeology;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	b. Direction and rate of ground water and surface water flow including seasonal variations;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	c. Background quality of ground water and surface water;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	d. Any on-site hydraulic connections between aquifers;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	e. Site stratigraphy and aquifer characteristics for confining layers, semi-confining layers, and all aquifers below the landfill site that may be affected by the landfill;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	f. Description of topography, soil types and surface water drainage systems;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	g. Inventory of all public and private water wells within a one-mile radius of the landfill including, where available, well top of casing and bottom elevations, name of owner, age and usage of each well, stratigraphic unit screened, well construction technique and static water level;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	h. Identify and locate any existing contaminated areas on the site;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	i. Include a map showing the locations of all potable wells within 500 feet of the waste storage and disposal areas;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2. Report signed, sealed and dated by PE and/or PG.

PART I. GEOTECHNICAL INVESTIGATION REQUIREMENTS (62-701.410(2),FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1. Submit a geotechnical site investigation report defining the engineering properties of the site including at least the following:
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	a. Description of subsurface conditions including soil stratigraphy and ground water table conditions;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	b. Investigate for the presence of muck, previously filled areas, soft ground, lineaments and sink holes;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	c. Estimates of average and maximum high water table across the site;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	d. Foundation analysis including:
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(1) Foundation bearing capacity analysis;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(2) Total and differential subgrade settlement analysis;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(3) Slope stability analysis;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	e. Description of methods used in the investigation and includes soil boring logs, laboratory results, analytical calculations, cross sections, interpretations and conclusions;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	f. An evaluation of fault areas, seismic impact zones, and unstable areas as described in 40 CFR 258.13, 40 CFR 258.14 and 40 CFR 258.15.
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2. Report signed, sealed and dated by PE and/or PG.

PART J. VERTICAL EXPANSION OF LANDFILLS (62-701.430,FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. Describe how the vertical expansion shall not cause or contribute to leachate leakage from the existing landfill, shall not cause objectionable odors, or adversely affect the closure design of the existing landfill;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. Describe how the vertical expansion over unlined landfills will meet the requirements of Rule 62-701.400, FAC with the exceptions of Rule 62-701.430(1)(c),FAC;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. Provide foundation and settlement analysis for the vertical expansion;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. Provide total settlement calculations demonstrating that the final elevations of the lining system, that gravity drainage, and that no other component of the design will be adversely affected;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. Minimum stability safety factor of 1.5 for the lining system component interface stability and deep stability;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. Provide documentation to show the surface water management system will not be adversely affected by the vertical expansion;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. Provide gas control designs to prevent accumulation of gas under the new liner for the vertical expansion.

PART K. LANDFILL OPERATION REQUIREMENTS (62-701.500,FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1. Provide documentation that landfill will have at least one trained operator during operation and at least one trained spotter at each working face; (62-701.500(1),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2. Provide a landfill operation plan including procedures for: (62-701.500(2), FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	a. Designating responsible operating and maintenance personnel;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	b. Emergency preparedness and response, as required in subsection 62-701.320(16), FAC;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	c. Controlling types of waste received at the landfill;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	d. Weighing incoming waste;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	e. Vehicle traffic control and unloading;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	f. Method and sequence of filling waste;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	g. Waste compaction and application of cover;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	h. Operations of gas, leachate, and stormwater controls;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	i. Water quality monitoring.
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	j. Maintaining and cleaning the leachate collection system;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3. Provide a description of the landfill operation record to be used at the landfill; details as to location of where various operational records will be kept (i.e. FDEP permit, engineering drawings, water quality records, etc.) (62-701.500(3),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4. Describe the waste records that will be compiled monthly and provided to the Department annually; (62-701.500(4),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5. Describe methods of access control; (62-701.500(5),FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	PART K CONTINUED
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6. Describe load checking program to be implemented at the landfill to discourage disposal of unauthorized wastes at the landfill; (62-701.500(6),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	7. Describe procedures for spreading and compacting waste at the landfill that include: (62-701.500(7),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	a. Waste layer thickness and compaction frequencies;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	b. Special considerations for first layer of waste placed above liner and leachate collection system;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	c. Slopes of cell working face and side grades above land surface, planned lift depths during operation;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	d. Maximum width of working face;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	e. Description of type of initial cover to be used at the facility that controls:
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(1) Vector breeding/animal attraction
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(2) Fires
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(3) Odors
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(4) Blowing litter
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(5) Moisture infiltration
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	f. Procedures for applying initial cover including minimum cover frequencies;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	g. Procedures for applying intermediate cover;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	h. Time frames for applying final cover;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	i. Procedures for controlling scavenging and salvaging.

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	PART K CONTINUED
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	j. Description of litter policing methods;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	k. Erosion control procedures.
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	8. Describe operational procedures for leachate management including; (62-701.500(8),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	a. Leachate level monitoring, sampling, analysis and data results submitted to the Department;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	b. Operation and maintenance of leachate collection and removal system, and treatment as required;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	c. Procedures for managing leachate if it becomes regulated as a hazardous waste;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	d. Identification of treatment or disposal facilities that may be used for off-site discharge and treatment of leachate;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	e. Contingency plan for managing leachate during emergencies or equipment problems;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	f. Procedures for recording quantities of leachate generated in gal/day and including this in the operating record;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	g. Procedures for comparing precipitation experienced at the landfill with leachate generation rates and including this information in the operating record;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	h. Procedures for water pressure cleaning or video inspecting leachate collection systems.
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	9. Describe how the landfill receiving degradable wastes shall implement a gas management system meeting the requirements of Rule 62-701.530, FAC; (62-701.500(9),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	10. Describe procedures for operating and maintaining the landfill stormwater management system to comply with the requirements of Rule 62-701.400(9); (62-701.500(10),FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	PART K CONTINUED
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	11. Equipment and operation feature requirements; (62-701.500(11),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	a. Sufficient equipment for excavating, spreading, compacting and covering waste;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	b. Reserve equipment or arrangements to obtain additional equipment within 24 hours of breakdown;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	c. Communications equipment;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	d. Dust control methods;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	e. Fire protection capabilities and procedures for notifying local fire department authorities in emergencies;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	f. Litter control devices;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	g. Signs indicating operating authority, traffic flow, hours of operation, disposal restrictions.
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	12. Provide a description of all-weather access road, inside perimeter road and other roads necessary for access which shall be provided at the landfill; (62-701.500(12),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	13. Additional record keeping and reporting requirements; (62-701.500(13),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	a. Records used for developing permit applications and supplemental information maintained for the design period of the landfill;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	b. Monitoring information, calibration and maintenance records, copies of reports required by permit maintained for at least 10 years;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	c. Maintain annual estimates of the remaining life of constructed landfills and of other permitted areas not yet constructed and submit this estimate annually to the Department;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	d. Procedures for archiving and retrieving records which are more than five year old.

PART L. WATER QUALITY AND LEACHATE MONITORING REQUIREMENTS (62-701.510, FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1. Water quality and leachate monitoring plan shall be submitted describing the proposed ground water, surface water and leachate monitoring systems and shall meet at least the following requirements;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	a. Based on the information obtained in the hydrogeological investigation and signed, dated and sealed by the PG or PE who prepared it; (62-701.510(2)(a),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	b. All sampling and analysis performed in accordance with Chapter 62-160, FAC; (62-701.510(2)(b),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	c. Ground water monitoring requirements; (62-701.510(3),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(1) Detection wells located downgradient from and within 50 feet of disposal units;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(2) Downgradient compliance wells as required;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(3) Background wells screened in all aquifers below the landfill that may be affected by the landfill;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(4) Location information for each monitoring well;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(5) Well spacing no greater than 500 feet apart for downgradient wells and no greater than 1500 feet apart for upgradient wells unless site specific conditions justify alternate well spacings;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(6) Well screen locations properly selected;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(7) Monitoring wells constructed to provide representative ground water samples;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(8) Procedures for properly abandoning monitoring wells;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(9) Detailed description of detection sensors if proposed.
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	d. Surface water monitoring requirements; (62-701.510(4),FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	PART L CONTINUED
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(1) Location of and justification for all proposed surface water monitoring points;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(2) Each monitoring location to be marked and its position determined by a registered Florida land surveyor;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	e. Leachate sampling locations proposed; (62-701.510(5),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	f. Initial and routine sampling frequency and requirements; (62-701.510(6),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(1) Initial background ground water and surface water sampling and analysis requirements;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(2) Routine leachate sampling and analysis requirements;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(3) Routine monitoring well sampling and analysis requirements;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(4) Routine surface water sampling and analysis requirements.
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	g. Describe procedures for implementing evaluation monitoring, prevention measures and corrective action as required; (62-701.510(7),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	h. Water quality monitoring report requirements;(62-701.510(9),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(1) Semi-annual report requirements (see paragraphs 62 701.510(6)(c),(d)and (e) for sampling frequencies);
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(2) Documentation that the water quality data shall be provided to the Department in an electronic format consistent with requirements for importing into Department databases, unless an alternate form of submittal is specified in the permit.
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(3) Two and one-half year report requirements, or every five years if in long-term care, signed, dated and sealed by PG or PE.

PART M. SPECIAL WASTE HANDLING REQUIREMENTS (62-701.520, FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1. Describe procedures for managing motor vehicles; (62-701.520(1),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2. Describe procedures for landfilling shredded waste; (62-701.520(2),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3. Describe procedures for asbestos waste disposal; (62-701.520(3),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4. Describe procedures for disposal or management of contaminated soil; (62-701.520(4), FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5. Describe procedures for disposal of biological wastes; (62-701.520(5), FAC)

PART N. GAS MANAGEMENT SYSTEM REQUIREMENTS (62-701.530,FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1. Provide the design for a gas management system that will (62-701.530(1), FAC):
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	a. Be designed to prevent concentrations of combustible gases from exceeding 25% the LEL in structures and 100% the LEL at the property boundary;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	b. Be designed for site-specific conditions;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	c. Be designed to reduce gas pressure in the interior of the landfill;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	d. Be designed to not interfere with the liner, leachate control system or final cover.
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2. Provide documentation that will describe locations, construction details and procedures for monitoring gas at ambient monitoring points and with soil monitoring probes; (62-701.530(2), FAC):
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3. Provide documentation describing how the gas remediation plan and odor remediation plan will be implemented; (62-701.530(3), FAC):
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. Landfill gas recovery facilities; (62-701.530(5), FAC):

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	PART N CONTINUED
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	a. Information required in Rules 62-701.320(7) and 62-701.330(3), FAC supplied;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	b. Information required in Rule 62-701.600(4), FAC supplied where relevant and practical;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	c. Estimate of current and expected gas generation rates and description of condensate disposal methods provided;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	d. Description of procedures for condensate sampling, analyzing and data reporting provided;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	e. Closure plan provided describing methods to control gas after recovery facility ceases operation and any other requirements contained in Rule 62-701.400(10), FAC;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	f. Performance bond provided to cover closure costs if not already included in other landfill closure costs.

PART O. LANDFILL FINAL CLOSURE REQUIREMENTS (62-701.600,FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. Closure permit requirements; (62-701.600(2),FAC)
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	a. Application submitted to Department at least 90 days prior to final receipt of wastes;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	b. Closure plan shall include the following:
<input checked="" type="checkbox"/>	<u>Partial Closure Drawings</u>	<input type="checkbox"/>	<input type="checkbox"/>	(1) Closure design plan;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(2) Closure operation plan;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(3) Plan for long-term care;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(4) A demonstration that proof of financial responsibility for long-term care will be provided.

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	PART O CONTINUED
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	2. Closure design plan including the following requirements: (62-701.600(3),FAC)
<input checked="" type="checkbox"/>	<u>Partial Closure Drawings</u>	<input type="checkbox"/>	<input type="checkbox"/>	a. Plan sheet showing phases of site closing;
<input checked="" type="checkbox"/>	<u>Partial Closure Drawings</u>	<input type="checkbox"/>	<input type="checkbox"/>	b. Drawings showing existing topography and proposed final grades;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	c. Provisions to close units when they reach approved design dimensions;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	d. Final elevations before settlement;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	e. Side slope design including benches, terraces, down slope drainage ways, energy dissipaters and discussion of expected precipitation effects;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	f. Final cover installation plans including:
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(1) CQA plan for installing and testing final cover;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(2) Schedule for installing final cover after final receipt of waste;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(3) Description of drought-resistant species to be used in the vegetative cover;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(4) Top gradient design to maximize runoff and minimize erosion;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(5) Provisions for cover material to be used for final cover maintenance.
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	g. Final cover design requirements:
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(1) Protective soil layer design;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(2) Barrier soil layer design;

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	PART O CONTINUED
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(3) Erosion control vegetation;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(4) Geomembrane barrier layer design;
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	(5) Geosynthetic clay liner design if used;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	(6) Stability analysis of the cover system and the disposed waste.
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	h. Proposed method of stormwater control;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	i. Proposed method of access control;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	j. Description of the proposed or existing gas management system which complies with Rule 62-701.530, FAC.
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	3. Closure operation plan shall include:(62-701.600(4),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	a. Detailed description of actions which will be taken to close the landfill;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	b. Time schedule for completion of closing and long-term care;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	c. Describe proposed method for demonstrating financial assurance for long-term care;
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	d. Operation of the water quality monitoring plan required in Rule 62-701.510, FAC.
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	e. Development and implementation of gas management system required in Rule 62-701.530, FAC.
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>	4. Certification of closure construction completion including: (62-701.600(6),FAC)
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	a. Survey monuments; (62-701.600(6)(a),FAC)
<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	b. Final survey report; (62-701.600(6)(b),FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	PART O CONTINUED
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<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. Declaration to the public; (62-701.600(7),FAC)
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<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. Official date of closing; (62-701.600(8),FAC)
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<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. Justification for and detailed description of procedures to be followed for temporary closure of the landfill, if desired; (62-701.600(9),FAC)
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PART P. OTHER CLOSURE PROCEDURES (62-701.610,FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>
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<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. Describe how the requirements for use of closed solid waste disposal areas will be achieved;(62-701.610(1),FAC)
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<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. Describe how the requirements for relocation of wastes will be achieved; (62-701.610(2), FAC)
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PART Q. LONG-TERM CARE (62-701.620,FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>
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<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. Maintaining the gas collection and monitoring system; (62-701.620(5), FAC)
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<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. Stabilization report requirements; (62-701.620(6),FAC)
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<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. Right of access;(62-701.620(7),FAC)
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<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. Requirements for replacement of monitoring devices; (62-701.620(8),FAC)
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<input type="checkbox"/>	_____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. Completion of long-term care signed and sealed by professional engineer (62-701.620(9), FAC).
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PART R. FINANCIAL ASSURANCE (62-701.630,FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
<input type="checkbox"/>	To be provided with cert. of constr. completion _____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1. Provide cost estimates for closing, long-term care, and corrective action costs estimated by a PE for a third party performing the work, on a per unit basis, with the source of estimates indicated; (62-701.630(3)&(7), FAC).
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2. Describe procedures for providing annual cost adjustments to the Department based on inflation and changes in the closing, long-term care, and corrective action plans; (62-701.630(4)&(8), FAC).
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3. Describe funding mechanisms for providing proof of financial assurance and include appropriate financial assurance forms; (62-701.630(5),(6),&(9), FAC).
<input type="checkbox"/>	_____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4. Provide documentation and the appropriate forms for delaying submitting proof of financial assurance for solid waste disposal units that qualify; (62-701.630(2)(c), FAC).

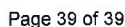
1. Applicant:

is aware that statements made in this form and attached

*Omni is a wholly owned subsidiary of Waste Services, Inc. (WSI)

Date: 3/1/2011

Date: 3/10/2011





2893 Executive Park Drive, Suite 305, Weston, Florida 33331

January 24, 2011

RE: Omni Waste of Osceola County, LLC

To Whom It May Concern:

This is to confirm that Michael Kaiser is an authorized signatory of Omni Waste of Osceola County, LLC (the "Corporation"), with authority to execute and deliver all documents and instruments required in connection with environmental matters for the Corporation, including without limitation, permit applications, modifications and financial assurances for permits issued to the Corporation.

Omni Waste of Osceola County, LLC

A handwritten signature in black ink, appearing to read "William P. Hulligan", written over a horizontal line.

William P. Hulligan
Manager

Waste Services, Inc.

A handwritten signature in black ink, appearing to read "William P. Hulligan", written over a horizontal line.

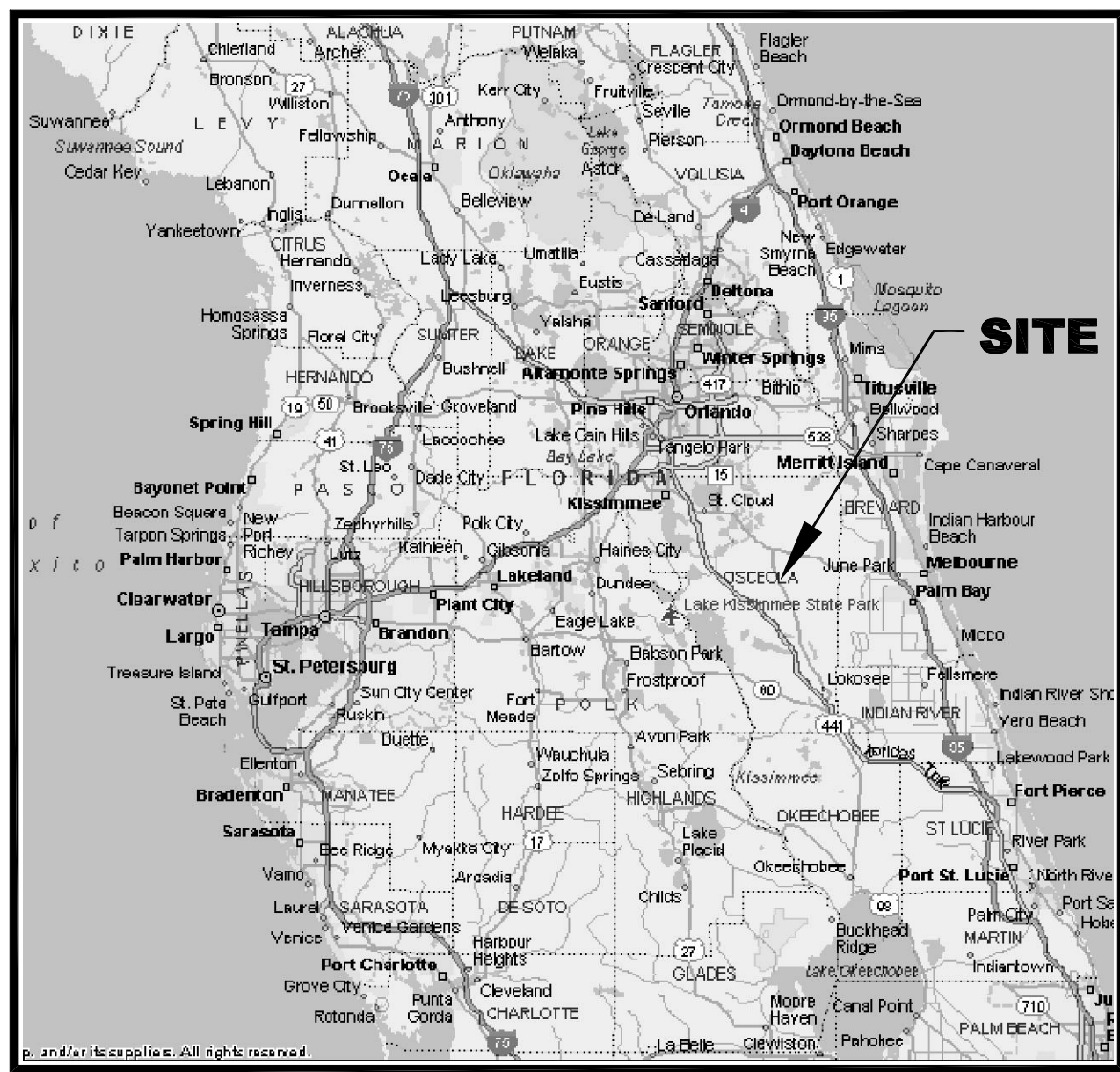
William P. Hulligan
Executive Vice President, U.S. Operations

APPENDIX B

Construction Drawings

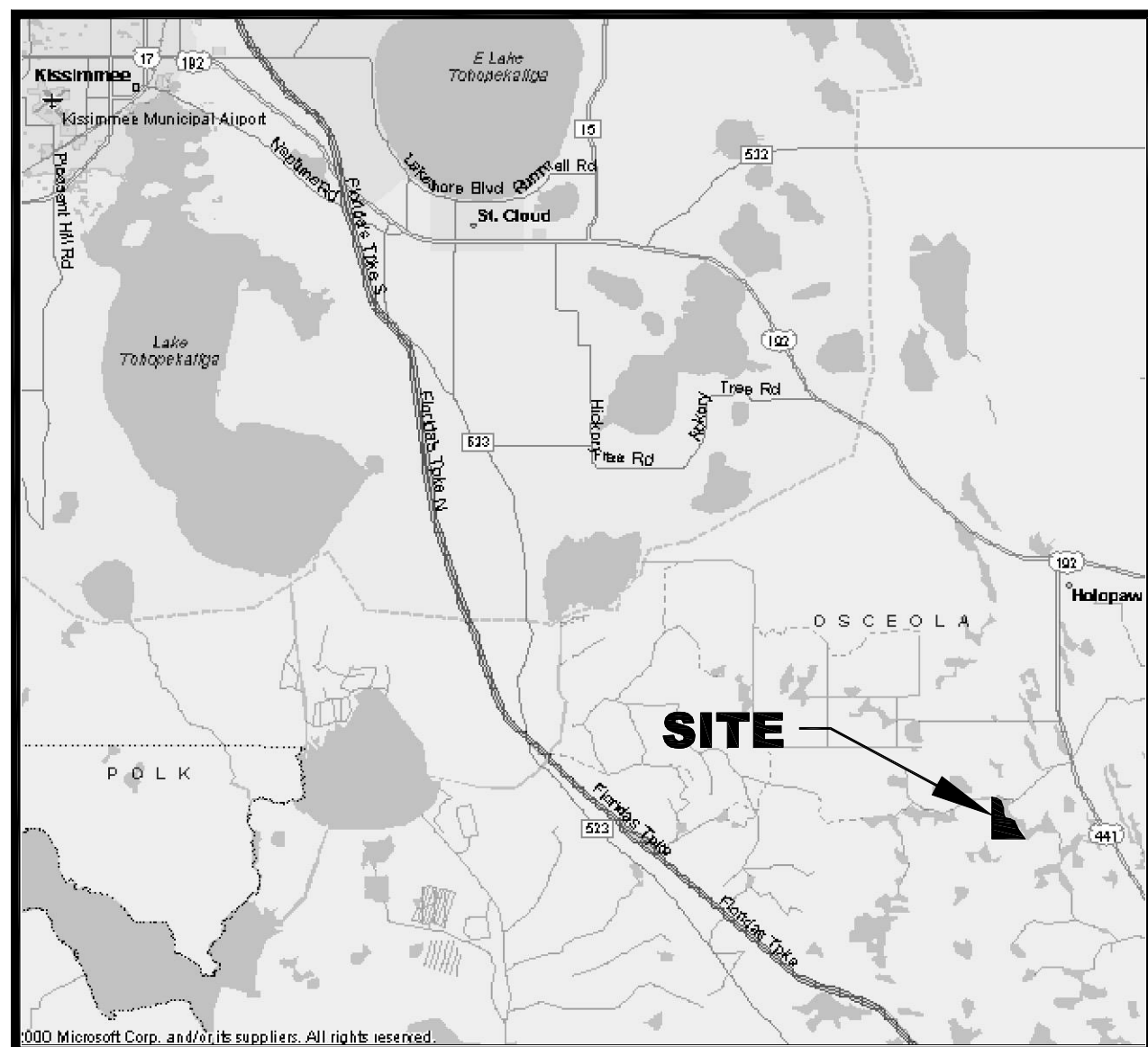


J.E.D. SOLID WASTE MANAGEMENT FACILITY
ST.CLOUD, FLORIDA
PARTIAL LANDFILL CLOSURE CONSTRUCTION - EVENT 2
PHASE 1 DISPOSAL AREA
INTERMEDIATE PERMIT MODIFICATION TO PERMIT NOS.
SC49-0199726-004 AND SO49-0199726-005
MARCH 2011



LOCATION MAP

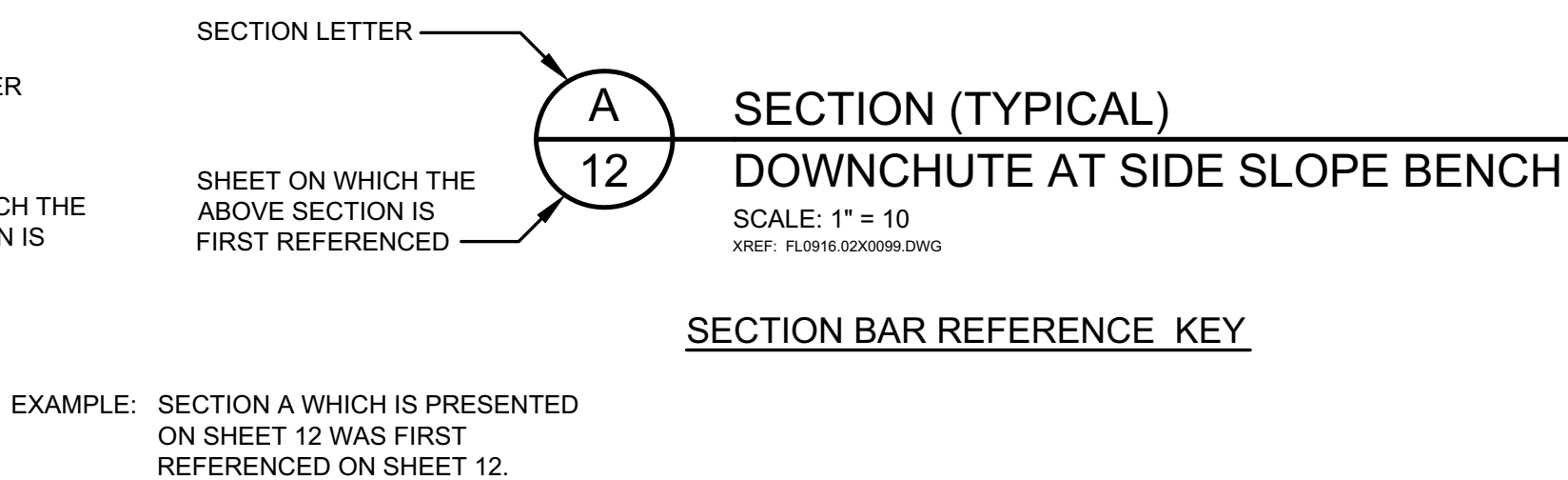
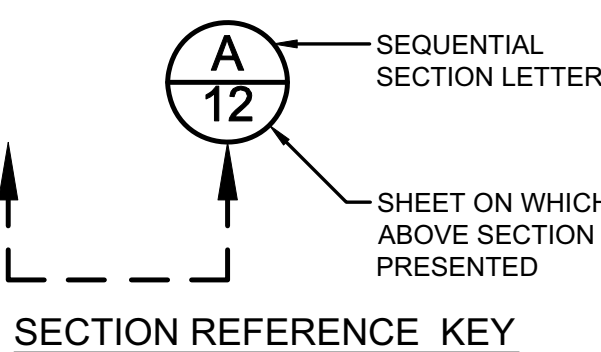
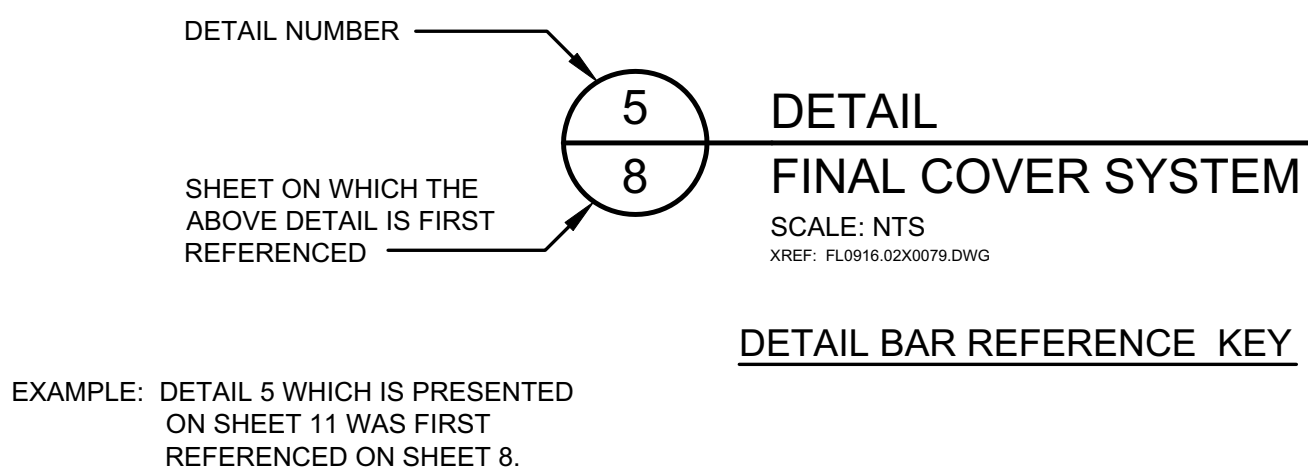
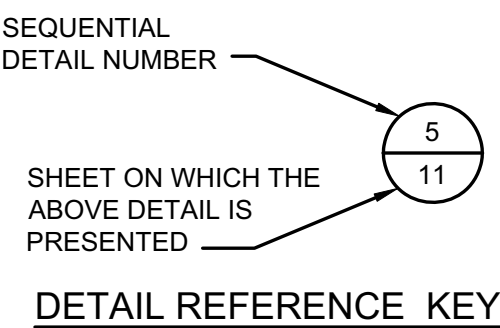
0 32
SCALE: 1" = 32 MILES



VICINITY MAP

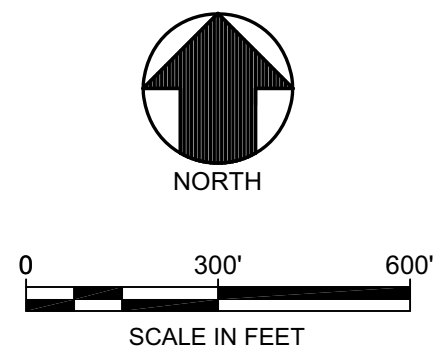
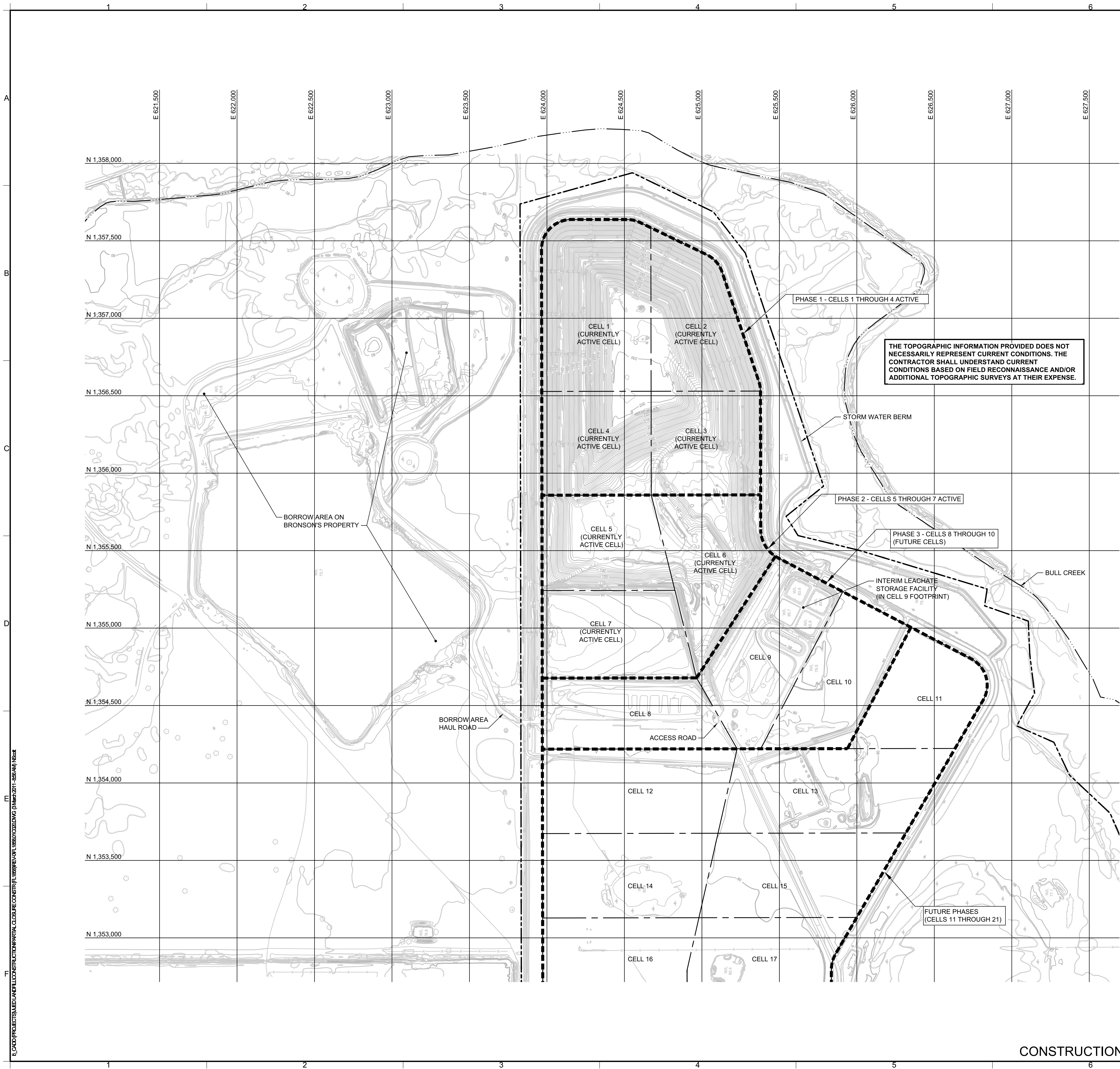
0 4
SCALE: 1" = 4 MILES

LIST OF DRAWINGS		
SHEET	TITLE	REVISION
1	TITLE SHEET	0
2	SITE DEVELOPMENT PLAN	0
3	EXISTING CONDITIONS	0
4	TOP OF WASTE GRADING AND STAKING PLAN	0
5	TOP OF WASTE CONTROL POINT DATA	0
6	TOP OF INTERMEDIATE COVER GRADING AND STAKING PLAN	0
7	TOP OF INTERMEDIATE COVER CONTROL POINT DATA	0
8	TOP OF FINAL COVER SYSTEM GRADING PLAN	0
9	TOP OF FINAL COVER SYSTEM STAKING PLAN	0
10	TOP OF FINAL COVER SYSTEM CONTROL POINT DATA	0
11	FINAL COVER SYSTEM DETAILS	0
12	STORM WATER MANAGEMENT DETAILS	0
13	GAS SYSTEM PENETRATION DETAILS	0



CONSTRUCTION DRAWING

0	MAR-11	INTERMEDIATE PERMIT MODIFICATION	CMV	CRB
REV	DATE	DESCRIPTION	DRN	APP
Geosyntec consultants 13101 TELECOM DRIVE, SUITE 120 TEMPLE TERRACE, FLORIDA 33637 USA PH: 813.558.0990 - FX: 813.558.9726 AUTHORIZATION NUMBER: 4321				
WSI Waste Services, Inc. 1501 GANN WAY ST. CLOUD, FLORIDA 34773 TEL: 407-891-3720 FAX: 407-891-3730				
TITLE: TITLE SHEET				
PROJECT: PARTIAL LANDFILL CLOSURE CONSTRUCTION - EVENT 2				
SITE: PHASE 1 DISPOSAL AREA J.E.D. SOLID WASTE MANAGEMENT FACILITY				
DESIGN BY: VMD/JWO		DATE: MARCH 2011		
DRAWN BY: CMV		PROJECT NO.: FL1858.01		
CHECKED BY: VMD		FILE: FL1858.01C010		
REVIEWED BY: JAB		DRAWING NO.: 1 OF 13		
APPROVED BY: CRB				
CRAIG BROWNE - LICENSE NO. 68613				



LEGEND	
	PROPERTY BOUNDARY
	EXISTING LANDFILL ACCESS OR PERIMETER ROAD
	EXISTING GROUND ELEVATION (FEET) (SEE NOTE 4)
	EXISTING FENCE LINE
	EXISTING TOPOGRAPHY SPOT ELEVATION (FEET)
	TREE LINE
	PHASE BOUNDARY
	CELL BOUNDARY

- NOTES:**
- NORTHING AND EASTING COORDINATES SHOWN REPRESENT FLORIDA STATE PLANE EAST ZONE NORTH AMERICAN DATUM OF 1983 (NAD83).
 - THE ELEVATIONS SHOWN REPRESENT NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29)(FEET).
 - THE PROPERTY BOUNDARY IS BASED ON A COMPOSITE BOUNDARY SURVEY PROVIDED BY JOHNSTON SURVEYING INC., KISSIMEE FLORIDA, DATED AUGUST 12, 1999.
 - THE TOPOGRAPHIC INFORMATION SHOWN ON THIS DRAWING WAS PROVIDED BY BASE MAPPING CO. LTD. BASED ON AN AERIAL PHOTOGRAPH TAKEN ON 24 JULY 2010.
 - THE TOPOGRAPHIC INFORMATION PROVIDED DOES NOT NECESSARILY REPRESENT CURRENT CONDITIONS. THE CONTRACTOR SHALL UNDERSTAND CURRENT CONDITIONS BASED ON FIELD RECONNAISSANCE AND/OR ADDITIONAL TOPOGRAPHIC SURVEYS AT THEIR EXPENSE.

0	MAR-11	INTERMEDIATE PERMIT MODIFICATION	CMV	CRB
REV	DATE	DESCRIPTION	DRN	APP
<div><div>Geosyntec consultants 13101 TELECOM DRIVE, SUITE 120 TEMPLE TERRACE, FLORIDA 33637 USA PH: 813.558.0990 - FX:813.558.9726 AUTHORIZATION NUMBER: 4321</div><div> 1501 OMNI WAY ST. CLOUD, FLORIDA 34773 TEL: 407-891-3720 FAX: 407-891-3730</div></div>				
TITLE: SITE DEVELOPMENT PLAN				
PROJECT: PARTIAL LANDFILL CLOSURE CONSTRUCTION - EVENT 2				
SITE: PHASE 1 DISPOSAL AREA J.E.D. SOLID WASTE MANAGEMENT FACILITY				
 SIGNATURE 3/10/2011 DATE		DESIGN BY: VMD/JWO DATE: MARCH 2011 DRAWN BY: CMV PROJECT NO.: FL1858.01 CHECKED BY: VMD FILE: FL1858.01C020 REVIEWED BY: JAB DRAWING NO.: APPROVED BY: CRB 2 OF 13		
CRAIG BROWNE - LICENSE NO. 68613				

CONSTRUCTION DRAWING



NORTH

0 100' 200'

SCALE IN FEET

LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL ACCESS OR PERIMETER ROAD
- EXISTING GROUND ELEVATION (FEET) (NOTE 4)
- EXISTING FENCE LINE
- EXISTING TOPOGRAPHY SPOT ELEVATION (FEET)
- EXISTING TREE LINE
- CELL BOUNDARY
- LIMIT OF WASTE
- EXISTING GROUNDWATER MONITORING WELL CLUSTER
- EXISTING LEACHATE TRANSMISSION MANHOLE
- EXISTING LEACHATE SUMP RISERS
- EXISTING LEACHATE CLEANOUT
- EXISTING ELECTRIC POLES
- EXISTING GAS EXTRACTION WELL
- EXISTING ISOLATION VALVE
- EXISTING HEADER ACCESS RISER
- EXISTING AREA OF PARTIAL CLOSURE
- EXISTING STORM WATER STRUCTURES
- EXISTING LATERAL PIPE (BURIED)
- EXISTING HEADER PIPE (BURIED)
- LATERAL PIPE (NOTE 9)
- GAS EXTRACTION WELL (NOTE 9)

- NOTES:**
- NORTHING AND EASTING COORDINATES SHOWN REPRESENT FLORIDA STATE PLANE EAST ZONE NORTH AMERICAN DATUM OF 1983 (NAD83).
 - THE ELEVATIONS SHOWN REPRESENT NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29)(FEET).
 - THE PROPERTY BOUNDARY IS BASED ON A COMPOSITE BOUNDARY SURVEY PROVIDED BY JOHNSTON SURVEYING INC., KISSIMMEE FLORIDA, DATED AUGUST 12, 1999.
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 - THE TOPOGRAPHIC INFORMATION PROVIDED DOES NOT NECESSARILY REPRESENT CURRENT CONDITIONS. THE CONTRACTOR SHALL UNDERSTAND CURRENT CONDITIONS BASED ON FIELD RECONNAISSANCE AND/OR ADDITIONAL TOPOGRAPHIC SURVEYS AT THEIR EXPENSE.
 - EDGE OF LINER MARKERS SHALL BE REPLACED AFTER FINAL COVER INSTALLATION. MARKERS SHALL BE PLACED NO MORE THAN 500 FT APART AND AT CHANGES IN DIRECTION.
 - CONTRACTOR SHALL ENSURE THAT ALL EXISTING STRUCTURES, INCLUDING, BUT NOT LIMITED TO GROUNDWATER MONITORING WELLS, STORMWATER STRUCTURES, GAS EXTRACTION WELLS AND ASSOCIATED PIPING, ETC. ARE ADEQUATELY PROTECTED DURING CONSTRUCTION. ANY EXISTING FACILITY OR SITE FEATURE DAMAGED BY THE CONTRACTOR SHALL BE RESTORED OR REPLACED TO THE SATISFACTION OF THE OWNER.
 - CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING, REGRADING, AND REFURBISHING THE UPPER DRAINAGE TERRACES AND INLET STRUCTURES.
 - LANDFILL GAS (LFG) COLLECTION FEATURES FOR PHASE 1, SEQUENCE 1, 2, AND 3A, SHOWN HEREON REPRESENT DESIGN LOCATIONS AND MAY VARY SLIGHTLY FROM AS-BUILT LOCATIONS. THE GCCS SYSTEM IS SHOWN AS EXISTING FOR REFERENCE PURPOSES TO PROVIDE THE CONTRACTOR DETAILS OF THE EXTENT OF THE SYSTEM. CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING AND PROTECTING ALL LFG FEATURES THROUGHOUT CONSTRUCTION. REFER TO SHEET 13 FOR LFG PENETRATION THROUGH FINAL COVER SYSTEM DETAILS.
 - AS-BUILT SURVEYS FOR EXISTING GCCS PERFORMED BY JOHNSTON'S SURVEYING INC. ON 10/09/08 AND PEAVEY & ASSOCIATES ON 07/21/2010. AS-BUILT SURVEYS FOR CLOSURE LIMITS PERFORMED BY JOHN B. WEBB & ASSOCIATES, INC. ON 08/18/09.

0	MAR-11	INTERMEDIATE PERMIT MODIFICATION	CMV	CRB
REV	DATE	DESCRIPTION	DRN	APP

13101 TELECOM DRIVE, SUITE 120
TEMPLE TERRACE, FLORIDA 33637 USA
PH: 813.558.0990 - FX: 813.558.9726
AUTHORIZATION NUMBER: 4321

1501 GAIN WAY
ST. CLOUD, FLORIDA 34773
TEL: 407-891-3720 FAX: 407-891-3730

TITLE: **EXISTING CONDITIONS**

PROJECT: **PARTIAL LANDFILL CLOSURE CONSTRUCTION - EVENT 2**

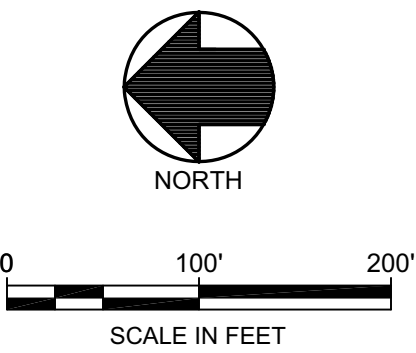
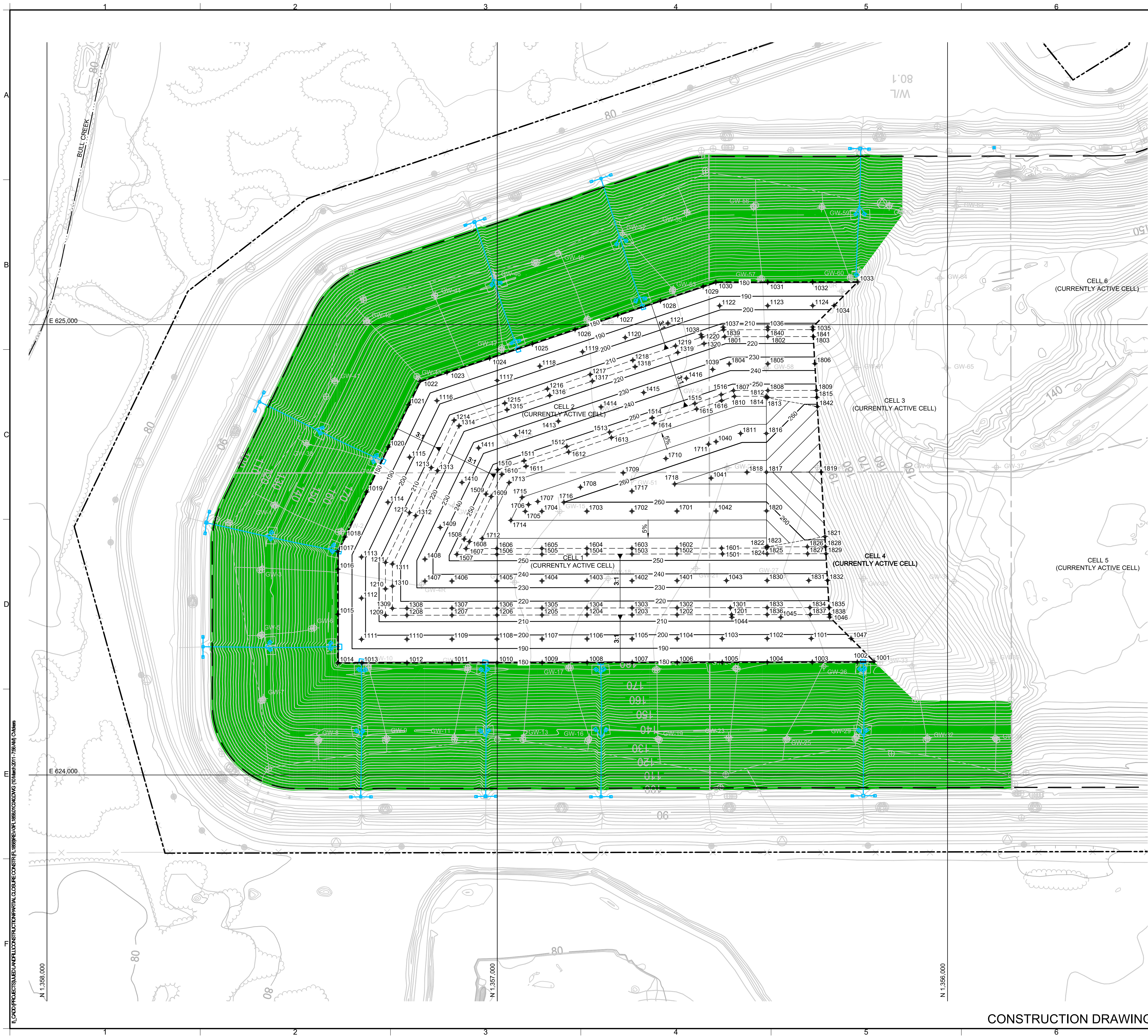
SITE: **PHASE 1 DISPOSAL AREA
J.E.D. SOLID WASTE MANAGEMENT FACILITY**

DESIGN BY:	VMD/JVO	DATE:	MARCH 2011
DRAWN BY:	CMV	PROJECT NO.:	FL1858.01
CHECKED BY:	VMD	FILE:	FL1858.01C030
REVIEWED BY:	JAB	DRAWING NO.:	3 OF 13
APPROVED BY:	CRB		

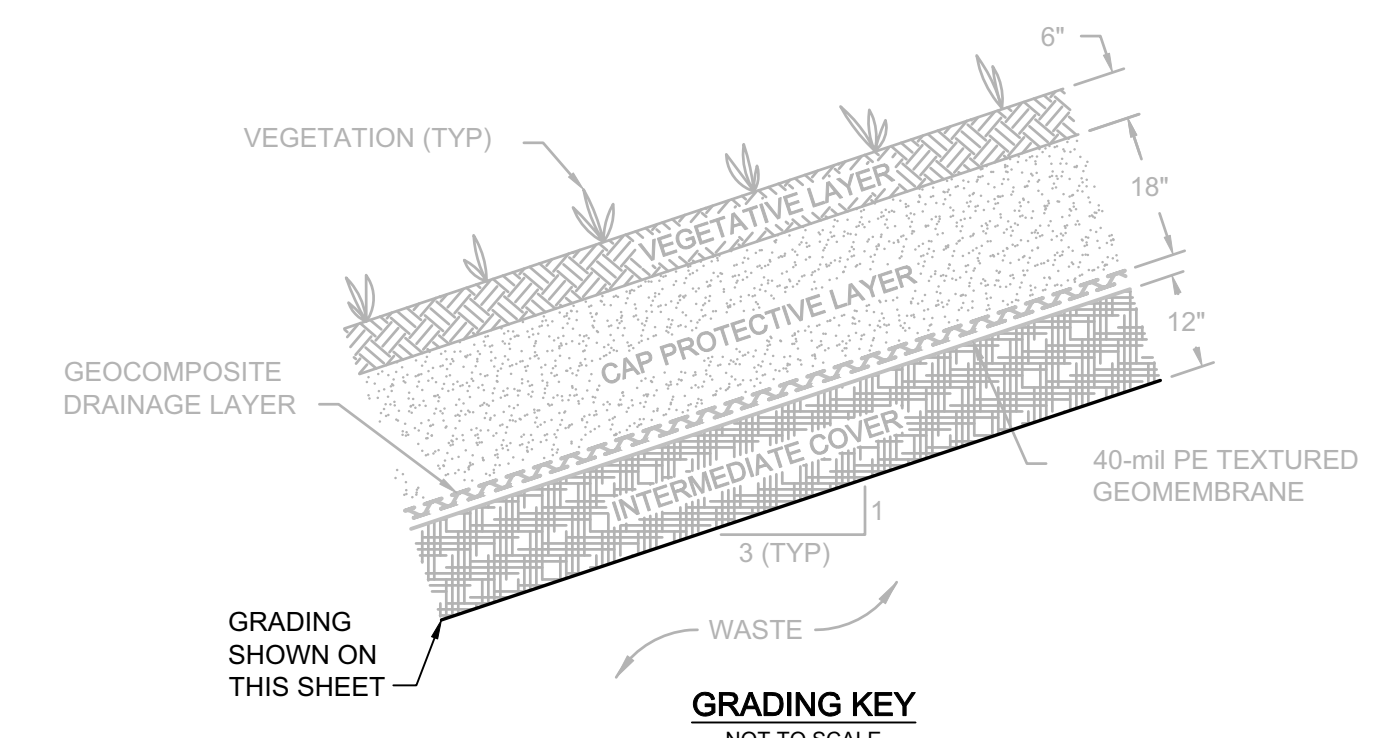
3/10/2011

CRAIG BROWNE - LICENSE NO. 68613

CONSTRUCTION DRAWING



- LEGEND**
- PROPERTY BOUNDARY
 - EXISTING LANDFILL ACCESS OR PERIMETER ROAD
 - EXISTING GROUND ELEVATION (FEET) (SEE NOTE 4)
 - EXISTING FENCE LINE
 - EXISTING TOPOGRAPHY SPOT ELEVATION (FEET)
 - TREE LINE
 - CELL BOUNDARY
 - AS-BUILT GAS EXTRACTION WELL
 - EXISTING AREA OF PARTIAL CLOSURE
 - EXISTING STORM WATER STRUCTURES
 - TOP OF WASTE ELEVATION
 - BENCH AT TOP OF WASTE
 - APPROXIMATE LIMIT OF PARTIAL CLOSURE CONSTRUCTION (FINAL COVER LIMITS) (NOTE 7)
 - LIMIT OF WASTE
 - TOP OF WASTE CONTROL POINT



- NOTES:**
- NORTHING AND EASTING COORDINATES SHOWN REPRESENT FLORIDA STATE PLANE EAST ZONE NORTH AMERICAN DATUM OF 1983 (NAD83).
 - THE ELEVATIONS SHOWN REPRESENT NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29)(FEET).
 - THE PROPERTY BOUNDARY IS BASED ON A COMPOSITE BOUNDARY SURVEY PROVIDED BY JOHNSTON SURVEYING INC., KISSIMMEE FLORIDA, DATED AUGUST 12, 1999.
 - THE TOPOGRAPHIC INFORMATION SHOWN ON THIS DRAWING WAS PROVIDED BY BASE MAPPING CO. LTD, BASED ON AN AERIAL PHOTOGRAPH TAKEN ON 24 JULY 2010.
 - THE TOPOGRAPHIC INFORMATION PROVIDED DOES NOT NECESSARILY REPRESENT CURRENT CONDITIONS. THE CONTRACTOR SHALL PERFORM FIELD RECONNAISSANCE AND ADDITIONAL TOPOGRAPHIC SURVEYS AT THEIR EXPENSE TO IDENTIFY WASTE ELEVATIONS EXISTING AT THE TIME OF CONSTRUCTION.
 - PRIOR TO PLACING INTERMEDIATE COVER SOIL, AREAS WITH VISIBLE LEACHATE SEEPS SHALL BE EXCAVATED A MINIMUM OF 5 FEET BELOW GRADE (OR AS OTHERWISE DIRECTED BY OWNER) AND BACKFILLED WITH GRAVEL OR EQUIVALENT HIGHLY PERMEABLE WASTE MATERIAL.
 - FINAL LIMITS OF CLOSURE MAY BE ADJUSTED DURING CONSTRUCTION AS NECESSARY TO ACCOMMODATE FILLING LIMITS ADJACENT TO ACTIVE DISPOSAL AREAS.

0	MAR-11	INTERMEDIATE PERMIT MODIFICATION	CMV	CRB
REV	DATE	DESCRIPTION	DRN	APP
<div>Geosyntec consultants 13101 TELECOM DRIVE, SUITE 120 TEMPLE TERRACE, FLORIDA 33637 USA PH: 813.558.0990 - FX: 813.558.9726 AUTHORIZATION NUMBER: 4321</div> <div>WSI 1501 OMNI WAY ST. CLOUD, FLORIDA 34773 TEL: 407-891-3720 FAX: 407-891-3730</div>				
TITLE: TOP OF WASTE GRADING AND STAKING PLAN				
PROJECT: PARTIAL LANDFILL CLOSURE CONSTRUCTION - EVENT 2				
SITE: PHASE 1 DISPOSAL AREA J.E.D. SOLID WASTE MANAGEMENT FACILITY				
DESIGN BY: VMD/JWO		DATE: MARCH 2011		
DRAWN BY: CMV		PROJECT NO.: FL1858.01		
CHECKED BY: VMD		FILE: FL1858.01C040		
REVIEWED BY: JAB		DRAWING NO.: 4 OF 13		
APPROVED BY: CRB				

CONSTRUCTION DRAWING

Top of Waste Control Point Table				
Point	Northing	Easting	Elevation	Description
1001	1356163.33	624252.29	180.00	Waste Top
1002	1356200.47	624250.75	179.51	Waste Top
1003	1356300.41	624250.58	179.51	Waste Top
1004	1356400.47	624250.41	179.51	Waste Top
1005	1356500.47	624250.24	179.51	Waste Top
1006	1356600.47	624250.07	179.51	Waste Top
1007	1356700.47	624249.90	179.51	Waste Top
1008	1356800.47	624249.73	179.51	Waste Top
1009	1356900.47	624249.55	179.51	Waste Top
1010	1357000.47	624249.38	179.51	Waste Top
1011	1357100.47	624249.21	179.51	Waste Top
1012	1357200.47	624249.04	179.51	Waste Top
1013	1357300.47	624248.87	179.51	Waste Top
1014	1357354.07	624248.78	179.51	Waste Top
1015	1357354.07	624356.95	179.51	Waste Top
1016	1357354.07	624456.95	179.51	Waste Top
1017	1357354.07	624496.22	179.51	Waste Top
1018	1357338.45	624528.58	179.51	Waste Top
1019	1357290.18	624628.58	179.51	Waste Top
1020	1357241.90	624728.58	179.51	Waste Top
1021	1357196.75	624822.12	179.51	Waste Top
1022	1357171.76	624837.90	179.51	Waste Top
1023	1357111.78	624894.02	179.51	Waste Top
1024	1357016.98	624925.84	179.51	Waste Top
1025	1356922.18	624957.65	179.51	Waste Top
1026	1356827.37	624989.47	179.51	Waste Top
1027	1356732.57	625021.28	179.51	Waste Top
1028	1356637.76	625053.10	179.51	Waste Top
1029	1356542.96	625084.91	179.51	Waste Top
1030	1356514.76	625094.37	179.51	Waste Top
1031	1356399.53	625094.57	179.51	Waste Top
1032	1356299.53	625094.74	179.51	Waste Top
1033	1356199.46	625094.91	179.51	Waste Top
1034	1356251.98	625042.31	197.01	Waste Top
1035	1356299.36	624994.85	212.80	Bench Waste
1036	1356399.36	624994.57	212.84	Bench Waste
1037	1356498.35	624994.40	212.84	Bench Waste
1038	1356547.62	624977.87	212.84	Waste Top
1039	1356521.70	624900.62	235.00	Waste Top
1040	1356514.20	624740.14	259.00	Waste Top
1041	1356525.17	624659.33	262.13	Waste Top
1042	1356514.20	624586.21	259.00	Waste Top
1043	1356491.09	624431.73	235.00	Waste Top
1044	1356478.93	624350.27	212.84	Waste Top
1045	1356370.39	624350.46	212.84	Waste Top
1046	1356261.84	624350.64	212.84	Waste Top
1047	1356214.33	624303.21	197.00	Waste Top

Top of Waste Control Point Table				
Point	Northing	Easting	Elevation	Description
1101	1356302.66	624303.06	197.00	Bench Waste
1102	1356400.56	624302.89	197.00	Bench Waste
1103	1356500.56	624302.72	197.00	Bench Waste
1104	1356600.56	624302.55	197.00	Bench Waste
1105	1356700.56	624302.38	197.00	Bench Waste
1106	1356800.56	624302.21	197.00	Bench Waste
1107	1356900.56	624302.04	197.00	Bench Waste
1108	1357000.56	624301.87	197.00	Bench Waste
1109	1357100.56	624301.70	197.00	Bench Waste
1110	1357200.56	624301.53	197.00	Bench Waste
1111	1357301.59	624301.35	197.00	Bench Waste
1112	1357301.59	624392.78	197.00	Bench Waste
1113	1357301.59	624484.21	197.00	Bench Waste
1114	1357242.91	624605.77	197.00	Bench Waste
1115	1357194.64	624705.77	197.00	Bench Waste
1116	1357134.11	624831.17	197.00	Bench Waste
1117	1357000.28	624876.08	197.00	Bench Waste
1118	1356905.48	624907.90	197.00	Bench Waste
1119	1356810.67	624939.71	197.00	Bench Waste
1120	1356715.87	624971.53	197.00	Bench Waste
1121	1356621.07	625003.34	197.00	Bench Waste
1122	1356506.15	625041.91	197.00	Bench Waste
1123	1356399.44	625042.07	197.00	Bench Waste
1124	1356299.44	625042.26	197.00	Bench Waste

Top of Waste Control Point Table				
Point	Northing	Easting	Elevation	Description
1201	1356479.79	624355.98	214.74	Bench Waste
1202	1356600.65	624355.78	214.74	Bench Waste
1203	1356700.65	624355.61	214.74	Bench Waste
1204	1356800.65	624355.44	214.74	Bench Waste
1205	1356900.65	624355.27	214.74	Bench Waste
1206	1357000.65	624355.10	214.74	Bench Waste
1207	1357100.65	624354.93	214.74	Bench Waste
1208	1357200.65	624354.75	214.74	Bench Waste
1209	1357248.36	624354.67	214.74	Bench Waste
1210	1357248.36	624413.36	214.74	Bench Waste
1211	1357248.36	624472.04	214.74	Bench Waste
1212	1357194.97	624582.63	214.74	Bench Waste
1213	1357146.70	624682.63	214.74	Bench Waste
1214	1357095.92	624787.84	214.74	Bench Waste
1215	1356983.35	624825.62	214.74	Bench Waste
1216	1356888.54	624857.43	214.74	Bench Waste
1217	1356793.74	624889.25	214.74	Bench Waste
1218	1356698.94	624921.06	214.74	Bench Waste
1219	1356604.13	624952.88	214.74	Bench Waste
1220	1356545.80	624972.45	214.74	Bench Waste

Top of Waste Control Point Table				
Point	Northing	Easting	Elevation	Description
1301	1356482.42	624371.44	214.90	Bench Waste
1302	1356600.68	624371.24	214.90	Bench Waste
1303	1356700.68	624371.07	214.90	Bench Waste
1304	1356800.68	624370.90	214.90	Bench Waste
1305	1356900.68	624370.65	214.90	Bench Waste
1306	1357000.68	624370.48	214.90	Bench Waste
1307	1357100.68	624370.39	214.90	Bench Waste
1308	1357200.68	624370.21	214.90	Bench Waste
1309	1357232.90	624370.16	214.90	Bench Waste
1310	1357232.90	624419.33	214.90	Bench Waste
1311	1357232.90	624468.50	214.90	Bench Waste
1312	1357181.05	624575.91	214.90	Bench Waste
1313	1357132.78	624675.91	214.90	Bench Waste
1314	1357084.82	624775.26	214.90	Bench Waste
1315	1356978.43	624810.96	214.90	Bench Waste
1316	1356883.62	624842.78	214.90	Bench Waste
1317	1356788.85	624874.66	214.90	Bench Waste
1318	1356694.02	624906.41	214.90	Bench Waste
1319	1356599.21	624938.22	214.90	Bench Waste
1320	1356540.88	624957.80	214.90	Bench Waste

Top of Waste Control Point Table				
Point	Northing	Easting	Elevation	Description
1401	1356600.78	624431.54	235.00	Waste Top
1402	1356700.78	624431.37	235.00	Waste Top
1403	1356800.78	624431.20	235.00	Waste Top
1404	1356900.78	624431.03	235.00	Waste Top
1405	1357000.78	624430.86	235.00	Waste Top
1406	1357100.78	624430.69	235.00	Waste Top
1407	1357160.71	624430.59	235.00	Waste Top
1408	1357160.71	624479.32	235.00	Waste Top
1409	1357126.74	624549.69	235.00	Waste Top
1410	1357078.47	624649.69	235.00	Waste Top
1411	1357041.56	624726.17	235.00	Waste Top
1412	1356959.24	624753.79	235.00	Waste Top
1413	1356864.44	624785.60	235.00	Waste Top
1414	1356769.63	624817.42	235.00	Waste Top
1415	1356674.83	624849.23	235.00	Waste Top
1416	1356580.03	624881.05	235.00	Waste Top

Top of Waste Control Point Table				
Point	Northing	Easting	Elevation	Description
1501	1356499.92	624490.95	254.74	Waste Top
1502	1356600.88	624490.77	254.74	Waste Top
1503	1356700.88	624490.60	254.74	Waste Top
1504	1356800.88	624490.43	254.74	Waste Top
1505	1356900.88	624490.26	254.74	Waste Top
1506	1357000.88	624490.09	254.74	Waste Top
1507	1357089.81	624489.94	254.74	Waste Top
1508	1357073.40	624523.94	254.74	Waste Top
1509	1357025.13	624623.94	254.74	Waste Top
1510	1356999.06	624677.95	254.74	Waste Top
1511	1356940.40	624697.64	254.74	Waste Top
1512	1356845.59	624729.45	254.74	Waste Top
1513	1356750.79	624761.27	254.74	Waste Top
1514	1356655.99	624793.08	254.74	Waste Top
1515	1356561.18	624824.90	254.74	Waste Top
1516	1356502.85	624844.47	254.74	Waste Top

Top of Waste Control Point Table				
Point	Northing	Easting	Elevation	Description
1601	1356501.83	624503.74	254.87	Waste Top
1602	1356600.91	624503.57	254.87	Waste Top
1603	1356700.91	624503.40	254.87	Waste Top
1604	1356800.91	624503.23	254.87	Waste Top
1605	1356900.91	624503.06	254.87	Waste Top
1606	1357000.90	624502.89	254.87	Waste Top
1607	1357069.41	624502.77	254.87	Waste Top
1608	1357061.87	624518.38	254.87	Waste Top
1609	1357013.60	624618.38	254.87	Waste Top
1610	1356989.88	624667.53	254.87	Waste Top
1611	1356936.33	624685.50	254.87	Waste Top
1612	1356841.52	624717.32	254.87	Waste Top
1613	1356746.72	624749.13	254.87	Waste Top
1614	1356651.91	624780.95	254.87	Waste Top
1615	1356557.11	624812.76	254.87	Waste Top
1616	1356501.83	624831.31	254.87	Waste Top

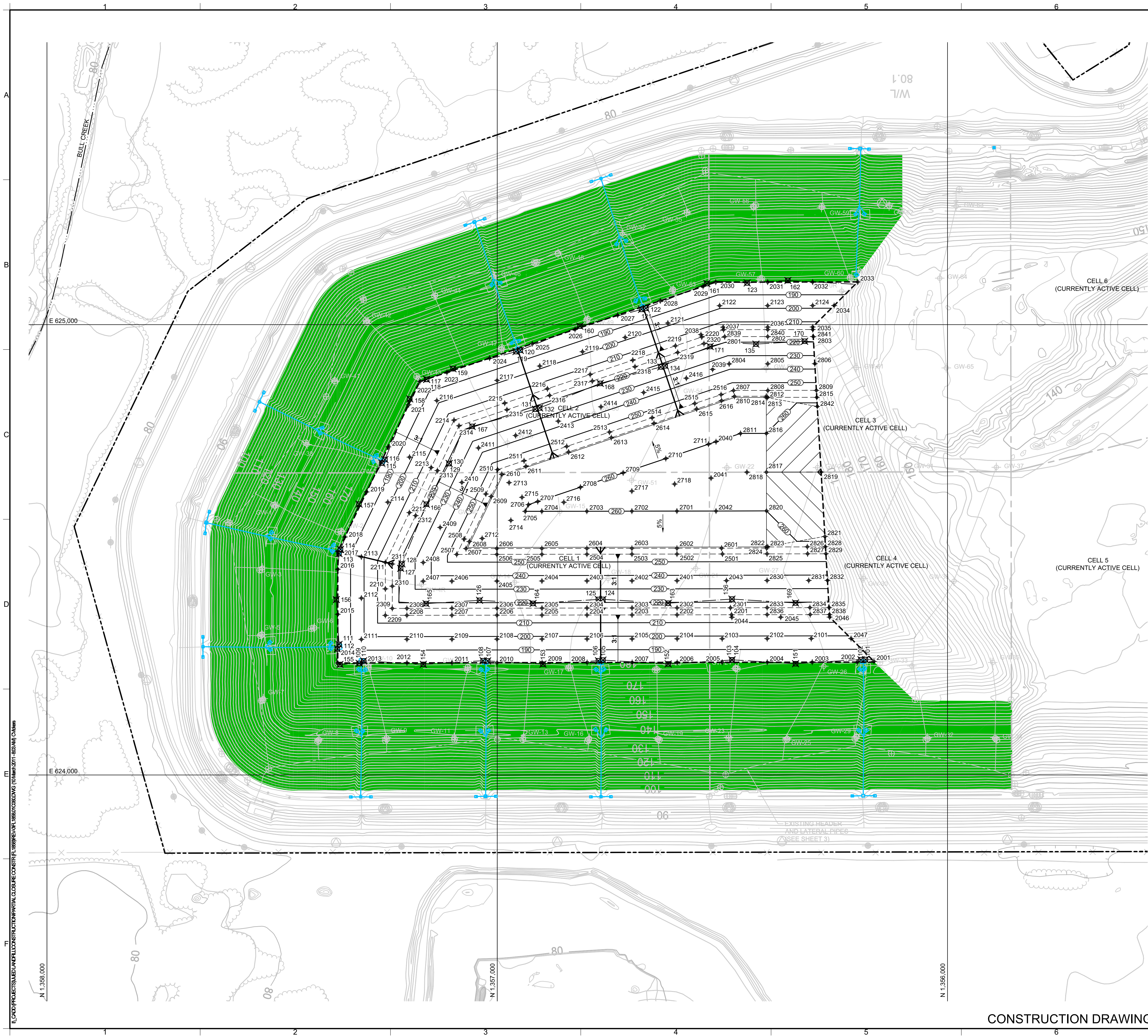
Top of Waste Control Point Table				
Point	Northing	Easting	Elevation	Description
1701	1356601.05	624586.07	259.00	Waste Top
1702	1356701.05	624585.90	259.00	Waste Top
1703	1356801.05	624585.73	259.00	Waste Top
1704	1356901.05	624585.56	258.64	Waste Top
1705	1356937.86	624585.50	258.08	Waste Top
1706	1356930.69	624603.37	258.08	Waste Top
1707	1356910.08	624607.29	258.42	Waste Top
1708	1356815.27	624639.10	259.00	Waste Top
1709	1356720.47	624670.92	259.00	Waste Top
1710	1356625.67	624702.73	259.00	Waste Top
1711	1356530.86	624734.55	259.00	Waste Top
1712	1357033.50	624525.35	256.00	Waste Top
1713	1356973.72	624649.20	256.00	Waste Top
1714	1356969.75	624565.45	258.00	Waste Top
1715	1356945.03	624616.65	258.00	Waste Top
1716	1356852.16	624605.64	260.00	Waste Top
1717	1356701.12	624630.44	260.21	Waste Top
1718	1356605.99	624646.06	262.00	Waste Top

Top of Waste Control Point Table				
Point	Northing	Easting	Elevation	Description
1801	1356494.87	624973.24	214.90	Bench Waste
1802	1356399.32	624973.40	214.90	Bench Waste
1803	1356298.23	624973.57	214.90	Bench Waste

Top of Waste Control Point Table				
Point	Northing	Easting	Elevation	Description
1833	1356400.68	624371.58	214.90	Bench Waste
1834	1356305.59	624371.74	214.90	Bench Waste
1835	1356263.08	624371.81	214.90	Bench Waste
1836	1356400.65	624356.12	214.74	Bench Waste
1837	1356304.93	624356.28	214.74	Bench Waste
1838	1356262.18	624356.36	214.74	Bench Waste
1839	1356497.41	624988.69	214.74	Bench Waste
1840	1356399.35	624988.86	214.74	Bench Waste
1841	1356299.36	624989.03	214.74	Bench Waste
1842	1356289.15	624818.20	261.70	Bench Waste

Top of Waste Control Point Table				
Point	Northing	Easting	Elevation	Description
1804	1356484.98	624912.95	235.00	Waste Top
1805	1356399.22	624913.09	235.00	Waste Top
1806	1356294.70	624913.27	235.00	Waste Top
1807	1356475.25	624853.73	254.74	Waste Top
1808	1356399.12	624853.86	254.74	Waste Top
1809	1356291.25	624854.05	254.74	Waste Top
1810	1356473.15	624840.94	254.87	Waste Top
1811	1356459.72	624758.42	259.00	Waste Top
1812	1356402.55	624841.06	254.80	Waste Top
1813	1356399.89	624838.40	254.90	Waste Top
1814	1356402.55	624838.01	254.87	Waste Top
1815	1356290.34	624838.59	254.90	Waste Top
1816	1356402.41	624758.42	259.00	Waste Top
1817	1356402.27	624672.49	263.30	Waste Top
1818	1356445.50	624672.41	262.29	Waste Top
1819	1356280.65	624672.69	269.08	Waste Top
1820	1356402.12	624586.41	259.00	Waste Top
1821	1356272.29	624529.52	262.48	Waste Top
1822	1356401.99	624506.96	254.87	Waste Top
1823	1356399.32	624506.58	254.90	Waste Top
1824	1356401.98	624503.91	254.80	Waste Top
1825	1356400.88	624491.11	254.74	Waste Top
1826	1356311.36	624506.73	254.90	Waste Top
1827	1356310.70	624491.27	254.74	Waste Top
1828	1356271.50	624506.91	254.90	Waste Top
1829	1356270.06	624491.34	254.74	Waste Top
1830	1356400.78	624431.89	235.00	Waste Top
1831	1356308.17	624432.04	235.00	Waste Top
1832	1356266.60	624432.11	235.00	Waste Top

0	MAR-11	INTERMEDIATE PERMIT MODIFICATION		CMV	CRB
REV	DATE	DESCRIPTION		DRN	APP
<div style="display: flex; justify-content: space-between;"> <div> <p>Geosyntec[®] consultants</p> <p>13101 TELECOM DRIVE, SUITE 120 TEMPLE TERRACE, FLORIDA 33837 USA PH: 813.558.0990 - FX: 813.558.9726 AUTHORIZATION NUMBER: 4321</p> </div> <div>  <p>1501 OMNI WAY ST. CLOUD, FLORIDA 34773 TEL: 407-891-3720 FAX: 407-891-3730</p> </div> </div>					
TITLE:					
TOP OF WASTE CONTROL POINT DATA					
PROJECT:					
PARTIAL LANDFILL CLOSURE CONSTRUCTION - EVENT 2					
SITE:					
PHASE 1 DISPOSAL AREA J.E.D. SOLID WASTE MANAGEMENT FACILITY					
 SIGNATURE <u>3/10/2011</u> DATE				DESIGN BY: VMD/JWO DATE: MARCH 2011 <hr/> DRAWN BY: CMV PROJECT NO.: FL1858.01 <hr/> CHECKED BY: VMD FILE: FL1858.01C040 <hr/> REVIEWED BY: JAB DRAWING NO.: <hr/> APPROVED BY: CRB 5 OF 13	
CRAIG BROWNE - LICENSE NO. 68613					



LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL ACCESS OR PERIMETER ROAD
- EXISTING GROUND ELEVATION (FEET) (SEE NOTE 4)
- EXISTING FENCE LINE
- EXISTING TOPOGRAPHY SPOT ELEVATION (FEET)
- TREE LINE
- CELL BOUNDARY
- AS-BUILT GAS EXTRACTION WELL
- EXISTING AREA OF PARTIAL CLOSURE
- EXISTING STORM WATER STRUCTURES
- TOP OF INTERMEDIATE COVER ELEVATION
- BENCH AT TOP OF INTERMEDIATE COVER
- APPROXIMATE LIMIT OF PARTIAL CLOSURE CONSTRUCTION (FINAL COVER LIMITS) (NOTE 7)
- TOP OF INTERMEDIATE COVER CONTROL POINT
- TOE DRAIN HEADER AND DISCHARGE CONTROL POINT

GRADING KEY
NOT TO SCALE

VEGETATION (TYP)
GEOCOMPOSITE DRAINAGE LAYER
CAP PROTECTIVE LAYER
INTERMEDIATE COVER
40-mil PE TEXTURED GEOMEMBRANE
WASTE
3 (TYP)

NOTES:

- NORTHING AND EASTING COORDINATES SHOWN REPRESENT FLORIDA STATE PLANE EAST ZONE NORTH AMERICAN DATUM OF 1983 (NAD83).
- THE ELEVATIONS SHOWN REPRESENT NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29)(FEET).
- THE PROPERTY BOUNDARY IS BASED ON A COMPOSITE BOUNDARY SURVEY PROVIDED BY JOHNSTON SURVEYING INC., KISSIMMEE FLORIDA, DATED AUGUST 12, 1999.
- THE TOPOGRAPHIC INFORMATION SHOWN ON THIS DRAWING WAS PROVIDED BY BASE MAPPING CO. LTD, BASED ON AN AERIAL PHOTOGRAPH TAKEN ON 24 JULY 2010.
- THE TOPOGRAPHIC INFORMATION PROVIDED DOES NOT NECESSARILY REPRESENT CURRENT CONDITIONS. THE CONTRACTOR SHALL PERFORM FIELD RECONNAISSANCE AND ADDITIONAL TOPOGRAPHIC SURVEYS AT THEIR EXPENSE TO IDENTIFY WASTE ELEVATIONS EXISTING AT THE TIME OF CONSTRUCTION.
- PRIOR TO PLACING INTERMEDIATE COVER SOIL, AREAS WITH VISIBLE LEACHATE SEEPS SHALL BE EXCAVATED A MINIMUM OF 5 FEET BELOW GRADE (OR AS OTHERWISE DIRECTED BY OWNER) AND BACKFILLED WITH GRAVEL OR EQUIVALENT HIGHLY PERMEABLE WASTE MATERIAL.
- FINAL LIMITS OF CLOSURE MAY BE ADJUSTED DURING CONSTRUCTION AS NECESSARY TO ACCOMMODATE FILLING LIMITS ADJACENT TO ACTIVE DISPOSAL AREAS.

REV	DATE	DESCRIPTION	CMV	CRB
0	MAR-11	INTERMEDIATE PERMIT MODIFICATION	CMV	CRB

Geosyntec
consultants

13101 TELECOM DRIVE, SUITE 120
TEMPLE TERRACE, FLORIDA 33637 USA
PH: 813.558.0990 - FX: 813.558.9726
AUTHORIZATION NUMBER: 4321

WSI
Waste Services Inc.

1501 GAIN WAY
ST. CLOUD, FLORIDA 34773
TEL: 407-891-3720 FAX: 407-891-3730

TITLE: TOP OF INTERMEDIATE COVER GRADING AND STAKING PLAN

PROJECT: PARTIAL LANDFILL CLOSURE CONSTRUCTION - EVENT 2

SITE: PHASE 1 DISPOSAL AREA
J.E.D. SOLID WASTE MANAGEMENT FACILITY

DESIGN BY:	VMD/JVO	DATE:	MARCH 2011
DRAWN BY:	CMV	PROJECT NO.:	FL1858.01
CHECKED BY:	VMD	FILE:	FL1858.01C060
REVIEWED BY:	JAB	DRAWING NO.:	6 OF 13
APPROVED BY:	CRB		

[Signature]
3/10/2011
DATE

CRAIG BROWNE - LICENSE NO. 68613

CRAIG R. BROWNE
LICENSE
No. 68613
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

Top of Intermediate Control Point Table				
Point	Northing	Easting	Elev.	Description
2001	1356163.33	624252.29	181.05	Top Intermediate
2002	1356200.47	624250.75	180.56	Top Intermediate
2003	1356300.41	624250.58	180.56	Top Intermediate
2004	1356400.47	624250.41	180.56	Top Intermediate
2005	1356500.47	624250.24	180.56	Top Intermediate
2006	1356600.47	624250.07	180.56	Top Intermediate
2007	1356700.47	624249.90	180.56	Top Intermediate
2008	1356800.47	624249.73	180.56	Top Intermediate
2009	1356900.47	624249.55	180.56	Top Intermediate
2010	1357000.47	624249.38	180.56	Top Intermediate
2011	1357100.47	624249.21	180.56	Top Intermediate
2012	1357200.47	624249.04	180.56	Top Intermediate
2013	1357300.47	624248.87	180.56	Top Intermediate
2014	1357354.07	624248.78	180.56	Top Intermediate
2015	1357354.07	624356.95	180.56	Top Intermediate
2016	1357354.07	624456.95	180.56	Top Intermediate
2017	1357354.07	624496.22	180.56	Top Intermediate
2018	1357338.45	624528.58	180.56	Top Intermediate
2019	1357290.18	624628.58	180.56	Top Intermediate
2020	1357241.94	624728.58	180.56	Top Intermediate
2021	1357196.75	624822.12	180.56	Top Intermediate
2022	1357171.76	624873.90	180.56	Top Intermediate
2023	1357111.78	624894.02	180.56	Top Intermediate
2024	1357016.98	624925.84	180.56	Top Intermediate
2025	1356922.18	624957.65	180.56	Top Intermediate
2026	1356827.37	624989.47	180.56	Top Intermediate
2027	1356732.57	625021.28	180.56	Top Intermediate
2028	1356637.58	625053.10	180.56	Top Intermediate
2029	1356542.96	625084.91	180.56	Top Intermediate
2030	1356514.76	625094.37	180.56	Top Intermediate
2031	1356399.53	625094.57	180.56	Top Intermediate
2032	1356299.53	625094.74	180.56	Top Intermediate
2033	1356199.46	625094.91	180.56	Top Intermediate
2034	1356251.79	625042.49	198.00	Top Intermediate
2035	1356299.36	624994.85	213.86	Top Intermediate
2036	1356399.36	624994.57	213.89	Top Intermediate
2037	1356498.35	624994.40	213.89	Top Intermediate
2038	1356547.62	624977.87	213.89	Top Intermediate
2039	1356521.75	624900.77	236.00	Top Intermediate
2040	1356514.20	624740.14	260.00	Top Intermediate
2041	1356525.17	624659.33	263.66	Top Intermediate
2042	1356514.20	624586.21	260.00	Top Intermediate
2043	1356491.06	624431.58	236.00	Top Intermediate
2044	1356478.93	624350.27	213.89	Top Intermediate
2045	1356370.39	624350.46	213.89	Top Intermediate
2046	1356261.84	624350.64	213.89	Top Intermediate
2047	1356214.17	624303.05	198.00	Top Intermediate

Top of Intermediate Control Point Table				
Point	Northing	Easting	Elev.	Description
2101	1356302.65	624302.90	198.00	Top Intermediate
2102	1356400.56	624302.73	198.00	Top Intermediate
2103	1356500.56	624302.56	198.00	Top Intermediate
2104	1356600.56	624302.39	198.00	Top Intermediate
2105	1356700.56	624302.22	198.00	Top Intermediate
2106	1356800.56	624302.05	198.00	Top Intermediate
2107	1356900.56	624301.88	198.00	Top Intermediate
2108	1357000.56	624301.71	198.00	Top Intermediate
2109	1357100.56	624301.54	198.00	Top Intermediate
2110	1357200.56	624301.37	198.00	Top Intermediate
2111	1357301.74	624301.20	198.00	Top Intermediate
2112	1357301.74	624392.78	198.00	Top Intermediate
2113	1357301.74	624484.25	198.00	Top Intermediate
2114	1357243.05	624605.83	198.00	Top Intermediate
2115	1357194.78	624705.83	198.00	Top Intermediate
2116	1357134.22	624831.30	198.00	Top Intermediate
2117	1357000.33	624876.23	198.00	Top Intermediate
2118	1356905.53	624908.04	198.00	Top Intermediate
2119	1356810.72	624939.86	198.00	Top Intermediate
2120	1356715.92	624971.67	198.00	Top Intermediate
2121	1356621.12	625003.49	198.00	Top Intermediate
2122	1356506.17	625042.06	198.00	Top Intermediate
2123	1356399.44	625042.24	198.00	Top Intermediate
2124	1356299.44	625042.41	198.00	Top Intermediate

Top of Intermediate Control Point Table				
Point	Northing	Easting	Elev.	Description
2201	1356479.76	624355.83	215.74	Top Intermediate
2202	1356600.65	624355.62	215.74	Top Intermediate
2203	1356700.65	624355.45	215.74	Top Intermediate
2204	1356800.65	624355.28	215.74	Top Intermediate
2205	1356900.65	624355.11	215.74	Top Intermediate
2206	1357000.65	624354.94	215.74	Top Intermediate
2207	1357100.65	624354.77	215.74	Top Intermediate
2208	1357200.65	624354.60	215.74	Top Intermediate
2209	1357248.52	624354.51	215.74	Top Intermediate
2210	1357248.52	624413.36	215.74	Top Intermediate
2211	1357248.52	624472.07	215.74	Top Intermediate
2212	1357195.12	624582.70	215.74	Top Intermediate
2213	1357148.85	624682.70	215.74	Top Intermediate
2214	1357096.03	624787.97	215.74	Top Intermediate
2215	1356983.40	624825.77	215.74	Top Intermediate
2216	1356888.59	624857.58	215.74	Top Intermediate
2217	1356793.79	624889.40	215.74	Top Intermediate
2218	1356698.99	624921.21	215.74	Top Intermediate
2219	1356604.18	624953.03	215.74	Top Intermediate
2220	1356545.85	624972.60	215.74	Top Intermediate

Top of Intermediate Control Point Table				
Point	Northing	Easting	Elev.	Description
2301	1356482.07	624371.28	215.90	Top Intermediate
2302	1356600.68	624371.08	215.90	Top Intermediate
2303	1356700.68	624370.91	215.90	Top Intermediate
2304	1356800.68	624370.74	215.90	Top Intermediate
2305	1356900.68	624370.57	215.90	Top Intermediate
2306	1357000.68	624370.40	215.90	Top Intermediate
2307	1357100.68	624370.23	215.90	Top Intermediate
2308	1357200.68	624370.06	215.90	Top Intermediate
2309	1357230.06	624370.00	215.90	Top Intermediate
2310	1357233.06	624419.33	215.90	Top Intermediate
2311	1357233.06	624468.54	215.90	Top Intermediate
2312	1357181.20	624575.98	215.90	Top Intermediate
2313	1357132.92	624675.98	215.90	Top Intermediate
2314	1357084.94	624775.39	215.90	Top Intermediate
2315	1356978.48	624811.11	215.90	Top Intermediate
2316	1356883.68	624842.93	215.90	Top Intermediate
2317	1356788.87	624874.74	215.90	Top Intermediate
2318	1356694.07	624906.56	215.90	Top Intermediate
2319	1356599.26	624938.37	215.90	Top Intermediate
2320	1356540.93	624957.95	215.90	Top Intermediate

Top of Intermediate Control Point Table				
Point	Northing	Easting	Elev.	Description
2401	1356600.78	624431.39	236.00	Top Intermediate
2402	1356700.78	624431.22	236.00	Top Intermediate
2403	1356800.78	624431.05	236.00	Top Intermediate
2404	1356900.78	624430.88	236.00	Top Intermediate
2405	1357000.78	624430.71	236.00	Top Intermediate
2406	1357100.78	624430.54	236.00	Top Intermediate
2407	1357164.44	624430.43	236.00	Top Intermediate
2408	1357164.44	624471.94	236.00	Top Intermediate
2409	1357126.88	624549.76	236.00	Top Intermediate
2410	1357078.61	624649.76	236.00	Top Intermediate
2411	1357041.67	624726.29	236.00	Top Intermediate
2412	1356959.29	624753.94	236.00	Top Intermediate
2413	1356864.49	624785.75	236.00	Top Intermediate
2414	1356769.68	624817.57	236.00	Top Intermediate
2415	1356674.88	624849.38	236.00	Top Intermediate
2416	1356580.08	624881.20	236.00	Top Intermediate

Top of Intermediate Control Point Table				
Point	Northing	Easting	Elev.	Description
2501	1356499.92	624490.79	255.74	Top Intermediate
2502	1356600.88	624490.62	255.74	Top Intermediate
2503	1356700.88	624490.45	255.74	Top Intermediate
2504	1356800.88	624490.28	255.74	Top Intermediate
2505	1356900.88	624490.11	255.74	Top Intermediate
2506	1357000.88	624489.94	255.74	Top Intermediate
2507	1357090.06	624489.78	255.74	Top Intermediate
2508	1357073.54	624524.01	255.74	Top Intermediate
2509	1357025.27	624624.01	255.74	Top Intermediate
2510	1356999.17	624678.08	255.74	Top Intermediate
2511	1356940.45	624697.78	255.74	Top Intermediate
2512	1356845.64	624729.60	255.74	Top Intermediate
2513	1356750.84	624761.41	255.74	Top Intermediate
2514	1356656.04	624793.23	255.74	Top Intermediate
2515	1356561.45	624825.04	255.74	Top Intermediate
2516	1356502.93	624844.61	255.74	Top Intermediate


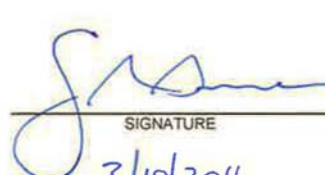

Top of Intermediate Control Point Table				
Point	Northing	Easting	Elev.	Description
2601	1356501.83	624503.71	255.87	Top Intermediate
2602	1356600.90	624503.54	255.87	Top Intermediate
2603	1356700.90	624503.37	255.87	Top Intermediate
2604	1356800.90	624503.20	255.87	Top Intermediate
2605	1356900.90	624503.03	255.87	Top Intermediate
2606	1357000.90	624502.86	255.87	Top Intermediate
2607	1357069.46	624502.74	255.87	Top Intermediate
2608	1357061.91	624516.39	255.87	Top Intermediate
2609	1357013.63	624618.39	255.87	Top Intermediate
2610	1356989.90	624667.56	255.87	Top Intermediate
2611	1356936.34	624685.53	255.87	Top Intermediate
2612	1356841.53	624717.35	255.87	Top Intermediate
2613	1356746.73	624749.16	255.87	Top Intermediate
2614	1356651.93	624780.98	255.87	Top Intermediate
2615	1356557.12	624812.79	255.87	Top Intermediate
2616	1356501.89	624831.33	255.87	Top Intermediate

Top of Intermediate Control Point Table				
Point	Northing	Easting	Elev.	Description
2701	1356601.05	624586.07	260.00	Top Intermediate
2702	1356701.05	624585.90	260.00	Top Intermediate
2703	1356801.05	624585.73	260.00	Top Intermediate
2704	1356901.05	624585.56	260.00	Top Intermediate
2705	1356937.86	624585.50	260.00	Top Intermediate
2706	1356930.69	624600.37	260.00	Top Intermediate
2707	1356910.08	624607.29	260.00	Top Intermediate
2708	1356811.25	624639.10	260.00	Top Intermediate
2709	1356720.47	624670.92	260.00	Top Intermediate
2710	1356625.67	624702.73	260.00	Top Intermediate
2711	1356530.86	624734.55	260.00	Top Intermediate
2712	1357033.50	624525.35	257.00	Top Intermediate
2713	1356973.72	624649.20	257.00	Top Intermediate
2714	1356969.75	624565.45	259.00	Top Intermediate
2715	1356945.03	624616.65	259.00	Top Intermediate
2716	1356852.16	624605.64	261.00	Top Intermediate
2717	1356701.12	624630.44	262.23	Top Intermediate
2718	1356605.99	624646.06	263.00	Top Intermediate

Top of Intermediate Control Point Table				
Point	Northing	Easting	Elev.	Description
2801	1356494.87	624973.24	215.90	Top Intermediate
2802	1356399.32	624973.40	215.90	Top Intermediate
2803	1356298.23	624973.57	215.90	Top Intermediate
2804	1356484.98	624912.95	236.00	Top Intermediate
2805	1356399.22	624913.09	236.00	Top Intermediate
2806	1356294.70	624913.27	236.00	Top Intermediate
2807	1356474.75	624853.73	255.74	Top Intermediate
2808	1356399.12	624853.86	255.74	Top Intermediate
2809	1356291.25	624854.05	255.74	Top Intermediate
2810	1356473.15	624840.94	255.87	Top Intermediate
2811	1356459.72	624758.42	260.00	Top Intermediate
2812	1356402.55	624841.06	255.80	Top Intermediate
2813	1356399.89	624838.40	255.90	Top Intermediate
2814	1356402.55	624838.01	255.87	Top Intermediate
2815	1356290.34	624838.59	255.90	Top Intermediate
2816	1356402.41	624758.42	260.00	Top Intermediate
2817	1356402.27	624672.49	266.30	Top Intermediate
2818	1356445.50	624672.41	263.29	Top Intermediate
2819	1356280.65	624672.69	270.08	Top Intermediate
2820	1356402.12	624586.41	260.00	Top Intermediate
2821	1356272.29	624529.52	263.48	Top Intermediate
2822	1356401.99	624526.56	255.87	Top Intermediate
2823	1356399.32	624506.58	255.90	Top Intermediate
2824	1356401.98	624503.91	255.80	Top Intermediate
2825	1356400.88	624491.11	255.74	Top Intermediate
2826	1356311.38	624506.73	255.90	Top Intermediate
2827	1356310.70	624491.27	255.74	Top Intermediate
2828	1356271.50	624506.91	255.90	Top Intermediate
2829	1356270.06	624491.34	255.74	Top Intermediate
2830	1356400.78	624431.89	236.00	Top Intermediate
2831	1356308.17	624432.04	236.00	Top Intermediate
2832	1356266.60	624432.11	236.00	Top Intermediate
2833	1356400.68	624371.58	215.90	Top Intermediate
2834	1356305.59	624371.74	215.90	Top Intermediate
2835	1356263.08	624371.81	215.90	Top Intermediate
2836	1356400.65	624356.12	215.74	Top Intermediate
2837	1356304.93	624356.28	215.74	Top Intermediate
2838	1356262.18	624356.36	215.74	Top Intermediate
2839	1356497.44	624988.85	215.74	Top Intermediate
2840	1356399.35	624989.02	215.74	Top Intermediate
2841	1356299.35	624989.19	215.74	Top Intermediate
2842	1356289.16	624818.39	262.70	Top Intermediate

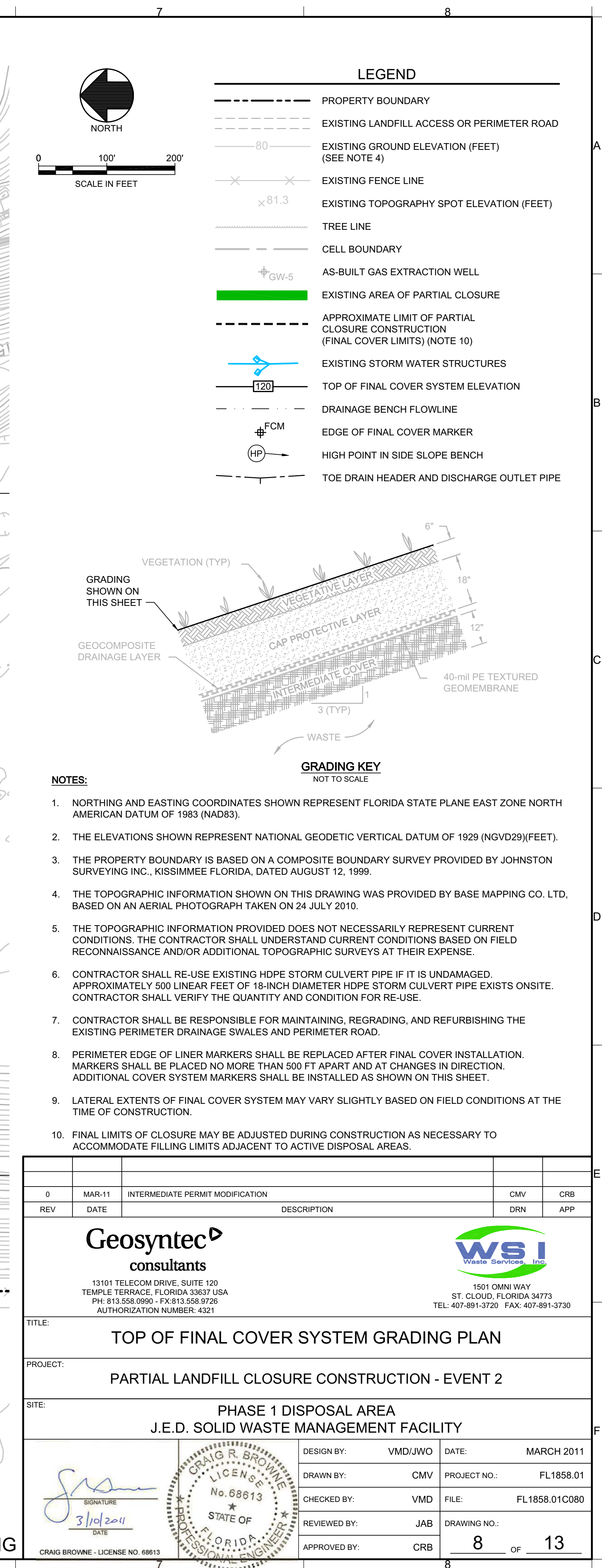
Toe Drain Header and Discharge Control Point Table			
Point	Nothing	Easting	Description
101	1356182.31	624256.55	High Point
102	1356192.30	624256.03	High Point
103	1356478.73	624255.80	High Point
104	1356478.73	624255.34	High Point
105	1356765.25	624255.14	High Point
106	1356775.25	624253.74	High Point
107	1357021.36	624253.39	High Point
108	1357031.37	624253.88	High Point
109	1357306.78	624248.05	High Point
110	1357296.85	624253.50	High Point
111	1357351.33	624289.97	High Point
112	1357354.96	624279.90	High Point
113	1357351.45	624491.67	High Point
114	1357348.06	624501.14	High Point
115	1357256.20	624692.66	High Point
116	1357249.33	624700.50	High Point
117	1357156.90	624878.65	High Point
118	1357156.81	624878.37	High Point
119	1356958.39	624940.12	High Point
120	1356948.83	624943.05	High Point
121	1356679.65	625033.86	High Point
122	1356669.96	625036.43	High Point
123	1356445.04	625092.70	High Point
124	1356765.48	624389.99	High Point
125	1356775.48	624389.87	High Point
126	1357039.32	624387.96	High Point
127	1357214.56	624458.99	High Point
128	1357211.69	624468.59	High Point
129	1357106.96	624691.75	High Point
130	1357106.77	624691.66	High Point
131	1356915.49	624812.27	High Point
132	1356905.88	624815.08	High Point
133	1356636.79	624906.16	High Point
134	1356627.07	624908.64	High Point
135	1356425.58	624956.88	High Point
136	1356478.76	624390.64	High Point

Toe Drain Header and Discharge Control Point Table			
Point	Nothing	Easting	Description
151	1356337.46	624247.18	Low Point
152	1356620.43	624246.70	Low Point
153	1356898.49	624246.23	Low Point
154	1357164.27	624245.77	Low Point
155	1357349.29	624245.46	Low Point
156	1357357.40	624389.52	Low Point
157	1357306.96	624601.48	Low Point
158	1357194.17	624836.12	Low Point
159	1357098.24	624902.08	Low Point
160	1356816.39	624996.66	Low Point
161	1356534.54	625091.25	Low Point
162	1356354.49	625097.98	Low Point
163	1356620.46	624381.55	Low Point
164	1356920.46	624381.03	Low Point
165	1357158.17	624380.63	Low Point
166	1357157.35	624601.22	Low Point
167	1357055.64	624774.14	Low Point
168	1356771.23	624869.59	Low Point
169	1356337.49	624382.03	Low Point
170	1356317.19	624963.20	Low Point
171	135652.12	62495.151	Low Point

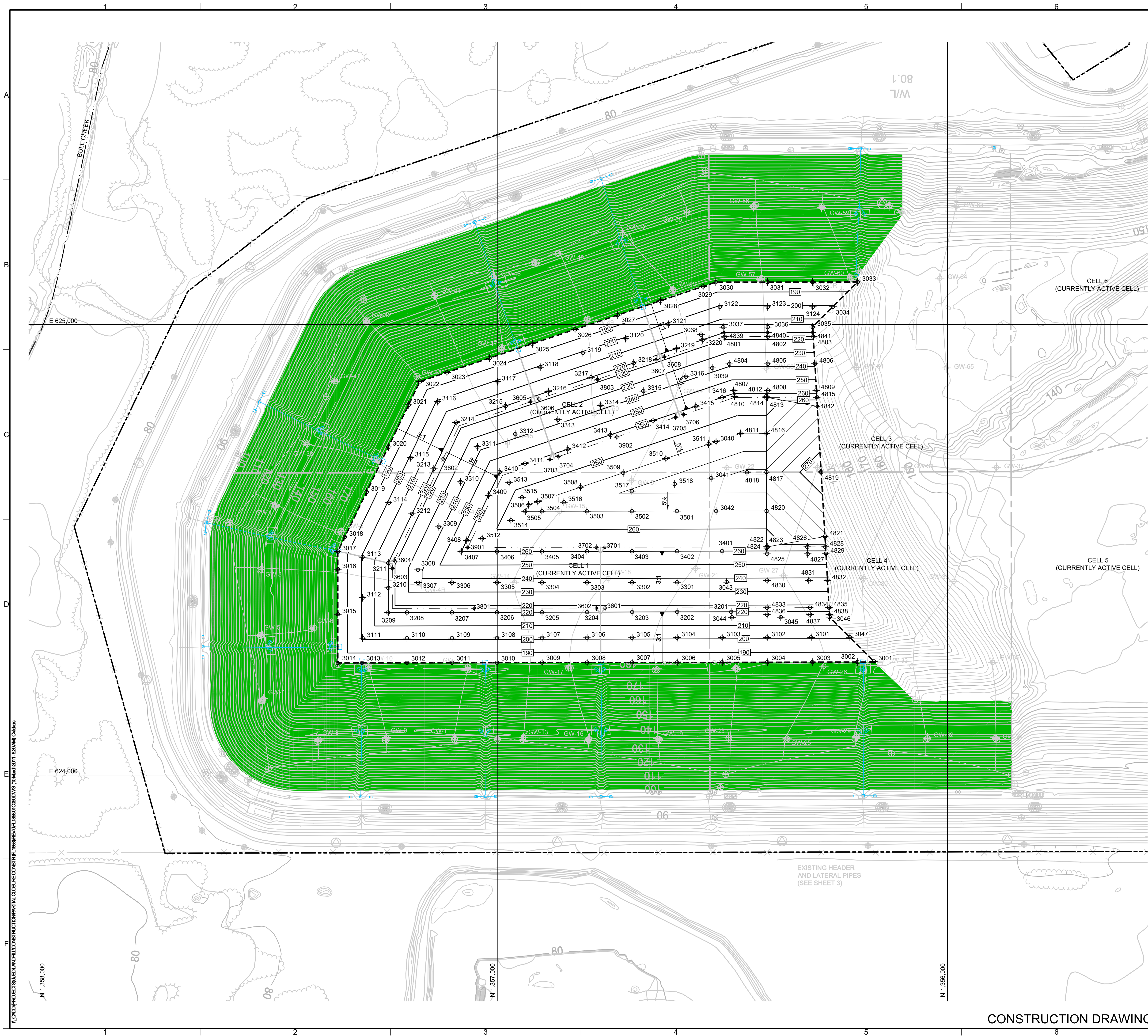
0	MAR-11	INTERMEDIATE PERMIT MODIFICATION						CMV	CRCB
REV	DATE	DESCRIPTION						DRN	APP
<div><div><h1>Geosyntec[®]</h1><p>consultants</p><p>13101 TELECOM DRIVE, SUITE 120 TEMPLE TERRACE, FLORIDA 33837 USA PH: 813.558.0950 - FX:813.558.9726 AUTHORIZATION NUMBER: 4321</p></div><div><p>1501 OMNI WAY ST. CLOUD, FLORIDA 34773 TEL: 407-891-3720 FAX: 407-891-3730</p></div></div>									
TITLE:									
TOP OF INTERMEDIATE COVER CONTROL POINT DATA									
PROJECT:									
PARTIAL LANDFILL CLOSURE CONSTRUCTION - EVENT 2									
SITE:									
PHASE 1 DISPOSAL AREA J.E.D. SOLID WASTE MANAGEMENT FACILITY									
 SIGNATURE 3/10/2011 DATE				DESIGN BY: VMD/JWO		DATE: MARCH 2011			
				DRAWN BY: CMV		PROJECT NO.: FL1858.01			
				CHECKED BY: VMD		FILE: FL1858.01C060			
				REVIEWED BY: JAB		DRAWING NO.:			
				APPROVED BY: CRB		7 OF 13			
CRAIG BROWNE - LICENSE NO. 68813									

CONSTRUCTION DRAWING

H:\CADD (PROJECTS)\MED LANDFILL\CONSTRUCTION\PARTIAL CLOSURE CONSTR (FL1858)\REV-0\FL1858.01\000.DWG (10 March 2011 - 8:03 AM) CV\dkers

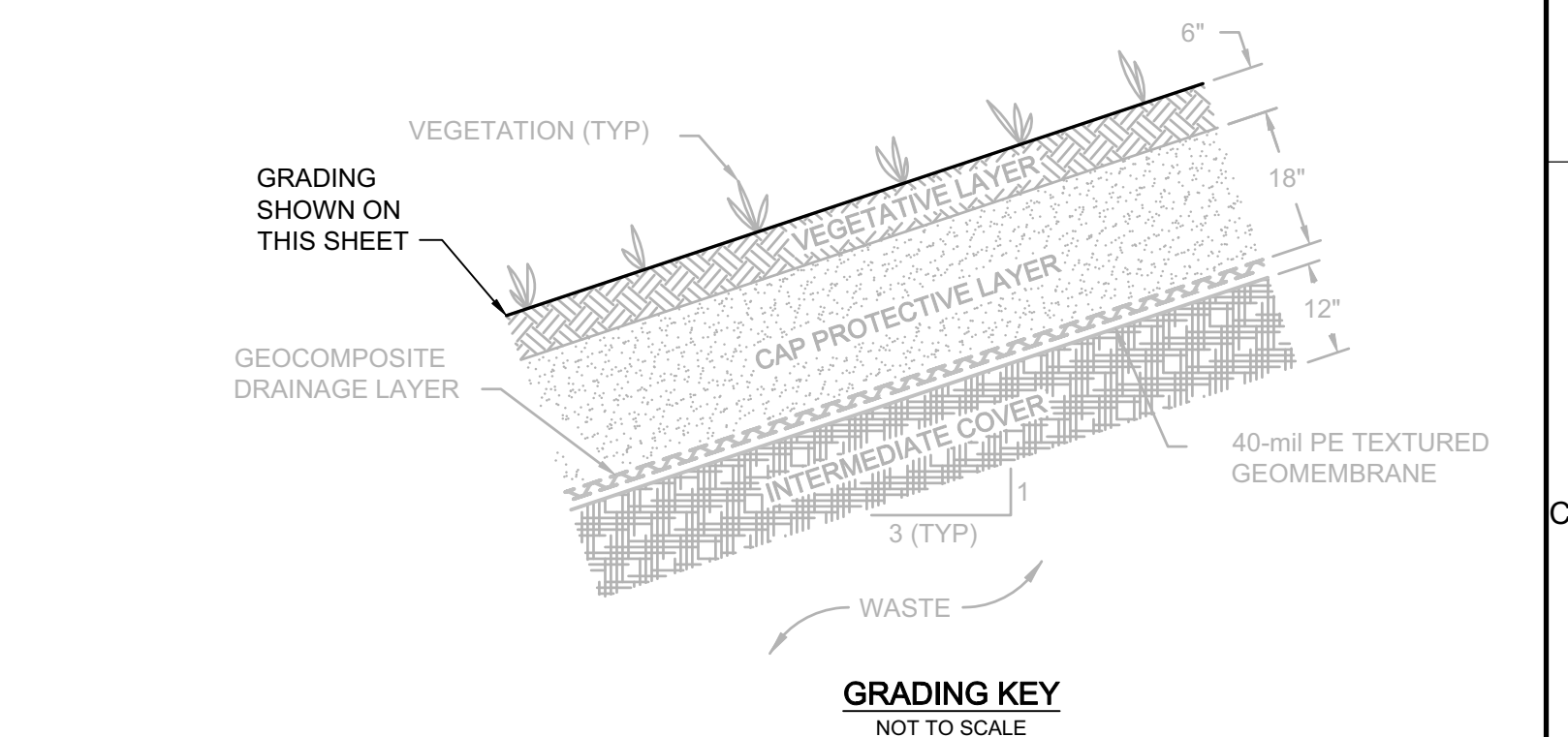


CONSTRUCTION DRAWING





LEGEND

- PROPERTY BOUNDARY
- EXISTING LANDFILL ACCESS OR PERIMETER ROAD
- EXISTING GROUND ELEVATION (FEET) (SEE NOTE 4)
- EXISTING FENCE LINE
- EXISTING TOPOGRAPHY SPOT ELEVATION (FEET)
- TREE LINE
- CELL BOUNDARY
- AS-BUILT GAS EXTRACTION WELL
- EXISTING AREA OF PARTIAL CLOSURE
- EXISTING STORM WATER STRUCTURES
- APPROXIMATE LIMIT OF PARTIAL CLOSURE CONSTRUCTION (FINAL COVER LIMITS) (NOTE 6)
- TOP OF FINAL COVER SYSTEM ELEVATION
- DRAINAGE BENCH FLOWLINE
- TOP OF FINAL COVER SYSTEM CONTROL POINT



- NOTES:**
- NORTHING AND EASTING COORDINATES SHOWN REPRESENT FLORIDA STATE PLANE EAST ZONE NORTH AMERICAN DATUM OF 1983 (NAD83).
 - THE ELEVATIONS SHOWN REPRESENT NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29)(FEET).
 - THE PROPERTY BOUNDARY IS BASED ON A COMPOSITE BOUNDARY SURVEY PROVIDED BY JOHNSTON SURVEYING INC., KISSIMEE FLORIDA, DATED AUGUST 12, 1999.
 - THE TOPOGRAPHIC INFORMATION SHOWN ON THIS DRAWING WAS PROVIDED BY BASE MAPPING CO. LTD, BASED ON AN AERIAL PHOTOGRAPH TAKEN ON 24 JULY 2010.
 - THE TOPOGRAPHIC INFORMATION PROVIDED DOES NOT NECESSARILY REPRESENT CURRENT CONDITIONS. THE CONTRACTOR SHALL UNDERSTAND CURRENT CONDITIONS BASED ON FIELD RECONNAISSANCE AND/OR ADDITIONAL TOPOGRAPHIC SURVEYS AT THEIR EXPENSE.
 - FINAL LIMITS OF CLOSURE MAY BE ADJUSTED DURING CONSTRUCTION AS NECESSARY TO ACCOMMODATE FILLING LIMITS ADJACENT TO ACTIVE DISPOSAL AREAS.

0	MAR-11	INTERMEDIATE PERMIT MODIFICATION		CMV	CRB																									
REV	DATE	DESCRIPTION		DRN	APP																									
<div>Geosyntec consultants</div> <div>13101 TELECOM DRIVE, SUITE 120 TEMPLE TERRACE, FLORIDA 33637 USA PH: 813.558.0990 - FX: 813.558.9726 AUTHORIZATION NUMBER: 4321</div>				<div> 1501 OMNI WAY ST. CLOUD, FLORIDA 34773 TEL: 407-891-3720 FAX: 407-891-3730</div>																										
TITLE: TOP OF FINAL COVER SYSTEM STAKING PLAN																														
PROJECT: PARTIAL LANDFILL CLOSURE CONSTRUCTION - EVENT 2																														
SITE: PHASE 1 DISPOSAL AREA J.E.D. SOLID WASTE MANAGEMENT FACILITY																														
<div> SIGNATURE 3/10/2011 DATE</div> <div>CRAIG BROWNE - LICENSE NO. 68613</div>		<table><tr><td>DESIGN BY:</td><td>VMD/JWO</td><td>DATE:</td><td colspan="2">MARCH 2011</td></tr><tr><td>DRAWN BY:</td><td>CMV</td><td>PROJECT NO.:</td><td colspan="2">FL1858.01</td></tr><tr><td>CHECKED BY:</td><td>VMD</td><td>FILE:</td><td colspan="2">FL1858.01C090</td></tr><tr><td>REVIEWED BY:</td><td>JAB</td><td>DRAWING NO.:</td><td colspan="2">9 OF 13</td></tr><tr><td>APPROVED BY:</td><td>CRB</td><td colspan="3"></td></tr></table>				DESIGN BY:	VMD/JWO	DATE:	MARCH 2011		DRAWN BY:	CMV	PROJECT NO.:	FL1858.01		CHECKED BY:	VMD	FILE:	FL1858.01C090		REVIEWED BY:	JAB	DRAWING NO.:	9 OF 13		APPROVED BY:	CRB			
DESIGN BY:	VMD/JWO	DATE:	MARCH 2011																											
DRAWN BY:	CMV	PROJECT NO.:	FL1858.01																											
CHECKED BY:	VMD	FILE:	FL1858.01C090																											
REVIEWED BY:	JAB	DRAWING NO.:	9 OF 13																											
APPROVED BY:	CRB																													

FL 0400 PROJECT SUBMITTED AND FULLY CONSTRUCTION PARTIAL CLOSURE CONSTRUCTION (10 March 2011 - 12:00 AM) Closes

Final Cover Control Point Table				
Point	Northing	Easting	Elev.	Description
3001	1356163.33	624252.29	183.16	FNL CVR
3002	1356200.47	624250.75	182.67	FNL CVR
3003	1356300.41	624250.58	182.67	FNL CVR
3004	1356400.47	624250.41	182.67	FNL CVR
3005	1356500.47	624250.24	182.67	FNL CVR
3006	1356600.47	624250.07	182.67	FNL CVR
3007	1356700.47	624249.90	182.67	FNL CVR
3008	1356800.47	624249.73	182.67	FNL CVR
3009	1356900.47	624249.55	182.67	FNL CVR
3010	1357000.47	624249.38	182.67	FNL CVR
3011	1357100.47	624249.21	182.67	FNL CVR
3012	1357200.47	624249.04	182.67	FNL CVR
3013	1357300.47	624248.87	182.67	FNL CVR
3014	1357354.07	624248.78	182.67	FNL CVR
3015	1357354.07	624356.95	182.67	FNL CVR
3016	1357354.07	624456.95	182.67	FNL CVR
3017	1357354.07	624496.22	182.67	FNL CVR
3018	1357338.45	624528.58	182.67	FNL CVR
3019	1357290.18	624628.58	182.67	FNL CVR
3020	1357241.90	624728.58	182.67	FNL CVR
3021	1357196.75	624822.12	182.67	FNL CVR
3022	1357171.76	624873.90	182.67	FNL CVR
3023	1357111.78	624894.02	182.67	FNL CVR
3024	1357016.98	624925.84	182.67	FNL CVR
3025	1356922.18	624957.65	182.67	FNL CVR
3026	1356827.37	624989.47	182.67	FNL CVR
3027	1356732.57	625021.28	182.67	FNL CVR
3028	1356637.76	625053.10	182.67	FNL CVR
3029	1356542.96	625084.91	182.67	FNL CVR
3030	1356514.76	625094.37	182.67	FNL CVR
3031	1356399.53	625094.57	182.67	FNL CVR
3032	1356299.53	625094.74	182.67	FNL CVR
3033	1356199.46	625094.91	182.67	FNL CVR
3034	1356254.46	625039.82	201.00	FNL CVR
3035	1356299.36	624994.85	215.96	FNL CVR
3036	1356399.36	624994.57	216.00	FNL CVR
3037	1356498.35	624994.40	216.00	FNL CVR
3038	1356547.62	624977.87	216.00	FNL CVR
3039	1356522.80	624903.92	237.00	FNL CVR
3040	1356514.20	624740.14	262.00	FNL CVR
3041	1356525.17	624659.33	265.19	FNL CVR
3042	1356514.20	624586.21	262.00	FNL CVR
3043	1356490.57	624428.25	237.00	FNL CVR
3044	1356478.93	624350.27	216.00	FNL CVR
3045	1356370.39	624350.46	216.00	FNL CVR
3046	1356261.84	624350.64	216.00	FNL CVR
3047	1356216.84	624305.72	201.00	FNL CVR

Final Cover Control Point Table				
Point	Northing	Easting	Elev.	Description
3101	1356302.76	624305.57	201.00	FNL CVR
3102	1356400.57	624305.41	201.00	FNL CVR
3103	1356500.57	624305.24	201.00	FNL CVR
3104	1356600.56	624305.07	201.00	FNL CVR
3105	1356700.57	624304.90	201.00	FNL CVR
3106	1356800.57	624304.73	201.00	FNL CVR
3107	1356900.57	624304.55	201.00	FNL CVR
3108	1357000.56	624304.38	201.00	FNL CVR
3109	1357100.57	624304.21	201.00	FNL CVR
3110	1357200.56	624304.04	201.00	FNL CVR
3111	1357299.07	624303.88	201.00	FNL CVR
3112	1357299.07	624393.76	201.00	FNL CVR
3113	1357299.07	624483.64	201.00	FNL CVR
3114	1357240.64	624604.67	201.00	FNL CVR
3115	1357192.37	624704.67	201.00	FNL CVR
3116	1357132.30	624829.12	201.00	FNL CVR
3117	1356999.48	624873.70	201.00	FNL CVR
3118	1356904.68	624905.51	201.00	FNL CVR
3119	1356809.87	624937.32	201.00	FNL CVR
3120	1356715.07	624969.14	201.00	FNL CVR
3121	1356620.27	625000.95	201.00	FNL CVR
3122	1356505.74	625039.39	201.00	FNL CVR
3123	1356399.44	625039.57	201.00	FNL CVR
3124	1356299.43	625039.74	201.00	FNL CVR

Final Cover Control Point Table				
Point	Northing	Easting	Elev.	Description
3201	1356480.72	624362.27	220.00	Bench Crest
3202	1356600.65	624362.07	220.00	Bench Crest
3203	1356700.66	624361.90	220.00	Bench Crest
3204	1356800.65	624361.72	220.00	Bench Crest
3205	1356900.66	624361.55	220.00	Bench Crest
3206	1357000.66	624361.38	220.00	Bench Crest
3207	1357100.65	624361.21	220.00	Bench Crest
3208	1357200.66	624361.04	220.00	Bench Crest
3209	1357242.07	624360.97	220.00	Bench Crest
3210	1357242.07	624415.79	220.00	Bench Crest
3211	1357242.07	624470.60	220.00	Bench Crest
3212	1357189.31	624579.89	220.00	Bench Crest
3213	1357141.04	624679.89	220.00	Bench Crest
3214	1357091.40	624782.72	220.00	Bench Crest
3215	1356981.35	624819.66	220.00	Bench Crest
3216	1356886.54	624851.47	220.00	Bench Crest
3217	1356791.74	624883.29	220.00	Bench Crest
3218	1356696.93	624915.10	220.00	Bench Crest
3219	1356602.13	624946.92	220.00	Bench Crest
3220	1356543.80	624966.49	220.00	Bench Crest

Final Cover Control Point Table				
Point	Northing	Easting	Elev.	Description
3301	1356600.78	624428.07	237.00	FNL CVR
3302	1356700.78	624427.90	237.00	FNL CVR
3303	1356800.78	624427.72	237.00	FNL CVR
3304	1356900.78	624427.55	237.00	FNL CVR
3305	1357000.78	624427.38	237.00	FNL CVR
3306	1357100.78	624427.21	237.00	FNL CVR
3307	1357176.07	624427.08	237.00	FNL CVR
3308	1357176.07	624455.50	237.00	FNL CVR
3309	1357129.87	624551.20	237.00	FNL CVR
3310	1357081.60	624651.20	237.00	FNL CVR
3311	1357044.05	624729.00	237.00	FNL CVR
3312	1356960.35	624757.09	237.00	FNL CVR
3313	1356865.55	624788.90	237.00	FNL CVR
3314	1356770.74	624820.72	237.00	FNL CVR
3315	1356675.94	624852.53	237.00	FNL CVR
3316	1356581.13	624884.35	237.00	FNL CVR

Final Cover Control Point Table				
Point	Northing	Easting	Elev.	Description
3401	1356500.86	624497.24	260.00	Bench Crest
3402	1356600.89	624497.07	260.00	Bench Crest
3403	1356700.89	624496.90	260.00	Bench Crest
3404	1356800.89	624496.72	260.00	Bench Crest
3405	1356900.89	624496.55	260.00	Bench Crest
3406	1357000.89	624496.38	260.00	Bench Crest
3407	1357079.78	624496.25	260.00	Bench Crest
3408	1357067.74	624521.21	260.00	Bench Crest
3409	1357019.46	624621.21	260.00	Bench Crest
3410	1356994.55	624672.83	260.00	Bench Crest
3411	1356938.40	624691.67	260.00	Bench Crest
3412	1356843.59	624723.49	260.00	Bench Crest
3413	1356748.79	624755.30	260.00	Bench Crest
3414	1356653.98	624787.12	260.00	Bench Crest
3415	1356559.18	624818.93	260.00	Bench Crest
3416	1356500.85	624838.51	260.00	Bench Crest

Final Cover Control Point Table				
Point	Northing	Easting	Elev.	Description
3501	1356601.05	624586.07	262.00	FNL CVR
3502	1356701.05	624585.90	262.00	FNL CVR
3503	1356801.05	624585.73	262.00	FNL CVR
3504	1356901.05	624585.56	262.00	FNL CVR
3505	1356937.86	624585.50	262.00	FNL CVR
3506	1356930.69	624600.37	262.00	FNL CVR
3507	1356910.08	624607.29	262.00	FNL CVR
3508	1356815.27	624639.10	262.00	FNL CVR
3509	1356720.47	624670.92	262.00	FNL CVR
3510	1356625.67	624702.73	262.00	FNL CVR
3511	1356530.86	624734.55	262.00	FNL CVR
3512	1357033.50	624525.35	259.00	FNL CVR
3513	1356973.72	624649.20	259.00	FNL CVR
3514	1356969.75	624565.45	261.00	FNL CVR
3515	1356945.03	624616.65	261.00	FNL CVR
3516	1356852.16	624605.64	263.00	FNL CVR
3517	1356701.12	624630.44	264.23	FNL CVR
3518	1356605.99	624646.06	265.00	FNL CVR

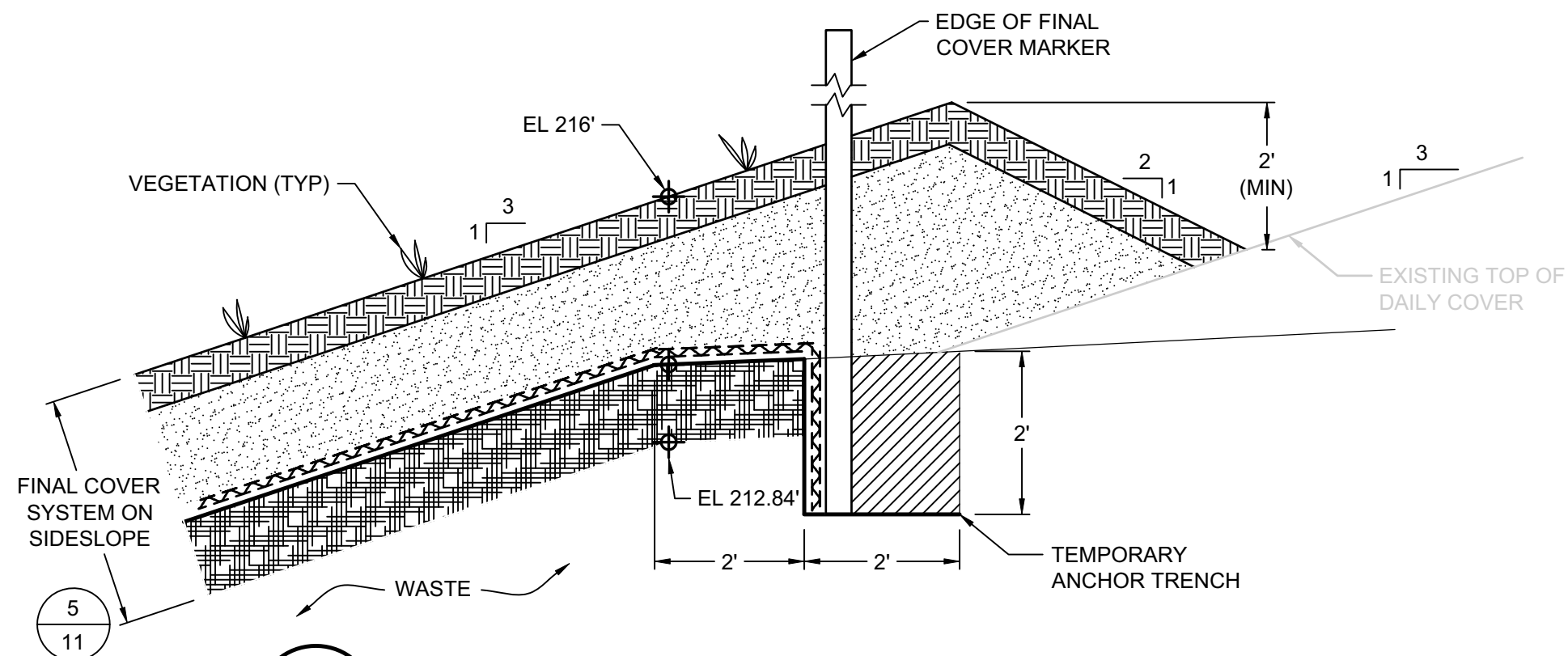
Final Cover Control Point Table				
Point	Northing	Easting	Elev.	Description
3601	1356760.64	624370.79	218.00	Low Point
3602	1356780.02	624370.76	218.00	Low Point
3603	1357233.07	624458.94	218.00	Low Point
3604	1357228.85	624477.28	218.00	Low Point
3605	1356926.15	624828.69	218.00	Low Point
3606	1356907.62	624834.90	218.00	Low Point
3607	1356647.34	624922.25	218.00	Low Point
3608	1356628.82	624928.47	218.00	Low Point

Final Cover Control Point Table				
Point	Northing	Easting	Elev.	Description
3701	1356760.87	624505.79	258.00	Low Point
3702	1356780.25	624505.76	258.00	Low Point
3703	1356883.12	624700.73	258.00	Low Point
3704	1356864.75	624706.89	258.00	Low Point
3705	1356604.32	624794.29	258.00	Low Point
3706	1356585.94	624800.46	258.00	Low Point

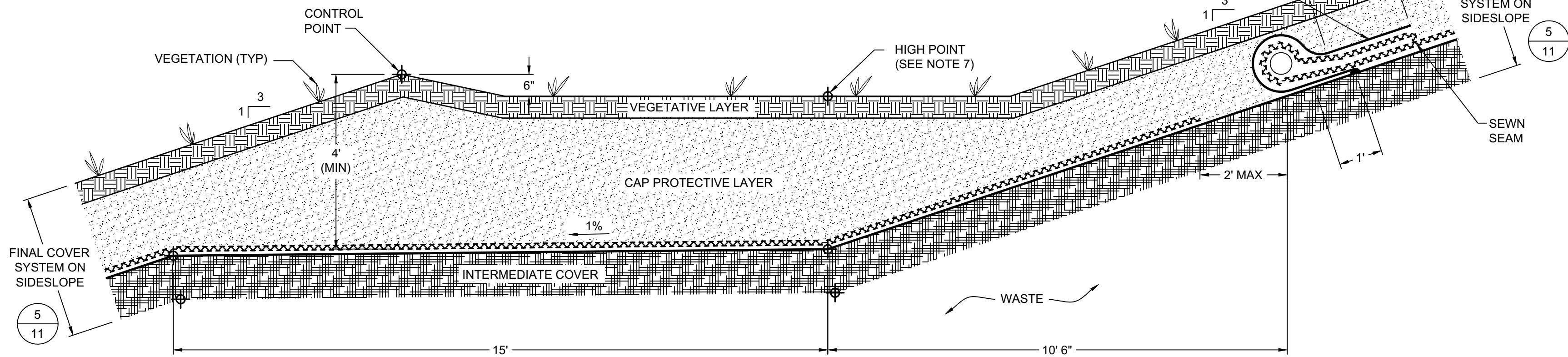
Final Cover Control Point Table				
Point	Northing	Easting	Elev.	Description
3801	1357051.07	624370.30	219.50	High Point
3802	1357120.47	624701.80	219.50	High Point
3803	1356777.44	624878.59	219.50	High Point

Final Cover Control Point Table				
Point	Northing	Easting	Elev.	Description
3901	1357065.43	624505.27	259.50	High Point
3902	1356734.49	624750.60	259.50	High Point

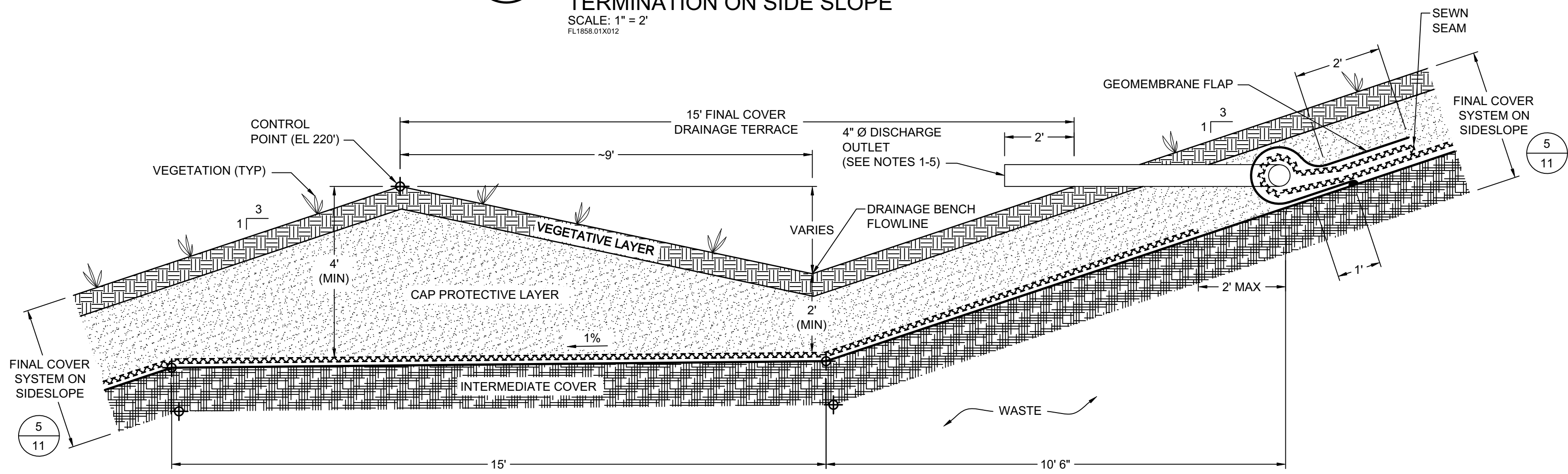
Final Cover Control Point Table				
Point	Northing	Easting	Elev.	Description
4801	1356494.87	624973.24	218.00	Bench Crest
4802	1356399.32	624973.40	218.00	Bench Crest
4803	1356298.23	624973.57	218.00	Bench Crest
4804	1356484.98	624912.95	238.16	FNL CVR
4805	1356399.22	624913.09	238.16	FNL CVR
4806	1356294.70	624913.27	238.16	FNL CVR
4807	1356475.25	624853.73	257.90	FNL CVR
4808	1356399.12	624853.86	257.90	FNL CVR
4809	1356291.25	624854.05	257.90	FNL CVR
4810	1356473.15	624840.94	258.03	FNL CVR
4811	1356459.72	624758.42	262.16	FNL CVR
4812	1356402.55	624841.06	257.96	FNL CVR
4813	1356399.89	624838.40	258.06	FNL CVR
4814	1356402.55	624838.01	258.03	FNL CVR
4815	1356290.34	624838.59	258.06	FNL CVR
4816	1356402.41	624758.42	262.17	FNL CVR
4817	1356402.27	624672.49	266.46	FNL CVR
4818	1356445.50	624672.41	265.45	FNL CVR
4819	1356280.65	624672.69	272.24	FNL CVR
4820	1356402.12	624586.41	262.17	FNL CVR
4821	1356272.29	624529.52	265.64	FNL CVR



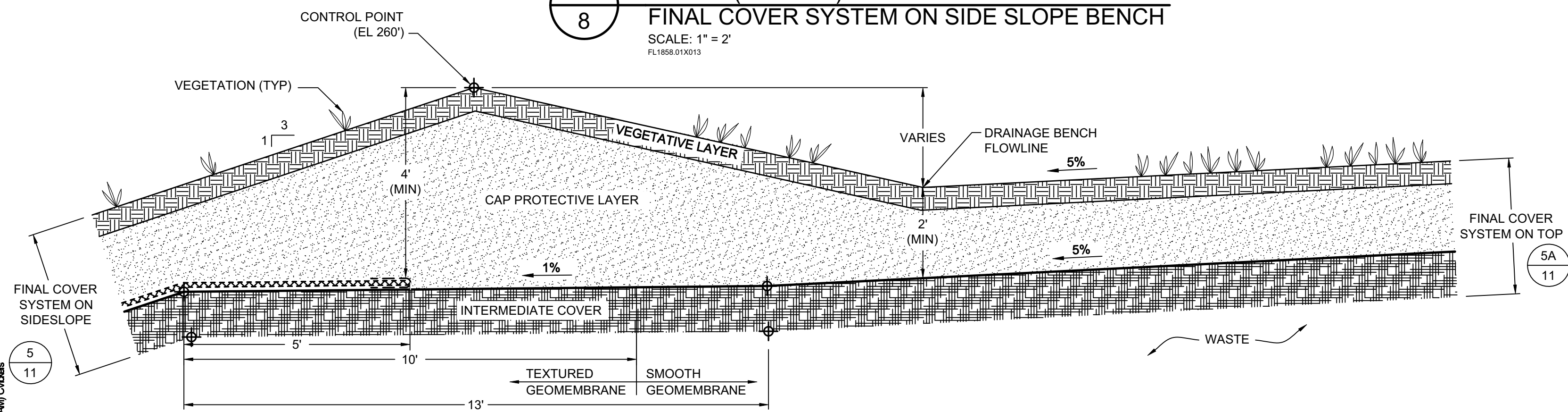
1/8 DETAIL (TYPICAL)
TEMPORARY FINAL COVER SYSTEM
TERMINATION ON SIDE SLOPE
SCALE: 1" = 2'
FL1858.01X012



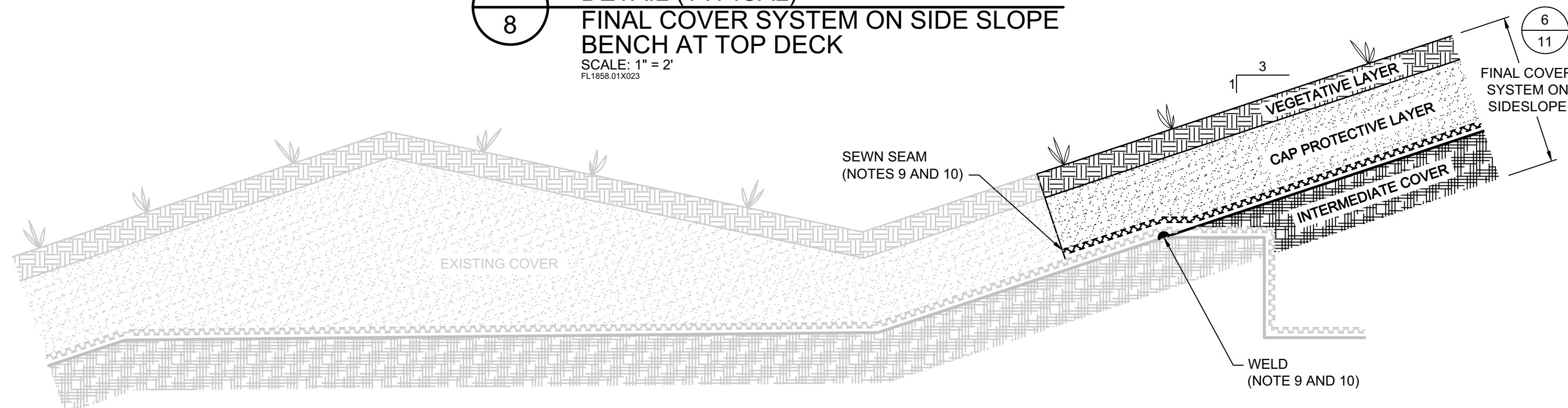
3/8 DETAIL (TYPICAL)
FINAL COVER SYSTEM ON SIDE SLOPE BENCH
AT HIGH POINT
SCALE: 1" = 2'
FL1858.01X022



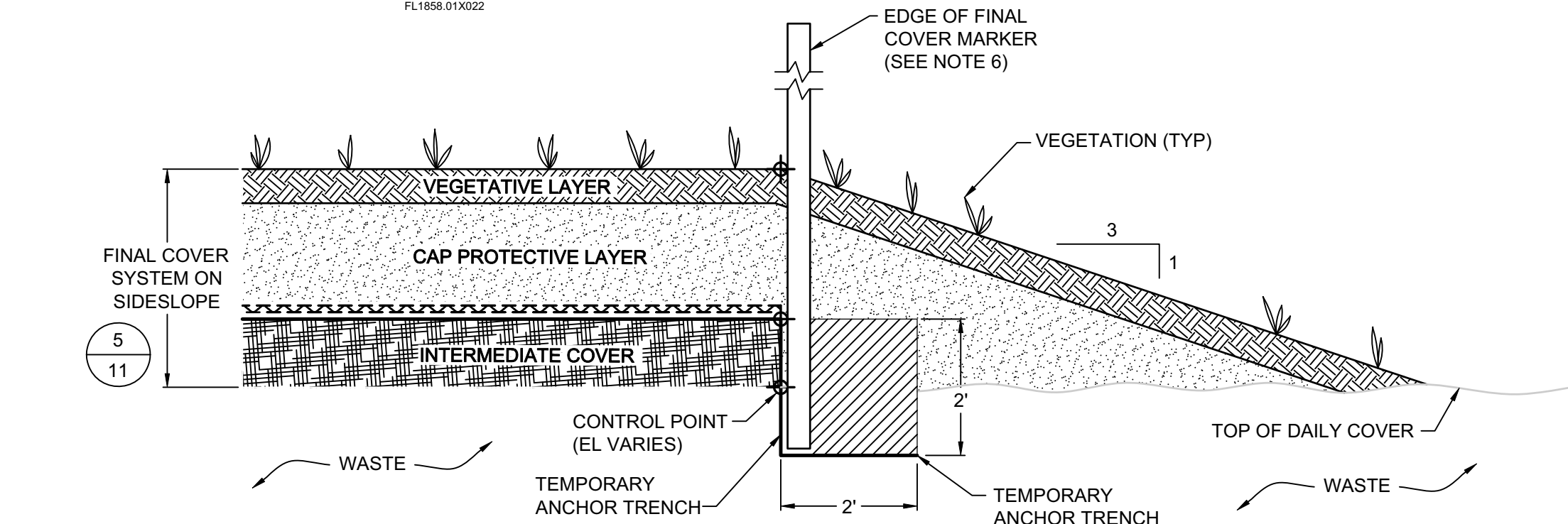
2/8 DETAIL (TYPICAL)
FINAL COVER SYSTEM ON SIDE SLOPE BENCH
SCALE: 1" = 2'
FL1858.01X013



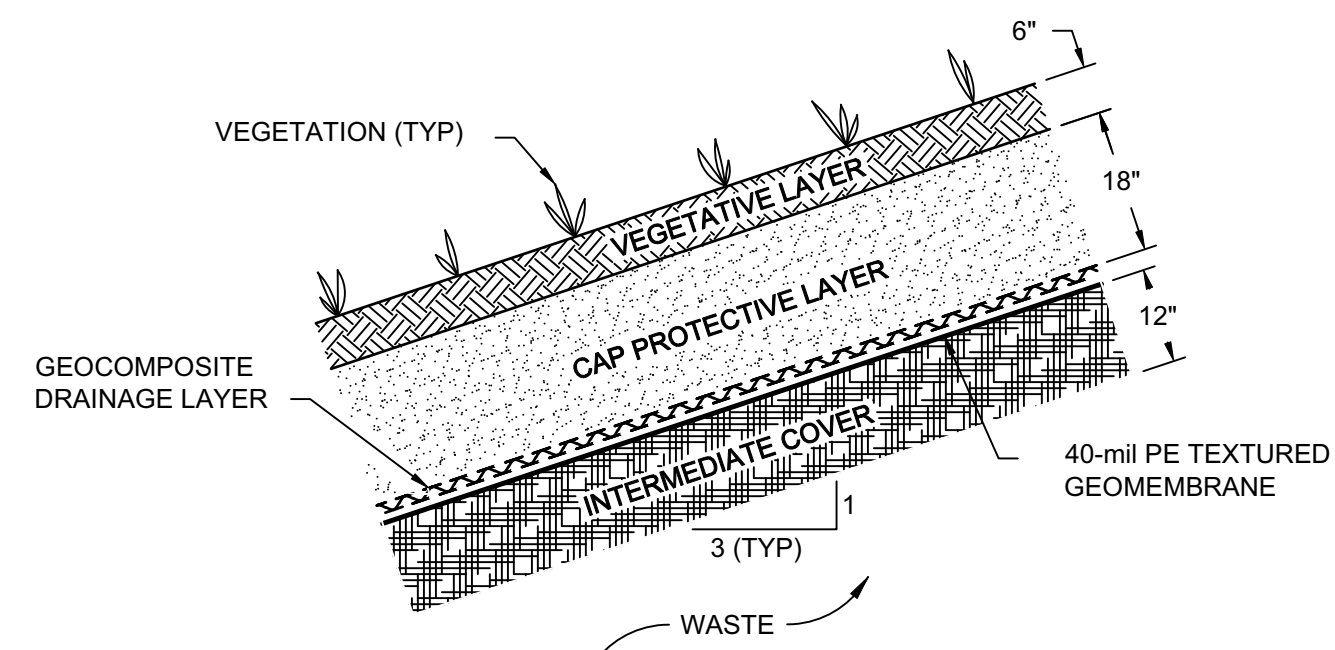
2A/8 DETAIL (TYPICAL)
FINAL COVER SYSTEM ON SIDE SLOPE
BENCH AT TOP DECK
SCALE: 1" = 2'
FL1858.01X023



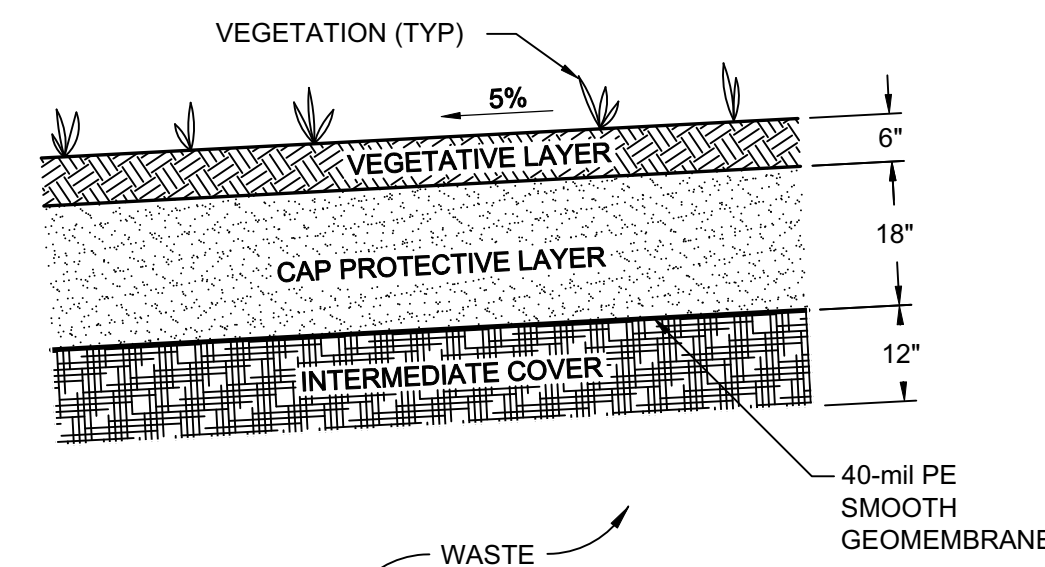
2B/8 DETAIL (TYPICAL)
FINAL COVER TIE-IN TO EXISTING COVER
SYSTEM ON SIDE SLOPE BENCH
SCALE: 1" = 2'
FL1858.01X024



4/8 DETAIL (TYPICAL)
TEMPORARY FINAL COVER SYSTEM TERMINATION
ACROSS SIDE SLOPE AND TOP
SCALE: 1" = 2'
XREF: FL1858.01X021



5/8 DETAIL (TYPICAL)
FINAL COVER SYSTEM
ON SIDE SLOPE
SCALE: 1" = 2'
XREF: FL1858.01X011



5A/11 DETAIL (TYPICAL)
FINAL COVER SYSTEM ON TOP
SCALE: 1" = 2'
XREF: FL1858.01X024

NOTES:

- HEADER AND DISCHARGE OUTLET PIPES SHALL BE CORRUGATED HDPE PIPE 4-IN IN DIAMETER. THE HEADER PIPE SHALL BE PERFORATED.
- DISCHARGE OUTLET PIPES SHALL BE SPACED NO MORE THAN 250 FT APART.
- DISCHARGE OUTLET PIPE SHALL BE INSTALLED AT A MINIMUM SLOPE OF 1%. HEADER PIPE SHALL BE INSTALLED AT A MINIMUM SLOPE OF 2%.
- PIPE SHALL BE PROVIDED WITH AN OUTLET (T OR L) THAT DISCHARGES THE WATER INTO THE DRAINAGE SWALE.
- HEADER PIPE SHALL BE TERMINATED WITH A CAP ON EITHER SIDE OF THE FINAL COVER DOWNCHUTES AND AT END LOCATIONS.
- THE EDGE OF FINAL COVER SYSTEM SHALL BE MARKED AT LOCATIONS SHOWN ON SHEET 8 OF THIS DRAWING SET. THE MARKERS SHALL BE 4"x4"x8' PRESSURE-TREATED TIMBER POST AND SHALL BE PAINTED ORANGE.
- DRAINAGE SWALE HIGH POINT LOCATIONS ARE SHOWN ON SHEET 9 AND HIGH POINT ELEVATIONS ARE PROVIDED ON SHEET 10.
- DETAILS ARE SHOWN TO SCALE AS NOTED EXCEPT FOR THE GEOSYNTHETICS WHICH ARE SHOWN AT AN EXAGGERATED SCALE FOR CLARITY.
- TIE-IN TO EXISTING LINER SYSTEM SHALL BE ACHIEVED THROUGH EXTRUSION WELD ON GEOMEMBRANE AND SEWN SEAM ON GEOCOMPOSITE.
- EXISTING EDGE OF LINER MARKERS INDICATE APPROXIMATE LOCATION OF EXISTING LINER TERMINATION. CONTRACTORS SHALL LOCATE AND UNCOVER EXISTING LINER TERMINATION. TIE-IN LOCATION WILL BE FIELD FITTED AS NECESSARY.

CONSTRUCTION DRAWING

0	MAR-11	INTERMEDIATE PERMIT MODIFICATION	CMV	CRB
REV	DATE	DESCRIPTION	DRN	APP

Geosyntec
consultants

13101 TELECOM DRIVE, SUITE 120
TEMPLE TERRACE, FLORIDA 33637 USA
PH: 813.558.0990 - FX: 813.558.9726
AUTHORIZATION NUMBER: 4321

WSI
Waste Services, Inc.

1501 OMNI WAY
ST. CLOUD, FLORIDA 34773
TEL: 407-891-3720 FAX: 407-891-3730

TITLE: **FINAL COVER SYSTEM DETAILS**

PROJECT: **PARTIAL LANDFILL CLOSURE CONSTRUCTION - EVENT 2**

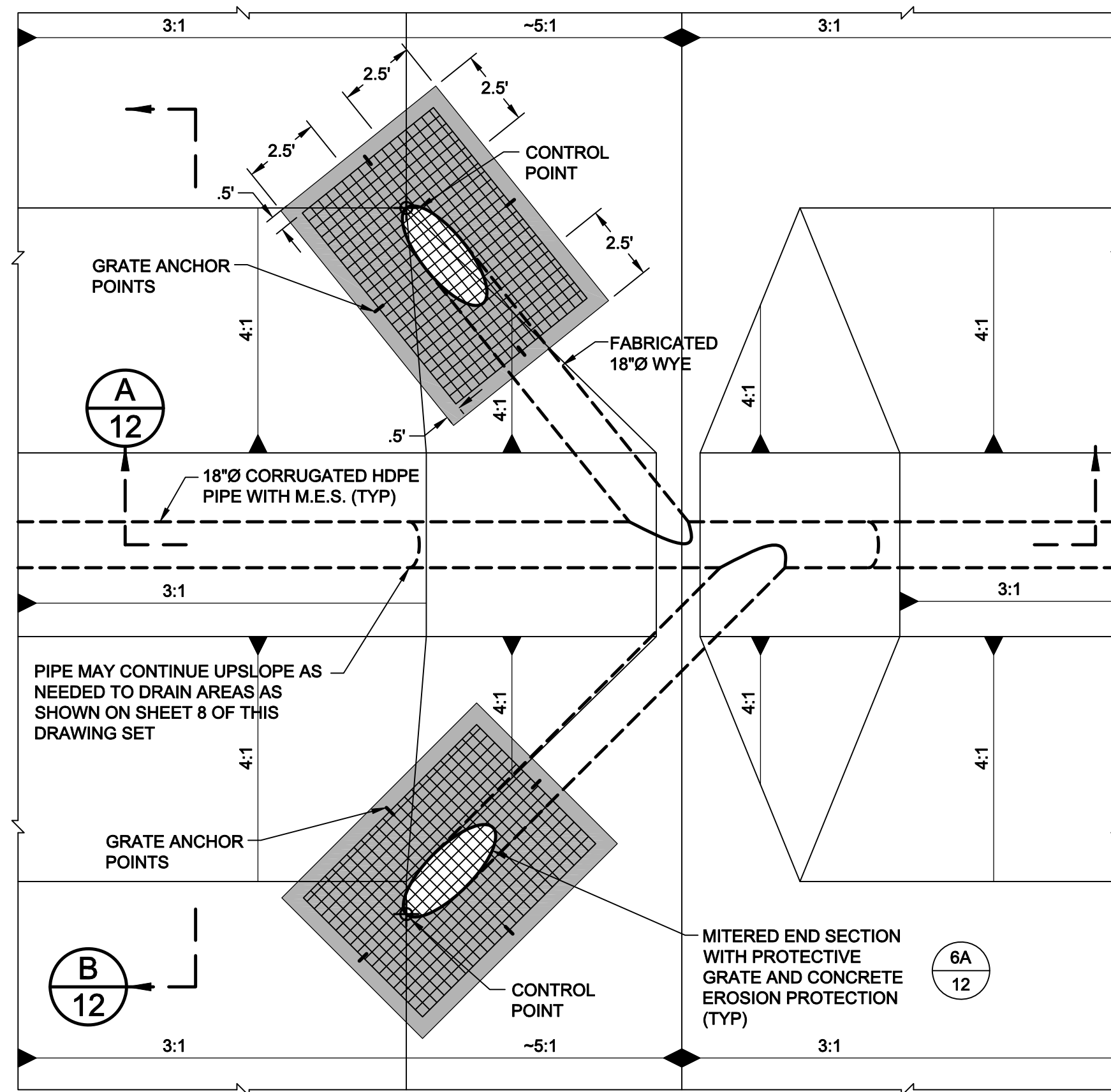
SITE: **PHASE 1 DISPOSAL AREA
J.E.D. SOLID WASTE MANAGEMENT FACILITY**

DESIGN BY: VMD/JWO	DATE: MARCH 2011
DRAWN BY: CMV	PROJECT NO.: FL1858.01
CHECKED BY: VMD	FILE: FL1858.01C110
REVIEWED BY: JAB	DRAWING NO.: 11 OF 13
APPROVED BY: CRB	

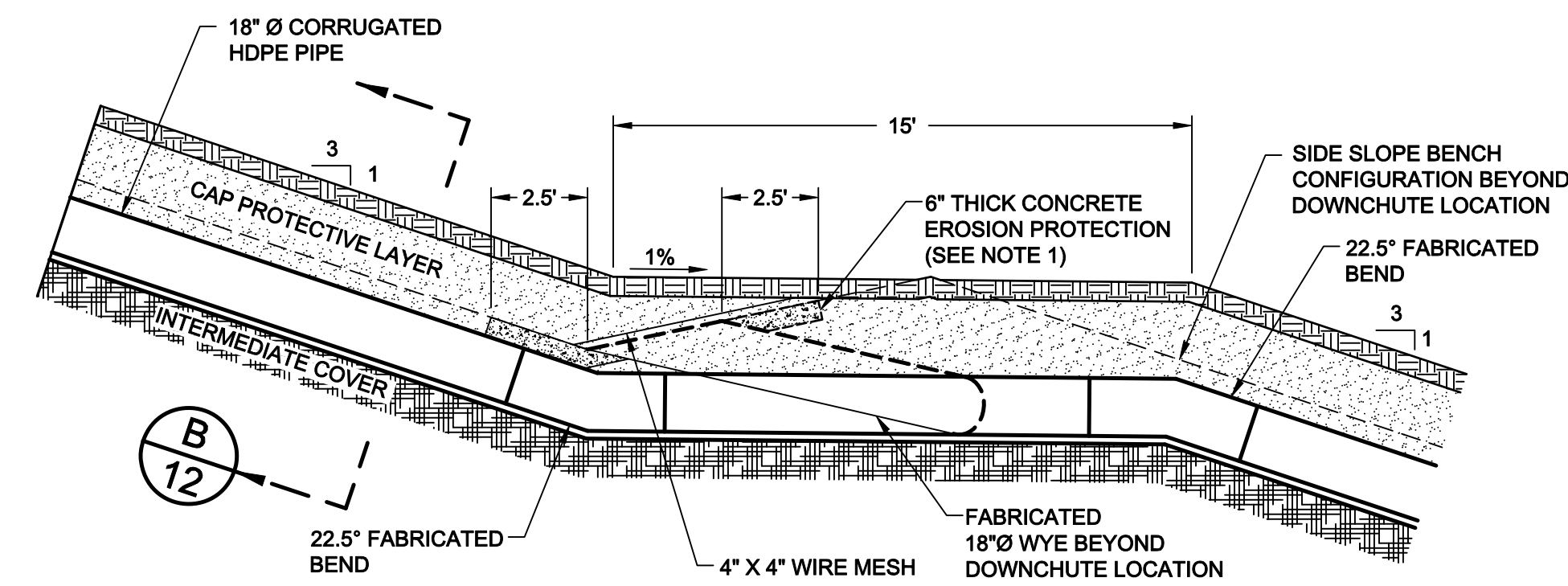
CRAIG BROWNE - LICENSE NO. 68613

3/10/2011

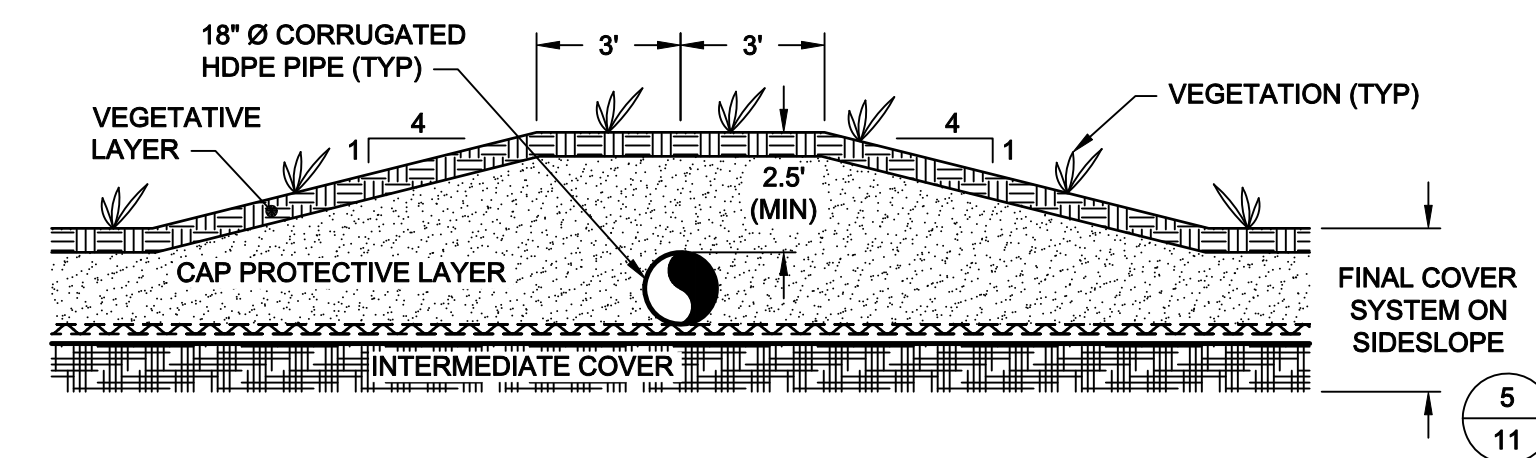
CRAIG R. BROWNE
LICENSE
No. 68613
STATE OF
FLORIDA
PROFESSIONAL ENGINEER



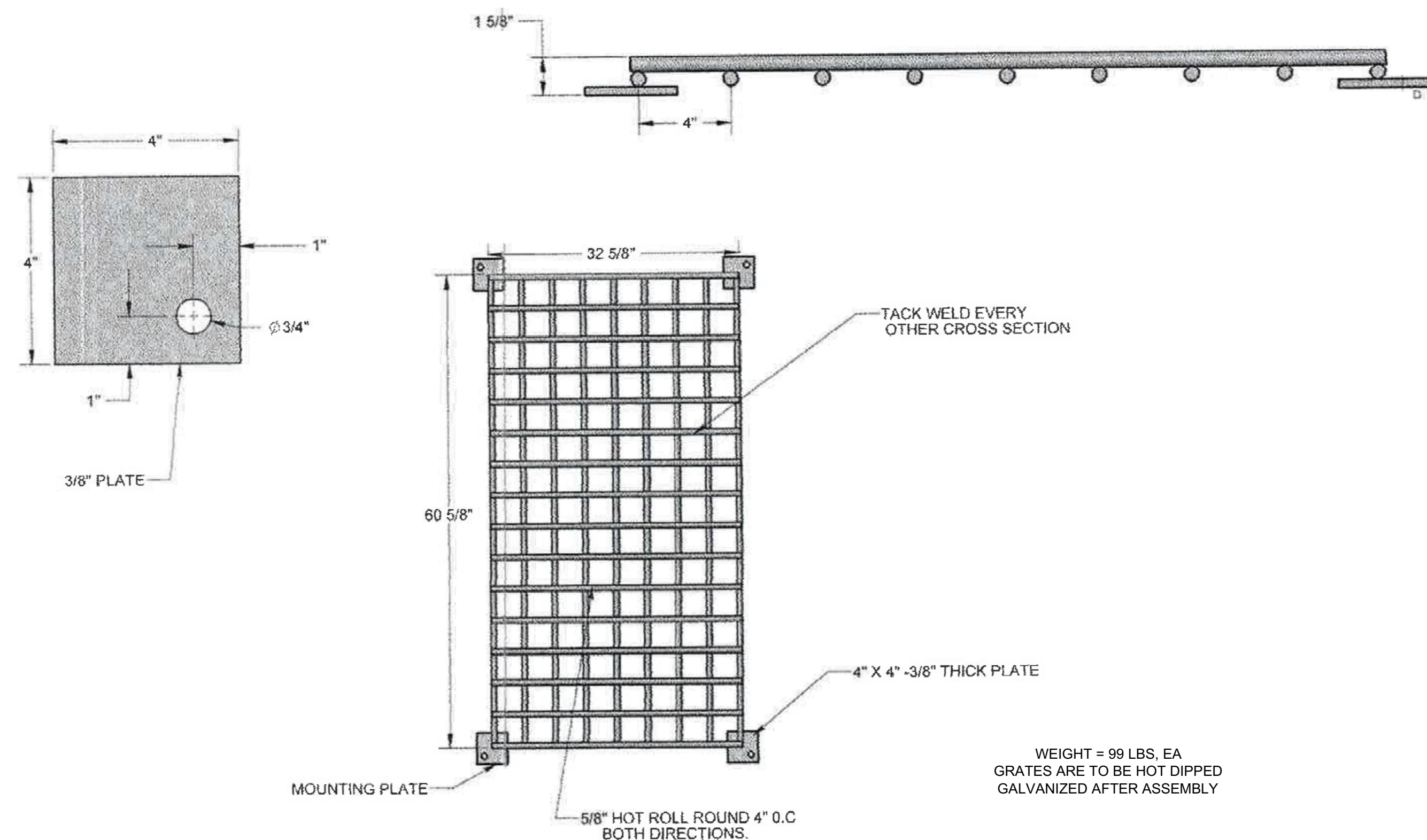
6
8 PLAN (TYPICAL)
DOWNCHUTE AT SIDE SLOPE BENCH
SCALE: 1" = 4'



A
12 SECTION (TYPICAL)
DOWNCHUTE AT SIDE SLOPE BENCH
SCALE: 1" = 4'



B
12 SECTION (TYPICAL)
FINAL COVER CONFIGURATION
AT DOWNCHUTE LOCATIONS
SCALE: 1" = 4'



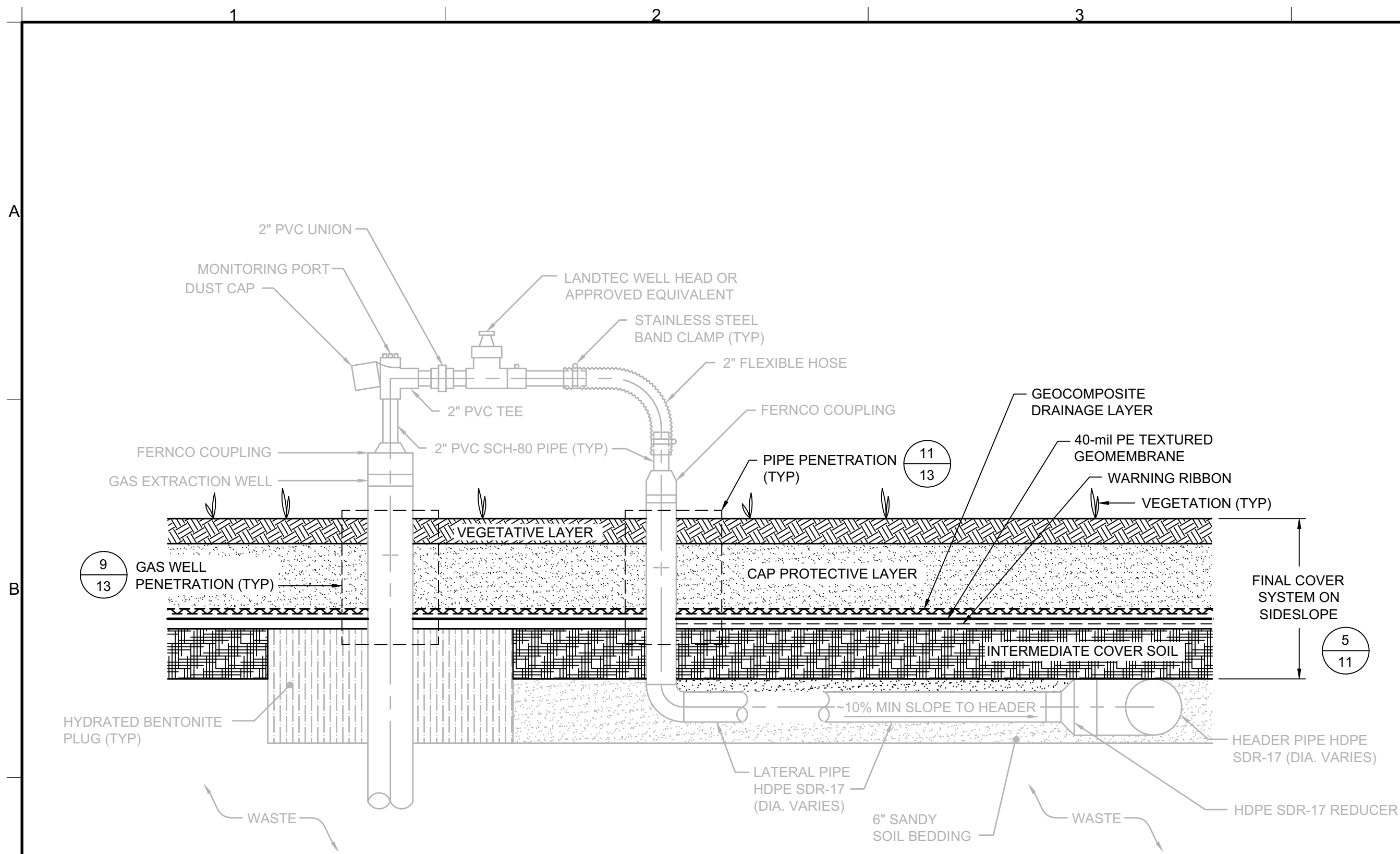
6A
12 DETAIL
PROTECTIVE GRATE
SCALE: N.T.S.

NOTES:

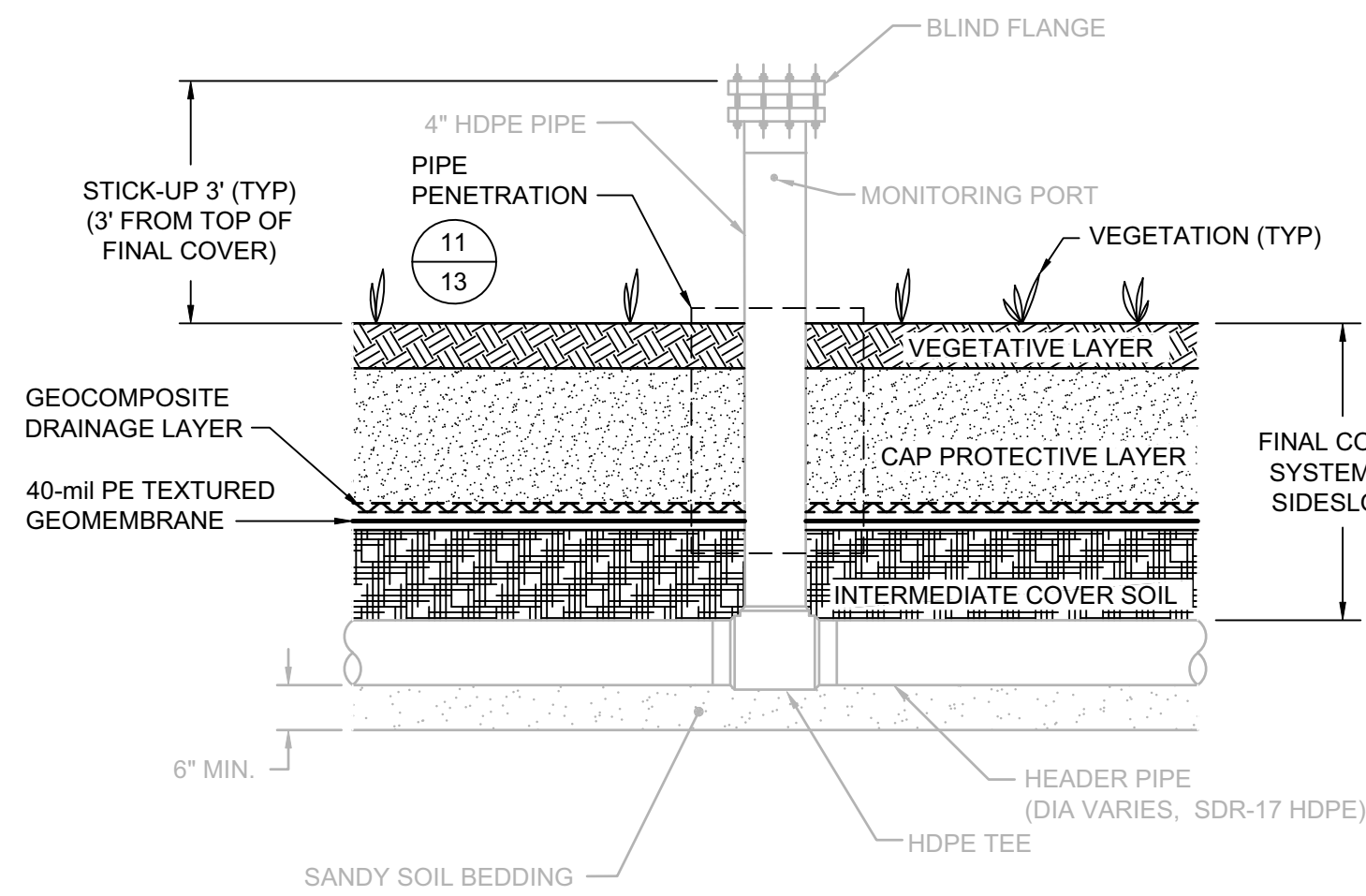
- CONCRETE SHALL BE REINFORCED WITH 4" X 4" MESH AND MEET THE REQUIREMENTS OF SECTION 349 OF THE FDOT STANDARD SPECIFICATIONS FOR ROAD & BRIDGE CONSTRUCTION, 2007 EDITION.
- DETAILS ARE SHOWN TO SCALE AS NOTED EXCEPT FOR THE GEOSYNTHETICS WHICH ARE SHOWN AT AN EXAGGERATED SCALE FOR CLARITY.

0	MAR-11	INTERMEDIATE PERMIT MODIFICATION	CMV	CRB
REV	DATE	DESCRIPTION	DRN	APP
Geosyntec consultants 13101 TELECOM DRIVE, SUITE 120 TEMPLE TERRACE, FLORIDA 33637 USA PH: 813.558.0990 - FX: 813.558.9726 AUTHORIZATION NUMBER: 4321				
WSI Waste Services, Inc. 1501 OMNI WAY ST. CLOUD, FLORIDA 34773 TEL: 407-891-3720 FAX: 407-891-3730				
TITLE: STORM WATER MANAGEMENT DETAILS				
PROJECT: PARTIAL LANDFILL CLOSURE CONSTRUCTION - EVENT 2				
SITE: PHASE 1 DISPOSAL AREA J.E.D. SOLID WASTE MANAGEMENT FACILITY				
DESIGN BY: VMD/JWO		DATE: MARCH 2011		
DRAWN BY: CMV		PROJECT NO.: FL1858.01		
CHECKED BY: VMD		FILE: FL1858.01C120		
REVIEWED BY: JAB		DRAWING NO.: 12 OF 13		
APPROVED BY: CRB				

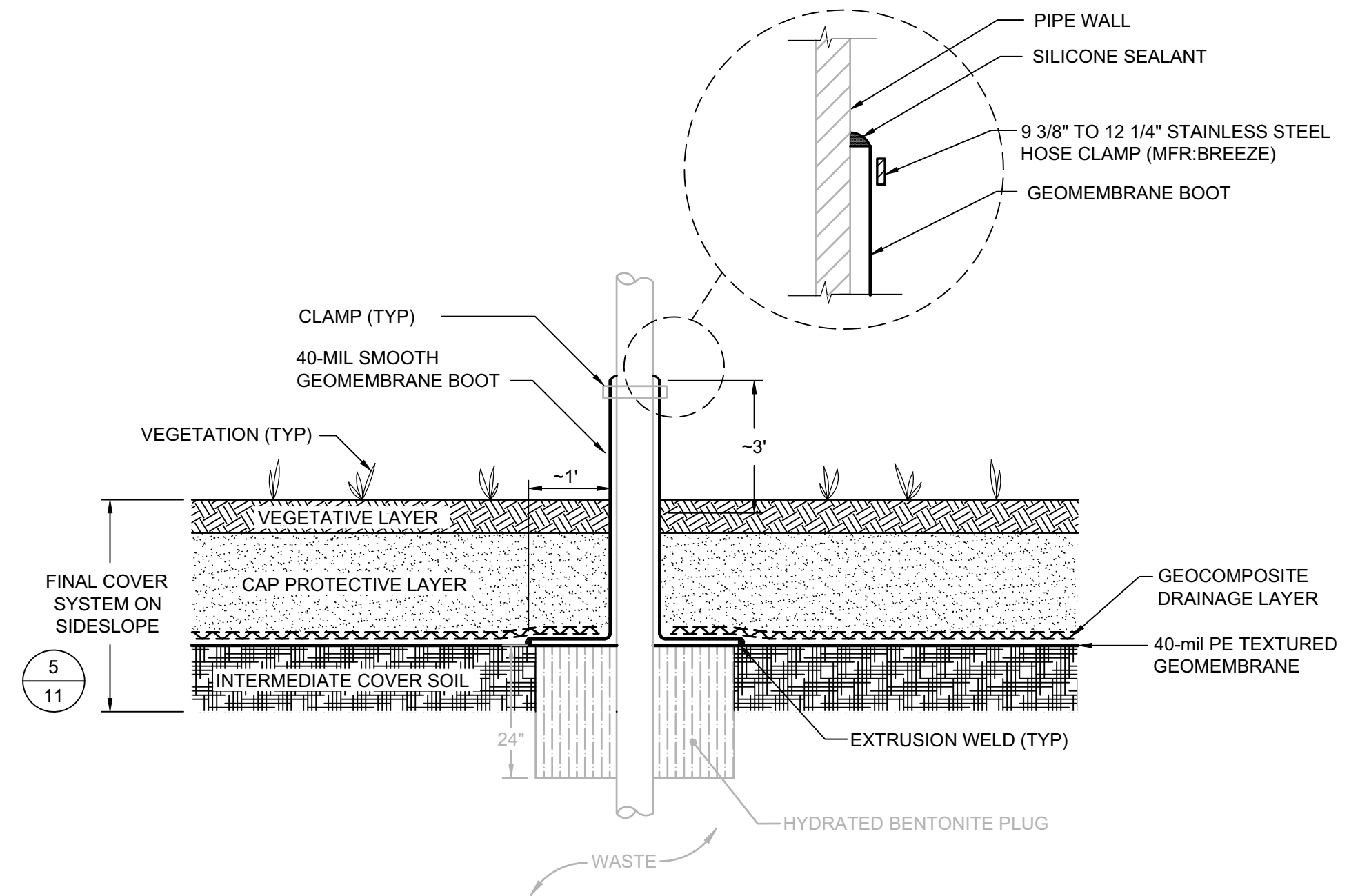
CONSTRUCTION DRAWING



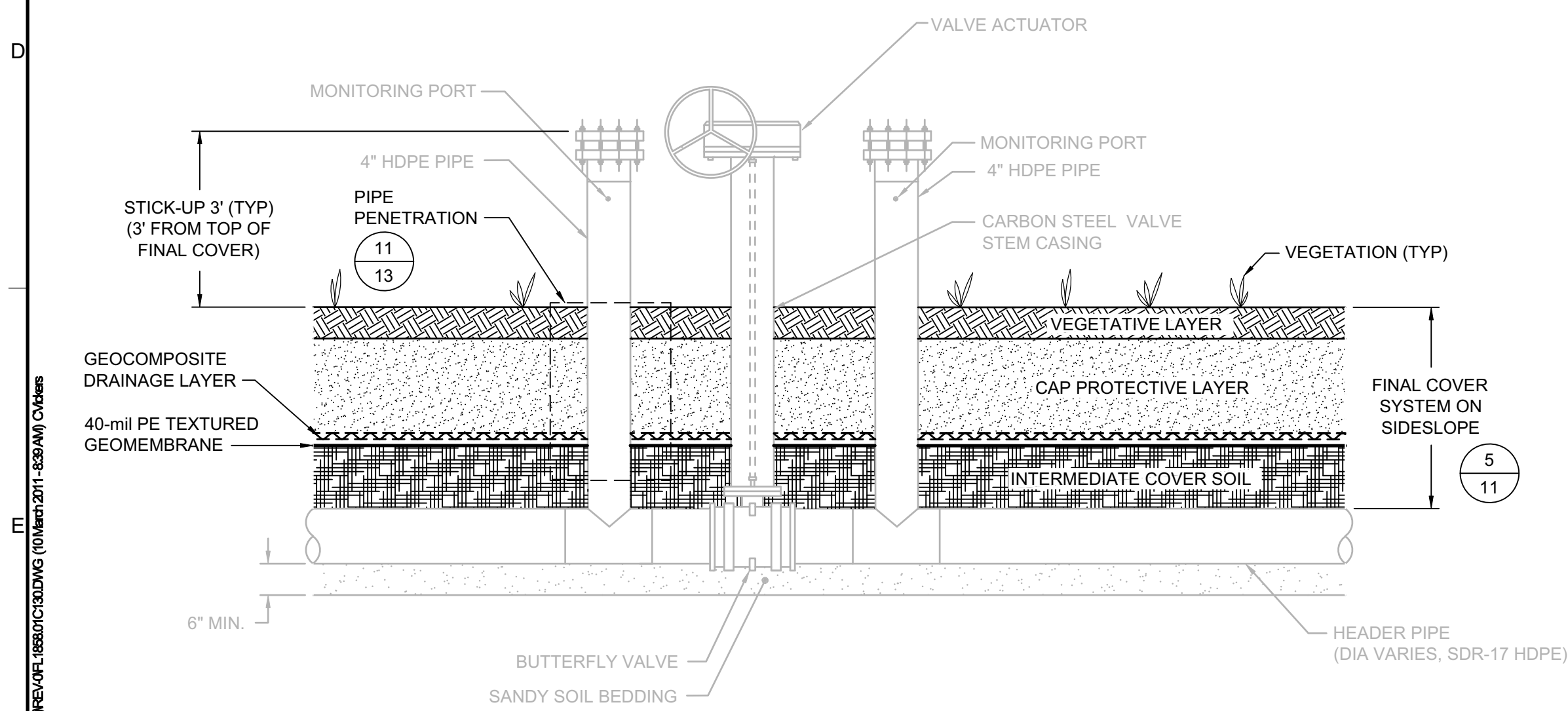
7
13 **DETAIL**
WELLHEAD TO LATERAL PENETRATION
SCALE: N.T.S.
XREF: FL1858.01X016



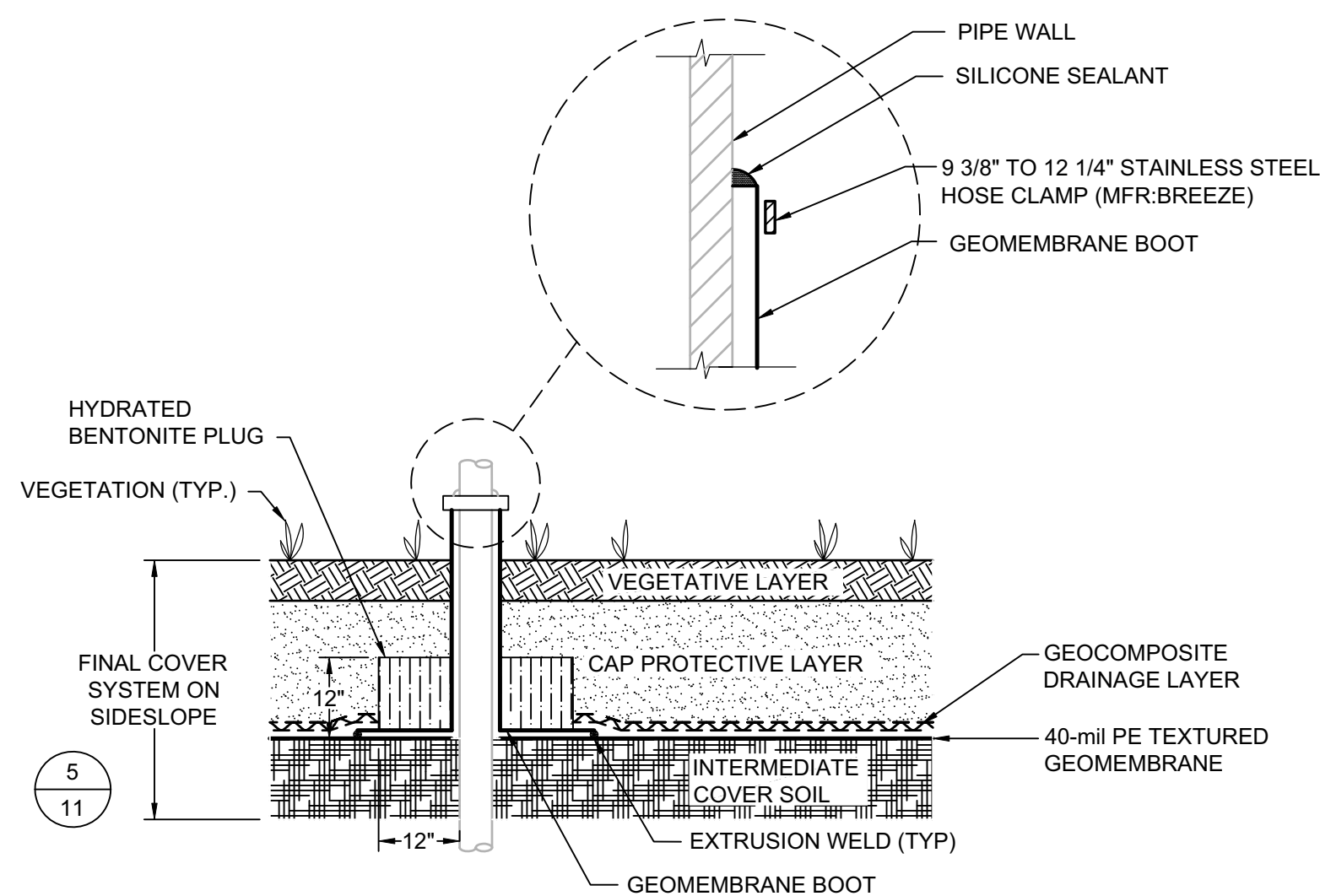
8
13 **DETAIL**
HEADER ACCESS RISER PENETRATION
SCALE: N.T.S.
XREF: FL1858.01X020



9
13 **DETAIL**
GAS WELL FINAL COVER PENETRATION
SCALE: N.T.S.
XREF: FL1858.01X015



10
13 **DETAIL**
ISOLATION VALVE PENETRATION
SCALE: N.T.S.
XREF: FL1858.01X019



11
13 **DETAIL**
PIPE FINAL COVER PENETRATION
SCALE: N.T.S.
XREF: FL1858.01X017

NOTES:

1. LANDFILL GAS FEATURES SHALL BE IDENTIFIED BY THE CONTRACTOR AND THE APPROPRIATE FINAL COVER PENETRATION SHOWN ON THIS SHEET SHALL BE CONSTRUCTED.
2. DETAILS ARE SHOWN TO SCALE AS NOTED EXCEPT FOR THE GEOSYNTHETICS WHICH ARE SHOWN AT AN EXAGGERATED SCALE FOR CLARITY.

0	MAR-11	INTERMEDIATE PERMIT MODIFICATION	CMV	CRB
REV	DATE	DESCRIPTION	DRN	APP

Geosyntec
consultants

13101 TELECOM DRIVE, SUITE 120
TEMPLE TERRACE, FLORIDA 33637 USA
PH: 813.558.0990 - FX: 813.558.9726
AUTHORIZATION NUMBER: 4321

WSI
Waste Services, Inc.

1501 OMNI WAY
ST. CLOUD, FLORIDA 34773
TEL: 407-891-3720 FAX: 407-891-3730

TITLE: **GAS SYSTEM PENETRATION DETAILS**

PROJECT: **PARTIAL LANDFILL CLOSURE CONSTRUCTION - EVENT 2**

SITE: **PHASE 1 DISPOSAL AREA
J.E.D. SOLID WASTE MANAGEMENT FACILITY**

DESIGN BY: VMD/JWO	DATE: MARCH 2011
DRAWN BY: CMV	PROJECT NO.: FL1858.01
CHECKED BY: VMD	FILE: FL1858.01C130
REVIEWED BY: JAB	DRAWING NO.: 13 OF 13
APPROVED BY: CRB	

Craig Browne
SIGNATURE
3/10/2011
DATE

CRAIG R. BROWNE
LICENSE
No. 68613
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

CRAIG BROWNE - LICENSE NO. 68613

APPENDIX C

Technical Specifications

Prepared for



Omni Waste of Osceola County, LLC

1501 Omni Way
St. Cloud, Florida 34773

TECHNICAL SPECIFICATIONS

J.E.D. SOLID WASTE MANAGEMENT FACILITY PARTIAL CLOSURE OF PHASE 1 (Event 2)

St. Cloud, Osceola County, Florida

Prepared by

Geosyntec 
consultants

13101 Telecom Drive, Suite 120
Temple Terrace, FL 33637
(813) 558-0990
Authorization No. 4321

Project Number FL1858
March 2011




Craig Browne, P.E.
Florida Registration No. 68613

Date: 3/10/2011

TECHNICAL SPECIFICATIONS

J.E.D SOLID WASTE MANAGEMENT FACILITY CLOSURE

Section 02100 – Surveying

Section 02110 – Clearing, Grubbing, and/or Stripping

Section 02200 – Earthwork

Section 02215 – Trenching and Backfilling

Section 02240 – Cap Protective Layer

Section 02290 – Sediment and Erosion Control

Section 02615 – Storm Water Structures and Swales

Section 02720 - Geotextile

Section 02740 – Geocomposite

Section 02770 – Geomembrane

Section 02790 – Interface Friction Conformance Testing

Section 02920 – Vegetative Soil Layer

Section 02930 – Vegetation

SECTION 02100

SURVEYING

PART 1 GENERAL

1.01 SCOPE

- A. This section describes the requirements for surveying during construction, production of “as-built” documents, and computation of quantities for payment purposes. Survey work will be required to perform general fill earthwork; to develop and manage the borrow area; and to perform other work, as needed, to complete various construction activities.

1.02 RELATED SECTIONS AND PLANS

- A. Section 02110 - Clearing, Grubbing, and/or Stripping
- B. Section 02200 - Earthwork
- C. Section 02215 - Trenching and Backfilling
- D. Section 02615 - Storm Water Structures and Swales
- E. Section 02920 - Vegetative Soil Layer
- F. Construction Quality Assurance (CQA) Plan.

1.03 REFERENCES

- A. National Geodetic Survey Standards.

1.04 SUBMITTALS

- A. Interim surveys performed shall be submitted to the Engineer with each payment request to substantiate the quantities claimed.
- B. Contractor will be required to submit survey notes during construction upon request by the Engineer.

1.05 PROJECT RECORD DOCUMENTS

- A. Contractor shall maintain on-site, a complete and accurate survey log documenting the survey work performed.
- B. Contractor shall maintain on-site, a plan clearly showing all site reference points, survey control points, and benchmarks.
- C. Contractor shall maintain on-site an accurate and current set of marked-up drawings indicating the as-built conditions.
- D. As-built surveys, stamped and signed, by a State of Florida Licensed/Registered Land Surveyor or Professional Engineer shall be submitted immediately following the completion of any applicable construction activity. Complete as-built surveys shall be submitted upon substantial completion of each phase of construction and are a prerequisite for contract closeout.
- E. Upon completion of each work item, the Contractor shall prepare and/or update the as-built drawings.

PART 2 PRODUCTS

2.01 MATERIALS AND SURVEY EQUIPMENT

- A. Provide materials and survey equipment as required to properly perform the surveys, including, but not limited to, instruments, tapes, rods, measures, mounts, and tripods, stakes and hubs, nails, ribbons, other reference markers, and all else as required.
- B. The survey instruments used for this work shall be precise and accurate to meet the needs of the work described. All survey instruments should be capable of reading to a precision of 0.001 ft and with a setting accuracy of ± 0.8 seconds.

PART 3 EXECUTION

3.01 GENERAL

- A. Maintain accurate and complete notes of surveys:
 - 1. Handwritten survey notes and information shall be written with lead pencil(s) and entered in "write in rain" notebooks. A copy of the numbered, dated, and signed field

- book pages shall be provided to the Engineer upon request for use in checking the work.
2. Electronic field survey information shall be collected and backup equipment shall be available in the event of equipment malfunction.
 - a. Electronic format for printed output of data collector field survey notes shall be compatible with the approved field book notation format.
 - b. Electronic format for printed output of data collector field work shall be compatible with the Contractor's and Engineer's computer equipment and software for verifying and checking the work. A copy of the data disk shall be submitted to the Engineer upon request.
 - B. During construction, survey notes shall be retained by the Contractor and shall be submitted to the Engineer for review upon request. Prior to the placement of successive soil layer, the Contractor shall submit a written statement certifying compliance of the preceding layer thickness and grades to the Engineer. Surveys will be required from the Contractor prior to approval by the Engineer for the placement of overlying materials.
 - C. Conformance check surveys for elevation and for horizontal coordinates shall be to the nearest 0.01 ft and for angles shall be to the nearest 20 seconds.
 - D. Measurement and payment surveys for elevation and for horizontal distances shall be to the nearest 0.1 ft \pm 0.05 ft.
 - E. Perform construction layout surveys in advance of scheduled construction activities. At completion of a survey, provide a copy of the field notes, drawings, or sketches to the Engineer for review. The Contractor shall allow the CQA Consultant and/or Engineer three calendar days for review. The Contractor is responsible for rework and/or construction delays caused by survey or staking errors.
 - F. Set slope stakes in accordance with accepted surveying practices.
 - G. Set grade stakes required for construction activities as the work progresses. Set fine grade stakes on all items for which the Construction Drawings specify a definite grade line.
 - H. Upon completion of the work, the Contractor shall provide the Engineer with all original surveying field notes, layouts, computations, and electronic files in standard bound survey notebooks. Electronic file information shall be compatible with the Engineer's computer equipment and software as requested.

- I. Protect survey control points and replace disturbed survey control points at no additional cost to the Owner.

3.02 SPECIFIC FIELD REQUIREMENTS

- A. Establish temporary control points, as necessary, to support construction activities.
- B. Survey Documentation:
 1. Record the following information in survey notebooks for each control point established and for all other surveying:
 - a. control point designation;
 - b. northing and easting in State Plane North American Datum (NAD83);
 - c. elevation in National Geodetic Vertical Datum (NGVD29);
 - d. date of establishment;
 - e. description and sketch of the control point location; and
 - f. a minimum of three reference features that can be seen from the control point.
 2. Document survey work in the field notebooks using the format and procedures described below:
 - a. title and consecutive number on the front cover;
 - b. consecutively numbered pages;
 - c. table of contents, indicated by survey task, on the first numbered page;
 - d. legend indicating symbols used in survey notes;
 - e. names of survey team for each task;
 - f. notes on weather and equipment;
 - g. date and time on each page to indicate when work was recorded;
 - h. notes in a uniform character such that they can be interpreted and used by anyone with survey knowledge; and
 - i. description and/or sketches of the survey control used.
- C. Preliminary Surveys:
 1. Earthwork Staking: Stakes for cut and fill limits shall establish the exterior limits of excavations and berms. The maximum staking interval shall be 50 feet. Stakes shall be prominently noted with description of point, vertical distance to design elevation, and offset distance as applicable.
 2. Structures: Stake structure centerlines so that the orientation, position, limits, and foundation elevation(s) are positively identified. Mark stakes to reflect the design elevation and offset distance as applicable.
 3. Ditches and Channels: Stake ditches and channels such that the layout remains undisturbed during construction.

4. Pipes and Culverts: Stake pipes and culverts on 50-ft maximum stationing. Place offset stakes beyond excavation limits and material stockpiles. Continuously check invert elevation during placement.
- D. Final Surveys:
1. Final topography shall be staked at nominal 50-foot intervals. Additionally, the following points shall be staked and noted as applicable.
 - a. Grade breaks.
 - b. Mid-point of slopes less than 50 ft.
 - c. Points of horizontal curvature and tangency.
 - d. Points of stationing equation.
 2. Pipes and culverts: Survey alignment and elevations of the top of all pipes at each change in grade and every 50 feet between changes in grades.

3.03 SURVEYS FOR MEASUREMENT AND PAYMENT

- A. Perform surveys to evaluate quantities of work performed and percent of completed work.
- B. Calculate and certify quantities and submit survey results, calculations, and certification to the Engineer for review and evaluation.

3.04 SURVEYS FOR CONFORMANCE CHECKS AND AS-BUILT DOCUMENTS

- A. Survey the following surfaces to verify the lines and grades achieved during construction:
 1. For berms, ditches, drainage swales, roads, and other earthwork:
 - a. original grade surface;
 - b. compacted surface of cut slopes; and
 - c. finished grade surface.
 2. For the final cover system:
 - a. prepared waste surface;
 - b. finished intermediate cover (or geomembrane) layer;
 - c. top surface of cover protective layer; and
 - d. finished grade surface of vegetative layer.
- B. Perform earthwork conformance checks and as-built surveying immediately upon completion of a given installation to verify compliance with the Construction Drawings, facilitate progress, and avoid delaying commencement of the next installation. Provide the following minimum spacing and locations for survey points:

1. surfaces with gradients less than 10 percent, survey on a square grid spaced not wider than 50 ft;
2. on slopes greater than 10 percent, a square grid spaced not wider than 50 ft shall be used, but in all cases, a line at the crest, midpoint, and toe of the slope shall be taken;
3. a line of survey points spaced not more than 50 ft apart shall be taken along any slope break (this will include the inside edge and outside edge of any bench on a slope); and
4. a line of survey points spaced not more than 50 ft apart and at each end shall be taken at the top of any pipes, culverts, discharge structures, or other appurtenances.

[END OF SECTION]

SECTION 02110

CLEARING, GRUBBING, AND/OR STRIPPING

PART 1 – GENERAL

1.01 SCOPE

- A. This section describes the requirements for clearing, grubbing, and/or stripping activities. Clearing, grubbing, and/or stripping activities will be required to perform the earthwork, develop the borrow area, and to perform other work, as needed, to complete various construction activities.

1.02 RELATED SECTIONS AND PLANS

- A. Section 02100 – Surveying
- B. Section 02200 – Earthwork
- C. Section 02290 – Sediment and Erosion Control
- D. Section 02930 – Vegetation
- E. Construction Quality Assurance (CQA) Plan

1.03 COMPLIANCE WITH REGULATIONS

- A. It is the sole responsibility of the Contractor to be completely familiar with and to follow all local, state, and federal regulations pertaining to the work required in this Section.

1.04 CONSTRUCTION QUALITY ASSURANCE

- A. Clearing, grubbing, and/or stripping operations shall be monitored by the CQA Consultant as outlined in the CQA Plan.
- B. The Contractor shall be aware of the activities set forth in the CQA Plan and shall account for these activities in the construction schedule.
- C. The Contractor shall assist CQA personnel in every manner necessary for the proper performance of activities set forth in the CQA Plan.

- D. CQA testing or inspections in no manner relieves the Contractor of the responsibility to perform all work in conformance with to the Construction Drawings and Specifications.
- E. If quality control or quality assurance tests indicate work does not meet specified requirements, the Contractor shall perform the work as directed by the CQA Consultant at no additional cost to the Owner.

1.05 EXISTING CONDITIONS

- A. The Contractor shall comply with applicable regulations in locating and providing clearance for all underground and above ground utilities, if applicable, prior to beginning construction activities. The Contractor shall immediately notify the Owner and the Engineer if utility lines or structures not shown on the Construction Drawings are encountered. Repair of damage and all restitution for liabilities resulting from damage to existing facilities due to activities by the Contractor shall be at the Contractor's expense.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Materials to be cleared, grubbed, and/or stripped include trees, shrubs, debris, muck, or other foreign matter, as needed, to develop the work area and enable construction activities.
- B. Vegetative stabilization and erosion control of stripped soil stockpiles shall be as specified in Section 02930.

PART 3 – EXECUTION

3.01 FAMILIARIZATION

- A. Prior to implementing any of the work described in this section, the Contractor shall become thoroughly familiar with the site, the site conditions, and all portions of the work described in this section.
- B. Contractor shall note that the elevation of groundwater is at or near the existing ground surface for areas covered under this Contract. Some areas may also be inundated with water at the start of construction. Contractor is responsible for any dewatering required to execute the required work.
- C. Inspection:

1. Prior to implementing any of the work in this section, the Contractor shall carefully inspect and verify that related work required by other sections is complete to the point where the work described in this section may properly commence without adverse impact.
2. If the Contractor has any concerns regarding the related work required by other Sections, he shall notify the Engineer in writing prior to the commencement of operations. Failure to notify the Engineer will be construed as Contractor acceptance of the related work of all other sections.

3.02 SEDIMENT AND EROSION CONTROL

- A. Prior to implementing any work described in this section, the Contractor shall install all sediment and erosion controls in the relevant area(s) of construction. Sediment and erosion control shall be in accordance with Section 02290.
- B. Contractor is solely responsible for selecting, implementing, and maintaining proper and fully adequate sediment and erosion controls at all times during construction.

3.03 CLEARING AND GRUBBING

- A. Clearing and/or grubbing shall be performed in areas identified in the contract documents or as directed by the Engineer. All sediment and erosion controls, as described in Section 02290 of the Specifications or as indicated on the Construction Drawings, shall be in place before the start of clearing.
- B. If weather conditions are unsuitable for clearing and/or grubbing, as determined by the Engineer, the Contractor shall cease operations until permission to resume operations is obtained from the Engineer.
- C. Clearing shall consist of removing trees, undergrowth, and deadwood. Trees shall be cut level with the adjacent ground surface. Grubbing shall consist of the removing stumps, roots, and surficial debris from the areas identified in this section or as directed by the Engineer.
- D. Clearing and/or grubbing activities shall be performed in a manner so as to minimize disturbance to the surrounding areas.
- E. All cleared and/or grubbed materials shall be reduced to mulch and stockpiled as directed by the Owner.

3.04 STRIPPING

- A. Stripping shall be performed in areas identified in this section or as directed by the Engineer. All sediment and erosion controls shall be in place before the start of stripping. Stripping shall include all vegetation, organics, and other deleterious materials as required by the Engineer. Stripping depth shall be a minimum of 6 inches. However, overstripping shall be avoided.
- B. If soil or weather conditions are unsuitable for stripping, as determined by the Engineer, the Contractor shall cease stripping activities until permission to resume work is obtained from the Engineer.
- C. Equipment and methods of operation shall be selected by the Contractor to minimize disturbance to the surrounding areas.
- D. All stripped material shall be stockpiled in the areas designated by the Owner. Stockpiled material shall be sloped and grassed as required in the Specifications or as directed by the Engineer.

3.05 SURVEYING AND CONSTRUCTION TOLERANCES

- A. The Contractor shall retain a Surveyor who shall be responsible for providing survey control for the work. The areas to be cleared, grubbed, and/or stripped shall be surveyed prior to performing the work for the purpose of measurement and payment. All surveying shall be performed in accordance with Section 02100 of the Specifications.

3.06 PROTECTION OF WORK

- A. The Contractor shall protect all prior work, including all materials and related work of other Sections.
- B. In the event of damage, the Contractor shall immediately make all necessary repairs and replacements necessary, as directed and approved by the Engineer, at no additional cost to the Owner.

[END OF SECTION]

SECTION 02200

EARTHWORK

PART 1 GENERAL

1.01 SCOPE

- A. This section includes the requirements for site preparation, excavation, surface water control, excavation dewatering, stockpiling, general fill, and earthwork materials.

1.02 RELATED SECTIONS AND PLANS

- A. Section 02100 – Surveying
- B. Section 02110 – Clearing, Grubbing, and/or Stripping
- C. Section 02215 – Trenching and Backfilling
- D. Section 02240 – Cap Protective Layer
- E. Section 02290 – Sediment and Erosion Control
- F. Section 02920 – Vegetative Soil Layer
- G. Construction Quality Assurance (CQA) Plan

1.03 REFERENCES

- A. Latest version of American Society of Testing and Materials (ASTM) standards.
 - 1. ASTM D 2487 - Standard Test Method for Classification of Soils for Engineering Purposes.

1.04 SUBMITTALS

- A. Within 15 calendar days from Notice to Proceed, submit to the Engineer for review an Earthwork Work Plan. The Earthwork Work Plan shall include, at a minimum:
 - 1. list of equipment proposed for the construction activities including earthwork and other scope of work specified described in the contract documents;
 - 2. construction methods for each construction activity;

3. dewatering methods and techniques;
4. coordination of survey requirements for the earthwork;
5. proposed locations of temporary soil stockpile areas;
6. coordination of earthwork activities with surface water management and erosion and sediment control measures;
7. schedule for earthwork activities; and
8. dust control measures.

1.05 CONSTRUCTION QUALITY ASSURANCE

- A. The earthwork will be monitored and tested by the CQA Consultant as required in the CQA Plan.
- B. The CQA Consultant will perform soil conformance testing on general fill to establish compliance with this Section. Provide equipment and labor to assist the CQA Consultant in obtaining conformance samples from excavations and stockpiles.
- C. The CQA Consultant will perform soil performance testing on general fill lifts to evaluate compliance with this Section. The CQA Consultant will indicate any portion of the earthwork that does not meet the requirements of this Section and will delineate the extent of the nonconforming area.
- D. The Contractor shall correct all deficiencies and non-conformances identified by the CQA Consultant at no additional cost to the Owner.
- E. The Contractor shall be aware of the activities required of the CQA Consultant by the CQA Plan and shall account for these activities in the construction schedule.

1.06 EXISTING CONDITIONS

- A. Existing site surface and subsurface conditions, based on available site data, are indicated on the Construction Drawings.
- B. Contractor shall verify existing conditions as indicated in Section 02100 and as noted on the Construction Drawings.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Obtain material for general fill from the borrow sources designated by the Engineer.
- B. General fill material shall be free of debris, foreign objects, large rock fragments, organics, and other deleterious materials. General fill material shall classify as SW, SP, SW-SM, SW-SC, SP-SM, SP-SC, SM, or SC according to the Unified Soil Classification System (per ASTM D 2487). General fill material having the indicated classification is expected to be available from designated borrow sources. Soils having other classifications may be acceptable as general fill, if approved by the Engineer.

2.02 EQUIPMENT

- A. Furnish compaction equipment to achieve the required minimum soil dry density within the range of acceptable moisture contents.
- B. Furnish hand compaction equipment, such as a walk-behind compactor, hand tampers, or vibratory plate compactor, for compaction in areas inaccessible to large compaction equipment.
- C. Furnish water trucks, pressure distributors, or other equipment designed to apply water uniformly and in controlled quantities to variable surface widths for required in-place moisture adjustment, to prevent drying of soil surfaces, and for dust control.
- D. Furnish equipment such as excavators, scrapers, compactors, loaders, dozers, earth hauling equipment and all other equipment, as required for earthwork construction.

PART 3 EXECUTION

3.01 GENERAL

- A. All general fill material to be compacted shall be at a moisture content that will readily facilitate effective compaction.
- B. General fill material placed wet that exhibits pumping shall not be accepted regardless of the in-place density or percent compaction. Wet materials shall not be placed and compacted. Wet materials, if used, shall be allowed to dry in place, if feasible, or removed and replaced with suitable materials as directed by the Engineer.

3.02 SITE PREPARATION

- A. Install construction fence and barricades around open trenches and excavated areas.

- B. Install erosion and sediment controls in relevant areas of construction as indicated on the Construction Drawings and as required by Section 02290. Maintain the erosion and sediment controls for the duration of the Contract and until the contained areas are vegetated in accordance with Section 02930. Accumulated sediment behind silt fences and from drainage swales and structures shall be removed as required or as directed by the Engineer.

3.03 SURFACE WATER CONTROL

- A. Installation of surface water and erosion controls shall be in accordance with approved Surface Water Management and Erosion Control Plan as specified in Section 02290.
- B. Install surface water and erosion controls in and around work areas to control runoff and erosion and to prevent surface water run-on into excavations. Perimeter controls may include shallow ditches, berms, or localized regrading.

3.04 EXCAVATION

- A. Excavate designated areas to the excavation limits indicated on the Construction Drawings. Stockpile excavated material in areas designated by the Construction Manager for use in subsequent construction.

3.05 EXCAVATION DEWATERING

- A. Anticipate seepage of groundwater into, and accumulation of surface water runoff in excavations. Manage groundwater and surface water in excavations in accordance with this section.
- B. Prevent surface water run-on from adjacent areas from entering the excavation.
- C. All fill operations, except hydraulic filling, shall be performed in the dry.

3.06 STOCKPILING

- A. Separate stockpiles by material type.
- B. Stockpile excavated soils at the areas indicated on the Construction Drawings or as designated by the Engineer.
- C. Construct stockpiles no steeper than 3H:1V (horizontal:vertical), grade to drain, seal by tracking perpendicular to the slope contours with a dozer, and dress daily during periods when fill is taken from the stockpile.
- D. Silt fence or berms shall be constructed at the base of stockpiles that will not be immediately used.
- E. Restore all areas used for stockpiling when stockpiles are removed as directed by the OWNER.

3.07 GENERAL FILL

- A. Place general fill material on surfaces that are free of debris, vegetation, or other deleterious material.
- B. Place general fill material in loose lifts with a thickness of 12 inches \pm 1 inch. In areas where compaction is to be performed using hand operated equipment, place the fill material in loose lifts with a loose thickness of 6 inches \pm 1 inch.
- C. Prior to placing a succeeding lift of material over a previously compacted lift, thoroughly scarify the previous lift to a depth of 2 inches by discing, raking, or tracking with a dozer. Moisture conditions the preceding lift if not within the acceptable moisture range.
- D. The trafficking of scarified surfaces by trucks or other equipment, except compaction equipment, is not permitted.
- E. For general fill placed outside the limit of waste, except as specified in this Section, compact general fill in each lift to at least 95 percent of its standard Proctor maximum dry density (ASTM D 698). Compact general fill at moisture contents as required to attain the specified density or as approved by the Engineer.
- F. For general fill placed within the limit of waste, except as specified in this Section, compact general fill in each lift to at least 85 percent of its standard Proctor maximum

dry density (ASTM D 698). Compact general fill at moisture contents as required to attain the specified density or as approved by the Engineer.

- G. Do not place fill during periods of precipitation. Placement may occur during periods of misting or drizzle, but only as authorized by the Engineer.
- H. Dust shall be controlled by the application of water to the general fill surfaces.

3.08 SURVEY CONTROL

- A. Survey limits and elevations of excavations and top of general fill in accordance with Section 02100.

3.09 TOLERANCES

- A. Perform the earthwork construction related to the berms and roads to within ± 0.1 ft of the elevations and within 10 percent of the slopes indicated on the Construction Drawings.
- B. Perform the earthwork construction related to the final cover system (i.e., intermediate cover) to within +0.2 feet of the elevations and within 10 percent of the slopes indicated on the Construction Drawings.
- C. Positively draining slopes shall be maintained during all construction.

[END OF SECTION]

SECTION 02215

TRENCHING AND BACKFILLING

PART 1 GENERAL

1.01 SCOPE

- A. This section describes the requirements for trenching, backfilling, placing, and compacting materials and to perform other work as directed by the Engineer.

1.02 RELATED SECTIONS AND PLANS

- A. Section 02100 - Surveying
- B. Section 02200 - Earthwork
- C. Section 02615 - Storm Water Structures and Swales
- D. Construction Quality Assurance (CQA) Plan

1.03 REFERENCES

- A. Latest version of American Society of Testing and Materials (ASTM) standards and other standards noted in this specification.
- B. Standard Specifications for Road and Bridge Construction, Florida Department of Transportation, 2000 Edition (FDOT Specifications).
- C. Latest version of Occupational Safety and Health Administration (OSHA) Construction Standards.

1.04 SUBMITTALS

- A. Submit a list of equipment for trenching and backfilling to the Engineer no less than 15 calendar days prior to construction/installation.
- B. If the embedment fill material is obtained from a source different than the source of general fill, submit the source of the embedment fill, a representative sample, and results of tests conducted on the embedment fill samples in accordance with ASTM C 136 and ASTM D 2487.

1.05 CONSTRUCTION QUALITY ASSURANCE

- A. The trenching and backfilling will be monitored by the CQA Consultant as required in the CQA Plan.
- B. The Contractor shall be aware of the activities required of the CQA Consultant in the CQA Plan and shall account for these activities in the construction schedule.
- C. The Contractor shall correct all deficiencies and non-conformances identified by the CQA Consultant at no additional cost to the OWNER.

1.06 EXISTING CONDITIONS

- A. In advance of trenching in an area, verify the accuracy of existing conditions indicated on the Construction Drawings. Immediately notify the Engineer in writing of deviations from the existing conditions indicated on the Construction Drawings.
- B. The approximate locations of all known underground utilities, above ground utilities, and other structures, if any, are indicated on the Construction Drawings.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Embedment material and backfill material shall be obtained from the designated or other borrow area and shall meet the material requirements for general fill as specified in Section 02200.

2.02 EQUIPMENT

- A. Provide, operate, and maintain all equipment necessary to perform the work described in this section.

PART 3 EXECUTION

3.01 GENERAL

- A. In areas of trenching and backfilling, maintain and protect existing underground utilities, above ground utilities, and other structures, if any.

- B. Do not damage or disturb, if possible, the existing work/systems that must remain after trenching and backfilling is completed. If damaged or disturbed, these systems shall be restored to the condition existing prior to the trenching and backfilling operations.

3.02 TRENCHING

- A. Use sheeting and bracing where and whenever necessary to maintain the safety and stability of all slopes, trenches, and adjacent structures, if any. Satisfy all applicable local, state, and federal requirements for slope and trench sheeting and bracing, including requirements of the Occupational Safety and Health Administration (OSHA) construction standards. Provide required sheeting and bracing materials on site prior to start of trenching. Adjust spacing and arrangement of sheeting and bracing as required by conditions encountered. Remove sheeting and bracing as backfill progresses. Fill any voids left from sheeting or bracing withdrawal with general fill or other approved materials.
- B. Trench soils for geosynthetics anchor trench, pipes, culverts, storm water structures and/or to perform other work to depths and minimum dimensions indicated on the Construction Drawings. Fill material shall be placed and compacted with a hand tamper so as not to damage the geosynthetics, structures, or displace the pipes.
- C. Protect and maintain the trench bottom. Remove rock fragments or raveled materials that collect on the trench bottom. Backfill excess excavation with general fill or other approved materials. Excavate any soft subgrade soils encountered at the trench bottom and backfill and compact general fill to subgrade elevation.
- D. Dewater trenches and excavations as needed. Perform dewatering in accordance with Section 02200.
- E. Stockpile excess material from trenching in accordance with Section 02200.

3.03 BACKFILLING

- A. General:
 - 1. do not backfill with saturated material;
 - 2. do not backfill over wet or soft subgrade;
 - 3. do not disturb or damage the installed pipes during backfilling; and
 - 4. do not use heavy compaction equipment which exerts greater than 5 pounds per square inch ground pressure over pipes that are covered by less than 12 inches of backfill material.
- B. Placement of backfill material:
 - 1. place the first lift of backfill material in a 12-inch loose lift. Place subsequent lifts of trench backfill material in 8-inch \pm 1-inch loose lifts; and

2. compact each lift to 95 percent of the maximum standard Proctor dry unit weight at a moisture content generally within ± 3 percent of the optimum moisture content as determined by ASTM D 698, or as directed by the Engineer.
- C. Placement of embedment fill:
1. place embedment fill in 7-inch ± 1 -inch thick loose lifts to the elevation of the bottom of the pipe;
 2. compact embedment fill with a minimum of 4 passes of a vibratory plate compactor prior to placing pipe;
 3. place pipe on top of the compacted embedment fill;
 4. for pipes 12 inches in diameter or less, place additional pipe embedment fill on the sides and hand tamp the fill around the sides as needed to insure intimate contact between the pipe and the embedment fill below the spring line. Continue placing embedment fill until it is even with the top of the pipe. Compact the embedment fill with a minimum of 4 passes of a vibratory plate compactor. Do not compact on top of the pipe unless a minimum of 12 inches of trench backfill separates the compactor from the top of the pipe; and
 5. for pipes greater than 12 inches in diameter, place embedment fill in 7-inch ± 1 -inch thick loose lifts to the limits shown on the Construction Drawings. Compact each lift with a minimum of 4 passes of a vibratory plate compactor.

3.04 SURVEY CONTROL

- A. Survey the limits and elevations of the bottom liner system and the final cover system anchor trenches in accordance with Section 02100.
- B. Survey the limits and invert elevations of all pipes, culverts, and structures in accordance with Section 02100.
- C. Survey the alignment and elevations of the top of all pipes at each change in grade and every 50 feet between changes in grades in accordance with Section 02100.

3.05 TOLERANCES

- A. Install pipes to within ± 0.1 ft of the elevations and within 10 percent of the slopes indicated on the Construction Drawings.
- B. Excavate anchor trenches within 0 to +0.2 feet of the depth indicated on the Construction Drawings.

[END OF SECTION]

SECTION 02240

CAP PROTECTIVE LAYER

PART 1 GENERAL

1.01 SCOPE

- A. This Section includes the requirements for the cap protective layer (on top of the final cover system).

1.02 RELATED SECTIONS AND PLANS

- A. Section 02100 - Surveying
- B. Section 02200 - Earthwork
- C. Section 02740 - Geocomposite
- D. Section 02770 - Geomembrane
- E. Section 02790 - Interface Friction Conformance Testing
- F. Construction Quality Assurance (CQA) Plan

1.03 REFERENCES

- A. Latest version of American Society of Testing and Materials (ASTM) standards.
 - 1. ASTM D 422 - Standard Test Method for Particle-Size Analysis of Soils
 - 2. ASTM D 2434 - Standard Test Method for Permeability of Granular Soils (Constant Head)
 - 3. ASTM D 2487 - Standard Test Method for Classification of Soils for Engineering Purposes.

1.04 SUBMITTALS

- A. The Contractor shall submit a plan to the Engineer for approval describing the placement of the cap protective layer in an upslope manner, 30 calendar days prior to the start of protective layer placement.
- B. Identify source(s) of cap protective layer material at last 21 calendar days prior to use.

1.05 CONSTRUCTION QUALITY ASSURANCE

- A. The cap protective layer construction will be monitored and tested by the CQA Consultant as required in the CQA Plan.
- B. The CQA Consultant will perform soil conformance testing on the cap protective layer materials to establish compliance with this Section. Conformance testing on cap protective layer will be performed on materials obtained from the source and the completed cap protective layer. Provide equipment and labor to assist the CQA Consultant in obtaining conformance samples from excavation and stockpile areas.
- C. The CQA Consultant will perform soil testing on the cap protective layer to evaluate compliance with this Section. The CQA Consultant will indicate any portion of the cap protective layer that does not meet the requirements of this Section and will delineate the extent of the nonconforming area.
- D. The Contractor shall correct all deficiencies and non-conformances identified by the CQA Consultant at no additional cost to the Owner.
- E. The Contractor shall be aware of the activities of the CQA Consultant required by the CQA Plan and shall account for these activities in the construction schedule.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Obtain material for cap protective layers from borrow areas approved by the Engineer.
- B. Cap protective layer material shall consist of relatively homogeneous natural soils that are free of materials, which due to their nature or size, are deleterious to the intended use as determined by the Engineer. No particles larger than 0.5 inches shall be allowed in cap protective layers.

- C. The material for cap protective layer shall be classified according to the Unified Soil Classification System (per ASTM D 2487) as SW, SP, SW-SM, SW-SC, SP-SM, or SP-SC. Other soil classification may be accepted by the Engineer provided the soil meets the hydraulic conductivity requirement noted below.
- D. Cap protective layer soils shall have:
 - 1. hydraulic conductivity within the range of 1×10^{-2} cm/sec to 1×10^{-5} cm/sec when tested according to ASTM D 2434; and
 - 2. less than 15 percent (typically) passing through a standard U.S. No. 200 sieve per ASTM D 422. A higher fines content may be accepted by the Engineer provided the soil meets the hydraulic conductivity and interface friction requirements.

2.02 EQUIPMENT

- A. Furnish, operate, and maintain equipment necessary to transport, place, and compact the cap protective layer material.

PART 3 EXECUTION

3.01 PLACEMENT

- A. Construct the cap protective layer to the thickness, elevations, and limits indicated on the Construction Drawings and as specified in this Section.
- B. All lifts of the cap protective layer shall be placed upslope where the slopes exceed 10 percent. The Contractor may deliver material downslope on specially constructed ramps as approved by the Engineer.
- C. Prior to placing the cap protective layer, the Contractor shall verify by visual inspection that the underlying geosynthetic layer is free of holes, tears, wrinkles, or foreign objects. Material shall be spread over the underlying geosynthetics to cause the material to cascade over the geosynthetics rather than be shoved across the geosynthetics. The Contractor shall “work out” wrinkles in the geosynthetic layers to the satisfaction of the CQA Consultant prior to placement of the cap protective layer. In all cases, wrinkles shall not be of a size that they could fold back on themselves.
- D. The cap protective layer shall be placed directly on top of the geosynthetics indicated on the Construction Drawings. A low ground-pressure dozer shall be used for spreading in accordance with the requirements of Sections 02740 and 02770 capable of achieving adequate density. The tracked equipment shall operate only over previously placed cap

protective layer material. The Contractor shall not operate equipment directly on the geomembrane or geocomposite.

- E. Cover protective soil layer lifts after the initial 12-inch lift shall be compacted to a dry unit weight of at least 85 percent of the optimum dry unit weight as measured by the standard Proctor test (ASTM D 698).
- F. Moisture condition the soil if the moisture content of the material to be used as the cover protective soil layer is not appropriate to achieve the compaction requirements. The appropriate range of placement moisture contents will be determined by the CQA Consultant. Use a water truck and spray nozzle for wetting. Use discing, raking, or other appropriate methods to dry the material as required. During wetting or drying, regularly disc, rake, or otherwise mix the material to thoroughly blend the moisture throughout the lift.

3.02 TOLERANCE

- A. Construct the cap protective layer to within +0.2 feet of the thickness shown on the Construction Drawings.
- B. Construct the cap protective layer to within +0.4 feet of the elevations and within 10 percent of the slopes indicated on the Construction Drawings.

[END OF SECTION]

SECTION 02290

SEDIMENT AND EROSION CONTROL

PART 1 GENERAL

1.01 SCOPE

- A. The Contractor shall furnish all labor, materials, tools, and incidentals required to install and maintain the temporary sediment and erosion control measures and structures including, but not limited to, silt fence, straw bales, check dams, and sediment traps, throughout the duration of the construction work. The Contractor shall also be responsible for removing the temporary sediment and erosion control measures and structures after the construction work is completed.

1.02 RELATED SECTIONS AND PLANS

- A. Section 02100 – Surveying
- B. Section 02110 – Clearing, Grubbing, and/or Stripping
- C. Section 02200 – Earthwork
- D. Construction Quality Assurance (CQA) Plan

1.03 REFERENCES

- A. The Florida Stormwater, Erosion, and Sedimentation Control Inspector's Manual, as found at the website: www.dep.state.fl.us/water/nonpoint/ero_man.htm.

1.04 COMPLIANCE WITH REGULATIONS

- A. It is the sole responsibility of the Contractor to be completely familiar and comply with all local, state, and federal regulations pertaining to the work required in this Section.

1.05 CONSTRUCTION QUALITY ASSURANCE

- A. Sediment and erosion control activities shall be monitored as outlined in the CQA Plan.
- B. The Contractor shall be aware of the activities set forth in the CQA Plan and shall account for these activities in the construction schedule.
- C. The Contractor shall assist the CQA Consultant in every manner necessary for the proper performance of activities set forth in the CQA Plan.

- D. CQA testing or inspections does not relieve the Contractor of the responsibility to construct all work in conformance with the Construction Drawings and Specifications.
- E. If quality control or quality assurance tests indicate work does not meet specified requirements, the Contractor shall remove, replace, and retest the work at no additional cost to the Owner.

1.06 SUBMITTALS

- A. The Contractor shall submit samples and manufacturer's product data sheets and recommended methods of installation for the proposed silt fence to the Engineer at least 14 days prior to starting installation. The manufacturer's product data sheets shall provide documentation and certification that the silt fence products meet or exceed the requirements specified in this Section.

PART 2 PRODUCTS

2.01 SILT FENCE

- A. Furnish silt fence with either woven or nonwoven fabric. Silt fence shall:
 - 1. be woven fabric consisting of slit films of polypropylene treated with ultraviolet light stabilizers or nonwoven fabric consisting of long chain polymeric filaments or polyester yarns;
 - 2. be inert to hydrocarbons and chemicals commonly found in soils;
 - 3. be resistant to mildew, rot, insects, and rodent attack;
 - 4. have fence post of minimum 2" x 2" lumber and with minimum length of 36 inches spaced a maximum distance of 6 ft along fabric; and
 - 5. have minimum fabric width of 36 inches.

2.02 VEGETATION

- A. Vegetation shall be as specified in Section 02930 of these Specifications.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Silt fence shall be installed in accordance with the manufacturer's recommendations as needed or as directed by the Engineer, prior to any construction activities. Minimum fabric burial depth shall be 6 inches or as recommended by the manufacturer, whichever is greater.
- B. The exterior slopes of landfill berms and road shoulders shall be grassed immediately after final grading and shaping.
- C. The Contractor shall use straw bales to contain sediment and water from dewatering operations and promote infiltration. Accumulated sediment shall be removed and stockpiled for reuse in an area designated by the Engineer. No water from dewatering operations shall be discharged from the site. All water from dewatering operations shall be re-infiltrated into site soils at a location outside of the immediate work area.

3.02 PROTECTION OF WORK

- A. The Contractor shall protect all prior work, including materials and related work of other sections.
- B. In the event of damage, the Contractor shall immediately make all repairs and replacements necessary, as directed and approved by the Engineer, at no additional cost to the Owner.

3.03 REMOVAL

- A. The Contractor shall remove all silt fence at the completion of site activities once permanent vegetation has been established or as directed by Engineer.

[END OF SECTION]

SECTION 02615

STORM WATER STRUCTURES AND SWALES

PART 1 GENERAL

1.01 SCOPE

- A. This section includes the requirements for products and installation of storm water drainage structures and swales.

1.02 RELATED SECTIONS AND PLANS

- A. Section 02200 - Earthwork
- B. Section 02215 - Trenching and Backfilling
- C. Section 02245 - Riprap
- D. Construction Quality Assurance (CQA) Plan

1.03 REFERENCES

- A. Standard Specifications for Road and Bridge Construction, Florida Department of Transportation, 2007 Edition (FDOT Specifications).
- B. Design Standards for Design, Construction, Maintenance, and Utility Operations on the State Highway System, Topic No. 625-010-003, 2008 (FDOT Design Standards).
- C. Latest version of American Association of State Highway Transportation Officials (AASHTO) M294 - Standard Specification for Corrugated Polyethylene Pipe, 300- to 900-mm (12- to 36-in.) Diameter.
- A. Latest version of American Society of Testing and Materials (ASTM) standards.
 - 1. ASTM D 2412 - Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
 - 2. ASTM D 3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.

1.04 SUBMITTALS

- A. Submit shop drawings for pre-cast concrete storm water drainage structures to the Engineer for approval a minimum of 30 days prior to construction.
- B. The Contractor shall submit to the Engineer the Manufacturer's certification of compliance with these Specifications for all materials delivered to the site and shall comply with the pipe Manufacturer's recommendations for handling, storing, and installing pipes and fittings.
- C. Submit shop drawings for concrete headwall and thrust block to the Engineer for approval a minimum of 30 days prior to construction.

1.05 CONSTRUCTION QUALITY ASSURANCE

- A. The installation of storm water drainage structures and construction of swales will be monitored by the CQA Consultant as required by the CQA Plan.
- B. The CQA Consultant will perform material conformance testing and installation quality control testing during construction of drainage structures and swales as required by the CQA Plan.
- C. The Contractor shall be aware of the activities required of the CQA Consultant by the CQA Plan and account for these activities in the construction schedule.
- D. The Contractor shall correct all deficiencies and non-conformances identified by the CQA Consultant at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Furnish corrugated HDPE pipe with smooth wall interior and with diameter as indicated on the Construction Drawings and meeting the following requirements:
 - 1. Pipe shall comply with AASHTO M294 Type "C" and shall be constructed of new polyethylene compounds which meet the minimum cell classification of 323410C or 333410B as defined and described in ASTM D 3350. Compounds that have a higher cell classification in one or more properties are acceptable provided the product requirements are met.
 - 2. The minimum parallel plate stiffness values when tested in accordance with ASTM 2412 shall be 30-psi.
 - 3. The pipe shall be homogeneous throughout and free of foreign inclusions and

visible defects.

- B. Furnish HDPE pipe fittings, as needed, based on the Contractor's shop drawings that meet the following requirements:
 - 1. Fittings shall not reduce or impair the overall integrity or function of the pipeline.
 - 2. Only fittings supplied or recommended by the manufacturer shall be used.
 - 3. Fittings for corrugated HDPE pipe shall comply with material requirements for the corrugated HDPE pipe.
 - 4. Fittings shall be free of foreign inclusions and visible defects.

PART 3 EXECUTION

3.01 PREPARATION

- A. All excavation, shoring, and storm water control required for the construction of drainage structures shall be performed in accordance with Section 02200.
- B. Excavation shall be to the required depth. Over-excavated areas shall be backfilled with general fill material, properly compacted as specified in Section 02200 and Section 02215.

3.02 INSTALLATION

- A. Drainage Structures
 - 1. Pipe inlet structures may be set or cast-in-place. Install drainage structures at the proper elevation with proper bearing on a suitable foundation.
 - 2. Pipe openings shall be neatly cut two inches larger than the outside diameter of the pipe. Fill openings around pipe with non-shrink grout to provide a smooth watertight joint between structure and pipe.
 - 3. Opening for the upstream pipe shall be covered with a piece of plywood for future use.
 - 4. Cut pipe entering the structure to the correct length prior to installation. Removal of excess pipe in structure after installation will not be acceptable.
 - 5. All backfilling required for the installation of drainage structures shall be performed in accordance with Section 02215.
- B. HDPE Stormwater Pipe
 - 1. HDPE piping and fittings shall be installed in accordance with manufacturer's recommendations.

3.03 SURVEY CONTROL

- A. Survey the location and elevation of all storm water drainage structures and the lines, slopes, and grades in accordance with Section 02100.

3.04 TOLERANCE

- A. Install drainage swales and structures to within ± 0.1 ft of elevations indicated on the Construction Drawings or as directed by the Engineer.

[END OF SECTION]

SECTION 02720

GEOTEXTILES

PART 1 GENERAL

1.01 SCOPE

- A. This section includes the requirements for geotextile products and installation.

1.02 RELATED SECTIONS AND PLANS

- A. Section 02215 - Trenching and Backfilling
- B. Section 02245 - Riprap
- C. Construction Quality Assurance (CQA) Plan

1.03 REFERENCES

- A. Latest version of American Society of Testing and Materials (ASTM) standards and other standards noted in this specification.
- B. Federal Standard No. 751a - Stitches, Seams, and Stitching.

1.04 SUBMITTALS

- A. Submit the following to the Engineer for review not less than 21 calendar days prior to use.
 - 1. geotextile Manufacturer and product name;
 - 2. certification of minimum average roll values and the corresponding test procedures for all geotextile properties listed in Table 02720-1; and
 - 3. projected geotextile delivery dates.
- B. Submit to the Engineer for review at least 14 calendar days prior to geotextile placement, manufacturing quality control certificates for each roll of geotextile as specified in this section.

1.05 CONSTRUCTION QUALITY ASSURANCE

- A. The installation of geotextiles will be monitored by the CQA Consultant as required in the CQA Plan.
- B. The CQA Consultant will perform material conformance testing of the geotextiles as required in the CQA Plan.
- C. The Contractor shall be aware of the activities required of the CQA Consultant by the CQA Plan and shall account for these activities in the construction schedule.
- D. The Contractor shall correct all deficiencies and nonconformances identified by the CQA Consultant at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 GEOTEXTILE

- A. Furnish geotextile products with minimum average roll values (95 percent lower confidence limit) meeting or exceeding the required property values in Table 02720-1.
- B. Furnish geotextiles that are stock products.
- C. Furnish geotextiles that are manufactured from first quality polymers, with no more than 20 percent reclaimed polymer used in production.
- D. Furnish polymeric threads for stitching that are ultra-violet (UV) light stabilized to at least the same requirements as the geotextile to be sewn. Furnish polyester or polypropylene threads that have a minimum size of 2,000 denier.

2.02 MANUFACTURING QUALITY CONTROL

- A. Sample and test the geotextile to demonstrate that the material conforms to the requirements of this section.
- B. Perform manufacturing quality control tests to demonstrate that the geotextiles properties conform to the values specified in Table 02720-1. Perform as a minimum, the following manufacturing quality control tests at a minimum frequency of once per 50,000 square feet with minimum of 1 test per resin lot:

<u>Test</u>	<u>Procedure</u>
Mass per unit area	ASTM D 5261
Grab strength	ASTM D 4632
Tear strength	ASTM D 4533
Puncture strength	ASTM D 4833
Static Puncture strength	ASTM D 6241

- C. Submit quality control certificates signed by the geotextile manufacturer quality control manager. The certificates shall state that the geotextiles are continuously inspected and are needle-free. The quality control certificates shall also include: lot, batch, and roll number and identification; and results of manufacturing quality control tests including description of test methods used.
- D. Do not supply any geotextile roll that does not comply with the manufacturing quality control requirements.
- E. If a geotextile sample fails to meet the quality control requirements of this section, sample and test rolls manufactured at the same time or in the same lot as the failing roll. Continue to sample and test the rolls until the extent of the failing rolls are bracketed by passing rolls. Do not supply failing rolls.

2.03 PACKAGING AND LABELING

- A. Supply geotextiles in rolls wrapped in relatively impermeable and opaque protective wrapping. Wrapping which becomes torn or damaged shall be repaired with similar materials.
- B. Mark or tag geotextile rolls in accordance with ASTM D 4873 with the following information:
 - 1. manufacturer's name;
 - 2. product identification;
 - 3. lot or batch number;
 - 4. roll number; and
 - 5. roll dimensions.
- C. Geotextile rolls not labeled in accordance with this section or on which labels are illegible upon delivery to the site shall be rejected and replaced at no expense to the Owner.

2.04 TRANSPORTATION

- A. Deliver geotextiles to the site at least 14 calendar days prior to the planned deployment date to allow the CQA Consultant adequate time to perform conformance testing on the geotextile samples as described in the CQA Plan.

2.05 HANDLING AND STORAGE

- A. Protect geotextiles from sunlight, moisture, excessive heat or cold, puncture, mud, dirt, and dust or other damaging or deleterious conditions. Follow all geotextile manufacturer recommendations for handling and storage. Geotextile rolls shall be covered with additional tarp cover (in addition to the roll cover) to prevent damage to the rolls.
- B. Store geotextile rolls on palates or other elevated structures. Do not store geotextile rolls directly on the ground.
- C. Outdoor storage of geotextile rolls shall not exceed the manufacturer's recommendation or longer than 6 months, whichever is less.

PART 3 EXECUTION

3.01 PLACEMENT

- A. Do not commence geotextile installation until the CQA Consultant completes conformance evaluation of the geotextiles and performance evaluation of previous work, including evaluation of Contractor's survey results for previous work.
- B. Handle geotextiles so as to ensure they are not damaged in any way.
- C. Take necessary precautions to prevent damage to underlying layers including rutting during placement of the geotextiles.
- D. After unwrapping the geotextiles from its opaque cover, do not leave them exposed for a period in excess of 30 calendar days.
- E. If white colored geotextiles are used, take precautions against "snowblindness" of personnel.
- F. Examine the geotextile surface after installation to ensure that no potentially harmful foreign objects are present. Remove any such objects and replace any damaged geotextiles.

3.02 SEAMS AND OVERLAPS

- A. Overlap separator geotextiles a minimum of 2 feet and ensure that the overlap is maintained.

3.03 REPAIR

- A. Repair any holes or tears in the geotextiles using a patch made from the same geotextile material. Extend geotextile patches a minimum of 1 foot beyond the damaged area. Sew geotextile patches into place no closer than 1 inch from any panel edge. Should any tear exceed 50 percent of the width of the roll, remove and replace that roll.
- B. Remove any soil or other material that may have penetrated the torn geotextiles.

3.04 PLACEMENT OF SOIL MATERIALS

- A. Place soil materials on top of geotextiles in such a manner as to ensure that:
 - 1. the geotextiles and the underlying materials are not damaged; and
 - 2. slippage does not occur between the geotextile and the underlying layers during placement.
- B. Spread soil on top of the geotextile to cause the soil to cascade over the geotextile rather than be shoved across the geotextile.
- C. Place aggregate over geotextile separators as indicated on the Construction Drawings prior to trafficking.
- D. Place soil over geotextile filters as indicated on the Construction Drawings prior to trafficking.

TABLE 02720-1
REQUIRED PROPERTY VALUES FOR GEOTEXTILE SEPARATOR

PROPERTIES ⁽⁶⁾	QUALIFIER	UNITS ⁽⁵⁾	SPECIFIED VALUES ⁽¹⁾	TEST METHOD
<u>Product Requirements</u>				
Type	--	--	Nonwoven needle-punched	--
Polymer composition	Minimum	%	95 polypropylene or polyester	--
Mass per unit area	Minimum	oz/yd ²	8	ASTM D 5261
<u>Mechanical Requirements</u>				
Grab strength	Minimum	lb	200	ASTM D 4632 ⁽²⁾
Tear strength	Minimum	lb	75	ASTM D 4533 ⁽³⁾
Puncture strength	Minimum	lb	90	ASTM D 4833 ⁽⁴⁾
Static puncture strength	Minimum	psi	500	ASTM D 6241
<u>Durability Requirements</u>				
Ultraviolet Resistance	Minimum	%	70	ASTM D 4355

Notes:

- (1) All values represent minimum average roll values.
- (2) Minimum of values measured in machine and cross machine directions with 1 inch clamp on Constant Rate of Extension (CRE) machine.
- (3) Minimum value measured in machine and cross machine direction.
- (4) Tension testing machine with a 1.75-inch diameter ring clamp, the steel ball being replaced with 0.31-inch diameter solid steel cylinder with flat tip centered within the ring clamp.
- (5) % = percent
oz/yd² = ounce per square yard
lb = pound
psi = pound per square inch
- (6) See Paragraph 2.02 for required MQC test frequencies.

[END OF SECTION]

SECTION 02740

GEOCOMPOSITE

PART 1 GENERAL

1.01 SCOPE

- A. This section includes requirements for geocomposite drainage layer products and installation.

1.02 RELATED SECTIONS AND PLANS

- A. Section 02240 – Cap Protective Layer
- B. Section 02770 – Geomembrane
- C. Section 02790 – Interface Friction Conformance Testing
- D. Construction Quality Assurance (CQA) Plan

1.03 REFERENCES

- A. Latest version of American Society of Testing and Materials (ASTM) standards.
 - 1. ASTM D 792 - Standard Test Methods for Density and Specific Gravity of Plastics by Displacement.
 - 2. ASTM D 1505 - Standard Test Method for the Density of Plastic by the Density Gradient Method.
 - 3. ASTM D 1603 - Standard Test Method for Determination of Carbon Black Content in Olefin Plastics
 - 4. ASTM D 4218 - Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by Muffle-Furnace Techniques.
 - 5. ASTM D 4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
 - 6. ASTM D 4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
 - 7. ASTM D 4632 - Standard Test Method for Breaking Load and Elongation of Geotextile (Grab Method).
 - 8. ASTM D 4716 - Standard Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.

- 9. ASTM D 4751 - Standard Test Method for determining apparent opening size of a geotextile
- 10. ASTM D 4833 - Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products
- 11. ASTM D 5199 - Standard Test Method for Measuring the Nominal Thickness of Geosynthetics
- 12. ASTM D 5261 - Standard Test Method for Measuring Mass Per Unit Area of Geotextiles
- 13. ASTM D 6241 - Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe.
- 14. ASTM D 7005 - Standard Test Method for Determining the Bond Strength (Ply Adhesion) of Geocomposites.

1.04 SUBMITTALS

- A. Submit the following to the Engineer for review at least 21 calendar days prior to use:
 - 1. geocomposite Manufacturer and product names;
 - 2. certification of minimum average roll values and the corresponding test procedures for all geocomposite properties listed in Table 02740-1; and
 - 3. projected geocomposite delivery dates.
- D. Submit to the Engineer for review at least 14 calendar days prior to geocomposite placement, manufacturing quality control certificates for each roll of geocomposite as specified in this section.
- E. For each proposed geocomposite material, the Contractor shall submit to the Engineer for review at least 14 calendar days prior to transporting the geocomposite to site the results of manufacturing quality control testing and certification that the geocomposite is manufactured to meet the minimum interface shear strength criteria when tested in compliance with requirements of Section 02790.

1.05 CONSTRUCTION QUALITY ASSURANCE

- A. The installation of the geocomposite will be monitored by the CQA Consultant as required by the CQA Plan.
- B. The CQA Consultant will perform material conformance testing of the geocomposite as required by the CQA Plan.
- C. The Contractor shall be aware of the activities required of the CQA Consultant by the CQA Plan and shall account for these activities in the installation schedule.

- D. The Contractor shall correct all deficiencies and nonconformances identified by the CQA Consultant at no additional cost to the Owner.

PART 2 PRODUCT

2.01 GEOCOMPOSITE

- A. Furnish geocomposite drainage layer materials consisting of a polyethylene geonet core with a needle-punched nonwoven geotextile heat laminated to both sides of the geonet core.
- B. Furnish geocomposite for the final cover having properties meeting the required property values shown in Table 02740-1. Required geocomposites properties shall be considered minimum average roll values (95 percent lower confidence limit).
- C. Furnish geocomposites that are stock products.
- D. In addition to the property values listed in Table 02740-1, the geocomposites shall:
 - 1. retain their structure during handling, placement, and long-term service (provide manufacturer's data for long-term compression creep testing); and
 - 2. be capable of withstanding outdoor exposure for a minimum of 30 days with no measurable deterioration.
- E. Furnish geocomposite that meets the interface shear strength requirements of Section 02790 as tested by an approved testing laboratory.
- F. Furnish polymeric threads for stitching that are ultra-violet (UV) light stabilized to at least the same requirements as the geotextile to be sewn. Furnish polyester or polypropylene threads that have a minimum size of 2,000 denier.
- G. Furnish geocomposite meeting the transmissivity requirements in Table 02740-1 as tested by an approved testing laboratory. The transmissivity of the geocomposites for final cover system construction shall be tested in accordance with ASTM D 4716 to demonstrate that the design transmissivity will be maintained for the design period of the facility. The geocomposite used in the final cover system shall be tested using the actual boundary materials intended for the geocomposite at a normal load of 500 psf for a minimum period of 24 hours.

2.02 MANUFACTURING QUALITY CONTROL

- A. Sample and test the geotextile and geonet components of the geocomposite to demonstrate that these materials conform to the requirements of this section.

- B. Perform manufacturing quality control tests to demonstrate that the geotextile properties conform to the values specified in Table 02740-1. Perform as a minimum, the following manufacturing quality control tests at a minimum frequency of once per 100,000 square feet with minimum of 1 test per lot:

<u>Test</u>	<u>Procedure</u>
Mass per unit area	ASTM D 5261
Grab strength	ASTM D 4632
Tear strength	ASTM D 4533
Puncture strength	ASTM D 4833
Static Puncture strength	ASTM D 6241

- C. Perform additional manufacturing quality control tests on the geotextile, at a minimum frequency of once per 250,000 square feet with minimum of 1 test per lot, to demonstrate that the apparent opening size (per ASTM D 4751) and permittivity (per ASTM D 4491) of the geotextile conform to the values specified in Table 02740-1.
- D. Perform manufacturing quality control tests to demonstrate that the geonet drainage core properties conform to the values specified in Table 02740-1. Perform as a minimum, the following manufacturing quality control tests at a minimum frequency of once per 100,000 square feet with minimum of 1 test per lot:

<u>Test</u>	<u>Procedure</u>
Polymer density	ASTM D 792 or 1505
Carbon black	ASTM D 1603 or 4218
Thickness	ASTM D 5199

- E. Perform additional manufacturing quality control tests, at a minimum frequency of once per 100,000 square feet with minimum of 1 test per geonet lot, to demonstrate that the geocomposite drainage layers conform to the hydraulic transmissivity (per ASTM D 4716) and ply adhesion (per ASTM D 7005) requirements of Table 02740-1.
- F. Submit quality control test certificates signed by the geotextile, geonet, and geocomposite manufacturer quality control manager. The quality control certificates shall include:
1. lot, batch, and roll number and identification; and
 2. results of manufacturing quality control tests including description of test methods used.
- G. Do not supply any geocomposite roll that does not comply with the manufacturing quality control requirements.

- H. If a geotextile, geonet, or geocomposite sample fails to meet the quality control requirements of this section, sample and test rolls manufactured at the same time or in the same lot as the failing roll. Continue to sample and test the rolls until the extent of the failing rolls are bracketed by passing rolls. Do not supply failing rolls.

2.03 PACKING AND LABELING

- A. The geocomposite shall be supplied in rolls wrapped in relatively impermeable and opaque protective covers.
- B. Geocomposite rolls shall be labeled with the following information.
 - 1. Fabricator's name;
 - 2. product identification;
 - 3. lot or batch number;
 - 4. roll number; and
 - 5. roll dimensions.
- C. Geocomposite rolls not labeled in accordance with this section or on which labels are illegible upon delivery to the site shall be rejected and replaced with properly labeled rolls at no additional cost to the Owner.
- D. If any special handling is required, it shall be so marked on the geotextile component e.g., "This Side Up" or "This Side Against Soil To Be Retained".

2.04 TRANSPORTATION

- A. Geocomposites shall be delivered to the site at least 21 days prior to the planned deployment date to allow the CQA Consultant adequate time to perform conformance testing on the geocomposite samples as required by the CQA Plan.

2.05 HANDLING AND STORAGE

- A. The Contractor shall be responsible for storage of the geocomposite at the site.
- B. Handling and care of the geocomposite prior to and following installation at the site, is the responsibility of the Contractor. The Contractor shall be liable for all damage to the materials incurred prior to final acceptance by the Owner.
- C. The geocomposite shall be stored off the ground and out of direct sunlight, and shall be protected from excessive heat or cold, mud, dirt, and dust. Any additional storage procedures required by the manufacturer shall be the Contractor's responsibility.

PART 3 EXECUTION

3.01 PLACEMENT

- A. The Contractor shall not commence geocomposite installation until the CQA Consultant completes conformance evaluation of the geocomposite and quality assurance evaluation of previous work, including evaluation of Contractor's survey results for previous work.
- B. For geocomposite with directional hydraulic transmissivity, the Contractor shall install the geocomposite in accordance with manufacturer's recommendations (usually the roll direction).
- C. The Contractor shall handle the geocomposite in such a manner as to ensure the geocomposite is not damaged in any way.
- D. The Contractor shall take any necessary precautions to prevent damage to underlying layers during placement of the geocomposite.
- E. The geocomposite shall only be cut using manufacturer's recommended procedures.
- F. In the presence of wind, all geocomposite panels shall be weighted with sandbags or the equivalent. Such sandbags shall be installed during placement and shall remain until replaced with cover material.
- G. Care shall be taken during placement of geocomposite not to entrap dirt or excessive dust in the geocomposite that could cause clogging of the drainage system, and/or stones that could damage the adjacent geomembrane. Care shall be exercised when handling sandbags, to prevent rupture or damage of the sandbags.
- H. If necessary, the geocomposite shall be positioned by hand after being unrolled over a smooth rub sheet.
- I. Tools shall not be left on, in, or under the geocomposite.
- J. After unwrapping the geocomposite from its opaque cover, the geocomposite shall not be left exposed for a period in excess of 30 days.
- K. If white colored geotextile is used in the geocomposite, precautions shall be taken against "snowblindness" of personnel.

3.02 SEAMS AND OVERLAPS

- A. The components of the geocomposite (i.e., geotextile, geonet, and geotextile) are not bonded together at the ends and edges of the rolls. Each component will be secured or seamed to the like component of adjoining panels.
- B. Geotextile Components:
 - 1. The bottom layers of geotextile shall be overlapped. The top layers of geotextiles shall be continuously sewn (i.e., spot sewing is not allowed). Geotextiles shall be overlapped a minimum of 6 inches prior to seaming.
 - 2. No horizontal seams shall be allowed higher than one-third the slope height on slopes steeper than 10 horizontal to 1 vertical.
 - 3. Polymeric thread, with chemical resistance properties equal to or exceeding those of the geotextile component, shall be used for all sewing. The seams shall be sewn using Stitch Type 401 per Federal Standard No. 751a. The seam type shall be Federal Standard Type SSN-1.

3.03 REPAIR

- A. Any holes or tears in the geocomposite shall be repaired by placing a patch extending 2 ft beyond the edges of the hole or tear. The patch shall be secured by tying fasteners through the bottom geotextile and the geonet of the patch, and through the top geotextile and geonet on the slope. The patch shall be secured every 6 inches with approved tying devices. The top geotextile component of the patch shall be heat sealed to the top geotextile of the geocomposite needing repair. If the hole or tear width across the panel is more than 50 percent of the width of the panel, the damaged area shall be cut out and the two portions of the geonet shall be joined in accordance with this section.
- B. All repairs shall be performed at no additional cost to the Owner.

3.04 PLACEMENT OF SOIL MATERIALS

- A. The Contractor shall place all soil materials in such a manner as to ensure that:
 - 1. the geocomposite and underlying geosynthetic materials are not damaged;
 - 2. minimal slippage occurs between the geocomposite and underlying layers; and
 - 3. excess tensile stresses are not produced in the geocomposite.
- B. Spread soil on top of the geocomposite from the bottom of slopes upward to cause the soil to cascade over the geocomposite rather than be shoved across the geocomposite.
- C. For geocomposites overlying the geomembrane, do not place overlying soil material at ambient temperatures below 40 degrees Fahrenheit (F) or above 104°F, unless authorized

in writing by the Engineer. For cold (<40°F) and hot (>104°F) weather placement operations, use the additional procedures authorized in writing by the Engineer.

- D. Do not drive equipment directly on the geocomposite. Only use equipment above a geocomposite overlying a geomembrane that meets the following ground pressure requirements above the geomembrane:

Maximum Allowable Equipment Ground Pressure (<u>pounds per square inch</u>)	Minimum Thickness of Overlying Soil (<u>inches</u>)
<5	12
<10	18
<20	24
>20	36

TABLE 02740-1
GEOCOMPOSITE PROPERTY VALUES

PROPERTIES ⁽⁶⁾	QUALIFIER	UNITS	SPECIFIED VALUES ⁽¹⁾	TEST METHOD
<u>Geonet Component:</u>				
Polymer composition	Minimum	%	95 polyethylene by wt	--
Polymer density	Minimum	g/cm ³	0.93	ASTM D 792 (Method B) or D 1505
Carbon black content	Range	%	2 - 3	ASTM D 1603 or 4218
Nominal thickness	Minimum	mil	200	ASTM D 5199
<u>Geotextile Component:</u>				
Type	None	none	Needlepunched nonwoven	--
Polymer composition	Minimum	%	95 polyester or polypropylene	
Mass per unit area	Minimum	oz/yd ²	8	ASTM D 5261
Apparent opening size	Maximum	mm	O ₉₅ ≤ 0.21 mm	ASTM D 4751
Permittivity	Minimum	sec ⁻¹	0.5	ASTM D 4491
Grab strength	Minimum	lb	200	ASTM D 4632 ⁽²⁾
Tear strength	Minimum	lb	75	ASTM D 4533 ⁽²⁾
Puncture strength	Minimum	lb	90	ASTM D 4833 ⁽³⁾
Static puncture strength	Minimum	psi	500	ASTM D 6241
<u>Geocomposite:</u>				
Transmissivity	Minimum	m ² /s	6.1x10 ⁻⁴ (See notes 4 and 5)	ASTM D 4716
Ply Adhesion	Minimum	lb/in	1.0	ASTM D 7005

Notes:

1. All values represent minimum average roll values.
2. Minimum value measured in machine and cross-machine direction.
3. Tension testing machine with a 1.75-inch diameter ring clamp, the steel ball being replaced with 0.31-inch diameter solid steel cylinder with flat tip centered within the ring clamp.

(notes continued on following page)

TABLE 02740-1 (Continued)

4. The design transmissivity of the geocomposite drainage layer in the final cover system shall be measured using water at a gradient of 0.33 under compressive stresses of 500 psf for a period of 24 hours. For the test, the geocomposite shall be sandwiched between 40-mil textured PE geomembrane and soil actually used for the cap protective layer. The minimum required transmissivity is $6.1 \times 10^{-4} \text{ m}^2/\text{s}$ under the compressive stresses of 500 psf.
5. See Paragraph 2.02 for required MQC test frequencies.

[END OF SECTION]

SECTION 02770

GEOMEMBRANE

PART 1 GENERAL

1.01 SCOPE

- A. The section includes requirements for geomembrane products and installation.

1.02 RELATED SECTIONS AND PLANS

- A. Section 02100 - Surveying
- B. Section 02200 - Earthwork
- C. Section 02215 - Trenching and Backfilling
- D. Section 02740 - Geocomposites
- E. Section 02790 - Interface Friction Conformance Testing
- F. Construction Quality Assurance (CQA) Plan

1.03 REFERENCES

- A. Latest version of American Society of Testing and Materials (ASTM) standards.
 - 1. ASTM D 792 - Standard Test Methods for Density and Specific Gravity of Plastics by Displacement.
 - 2. ASTM D 1004 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
 - 3. ASTM D 1238 - Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer.
 - 4. ASTM D 1505 - Standard Test Method for the Density of Plastic by the Density Gradient Method.
 - 5. ASTM D 1603 - Standard Test Method for Carbon Black Content in Olefin Plastics.
 - 6. ASTM D 3895 - Standard Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry.
 - 7. ASTM D 4218 - Standard Test Method for Determination of Carbon Black

- Content in Polyethylene Compounds By the Muffle-Furnace Technique.
8. ASTM D 4833 - Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products.
 9. ASTM D 5397 - Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test.
 10. ASTM D 5596 - Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics.
 11. ASTM D 5617 - Standard Test Method for Multi-Axial Tension Test for Geosynthetics.
 12. ASTM D 5721 - Standard Practice for Air-Oven Aging of Polyolefin Geomembranes.
 13. ASTM D 5885 - Standard Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High-Pressure Differential Scanning Calorimetry.
 14. ASTM D 5994 - Standard Test Method for Measuring Core Thickness of Textured Geomembrane.
 15. ASTM D 6392 - Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods.
 16. ASTM D 6693 - Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes.
 17. GRI GM-12 Asperity Measurement of Textured Geomembranes Using a Depth Gage
 18. GRI GM-13 Standard Specification for Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes.
 19. GRI GM-17 Standard Specification for Test Properties, Testing Frequency and Recommended Warranty for Linear Low Density Polyethylene (LLDPE) Smooth and Textured Geomembranes.

1.04 QUALIFICATIONS

- A. Geomembrane manufacturer:
 1. The Geomembrane manufacturer shall be responsible for the production of geomembrane rolls from resin and shall have sufficient production capacity and

qualified personnel to meet the demands (e.g., quantity production and quality control) of this project.

2. The Geomembrane manufacturer shall have successfully manufactured a minimum of 10,000,000 square feet of HDPE and PE geomembrane for use in at least ten similar projects in the past five years.

B. Geosynthetic Installer:

1. The Installer shall be responsible for field handling, storing, deploying, seaming, temporarily restraining (against wind), and other site aspects of the geomembrane and other components of the cover system, and shall provide qualified installation personnel, as outlined in this Section. The Geosynthetic Installer may also be responsible for transportation of these materials to the site, and for anchoring systems.
2. As a firm, the Geosynthetic Installer shall have successfully installed a minimum of 10,000,000 square feet of PE geomembrane for at least ten projects in the past five years.
3. The superintendent assigned to this project shall have supervised the installation of a minimum of 2,000,000 square feet of PE geomembrane on at least ten similar projects.
4. All personnel performing seaming operations shall be qualified by experience or by successfully passing seaming tests.
 - a. At least one seamer shall have experience seaming a minimum of 1,000,000 linear feet of PE geomembrane using the same type of seaming apparatus to be used at this site. Seamers with such experience will be designated "master seamers" and shall provide direct supervision over less experienced seamers.
 - b. All seaming personnel shall have seamed at least 100,000 linear ft of PE geomembrane using the same type of seaming apparatus to be used at this site.

1.05 SUBMITTALS

- A. Submit the following information to the Engineer for review not less than 45 calendar days prior to geomembrane use.
1. Geomembrane manufacturer capabilities, including:
 - a. daily production capacity available for this Contract; and
 - b. manufacturing quality control procedures.
 2. A list of 10 completed facilities for which the manufacturer has supplied a minimum total of 10,000,000 square feet of PE geomembrane. Provide the following information for each facility:
 - a. name, location, purpose of facility, and date of installation;
 - b. names of owner, project manager, design engineer, and installer; and
 - c. thickness and surface area of geomembrane provided.

3. Origin (resin supplier's name, resin production plant) and identification (brand name, number) of the polyethylene resin used.
 4. Certification of minimum average roll values (95 percent lower confidence limit) for physical, mechanical, and environmental properties and the corresponding test procedures for the geomembrane properties listed in Table 02770-1. Submit values that are specific to the resin used in manufacture.
 5. Certification that welding rod or granules are compatible with the specifications and the resin of the geomembrane furnished for this project.
 6. Manufacturer warranty as specified in this section.
- B. Submit to the Engineer for review not less than 30 calendar days prior to geomembrane use the following documentation on the resin used to manufacture the geomembranes:
1. Copies of quality control certificates issued by the resin supplier including the production dates and origin of the resin used to manufacture the geomembrane for this Contract.
 2. Results of tests conducted by the manufacturer to verify the quality of the resin used to manufacture the geomembrane rolls assigned to the project.
 3. Certification that no more than 10 percent reclaimed polymer is added to the resin during the manufacturing of the geomembrane to be used for this project and that all reclaimed polymer (if added) is same as the parent material.
- C. Submit to the Engineer for review the following documentation on geomembrane roll production at least 14 calendar days prior to transporting any geomembrane to the site.
1. Manufacturing certificates for each shift's production of geomembrane, signed by the manufacturer quality control manager.
 2. Certificate shall include:
 - a. roll numbers and identification;
 - b. sampling procedures; and
 - c. results of manufacturer quality control tests, including descriptions of the test methods used (the manufacturer quality control tests to be performed are given in Part 2 of this Section).
- D. Submit to the Engineer for review the following information from the installer at least 14 calendar days prior to mobilization of the installer to the site.
1. Layout drawings showing the installation layout identifying geomembrane panel configurations, dimensions, details, locations of seams, as well as any variance or additional details which deviate from the Construction Drawings. The layout drawings shall be adequate for use as a construction plan and shall include dimensions, details, etc. The layout drawings, as modified and/or approved by the Engineer, shall become part of the contract.
 2. Installation schedule.
 3. Copy of installer's letter of approval or license by the manufacturer.

4. Installation capabilities, including:
 - a. information on equipment proposed for this project;
 - b. average daily production anticipated for this project; and
 - c. quality control procedures to include quality control organization.
 5. A list of 10 completed facilities for which the installer has installed a minimum of 5,000,000 square feet of polyethylene geomembrane. The following information shall be provided for each facility:
 - a. the name and purpose of the facility, its location, and dates of installation;
 - b. the names of the owner, project manager, and geomembrane manufacturer;
 - c. name and qualifications of the supervisor of the installation crew;
 - d. thickness and surface area of installed geomembrane;
 - e. type of seaming and type of seaming apparatus used; and
 - f. duration of installation.
 6. Resumes of the installer superintendent and quality control chief to be assigned to this project, including dates and duration of employment.
 7. Resumes of all personnel who will perform seaming operations on this project, including dates and duration of employment.
 8. Evidence that the installation crew has the following experience.
 - a. The superintendent shall have supervised the installation of a minimum of 2,000,000 square feet of polyethylene geomembrane.
 - b. At least one seamer shall have experience seaming a minimum of 500,000 square feet of polyethylene geomembrane using the same type of seaming apparatus to be used at this site. Seamers with such experience will be designated "master seamers" and shall provide direct supervision over less experienced seamers.
 - c. All other seaming personnel shall have seamed at least 100,000 square feet of polyethylene geomembrane using the same type of seaming apparatus to be used at this site. Personnel who have seamed less than 100,000 square feet of seams shall be allowed to seam only under the direct supervision of the master seamer or Superintendent.
- E. Submit to the Engineer for review at least 14 days prior to geomembrane placement, a certificate of calibration less than 12 months old for the field tensiometer. Tensiometer shall be calibrated within one year of date of test. Calibration shall be traceable to national or industry recognized standards where possible.
- F. Submit subgrade acceptance certificates, signed by the Installer, for each area to be covered by the geomembrane prior to that area being covered by geomembrane.
- G. Within 14 calendar days of completion of the geomembrane installation, submit to the Engineer the executed installation warranty as specified in this section.

1.06 CONSTRUCTION QUALITY ASSURANCE

- A. The construction of the geomembrane component of the final cover system will be monitored by the CQA Consultant as required in the CQA Plan.
- B. The CQA Consultant will perform material conformance testing of geomembrane materials and installation quality assurance testing of the geomembrane cover seams.
- C. The Contractor shall be aware of the activities required of the CQA Consultant by the CQA Plan and shall account for these activities in the construction schedule.
- D. The Contractor shall correct all deficiencies and nonconformances identified by the CQA Consultant at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 RESIN

- A. Provide geomembrane manufactured from new, first-quality polyethylene resin. Do not add reclaimed polymer to the resin. The use of polymer recycled during the manufacturing process is permitted if performed with appropriate cleanliness and if the recycled polymer during the manufacturing process does not exceed 10 percent by weight of the total polymer weight.
- B. Use PE resin for final cover geomembrane having the following properties:
 - 1. Specific Gravity (min.): 0.915 (ASTM D 792 Method B, or ASTM D 1505)
 - 2. Melt Index (max.): 1.0 g/10 min (ASTM D 1238)

2.02 GEOMEMBRANE PROPERTIES

- A. Furnish 40-mil PE smooth and textured geomembranes having properties that comply with the required values shown in Table 02770-1.
- B. Furnish geomembranes that meet the interface shear strength requirements of Section 02790 as tested by an approved testing laboratory.
- C. In addition, furnish geomembrane that:
 - 1. contains a maximum of 1 percent by weight of additives, fillers, or extenders not including carbon black;
 - 2. does not have striations, pinholes, bubbles, blisters, nodules, undispersed raw materials, or any sign of contamination by foreign matter on the surface or in the interior;

3. is free of holes, blisters, modules, undispersed raw materials, or any sign of contamination by foreign matter; and
4. is manufactured in a single layer (thinner layers shall not be welded together to produce the final required thickness).

2.03 MANUFACTURING QUALITY CONTROL

A. Resin:

1. Sample and test resin at a minimum frequency of one test per rail car to demonstrate that the resin complies with the requirements of this section. Perform tests on resin after the addition of additives to the virgin resin. Certify in writing that the resin meets the requirements of this section.
2. Do not use any noncomplying resin.

B. Rolls:

1. Continuously monitor for geomembrane defects during manufacture. Geomembranes shall be subjected to continuous spark testing by the Manufacturer at the factory.
2. Do not supply geomembrane that exhibits any defects.
3. Regularly monitor for geomembrane thickness during manufacture.
4. Do not supply geomembrane that fails to meet the specified thickness.
5. Sample and test the geomembrane, to demonstrate that its properties conform to the values specified in Tables 02770-1. Perform the manufacture quality control tests at the following minimum frequencies with minimum of one test per lot:

<u>Test</u>	<u>Frequency</u>
Thickness	Every Roll
Asperity height	Every 2 nd Roll
Specific gravity	200,000 lb
Yield strength	20,000 lb
Yield elongation	20,000 lb
Break strength	20,000 lb
Break elongation	20,000 lb
Carbon black (for HDPE)	20,000 lb
Carbon black (for LLDPE)	45,000 lb
Carbon black dispersion	45,000 lb
Tear resistance	45,000 lb
Puncture resistance	45,000 lb
Oxidative induction time (OIT)	200,000 lb
Stress crack resistance (for HDPE)	200,000 lb

6. If a geomembrane sample fails to meet the quality control requirements of this Section, sample and test rolls manufactured, in the same resin batch, or at the same time, as the failing roll. Continue to sample and test the rolls until the extent of the failing rolls are bracketed by passing rolls. Do not supply any failing rolls.
7. Provide a written certification that the geomembrane meets the material requirements specified in GRI-GM13 or GRI-GM17 for the following properties using the indicated test procedures. Provide written certification that these tests have been performed on geomembrane rolls having the same formulation as the geomembrane rolls that will be delivered for the project.

<u>Test</u>	<u>Procedure</u>
Oven aging	ASTM D 5721
UV resistance	ASTM D 5885
Axi-Symmetric Break Resistance Strain	ASTM D 5617 (for LLDPE)

- C. Permit the CQA Consultant and/or Engineer to visit the manufacturing plant for project specific visits. If possible, such visits will be prior to, or during, the manufacturing of the geomembrane rolls for this project.

2.04 LABELING

- A. Label the geomembrane rolls with the following information.
 1. thickness of the material;
 2. length and width of the roll;
 3. name of Manufacturer;
 4. product identification;
 5. lot number; and
 6. roll number.
- B. Geomembrane rolls not labeled in accordance with this Section or on which labels are illegible upon arrival at the site will be rejected and replaced at no additional expense to the Owner.

2.05 TRANSPORTATION, HANDLING AND STORAGE

- A. Deliver geomembranes to the site at least 14 calendar days prior to the planned deployment date to allow the CQA Consultant adequate time to perform conformance testing on the geomembrane samples as described in the CQA Plan.
- B. Provide proper handling and storage of the geomembrane at the site. Protect the geomembrane from excessive heat or cold, dirt, puncture, cutting, or other damaging or deleterious conditions. Provide any additional storage procedures required by the Manufacturer.
- C. Store geomembrane rolls on pallets or other elevated structures. Do not store geomembrane rolls directly on the ground surface. Do not store more than 3 rolls high.

PART 3 EXECUTION

3.01 FAMILIARIZATION

- A. Prior to implementing any of the work described in this section, the Contractor shall become thoroughly familiar with all portions of the work falling within this section.
- B. Inspection:
 - 1. Prior to implementing any of the work in this section, the Contractor shall carefully inspect the installed work of all other sections and verify that all work is complete to the point where the installation of this section may properly commence without adverse impact.
 - 2. If the Contractor has any concerns regarding the installed work of other sections, the Contractor shall immediately notify the Engineer in writing. Failure to inform the Engineer in writing or continuance of installation of the geomembrane will be construed as the Contractor's acceptance of the related work of all other sections.

3.02 SUBGRADE SURFACE PREPARATION

- A. The Contractor shall provide certification in writing that the surface on which the geomembrane will be installed is acceptable. This certification of acceptance shall be given to the CQA Consultant prior to commencement of geomembrane installation in the area under consideration.
- B. Special care shall be taken to maintain the prepared surface.
- C. No geomembrane shall be placed onto areas of standing water.

- D. Any damage to the prepared subgrade caused by installation activities shall be repaired at the Contractor's expense.

3.03 GEOMEMBRANE DEPLOYMENT

A. General:

1. Textured geomembrane shall be used on the side slopes as indicated on the Construction drawings. Smooth geomembrane will be used on top of the landfill as indicated on the Construction drawings.
2. The Contractor shall produce layout drawings prior to geomembrane deployment. These drawings shall indicate the geomembrane configuration, dimensions, details, locations of seams, etc. The layout drawings must be approved by the Engineer prior to the installation of any geomembranes. The layout drawings, as modified and/or approved by the Engineer, shall become part of these specifications.
3. Do not deploy geomembrane until the layout drawings are approved by the Engineer.
4. Do not deploy a geomembrane panel in an area until the CQA Consultant has been provided with a certificate of subgrade acceptance for that area.
5. Do not deploy geomembranes until CQA Consultant completes conformance evaluation of the geomembrane and performance evaluation of previous work, including evaluation of Contractor's survey results for previous work.
6. Deploy each geomembrane panel in accordance with the approved layout drawings.

B. Field Panel Identification:

1. A geomembrane field panel is a roll or a portion of roll cut in the field.
2. Give each field panel an identification code (number or letter-number). This identification code shall be agreed upon by the CQA Consultant and the Installer.

C. Field Panel Placement:

1. Place each geomembrane panel one at a time and seam each panel immediately after its placement.
2. Do not place geomembrane panels when the ambient temperature is below 40° Fahrenheit (F), unless authorized in writing by the Engineer. For cold weather (<40°F) deployment, use the additional procedures authorized in writing by the Engineer.
3. Do not place geomembranes during any precipitation, in the presence of heavy fog or dew, in an area of ponded water, or in the presence of high wind.
4. Ensure that:
 - a. No vehicular traffic drives directly on the geomembrane.
 - b. Equipment used does not damage the geomembrane by handling, trafficking, or leakage of hydrocarbons (i.e., fuels).

- c. Personnel working on the geomembrane do not smoke, bring glass onto the geomembrane, or engage in other activities that could damage the geomembrane.
 - d. The method used to unroll the panels does not scratch or crimp the geomembrane and does not damage the supporting soil.
 - e. The method used to place the panels minimizes wrinkles (especially differential wrinkles between adjacent panels). Adjust or repair any area of geomembrane wrinkles where the wrinkle height, measured perpendicular to the slope during the hottest portion of the day, is more than 4 inches.
 - f. The method used to place the panels does not cause the panels to lift up or trampoline during the coolest portion of the day.
 - g. The geomembrane is anchored or weighted with sandbags, or the equivalent, to prevent damage or uplift from wind. Install sufficient anchoring or weighting to prevent uplift and maintain such system until overlying material is placed.
6. Replace any field panel or portion thereof that becomes damaged (torn, twisted, or crimped). Remove from the work area damaged panels or portions of damaged panels.
- D. Do not install geomembrane between one hour before sunset and one hour after sunrise unless approved by the Engineer.

3.04 FIELD SEAMING

- A. Personnel shall be experienced as specified in this section. Do not perform seaming unless a "master seamer" and the CQA Consultant are on-site.
- B. Orient seams parallel to the line of maximum slope (i.e., oriented down, not across, the slope). Minimize the number of seams in corners and at odd-shaped geometric locations. No horizontal seam shall be less than 10 feet from the toe of the slope, except where approved by the Engineer. Do not locate seams at an area of potential stress concentration.
- C. Weather Conditions for Seaming:
- 1. Do not seam geomembrane at ambient temperatures below 40°F or above 104°F, unless authorized in writing by the Engineer. For cold (<40°F) or hot (>104°F) weather seaming, use the additional procedures authorized in writing by the Engineer.
 - 2. Measure ambient temperatures between 0 to 6 inches above the geomembrane surface.
 - 3. In all cases the geomembrane seam areas shall be dry and protected from wind.

D. Overlapping and Temporary Bonding:

1. Sufficiently overlap geomembrane panels for welding and to allow peel tests to be performed on the seam. Any seams that cannot be destructively tested because of insufficient overlap are failing seams.
2. Control the temperature of the air at the nozzle of heat bonding apparatus such that the geomembrane is not damaged.

E. Seam Preparation:

1. Prior to seaming, clean the seam area and ensure that area to be bonded is free of moisture, dust, dirt, debris of any kind, and foreign material.
2. If seam overlap grinding is required, complete the process according to the Manufacturer's instructions or within 60 minutes of the seaming operation. Do not grind to a depth that exceeds ten percent of the geomembrane thickness. Grinding marks shall not appear beyond 0.25 inch of the extrudate after it is placed.
3. Align seams with the fewest possible number of wrinkles and "fishmouths".

F. General Seaming Requirements:

1. Extend seams to the outside edge of panels to be placed in the anchor trench.
2. If required, place a firm substrate such as a flat board or similar hard surface directly under the seam overlap to achieve proper support.
3. Cut fishmouths or wrinkles at the seam overlaps along the ridge of the wrinkle to achieve a flat overlap. Seam the cut fishmouths or wrinkles and patch any portion where the overlap is less than 6 inches with an oval or round patch of geomembrane that extends a minimum of 6 inches beyond the cut in all directions.
4. Place the electric generator used for power supply to the welding machines outside the area to be lined or mount it on soft tires such that no damage occurs to the geomembrane. Properly ground the electric generator. Place a smooth insulating plate or fabric beneath the hot welding apparatus after use.

G. Seaming Process:

1. Approved processes for field seaming are extrusion welding and fusion welding. The primary method of welding shall be fusion. Seaming equipment shall not damage the geomembrane. Use only geomembrane Manufacturer-approved equipment.
2. Extrusion Equipment and Procedures:
 - a. Maintain at least one spare operable seaming apparatus on site.
 - b. Equip extrusion welding apparatus with gauges giving the temperature in the apparatus and at the nozzle.
 - c. Prior to beginning a seam, purge the extruder until all heat-degraded extrudate has been removed from the barrel. Whenever the extruder is stopped, purge the barrel of all heat-degraded extrudate.
3. Fusion Equipment and Procedures:

- a. Maintain at least one spare operable seaming apparatus on site.
- b. Fusion-welding apparatus shall be automated self-propelled devices equipped with gauges giving the applicable temperatures and pressures.
- c. Fusion-welding apparatus shall produce a double-track seam.
- d. Abrade the edges of cross seams to a smooth incline (top and bottom) prior to extrusion welding.

H. Trial Seams:

1. Make trial seams on excess pieces of geomembrane to verify that seaming conditions are adequate. Conduct trial seams on the same material to be installed and under similar field conditions as production seams. Conduct trial seaming at the beginning of each seaming period, and at least once each five hours, for each seaming apparatus used that day prior to seaming. Also, each seamer shall make at least one trial seam each day, for each day that seaming is performed by that seamer. Conduct trial seaming under the same conditions as the actual seaming. Prepare trial seams that are at least 15 feet long by 1 foot wide (after seaming) with the seam centered lengthwise for fusion equipment and at least 3 feet long by 1 foot wide for extrusion equipment. Prepare seam overlap as indicated in the "Overlapping and Temporary Bonding" Article of this Part.
2. Cut four specimens, each 1.0 inch wide, from the trial seam sample. Test two specimens in shear and two in peel, using a field tensiometer. The test specimens shall not fail in the seam. If a specimen fails, repeat the entire operation. If the additional specimen fails, do not accept the seaming apparatus or seamer until the deficiencies are corrected and two consecutive successful trial seams are achieved. A seamer may start production seaming prior to testing of the trial seams. In the event the trial seam fails, all production seams by the seamer are failed seams.

I. Nondestructive Seam Continuity Testing:

1. Nondestructively test field seams for continuity over their full length. Perform continuity testing as the seaming work progresses, not at the completion of field seaming. Complete any required repairs in accordance with the "Defects and Repairs" Article of this Part. Apply the following procedures:
 - a. use vacuum testing for extrusion welds; and
 - b. use air pressure testing for double-track fusion seams.
2. Vacuum Testing:
 - a. Use the following equipment:
 - i. A vacuum box assembly consisting of a stiff housing, a transparent viewing window, a soft neoprene gasket attached to the bottom, port hole or valve assembly, and a vacuum gauge.
 - ii. A system for applying 5 pound per square inch (psi) gauge suction to the box.
 - iii. A bucket of soapy solution and applicator.

- b. Follow these procedures:
 - i. Energize the vacuum pump and reduce the tank pressure to 5 ± 1 psi gauge.
 - ii. Wet an area of the geomembrane seam larger than the vacuum box with the soapy solution.
 - iii. Place the box over the wetted area.
 - iv. Close the bleed valve and open the vacuum valve.
 - v. Ensure that a leak tight seal is created.
 - vi. Examine the geomembrane through the viewing window for the presence of soap bubbles for not less than 20 seconds.
 - vii. If no bubbles appear after 20 seconds, close the vacuum valve and open the bleed valve, move the box over the next adjoining area with a minimum 3 inch overlap, and repeat the process.
 - viii. Mark all areas where soap bubbles appear with a marker that will not damage the geomembrane and repair in accordance with the "Defects and Repairs" Article of this Part.
- 3. Air Pressure Testing:
 - a. Use the following equipment:
 - i. an air pump (manual or motor driven) or air reservoir, equipped with a pressure gauge, capable of generating and sustaining a pressure between 25 and 30 pounds per square inch;
 - ii. a rubber hose with fittings and connections; and
 - iii. a hollow needle, or other approved pressure feed device..
 - b. Follow these procedures:
 - i. Seal both ends of the seam to be tested.
 - ii. Insert needle, or other approved pressure feed device, into the tunnel created by the fusion weld.
 - iii. Insert a protective cushion between the air pump and the geomembrane.
 - iv. Energize the air pump to a pressure between 25 and 30 pounds per square inches, close valve, and sustain the pressure for not less than 5 minutes.
 - v. If loss of pressure exceeds 3 pounds per square inches, or does not stabilize, locate faulty area and repair in accordance with the "Defects and Repairs" Article of this Part.
 - vi. Cut opposite end of air channel from pressure gauge and observe release of pressure to ensure air channel is not blocked.
 - vii. Remove needle, or other approved pressure feed device, and seal both ends in accordance with the "Defects and Repairs" Article of this Part.

J. Destructive Testing:

1. Perform destructive seam tests to evaluate seam strength and integrity. Perform destructive testing as the seaming work progresses, not at the completion of field seaming. Destructive seam test shall meet the seam properties presented in Table 02770-2.
2. Sampling and Testing:
 - a. Collect destructive test samples at a minimum average frequency of one test location per 500 feet of seam length and at additional locations of suspected nonperformance. The CQA Consultant will select test locations, including locations with evidence of excess geomembrane crystallinity, contamination, offset seams, or any other evidence of inadequate seaming.
 - b. Cut samples at the locations designated by the CQA Consultant at the time the locations are designated. Number each sample and identify the sample number and location on the panel layout drawing. Immediately repair all holes in the geomembrane resulting from the destructive seam sampling in accordance with the repair procedures described in the "Defects and Repairs" Article of this Part. Test the continuity of the new seams in the repaired areas according to "Nondestructive Seam Continuity Testing" Article of this Part.
 - c. Cut two strips 1 inch wide and 12 inch long with the seam centered parallel to the width from either side of the sample location. Test the two 1-inch wide strips in the field tensiometer in the peel mode. The CQA Consultant may request an additional test in the shear mode. If these samples pass the field test, prepare a laboratory sample at least 1 foot wide by 3.5 feet long with the seam centered lengthwise. Cut the laboratory sample into three parts and distribute as follows:
 - i. one portion 1 foot long to the Installer;
 - ii. one portion 1.5 feet long to the CQC Consultant for testing; and
 - iii. one portion 1 foot long to the Engineer for archival storage.
3. In the event of failing field or laboratory test results, the Contractor may reconstruct the entire seam between two passing destructive tests; otherwise, the CQA Consultant will identify the extent of the nonconforming area following the procedures given in the CQA Plan. Obtain additional samples for testing as requested by the CQA Consultant.

K. Defects and Repairs:

1. Inspect the geomembrane before and after seaming for evidence of defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. The surface of the geomembrane shall be clean at the time of inspection. Sweep or wash the geomembrane surface if surface contamination inhibits inspection.
2. Test each suspect location, both in seam and non-seam areas, using the methods described in the "Nondestructive Seam Continuity Testing" Article of this Part. Repair each location that fails nondestructive testing.

3. Cut and reseat wrinkles not conforming with Part 2 of this Section. Test the seams thus produced like any other seam.
4. Repair Procedures:
 - a. Repair any portion of the geomembrane exhibiting a flaw, or failing a destructive or nondestructive test. Use the most appropriate of the available procedures:
 - i. patching, used to repair large holes, tears, undispersed raw materials, and contamination by foreign matter;
 - ii. abrading and reseaming, used to repair small sections of extruded seams;
 - iii. spot seaming, used to repair minor, localized flaws;
 - iv. capping, used to repair long lengths of failed seams;
 - v. topping, used to repair areas of inadequate seams, which have an exposed edge less than 4 inches in length; and
 - vi. removing bad seam and replacing with a strip of new material seamed into place (used with long lengths of fusion seams).
 - b. When making repairs, satisfy the following:
 - i. abrade surfaces of the geomembrane that are to be repaired no more than 60 minutes prior to the repair;
 - ii. clean and dry all geomembrane surfaces immediately prior to repair;
 - iii. only use approved seaming equipment;
 - iv. extend patches or caps at least 6 inches beyond the edge of the defect, and round corners of patches to a radius of at least 3 inches; and
 - v. cut the geomembrane below large caps to avoid potential for water or gas collection between the two sheets.
5. Repair Verification:
 - a. Test each repair using the methods described in the "Nondestructive Seam Continuity Testing" Article of this Part. Repairs that pass the nondestructive test are adequate unless the CQA Consultant elects to also perform destructive tests. Re-repair and retest failed tests.

3.05 ANCHORAGE SYSTEM

- A. The anchor trench shall be excavated prior to geomembrane placement to the lines, grades, and configuration indicated on the Construction Drawings.
- B. Slightly rounded corners shall be provided in the trench where the geomembrane adjoins the trench to avoid sharp bends in the geomembrane.
- C. Temporarily anchor each geomembrane panel in the anchor trench at the crest of the slope as soon as the panel is deployed or positioned.

- D. Do not entrap loose soil, sand bags, or other materials between or beneath the geosynthetic layers.
- E. Do not backfill the anchor trench until all geosynthetic layers are installed in the anchor trench. Backfill in accordance with the Construction Drawings and Section 02215.
- F. Do not damage any geosynthetic layer when backfilling the anchor trench.

3.06 MATERIALS IN CONTACT WITH THE GEOMEMBRANE

- A. Take all necessary precautions to prevent damage to the geomembrane during the installation of other components of the final cover system.
- B. Do not drive equipment directly on the geomembrane. Only use equipment above the geomembrane that meets the following ground pressure requirements.

Maximum Allowable Equipment Ground Pressure (pounds per square inches)	Minimum Thickness of Overlying Material (inches)
<5	12
<10	18
<20	24
>20	36

3.07 SURVEY CONTROL

- A. Survey the installed geomembrane final cover in accordance with Section 02100.

3.08 GEOMEMBRANE ACCEPTANCE

- A. The Contractor shall retain all ownership and responsibility for the geomembrane until accepted by the Owner.
- B. The geomembrane shall be accepted by the Owner when:
 - 1. the installation is finished;
 - 2. all documentation of installation is completed including the CQA Consultant's final report; and
 - 3. verification of the adequacy of all field seams and repairs, including associated testing, is complete.

3.09 PROTECTION OF WORK

- A. The Contractor shall use all means necessary to protect all prior work and all materials and completed work of other sections.
- B. In the event of damage, the Contractor shall make all repairs and replacements necessary at no additional cost to Owner.

TABLE 02770-1
REQUIRED 40-mil PE GEOMEMBRANE PROPERTIES

Properties ⁽³⁾	Qualifiers	Units ⁽¹⁾	Specified Values Smooth (S) / Textured (T)	Test Method
<u>Physical Properties</u>				
Thickness	Nominal	mils	40	ASTM D 5199 (S)
	Minimum		36	ASTM D 5994 (T)
Asperity Height	Minimum	mils	15	GRI-GM12
Specific Gravity	Minimum	N/A	0.939	ASTM D 792 (Method B) or ASTM D 1505
Carbon Black Content	Range	%	2-3	ASTM D 1603 or D 4218
Carbon Black Dispersion	N/A	none	9 of 10 in Category 1 or 2 and all in Category 1, 2, or 3	ASTM D 5596
<u>Mechanical Properties</u>				
Tensile Properties				
1. Yield Strength (HDPE)	Minimum	lb/in	84	ASTM D 6693
2. Break Strength	Minimum	lb/in	152 (S) / 60 (T)	ASTM D 6693
3. Yield Elongation (HDPE)	Minimum	%	12	ASTM D 6693
4. Break Elongation	Minimum	%	800 (S) / 250 (T)	ASTM D 6693
Tear Resistance	Minimum	lb	22	ASTM D 1004 Die C Puncture
Puncture Resistance	Minimum	lb	56 (S) / 44 (T)	ASTM D 4833

TABLE 02770-1 (continued)

Properties	Qualifiers	Units ⁽¹⁾	Specified Values	Test Method
<u>Environmental Properties</u>				
Stress Crack Resistance (HDPE)	Minimum	hrs	300 ⁽²⁾	ASTM D 5397 (Appendix)
Oxidative Induction Time (OIT)	Minimum	min	100 / 400	ASTM D 3895 / D 5885

Notes:

- % = percent
 hrs = hours
 min = minutes
 lb/in = pounds per inch
 lb = pound
 N/A = Not Applicable
 (S) = Applies to smooth geomembrane
 (T) = Applies to textured geomembrane
- For textured geomembrane, test is conducted on smooth edges of textured roll or smooth geomembrane from the same resin lot (batch) as the textured geomembrane furnished.
- See Paragraph 2.03 for required MQC test frequencies.

TABLE 02770-2
REQUIRED 40-mil PE GEOMEMBRANE SEAM PROPERTIES

Properties	Qualifiers	Units ⁽³⁾	Specified Values ⁽⁴⁾ Smooth or Textured	Test Method
<u>Shear Strength</u> ⁽¹⁾				
			FTB ⁽²⁾	ASTM D 6392
Fusion	Minimum	lb/in	60	
Extrusion	Minimum	lb/in	60	ASTM D 6392
<u>Peel Strength</u>				
			FTB ⁽²⁾	
Fusion	Minimum	lb/in	50	ASTM D 6392
Extrusion	Minimum	lb/in	44	ASTM D 6392

Notes:

1. Also called "Bonded Seam Strength". Value is at material yield point and failure shall occur in material outside of seam area.
2. Failures shall be FTB = Film Tear Bond. (Maximum 10 percent seam separation).
3. lb/in = pounds per inch.
4. Values listed for peel and shear strengths are for 4 out of 5 test specimen. The seam strength of the 5th specimen can be as low as 80% of the listed values.

[END OF SECTION]

SECTION 02790

INTERFACE FRICTION CONFORMANCE TESTING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The work in this Section includes all labor, materials, tools and equipment necessary to perform conformance interface shear strength testing using a composite configuration (i.e., “sandwich” test) for the final cover system. The composite configuration for the final cover system shall consist of the following components, from top to bottom:
 - 1. Cap protective soil;
 - 2. Geocomposite drainage layer;
 - 3. PE textured geomembrane; and
 - 4. Intermediate cover soils.
- B. The Contractor shall be responsible to provide a bucket of representative soil to the Owner/Engineer 21 days prior to using the material and will provide assistance in obtaining geosynthetics samples from on-site stockpiles. The Engineer shall perform the test.

1.02 APPLICABLE SECTIONS

- A. Section 02200 – Earthwork
- B. Section 02240 – Cap Protective Soil Layer
- C. Section 02740 – Geocomposite
- D. Section 02770 – Geomembrane

1.03 QUALITY CONTROL

- A. The Materials Testing Laboratory performing the interface friction angle conformance testing shall be accredited by the Geosynthetics Accreditation Institute.

- B. The Materials Testing Laboratory shall perform the required interface friction angle testing in accordance with the American Society for Testing and Materials (ASTM) method D 5321.
- C. The Materials Testing Laboratory shall provide test results to the CQA Consultant within five (5) days of receipt of the test samples. Test results shall be in the form of figures that present shear force versus displacement and shear stress versus normal stress. Both peak strength and large displacement (i.e., residual) strength shall be plotted. The laboratory shall report any influences or conditions that may have affected the test results. The laboratory shall indicate the correlation coefficient of the best-fit lines drawn through the strength data and the resulting peak strength and residual strength values for adhesion and friction angle.

1.04 REFERENCES

- A. Latest version of American Society of Testing and Materials (ASTM) standards.
 - 1. ASTM D 5321 - Standard Test Method for Determining the Coefficient of Soil and Geosynthetic Friction by the Direct Shear Method.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Materials to be tested shall be obtained from materials that will be used during construction.
- B. Sample size shall be determined by the Materials Testing Laboratory requirements.
- C. Soil components used in the laboratory testing program shall be obtained from the borrow source or from soil stockpiles to be utilized in the construction of the soil components of the landfill.
- D. Additional tests may be required at the discretion of the CQA Consultant.

2.02 TESTING CONDITIONS

- A. The following testing conditions shall be utilized for the “sandwich” interface friction testing.
 - 1. Use twelve (12) inch by twelve (12) inch square direct shear apparatus as defined by ASTM D 5321;
 - 2. Use site-specific soils and materials;

3. Test all geosynthetics in the direction parallel to the length of the roll (i.e., machine direction);
4. Orient surface texturing of the PE textured geomembrane so that machine direction is oriented parallel to the direction of movement of the testing apparatus;
5. Soil components shall be remolded and compacted into the testing apparatus at the minimum dry density and maximum moisture content permitted by the relevant Specification Sections;
6. The composite configuration, normal pressures, and strain rate for the “sandwich” test shall be as indicated below:

System Analyzed	Composite Configuration (Sandwich Test)	Normal Stresses (psf)	Displacement Rate (inch/min)
Final Cover System	Cap Protective Layer Geocomposite Geomembrane Intermediate Cover	100 300 500	0.04

7. Test results will be used to develop a failure envelope;
8. The interface between the geocomposite drainage layer and the geomembrane will be wetted before initiating the shear deformation; and
9. All tests shall be run out to a minimum of three (3) inches of horizontal displacement. The large displacement (residual) strengths shall be defined as the strength occurring at the point that shear stress levels off to a constant value or the shear stress at three (3) inches of horizontal displacement, whichever occurs first.

PART 3 - EXECUTION

3.01 INTERFACE STRENGTH REQUIREMENTS

- A. The peak interface shear strength envelope for the “sandwich” shall equal or exceed an envelope characterized by an effective friction angle of 25.6° assuming no adhesion when measured in accordance with the ASTM D 5321.

3.02 REVIEW OF TEST RESULTS

- A. The CQA Consultant shall review all test reports to determine if the test results meet the minimum requirements stated above.

3.03 RETESTING

- A. The Contractor, Geosynthetics Subcontractor or the Manufacturer may elect to retest failed tests. Testing may be done at the same laboratory or another independent laboratory. The CQA Consultant shall approve the testing laboratory and the testing conditions shall be in accordance with ASTM D 5321 and this Section. Retesting shall be done at the Contractor's or Manufacturer's expense. Retest results shall also be reviewed by the CQA Consultant

[END OF SECTION]

SECTION 02920

VEGETATIVE SOIL LAYER

PART 1 GENERAL

1.01 SCOPE

- A. This section includes vegetative soil layer material and placement.

1.02 RELATED SECTIONS AND PLANS

- A. Section 02200 - Earthwork
- B. Section 02930 - Vegetation
- C. Construction Quality Assurance (CQA) Plan

1.03 REFERENCES

- A. Latest version of American Society of Testing and Materials (ASTM) standards and other standards noted in this specification.
 - 1. ASTM D 422 - Standard Test Method for Particle-Size Analysis of Soils
 - 2. ASTM D 2434 - Standard Test Method for Permeability of Granular Soils (Constant Head)
 - 3. ASTM D 2487 - Standard Test Method for Classification of Soils for Engineering Purposes.
 - 4. ASTM D 2974 - Standard Test Methods for Moisture, Ash, Organic Matter of Peat and Other Organic Soils.
 - 5. ASTM D 4972 - Standard Test Method for pH of Soils.

1.04 SUBMITTALS

- A. For each on-site/off-site vegetative soil layer source, submit the following to the Engineer for review and approval within 30 calendar days from Notice to Proceed:
 - 1. the source of the vegetative soil layer;

2. test results conducted on samples from borrow stockpile in accordance with ASTM D 422, ASTM D 2487, ASTM D 2974, and ASTM D 4972; and
3. a 50-pound representative sample of the vegetative soil layer.

1.05 CONSTRUCTION QUALITY ASSURANCE

- A. The placement of the vegetative soil layer will be monitored by the CQA Consultant, as required by the CQA Plan
- B. CQA Consultant will perform soil conformance testing on the vegetative soil layer material to establish compliance with this section. Conformance testing to be performed and testing frequencies are given in the CQA Plan.
- C. The Contractor shall be aware of the activities required of the CQA Consultant by the CQA Plan and shall account for those activities in the construction schedule.
- D. The Contractor shall correct all deficiencies and nonconformances identified by the CQA Consultant and shall do so at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Obtain vegetative soil layer material from on-site/off-site borrow sources. The CQA Consultant will perform conformance testing on material submitted under this section.
- B. Furnish vegetative soil layer material meeting the following material requirements.
 1. Material shall be a loamy soil, classified as ML, SC, or SM (per ASTM D 2487), and be loose and friable. For vegetative soil layer to be considered loamy, that fraction passing the U.S. Standard No. 10 sieve shall contain not more than 40 percent clay-sized fraction, as determined in accordance with ASTM D 422.
 2. Vegetative soil layer shall be free of deleterious materials.
 3. Vegetative soil layer shall contain not less than 5 percent nor more than 20 percent organic matter as determined by loss on ignition of samples oven dried to constant weight (per ASTM D 2974, Method A for moisture content determination and Method C for ash content determination). The vegetative soil layer may be amended as approved in writing by the Engineer if the organic content is less than 5 percent.
 4. The pH of the vegetative soil layer material shall not be less than 5.5 and not more than 7 (per ASTM D 4972).

- C. Based on tests performed, the Engineer shall identify the vegetative soil layer as acceptable, acceptable with certain fertilizers and limestone applications, or unacceptable. If the vegetative soil layer is found acceptable, but requiring lime or fertilizer, the fertilizer and lime requirements will be met as specified in Section 02930 or as recommended by the Engineer. If the vegetative soil layer material is found unacceptable, the Contractor shall be responsible for identifying another source of vegetative soil layer material and shall incur all expenses associated with testing additional samples. All vegetative soil layer material incorporated into the site work shall match the sample provided to the Engineer for testing.
- D. Obtain water for moisture conditioning vegetative soil layer from the on-site water source as directed by the Engineer.

2.02 EQUIPMENT

- A. Furnish, operate, and maintain equipment necessary to transport, place, and prepare vegetative soil layer material.

PART 3 EXECUTION

3.01 PLACEMENT

- A. Do not commence placement of vegetative soil layer material until CQA Consultant completes conformance evaluation of vegetative soil layer material and performance testing of previous work, including evaluation of the Contractor's survey results of previous work.
- B. Prior to spreading the vegetative soil layer, scarify or otherwise loosen the top surface of the existing soil layer to a minimum depth of 1 inch. Scarify using a disc harrow, rake, dozer, or other suitable means.
- C. Construct vegetative soil layer to the thickness, elevations, and limits indicated on the Construction Drawings. Round breaks between slopes.
- D. Place vegetative soil layer materials over approved areas, spread, and track lightly so that the equipment grouser marks are perpendicular to the direction of flow.
- E. Place and spread vegetative soil layer material to a depth sufficiently greater than required so that after light tracking and natural settlement, the completed work will conform to the thickness requirement indicated on the Construction Drawings.

- F. Do not spread vegetative soil layer material in water. If soil or weather conditions are unsuitable, as determined by the Engineer, cease placing vegetative soil layer until permission to resume vegetative soil layer operations is obtained from the Engineer.
- G. After vegetative soil layer has been placed and spread, remove stiff clods, lumps, roots, litter, and other foreign material. Remove stiff clods larger than 3 inches in diameter or reduce in size by raking, discing, or other processing.
- H. Within 72 hours of the completion of the placement of vegetative soil layer in an area, vegetate the area in accordance with Section 02930.
- I. Repair any erosion or washout of the vegetative soil layer prior to final acceptance of vegetation.

3.02 SURVEY CONTROL

- A. Survey the limits and elevations of the top surface of the vegetative soil layer in accordance with Section 02100.

3.03 TOLERANCE

- A. Construct the vegetative soil layer to within +0.1 feet of the thickness shown on the Construction Drawings.
- B. Construct the vegetative soil layer to within +0.5 feet of the elevations indicated on the Construction Drawings.

[END OF SECTION]

SECTION 02930

VEGETATION

PART 1 GENERAL

1.01 SCOPE

- A. This section includes the requirements for sodding, seeding, liming, fertilizing, and maintaining vegetation until established and accepted. Areas to be vegetated with sod include areas of the closure construction. Areas to be vegetated with seed are as noted on the Construction Drawings and any other areas as directed by the Engineer.

1.02 RELATED SECTIONS AND PLANS

- A. Section 02100 - Surveying
- B. Section 02200 - Earthwork
- C. Section 02920 - Vegetative Soil Layer
- D. Construction Quality Assurance (CQA) Plan

1.03 REFERENCES

- A. Standard Specifications for Road and Bridge Construction, Florida Department of Transportation, 2007 Edition (FDOT Specifications).

1.04 SUBMITTALS

- A. Submit the following to the Engineer not less than 30 calendar days prior to use for review:
 - 1. proposed type and source of sod and seed; and
 - 2. manufacturer's product data for commercial fertilizer and lime and the recommended methods of application.
- B. Submit a plan for handling and storage of materials to prevent damage by moisture, heat, or exposure. Include all recommendations of manufacturers and suppliers.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Sod shall be live, thriving, and meet the requirements of Florida Department of Agriculture and Consumer Services.
- B. Seeds shall be live seed and meet the requirements of Florida Department of Agriculture and Consumer Services.
- C. The seeds should have been harvested from the previous year's crop.
- D. All seed bags shall have a label attached stating the date of harvest, LOT number, percent purity, percent germination, noxious weed certification, and date of test
- E. Use fertilizer that is dry or liquid commercial grade fertilizer uniform in composition that meets the requirements of all State and Federal regulations and standards of the Association of Agricultural Chemists. Deliver fertilizer to the site in original, properly labeled, unopened, clean, containers each showing the manufacturer's guaranteed analysis conforming to applicable fertilizer regulations and standards. Use fertilizer that is 16-4-8 or as modified by the Engineer based on testing of the topsoil by the Contractor. Apply fertilizer to all sodded areas.
- F. Use lime that is agricultural ground limestone with a minimum total neutralizing power of 90 percent. The lime shall have a gradation of at least 40 percent passing the U.S. Standard Number 100 sieve, and at 95 percent passing the U.S. Standard Number 8 sieve.

PART 3 EXECUTION

3.01 PLANTING AND APPLICATION OF FERTILIZER

- A. Do not commence vegetation until the Engineer reviews the results of soil analyses.
- B. Notify the Engineer 24 hours prior to laying sod, seeding, or fertilizing.
- C. The seed and fertilizer shall be placed by hydro seeding, or other method approved by the Engineer.
- D. The underlying soil layer should be graded to the lines and limits as indicated on the Construction Drawings. The soil layer surface shall be scarified and damp immediately prior to the seed or sod placement.

- E. Repair all gullies, washes, or disturbed areas that develop subsequent to final dressing of the prepared surface.
- F. Seeded areas shall be watered after germination as necessary until the vegetation is well established.
- G. Apply fertilizer and lime to all vegetated areas unless otherwise indicated by the Engineer.
- H. Apply fertilizer and lime at the specified rates. If not applied hydraulically, thoroughly rake the fertilizer and lime into the prepared surface to a minimum depth of 2 inches.
- I. Application rates:
 - 1. Application rates for seeding shall be according to manufacture/supplier recommendations or as directed by the Engineer.
 - 2. Application rates for fertilizer and lime in this section may be adjusted after the results of the site soil test results performed by the Contractor are available.
 - 3. Base contract price on application rates for fertilizer and lime specified in this section. Contract price will be adjusted for any variations either decreasing or increasing the application rates.
- J. For areas to be covered with seed or sod:
 - 1. Apply fertilizer at a uniform rate of 1,200 pounds per acre or as otherwise directed by the Engineer.
 - 2. Apply agricultural lime at a rate of two tons per acre or as otherwise directed by the Engineer

3.03 MAINTENANCE

- A. Maintain seeded and sodded areas immediately after placement until vegetation is well established and exhibits a vigorous growing condition.
- B. The Contractor shall supply and apply supplemental irrigation for the maintenance period following the placement of the seed or sod. All seeded and sodded areas should receive a minimum of 1½ in. of water per week either by precipitation or supplemental irrigation.
- C. Maintain the seeded and sodded areas in satisfactory condition. Maintenance of the seeded and sodded areas includes repairing eroded areas, revegetating, watering, and mowing (if applicable). A satisfactory condition of a seeded or sodded area is defined as a 10,000 square feet section of turf that has no bare spots larger than three square feet.
- D. The inspection will be performed by the Engineer, who will determine whether repair of sodded areas or revegetation is required.

3.04 ACCEPTANCE

- A. The vegetated areas shall be accepted at the end of the warranty period if a satisfactory condition as defined in this Section exists.

3.05 WARRANTY PERIOD

- A. Vegetated areas shall be subject to a warranty period of not less than 60 days from the issuance of the Engineer's final completion notice to the Contractor for the Contract over 100 percent of the areas seeded and sodded.
- B. At the end of the warranty period, the Engineer will perform an inspection upon written request by the Contractor. Vegetated areas not demonstrating satisfactory condition of vegetation as outlined above, shall be repaired, resodded, and maintained to meet all requirements as specified herein at the Contractor's expense. All unaccepted areas requiring repair, replacement of sod and/or reseeding shall be subject to a 60 day warranty period commencing at the completion of the reworking.
- C. After all necessary corrective work has been completed, the Engineer will certify in writing the final acceptance of the vegetated areas.

[END OF SECTION]

APPENDIX D

Partial Closure Cost Estimate

Table D-1

**CLOSURE COST ESTIMATE FOR PARTIAL CLOSURE (EVENT 2)
JED SOLID WASTE MANAGEMENT FACILITY**

		Partial Closure of Phase I			
Item #	Work Description	Units	Quantity	Unit Cost ⁽¹⁾	Total
Area of Closure:		acres 18.40			
1	Proposed Monitoring Wells	each	N/A	N/A	N/A
2	Slope and Fill (intermediate layer)	cyd	29,700	\$3.06	\$90,882
3	Cover Material (Barrier Layer)				\$643,798
	Cover Protective Soil	cyd	44,500	\$3.53	\$157,085
	Synthetics - 40-mil	sq. ft.	800,100	\$0.30	\$240,030
	Synthetics - geocomposite	sq. ft.	609,100	\$0.38	\$231,458
	Liner Tie-in	lf	2,900	\$5.25	\$15,225
4	Vegetative Soil Cover	cyd	14,900	\$3.49	\$52,001
5	Vegetative Layer (sodding)	sq. yd.	88,900	\$1.50	\$133,350
6	Stormwater Control System				\$152,694
	18"- Corrugated HDPE Pipe	lf	3,045.00	\$21.03	\$64,036
	4"- Corrugated HDPE Pipe	lf	5,100.00	\$1.82	\$9,282
	4"- Corrugated HDPE Pipe w rap	lf	5,100.00	\$12.30	\$62,730
	Control Structures	each	14	\$1,189.00	\$16,646
7	Gas Controls: Active				\$8,464
		each 8" boot	16	\$277.00	\$4,432
		each 6" boot	16	\$252.00	\$4,032
8	Engineering		1.00	\$22,000.00	\$22,000
9	Professional Services				\$140,319
	Contract Management		\$ 1,103,189.35	3%	\$33,096
	Quality Assurance (labor)		\$ 1,103,189.35	7%	\$77,223
	Quality Assurance (mat'l testing)	lump sum			\$30,000
Subtotal of Items 1-9 Above:					\$1,243,508
10	Contingency (10% of Total)				\$124,350.8
TOTAL CLOSURE COST:					\$1,367,859

Note:

(1) The unit costs above are based on the average of bid prices for the 2009 Phase I Partial Closure Event