



An employee-owned company

August 10, 2001

Mr. Robert J. Butera, P.E.
Solid Waste Manager
Southwest District
Florida Department of Environmental Protection
3804 Coconut Palm Drive
Tampa, Florida 33619-8318

RECEIVED
AUG 20 2001

Department of Environmental Protection
SOUTHWEST DISTRICT
BY _____

**RE: Manatee County Solid Waste Management Facility
Lena Road Landfill
Permits #39884-001-SO and #39884-004-SF
Application for Minor Modification**

Dear Mr. Butera:

On behalf of Manatee County, PBS&J is submitting this application for a minor modification to the permit for the Lena Road Landfill. Manatee County proposes to pump the leachate directly to a storage tank at the adjacent WWTP. This eliminates the need for the leachate storage pond. It is proposed to extend the leachate collection system around the leachate pond, and incorporate the area into the Class I landfill for waste disposal. In addition, this application includes an extension of the leachate collection system along the eastside of the Stage III landfill. The purpose is to lower the water table in Stage III, and prevent leachate from entering the storm water ditch.

This application is for construction. Per your December 4, 2000 letter, a second application will be submitted for a minor modification to the operation permit and a third application for a minor modification to the closure permit. It is our understanding that the construction can be approved prior to submittal of the applications for modifications to the operation permit and closure permit.

Documentation of the storage capacity of the WWTP demonstrating sufficient capacity to accept peak leachate flows is being prepared and will be submitted shortly.

Enclosed are six copies of the application, engineering report and drawings. Also enclosed is a \$1000 check for the application fee.

Sincerely,

C.P. "Pete" Putman, P.E.
Senior Program Manager

C: Gus Difonzo, Manatee County Solid Waste Manager

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Florida Department of Environmental Protection
Twin Towers Office Bldg. 2600 Blair Stone Road Tallahassee, FL 32399-2400

DEP Form # 62-101.900(1)
Form Title Solid Waste Management Facility Permit
Effective Date May 19, 1994

DEP Application No.

(Filled by DEP)

SECTION

1

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

SOLID WASTE MANAGEMENT FACILITY PERMIT

APPLICATION INSTRUCTIONS AND FORMS

INSTRUCTIONS TO APPLY FOR A SOLID WASTE MANAGEMENT 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 six copies of the application shall be submitted to the Department District Office having jurisdiction over the facility. The appropriate fee in accordance with Chapter 62-4, FAC, and Rule 62-701.320(5)(c), FAC, shall be submitted with the application by check made payable to the Department of Environmental Regulation (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,B, D through R, and T
- B. Asbestos Monofills - Submit parts A,B,D,E,F,I,K, M through Q, and T
- C. Industrial Solid Waste Facilities - Submit parts A,B, D through Q, and T
- D. Volume Reduction Facilities - Submit parts A,C,D,S, and T
- E. Materials Recovery Facilities - Submit parts A,C,D,S, and T

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,C,D, and E 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, N through R, and T
- B. Asbestos Monofills - Submit parts A,B, M through Q, and T
- C. Industrial Solid Waste Facilities - Submit parts A,B, N through Q, and T
- D. Volume Reduction Facilities - Submit parts A,C,S, and T
- E. Materials Recovery Facilities - Submit parts A,C,S, and T

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-	MATERIALS RECOVERY / VOLUME REDUCTION FACILITY GENERAL INFORMATION
PART D-	SOLID WASTE MANAGEMENT FACILITY PERMIT GENERAL REQUIREMENTS
PART E-	LANDFILL PERMIT GENERAL 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-	LANDFILL CLOSURE REQUIREMENTS
PART O-	CLOSURE PROCEDURES
PART P-	LONG TERM CARE REQUIREMENTS
PART Q-	FINANCIAL RESPONSIBILITY REQUIREMENTS
PART R-	CLOSURE OF EXISTING LANDFILL REQUIREMENTS
PART S-	MATERIALS RECOVERY FACILITY REQUIREMENTS
PART T-	CERTIFICATION BY APPLICANT AND ENGINEER OR PUBLIC OFFICER

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

Please Type or Print

A. GENERAL INFORMATION

1. Type of facility:

Disposal ☒

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

Volume Reduction ☐

Incinerator	<input type="checkbox"/>	Pulverizer / Shredder	<input type="checkbox"/>
Composting	<input type="checkbox"/>	Compactor/Baling Plant	<input type="checkbox"/>
Materials Recovery	<input type="checkbox"/>	Energy Recovery	<input type="checkbox"/>
Other	<input type="checkbox"/>		

2. Type of application:

Construction	<input checked="" type="checkbox"/>	Construction/Operation	<input type="checkbox"/>
Operation	<input type="checkbox"/>	Closure	<input type="checkbox"/>

3. Classification of application:

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

4. Facility name: Manatee County Solid Waste Management Facility - Lena Road Landfill

5. DEP ID number: 4041C02025 County: Manatee

6. Facility location (main entrance): 3333 Lena Road, Bradenton, FL. 34202

7. Location coordinates:

Section: 1,6 & 31 Township: 34S Range: 19E

UTMs: Zone _____ km E _____ km N

Latitude: 27 ° 28 ' 00 " Longitude: 82 ° 27 ' 00 "

8. Applicant name (operating authority): Manatee County

Mailing address: 1026 26th Avenue East Bradenton, FL 34210
Street or P.O. Box City State Zip

Contact person: Gus A. DiFonzo Telephone: (941) 795-3428

Title: Solid Waste Manager

9. Authorized agent/Consultant: PBS&J
Mailing address: 330 S. Pineapple Ave. Sarasota, FL 34236
Street or P.O. Box City State Zip
Contact person: C. P. "Pete" Putman Telephone: (941) 954-4036
Title: Senior Program Manager
10. Landowner(if different than applicant):
Mailing address: _____
Street or P.O. Box City State Zip
Contact person: _____ Telephone: (____)
11. Cities, towns and areas to be served: Manatee County
12. Population to be served:
Current: 250,000 Five-Year Projection: 290,000
13. Volume of solid waste to be received: 1,500 yds³/day tons/day gallons/day
14. Date site will be ready to be inspected for completion: Dec. 28, 2001
15. Estimated life of facility: 25 years
16. Estimated costs:
Total Construction: \$ 300,000 Closing Costs: \$ N / A
17. Anticipated construction starting and completion dates:
From: 10/8/01 To: 12/28/01

B. DISPOSAL FACILITY GENERAL INFORMATION

1. Provide brief description of disposal facility design and operations planned by this application:

This application is for a minor modification to the construction permit.

The leachate will be pumped directly to a storage tank at the adjacent WWTP. This eliminates the need for the existing leachate storage pond. The leachate collection system will be extended around the leachate storage pond, and the pond converted for disposal of Class I waste. A leachate collection pipe will be added to the eastside of the Stage III landfill to lower the water table.

2. Facility site supervisor: Mike Gore

Title: Superintendent Landfill Division Telephone: (941) 748-5543

3. Disposal area: Total 320 acres; Used 135 acres; Available 185 acres

4. Weighing scales used: Yes ☒ No ☐

5. Security to prevent unauthorized use: Yes ☒ No ☐

6. Charge for waste received: _____ \$/yds³ 23 \$/ton for MSW & 45 \$/ton for C&D

7. Surrounding land use, zoning:

Residential	<input type="checkbox"/>	Industrial	<input type="checkbox"/>
Agricultural	<input checked="" type="checkbox"/>	None	<input type="checkbox"/>
Commercial	<input type="checkbox"/>	Other	<input type="checkbox"/>

8. Types of waste received:

Residential	<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 biohazardous	<input type="checkbox"/>	Septic tank	<input type="checkbox"/>
Water treatment sludge	<input checked="" type="checkbox"/>	Industrial	<input checked="" type="checkbox"/>
Air treatment sludge	<input type="checkbox"/>	Industrial sludge	<input type="checkbox"/>
Agricultural	<input checked="" type="checkbox"/>	Domestic sludge	<input checked="" type="checkbox"/>
Asbestos	<input checked="" type="checkbox"/>		
Other	<input type="checkbox"/>		

9. Salvaging permitted: Yes ☐ No ☒

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

11. Spotters: Yes ☒ No ☐ Number of spotters used: ONE

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

13. Property recorded as a Disposal Site in County Land Records: Yes ☒ No ☐

14. Days of operation: Monday through Saturday

15. Hours of operation: 8 am to 5 pm

16. Days Working Face covered: Daily

17. Elevation of water table: 31 average Ft. NGVD
18. Number of monitoring wells: Twenty-seven
19. Number of surface monitoring points: Two
20. Gas controls used: Yes ☒ No ☐ Type controls: Active ☒ Passive ☐
 Gas flaring: Yes ☒ No ☐ Gas recovery: Yes ☐ No ☒
21. Landfill Unit - liner type:
- | | | | |
|--------------------|-------------------------------------|-------------------------|--------------------------|
| Natural soils | <input type="checkbox"/> | Double geomembrane | <input type="checkbox"/> |
| Single clay liner | <input type="checkbox"/> | Geomembrane & composite | <input type="checkbox"/> |
| Single geomembrane | <input type="checkbox"/> | Double composite | <input type="checkbox"/> |
| Single composite | <input type="checkbox"/> | None | <input type="checkbox"/> |
| Slurry wall | <input checked="" type="checkbox"/> | | |
| Other | <input type="checkbox"/> | | |
22. Leachate collection method:
- | | | | |
|------------------|-------------------------------------|--------------------|-------------------------------------|
| Collection pipes | <input checked="" type="checkbox"/> | Sand layer | <input type="checkbox"/> |
| Geonets | <input type="checkbox"/> | Gravel layer | <input type="checkbox"/> |
| Well points | <input type="checkbox"/> | Interceptor trench | <input checked="" type="checkbox"/> |
| Perimeter ditch | <input type="checkbox"/> | None | <input type="checkbox"/> |
| Other | <input type="checkbox"/> | | |
23. Leachate storage method:
- | | | | |
|-------|--------------------------|--|--------------------------|
| Tanks | <input type="checkbox"/> | Surface impoundments | <input type="checkbox"/> |
| Other | <input type="checkbox"/> | Modification will eliminate pond. | |
| | | Leachate will be pumped to tank at WWTP. | |
24. Leachate treatment method:
- | | | | |
|-----------|--------------------------|--------------------|-------------------------------------|
| Oxidation | <input type="checkbox"/> | Chemical treatment | <input type="checkbox"/> |
| Secondary | <input type="checkbox"/> | Settling | <input type="checkbox"/> |
| Advanced | <input type="checkbox"/> | None | <input checked="" type="checkbox"/> |
| Other | <input type="checkbox"/> | | |
25. Leachate disposal method:
- | | | | |
|---------------------|--------------------------|-----------------------------|-------------------------------------|
| Recirculated | <input type="checkbox"/> | Pumped to WWTP | <input checked="" type="checkbox"/> |
| Transported to WWTP | <input type="checkbox"/> | Discharged to surface water | <input type="checkbox"/> |
| Injection well | <input type="checkbox"/> | Evaporation (ie: Perc Pond) | <input type="checkbox"/> |
| Other | <input type="checkbox"/> | | |
26. For leachate discharged to surface waters:
- Name and Class of receiving water: N / A
27. Storm Water:
- Collected: Yes ☒ No ☐ Type of treatment: Swales and retention ponds
- Name and Class of receiving water: Cypress Strand Creek
28. Management and Storage of Surface Waters (MSSW) Permit number or status:
- SWFWMD Permit No. 403143.001/CT68530 (Operation Phase since 1992)

C. MATERIALS RECOVERY / VOLUME REDUCTION FACILITY GENERAL INFORMATION - N/A

1. Provide brief description of materials recovery / volume reduction facility design and operations planned by this application:

2. Facility site supervisor:

Title: _____ Telephone: (____) _____

3. Disposal area: Total _____ acres; Used _____ acres; Available _____ acres

4. Security to prevent unauthorized use: Yes ☐ No ☐

5. Site located in: Floodplain ☐ Wetlands ☐ Other ☐

6. Days of operation:

7. Hours of operation:

8. Number of operating staff:

9. Expected useful life: _____ Years

10. Weighing scales used: Yes ☐ No ☐

11. Normal processing rate: _____ yd³/day _____ tons/day _____ gal/day

12. Maximum processing rate: _____ yd³/day _____ tons/day _____ gal/day

13. Charge for waste received:

14. Type of facility (check one or more):

Incinerator	<input type="checkbox"/>	Composting	<input type="checkbox"/>
Pulverizer / shredder	<input type="checkbox"/>	Materials recovery	<input type="checkbox"/>
Compactor/baling	<input type="checkbox"/>	Energy recovery	<input type="checkbox"/>
Sludge concentration	<input type="checkbox"/>	Pyrolysis	<input type="checkbox"/>
Other	<input type="checkbox"/>		

15. Material recovered, tons/week:

_____ Paper	_____ Glass
_____ Ferrous metals	_____ Non-ferrous metals
_____ Aluminum	_____ Plastics
_____ Other:	

16. Energy recovery, in units shown:

_____ High pressure steam, lb/hr	_____ Chilled water, gal/hr
_____ Low pressure steam, lb/hr	_____ Oil, gal/hr
_____ Electricity, kw/hr	_____ Oil, BTU/hr
_____ Gas, ft ³ /hr	_____ Gas, BTU/hr
_____ Other:	

17. Process water management:

Recycled: Yes ☐ No ☐

Treatment method used:

Discharged to: Surface waters ☐ Underground ☐ Other ☐

Name and Class of receiving water:

18. Storm Water:

Collected: Yes ☐ No ☐ Type of treatment:

Name and Class of receiving water:

19. MSSW Permit number or status:

20. Final residue produced:

_____ % of normal processing rate

_____ % of maximum processing rate

Disposed of at (Site name):

21. Supplemental fuel used:

Type: _____ Quantity used/hour:

22. Costs:

Estimated operating costs (material-energy revenue): \$

Total cost/ton: \$ _____ Net cost/ton: \$

23. State pollution control bond financing amount: \$

24. Estimated amount of tax exemptions that will be requested: \$

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

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
<u>X</u>	<u>Section 1</u>	—	—	1. Six copies, at minimum, of the completed application form, all supporting data and reports; (62-701.320(5) (a), FAC)
<u>X</u>	<u>Section 1</u>	—	—	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)
<u>X</u>	<u>First page</u>	—	—	3. A letter of transmittal to the Department; (62-701.320(7) (a), FAC)
<u>X</u>	<u>Section 1</u>	—	—	4. A completed application form dated and signed by the applicant; (62-701.320(7) (b), FAC)
<u>X</u>	<u>Enclosed</u>	—	—	5. Permit fee specified in Rule 62-4.050, FAC and Rule 62-701.320(5) (c), FAC in check or money order, payable to the Department; (62-701.320(7) (c), FAC)
<u>X</u>	<u>Section 2</u>	—	—	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)
—	—	<u>X</u>	—	7. Operation Plan; (62-701.320(7) (e) 1, FAC)
—	—	<u>X</u>	—	8. Contingency Plan; (62-701.320(7) (e) 2, FAC)
—	—	—	—	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) showing; (62-702.320(7) (f), FAC)
—	—	<u>X</u>	—	a. A regional map or plan with the project location;
—	—	<u>X</u>	—	b. A vicinity map or aerial photograph no more than 1 year old;
—	—	<u>X</u>	—	c. A site plan showing all property boundaries certified by a registered Florida land surveyor;
<u>x</u>	<u>Section 2</u>	—	—	d. Other necessary details to support the engineering report.
—	—	<u>X</u>	—	10. Proof of property ownership or a copy of appropriate agreements between the facility operator and property owner authorizing use of property; (62-701.320(7) (g), FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>
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—	—	<u>X</u>	—
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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 recycling goals contained in Section 403.706,FS; (62-701.320(7)(h),FAC)

—	—	<u>X</u>	—
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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)

—	—	<u>X</u>	—
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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)

—	—	<u>X</u>	—
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14. Provide a description of how the requirements for airport safety will be achieved including proof of required notices if applicable; (62-701.320(12),FAC)

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

S	LOCATION	N/A	N/C	
—	—	X	—	1. Vicinity map or aerial photograph no more than 1 year old and of appropriate scale showing land use and local zoning within one mile of the landfill and of sufficient scale to show all homes or other structures, water bodies, and roads other significant features of the vicinity. All significant features shall be labeled; (62-701.330(4)(a), FAC)
—	—	X	—	2. Vicinity map or aerial photograph no more than 1 year old showing all airports that are located within five miles of the proposed landfill; (62-701.330(4)(b), FAC)
—	—	—	—	3. Plot plan with a scale not greater than 200 feet to the inch showing; (62-701.330(4)(c), FAC)
—	—	X	—	a. Dimensions;
—	—	X	—	b. Locations of proposed and existing water quality monitoring wells;
—	—	X	—	c. Locations of soil borings;
X	Section 2	—	—	d. Proposed plan of trenching or disposal areas;
—	—	X	—	e. Cross sections showing original elevations and proposed final contours which shall be included either on the plot plan or on separate sheets;
—	—	X	—	f. Any previously filled waste disposal areas;
—	—	X	—	g. Fencing or other measures to restrict access.
—	—	—	—	4. Topographic maps with a scale not greater than 200 feet to the inch with 5-foot contour intervals showing; (62-701.330(4)(d), FAC):
—	—	X	—	a. Proposed fill areas;
—	—	X	—	b. Borrow areas;
—	—	X	—	c. Access roads;
—	—	X	—	d. Grades required for proper drainage;
—	—	X	—	e. Cross sections of lifts;
—	—	X	—	f. Special drainage devices if necessary;
—	—	X	—	g. Fencing;
—	—	X	—	h. Equipment facilities.

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>
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5. A report on the landfill describing the following;
(62-701.330(4)(e),FAC)

_____	_____	<u>X</u>	_____
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a. The current and projected population and area to be served by the proposed site;

_____	_____	<u>X</u>	_____
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b. The anticipated type, annual quantity, and source of solid waste, expressed in tons;

_____	_____	<u>X</u>	_____
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c. The anticipated facility life;

_____	_____	<u>X</u>	_____
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d. The source and type of cover material used for the landfill.

_____	_____	<u>X</u>	_____
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6. Provide evidence that an approved laboratory shall conduct water quality monitoring for the facility in accordance with Rule 62-160,FAC; (62-701.330(4)(h),FAC)

_____	_____	<u>X</u>	_____
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7. Provide a statement of how the applicant will demonstrate financial responsibility for the closing and long-term care of the landfill; (62-701.330(4)(i),FAC)

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

_____	_____	<u>X</u>	_____
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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 is a washout of solid waste; (62-701.340(4)(b),FAC)

_____	_____	<u>X</u>	_____
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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(4)(c),FAC)

_____	_____	<u>X</u>	_____
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3. Describe what methods shall be taken to screen the landfill from public view where such screening can practically be provided; (62-701.340(4)(d),FAC)

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

S	LOCATION	N/A	N/C
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—	—	X	—
---	---	---	---

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; (62-701.400(2), FAC)

2. Landfill liner requirements; (62-701.400(3), FAC)

a. General construction requirements; (62-701.400(3)(a), FAC):

—	—	X	—
---	---	---	---

(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;

—	—	X	—
---	---	---	---

(2) Document foundation is adequate to prevent liner failure;

—	—	X	—
---	---	---	---

(3) Constructed so bottom liner will not be adversely impacted by fluctuations of the ground water;

—	—	X	—
---	---	---	---

(4) Designed to resist hydrostatic uplift if bottom liner located below seasonal high ground water table;

—	—	X	—
---	---	---	---

(5) Installed to cover all surrounding earth which could come into contact with the waste or leachate.

b. Composite liners; (62-701.400(3)(b), FAC)

—	—	X	—
---	---	---	---

(1) Upper geomembrane thickness and properties;

—	—	X	—
---	---	---	---

(2) Design leachate head for primary LCRS including leachate recirculation if appropriate;

—	—	X	—
---	---	---	---

(3) Design thickness in accordance with Table A and number of lifts planned for lower soil component.

c. Double liners; (62-701.400(3)(c), FAC)

—	—	X	—
---	---	---	---

(1) Upper and lower geomembrane thicknesses and properties;

—	—	X	—
---	---	---	---

(2) Design leachate head for primary LCRS to limit the head to one foot above the liner;

—	—	X	—
---	---	---	---

(3) Lower geomembrane sub-base design;

S	LOCATION	N/A	N/C
---	----------	-----	-----

		X	
--	--	---	--

- (4) Leak detection and secondary leachate collection system minimum design criteria ($k \geq 1$ cm/sec, head on lower liner ≤ 1 inch, head not to exceed thickness of drainage layer);

d. Standards for geomembranes; (62-701.400(3)(d), FAC)

		X	
--	--	---	--

- (1) Field seam test methods to ensure all field seams are at least 90 percent of the yield strength for the lining material;

		X	
--	--	---	--

- (2) Design of 24-inch-thick protective layer above upper geomembrane liner;

		X	
--	--	---	--

- (3) Describe operational plans to protect the liner and leachate collection system when placing the first layer of waste above 24-inch-thick protective layer.

e. Geosynthetic specification requirements; (62-701.400(3)(e), FAC)

		X	
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- (1) Definition and qualifications of the designer, manufacturer, installer, QA consultant and laboratory, and QA program;

		X	
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- (2) Material specifications for geomembranes, geotextiles, geogrids, and geonets;

		X	
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- (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;

		X	
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- (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;

		X	
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- (5) Geotextile and geogrid specifications including handling and placement, conformance testing, seams and overlaps, repair, and placement of soil materials;

		X	
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- (6) Geonet specifications including handling and placement, conformance testing, stacking and joining, repair, and placement of soil materials;

S	LOCATION	N/A	N/C
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f. Standards for soil components (62-701.400(3)(f), FAC):

—	—	X	—
—	—	X	—
—	—	X	—
—	—	X	—
—	—	X	—
—	—	X	—
—	—	X	—
—	—	X	—
—	—	X	—
—	—	X	—

- (1) Description of construction procedures including overexcavation and backfilling to preclude structural inconsistencies and procedures for placing and compacting soil component in layers;
- (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;
- (3) Procedures for testing in-situ soils to demonstrate they meet the specifications for soil liners;
- (4) Specifications for soil component of liner including at a minimum:
 - (a) Allowable particle size distribution, Atterberg limits, shrinkage limit;
 - (b) Placement moisture and dry density criteria;
 - (c) Maximum laboratory-determined saturated hydraulic conductivity using simulated leachate;
 - (d) Minimum thickness of soil liner;
 - (e) Lift thickness;
 - (f) Surface preparation (scarification);
 - (g) Type and percentage of clay mineral within the soil component;
- (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.

3. Leachate collection and removal system (LCRS); (62-701.400(4), FAC)

a. The primary and secondary LCRS requirements; (62-701.400(4)(a), FAC)

X	Section 2	—	—
X	Section 2	—	—

- (1) Constructed of materials chemically resistant to the waste and leachate;
- (2) Have sufficient mechanical properties to prevent collapse under pressure;

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>
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<u>X</u>	<u>Section 2</u>	<u> </u>	<u> </u>
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(3) Have granular material or synthetic geotextile to prevent clogging;

<u>X</u>	<u>Section 2</u>	<u> </u>	<u> </u>
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(4) Have method for testing and cleaning clogged pipes or contingent designs for rerouting leachate around failed areas;

b. Primary LCRS requirements; (62-701.400(4)(b), FAC)

<u> </u>	<u> </u>	<u>X</u>	<u> </u>
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(1) Bottom 12 inches having hydraulic conductivity $\geq 1 \times 10^{-3}$ cm/sec;

<u> </u>	<u> </u>	<u>X</u>	<u> </u>
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(2) Total thickness of 24 inches of material chemically resistant to the waste and leachate;

<u> </u>	<u> </u>	<u>X</u>	<u> </u>
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(3) Bottom slope design to accomodate for predicted settlement;

<u> </u>	<u> </u>	<u>X</u>	<u> </u>
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(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.

4. Leachate recirculation; (62-701.400(5), FAC)

<u> </u>	<u> </u>	<u>X</u>	<u> </u>
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a. Describe general procedures for recirculating leachate;

<u> </u>	<u> </u>	<u>X</u>	<u> </u>
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b. Describe procedures for controlling leachate runoff and minimizing mixing of leachate runoff with storm water;

<u> </u>	<u> </u>	<u>X</u>	<u> </u>
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c. Describe procedures for preventing perched water conditions and gas buildup;

<u> </u>	<u> </u>	<u>X</u>	<u> </u>
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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;

<u> </u>	<u> </u>	<u>X</u>	<u> </u>
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e. Describe methods of gas management to control odors and migration of methane;

<u> </u>	<u> </u>	<u>X</u>	<u> </u>
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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.

S	LOCATION	N/A	N/C
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5. Leachate storage tanks and leachate surface impoundments; (62-701.400(6), FAC)

a. Surface impoundment requirements; (62-701.400(6)(b), FAC)

_____	_____	<u>X</u>	_____
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(1) Documentation that the design of the bottom liner will not be adversely impacted by fluctuations of the ground water;

_____	_____	<u>X</u>	_____
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(2) Designed in segments to allow for inspection and repair as needed without interruption of service;

(3) General design requirements;

_____	_____	<u>X</u>	_____
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(a) Double liner system consisting of an upper and lower 60-mil minimum thickness geomembrane;

_____	_____	<u>X</u>	_____
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(b) Leak detection and collection system with hydraulic conductivity ≥ 1 cm/sec;

_____	_____	<u>X</u>	_____
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(c) Lower geomembrane placed on subbase ≥ 6 inches thick with $k \leq 1 \times 10^{-5}$ cm/sec;

_____	_____	<u>X</u>	_____
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(d) Design calculation to predict potential leakage through the upper liner;

_____	_____	<u>X</u>	_____
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(e) Daily inspection requirements and notification and corrective action requirements if leakage rates exceed that predicted by design calculations;

_____	_____	<u>X</u>	_____
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(4) Description of procedures to prevent uplift, if applicable;

_____	_____	<u>X</u>	_____
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(5) Design calculations to demonstrate minimum two feet of freeboard will be maintained;

_____	_____	<u>X</u>	_____
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(6) Procedures for controlling vectors and off-site odors.

b. Above-ground leachate storage tanks; (62-701.400(6)(c), FAC)

_____	_____	<u>X</u>	_____
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(1) Describe tank materials of construction and ensure foundation is sufficient to support tank;

_____	_____	<u>X</u>	_____
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(2) Describe procedures for cathodic protection if needed for the tank;

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—

- (3) Describe exterior painting and interior lining of the tank to protect it from the weather and the leachate stored;
- (4) Describe secondary containment design to ensure adequate capacity will be provided and compatibility of materials of construction;
- (5) Describe design to remove and dispose of stormwater from the secondary containment system;
- (6) Describe an overfill prevention system such as level sensors, gauges, alarms and shutoff controls to prevent overfilling;
- (7) Inspections, corrective action and reporting requirements;
- (a) Overfill prevention system weekly;
- (b) Exposed tank exteriors weekly;
- (c) Tank interiors when tank is drained or at least every three years;
- (d) Procedures for immediate corrective action if failures detected;
- (e) Inspection reports available for department review.
- c. Underground leachate storage tanks; (62-701.400 (6) (d), FAC)
- (1) Describe materials of construction;
- (2) A double-walled tank design system to be used with the following requirements;
- (a) Interstitial space monitoring at least weekly;
- (b) Corrosion protection provided for primary tank interior and external surface of outer shell;
- (c) Interior tank coatings compatible with stored leachate;
- (d) Cathodic protection inspected weekly and repaired as needed;
- (3) Describe an overfill prevention system such as level sensors, gauges, alarms and shutoff controls to prevent overfilling and provide for weekly inspections;

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____

9. Gas control systems; (62-701.400(10),FAC)

- a. Design details for gas control system including collection pipes and vents, and passive venting or vacuum extraction details;
- b. Documentation that the gas control system will not impact the liner or leachate control system;
- c. Proposed methods of odor control including flaring designs in accordance with Chapter 62-296, FAC;
- d. Description of a routine gas monitoring program to ensure gas control system is operating properly including:
 - (1) Location of monitoring points;
 - (2) Requirements for quarterly sampling of all monitoring points;
 - (3) Description of corrective measures to be completed within 60 days of detection of elevated levels of explosive gases;
- e. Description of condensate collection and disposal methods.

10. Landfill gas recovery facilities; (62-701.400(11),FAC)

- a. Information required in Rules 62-701.320(7) and 62-701.330(4), FAC supplied;
- b. Information required in Rule 62-701.600(4), FAC supplied where relevant and practical;
- c. Estimate of current and expected gas generation rates and description of condensate disposal methods provided;
- d. Description of procedures for condensate sampling, analyzing and data reporting provided;
- e. Closure plan provided describing methods to control gas after recovery facility ceases operation;
- f. Performance bond provided to cover closure costs if not already included in other landfill closure costs.

11. 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(12),FAC)

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

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
				1. Submit a hydrogeological investigation and site report including at least the following information:
—	—	<u>X</u>	—	a. Regional and site specific geology and hydrogeology;
—	—	<u>X</u>	—	b. Direction and rate of ground water and surface water flow including seasonal variations;
—	—	<u>X</u>	—	c. Background quality of ground water and surface water;
—	—	<u>X</u>	—	d. Any on-site hydraulic connections between aquifers;
—	—	<u>X</u>	—	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;
—	—	<u>X</u>	—	f. Site topography and soil characteristics;
—	—	<u>X</u>	—	g. Inventory of all public and private water wells within a one-mile radius of the landfill including 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;
—	—	<u>X</u>	—	h. Description of topography, soil types and surface water drainage systems;
—	—	<u>X</u>	—	i. An inventory of all public and private water wells within one mile of the landfill.
—	—	<u>X</u>	—	j. Existing contaminated areas on landfill site.
—	—	<u>X</u>	—	2. Report signed, sealed and dated by PE or PG.

I. GEOTECHNICAL INVESTIGATION REQUIREMENTS (62-701.420, FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
				1. Submit a geotechnical site investigation report defining the engineering properties of the site including at least the following:
—	—	<u>X</u>	—	a. Description of subsurface conditions including soil stratigraphy and ground water table conditions;
—	—	<u>X</u>	—	b. Investigate for the presence of muck, previously filled areas, soft ground, lineaments and sink holes;
—	—	<u>X</u>	—	c. Estimates of average and maximum high water table across the site;
—	—	<u>X</u>	—	d. Foundation analysis including:
—	—	<u>X</u>	—	(1) Foundation bearing capacity analysis;
—	—	<u>X</u>	—	(2) Total and differential subgrade settlement analysis;
—	—	<u>X</u>	—	(3) Slope stability analysis;
—	—	<u>X</u>	—	e. Description of methods used in the investigation and includes soil boring logs, laboratory results, analytical calculations, cross sections, interpretations and conclusions;
—	—	<u>X</u>	—	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.
—	—	<u>X</u>	—	2. Report signed, sealed and dated by PE or PG.

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

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
—	—	<u>X</u>	—	1. Describe how the vertical expansion shall not cause or contribute to leachate leakage from the existing landfill or adversely affect the closure design of the existing landfill;
—	—	<u>X</u>	—	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;
—	—	<u>X</u>	—	3. Provide foundation and settlement analysis for the vertical expansion;
—	—	<u>X</u>	—	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;
—	—	<u>X</u>	—	5. Minimum stability safety factor of 1.5 for the lining system component interface stability and deep stability;
—	—	<u>X</u>	—	6. Provide documentation to show the surface water management system will not be adversely affected by the vertical expansion;
—	—	<u>X</u>	—	7. Provide gas control designs to prevent accumulation of gas under the new liner for the vertical expansion.

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

—	—	<u>X</u>	—	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)
				2. Provide a landfill operation plan including procedures for: (62-701.500(2), FAC)
—	—	<u>X</u>	—	a. Designating responsible operating and maintenance personnel;
—	—	<u>X</u>	—	b. Contingency operations for emergencies;
—	—	<u>X</u>	—	c. Controlling types of waste received at the landfill;
—	—	<u>X</u>	—	d. Weighing incoming waste;
—	—	<u>X</u>	—	e. Vehicle traffic control and unloading;
—	—	<u>X</u>	—	f. Method and sequence of filling waste;
—	—	<u>X</u>	—	g. Waste compaction and application of cover;
—	—	<u>X</u>	—	h. Operations of gas, leachate, and stormwater controls;
—	—	<u>X</u>	—	i. Water quality monitoring.

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
<u> </u>	<u> </u>	<u> X </u>	<u> </u>	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)
<u> </u>	<u> </u>	<u> X </u>	<u> </u>	4. Describe the waste records that will be compiled monthly and provided to the Department quarterly; (62-701.500(4),FAC)
<u> </u>	<u> </u>	<u> X </u>	<u> </u>	5. Describe methods of access control; (62-701.500(5),FAC)
<u> </u>	<u> </u>	<u> X </u>	<u> </u>	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)
				7. Describe procedures for spreading and compacting waste at the landfill that include: (62-701.500(7),FAC)
<u> </u>	<u> </u>	<u> X </u>	<u> </u>	a. Waste layer thickness and compaction frequencies;
<u> </u>	<u> </u>	<u> X </u>	<u> </u>	b. Special considerations for first layer of waste placed above liner and leachate collection system;
<u> </u>	<u> </u>	<u> X </u>	<u> </u>	c. Slopes of cell working face and side grades above land surface, planned lift depths during operation;
<u> </u>	<u> </u>	<u> X </u>	<u> </u>	d. Maximum width of working face;
				e. Description of type of initial cover to be used at the facility that controls:
<u> </u>	<u> </u>	<u> X </u>	<u> </u>	(1) Disease vector breeding/animal attraction
<u> </u>	<u> </u>	<u> X </u>	<u> </u>	(2) Fires
<u> </u>	<u> </u>	<u> X </u>	<u> </u>	(3) Odors
<u> </u>	<u> </u>	<u> X </u>	<u> </u>	(4) Blowing litter
<u> </u>	<u> </u>	<u> X </u>	<u> </u>	(5) Moisture infiltration
<u> </u>	<u> </u>	<u> X </u>	<u> </u>	f. Procedures for applying initial cover including minimum cover frequencies;
<u> </u>	<u> </u>	<u> X </u>	<u> </u>	g. Procedures for applying intermediate cover;
<u> </u>	<u> </u>	<u> X </u>	<u> </u>	h. Time frames for applying final cover;
<u> </u>	<u> </u>	<u> X </u>	<u> </u>	i. Description of litter policing methods;
<u> </u>	<u> </u>	<u> X </u>	<u> </u>	j. Erosion control procedures.

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
<u>X</u>	<u>Section 2</u>	—	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—

8. Describe operational procedures for leachate management including; (62-701.500(8), FAC)
 - a. Leachate level monitoring, sampling, analysis and data results submitted to the Department;
 - b. Operation and maintenance of leachate collection and removal system, and treatment as required;
 - c. Procedures for managing leachate if it becomes regulated as a hazardous waste;
 - d. Agreements for off-site discharge and treatment of leachate;
 - e. Contingency plan for managing leachate during emergencies or equipment problems;
 - f. Procedures for recording quantities of leachate generated in gal/day;
 - g. Procedures for comparing precipitation experienced at the landfill with leachate generation rates.
9. Describe routine gas monitoring program for the landfill as required by Rule 62-701.400(10), FAC; (62-701.500(9), FAC)
10. Describe procedures for operating and maintaining the landfill stormwater management system to comply with the standards of Chapters 62-3, 62-302 and 62-25, FAC; (62-701.500(10), FAC)
11. Equipment and operation feature requirements; (62-701.500(11), FAC)
 - a. Sufficient equipment for excavating, spreading, compacting and covering waste;
 - b. Reserve equipment or arrangements to obtain additional equipment within 24 hours of breakdown;
 - c. Communications equipment;
 - d. Personnel shelter and sanitary facilities, first aid equipment;
 - e. Dust control methods;
 - f. Fire protection capabilities and procedures for notifying local fire department authorities in emergencies;
 - g. Litter control devices;
 - h. Signs indicating operating authority, traffic flow, hours of operation, disposal restrictions.

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____

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)
13. Additional record keeping and reporting requirements; (62-701.500(13), FAC)
 - a. Records used for developing permit applications and supplemental information maintained for the design period of the landfill;
 - b. Monitoring information, calibration and maintenance records, copies of reports required by permit maintained for at least 10 years;
 - c. Background water quality records shall be maintained for the design period of the landfill;
 - d. 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.

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

S	LOCATION	N/A	N/C
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- | | | | | |
|-------|-------|----------|-------|--|
| _____ | _____ | <u>X</u> | _____ | 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; |
| _____ | _____ | <u>X</u> | _____ | 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) |
| _____ | _____ | <u>X</u> | _____ | b. All sampling and analysis performed by organizations having Department approved Comprehensive Quality Assurance Plans; (62-701.510(2)(b), FAC) |
| _____ | _____ | | _____ | c. Ground water monitoring requirements; (62-701.510(3), FAC) |
| _____ | _____ | <u>X</u> | _____ | (1) Detection wells located downgradient from and within 50 feet of disposal units; |
| _____ | _____ | <u>X</u> | _____ | (2) Downgradient compliance wells as required; |
| _____ | _____ | <u>X</u> | _____ | (3) Background wells screened in all aquifers below the landfill that may be affected by the landfill; |
| _____ | _____ | <u>X</u> | _____ | (4) Location information for each monitoring well; |
| _____ | _____ | <u>X</u> | _____ | (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; |
| _____ | _____ | <u>X</u> | _____ | (6) Well screen locations properly selected; |
| _____ | _____ | <u>X</u> | _____ | (7) Procedures for properly abandoning monitoring wells; |
| _____ | _____ | <u>X</u> | _____ | (8) Detailed description of detection sensors if proposed. |
| _____ | _____ | | _____ | d. Surface water monitoring requirements; (62-701.510(4), FAC) |
| _____ | _____ | <u>X</u> | _____ | (1) Location of and justification for all proposed surface water monitoring points; |
| _____ | _____ | <u>X</u> | _____ | (2) Each monitoring location to be marked and its position determined by a registered Florida land surveyor; |
| _____ | _____ | <u>X</u> | _____ | e. Leachate sampling locations proposed; (62-701.510(5), FAC) |

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—
—	—	<u>X</u>	—

f. Routine sampling frequency and requirements;
(62-701.510(6), FAC)

- (1) Background ground water and surface water sampling and analysis requirements;
- (2) Leachate semi-annual and annual sampling and analysis requirements;
- (3) Detection well semi-annual sampling and analysis requirements;
- (4) Compliance well sampling and analysis requirements;
- (5) Surface water sampling and analysis requirements.

g. Describe procedures for implementing assessment monitoring and corrective action as required;
(62-701.510(7), FAC)

h. Water quality monitoring report requirements;
(62-701.510(9), FAC)

- (1) Semi-annual report requirements;
- (2) Bi-annual report requirements signed, dated and sealed by PG or PE.

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

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
		<u>X</u>		1. Describe procedures for managing motor vehicles; (62-701.520(1), FAC)
		<u>X</u>		2. Describe procedures for landfilling shredded waste; (62-701.520(3), FAC)
		<u>X</u>		3. Describe procedures for asbestos waste disposal; (62-701.520(4), FAC)
		<u>X</u>		4. Describe procedures for contaminated soil disposal; (62-701.520(5), FAC)

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

				1. Closure schedule requirements; (62-701.600(2), FAC)
		<u>X</u>		a. Documentation that a written notice including a schedule for closure will be provided to the Department at least one year prior to final receipt of wastes;
		<u>X</u>		b. Notice to user requirements within 120 days of final receipt of wastes;
		<u>X</u>		c. Notice to public requirements within 10 days of final receipt of wastes.
				2. Closure permit general requirements; (62-701.600(3), FAC)
		<u>X</u>		a. Application submitted to Department at least 90 days prior to final receipt of wastes;
				b. Closure plan shall include the following:
		<u>X</u>		(1) Closure report;
		<u>X</u>		(2) Closure design plan;
		<u>X</u>		(3) Closure operation plan;
		<u>X</u>		(4) Closure procedures;
		<u>X</u>		(5) Plan for long term care;
		<u>X</u>		(6) A demonstration that proof of financial responsibility for long term care will be provided.

S	LOCATION	N/A	N/C
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3. Closure report requirements; (62-701.600(4),FAC)

a. General information requirements;

_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____

- (1) Identification of landfill;
- (2) Location, description and vicinity map;
- (3) Total acres of disposal areas and landfill property;
- (4) Legal property description;
- (5) History of landfill;
- (6) Identification of types of waste disposed of at the landfill.

b. Geotechnical investigation report and water quality monitoring plan required by Rule 62-701.330(4),FAC;

c. Land use information report indicating: identification of adjacent landowners; zoning; present land uses; and roads, highways right-of-way, or easements.

d. Report on actual or potential gas migration at landfills containing biodegradable wastes including detailed description of test and investigation methods used;

e. Report assessing the effectiveness of the landfill design and operation including results of geotechnical investigations, surface water and storm water management, gas migration and concentrations, condition of existing cover, and nature of waste disposed of at the landfill;

4. Closure design requirements to be included in the closure design plan: (62-701.600(5),FAC)

_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____
_____	_____	<u>X</u>	_____

- a. Plan sheet showing phases of site closing;
- b. Drawings showing existing topography and proposed final grades;
- c. Provisions to close units when they reach approved design dimensions;
- d. Final elevations before settlement;
- e. Side slope design including benches, terraces, down slope drainage ways, energy dissipators and discussion of expected precipitation effects;

O. CLOSURE PROCEDURES (62-701.610, FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
<u> </u>	<u> </u>	<u> x </u>	<u> </u>	1. Survey monuments; (62-701.610(2), FAC)
<u> </u>	<u> </u>	<u> x </u>	<u> </u>	2. Final survey report; (62-701.610(3), FAC)
<u> </u>	<u> </u>	<u> x </u>	<u> </u>	3. Certification of closure construction completion; (62-701.610(4), FAC)
<u> </u>	<u> </u>	<u> x </u>	<u> </u>	4. Declaration to the public; (62-701.610(5), FAC)
<u> </u>	<u> </u>	<u> x </u>	<u> </u>	5. Official date of closing; (62-701.610(6), FAC)
<u> </u>	<u> </u>	<u> x </u>	<u> </u>	6. Use of closed landfill areas; (62-701.610(7), FAC)

P. LONG TERM CARE REQUIREMENTS (62-701.620, FAC)

<u> </u>	<u> </u>	<u> x </u>	<u> </u>	1. Right of property access requirements; (62-701.620(4), FAC)
<u> </u>	<u> </u>	<u> x </u>	<u> </u>	2. Successors of interest requirements; (62-701.620(5), FAC)
<u> </u>	<u> </u>	<u> x </u>	<u> </u>	3. Requirements for replacement of monitoring devices; (62-701.620(7), FAC)
<u> </u>	<u> </u>	<u> x </u>	<u> </u>	4. Completion of long term care signed and sealed by professional engineer (62-701.620(8), FAC).

Q. FINANCIAL RESPONSIBILITY REQUIREMENTS (62-701.630, FAC)

<u> </u>	<u> </u>	<u> x </u>	<u> </u>	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).
<u> </u>	<u> </u>	<u> x </u>	<u> </u>	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).
<u> </u>	<u> </u>	<u> x </u>	<u> </u>	3. Describe funding mechanisms for providing proof of financial assurance and include appropriate financial assurance forms; (62-701.630(5),(6),&(9), FAC).

R. CLOSURE OF EXISTING LANDFILLS (62-701.640, FAC)

<u> </u>	<u> </u>	<u> x </u>	<u> </u>	1. Demonstration that facility does not pose a bird hazard to aircraft as specified in Rule 62-701.320(12)(b), FAC.
<u> </u>	<u> </u>	<u> x </u>	<u> </u>	2. Demonstration that facility does not restrict the flow of the 100-year flood, reduce water storage capacity or result in wash-out of solid waste as specified in Rule 62-701.340(4)(b), FAC.

S	LOCATION	N/A	N/C
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		x	
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3. Demonstration that facility is not located in a fault area, seismic zone or unstable area as specified in Rule 62-701.420(1)(c), FAC.

4. Request for extension of closure criteria as specified in Rule 62-701.640(2)(a) & (2)(b), FAC.

		x	
--	--	---	--

a. Demonstration of no alternative disposal capacity.

		x	
--	--	---	--

b. Demonstration of no threat to human health or the environment.

S. MATERIALS RECOVERY FACILITY REQUIREMENTS (62-701.700, FAC)

		x	
--	--	---	--

1. Proof of posting a performance bond payable to the Department to cover closing costs, if required; (62-701.700(4), FAC)

		x	
--	--	---	--

2. Materials recovery facility requirements; (62-701.700, FAC)

		x	
--	--	---	--

a. Submit information required in Rule 62-701.320, FAC

		x	
--	--	---	--

b. Submit an engineering report including the following:

		x	
--	--	---	--

(1) Description of the solid waste proposed to be collected, stored, processed or disposed;

		x	
--	--	---	--

(2) Projection with assumptions for waste types and quantities expected in future years;

		x	
--	--	---	--

(3) Description of operation and functions of all processing equipment with design criteria and expected performance;

		x	
--	--	---	--

(4) Description of flow of solid waste, expected regular facility operations, procedures for start up and shut down, potential safety hazards and control methods including fire protection;

		x	
--	--	---	--

(5) Description of loading, unloading, and processing areas;

		x	
--	--	---	--

(6) Identification and capacity of temporary on-site storage areas for materials handled and provisions for solid waste and leachate containment;

		x	
--	--	---	--

(7) Identification of potential ground water and surface water contamination;

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>
_____	_____	<u>x</u>	_____
_____	_____	<u>x</u>	_____
_____	_____	<u>x</u>	_____
_____	_____	<u>x</u>	_____
_____	_____	<u>x</u>	_____
_____	_____	<u>x</u>	_____
_____	_____	<u>x</u>	_____

(8) Plan for disposal of unmarketable recyclables and residue and contingencies for waste handling during breakdowns.

c. Submit the following operational information:

- (1) Operation and maintenance manual;
- (2) Waste control plan to manage unauthorized wastes;
- (3) Contingency plan for emergencies;
- (4) Closure plan including the following:
 - (a) Notification to Department 180 days prior to closure;
 - (b) Procedures for removal of all waste within 30 days of receipt of final waste;
 - (c) Completion of closure activities within 180 days of receipt of final waste and notification to the Department that closure is complete.

T. CERTIFICATION BY APPLICANT AND ENGINEER OR PUBLIC OFFICER

A. Applicant

The undersigned applicant or authorized representative of Manatee County is aware that statements made in this form and attached information are an application for a Minor Modification to Construction Permit from the Florida Department of Environmental Regulation and certifies that the information in this application is true, correct and complete to the best of his knowledge and belief. Further, the undersigned agrees to comply with the provisions of Chapter 403, Florida Statutes, and all rules and regulations of the Department. It is understood that the Permit is not transferable, and the Department will be notified prior to the sale or legal transfer of the permitted facility.

Signature of Applicant or Agent

Daniel T. Gray, Dir. Utility Operations Dept

Name and Title Daniel T. Gray

Date: 8/16/01

Attach letter of authorization if agent is not a governmental official, owner, or corporate officer.

B. Professional Engineer Registered in Florida or Public Officer as required in Section 403.707 and 403.707(5), Florida Statutes.

This is to certify that the engineering features of this solid waste management facility have been designed/examined by me and found to conform to engineering principals applicable to such facilities. In my professional judgement, this facility, when properly maintained and operated, will comply with all applicable statutes of the State of Florida and rules of the Department. It is agreed that the undersigned will provide the applicant with a set of instructions of proper maintenance and operation of the facility.

Signature

8/16/01

C.P. "Pete" Putman

Senior Program Manager

Name and Title (please type)

35217

Florida Registration Number
(please affix seal)

PBS&J, 330 Pineapple Ave. Suite 113

Mailing Address

Sarasota, FL 34236

City, State, Zip Code

(941) 954-1477

Telephone Number

Date:

ENGINEERING REPORT FOR MODIFICATIONS TO THE
LEACHATE COLLECTION AND REMOVAL SYSTEM
MANATEE COUNTY LENA ROAD LANDFILL

Background

This engineering report concerns the proposed modifications to the leachate collection and removal system for the Manatee County Lena Road Landfill. Currently, leachate is pumped to a leachate storage pond in the southwest corner of the Stage I landfill. From the pond, leachate is pumped to the adjacent WWTP for treatment and disposal. Recent improvements at the WWTP include a storage tank, which makes the leachate storage pond unnecessary. Manatee County proposes to eliminate the pond and use the area for disposal of Class I solid waste. The leachate pond is within the slurry wall, which defines the limits of the Stage I landfill. This modification requires changes in the leachate force main to pump to the storage tank at the WWTP, and extension of the leachate collection system along the slurry wall in the leachate pond area. In addition, Manatee County proposes to extend the leachate collection system along the eastside of the Stage III landfill in order to prevent leachate from entering a storm water ditch. The Stage III landfill area was previously an abandoned landfill, and the groundwater is considered leachate.

Leachate Collection System

The proposed extension of the leachate collection system in the leachate storage pond area is shown on Drawing L-1. A new HDPE manhole will replace the existing manhole adjacent to Pump Station 2. The collection system will extend to the west and then north to tie into the existing leachate collection system at a clean out. The clean out will be replaced with a HDPE manhole. The line is approximately 950 feet and will be installed 10 feet inside the perimeter slurry wall and 11 feet below grade.

The proposed extension of the leachate collection system on the eastside of the Stage III landfill is shown on Drawing L-2. The line will start on the south at an existing manhole, and go north about 1400 feet and connect to an existing manhole. The pipe will be about 10 feet below grade, and 40 feet west of the stormwater ditch, and 70 feet west of the slurry wall.

Details and sections of the leachate collection system are shown on Drawing L-3. The leachate collection system consists of excavating a trench and installing an 8 oz. nonwoven geotextile, 3'-8 inch layer of crushed No. 5 granite with an 8 inch dia. perforated HDPE pipe set 12 inches above the trench invert. The geotextile is wrapped over the granite and the trench filled with clean granular fill to within 2 feet of the surface. The rest of the trench can be backfilled with excavated material.

The geotextile, HDPE pipe, and crushed granite are chemically resistant to the waste and leachate. Appendix A to this report contains the calculations showing that the pipe has sufficient mechanical properties to prevent collapse under pressure of the landfill. The geotextile and crushed granite will prevent clogging of the collection system. After installation, the contractor is required to TV the pipe, and submit the video and inspection report as documentation that the

pipe was installed properly. The pipes can be inspected from the manholes. A company specializing in cleaning landfill pipes, can TV up to 1000 feet and clean up to 2000 feet.

Leachate Forcemain

The existing leachate force main system includes:

- A 6-inch forcemain from Stage I to a discharge point in the leachate pond,
- an 8-inch forcemain from Stage II to a discharge point in the stormwater pond,
- a 10-inch forcemain from Stage III to a discharge point in the leachate pond, and
- a 6-inch forcemain from the leachage pond to the SERWTP.

The existing forcemains are routed along the west edge of Stage I, between Stage I and the stormwater pond and between the stormwater pond and the leachate pond.

The proposed revisions will intercept the existing forcemains and reroute the pipelines to avoid conflicts with the proposed use of the leachate pond area as a disposal site. Sheets 4, 5, 6 and 7 show the locations of the connections to the existing forcemains and the new pipeline routes. The proposed forcemains will be C900 PVC with ductile iron restrained joint fittings.

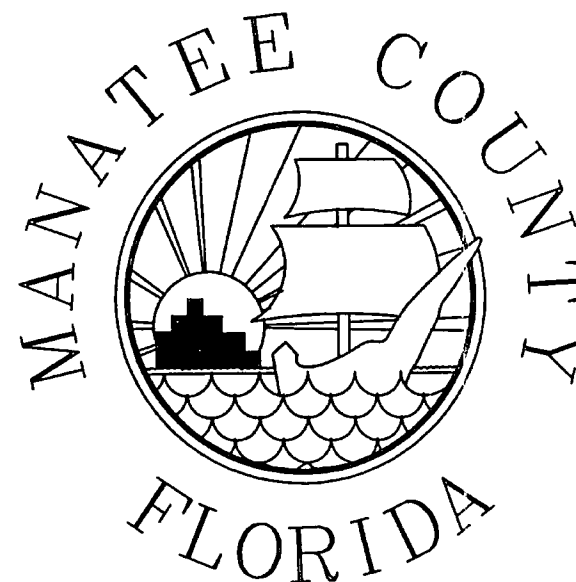
The flow in the forcemains will be individually metered. The proposed meter detail is shown on sheet 9 and consists of above ground ductile iron piping, FEBCO Model 758 (or approved equal) strainers and propeller meters as manufactured by McCrometer, Model MF100. The discharge from the meters will be manifold into a 12-inch forcemain and connected to the SERWTP piping.

The proposed improvements will consist of approximately:

- 3060 feet of 6-inch forcemain,
- 600 feet of 8-inch forcemain,
- 235 feet of 10-inch forcemain, and
- 100 feet of 12-inch forcemain

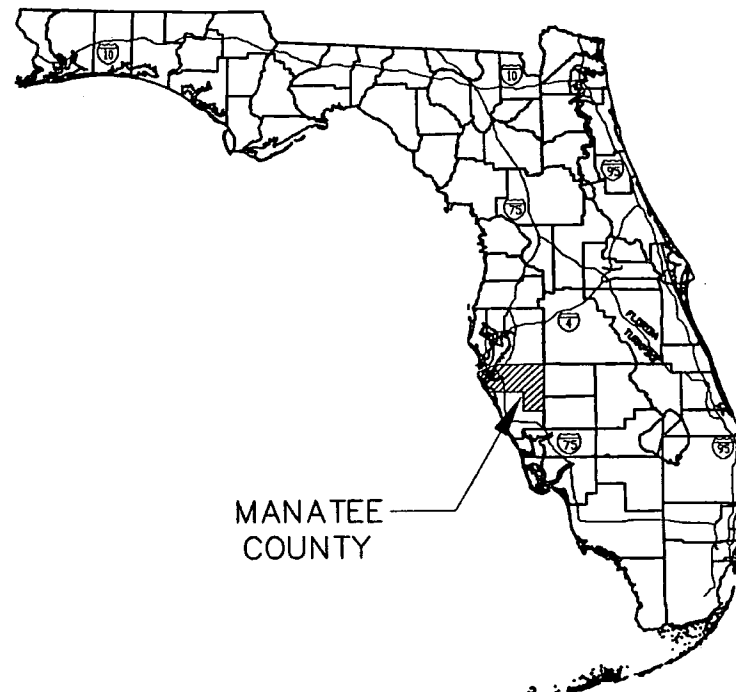
MANATEE COUNTY LENA ROAD LANDFILL LEACHATE POND FACILITIES

PREPARED FOR

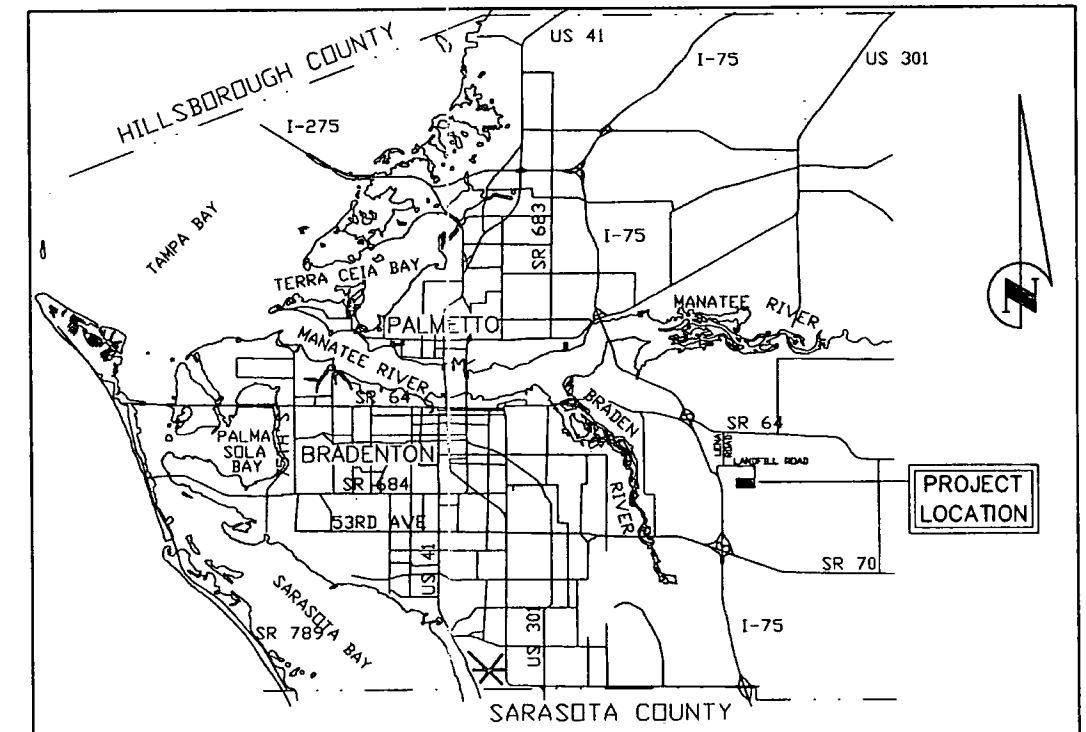


MANATEE
COUNTY

1026 26th AVENUE EAST
BRADENTON, FLORIDA 34208



LOCATION MAP



VICINITY MAP

INDEX TO DRAWINGS

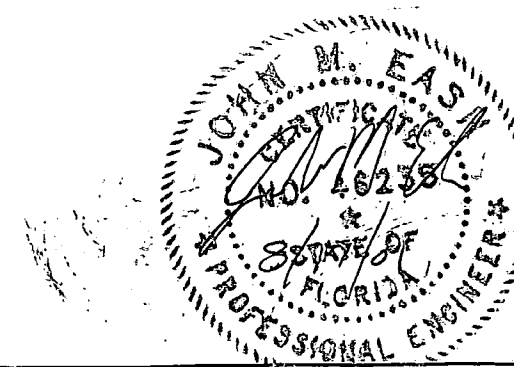
SHEET NO.	TITLE
1	COVER SHEET
2	GENERAL NOTES, ABBREVIATIONS AND LEGEND
3	PROJECT KEY
4	PLAN AND PROFILE STA. 1+00 TO 12+00
5	PLAN AND PROFILE STA. 12+00 TO 23+00
6	PLAN AND PROFILES STA. 23+00 TO 25+63 AND STA. 300+00 TO 302+35
7	PLAN AND PROFILES STA. 400+00 TO 600+54
8	DETAILS
9	METERING STATION DETAILS
10	EROSION CONTROL DETAILS
11	EROSION CONTROL DETAILS
L1	EXTENSION AT STORAGE POND PLAN
L2	EXTENSION IN STAGE III LANDFILL
L3	SECTIONS AND DETAILS

PREPARED BY



330 SOUTH PINEAPPLE AVE.
SUITE 113
SARASOTA, FLORIDA 34236
Ph. (941) 954-4036

POST, BUCKLEY, SCHUH & JERNIGAN, INC. D/SA/PS&J
2001 N.W. 10TH AVENUE, MIAMI, FL 33172-2507
FIRM CERTIFICATE OF AUTHORIZATION NO. 24



DATE: AUG., 2001

GENERAL NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING ALL CONDITIONS AND REQUIREMENTS OF ALL PERMITS AND ALL GOVERNING FEDERAL, STATE, AND LOCAL AGENCIES.
2. EXISTING UNDERGROUND FACILITIES, STRUCTURES, AND UTILITIES HAVE BEEN LOCATED FROM THE BEST AVAILABLE SURVEY DATA AND RECORDS AND THEIR LOCATIONS MUST ONLY BE CONSIDERED AS APPROXIMATE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE EXACT LOCATION OF ALL EXISTING UTILITIES SHOWN ON THE PLANS AND ANY OTHER UTILITIES WHICH MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES IN THE AREA AT LEAST 72 HOURS PRIOR TO BEGINNING CONSTRUCTION. CALL FLORIDA SUNSHINE STATE ONE CALL CENTER AT 1-800-432-4770.
3. A HORIZONTAL SPACING OF 10 FEET OUTSIDE TO OUTSIDE SHALL BE MAINTAINED BETWEEN POTABLE WATER MAINS AND ANY SANITARY SEWER MAINS. IN THE CASE OF A CROSSING, A VERTICAL SEPARATION OF NOT LESS THAN 18" SHALL BE MAINTAINED.
4. THE CONTRACTOR SHALL PROVIDE ALL DEWATER EQUIPMENT NECESSARY TO KEEP ALL EXCAVATIONS DRY AND SHALL PROVIDE ALL NECESSARY SHEETING, SHORING, AND BRACING NECESSARY TO PROTECT ADJACENT STRUCTURES, UTILITIES, AND PAVEMENT, OR TO MINIMIZE TRENCH WIDTH, ALL IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.
5. THE CONTRACTOR SHALL PROVIDE HAY BALES AND/OR SILT FENCES AROUND THE CONSTRUCTION ACTIVITY, AS NECESSARY, TO PREVENT THE TRANSPORTATION OF SEDIMENTS DOWNSTREAM INTO STREETS, STORM SEWERS, OPEN DITCHES, LAKES, RETENTION PONDS, PRIVATE PROPERTY, ETC., AND SHALL PERFORM ALL NECESSARY INSPECTIONS AND MAINTENANCE IN ACCORDANCE WITH THE STORMWATER POLLUTION PREVENTION PLAN (SPPP), AND FEDERAL, STATE, AND LOCAL GOVERNING AGENCY REQUIREMENTS.
6. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER'S CONSTRUCTION MANAGER REGARDING ANY CONFLICTS OR DISCREPANCIES ARISING DURING CONSTRUCTION.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES, STRUCTURES, OR UTILITIES CAUSED BY CONSTRUCTION OPERATIONS WHICH HAVE BEEN PREVIOUSLY LOCATED BY THEIR RESPECTIVE OWNERS.
8. CONNECTIONS TO EXISTING FACILITIES SHALL BE DONE IN THE PRESENCE OF THE UTILITY OWNER AND THE ENGINEER. THE CONTRACTOR SHALL GIVE AT LEAST 2 WEEKS NOTICE TO ALL PARTIES CONCERNED PRIOR TO BEGINNING WORK.
9. ALL ADDITIONAL EXCAVATION AND DEMOLITION MATERIAL SHALL BE DISPOSED OF BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE OWNER.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH THE FLORIDA TRENCH SAFETY ACT, 90-96, LAWS OF FLORIDA, EFFECTIVE OCTOBER 1, 1990, AND THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION EXCAVATION SAFETY STANDARDS, 29 CFR 1926.650, SUBPART P, AS AMENDED. THE CONTRACTOR SHALL INCLUDE IN THE TOTAL BID PRICE, ALL COSTS FOR COMPLIANCE WITH THESE REGULATIONS.
11. ALL DISTURBED AREAS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE NOTED.
12. ALL ELEVATIONS ARE BASED UPON NATIONAL GEODETIC VERTICAL DATUM, 1929.
13. THE CONTRACTOR SHALL BE REQUIRED TO OBTAIN ALL APPLICABLE PERMITS.
14. ALL FITTINGS USED ON THIS PROJECT SHALL BE DUCTILE IRON UNLESS OTHERWISE SHOWN. FITTING LININGS SHALL BE FUSION BONDED EPOXY 20 MILS DFT. ALL MECHANICAL JOINT FITTINGS AND VALVES ARE TO BE RESTRAINED USING THE "MEGA-LUG" SYSTEM OR EQUAL.
15. THE EXHAUST SYSTEM OF ALL GASOLINE AND DIESEL ENGINES SHALL BE EQUIPPED WITH MUFFLERS THAT MEET THE EQUIPMENT MANUFACTURER'S REQUIREMENTS FOR NOISE SUPPRESSION. THE CONTRACTOR SHALL, AT THE DIRECTION OF THE ENGINEER DUE TO RESIDENTIAL COMPLAINTS, INSTALL NOISE ABATEMENT BAFFLES POSITIONED TO BREAK LINE-OF-SITE FROM THE NOISE SOURCE TO AFFECTED RESIDENCES, AS APPROVED BY THE ENGINEER.
16. TEMPORARY PLUGS MUST BE INCLUDED FOR TESTING PURPOSES PRIOR TO FINAL TIE-IN OF NEW FORCE MAINS.
17. SEE STANDARD DETAIL SHEET 8 FOR RESTRAINED JOINT LENGTH TABLE.
18. THE CONTRACTOR SHALL PROVIDE PROPER WARNING SIGNS, BARRICADES, TEMPORARY FENCING AND OTHER APPROPRIATE SAFETY DEVICES DURING THE EXECUTION OF THE WORK TO PROVIDE PUBLIC PROTECTION AND SAFETY.
19. THE CONTRACTOR SHALL COORDINATE ALL TIE-INS, DOWN TIME OF LIFT STATIONS AND FLOW HANDLING WITH MANATEE COUNTY UTILITY OPERATIONS PRIOR TO CONSTRUCTION. CONTRACTOR SHALL PROVIDE FOR STATION DOWN TIMES TO OCCUR AT LOW FLOWS AND MAXIMUM DOWN TIME MUST BE LIMITED TO 2 HOURS. CONTRACTOR SHALL PROVIDE FOR THE PROPER HANDLING AND DISPOSAL OF ALL WASTEWATER FLOWS DURING THE CONNECTION PROCEDURES. CONTRACTOR SHALL NOT OPERATE ANY VALVES OR PUMP CONTROLS.
20. CONTRACTOR SHALL DEFLECT PIPE JOINTS TO OBTAIN MINIMUM CLEARANCE REQUIREMENTS AT ALL PIPE CROSSINGS INSTEAD OF USING VERTICAL FITTINGS.
21. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORATION OF ALL SLURRY WALLS PENETRATED/DAMAGED DURING CONSTRUCTION.

LEGEND

- [] = CONCRETE
- ⊗ = WATER METER
- ⊕ = CONCRETE POST WITH CONTROL PANELS
- ⊖ = SIGN
- ⊙ = POWER POLE
- = GUY ANCHOR
- = MONITORING WELL
- ⊙ = MISCELLANEOUS MANHOLE
- ⊗ = BLOWOFF VALVE (WATER)
- ⊕ = WATERLINE MARKER (2" PVC PIPE)
- ⊖ = WATER VALVE
- ⊙ = FIRE HYDRANT
- ⊖ = OVERHEAD LINE
- ⊙ = SANITARY MANHOLE
- ⊖ = GATE
- ⊙ = CONTROL PANEL
- ⊖ = LIGHT POLE
- ⊖ = PROPANE TANK
- [] = WIRING PULL BOX (ELECTRIC)

ABBREVIATIONS

APPROX	APPROXIMATELY	LSB	LICENSED SURVEYOR BUSINESS
ALUM	ALUMINUM	LF	LINEAL FEET
ARV	AIR RELEASE VALVE	LT	LEFT
AWWA	AMERICAN WATER WORK ASSOC.	MAX	MAXIMUM
AVG	AVERAGE	MJ	MECHANICAL JOINT
℄	BASE LINE	MISC	MISCELLANEOUS
BOC	BACK OF CURB	MIN	MINIMUM
BWF	BARBED WIRE FENCE	NTS	NOT TO SCALE
BFV	BUTTERFLY VALVE	OCEW	ON CENTER EACH WAY
CLF	CHAIN LINK FENCE	OD	OUTSIDE DIAMETER
CF	CUBIC FEET	OH	OVERHEAD
℄	CENTERLINE	ØHL	OVERHEAD LINES
CLR	CLEARANCE	PE	PLAIN END
CM	CONCRETE MONUMENT	PRM	PERMANENT REFERENCE MARKER
CMP	CORRUGATED METAL PIPE	PVC	POLYVINYL CHLORIDE
CONC	CONCRETE	PSI	POUNDS PER SQUARE INCH
CONN	CONNECT	RCP	REINFORCED CONCRETE PIPE
CONT	CONTINUOUS	RDCR	REDUCER
COR	CORNER	REQ'D	REQUIRED
DFT	DRY FILM THICKNESS	RJ	RESTRAINED JOINT
DIA, d	DIAMETER	R/W	RIGHT-OF-WAY
DI, DIP	DUCTILE IRON PIPE	RWGV	RESILIENT WEDGE GATE VALVE W/ LOW ZINC STEM & NUT
D/W	DRIVEWAY	RT	RIGHT
E	EAST	SCHD	SCHEDULE
EL, ELEV	ELEVATION	SHT	SHEET
EOP	EDGE OF PAVEMENT	SQ.FT.	SQUARE FEET
EXIST/EX	EXISTING	SST, ST/STL	STAINLESS STEEL
FL	FLANGED	STA	STATION
FM	FORCE MAIN	STS	STORM SEWER
FND	FOUND	TOB	TOP OF BANK
FPS	FEET PER SECOND	TOS	TOE OF SLOPE
FT	FEET	TYP.	TYPICAL
GAL	GALLONS	W	WEST
GV	GATE VALVE	W/	WITH
HDPE	HIGH DENSITY POLYETHYLENE	WM	POTABLE WATER MAIN
HR	HOURLY		
ID	IDENTIFICATION		
INV	INVERT		
IR	IRON ROD		
LB	POUND		



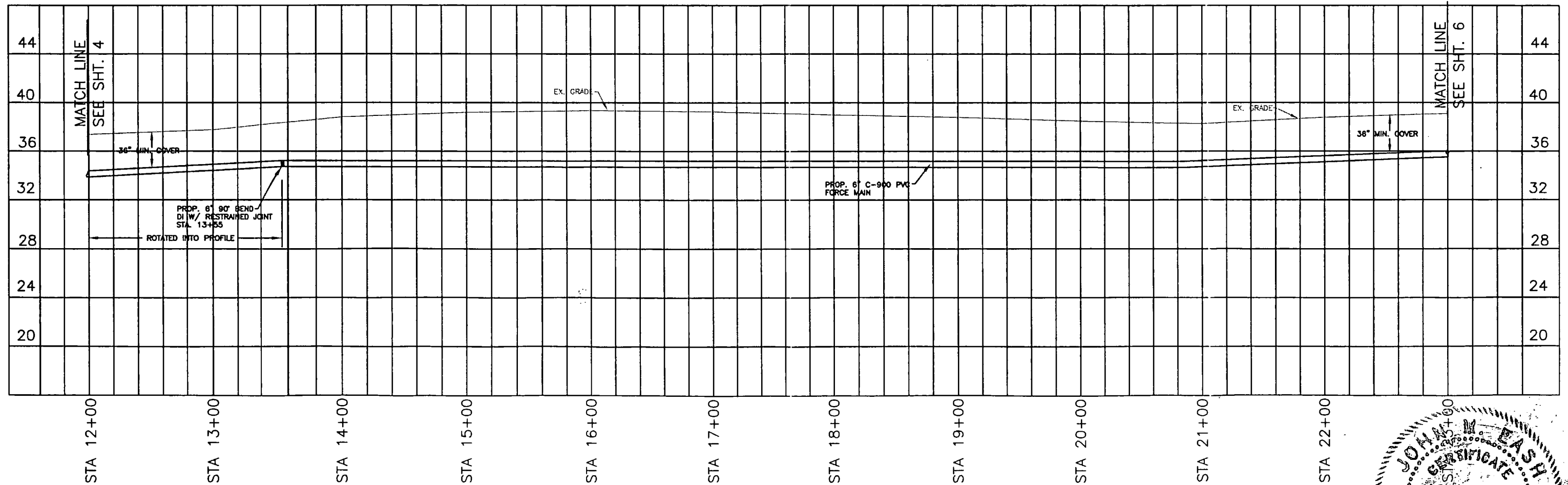
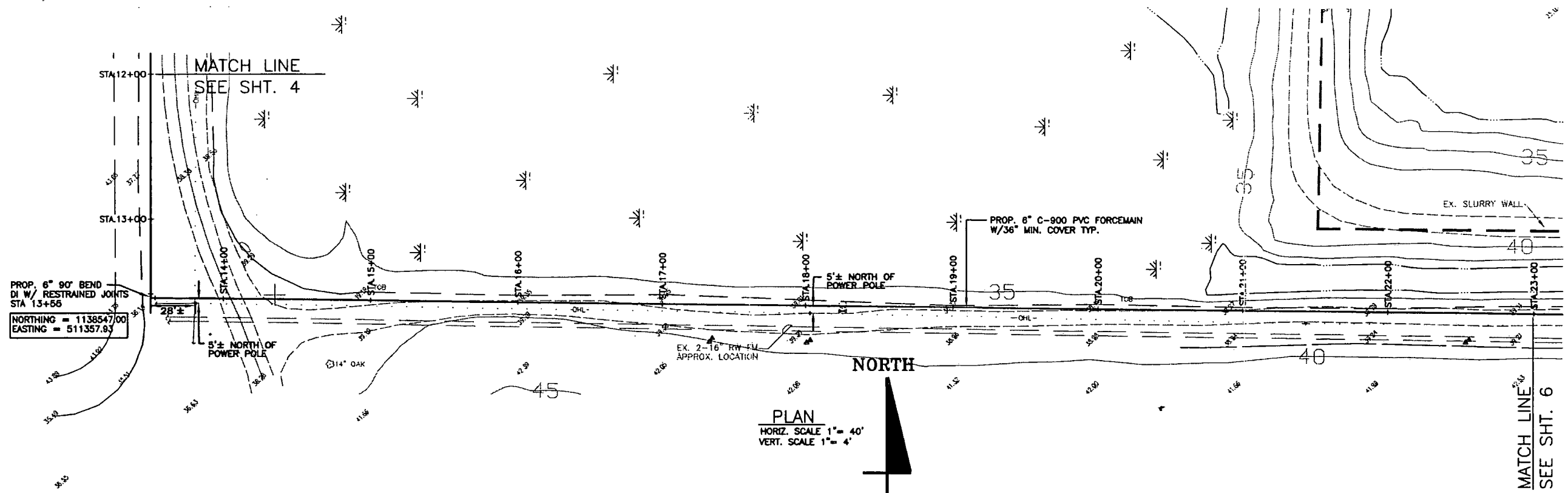
330 SOUTH PINEAPPLE AVE.
SUITE 113
SARASOTA, FLORIDA 34236
Ph. (941) 954-4036

CLIENT
**MANATEE COUNTY
PROJECT MANAGEMENT
DEPARTMENT**
**1023 26TH AVENUE EAST
BRADENTON, FLORIDA 34208**

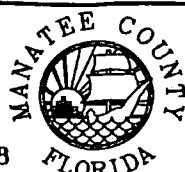


PROJECT	TASK	ORIGINAL:	REVISIONS:	6	7	8	9	10	11	12
LENA ROAD LANDFILL LEACHATE	GENERAL NOTES, ABBREVIATIONS		1							
POND FACILITIES	AND LEGEND		2							
			3							
			4							
			5							

JOHN M. EAST
CERTIFICATE
STATE OF FLORIDA
10/14/2025
SHEET 2



CLIENT
**MANATEE COUNTY
 PROJECT MANAGEMENT
 DEPARTMENT**
 1026 26TH AVENUE EAST
 BRADENTON, FLORIDA 34208

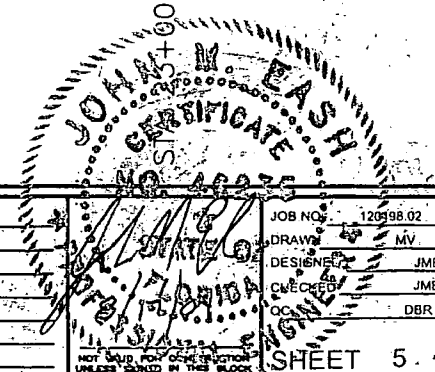


PROJECT
**LENA ROAD LANDFILL LEACHATE
 POND FACILITIES**

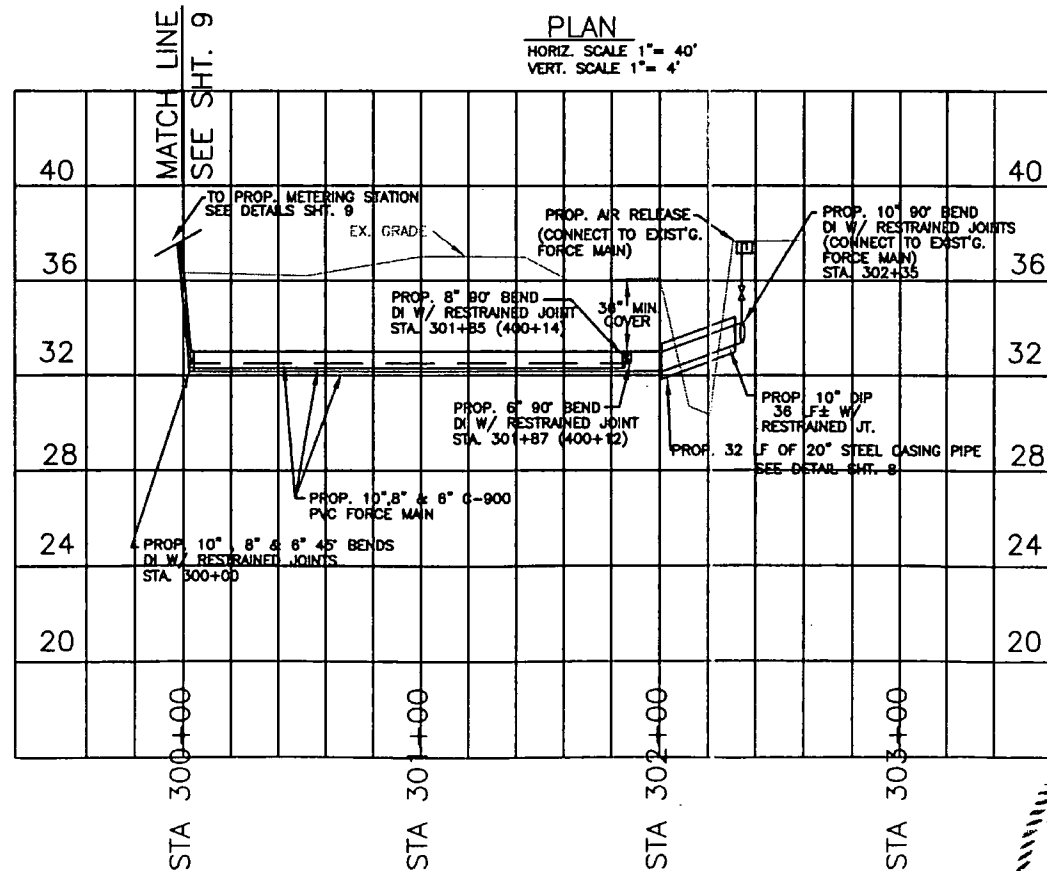
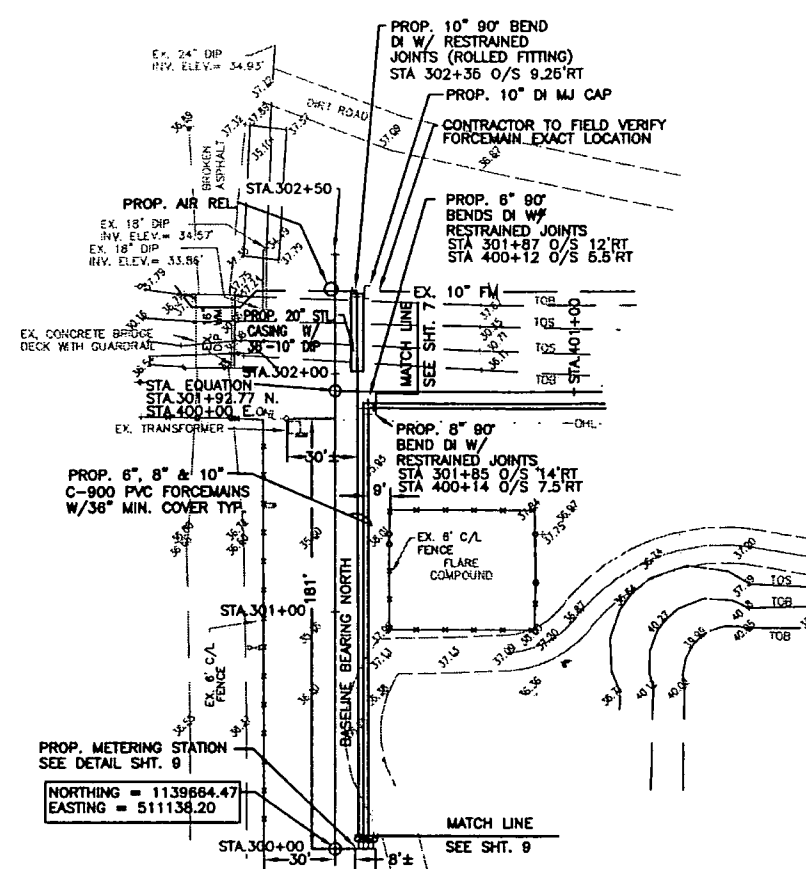
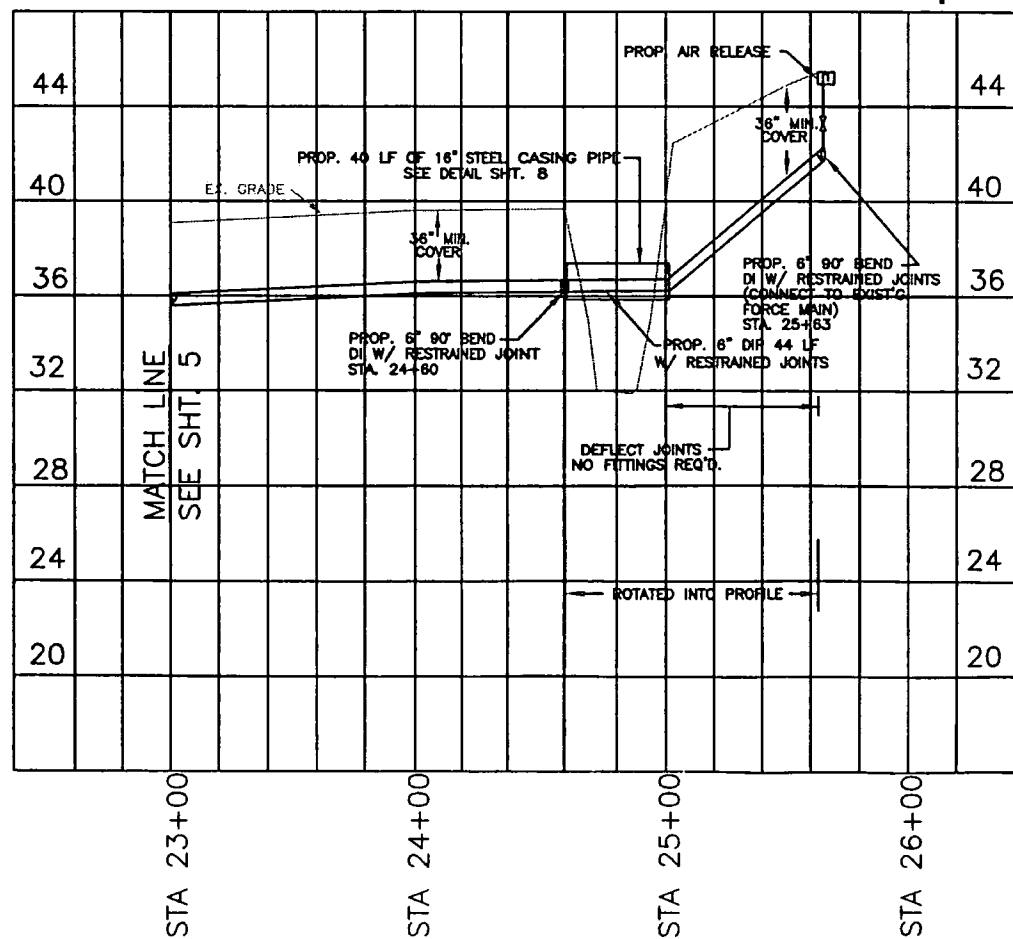
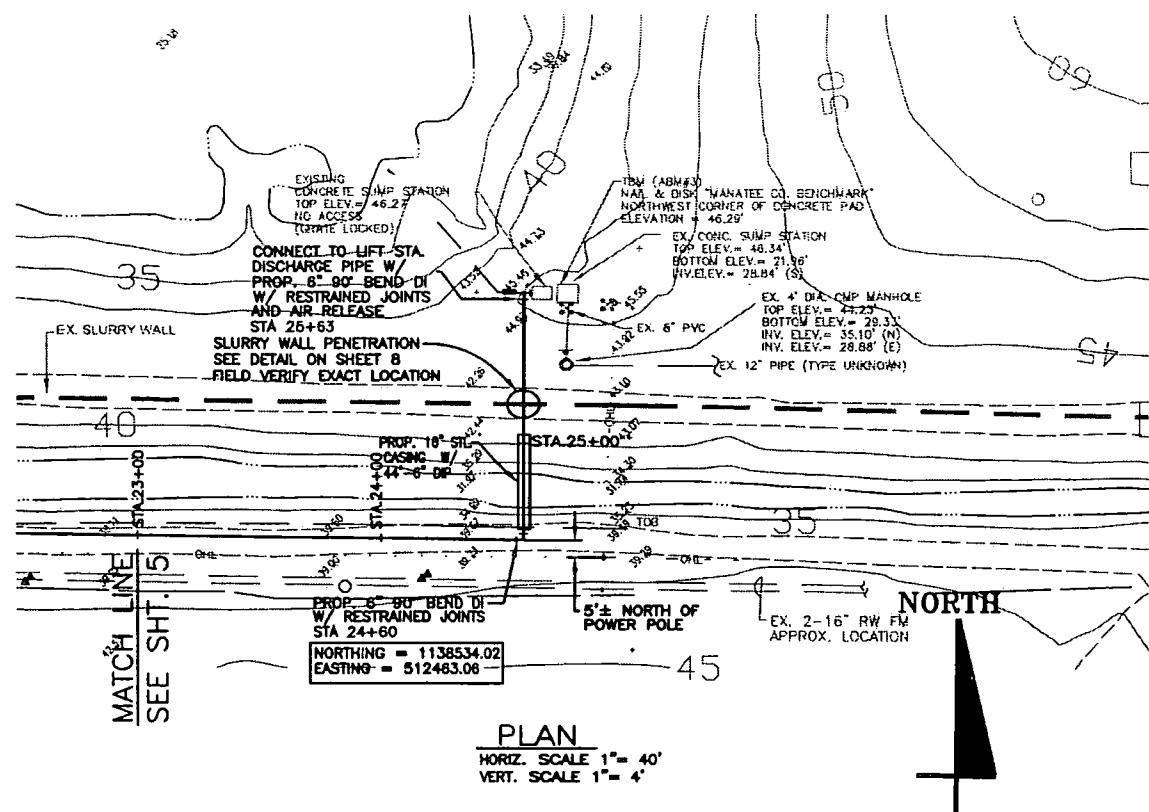
TASK
**PLAN AND PROFILE
 STA 12+00 TO 23+00**

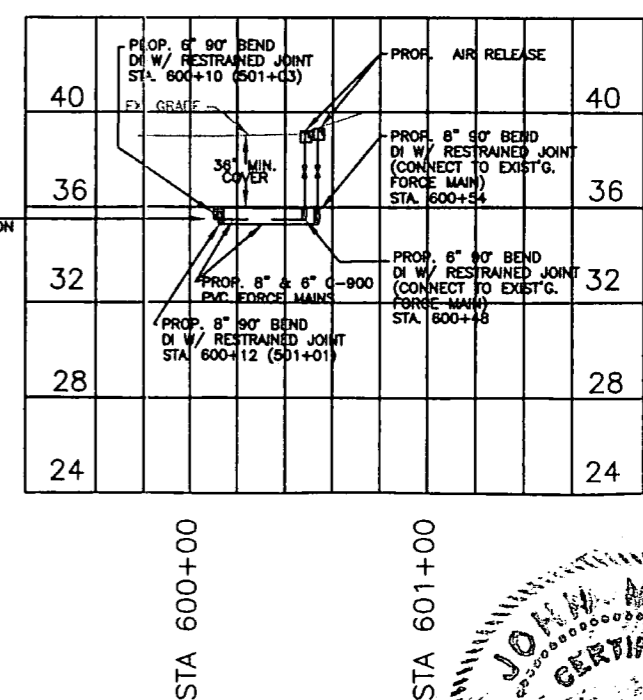
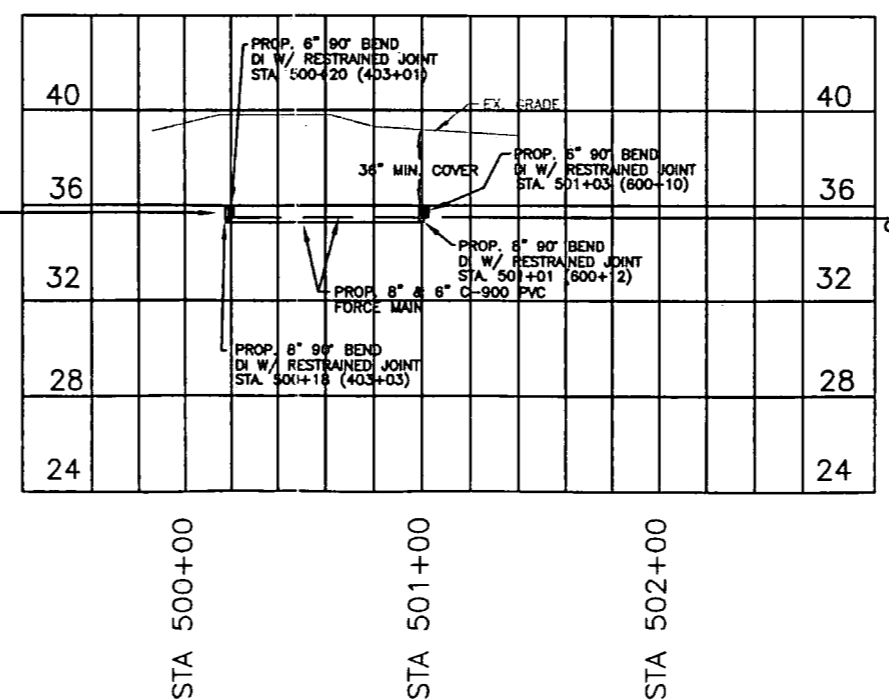
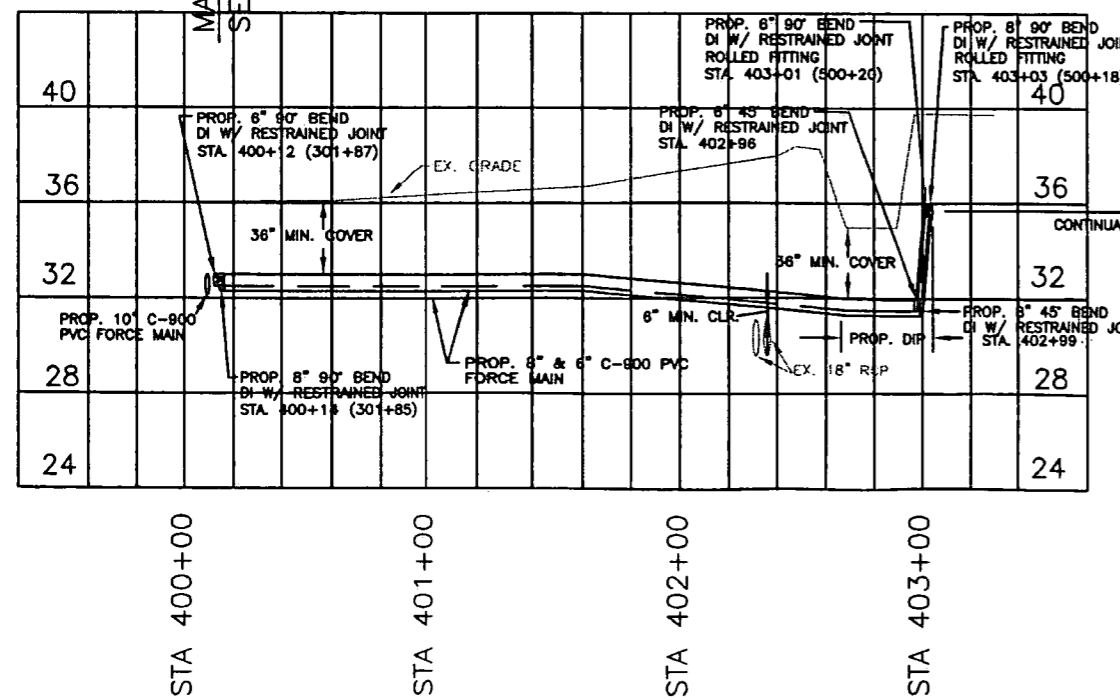
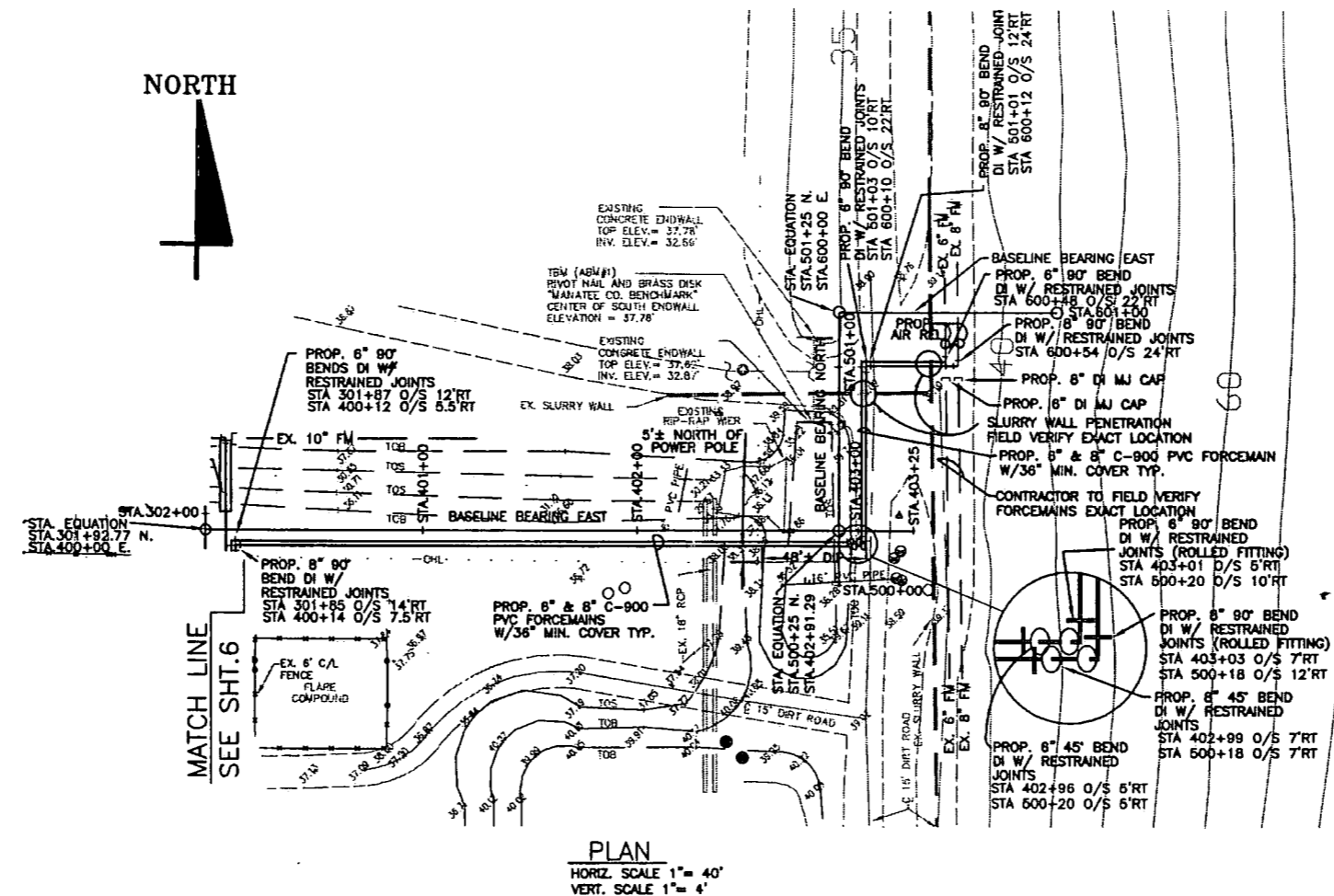
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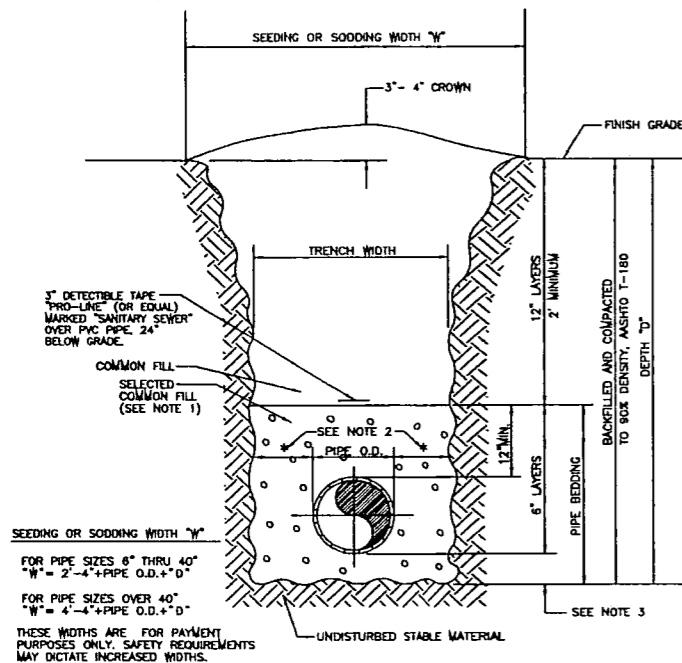
JOB NO. 120198.02
 DRAWN BY: JME
 DESIGNED BY: JME
 CHECKED BY: JME
 APPROVED BY: JME
 SHEET 5



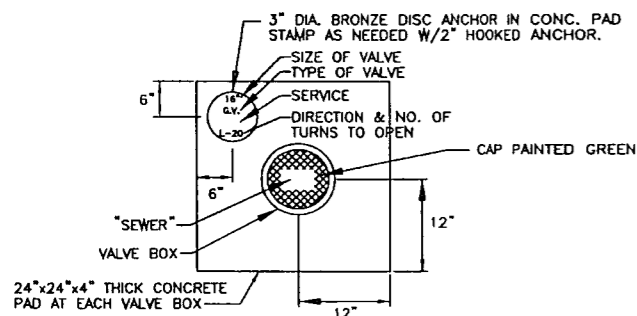


NOTES:

- 1.) USE OF TYPE A-2 AND A-3 PIPE BEDDING TO BE DETERMINED IN THE FIELD BY THE ENGINEER.
- 2.) 10" MAX. FOR PIPE DIAMETER LESS THAN 24"; 12" MAX. FOR PIPE DIAMETER 24" AND LESS THAN 42"; 24" MAX. FOR PIPE DIAMETER 42" AND OVER.
- 3.) 4" MAX. FOR PIPE 16" DIAMETER & LESS; 6" MAX. FOR PIPE 18" TO 36" DIAMETER; AND 9" MAX. FOR PIPE 42" DIAMETER AND LARGER.
- 4.) INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.



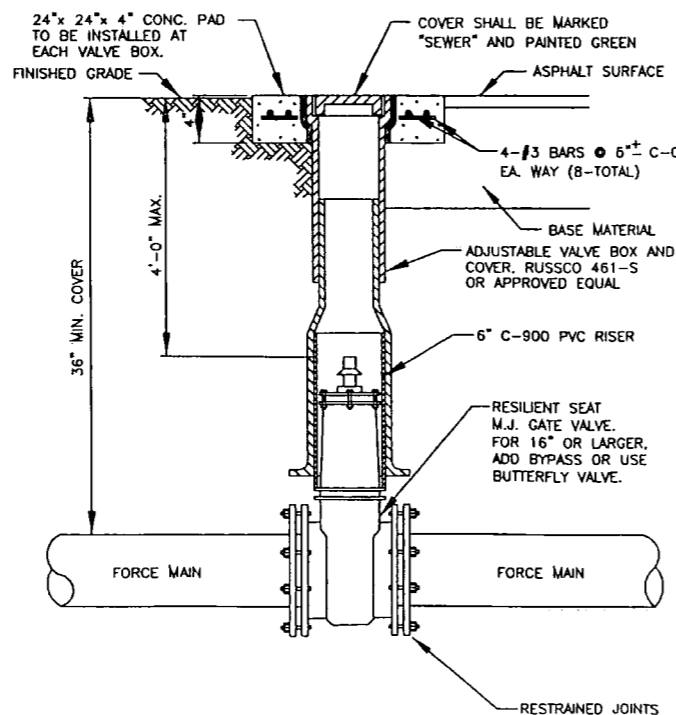
PIPE BEDDING DETAIL



NOTES:

1. GATE VALVE TO BE MARKED IN CURB WITH A "SV" WITH A FOOTAGE FROM THE BACK OF CURB TO THE VALVE OR IF NO CURB, A GREEN DISC WITH "SV" IN THE EDGE OF PAVEMENT WITH THE FOOTAGE FROM THE DISC TO THE VALVE.
2. ALL EXISTING AND PROPOSED VALVE BOXES SHALL BE ADJUSTED TO FINISHED GRADES AS ESTABLISHED IN THE FIELD.
3. SEWER VALVES SHALL NOT BE PLACED IN HANDICAPPED RAMPS.
4. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1/2".

VALVE AND COVER DETAIL



PROJECT

LENA ROAD LANDFILL LEACHATE
POND FACILITIES

TASK

DETAILS

ORIGINAL:

REVISIONS:

- 1
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JOB NO. 120498.02

DESIGNED BY JME

CHECKED BY JME

DATE 08/07/03

TXFF

SHEET 8



330 SOUTH PINEAPPLE AVE.
SUITE 113
SARASOTA, FLORIDA 34236
Ph. (941) 954-4036

CLIENT
**MANATEE COUNTY
PROJECT MANAGEMENT
DEPARTMENT**
1026 26TH AVENUE EAST
BRADENTON, FLORIDA 34208



PROJECT

LENA ROAD LANDFILL LEACHATE
POND FACILITIES

TASK

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PROJECT

LENA ROAD LANDFILL LEACHATE
POND FACILITIES

TASK

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SHEET 8



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BRADENTON, FLORIDA 34208



PROJECT

LENA ROAD LANDFILL LEACHATE
POND FACILITIES

TASK

DETAILS

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JOB NO. 120498.02

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CHECKED BY JME

DATE 08/07/03

TXFF

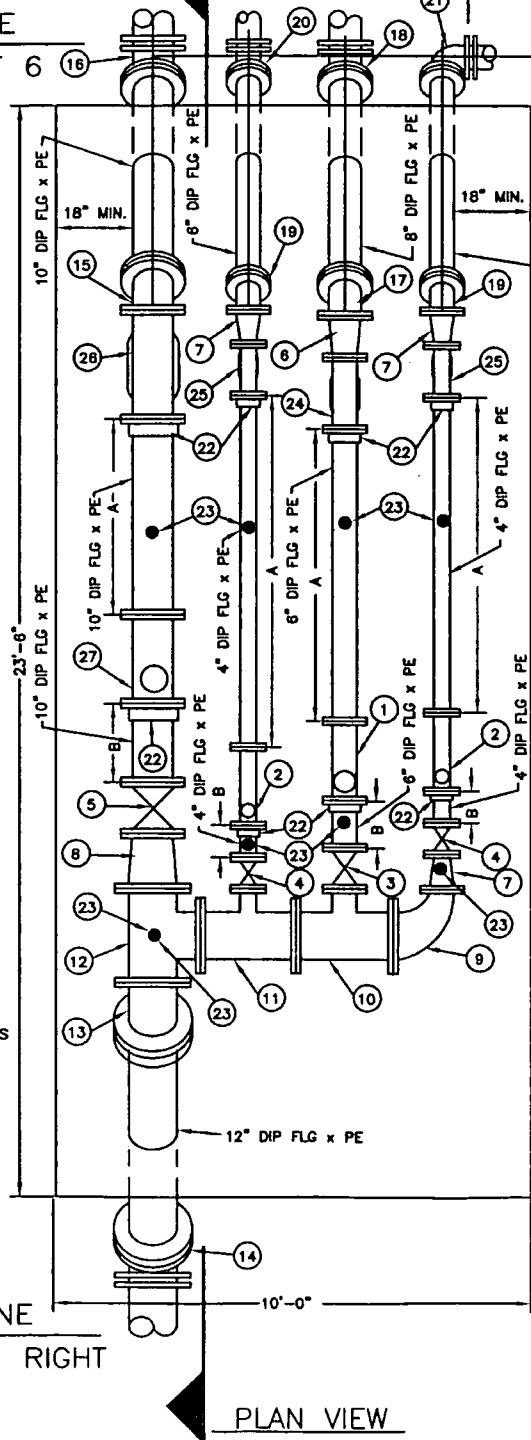
SHEET 8

LEGEND

- A MINIMUM DISTANCE SHALL BE 5 PIPE DIA.'S
- B MINIMUM DISTANCE SHALL BE 2 PIPE DIA.'S
- ① 6" McCROMETER MODEL NO. MF100 W/ FLOW STRAIGHTENING VANES
- ② 4" McCROMETER MODEL NO. MF100 W/ FLOW STRAIGHTENING VANES
- ③ 6" OS & Y RESILIENT SEAT GATE VALVE
- ④ 4" OS & Y RESILIENT SEAT GATE VALVE
- ⑤ 10" OS & Y RESILIENT SEAT GATE VALVE
- ⑥ 8"x 6" DI FLANGE REDUCER
- ⑦ 6"x 4" DI FLANGE REDUCER
- ⑧ 12"x 10" DI FLANGE REDUCER
- ⑨ 12"x 6" DI FLANGE REDUCING ELBOW
- ⑩ 12"x 6" DI FLANGE REDUCING TEE
- ⑪ 12"x 4" DI FLANGE REDUCING TEE
- ⑫ 12" DI FLANGE TEE
- ⑬ 12" DI FLANGE 45° BEND
- ⑭ 12" DI MJ 45° BEND W/ RETAINING GLANDS
- ⑮ 10" DI FLANGE 45° BEND
- ⑯ 10" DI MJ 45° BEND W/ RETAINING GLANDS
- ⑰ 8" DI FLANGE 45° BEND
- ⑱ 6" DI FLANGE 45° BEND
- ⑲ 6" DI MJ 45° BEND W/ RETAINING GLANDS
- ⑳ 6" DI MJ 90° BEND W/ RETAINING GLANDS
- ㉑ UNI-FLANGE
- ㉒ PIPE SUPPORT
- ㉓ 6" WYE STRAINER FEBCO MODEL 758 OR EQUAL
- ㉔ 4" WYE STRAINER FEBCO MODEL 758 OR EQUAL
- ㉕ 10" WYE STRAINER FEBCO MODEL 758 OR EQUAL
- ㉖ 10" McCROMETER MODEL NO. MF100 W/ FLOW STRAIGHTENING VANES

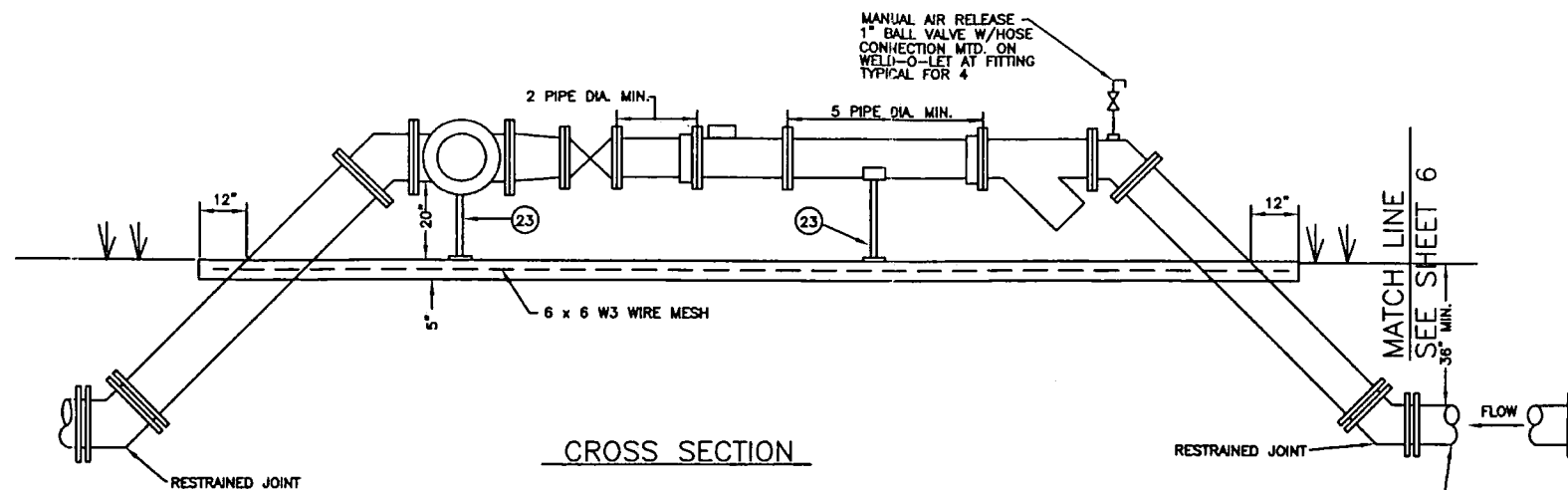
MATCH LINE
SEE SHEET 6

MATCH LINE
SEE PLAN RIGHT



METERING STATION DETAILS

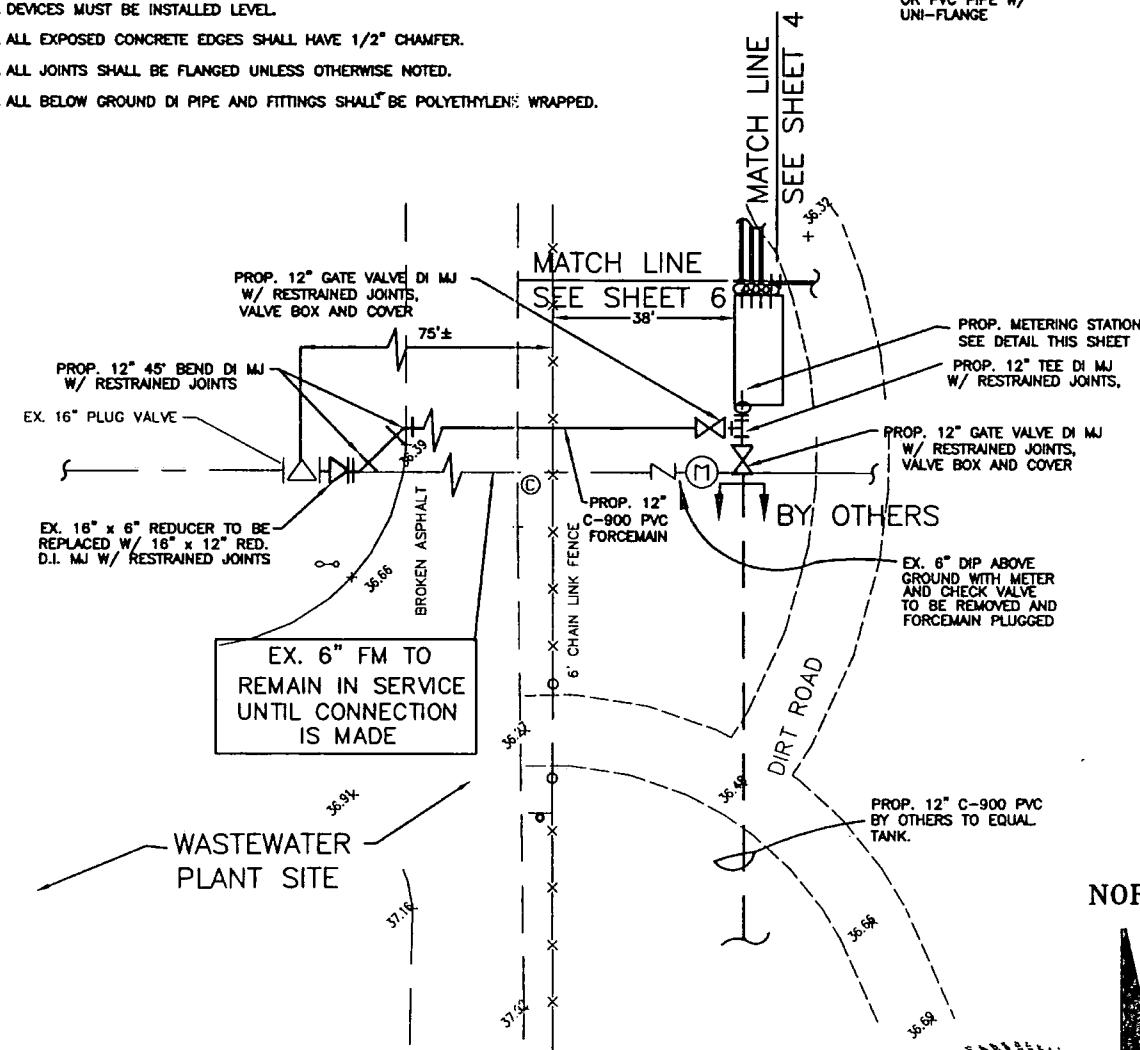
NORTH



CROSS SECTION

NOTES:

1. ALL ABOVE GROUND PIPING TO BE PAINTED GREEN W/ NON- POTABLE MARKINGS.
2. DEVICES MUST BE INSTALLED LEVEL.
3. ALL EXPOSED CONCRETE EDGES SHALL HAVE 1/2" CHAMFER.
4. ALL JOINTS SHALL BE FLANGED UNLESS OTHERWISE NOTED.
5. ALL BELOW GROUND DI PIPE AND FITTINGS SHALL BE POLYETHYLENE WRAPPED.



METERING STATION PLAN

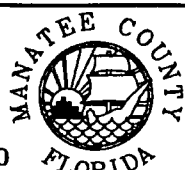
SCALE: 1"=20'
NOTE: CONTRACTOR TO VERIFY EXACT LOCATION OF 6" FORCEMAIN AND MAKE ANY REQUIRED ADJUSTMENTS.

NORTH



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1026 26TH AVENUE EAST
BRADENTON, FLORIDA 34210



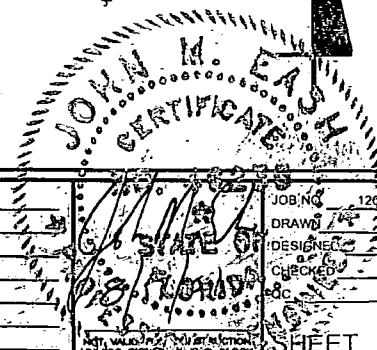
PROJECT
LENA ROAD LANDFILL LEACHATE
POND FACILITIES

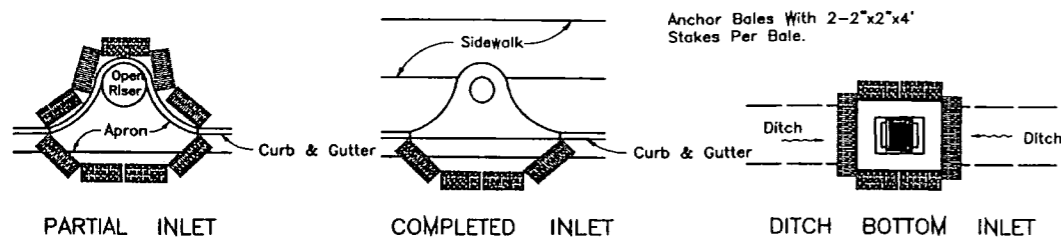
TASK
METERING STATION DETAILS

ORIGINAL:
REVISIONS:

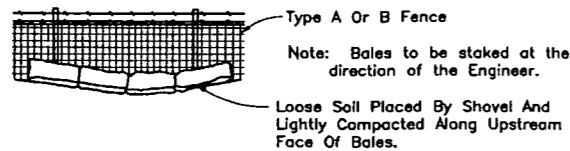
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6	JOB NO. 120598.02
7	DRAWN BY MV
8	DESIGNED BY JME
9	CHECKED BY JME
10	APPROVED BY DBR
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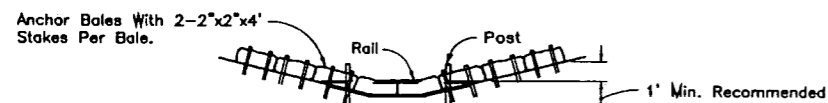
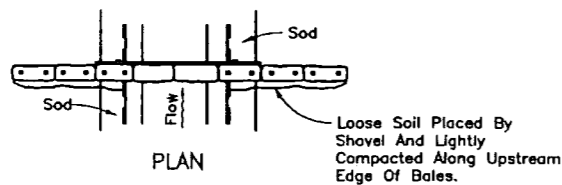




PROTECTION AROUND INLETS OR SIMILAR STRUCTURES



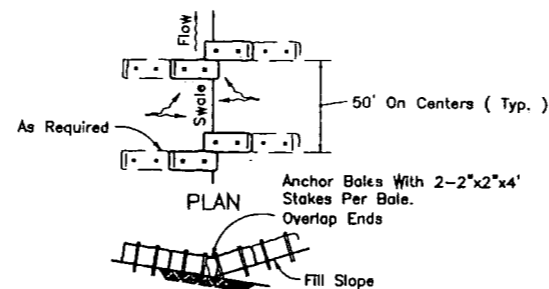
BALES BACKED BY FENCE



ELEVATION

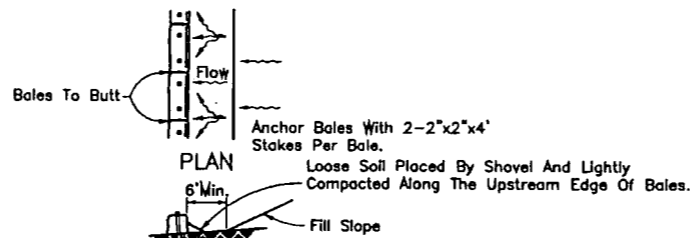
Spacing: Bale barriers for paved ditches should be spaced in accordance with Chart I

BARRIER FOR PAVED DITCH



ELEVATION

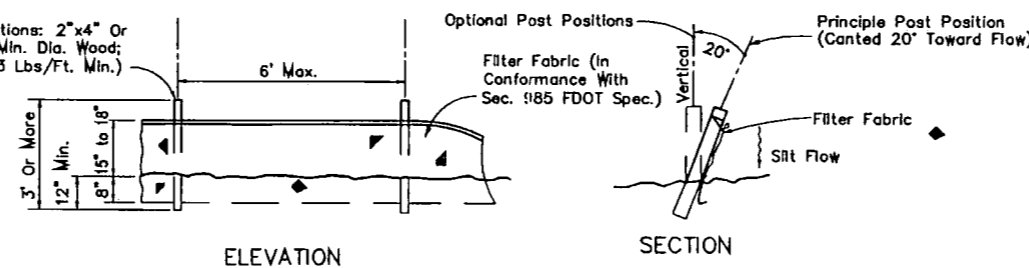
TO BE USED AT SELECTED SITES WHERE THE NATURAL GROUND SLOPES TOWARD THE TOE OF SLOPE



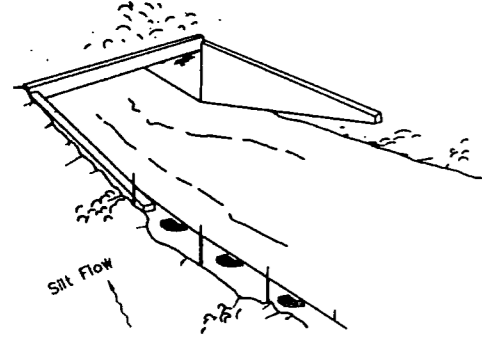
ELEVATION

TO BE USED AT SELECTED SITES WHERE THE NATURAL GROUND SLOPES AWAY FROM THE TOE OF SLOPE

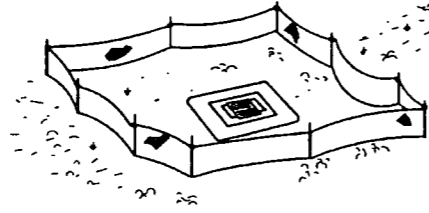
BARRIERS FOR FILL SLOPES



TYPE III SILT FENCE



Type III Silt Fence



Type III Silt Fence Protection Around Ditch Bottom Inlets.

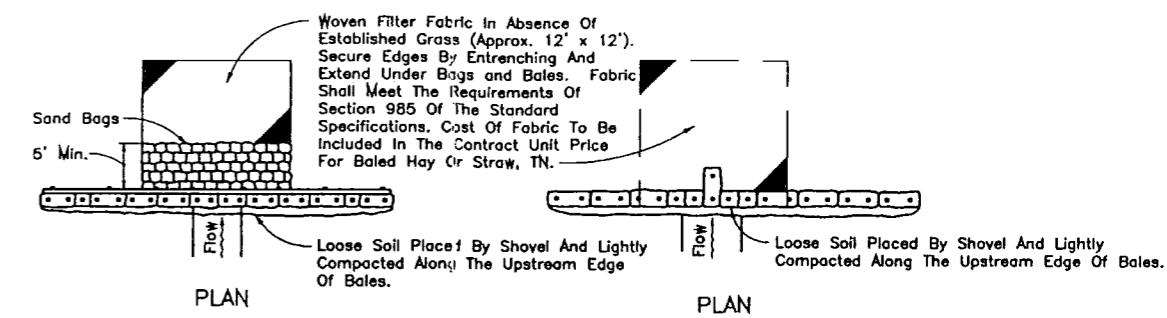


Type III Silt Fence

Note: Spacing for Type III Fence to be in accordance with Chart I.

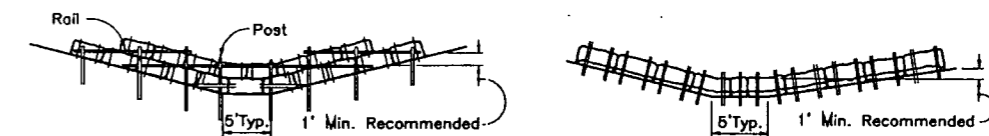
Do not deploy in a manner that silt fences will act as a dam across permanent flowing watercourses. Silt fences are to be used at upland locations and turbidity barriers used at permanent bodies of water.

SILT FENCE APPLICATIONS



PLAN

PLAN



Anchor Lower Bales With 2-2"x2"x4" Stakes Per Bale. Anchor Top Bales To Lower Bales With 2-2"x2"x4" Stakes Per Bale. Anchor Bales With 2-2"x2"x4" Stakes Per Bale

ELEVATION

ELEVATION

Application and Spacing: The use of Types I & II bale barriers should be limited to the conditions outlined in Chart I

TYPE II

TYPE I

BARRIER FOR UNPAVED DITCHES

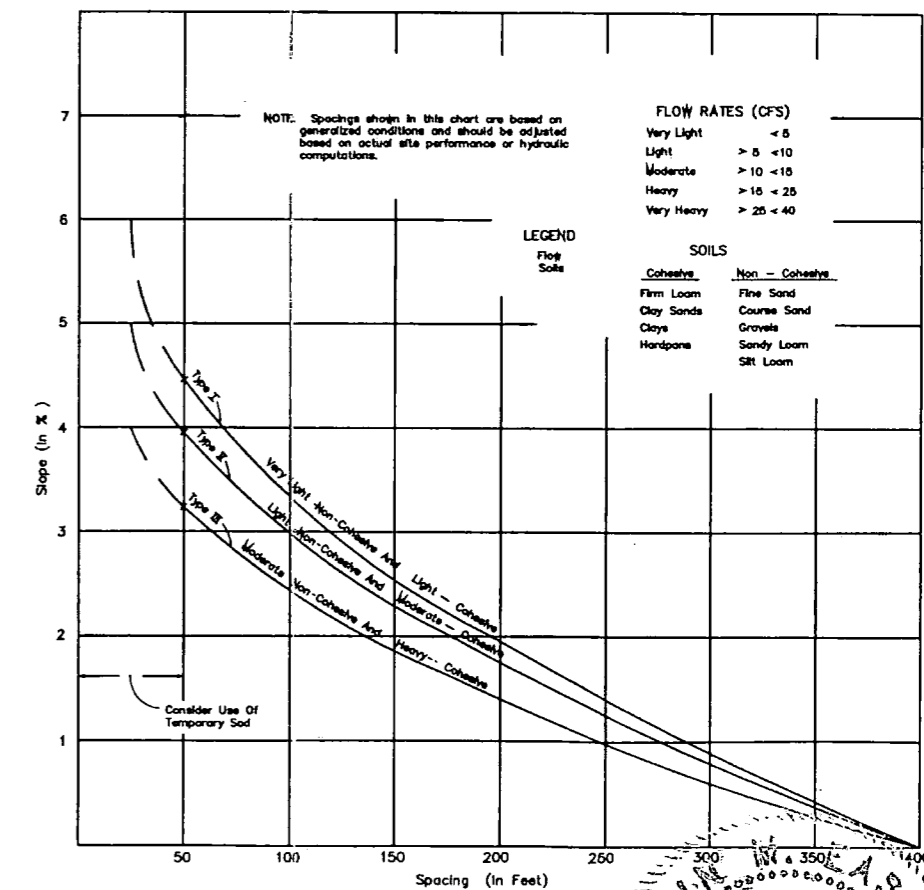


CHART I

RECOMMENDED SPACING FOR TYPE I AND TYPE II HAY BALE BARRIERS, AND TYPE III SILT FENCES

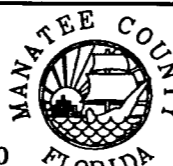


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DEPARTMENT

1026 26TH AVENUE EAST
BRADENTON, FLORIDA 34210



PROJECT

LENA ROAD LANDFILL LEACHATE

POND FACILITIES

TASK

EROSION CONTROL DETAILS

ORIGINAL:

REVISIONS:

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JOB NO. 120498.02

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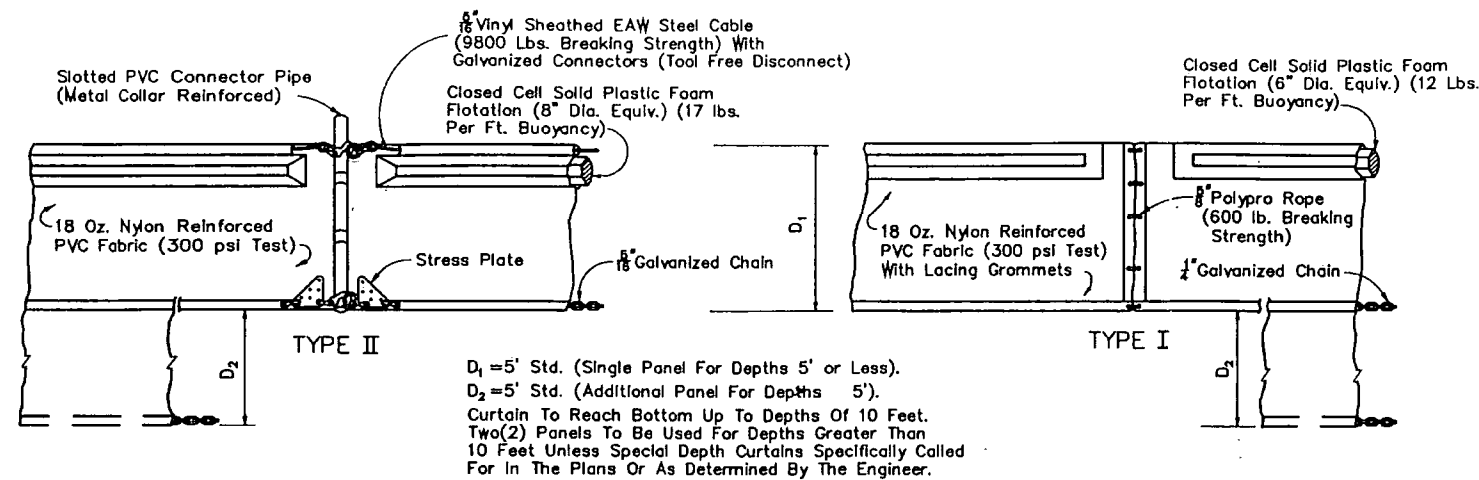
DESIGNED BY JME

CHECKED BY JME

DATE 10/23/2010

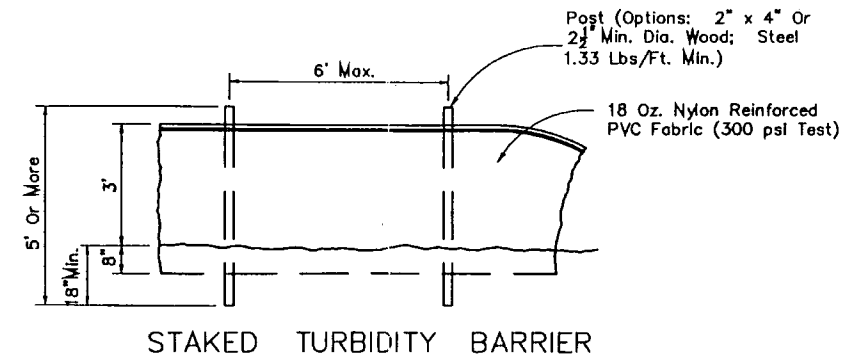
BY DBR

SHEET 10



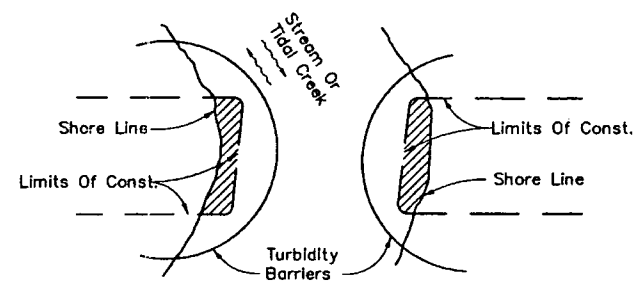
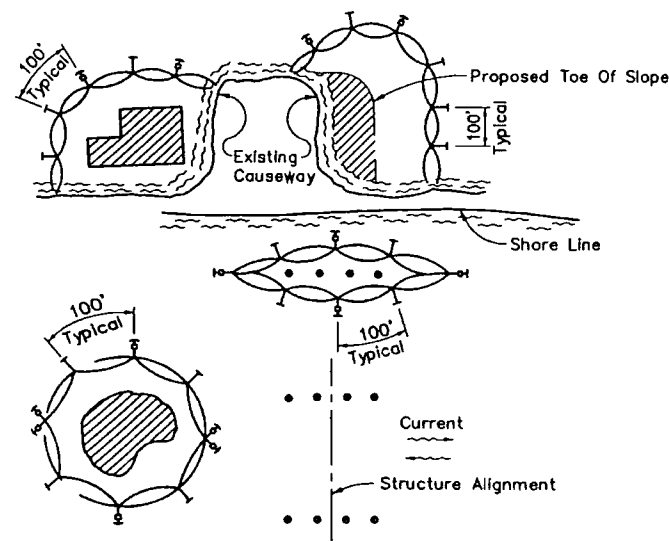
NOTICE: COMPONENTS OF TYPES I AND II MAY BE SIMILAR OR IDENTICAL TO PROPRIETARY DESIGNS. ANY INFRINGEMENT ON THE PROPRIETARY RIGHTS OF THE DESIGNER SHALL BE THE SOLE RESPONSIBILITY OF THE USER. SUBSTITUTIONS FOR TYPES I AND II SHALL BE AS APPROVED BY THE ENGINEER.

FLOATING TURBIDITY BARRIERS



LEGEND

- Pile Locations
- ▨ Dredge Or Fill Area
- Mooring Buoy w/Anchor
- Anchor
- Barrier Movement Due To Current Action



Note:
Turbidity barriers for flowing streams and tidal creeks may be either floating, or staked types or any combinations of types that will suit site conditions and meet erosion control and water quality requirements. The barrier type(s) will be at the Contractors option unless otherwise specified in the plans, however payment will be under the pay item(s) established in the plans for Floating Turbidity Barrier and/or Staked Turbidity Barrier. Posts in staked turbidity barriers to be installed in vertical position unless otherwise directed by the Engineer.

NOTES:

1. Turbidity barriers are to be used in all permanent bodies of water regardless of water depth.
2. Number and spacing of anchors dependent on current velocities.
3. Deployment of barrier around pile locations may vary to accommodate construction operations.
4. Navigation may require segmenting barrier during construction operations.
5. For additional information see Section 104 of the Standard Specifications.

TURBIDITY BARRIER APPLICATIONS



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1026 26TH AVENUE EAST
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PROJECT

LENA ROAD LANDFILL LEACHATE
POND FACILITIES

TASK

EROSION CONTROL DETAILS

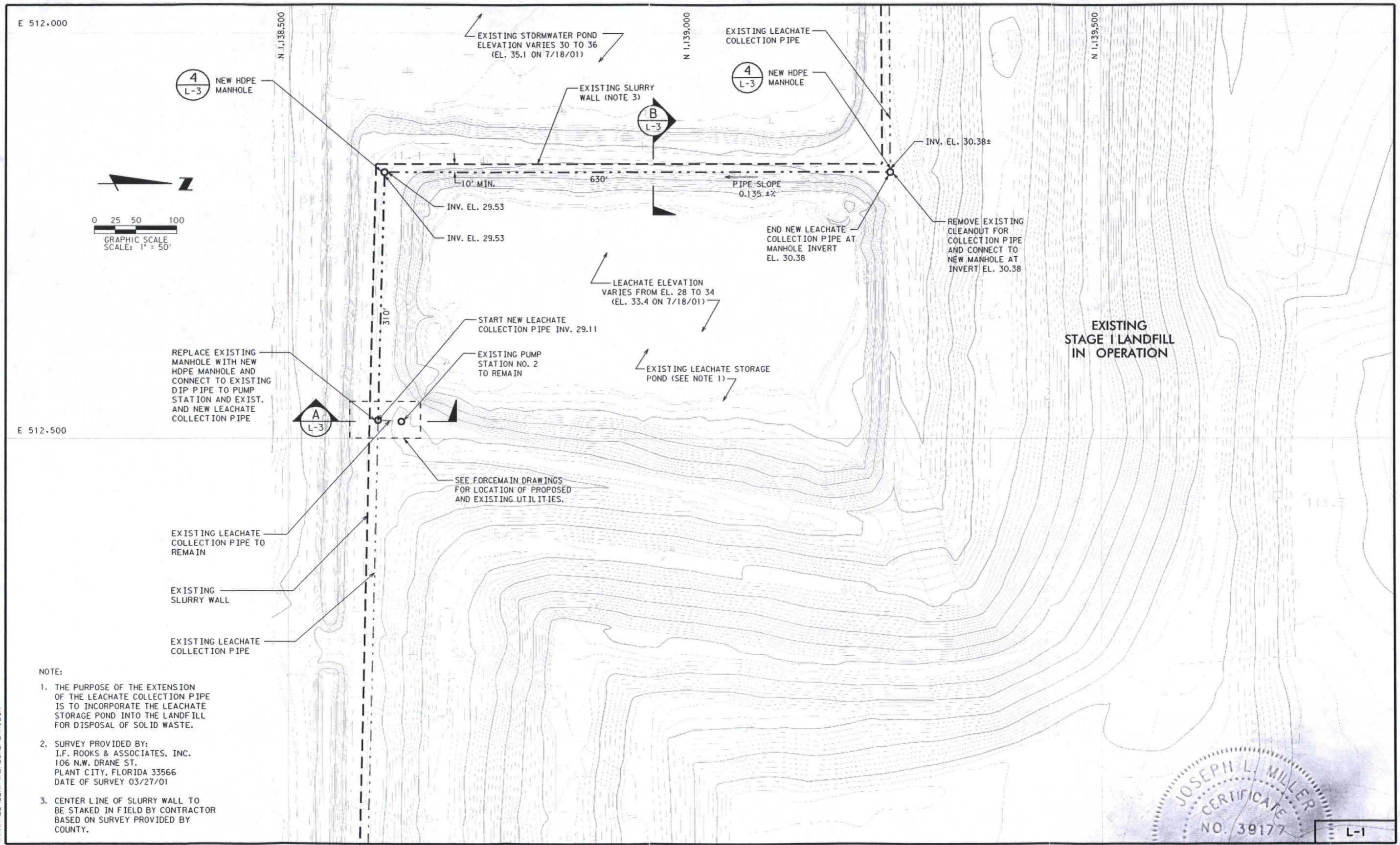
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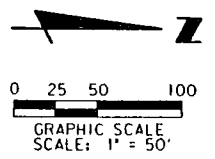
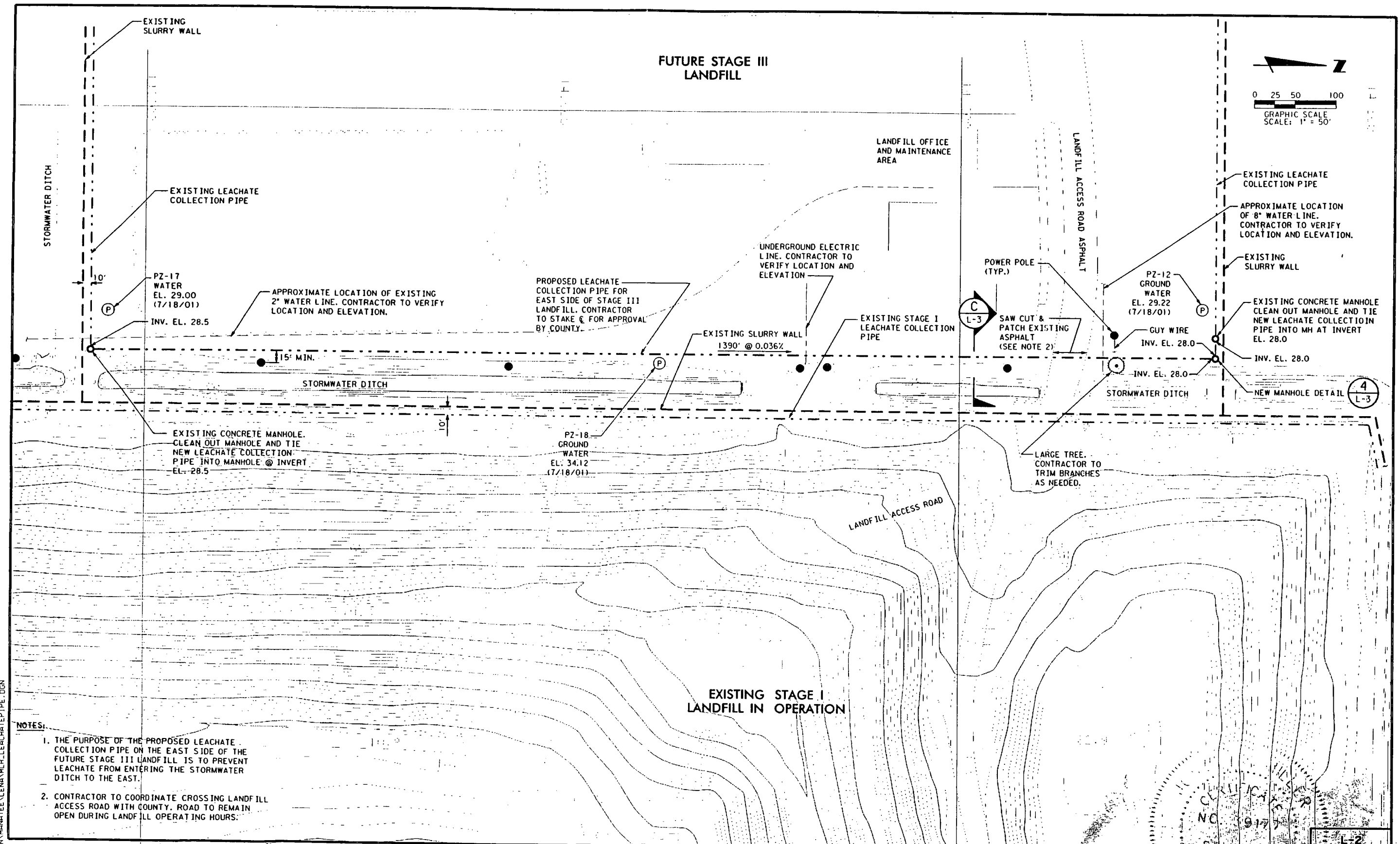
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JOB NO. 120498.02
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CHECKED BY JME
APPROVED BY DBR
SHEET 14

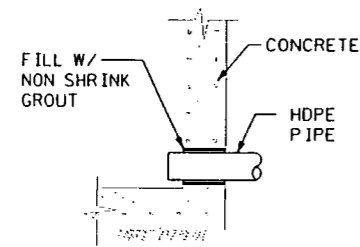
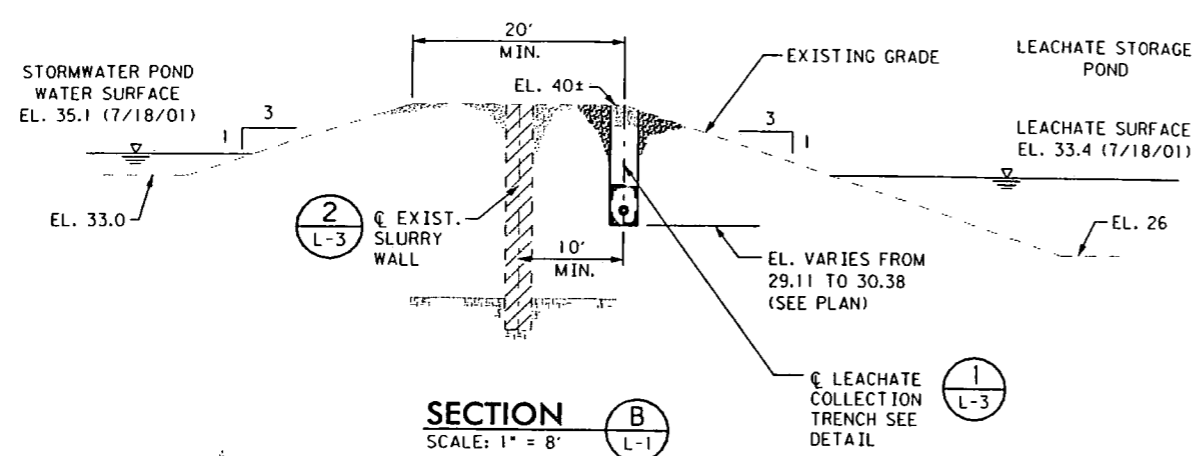


PBS& 330 SOUTH PINEAPPLE AVE. SUITE 113 SARASOTA, FLORIDA 34236 Ph. (941) 954-4036	CLIENT MANATEE COUNTY PROJECT MANAGEMENT DEPARTMENT 1026 26th AVENUE EAST BRADENTON, FLORIDA 34208	PROJECT LENA ROAD LANDFILL CONSTRUCTION PERMIT MODIFICATIONS	TASK LEACHATE COLLECTION SYSTEM EXTENSION AT LEACHATE STORAGE POND PLAN	ORIGINAL: AUG. 2001 REVISIONS: 1 _____ 2 _____ 3 _____ 4 _____ 5 _____	JOSEPH L. MILLER CERTIFICATE NO. 39177 L-1 JOB NO. 00-000.00 DRAWN RGC DESIGNED JLM/RGC CHECKED JLM OC DED SHEET / 8/16/01
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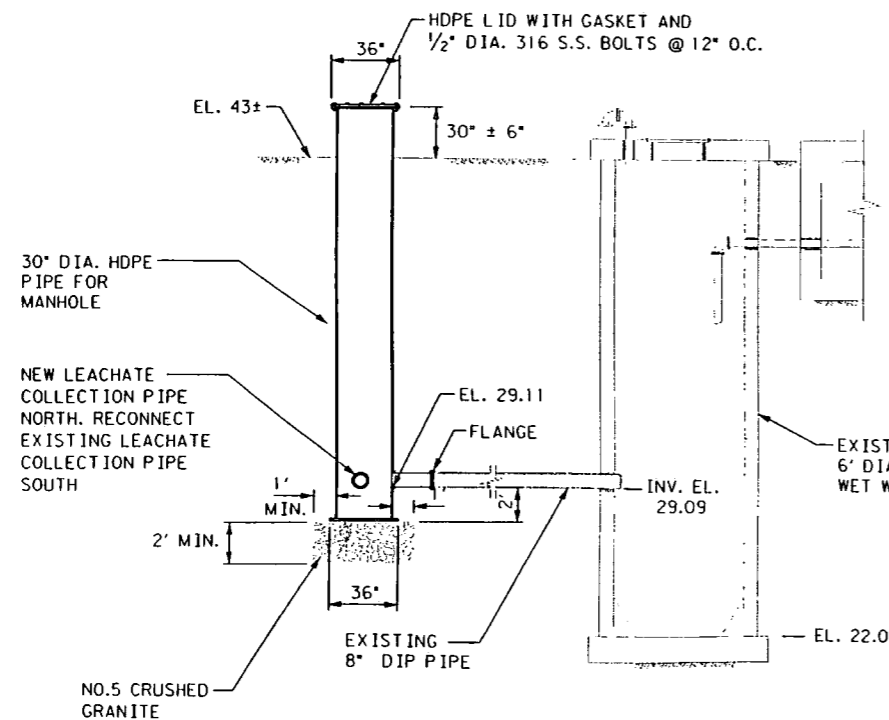
HA-NEWCADD-WASTEMAN-MANATEE-LENA-MLR-GRDPLAN.DGN



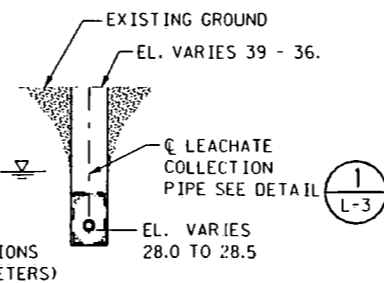
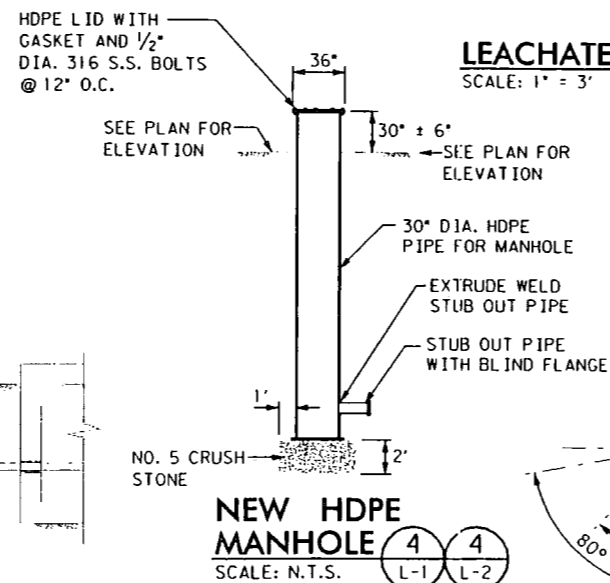
<div><div><div>PBS</div><div>&</div></div><div>330 SOUTH PINEAPPLE AVE. SUITE 113 SARASOTA, FLORIDA 34238 Ph. (941) 954-4036</div></div>	<div>CLIENT</div> <div>MANATEE COUNTY PROJECT MANAGEMENT DEPARTMENT</div> <div>1026 26th AVENUE EAST BRADENTON, FLORIDA 34208</div> <div></div>	PROJECT	TASK	ORIGINAL: AUG. 2001	<div><div>6</div><div>7</div><div>8</div><div>9</div><div>10</div><div>11</div><div>12</div></div> <div><div>REGISTERED</div><div>DESIGNED: JLM/RCC</div><div>CHECKED: JLM</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 8/16/01</div><div>DATE: 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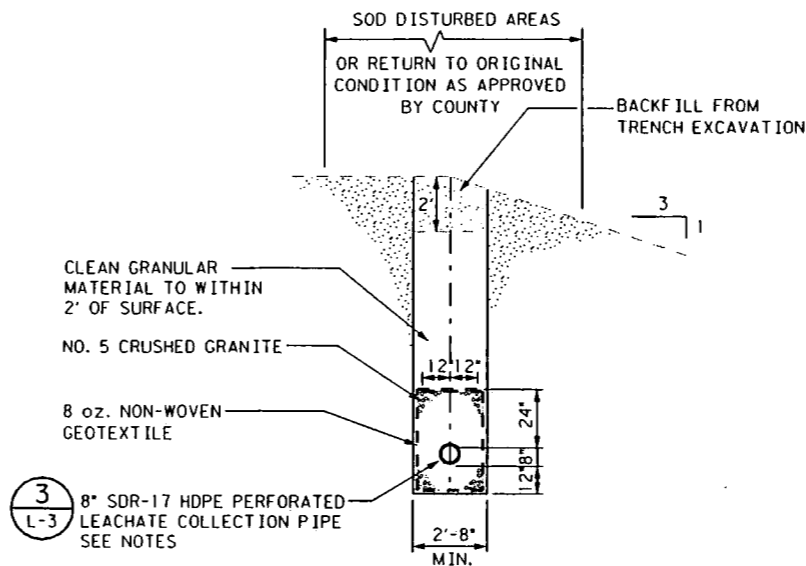
CONNECTION OF PIPE TO EXISTING MANHOLE
N.T.S.



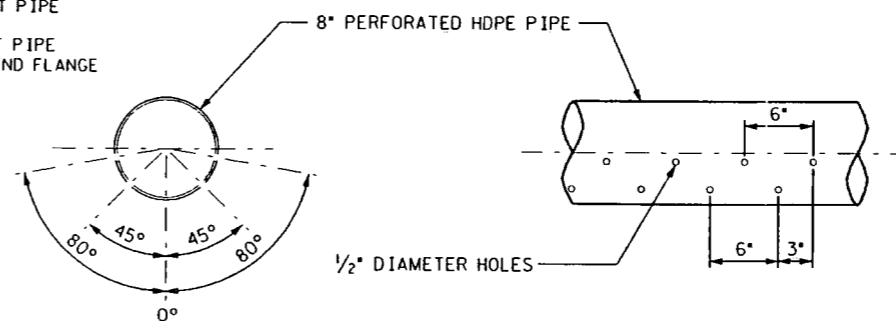
EXISTING PUMP STATION
SCALE: 1" = 4'



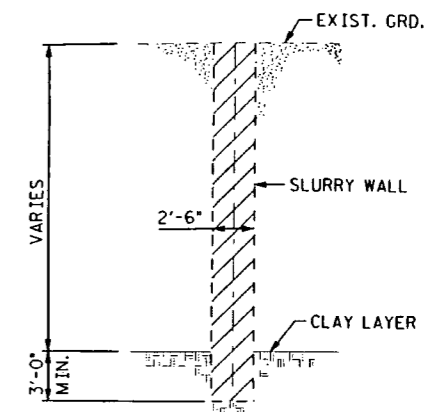
SECTION C
SCALE: N.T.S.



LEACHATE COLLECTION PIPE DETAIL
SCALE: 1" = 3'



PIPE PERFORATION PATTERN
SCALE: N.T.S.



EXISTING SLURRY WALL DETAIL
SCALE: 1" = 5'

(FOR INFORMATION ONLY)

NOTES:

SPECIFICATIONS FOR PIPE:
HIGH DENSITY POLYETHYLENE PIPE

1. THE POLYETHYLENE PIPE SHALL BE HIGH PERFORMANCE, HIGH MOLECULAR WEIGHT, HIGH DENSITY POLYETHYLENE PIPE, CONFORMING TO ASTM D 1248 (TYPE III, CLASS C, CATEGORY 5, GRADE P34). MINIMUM CELL CLASSIFICATION VALUE SHALL BE 345434C AS REFERENCED IN ASTM D 3350. THE MATERIAL DESIGNATION IS PE 3408. THE PIPE SHALL CONTAIN 2 PERCENT CARBON BLACK. THE PIPE SHALL BE DRISCOPE PIPE 1000 (PE 3404) POLYETHYLENE PIPE RESIN AS MANUFACTURED BY PHILLIPS DRISCOPE PIPE, INC., RICHARDSON, TEXAS; PLEXICO, FRANKLIN PARK, ILL.; POLY PIPE INDUSTRIES, INC., GAINSVILLE, TEXAS; OR EQUAL.
2. FITTINGS SHALL BE BUTT FUSION TYPE OR APPROVED EQUAL, MEETING THE REQUIREMENTS OF ASTM D-3261. ALL FITTINGS SHALL BE PRESSURE RATED TO MATCH THE SYSTEM PIPING TO WHICH THEY ARE FUSED. AT THE POINT OF FUSION, THE OUTSIDE DIAMETER AND MINIMUM WALL THICKNESS SHALL MEET THE OUTSIDE DIAMETER AND MINIMUM WALL THICKNESS SPECIFICATIONS OF ASTM F-714 FOR THE SAME SIZE OF PIPE. PIPE CONNECTIONS BETWEEN DISSIMILAR MATERIALS SHALL BE JOINED BY STUD END AND BACKING FLANGE.
3. CONTRACTOR SHALL PROVIDE VIDEO AND REPORT TO COUNTY AS PROOF OF PROPER INSTALLATION. NO. 39177

LENVAC ADD WASTE MANHOLE DETAILS, DON

PBS&
330 SOUTH PINEAPPLE AVE.
SUITE 113
SARASOTA, FLORIDA 34236
Ph. (941) 954-4036

CLIENT
**MANATEE COUNTY
PROJECT MANAGEMENT
DEPARTMENT**
1026 26th AVENUE EAST
BRADENTON, FLORIDA 34208



PROJECT	TASK
LENA ROAD LANDFILL	LEACHATE COLLECTION SYSTEM
CONSTRUCTION PERMIT	SECTIONS AND DETAILS
MODIFICATIONS	

ORIGINAL:	AUG. 2001
REVISIONS:	
1	
2	
3	
4	
5	

DATE	BY	CHKD	APP'D

JOB NO.	00-000-00
DRAWN	RCC
DESIGNED	JLM/RCC
CHECKED	JLM
OC	DED
SHEET	1

8/16/01

APPENDIX A – PIPE STRENGTH CALCULATIONS

COLLECTION PIPE CAPACITY

Given the following information:

- | | |
|---|----------|
| a) S (pipe slope) = | 0.90% |
| b) D (pipe diameter) = | 8 inches |
| c) R (pipe radius) = | 4 inches |
| d) "n" (pipe coefficient of friction) = | 0.012 |

Using Manning Equation:

$$V = 98.3 \times (Rh)^{(2/3)} \times S^{0.5}$$

$$Q = V \times A$$

$$Rh = Af/Pw$$

Where;

- | | |
|-------------------------------------|-------------|
| Q = Flow | (gal./min.) |
| A = Cross sectional area of pipe | (sf) |
| S = Slope | (%) |
| Rh = Hydraulic radius (ID/4) | (ft) |
| V = Velocity | (ft./sec.) |
| D = Pipe diameter | (ft) |
| R = Pipe radius | (ft) |
| Af = Area in flow | (sf) |
| Pw = Wetted perimeter | (ft) |
| O = vertex angle | (rad.) |
| L = length of arc | (ft) |
| Z = angle of perforation row | (degrees) |
| n = Manning coefficient of friction | |

Therefore;

$$z = 80$$

8 - INCH DIAMETER PIPE

PERCENTAGE OF PIPE FILLED		0.25	0.5	0.75	1	0.41
$O = 2 \times \arccos((R-h)/(R))$	(rad.)	2.0944	3.1416	4.1888	6.2832	2.7925
$Af = 1/2 \times R^2(O - \sin O)$	(sf)	0.0682	0.1745	0.2808	0.3491	0.1361
$Pw = O \times R$	(ft)	0.6981	1.0472	1.3963	2.0944	0.9308
$Rh = Af/Pw$	(ft)	0.0978	0.1667	0.2011	0.1667	0.1463
S	(%)	0.0090	0.0090	0.0090	0.0090	0.0090
$V = (1.48/n) \times (Rh)^{(2/3)} \times S^{0.5}$	(ft./sec.)	2.4828	3.5435	4.0165	3.5435	3.2479
$Q = V \times Af$	(cfs)	0.1694	0.6185	1.1279	1.2369	0.4422
Q	(gpm)	76.04	277.56	506.21	555.13	198.45



CHK. BY: JLM
DATE: 37113
SHEET NO.: 2
JOB NO.: 12-0498.02

Subject: MANATEE COUNTY - LENA ROAD LANDFILL

FLOW TO BE COLLECTED BY COLLECTION PIPE

Assumptions:

- a) W (Cell width) = 550 (ft)
- b) L (pipe length) = 765 (ft)
- c) S (pipe slope) = 0.90%
- d) E (impingement rate) = 1217.8 (cf/ac/day) Help Model (peak daily value)
9109.144 (gal/ac-day)

Required header flow:

$Q_{ph} = E \times (W \times L) / (43560 \times 24 \times 60) = 61.10 \text{ (gpm)}$

Minimum required factor of safety (F.S.) is 2.

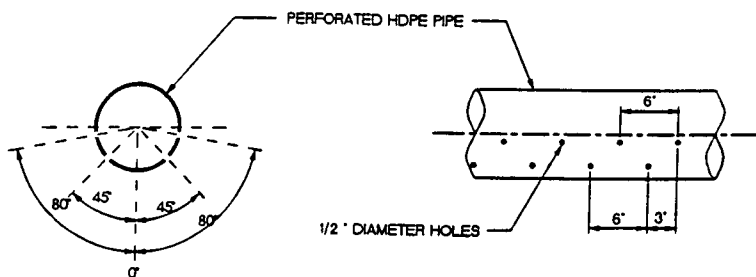
% pipe filled	Qph (gpm)		Qr (gpm)	F.S. = Qp/Qr
0.25	76.04		61.10	1.24
0.50	277.56		61.10	4.54
0.75	506.21		61.10	8.28
1.00	555.13		61.10	9.09
0.41	198.45		61.10	3.25

Subject: MANATEE COUNTY - LENA ROAD LANDFILL

FLOW THROUGH PERFORATIONS IN COLLECTION PIPE

Given:

- | | |
|-----------------------------------|------------------------------|
| a) H (holes per foot) = | 6 |
| b) d (diameter of perforations) = | 0.5 (inches) |
| c) D (pipe diameter) = | 8 (inches) |
| d) R (pipe radius) = | 4 (inches) |
| e) C (discharge coefficient) = | 0.61 (square edge orifice) |
| f) h (head over orifice) = | 0.0625 (1 inch between rows) |
| g) s (perforations per grid) = | 2 (perforations) |
| h) m (grid spacing) = | 3 (inches) |



NOTES:

1. σ CORRESPONDS TO PIPE INVERT.
2. PROVIDE FOUR 1/2" DIAMETER PERFORATIONS AS SHOWN 6" O.C.

$$Q = 19.636 \times C \times d^2 \times h^{0.5}$$

Where:

- Q = flow
 d = diameter of orifice
 h = differential head at orifice
 C = discharge coefficient

Therefore:

Q = 0.7486225 (gpm/hole)
 H = 6
 Q = Q x H = 4.49 (gpm/foot of pipe)
 F (flow of leachate per length of pipe) = $Qr/L = 0.07987114$ (gpm/foot of pipe)
 F.S. = Q/F
 F.S. = 56.2372703 > 2 OK



Subject: MANATEE COUNTY - LENA ROAD LANDFILL

CHK. BY: JLM
DATE: 37113
SHEET NO.: 4
JOB NO.: 12-0498.02

PIPE STRENGTH CALCULATION

REFERENCES:

- 1) DRISCOPIPE "Systems Design" type 3: Buried pipelines. page 34-47
- 2) "Avoiding Failure of Leachae Collection and Cap Drainage Systems", table 12
Design Equations for Calculating Vertical Loading Stresses On Flexible Pipe
Used in Landfill Drainage Systems, EPA June 1986, PB 86-208733

GIVEN:

- | | |
|-----------------------------------|---------------|
| a) Dh (header pipe diameter) = | 8 (inches) |
| b) Y (landfill height) = | 106 (ft) |
| c) U (waste unit weight) = | 1,300 (lb/cy) |
| d) Pf (trailer front axle load) = | 40,000 (lbs) |
| e) Pr (trailer rear axle load) = | 40,000 (lbs) |
| f) J (distance between axle) = | 15 (ft) |
| g) M (drainage layer thickness) = | 2 (ft) |

CALCULATIONS:

- a) Determine the total external pressure at the top of the pipe.

$$P_t = P_s + P_l + P_i \quad (\text{Driscopipe catalog page 41})$$

Where:

P_t = Total external soil pressure at the top of pipe.

P_s = Total "Static Load" pressure.

P_l = Total "Live Load" pressure

P_i = Total effective external pressure due to negative internal
operating pressure (vacuum)

Note:

For our calculation we are going to evaluate two case scenarios:

- 1) Considering trailer trucks traffic on the 2 feet of drainage sand.
(static load is minimum).
- 2) Considering the maximum static load that will occur when the cell
is full. live load will be disregarde because it becomes negligible

1) Considering Truck Traffic on 2 feet of Drainage Sand.

For:

$$P1 = (3 \times W \times Z^3) / (2 \times \pi \times R^5)$$

(1) (Driscopipe catalog, page 44)

$$R = (x^2 + y^2 + z^2)^{0.5}$$

Where:

Z = depth of burried pipe.

R = straight line distance from point of load to top of pipe.

W = 1.5 x vehicle load.

P1 = "live load" produced by the rear wheel axle

P2 = "live load" produced by the front wheel axle

$$P1 = P1 + P2$$

For:

a) "Live load" produced by the rear wheel axle

$$Rr = 15.13 \text{ (ft)}$$

$$Z = 2 \text{ (ft)}$$

$$Pr = 40000 \text{ (lbs)}$$

$$P1 = 0.289 \text{ (lbs/sf)} \quad 0.002 \text{ (psi)}$$

b) "Live load" produced by the front wheel axle

$$Rf = 2 \text{ (ft)}$$

$$Z = 2 \text{ (ft)}$$

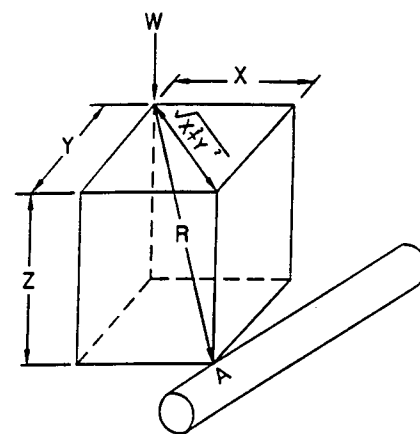
$$Pf = 40000 \text{ (lbs)}$$

$$P2 = 7,161.97 \text{ (lbs/sf)} \quad 49.74 \text{ (psi)} \quad \text{(Live load)}$$

Therefore: $P1 = P1 + P2 = 49.74 \text{ (psi)}$ (Total live load)

For: $Ps = U \times M = 0.67 \text{ (psi)}$ (Static load)

And: $Pt1 = Ps + P1 + P2 = 50.41 \text{ (psi)}$ (Total soil pressure)



2) Considering Maximum Static Load Will Occur When Cell is Full.

Where:

$$Ps = U \times (M + Y)$$

$$U = 1300 \text{ (lbs/cy)}$$

$$M = 2 \text{ (ft)}$$

$$Y = 106 \text{ (ft)}$$

Therefore: $Ps = 36.11 \text{ (psi)}$

And: $Pt2 = Ps + 0 + 0 = 36.11 \text{ (psi)}$

Since $Pt2 < Pt1$, $Pt1$ will be evaluated for the sizing of the pipes.

Referring to EPA's "Avoiding Failure...Drainage Systems" Table 12

(page 44), the strength of the pipe is reduced because of the

perforations

Subject: MANATEE COUNTY - LENA ROAD LANDFILL

PIPE STRENGTH CONSIDERING PERFORATIONS

Increased vertical stress for perforated pipe:

$$P_d = 12 / (12 - L_p) \times P_1$$

Where: P_1 (Static soil pressure) = 50.41 (psi)
 P_d = design load
 L_p = cumulative length (in inches) of perforations per foot of pipe = 5 (inches)

Therefore: P_d = 86.41 (psi)

DETERMINE THE "SDR" OF THE PIPE

To determine the "SDR" of the pipe we are going to use the method proposed by "DRISCOPIPE" "Design System".

- Method 1 - Simplified Burial Design
- Method 2 - Wall Crushing Design.
- Method 3 - Wall Buckling Design.
- Method 4 - Ring Deflection

Method 1 - Simplified Burial Design.

- 1) Select a soil modulus value (E) from table (1)
- 2) Determine the "SDR" value for the pipe using table (2)

Therefore:

Max. External Pressure	SDR
102	13.5
117	15.5
126	17

TABLE 1. VALUES OF E'

Soil Type of Initial Backfill Material		E' (psi) for Degree of Compaction Proctor Density			
		Loose	Slight (70-85 %)	Moderate (85-95 %)	High (95 %)
I	Manufactured angular, granular materials (crushed stone or rock, broken coral, cinders, etc.)	1,000	3,000	3,000	3,000
II	Coarse grained soils with little or no fines	N.R.	1,000	2,000	3,000
III	Coarse grained soils with fines	N.R.	N.R.	1,000	2,000
IV	Fine-grained soils	N.R.	N.R.	N.R.	N.R.
V	Organic soils (peat, muck, clay, etc.)	N.R.	N.R.	N.R.	N.R.

N.R. = Not Recommended for use by ASTM D2321 for pipe wall support

Reference: DRISCOPIPE

TABLE 2.

SDR	Maximum Burial Depth, ft. in dry soil of 100 lbs/cu. ft.				Maximum External Pressure psi			Maximum Deflection, % after installation		
	Soil Modulus, psi*				Soil Modulus, psi*			Soil Modulus, psi*		
	1000		2000	3000	1000	2000	3000	1000	2000	3000
32.5	25		32	37	17	22	26	1.7	0.9	0.6
26	33		45	52	23	31	36	2.3	1.2	0.8
21	46		61	71	32	42	49	3.2	1.6	1.1
19	52		69	81	36	48	56	3.6	1.8	1.2
17	61		121	181	42	84	126	4.2	2.1	1.4
15.5	56		112	168	39	78	117	3.9	2	1.3
13.5	49		98	147	34	68	102	3.4	1.7	1.1
11	39		78	117	27	54	81	2.7	1.4	0.9
9.3	33		68	101	23	47	70	2.3	1.2	0.8
8.3	30		61	89	21	42	62	2.1	1.1	0.7
7.3	26		52	79	18	36	55	1.8	0.9	0.6

* assumes no external loads

Reference: DRISCOPIPE



Subject: MANATEE COUNTY - LENA ROAD LANDFILL

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Method 2 - Wall Crushing Design.

$$S_a = 0.5 \times (\text{SDR} - 1) \times P_t$$

Where: S_a = Actual compressive stress (psi)
 SDR = Standard dimension ratio
 P_t = Total soil pressure (psi)

For: $\text{SDR} = 13.5$
 $P_t = 86.41 \text{ (psi)}$

Therefore: $S_a = 540.07 \text{ (psi)}$

And: $F.S. = 1500/S_a \geq 1$
 $F.S. = 2.78 > 1$ OK

For: $\text{SDR} = 15.5$
 $P_t = 86.41 \text{ (psi)}$

Therefore: $S_a = 626.48 \text{ (psi)}$

And: $F.S. = 1500/S_a \geq 1$
 $F.S. = 2.39 > 1$ OK

For: $\text{SDR} = 17$
 $P_t = 86.41 \text{ (psi)}$

Therefore: $S_a = 691.29 \text{ (psi)}$

And: $F.S. = 1500/S_a \geq 1$
 $F.S. = 2.17 > 1$ OK

Method 3 - Wall Buckling Design.

$$P_{cb} = 0.8 \times (E' \times P_c)^{0.5}$$

$$P_c = 2.32(E')/(SDR)^3$$

If $P_t > P_{cb}$ the pipe would collapse

Where:

P_{cb} = Critical buckling soil pressure

E' = Soil Modulus

P_c = Hydrostatic critical collapse differential pressure.

E' = Tensile modulus of elasticity

Given:

SDR =	17	(Standard Dimension Ratio)
Sa =	691.29	(actual compressive stress)
Pt =	86.41 (psi)	(Total soil load)
E =	14,000	(Modulus of elasticity, 50 yrs of life, ref: Driscopipe see att.)
E' =	3,000	(Modulus of elasticity, based on soil type)

Therefore:

P_c =	6.61 (psi)
P_{cb} =	112.66 (psi)
$P_{cb} > P_t$	Ok

For:

F.S. = P_{cb}/P_t	
F.S. =	1.30 Ok

Method 4 - Ring Deflection

$$dY/D = (.0025)(SDR)$$

Where:

D = pipe outside diameter (inches)

dY = Vertical deflection (inches)

SDR = Standard Dimension Ration

Given:

D =	8 (inches)	
SDR =	17	
dY/D =	4.25%	< 4.3% Ok (see table below)



Subject: NEW HANOVER COUNTY SECURE LANDFILL
CELL 5 LATERAL EXPANSION

CHK. BY: SEM
DATE: 37113
SHEET NO.: 10
JOB NO.: 12-0498.02

Table 3

SDR	Allowable Ring Deflection
32.5	8.1%
26.0	6.5%
21.0	5.2%
19.0	4.7%
17.0	4.3%
15.5	3.9%
13.5	3.4%
11.0	2.7%