

Report

FIVE
SEP 11 1995
of Environmental Pro.
SOUTHWEST DISTRICT

**WEST PASCO COUNTY LANDFILL
PERMIT MODIFICATION APPLICATION FOR
LEACHATE MANAGEMENT SYSTEM**

August, 1995

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APPENDICES

Appendix A - Additional Information For Leachate Storage Tank

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Appendix C - Stormwater Retention Calculations



Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, FL 32399-2400

DER Form # 17-701.900(1)

Form Title Solid Waste Management Facility Permit

Effective Date _____

DER Application No. _____

(Filled by DER)

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

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) Rule 17-701. 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 17, FAC, and Rule 17-701.320(5)(c), FAC, shall be submitted with the application by check, payable to the Department of Environmental Regulation (DER).

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 "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 packet indicated. The application shall include all information, drawings, and reports necessary to evaluate the facility. Information required to complete the application is listed on 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 the 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 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.

Application Codes

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

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

4. Facility name: Pasco County Resource Recovery Facility Class I Landfill

5. DER ID number: _____ County: Pasco

6. Facility location (main entrance): Hayes Road, Springhill, Florida

7. Location coordinates:

Section: 24,25,26 Township: 24S Range: 17E

UTMs: Zone _____ km E _____ km N

Latitude: 28 ° 22 ' 30 " Longitude: 82 ° 34 ' 00 "

8. Applicant name (operating authority): Pasco County Board of County Commissioners

Mailing address: 7536 State Street, New Port Richey, Florida 33654
Street or P.O. Box City State Zip

Contact person: Douglas Bramlett Telephone: (813) 847-8145

Title: Assistant County Administrator - Utilities Services Branch

- Authorized agent/Consultant: Camp Dresser & McKee Inc.
- Mailing address: One Tampa City Center, Suite 1750, Tampa, Florida 33602
Street or P.O. Box City State Zip
- Contact person: Daniel Strobridge Telephone: (813) 221-2833
- Title: _____
3. Landowner (if different than applicant): N/A
- Mailing address: _____
Street or P.O. Box City State Zip
- Contact person: N/A Telephone: ()
1. Cities, towns and areas to be served: Entire Pasco County including the six
incorporated municipalities
2. Population to be served:
Current: 295,000 Five-Year Projection: 318,000
3. Volume of solid waste to be received: 225 ~~XXXXXXX~~ tons/day ~~million/day~~
4. Date site will be ready to be inspected for completion: _____
5. Estimated life of facility: 20 years (for leachate disposal system)
5. Estimated costs:
Total Construction: \$ 4,000,000 Closing Costs: \$ -0-
7. Anticipated construction starting and completion dates:
From: Dec. 1995 To: Feb. 1997 (for leachate disposal system)

B. DISPOSAL FACILITY GENERAL INFORMATION

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

The proposed facilities include a 2-million gallon leachate storage tank and a 35,000-gpd treatment system. Leachate pumped from the existing pump station to the storage tank treatment system will be fed from the storage tank. Treated leachate will be reused in adjacent WTE facility.

2. Facility site supervisor: Mr. Vince Mannella
Title: Solid Waste Facility Manager Telephone: (813) 861-3006

3. Disposal area: Total 160 acres; Used _____ acres; Available _____ acres

4. Weighing scales used: Yes ☒ No ☐

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

6. Charge for waste received: N/A \$/yds³ _____ \$/ton

7. Surrounding land use, zoning:

Residential	<input checked="" 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 type="checkbox"/>	C & D debris	<input type="checkbox"/>
Commercial	<input type="checkbox"/>	Shredded/cut tires	<input type="checkbox"/>
Incinerator / WTE ash	<input checked="" type="checkbox"/>	Yard trash	<input type="checkbox"/>
Treated biohazardous	<input type="checkbox"/>	Septic tank	<input type="checkbox"/>
Water treatment sludge	<input type="checkbox"/>	Industrial	<input type="checkbox"/>
Air treatment sludge	<input type="checkbox"/>	Industrial sludge	<input type="checkbox"/>
Agricultural	<input type="checkbox"/>	Domestic sludge	<input type="checkbox"/>
Asbestos	<input type="checkbox"/>		
Other	<input checked="" type="checkbox"/>		

9. Salvaging permitted: Yes ☐ No ☒

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

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

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: _____

15. Hours of operation: 7:00 am - 5:00 pm

16. Days Working Face covered: N/A

17. Elevation of water table: 37 Ft. NGVD

8. Number of monitoring wells: 19 existing

9. Number of surface monitoring points: None

0. Gas controls used: Yes ☐ No ☐ Type controls: Active ☐ Passive ☒
Gas flaring: Yes ☐ No ☒ Gas recovery: Yes ☐ No ☒

1. Landfill Unit - liner type:

Natural soils	<input type="checkbox"/>	Double geomembrane	<input checked="" 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 type="checkbox"/>		
Other	<input type="checkbox"/>		

2. Leachate collection method:

Collection pipes	<input checked="" type="checkbox"/>	Sand layer	<input checked="" type="checkbox"/>
Geonets	<input checked="" type="checkbox"/>	Gravel layer	<input type="checkbox"/>
Well points	<input type="checkbox"/>	Interceptor trench	<input type="checkbox"/>
Perimeter ditch	<input type="checkbox"/>	None	<input type="checkbox"/>
Other	<input type="checkbox"/>		

3. Leachate storage method:

Tanks	<input checked="" type="checkbox"/>	Surface impoundments	<input type="checkbox"/>
Other	<input type="checkbox"/>		

4. 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 type="checkbox"/>
Other	<input checked="" type="checkbox"/>	Evaporation/Distillation	

5. Leachate disposal method:

Recirculated	<input type="checkbox"/>	Pumped to WWTP	<input 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 checked="" type="checkbox"/>	Reuse at power plant	

5. For leachate discharged to surface waters:

Name and Class of receiving water: N/A

7. Storm Water:

Collected: Yes ☒ No ☐ Type of treatment: Wet Retention

Name and Class of receiving water: N/A

3. Management and Storage of Surface Waters (MSSW) Permit number or status: _____

C. MATERIALS RECOVERY / VOLUME REDUCTION FACILITY GENERAL INFORMATION [NOT APPLICABLE]

1. Provide brief description of materials recovery / volume reduction facility design 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	[]	Composting	[]
Pulverizer / shredder	[]	Materials recovery	[]
Compactor/baling	[]	Energy recovery	[]
Sludge concentration	[]	Pyrolysis	[]
Other	[]		

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 (17-701.320, FAC)

S LOCATION N/A N/C

<u>X</u>	<u>Section 2.1</u>	<u> </u>	<u> </u>	1.	Six copies, at minimum, of the completed application form, all supporting data and reports; (17-701.320(5)(a), FAC)
<u>X</u>	<u>Section 2.2</u>	<u> </u>	<u> </u>	2.	Engineering and/or professional certification (signature, date and seal) provided on the application and all engineering plans, reports and supporting information for the application; (17-701.320(6), FAC)
<u>X</u>	<u>Section 2.3</u>	<u> </u>	<u> </u>	3.	A letter of transmittal to the Department; (17-701.320(7)(a), FAC)
<u>X</u>	<u>Section 2.4</u>	<u> </u>	<u> </u>	4.	A completed application form dated and signed by applicant; (17-701.320(7)(b), FAC)
<u>X</u>	<u>Section 2.5</u>	<u> </u>	<u> </u>	5.	Permit fee specified in Rule 17-4.050, FAC and Rule 17-1.320(5)(c), FAC in check or money order, payable to the Department; (17-701.320(7)(c), FAC)
<u>X</u>	<u>Section 3.0</u>	<u> </u>	<u> </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; (17-701.320(7)(d), FAC)
<u>X</u>	<u>Section 3.3</u>	<u> </u>	<u> </u>	7.	Operation Plan; (17-701.320(7)(e)1, FAC)
<u>X</u>	<u>Section 3.4</u>	<u> </u>	<u> </u>	8.	Contingency Plan; (17-701.320(7)(e)2, FAC)
<u> </u>	<u> </u>	<u> </u>	<u> </u>	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; (17-702.320(7)(f), FAC)
<u> </u>	<u> </u>	<u> </u>	<u>X</u>	a.	A regional map or plan with the project location
<u> </u>	<u> </u>	<u> </u>	<u>X</u>	b.	A vicinity map or aerial photograph no more than 1 year old;
<u> </u>	<u> </u>	<u> </u>	<u>X</u>	c.	A site plan showing all property boundaries certified by a registered Florida land surveyor
<u> </u>	<u> </u>	<u> </u>	<u>X</u>	d.	Other necessary details to support the engineering report.
<u> </u>	<u> </u>	<u> </u>	<u>X</u>	10.	Proof of property ownership or a copy of appropriate agreements between the facility operator and proper owner authorizing use of property; (17-701.320(7)(g), FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
—	—	—	<u>X</u>	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; (17-701.320(7)(h),FAC)
—	—	<u>X</u>	—	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; (17-701.320(7)(i),FAC)
—	—	<u>X</u>	—	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; (17-702.320(8),FAC)
—	—	<u>X</u>	—	14. Provide a description of how the requirements for airport safety will be achieved including proof of required notices if applicable; (17-701.320(12),FAC)

E. LANDFILL PERMIT GENERAL REQUIREMENTS (17-701.330, FAC)

_____	_____	_____	_____	1.	Vicinity map or aerial photograph no more than 1 : 1 scale and of appropriate scale showing land use and 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 vicinity. All significant features shall be labeled (17-701.330(4)(a), FAC)
_____	_____	_____	_____	2.	Vicinity map or aerial photograph no more than 1 : 1 scale showing all airports that are located within 1 mile of the proposed landfill; (17-701.330(4)(b), FAC)
X	Section 3.1	_____	_____	3.	Plot plan with a scale not greater than 200 feet to 1 inch showing; (17-701.330(4)(c), FAC)
X	Section 3.1	_____	_____	a.	Dimensions;
_____	_____	_____	X	b.	Locations of proposed and existing water quality monitoring wells;
_____	_____	_____	X	c.	Locations of soil borings;
_____	_____	_____	X	d.	Proposed plan of trenching or disposal areas;
_____	_____	_____	X	e.	Cross sections showing original elevations 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; (17-701.330(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.

5. A report on the landfill describing the following;
(17-701.330(4)(e),FAC)

— — — X

a. The current and projected population and area to be served by the proposed site;

— — — X

b. The anticipated type, annual quantity, and source of solid waste, expressed in tons;

— — — X

c. The anticipated facility life;

— — — X

d. The source and type of cover material used for the landfill.

— — — X

6. Provide evidence that an approved laboratory shall conduct water quality monitoring for the facility in accordance with Rule 17-160,FAC; (17-701.330(4)(h),FAC)

— — — X

7. Provide a statement of how the applicant will demonstrate financial responsibility for the closing and long-term care of the landfill; (17-701.330(4)(i),FAC)

8. GENERAL CRITERIA FOR LANDFILLS (17-701.340,FAC)

— — — X

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; (17-701.340(4)(b),FAC)

— — — X

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; (17-701.340(4)(c),FAC)

— — — X

3. Describe what methods shall be taken to screen the landfill from public view where such screening can practically be provided; (17-701.340(4)(d),FAC)

G. LANDFILL CONSTRUCTION REQUIREMENTS (17-701.400, FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
—	—	—	<u>X</u>	1. Describe how the landfill shall be designed so that solid waste disposal units will be constructed closed at planned intervals throughout the design period of the landfill; (17-701.400(2), FAC)
				2. Landfill liner requirements; (17-701.400(3), FAC)
				a. General construction requirements; (17-701.400(3)(a), FAC):
—	—	—	<u>X</u>	(1) Provide test information and documentation to ensure the liner will be constructed with materials that have appropriate physical, chemical, and mechanical properties to prevent failure;
—	—	—	<u>X</u>	(2) Document foundation is adequate to prevent liner failure;
—	—	—	<u>X</u>	(3) Constructed so bottom liner will not be adversely impacted by fluctuations of ground water;
—	—	—	<u>X</u>	(4) Designed to resist hydrostatic uplift; bottom liner located below seasonal high ground water table;
—	—	—	<u>X</u>	(5) Installed to cover all surrounding area which could come into contact with waste or leachate.
				b. Composite liners; (17-701.400(3)(b), FAC)
—	—	—	<u>X</u>	(1) Upper geomembrane thickness and properties;
—	—	—	<u>X</u>	(2) Design leachate head for primary LCRS including leachate recirculation when appropriate;
—	—	—	<u>X</u>	(3) Design thickness in accordance with Table 1 and number of lifts planned for lower secondary component.
				c. Double liners; (17-701.400(3)(c), FAC)
—	—	—	<u>X</u>	(1) Upper and lower geomembrane thicknesses and properties;
—	—	—	<u>X</u>	(2) Design leachate head for primary LCRS; limit the head to one foot above the liner;
—	—	—	<u>X</u>	(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;
(17-701.400(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;
(17-701.400(3)(e), FAC)

—	—	—	X
---	---	---	---

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

—	—	—	X
---	---	---	---

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

—	—	—	X
---	---	---	---

- (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
---	---	---	---

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

—	—	—	X
---	---	---	---

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

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

f. Standards for soil components (701.400(3)(f), FAC):

—	—	—	X	(1) Description of construction procedure including overexcavation and backfilling; preclude structural inconsistencies; procedures for placing and compacting component in layers;
—	—	—	X	(2) Demonstration of compatibility of the component with actual or simulated leachate in accordance with EPA Test Method 9100 or an equivalent test method;
—	—	—	X	(3) Procedures for testing in-situ soils demonstrate they meet the specifications for soil liners;
—	—	—	X	(4) Specifications for soil component of liner including at a minimum:
—	—	—	X	(a) Allowable particle size distribution; Atterberg limits, shrinkage limit
—	—	—	X	(b) Placement moisture and dry density criteria;
—	—	—	X	(c) Maximum laboratory-determined saturated hydraulic conductivity using simulated leachate;
—	—	—	X	(d) Minimum thickness of soil liner;
—	—	—	X	(e) Lift thickness;
—	—	—	X	(f) Surface preparation (scarification)
—	—	—	X	(g) Type and percentage of clay mineral within the soil component;
—	—	—	X	(5) Procedures for constructing and using field test section to document the design; saturated hydraulic conductivity; thickness can be achieved in the field.

3. Leachate collection and removal system (LCRS); (17-701.400(4), FAC)

a. The primary and secondary LCRS requirements; (17-701.400(4)(a), FAC)

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

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

(4) Have method for testing and cleaning clogged pipes or contingent designs for rerouting leachate around failed areas;

b. Primary LCRS requirements; (17-701.400(4)(b), FAC)

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

(2) Total thickness of 24 inches of material chemically resistant to the waste and leachate;

(3) Bottom slope design to accommodate for predicted settlement;

(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; (17-701.400(5), FAC)

a. Describe general procedures for recirculating leachate;

b. Describe procedures for controlling leachate runoff and minimizing mixing of leachate runoff with storm water;

c. Describe procedures for preventing perched water conditions and gas buildup;

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;

e. Describe methods of gas management to control odors and migration of methane;

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.

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>
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5. Leachate storage tanks and leachate surf
impoundments; (17-701.400(6), FAC)

a. Surface impoundment requirements;
(17-701.400(6)(b), FAC)

(1) Documentation that the design of
bottom liner will not be adversely impac
by fluctuations of the ground water;

(2) Designed in segments to allow
inspection and repair as needed with
interruption of service;

(3) General design requirements;

(a) Double liner system consisting of
upper and lower 60-mil mini
thickness geomembrane;

(b) Leak detection and collection sys
with hydraulic conductivity \geq
cm/sec;

(c) Lower geomembrane placed on subbas
6 inches thick with $k \leq 1 \times 10^{-5}$ cm/se

(d) Design calculation to pred
potential leakage through the up
liner;

(e) Daily inspection requirements ;
notification and corrective act
requirements if leakage rates exce
that predicted by desi
calculations;

(4) Description of procedures to preve
uplift, if applicable;

(5) Design calculations to demonstrate minim
two feet of freeboard will be maintained

(6) Procedures for controlling vectors and of
site odors.

b. Above-ground leachate storage tanks;
(17-701.400(6)(c), FAC)

(1) Describe tank materials of construction a
ensure foundation is sufficient to suppo
tank;

(2) Describe procedures for cathodic protecti
if needed for the tank;

<u>X</u>	<u>Section 3.1.1</u>	<u>—</u>	<u>—</u>
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<u>X</u>	<u>Section 3.1.2</u>	<u>—</u>	<u>—</u>
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LOCATION N/A N/C

Section 3.1.3

(3) Describe exterior painting and interior lining of the tank to protect it from the weather and the leachate stored;

Section 3.1.4

(4) Describe secondary containment design to ensure adequate capacity will be provided and compatibility of materials of construction;

Section 3.1.5

(5) Describe design to remove and dispose of stormwater from the secondary containment system;

Section 3.1.6

(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;

Section 3.1.7

(a) Overfill prevention system weekly;

Section 3.1.7

(b) Exposed tank exteriors weekly;

Section 3.1.7

(c) Tank interiors when tank is drained or at least every three years;

Section 3.1.7

(d) Procedures for immediate corrective action if failures detected;

Section 3.1.7

(e) Inspection reports available for department review.

c. Underground leachate storage tanks;
(17-701.400(6)(d), FAC)

 X

(1) Describe materials of construction;

 X

(2) A double-walled tank design system to be used with the following requirements;

 X

(a) Interstitial space monitoring at least weekly;

 X

(b) Corrosion protection provided for primary tank interior and external surface of outer shell;

 X

(c) Interior tank coatings compatible with stored leachate;

 X

(d) Cathodic protection inspected weekly and repaired as needed;

 X

(3) Describe an overfill prevention system such as level sensors, gauges, alarms and shutoff controls to prevent overfilling and provide for weekly inspections;

S	LOCATION	N/A	N/C	
		X		(4) Inspection reports available for department review.
			X	d. Schedule provided for routine maintenance LCRS; (17-701.400(6)(e), FAC)
				6. Liner systems construction quality assurance (CQA (17-701.400(7), FAC)
				a. Provide CQA Plan including:
				(1) Specifications and construction requirements for liner system;
				(2) Detailed description of quality control testing procedures and frequencies;
				(3) Identification of supervising professional engineer;
				(4) Identify responsibility and authority all appropriate organizations and personnel involved in the construction project;
				(5) State qualifications of CQA professional engineer and support personnel;
				(6) Description of CQA reporting forms and documents;
				b. An independent laboratory experienced in testing of geosynthetics to perform required testing;
				7. Soil Liner CQA (17-701.400(8), FAC)
		X		a. Documentation that an adequate borrow source has been located with test results or description of the field exploration and laboratory testing program to define a suitable borrow source;
		X		b. Description of field test section construction and test methods to be implemented prior to liner installation;
		X		c. Description of field test methods including rejection criteria and corrective measures to insure proper liner installation.
			X	8. Surface water management systems; (17-701.400(9), FAC)
				a. Design of surface water management system to isolate surface water from waste filled areas and to control stormwater run-off;
X	Section 3.1.5			b. Details of stormwater control design including retention ponds, detention ponds, and drainage ways;

S	LOCATION	N/A	N/C
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9. Gas control systems; (17-701.400(10),FAC)

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

- Design details for gas control system including collection pipes and vents, and passive venting or vacuum extraction details;
- Documentation that the gas control system will not impact the liner or leachate control system;
- Proposed methods of odor control including flaring designs in accordance with Chapter 17-296, FAC;
- Description of a routine gas monitoring program to ensure gas control system is operating properly including:
 - Location of monitoring points;
 - Requirements for quarterly sampling of all monitoring points;
 - Description of corrective measures to be completed within 60 days of detection of elevated levels of explosive gases;
- Description of condensate collection and disposal methods.

10. Landfill gas recovery facilities; (17-701.400(11),FAC)

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

- Information required in Rules 17-701.320(7) and 17-701.330(4), FAC supplied;
- Information required in Rule 17-701.600(4), FAC supplied where relevant and practical;
- Estimate of current and expected gas generation rates and description of condensate disposal methods provided;
- Description of procedures for condensate sampling, analyzing and data reporting provided;
- Closure plan provided describing methods to control gas after recovery facility ceases operation;
- 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; (17-701.400(12),FAC)

H. HYDROGEOLOGICAL INVESTIGATION REQUIREMENTS (17-701.410, FAC)

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: confining layers, semi-confining layers, and 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.

GEOTECHNICAL INVESTIGATION REQUIREMENTS (17-701.420,FAC)

S LOCATION N/A N/C

1. Submit a geotechnical site investigation report defining the engineering properties of the site including at least the following:

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

a. Description of subsurface conditions including soil stratigraphy and ground water table conditions;

b. Investigate for the presence of muck, previously filled areas, soft ground, lineaments and sink holes;

c. Estimates of average and maximum high water table across the site;

d. Foundation analysis including:

(1) Foundation bearing capacity analysis;

(2) Total and differential subgrade settlement analysis;

(3) Slope stability analysis;

e. Description of methods used in the investigation and includes soil boring logs, laboratory results, analytical calculations, cross sections, interpretations and conclusions;

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

2. Report signed, sealed and dated by PE or PG.

J. VERTICAL EXPANSION OF LANDFILLS (17-701.430, 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 contribute to leachate leakage from the exist landfill or adversely affect the closure design of existing landfill;
—	—	<u>X</u>	—	2. Describe how the vertical expansion over unli landfills will meet the requirements of Rule 17-701.4 FAC with the exceptions of Rule 17-701.430(1)(c), FA
—	—	<u>X</u>	—	3. Provide foundation and settlement analysis for vertical expansion;
—	—	<u>X</u>	—	4. Provide total settlement calculations demonstrating t the final elevations of the lining system, that grav drainage, and that no other component of the design w be adversely affected;
—	—	<u>X</u>	—	5. Minimum stability safety factor of 1.5 for the lin system component interface stability and deep stabili
—	—	<u>X</u>	—	6. Provide documentation to show the surface wa management system will not be adversely affected by 1 vertical expansion;
—	—	<u>X</u>	—	7. Provide gas control designs to prevent accumulation gas under the new liner for the vertical expansion.

K. LANDFILL OPERATION REQUIREMENTS (17-701.500, FAC)

—	—	—	<u>X</u>	1. Provide documentation that landfill will have at lea one trained operator during operation and at least o trained spotter at each working face; (17-701.500(1), FAC)
—	—	—	<u>X</u>	2. Provide a landfill operation plan including procedur for: (17-701.500(2), FAC)
—	—	—	<u>X</u>	a. Designating responsible operating and maintenar personnel;
<u>X</u>	<u>Section 3.1.4</u>	—	—	b. Contingency operations for emergencies;
—	—	—	<u>X</u>	c. Controlling types of waste received at t 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>	<u>Section 3.1.3</u>	—	—	h. Operations of gas, leachate, and stormwat controls;
—	—	—	<u>X</u>	i. Water quality monitoring.

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
—	_____	—	<u>X</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.) (17-701.500(3),FAC)
—	_____	—	<u>X</u>	4. Describe the waste records that will be compiled monthly and provided to the Department quarterly; (17-701.500(4),FAC)
—	_____	—	<u>X</u>	5. Describe methods of access control; (17-701.500(5),FAC)
—	_____	—	<u>X</u>	6. Describe load checking program to be implemented at the landfill to discourage disposal of unauthorized wastes at the landfill; (17-701.500(6),FAC)
				7. Describe procedures for spreading and compacting waste at the landfill that include: (17-701.500(7),FAC)
—	_____	—	<u>X</u>	a. Waste layer thickness and compaction frequencies;
—	_____	—	<u>X</u>	b. Special considerations for first layer of waste placed above liner and leachate collection system;
—	_____	—	<u>X</u>	c. Slopes of cell working face and side grades above land surface, planned lift depths during operation;
—	_____	—	<u>X</u>	d. Maximum width of working face;
				e. Description of type of initial cover to be used at the facility that controls:
—	_____	—	<u>X</u>	(1) Disease vector breeding/animal attraction
—	_____	—	<u>X</u>	(2) Fires
—	_____	—	<u>X</u>	(3) Odors
—	_____	—	<u>X</u>	(4) Blowing litter
—	_____	—	<u>X</u>	(5) Moisture infiltration
—	_____	—	<u>X</u>	f. Procedures for applying initial cover including minimum cover frequencies;
—	_____	—	<u>X</u>	g. Procedures for applying intermediate cover;
—	_____	—	<u>X</u>	h. Time frames for applying final cover;
—	_____	—	<u>X</u>	i. Description of litter policing methods;
—	_____	—	<u>X</u>	j. Erosion control procedures.

S	LOCATION	N/A	N/C
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- | | | | | |
|---|-------------|--|---|--|
| | | | X | 8. Describe operational procedures for leachate management including; (17-701.500(8),FAC) |
| X | Section 3.3 | | | a. Leachate level monitoring, sampling, analysis data results submitted to the Department; |
| | | | X | b. Operation and maintenance of leachate collect and removal system, and treatment as required |
| | | | X | c. Procedures for managing leachate if it becomes regulated as a hazardous waste; |
| X | Section 3.4 | | | d. Agreements for off-site discharge and treatment of leachate; |
| | | | X | e. Contingency plan for managing leachate during emergencies or equipment problems; |
| | | | X | f. Procedures for recording quantities of leachate generated in gal/day; |
| | | | X | g. Procedures for comparing precipitation experienced at the landfill with leachate generation rates. |
| | | | X | 9. Describe routine gas monitoring program for the landfill as required by Rule 17-701.400(10),FAC; (17-701.500(9),FAC) |
| | | | X | 10. Describe procedures for operating and maintaining a landfill stormwater management system to comply with standards of Chapters 17-3, 17-302 and 17-25, FAC; (17-701.500(10),FAC) |
| | | | X | 11. Equipment and operation feature requirements; (17-701.500(11),FAC) |
| | | | X | a. Sufficient equipment for excavating, spreading, compacting and covering waste; |
| | | | X | b. Reserve equipment or arrangements to obtain additional equipment within 24 hours breakdown; |
| | | | X | c. Communications equipment; |
| | | | X | d. Personnel shelter and sanitary facilities, fire aid equipment; |
| | | | X | e. Dust control methods; |
| | | | X | f. Fire protection capabilities and procedures for notifying local fire department authorities in emergencies; |
| | | | X | g. Litter control devices; |
| | | | X | h. Signs indicating operating authority, traffic flow, hours of operation, disposal restriction |

	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>
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—	_____	—	<u>X</u>
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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; (17-701.500(12), FAC)

13. Additional record keeping and reporting requirements; (17-701.500(13), FAC)

—	_____	—	<u>X</u>
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a. Records used for developing permit applications and supplemental information maintained for the design period of the landfill;

—	_____	—	<u>X</u>
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b. Monitoring information, calibration and maintenance records, copies of reports required by permit maintained for at least 10 years;

—	_____	—	<u>X</u>
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c. Background water quality records shall be maintained for the design period of the landfill;

—	_____	—	<u>X</u>
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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 (17-701.510, FAC)

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
—	—	—	<u>X</u>	1. Water quality and leachate monitoring plan shall submitted describing the proposed ground water, surf water and leachate monitoring systems and shall meet least the following requirements;
—	—	—	<u>X</u>	a. Based on the information obtained in hydrogeological investigation and signed, da and sealed by the PG or PE who prepared it; (17-701.510(2) (a), FAC)
—	—	—	<u>X</u>	b. All sampling and analysis preformed organizations having Department appro Comprehensive Quality Assurance Plans; (701.510(2) (b), FAC)
—	—	—	<u>X</u>	c. Ground water monitoring requirements; (17-701.510(3), FAC)
—	—	—	<u>X</u>	(1) Detection wells located downgradient f and within 50 feet of disposal units;
—	—	—	<u>X</u>	(2) Downgradient compliance wells as requir
—	—	—	<u>X</u>	(3) Background wells screened in all aquif below the landfill that may be affected the landfill;
—	—	—	<u>X</u>	(4) Location information for each monitor well;
—	—	—	<u>X</u>	(5) Well spacing no greater than 500 feet ap: for downgradient wells and no greater tl 1500 feet apart for upgradient wells unl: site specific conditions justify altern: well spacings;
—	—	—	<u>X</u>	(6) Well screen locations properly selected;
—	—	—	<u>X</u>	(7) Procedures for properly abandon: monitoring wells;
—	—	—	<u>X</u>	(8) Detailed description of detection sens: if proposed.
—	—	—	<u>X</u>	d. Surface water monitoring requirements; (17-701.510(4), FAC)
—	—	—	<u>X</u>	(1) Location of and justification for a proposed surface water monitoring points
—	—	—	<u>X</u>	(2) Each monitoring location to be marked a its position determined by a register Florida land surveyor;
—	—	—	<u>X</u>	e. Leachate sampling locations proposed; (1 701.510(5), FAC)

S	LOCATION	N/A	N/C
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—	—	—	<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>

f. Routine sampling frequency and requirements;
(17-701.510(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;
(17-701.510(7),FAC)

h. Water quality monitoring report requirements;
(17-701.510(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 (17-701.520, 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; (17-701.520(1), FAC)
_____	_____	_____	<u>X</u>	2. Describe procedures for landfilling shredded waste (17-701.520(3), FAC)
_____	_____	_____	<u>X</u>	3. Describe procedures for asbestos waste disposal; (17-701.520(4), FAC)
_____	_____	_____	<u>X</u>	4. Describe procedures for contaminated soil disposal; (17-701.520(5), FAC)

N. LANDFILL FINAL CLOSURE REQUIREMENTS (17-701.600, FAC)

				1. Closure schedule requirements; (17-701.600(2), FAC)
_____	_____	_____	<u>X</u>	a. Documentation that a written notice including schedule for closure will be provided to Department at least one year prior to final receipt of wastes;
_____	_____	_____	<u>X</u>	b. Notice to user requirements within 120 days final receipt of wastes;
_____	_____	_____	<u>X</u>	c. Notice to public requirements within 10 days final receipt of wastes.
				2. Closure permit general requirements; (17-701.600(3), FAC)
_____	_____	_____	<u>X</u>	a. Application submitted to Department at least 30 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; (17-701.600(4),FAC)

a. General information requirements;

- (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 17-701.330(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: (17-701.600(5),FAC)

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;

[illegible]

CLOSURE PROCEDURES (17-701.610,FAC)

<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
_____	_____	<u>X</u>	1. Survey monuments; (17-701.610(2),FAC)
_____	_____	<u>X</u>	2. Final survey report; (17-701.610(3),FAC)
_____	_____	<u>X</u>	3. Certification of closure construction completion; (17-701.610(4),FAC)
_____	_____	<u>X</u>	4. Declaration to the public; (17-701.610(5),FAC)
_____	_____	<u>X</u>	5. Official date of closing; (17-701.610(6),FAC)
_____	_____	<u>X</u>	6. Use of closed landfill areas; (17-701.610(7),FAC)

LONG TERM CARE REQUIREMENTS (17-701.620,FAC)

_____	_____	<u>X</u>	1. Right of property access requirements; (17-701.620(4),FAC)
_____	_____	<u>X</u>	2. Successors of interest requirements; (17-701.620(5),FAC)
_____	_____	<u>X</u>	3. Requirements for replacement of monitoring devices; (17-701.620(7),FAC)
_____	_____	<u>X</u>	4. Completion of long term care signed and sealed by professional engineer (17-701.620(8), FAC).

FINANCIAL RESPONSIBILITY REQUIREMENTS (17-701.630,FAC)

_____	_____	<u>X</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; (17-701.630(3)&(7), FAC).
_____	_____	<u>X</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; (17-701.630(4)&(8), FAC).
_____	_____	<u>X</u>	3. Describe funding mechanisms for providing proof of financial assurance and include appropriate financial assurance forms; (17-701.630(5), (6), & (9), FAC).

CLOSURE OF EXISTING LANDFILLS (17-701.640, FAC)

_____	_____	<u>X</u>	1. Demonstration that facility does not pose a bird hazard to aircraft as specified in Rule 17-701.320(12)(b), FAC.
_____	_____	<u>X</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 17-701.340(4)(b), FAC.

<u>S</u>	<u>LOCATION</u>	<u>N/A</u>	<u>N/C</u>	
—	—	<u>X</u>	—	3. Demonstration that facility is not located in a flood area, seismic zone or unstable area as specified in Rule 17-701.420(1)(c), FAC.
—	—	—	—	4. Request for extension of closure criteria as specified in Rule 17-701.640(2)(a) & (2)(b), FAC.
—	—	<u>X</u>	—	a. Demonstration of no alternative disposal capacity.
—	—	<u>X</u>	—	b. Demonstration of no threat to human health or environment.

S. MATERIALS RECOVERY FACILITY REQUIREMENTS (17-701.700, FAC)

—	—	<u>X</u>	—	1. Proof of posting a performance bond payable to Department to cover closing costs, if required; (17-701.700(4), FAC)
—	—	<u>X</u>	—	2. Materials recovery facility requirements; (17-701.700, FAC)
—	—	<u>X</u>	—	a. Submit information required in Rule 17-701.320, FAC
—	—	<u>X</u>	—	b. Submit an engineering report including following:
—	—	<u>X</u>	—	(1) Description of the solid waste proposed to be collected, stored, processed and disposed;
—	—	<u>X</u>	—	(2) Projection with assumptions for waste type and quantities expected in future years
—	—	<u>X</u>	—	(3) Description of operation and functions of all processing equipment with design criteria and expected performance;
—	—	<u>X</u>	—	(4) Description of flow of solid waste and expected regular facility operating procedures for start up and shut down, potential safety hazards and control methods including fire protection;
—	—	<u>X</u>	—	(5) Description of loading, unloading, processing areas;
—	—	<u>X</u>	—	(6) Identification and capacity of temporary on-site storage areas for materials handling and provisions for solid waste and leachate containment;
—	—	<u>X</u>	—	(7) Identification of potential ground water and surface water contamination;

LOCATION	N/A	N/C
_____	<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 Pasco County, Florida is aware that statements made in this form attached information are an application for a construction modification Per from the Florida Department of Environmental Regulation and certifies that information in this application is true, correct and complete to the best of 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.

Douglas S. Bramlett
Signature of Applicant or Agent

Douglas S. Bramlett, Assistant County
Name and Title Administrator

Date: 9/6/95

Attach letter of authorization, if agent not a governmental official, owner, 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 principles 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.

Darwish O. El-Hajji
Signature

Darwish O. El-Hajji
Name and Title (please type)

43929
Florida Registration Number
(please affix seal)

One Tampa City Center, Suite 1750
Mailing Address

Tampa, Florida 33602
City, State, Zip Code

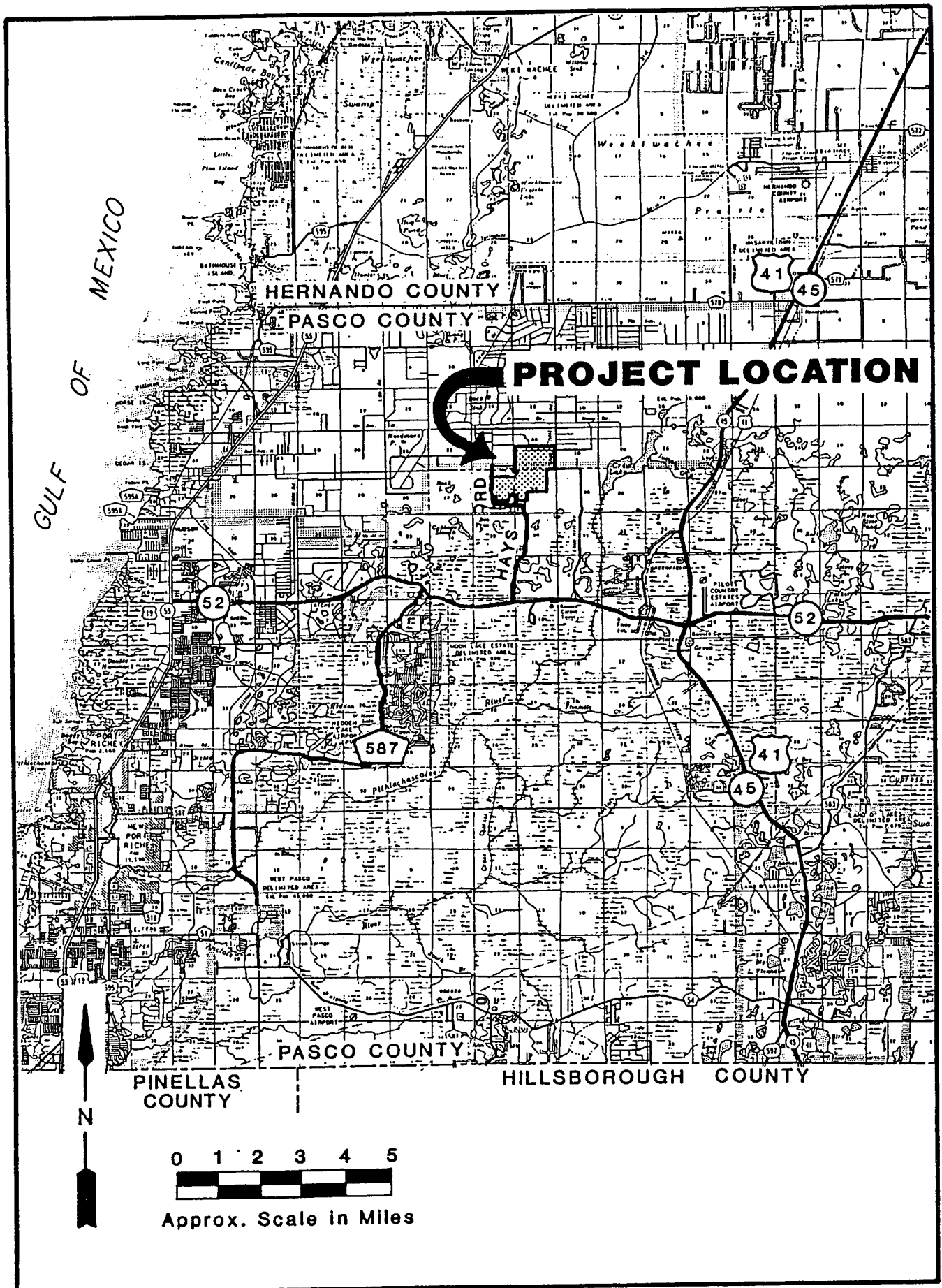
(813) 221-2833
Telephone Number

Date: _____

2.0 GENERAL REQUIREMENTS

This application is for modification of the existing permit for the purpose of adding a 2,000,000-gallon leachate storage tank and a leachate treatment and disposal system. This system is proposed as an alternative to the present leachate disposal method, discharge to the county-owned Shady Hills wastewater treatment plant (WWTP).

- 2.1 Six copies of the completed application form, all supporting data and reports are provided with this application submittal.
- 2.2 All engineering plans, reports, supporting information and application form are signed, sealed and dated by a professional engineer.
- 2.3 A letter of transmittal is provided with this application package.
- 2.4 The completed application form dated and signed by the applicant is provided as Section 1.0 of this package.
- 2.5 A check for the permit fee of \$1,000 is attached to the transmittal letter.
- 2.6 The location of the facility site is indicated on Figure 2-1.



Pasco County Resource Recovery Program
General Location Map

3.0 ENGINEERING REPORT

3.1 ABOVEGROUND LEACHATE STORAGE TANK

3.1.1 TANK MATERIALS FOR CONSTRUCTION TO ENSURE FOUNDATION IS SUFFICIENT TO SUPPORT TANK

The proposed leachate storage tank will contain a maximum of 2,000,000 gallons of stored leachate. The sidewalls of the tank will be constructed of one of two materials:

- prestressed concrete, or
- glass fused steel.

The tank will have a bottom reinforced concrete slab 5 to 6 inches thick. The slab will be a continuous pour slab requiring no joints.

The static load forces or stress for the concrete tank (worst case) is estimated to be 2,500 pounds per square foot (lb/sf). Previous geotechnical studies for this site indicate the net bearing capacity is 3,000 to 4,000 lb/sf which is sufficient to support the calculated stress.

3.1.2 PROCEDURES FOR CATHODIC PROTECTION, IF NEEDED FOR THE TANK

A concrete tank will not require cathodic protection. For a glass-fused steel tank, cathodic protection will be provided using sacrificial zinc anodes. The anodes are equally spaced around the tank near the floor and are bolted through the existing shell sheet bolt holes. A drawing detail of this system is provided in Appendix A.

3.1.3 EXTERIOR PAINTING AND INTERIOR LINING OF THE TANK FOR PROTECTION FROM THE WEATHER AND STORED LEACHATE

1. Concrete tank - exterior paint will be acrylic latex. Interior coating for protection from the expected leachate quality will be a two part epoxy, such as Interline 500, applied in two coats. Additional information on Interline 500 is contained in Appendix A.
2. Glass-fused steel tank - both interior and exterior surfaces will be factory coated with a proprietary process that provides a hard, inert barrier of silica glass, chemically and mechanically bonded to steel sheet for optimum resistance to corrosive attack. This process has been successfully used in approximately 1,000 industrial applications worldwide since the early 1970s.

3.1.4 SECONDARY CONTAINMENT DESIGN TO ENSURE ADEQUATE CAPACITY WILL BE PROVIDED AND COMPATIBILITY OF MATERIALS OF CONSTRUCTION

The secondary containment design will include a bermed area lined with 60-mil HDPE geomembrane as shown on Sheets C-2 and C-3 of the drawings. This area is designed to provide 2,200,000 gallons of storage capacity or 110 percent of the tank volume. Two feet of freeboard is provided at the maximum design capacity. The containment area liner material is high density polyethylene (HDPE), which is compatible with the leachate. The liner will be continuous under the storage tank slab, separated by a soil drainage layer for protection of the liner. Appendix B contains supporting calculations for sizing the secondary containment area.

3.1.5 DESIGN FOR REMOVAL AND DISPOSAL OF STORMWATER FROM SECONDARY CONTAINMENT SYSTEM

The secondary containment area is designed with an 8-inch drain line which discharges to a stormwater swale leading to stormwater retention pond No. 1. The 12-inch discharge line is designed to discharge up to 5.4 cubic feet per second (cfs). This rate is equal to the rainfall intensity for the catchment area of the secondary containment system, is equal to the accumulation rate of a 25-year/24-hour storm event at the point in time when 10 percent of the secondary containment volume has accumulated. Supporting calculations for this design are provided in Appendix B.

A valve will be provided on the gravity discharge line for the secondary containment system. The valve will normally remain closed. Within 24 hours of any rainfall accumulation, the containment area and storage tank will be visually inspected to ensure no contamination of the stormwater by leachate, and the valve will be opened to discharge the accumulated stormwater. Also, during heavy rainfall, an operator will be on duty to monitor stormwater accumulation within the secondary containment area. An indicator gauge will be provided to indicate when the water level approaches the 10 percent volume level. Before the water level reaches the indicator mark, the operator will open the drain valve and collect a sample of the stored water. The sample will be tested for conductivity prior to beginning any discharging of the collected water. If the conductivity reading is within the normal range, the operator will assume that there is only stormwater and open the valve to fully drain the stored water. If the conductivity reading exceeds the normal level, the collected water will be treated as leachate and pumped to the onsite treatment plant and the storage tank will be checked for leaks. Once the stormwater is drained from the secondary containment area, the valve will be closed by the operator.

The stormwater discharged from the secondary containment area will flow to retention pond No. 1 through a stormwater swale as shown on Sheet C-2 of the drawings. Pond No. 1 was designed for 32.5 acre/feet of stormwater retention during a 25-year/24-hour storm event. The pond was actually constructed with 81.5 acre/feet of retention capacity or 49 acre/feet of additional capacity. The secondary containment area and the other proposed impervious areas will contribute 6.5 acre/feet of additional runoff as a result of the design storm.

Therefore, pond No. 1 will provide adequate retention capacity for the stormwater runoff. Calculations for stormwater retention are provided in Appendix C.

3.1.6 OVERFILL PREVENTION SYSTEM (LEVEL SENSORS, GAUGES, ALARMS, AND SHUTOFF CONTROLS TO PREVENT OVERFILLING)

The leachate storage tank influent pipeline will be fitted with an altitude valve. This type of valve controls the water level inside the tank by sensing the internal head. The valve closes when the water level reaches a preset point. Additional information on the altitude valve is provided in Appendix B.

3.1.7 INSPECTIONS, CORRECTIVE ACTION AND REPORTING REQUIREMENTS

(a) Overfill Prevention System - Weekly

The overfill prevention, altitude valve will be manually activated by the operator at least once per week to ensure it is operating properly.

(b) Exposed Tank Exteriors - Weekly

The exposed tank exterior will be visually inspected by the operator for signs of leaks, rust or other evidence of deterioration at least once per week.

(c) Tank Interiors - When Tank is Drained or at Least Every Three Years

The tank interior will be visually inspected once per year when the tank is completely drained or at least once every three years. The operator will visually check for signs of deterioration, rusting, leaks or other mechanical deficiencies.

(d) Procedures for Immediate Corrective Action if Failures are Detected

The operator will initiate remedial measures immediately to eliminate any leak or correct any deficiency found during an inspection. The remedial measure(s) will depend on the nature of the deficiency. At a minimum, the operator will contact the tank manufacturer to initiate corrective repairs covered under any warranty conditions and/or to determine the appropriate remedial measures.

(e) Inspection Reports Available for Department Review

Each inspection as described above will be documented on an inspection report form. The form will have space for recording the date, time, inspector name, type of inspection (weekly or annual), and a list of any deficiencies found and any remedial actions taken. The completed forms will be securely stored for the lifetime of the facility.

3.2 LEACHATE TREATMENT SYSTEM

3.2.1 LEACHATE FORCE MAIN

The present leachate disposal system uses leachate pumps designed to discharge approximately 500 gallons per minute (gpm) to a force main leading to a county-operated WWTP. The proposed modification will provide about 1,400 linear feet of 6-inch HDPE pipe (SDR 17). The new pipeline will run south from the current pump station along the existing roadway to the proposed leachate storage tank as shown on Sheet C-1 of the drawings.

The 6-inch force main will allow the present pumps to operate at 575 gpm when the tank is empty, decreasing to 100 gpm when the tank is full due to the additional static head. At 575 gpm, the velocity in the 6-inch line will be 6.5 feet per second (fps), which is within an acceptable range.

3.2.2 LEACHATE TREATMENT SYSTEM

The proposed leachate treatment system is an evaporation/distillation process using proprietary technology developed by Resources Conservation Company (RCC). The system will separate the landfill leachate into two major components: (1) water, and (2) solids. The present leachate quality is summarized in Table 3-1. This leachate is very high in dissolved solids yet contains insignificant amounts of biochemical oxygen demand (BOD) or suspended solids. Based on this leachate quality, the county reviewed several treatment methods and determined that evaporation/distillation offers the best combination of effluent quality results and system reliability. The resulting distillate quality is sufficiently high for use by the adjacent waste-to-energy (WTE) plant for boiler makeup water.

The RCC leachate treatment system consists of the following major components: a brine concentrator, a spray dryer chamber and a bag house (fabric filter). Natural or propane gas is used to fire a boiler to generate startup heat for the system and for heating air used in the spray dryer.

The influent leachate from the leachate storage tank enters a feed tank where various chemicals are added to prevent scaling and precipitation within the system components. The influent is routed to the brine concentrator (BC). The BC contains two phases of the leachate, the liquid and vapor phases. A vapor compressor is used to increase the temperature of the vapor from the BC. The compressed vapor, or steam, is recirculated to the BC. As the liquid influent enters the BC, some of the liquid is converted to vapor due to the high temperature of the recirculated steam. The liquid is recirculated through the BC and

TABLE 3-1

PASCO COUNTY ASHPILE LEACHATE QUALITY

Date	TDS ¹	Chlorides	Sodium	HCO ₃	SO ₄	Calcium	CA/CO ₄	CA/CL	NA/CL	Flow (gpd)
08/20/91	9,636	5,800	1,630	93	166	1,945	12	0.34	0.28	
08/26/91	6,000	3,585	1,005	69	119	1,218	10	0.34	0.28	
11/18/91	29,134	18,145	3,330	141	102	7,413	73	0.41	0.18	
03/16/92	12,800	7,820	2,060	103	148	2,703	18	0.26	0.28	
05/01/92	39,600	24,320	7,495	177	238	7,334	31	0.30	0.31	
08/17/92	64,700	40,250	10,920	194	254	13,346	53	0.33	0.27	
12/22/92	78,478	54,560	14,300	242	175	9,222	53	0.17	0.26	
02/26/93	28,500	17,570	5,550	158	101	5,166	51	0.29	0.32	
06/14/93	37,600	23,430	4,980	180	228	9,020	40	0.38	0.21	
09/22/93	47,000	20,050	5,800	206	222	11,800	53	0.41	0.20	13,000
01/10/94	51,300	31,660	8,880	287	189	10,280	54	0.32	0.28	5,500
Average	36,813	23,290	5,995	168	177	7,222	41	0	0	

¹TDS as sum of ions

General Note: Water analyses were balanced ionically by adjusting sodium.

more of the liquid is converted to vapor. Some of the vapor is removed from the BC as new liquid enters the system. This vapor is cooled in a condenser to a distillate containing virtually pure water (conductivity of less than 60 $\mu\text{mho}/\text{cm}^2$).

As the liquid phase recirculates and more H_2O is removed the remaining liquid becomes more concentrated. This "brine" is removed to the spray dryer feed tank. The brine is fed into the spray dryer through a rotary atomizer to create a fine mist. Hot air is blown into the drying chamber to vaporize the remaining water. The exhaust air enters a bag house in which the solids are captured and the clean moist air is discharged to the atmosphere. An air emissions permit application for this source will be submitted to the Florida Department of Environmental Protection (FDEP).

The solids captured in the bag house fall to the bottom hopper and are discharged through a rotary valve. The results are a flowable dry solid consisting primarily of chloride salts. TCLP tests of these solids indicate they do not have any characteristic of a hazardous substance.

3.3 LEACHATE MANAGEMENT SYSTEM OPERATION PLAN

The proposed leachate management and treatment system will operate in the following manner. As leachate is generated it will be pumped from the existing leachate pump station to the 2,000,000-gallon leachate storage tank. Leachate will be withdrawn from the storage tank drain line using a small feed pump sized for the treatment system flow rate.

The leachate treatment system is designed to treat 35,000 gallons per day (gpd). The treatment system relies on heat for distillation of the leachate; therefore, it is more efficient to operate the system on a continuous basis at full design capacity. The collected leachate will be accumulated in the storage tank to supply several day's worth of flow volume before the treatment system is activated.

The leachate tank drain pump will feed approximately 25 gpm of leachate to the treatment facility. The treatment process will produce approximately 21 gpm of distillate (treated effluent) which will be stored in a 10,000-gallon tank and used by the WTE plant for boiler makeup water. Any excess distillate will be used in the WTE cooling tower. Some temporary storage of the distillate is required since the demand for boiler makeup water is not constant during the day, and distillate will be generated continuously while the leachate treatment system is operating.

The leachate treatment facility will also generate approximately 430 pounds of solids per hour while operating. The solids are the recovered total dissolved solids (TDS) in the leachate. These solids are composed primarily of calcium and chloride salts. The treatment system will use a spray dryer and fabric filter system to produce a 95 percent solids residue (5 percent moisture) which will require disposal. The dried solids will be collected in large bags consisting of polypropylene and polyethylene layers. The capacity of the bags will be about 480 cubic feet each or about one day's production of solids. The solids will weigh approximately 23 pounds per cubic foot (lb/ft³) based on data from similar operations.

Each day, the solids handling bag will be transported on a trailer to a prepared location within the ashfill and deposited. The impervious bag will prevent the dried solids from redissolving and reentering the landfill leachate cycle.

3.4 LEACHATE MANAGEMENT SYSTEM CONTINGENCY PLAN

If the proposed leachate treatment system fails, leachate will be pumped directly to the Shady Hills WWTP which is adjacent to the existing landfill. An existing leachate transmission force main is used to pump raw leachate to the WWTP. Two valves will be installed at the point of tie-in of the proposed 6-inch force main with the existing force main. The valves will allow the leachate to be directed to either the proposed storage tank or to the WWTP.

Normally, the valve to the WWTP will remain closed unless circumstances cause the storage tank to become full and the WWTP is used as the emergency back-up disposal method.

The Shady Hills WWTP presently accepts the landfill's leachate. This plant is owned and operated by Pasco County, and Pasco County also owns and operates the West Pasco landfill.

APPENDIX A
ADDITIONAL INFORMATION FOR
LEACHATE STORAGE TANK

APPENDIX B
SECONDARY CONTAINMENT CALCULATIONS

APPENDIX A
ADDITIONAL INFORMATION FOR
LEACHATE STORAGE TANK

Overflow Pipe Equipment

A variety of overflow piping designs are installed on AOSHPI Aquastore tanks. Installation for all designs should follow the guidelines provided in the Nozzle Installation chapter on page 32 of this Tank Assembly Guide. Care should be taken to ensure the brackets holding the overflow pipe are correctly located. Sealer must be used where brackets mate to the shell sheet surfaces.

Cathodic Protection System

Waste water tanks utilize a cathodic protection system using sacrificial zinc anodes to provide additional corrosion protection for the tank. The anodes are equally spaced around the tank near the floor, and are bolted through existing shell sheet bolt holes. On glass floor tanks, the inside end of each anode is attached to an existing fastener used during glass floor construction. On concrete floor tanks, the inside end is attached using a clip angle and concrete fastener. Jumper cables and buss bars may be used to ensure continuity between anodes, tank shell sheets and glass floor panels. Components of this cathodic protection system are provided by AOSHPI.

Potable water tanks sometimes utilize an impressed-current cathodic protection system. Such a system is designed and furnished by others. As with the sacrificial anode cathodic protection system, jumper cables and buss bars may be used to ensure continuity throughout all tank shell sheets and glass floor panels.

Sanitization Of Potable Water Tanks

The procedures for sanitizing Aquastore potable water tanks are detailed in the "Aquastore Tank Systems Operation and Maintenance Manual." Copies may be obtained from your Aquastore Tank Systems Dealer.

CRUSS STIFFENERS

REQUIRED AT ALL
HORZ. BOLT LINES
NOT HAVING WEB
CRUSS STIFFENERS
OR HORZ. STIFFENER
ANGLES. ON SOME
INSTALLATIONS THERE
WILL BE AN EXCESS
OF THIS ITEM WHICH
CAN BE DISCARDED IN
THE FIELD

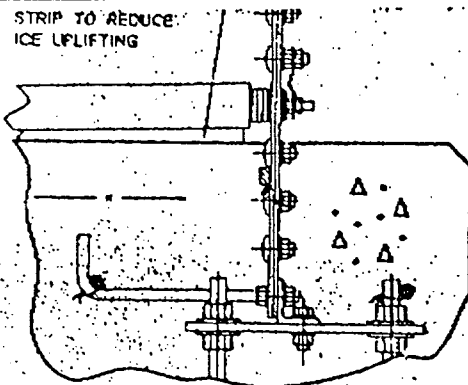
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NTAL SEAM
STIFFENER ANGLE OR
CRUSS STIFFENERS

REQUIRED AT ALL.
HORZ. BOLT LINES
NOT HAVING WEB
CRUSS STIFFENERS
OR HORZ. STIFFENER
ANGLES. ON SOME
INSTALLATIONS THERE
WILL BE AN EXCESS
OF THIS ITEM WHICH
CAN BE DISCARDED IN
THE FIELD

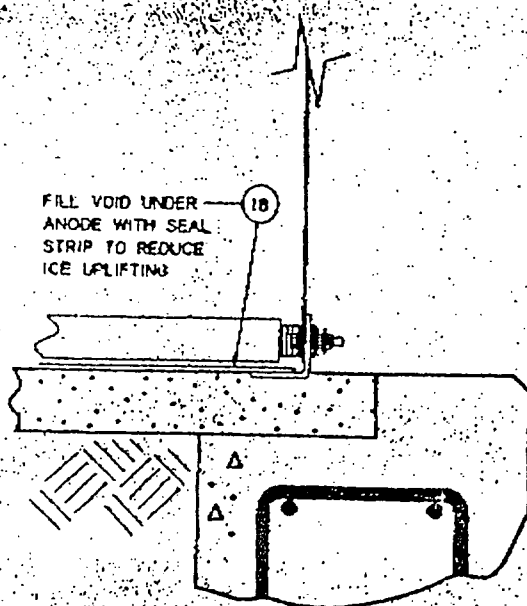
E

STRIP TO REDUCE
ICE LIFTING



USAGE AQUASTORE CONCRETE FOUNDATION
TYPICAL SECTION THRU FOUNDATION SHEET
SCALE .25" = 1"

FILL VOID UNDER
ANODE WITH SEAL
STRIP TO REDUCE
ICE LIFTING



USAGE AQUASTORE GLASS FLOOR
TYPICAL SECTION THRU FOUNDATION SHEET
SCALE .25" = 1"

+

USAGE AQUASTORE AND SLURRYSTORE
CONCRETE FOUNDATION
PLAN VIEW OF ANODE IN ASSEMBLED POSITION
SCALE .125" = 1"

IF REQUIRED, ADDITIONAL WASHERS
SHALL BE ADDED IN THE FIELD TO
ACCOMMODATE EXCESS LENGTH OF
NON-METALLIC BUSHING.

OUTER NUT TO BE
TIGHTENED TO A TORQUE OF
50 IN. - LBS.

FIELD CONNECTED
JUMPER CABLE

OUTER NUT TO BE
TIGHTENED TO A TORQUE OF
50 IN. - LBS.

INSIDE OF STRUCTURE

APPLY SEALER WITH ITEM 14
AROUND STEEL CURB OF ANODE
BEFORE INSTALLING THROUGH
SHELL SHEETS

- CLOSEST OR NEXT CONVENIENT
ADJACENT STRIP JOINT
LOCATION

VIEW A
PLAN VIEW OF ANODE TO
SHELL SHEET ATTACHMENT
SCALE FULL

SHELL SHEET

BUSS BAR

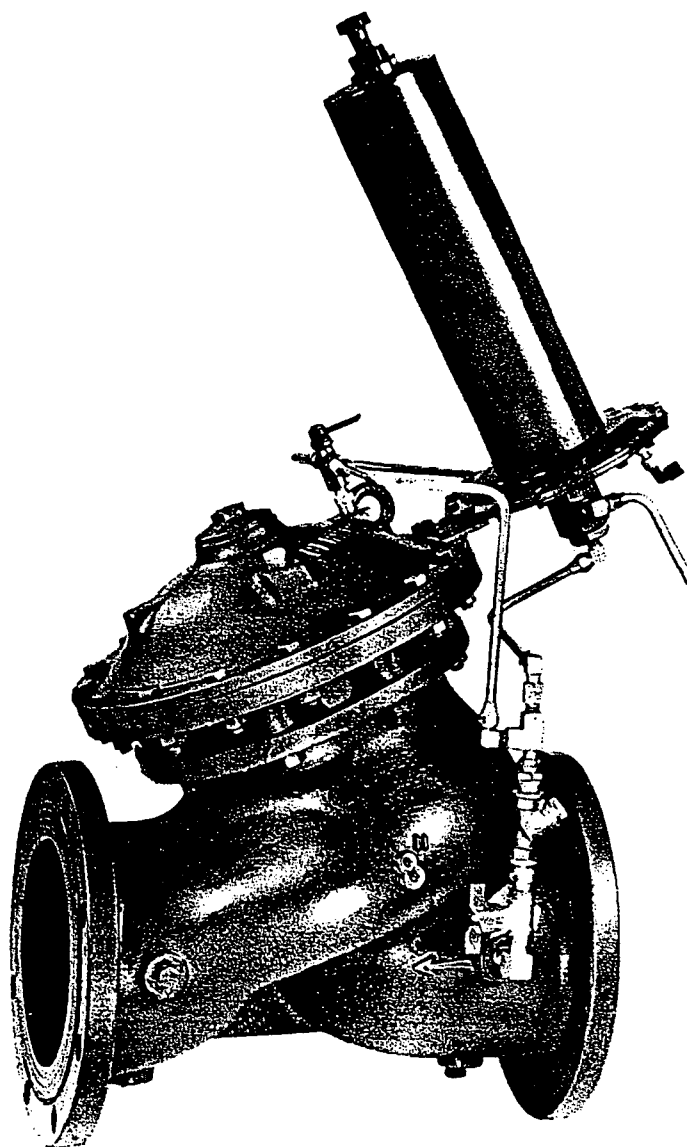
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15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	1	22	18	15	14	13
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22	18	15	14	13
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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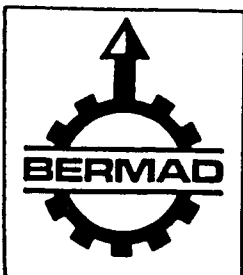
FROM HO SHI IN THROSTORE

100.00

780-AX ONE-WAY FLOW ALTITUDE VALVE



Controls water level in reservoirs by sensing built-up reservoir head, without using external control devices such as floats, etc. . . a non-throttling type of valve that opens to fill reservoir and closes driptight when water reaches pre-determined reservoir level. (Water withdraws through a separate line.)



BERMAD

4070 LEAVERTON CT. • ANAHEIM, CALIFORNIA 92807 • (714) 666-1100
(800) 821-6825 • (CA ONLY) (800)-BERMAD2 • TWX 910-542-3373

OPERATION

Valve pressure differential powers the diaphragm actuator to operate the valve. Lower control chamber is connected through a fixed orifice to downstream pressure; it serves as cushioning for smooth operation. Upper control chamber operates on 3-way control principle. The 3-way altitude pilot valve alternately applies upstream pressure to close tightly main valve and vent pressure to atmosphere to open fully main valve.

- When reservoir's water reaches desired level, pilot directs pressure to close the valve.

ADJUSTMENT DATA

Altitude pilot valve #12: Turn adjusting screw clockwise to increase reservoir water level. Set locking nut.

OPERATION BALL VALVES:

Valve mode	Cock #1	Cover Plug #3	3-way Cock #6
regulation	open	closed	directs pilot to valve actuator
closed	open	closed	directs pressure to valve actuator
fully open	closed	removed	blocks

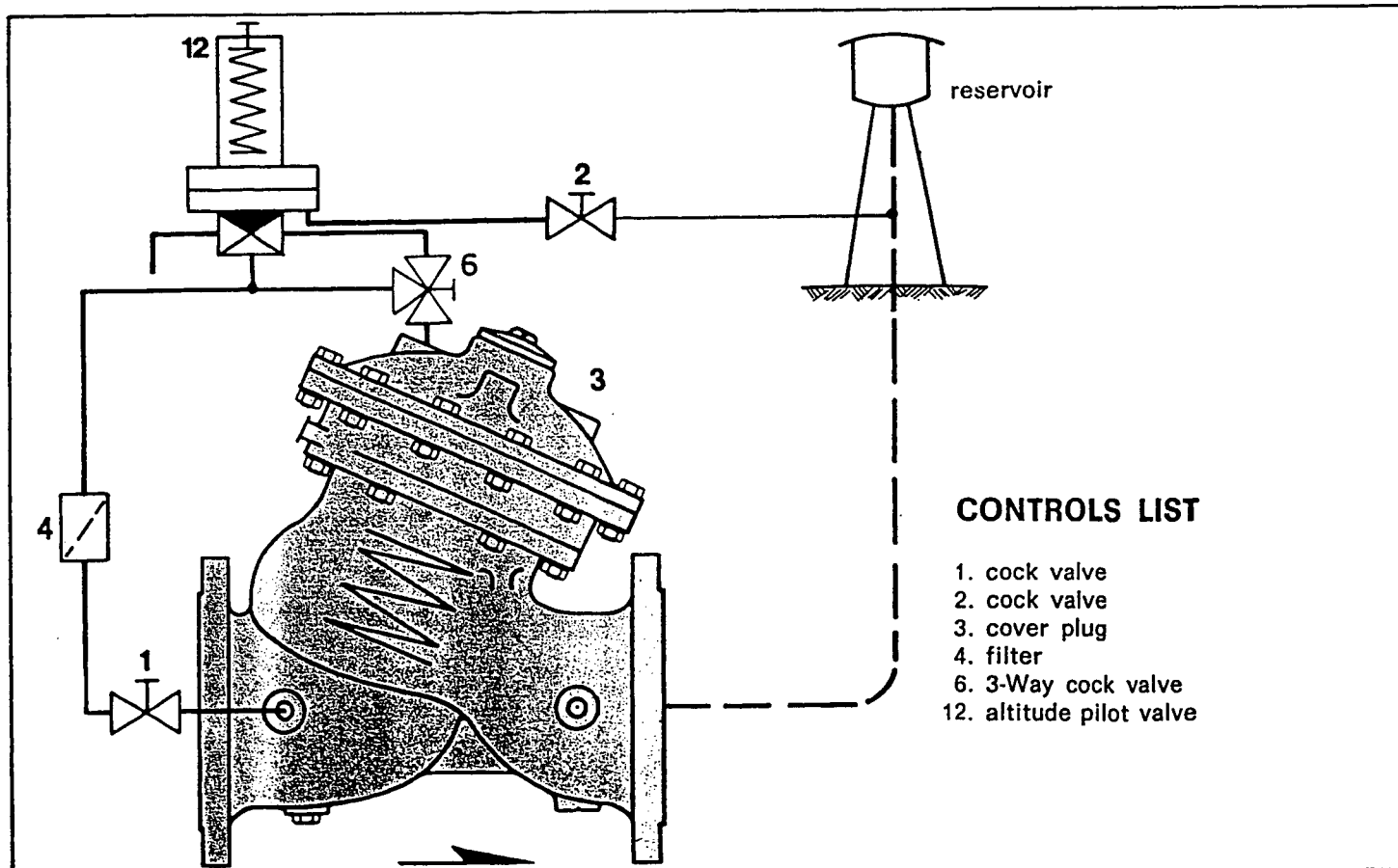
IMPORTANT :

- 1) Reconfirm operation requirements; pressure, flow, data.
- 2) Set valve on actual service conditions.

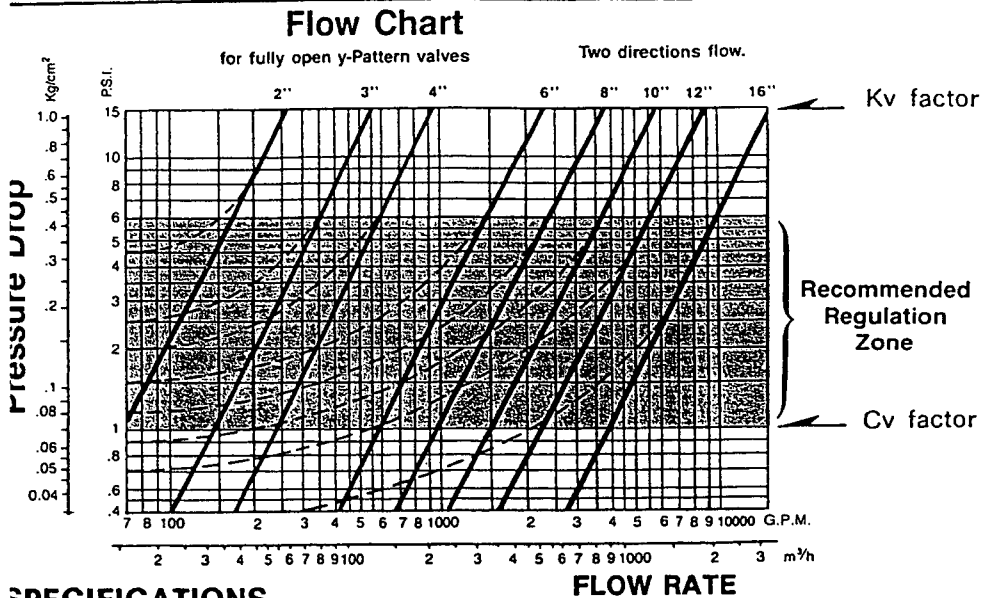
ADJUSTMENT RANGE (water level)

- 1) Water level : Spring A 5—120 ft (1.5—40 m)
Spring A+B 15—240 ft (5—80 m)
- 2) Shutoff level repeatability within 4" (10 cm)
- 3) Valve reopening on level lowering:
Spring A 20" (50 cm)
Spring A + B 40" (100 cm)

CONTROL DIAGRAM



FLOW CHART for fully-open Y-Pattern Valves



Recommended Flow: Based on pipe flow velocity (refer to flow chart, V-port throttling plug data, and cavitation data).

NORMAL SERVICE :

minimum 1.5 ft/sec (0.5 m/sec)
maximum 15 ft/sec (5 m/sec)

INTERMITTENT SERVICE :

maximum 25 ft/sec (8 m/sec)

Notes :

- 1) Straight lines : fully open valve, for two directions flow
- 2) Curved lines : modulating valve, check valve.

SPECIFICATIONS

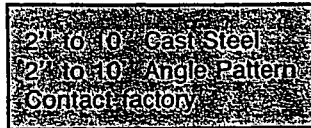
SIZE: Y-Pattern 2" to 16"

2"—3" Threaded

2"—16" Flanged

END DETAILS & PRESSURE RATINGS

FLANGED — Cast Iron



Standard	Class	Max. Pressure	Min. Pressure
ANSI B16.1	125	175 psi	10 psi
	250	300 psi	
SO/DIN/BS 4504	10	10 kg/cm ²	0.7 kg/cm ²
	16	16 kg/cm ²	
	25	25 kg/cm ²	
3S 10	D	100 psi	10 psi
IIS B2212	10	12 kg/cm ²	0.7 kg/cm ²
B2213	16	18 kg/cm ²	
B2214	20	24 kg/cm ²	

THREADING : NPT—BSP Standards

TEMPERATURE RANGE : Water to 180° F / 80° C

MATERIALS :

MAIN VALVE AND ACTUATOR :

Cast iron — ASTM A 126 Class B .

Main valve trim; stainless steel — SAE 303

Carbon steel — SAE 1015 (nylon 11 coated)

Cast bronze — ASTM B 62

Brass — ASTM B 21

PILOT CONTROL SYSTEM :

Carbon steel — SAE 1015

Stainless steel — SAE 303

Brass — ASTM B 21

SYNTHETIC RUBBER PARTS :

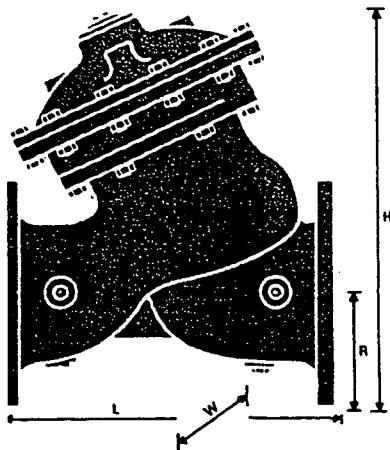
Diaphragm — neoprene, nylon fabric reinforced





















































































































Seals — Buna-N

COATING : Epoxy — optional

Other materials available on request.

DIMENSIONS AND WEIGHT for basic valves



		Threaded			Flanged														
	SIZE	2"		2"		3"		4"		6"		8"		10"		12"		16"	
	Dimensions	 mm	 mm	 mm	 mm	 mm	 mm	 mm	 mm	 mm	 mm	 mm	 mm	 mm	 mm	 mm	 mm		
Class 150 Standard 10, 16	L	 158	 205	 250	 320	 415	 500	 605	 725	 890	 1000								
	W	 122	 155	 163	 200	 320	 390	 480	 550	 670	 700								
	R	 40	 78	 100	 112	 140	 170	 203	 240	 288	 300								
	H	 200	 235	 305	 380	 500	 580	 720	 820	 1000	 1095								
	Weight	 5.5 kg	 10.6 kg	 22 kg	 37 kg	 75 kg	 125 kg	 217 kg	 370 kg	 610 kg	 2000 lb								
Class 250 Standard 20, 25	L	 158	 217	 264	 335	 433	 524	 637	 762	 920	 1035								
	W	 122	 165	 163	 200	 320	 390	 480	 550	 670	 700								
	R	 40	 83	 104	 125	 159	 188	 222	 255	 304	 320								
	H	 200	 240	 309	 393	 519	 582	 739	 835	 1000	 1115								
	Weight	 5.5 kg	 12.2 kg	 25 kg	 43 kg	 85 kg	 146 kg	 245 kg	 410 kg	 710 kg	 960 kg								

PURCHASE SPECIFICATION

Product Description

The valve fills the reservoir and closes at desired upper water level.

The 780-AX consists of a wide, Y-pattern body, hydrodynamically designed with semi-straight flow; a double-chambered diaphragm actuator, hydraulically operated. The body has a single removable seat with full-flow opening, free of bottom stem guide, and a resilient sealing disc for drip-tight closing. The valve diaphragm actuator contains two defined control chambers that can be removed as one distinct assembly. The actuator includes the separating partition containing the valve stem bearing and the assisting spring, which is placed over the valve sealing disc.

CONTROL: Altitude pilot valve, 3-way direct acting, adjustable spring load with remote reservoir static head sensing.

INSTALLATION RECOMMENDATIONS

Before installation, flush to clean pipeline.

Arrow on valve body must match actual flow direction in pipe.

Preferred valve installation — upright, for horizontal position; others acceptable.

Install isolation valves on both sides of control valve.

Provide adequate clearance for servicing.

Reservoir's static pressure sensing line ($\frac{1}{2}$ " size) should connect reservoir to pilot sensing port.

Note: Sensing line should be kept free of air pockets.

ORDERING INFORMATION

06-780-03-AX IF

valve size (inches)
valve category
additional features
optional accessories

Please specify:

- 1) Valve size
- 2) End connections
- 3) Working pressures (inlet, outlet)
- 4) Flow rate (min. normal, max.)
- 5) Water/fluid quality (dirt, chemicals, etc.)
- 6) Desired options

RECOMMENDED OPTIONS

- F — large control filter for longer valve service time.
- I — valve position indicator.
- M — mechanical closure and flow adjuster.
- I or M options can only be applied alternatively.

ROUTINE PREVENTATIVE MAINTENANCE SCHEDULE

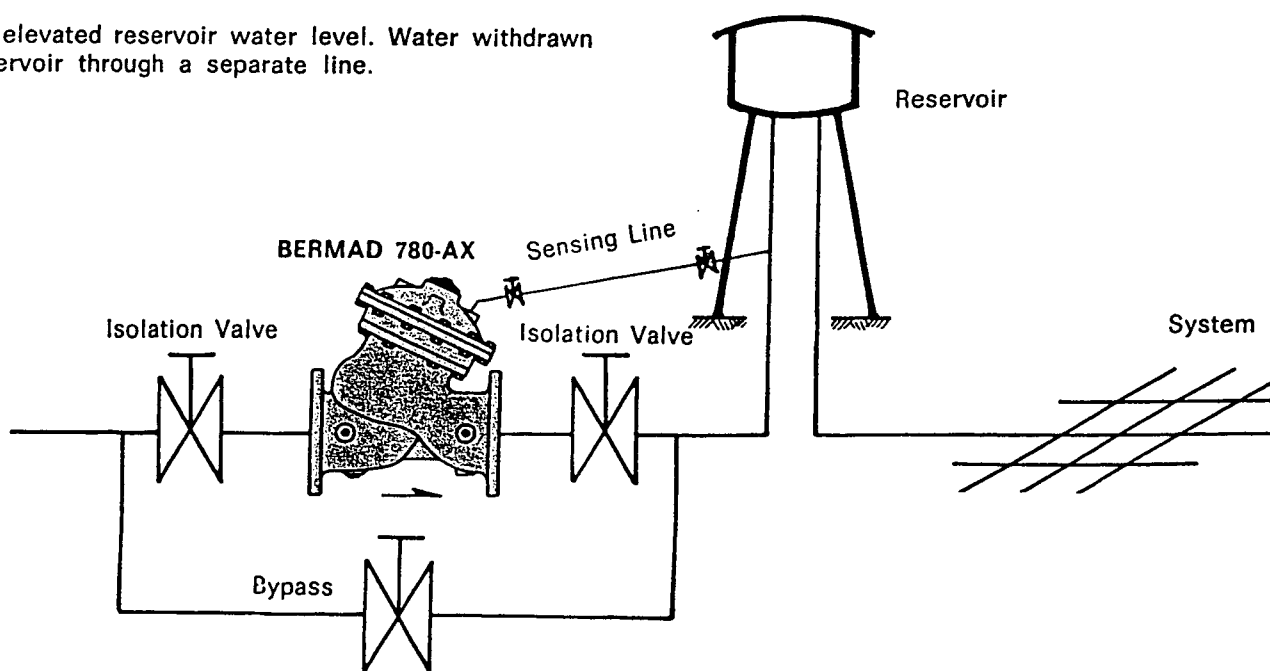
General inspection, filter cleaning, inspection of control accessory settings.

WINTER STORAGE

Set control valve at fully open position, while main line is being drained. All valve and control chambers must be drained by removing plugs and loosening fittings.

TYPICAL APPLICATIONS

Controls elevated reservoir water level. Water withdrawn from reservoir through a separate line.



A. International

Protective Coatings

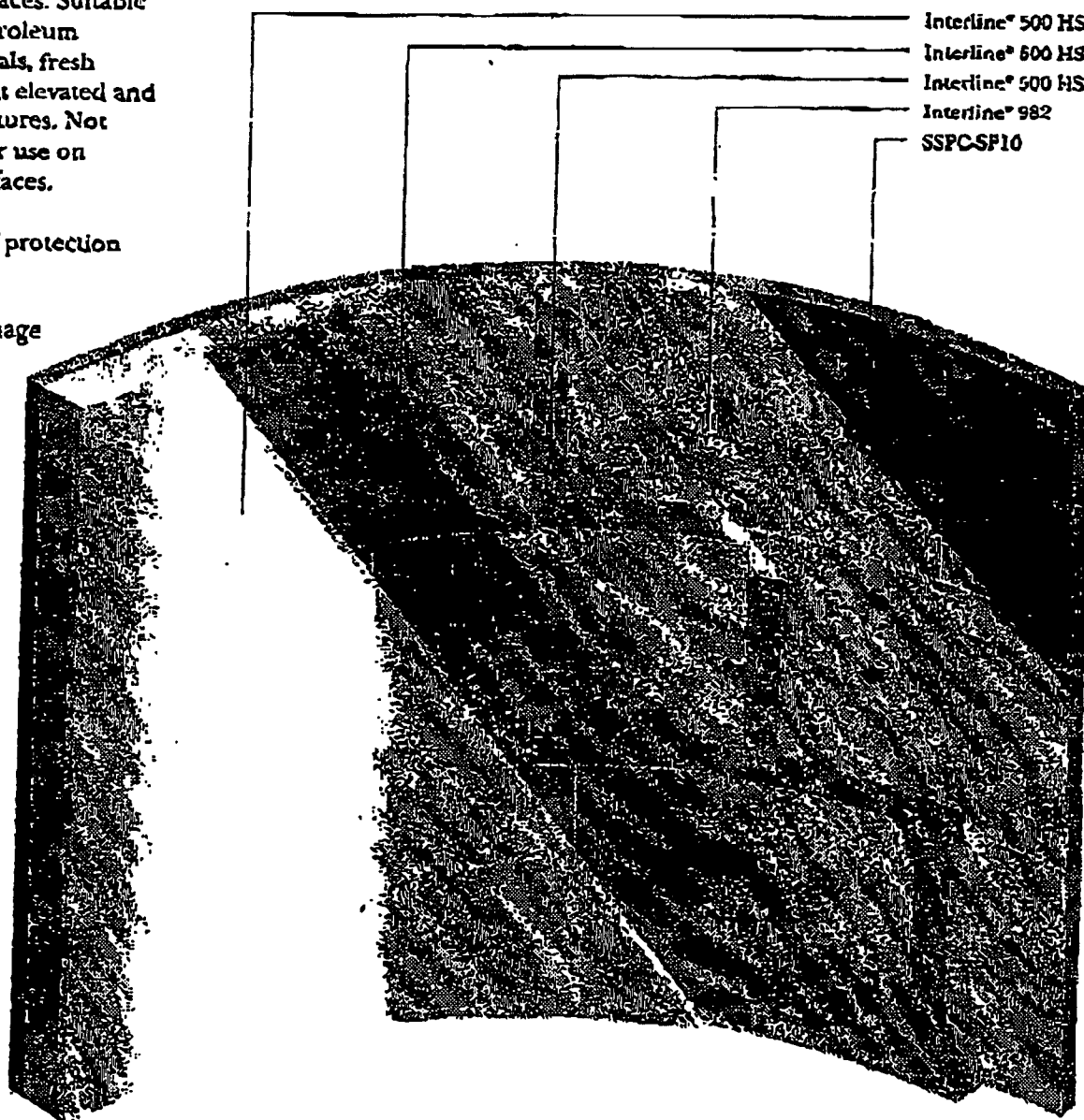
Interline® 500 HSThin Film Glass Flake Epoxy Phenolic
(Formerly THASOO Interline® High Build Glass Flake Tank Coating)RECEIVED
7/11/95

A solvent borne coating for application to new steel or lightly pitted surfaces. Suitable for storage of petroleum products, chemicals, fresh water, salt water at elevated and ambient temperatures. Not recommended for use on heavily pitted surfaces.

FEATURES

Advanced level of protection from:

- Wear
- Mechanical Damage
- Permeation

**SYSTEM PROFILE**

* Fax Note	7671	Date	7-8-95	# of pages	5
John Banks		From	Sam Sawyer		
CDM		Co.	Crom		
		Phone #			
713-355-5311		Fax #			

Surface Preparation	SSPC-SP10
Holding Primer	Interline® 982 at 0.5-1.0 mil (12.5-25.0 microns) DFT
Stripe Coat	Interline® 500
2 Full Coats	Interline® 500 at 6.0-10.0 mils (150-250 microns) DFT per coat

product data sheets.

see out in accordance with Interline® Tank Lining Application Procedures and individual

1 Interline® 500 HS

Thin Film Glass Flake Epoxy Phenolic

INTERFACE REPARATION

- Consult International for detailed tank lining procedures that should be followed.
- Oil and grease should be removed in accordance with SSPC-SP1 solvent cleaning.
- Where necessary, remove weld spatter and smooth weld seams and sharp edges.
- Abrasive blast clean to SSPC-SP10.
- Surfaces may be primed with Interline® 982 at 0.5-1.0 mils (12.5-25 microns) dry film thickness before oxidation occurs. Alternatively, the blast standard can be maintained by use of dehumidification.

Hot Product Tanks

- When refurbishing hot water tanks, the surface should be abrasive blast cleaned to SSPC-SP7 and thoroughly fresh water washed to remove salt contamination
- After drying, abrasive blast clean to SSPC-SP10.

PRODUCT APPLICATION

- Surfaces to be overcoated must be clean, dry and free from contamination.
- Products should be applied in accordance with information given on the individual data sheets.
- Stripe coats should be applied to all welds, lap joints, plate edges, corners, sharp edges and any other areas where spray application of the overall lining system may prove difficult.
- Interline® 500 HS will not cure adequately at low temperatures. Minimum steel temperature for maximum performance and optimum curing should be above 50°F (10°C). Steel temperatures must be at least 5°F (3°C) above the dew point.

All representations and statements concerning the products in this system sheet are accurate to the best of International's knowledge. Any statements herein are not intended to be specific recommendations or warranties of any product, evaluation of products or fitness for any particular purpose. Any warranty, if given, or specific Terms and Conditions of Sale are contained in International's Terms and Conditions of Sale. You should request a copy of this document AND review it carefully.

Interline® is a registered trademark.

General Offices 6001 Astorine, Houston, Texas 77091
Tel: (718) 682-1711
Medical Advisory Number 1-800-854-6813



**COURTAULDS
COATINGS**

PI 9591.1
12/94

Interline® 850 HS

International
Protective Coatings

Epoxy Phenolic
(Formerly THA800 Interline® Epoxy Phenolic)

INTENDED USES

Designed for the internal protection of tanks storing aggressive materials such as solvents, organic chemicals, vegetable oils, MTBE, non-leaded gasoline, crude oils, and caustic solutions.

PRODUCT DESCRIPTION

A two component epoxy phenolic tank lining.

PRODUCT INFORMATION

Color	THA852 - Gray; THA855 - Green
Finish/Sheen	Not Applicable
Volume Solids	65.3% ± 2% (ASTM-D2697)
Mix Ratio	19:1 by volume
Flash Point	Part A, 84 °F (29 °C); Part B, 62 °F (17 °C); Mixed 82 °F (28 °C) (Setaflash) (ASTM D-3278)
Film Thickness (SSPC-PA2)	5.0 - 6.0 mils (125-150 microns) dry, equivalent to 7.7 - 9.2 mils (195-230 microns) wet, according to specification
Theoretical Coverage	Minimum two coats
Dry Temp. Resist.	(6.0 mils DFT) 175 sq ft/gal. Allow appropriate loss factors 225 °F (107 °C)

APPLICATION DETAILS

Method	Conventional or airless spray. Airless spray preferred
Induction/Sweat-in Time	None, due to limited pot life
Thinner	If necessary, use GTA415. See additional instructions under Thinning
Cleaner	GTA415
Pot Life	4 hrs. @ 50 °F (10 °C) / 2 hrs. @ 75 °F (24 °C) / 1 hr. @ 90 °F (32 °C)

Drying Time (hours)	(ASTM D 1640 7.1.1)	(ASTM D 1640 7.2)	Overcoating Interval by Self	
			(ASTM D-1640 7.8)	
Substrate Temperature	Touch	Handle	Minimum	Maximum
50 °F (10 °C)	4	24	24	3 Days
75 °F (24 °C)	2-4	12-24	6-8	2 Days
95 °F (35 °C)	2	12	6	24

REGULATORY DATA

VOC

2.68 lbs/gal (321 g/ltr) as supplied (EPA method 24)
2.96 lbs/gal (354 g/ltr) at maximum recommended thinning.

Interline® 850

Epoxy Phenolic

Concrete:

Concrete should be cured 28 days prior to coating. Surfaces shall be clean, dry and free from curing compounds, release agents, troweling compounds, surface hardeners, efflorescence, grease, oil, dirt, old coatings and loose or disintegrating concrete.

(1) "Sweep Blast Cleaning" can be used to prepare the concrete to remove all foreign matter and provide a tooth for bonding. Remove all the dust from the surface before starting the application of the coating.

(2) "Acid Etching" Surfaces shall be clean, and free from curing compounds, oil, grease, dirt, chalk or previously applied coatings. All surfaces shall be acid etched with Muratic Acid solution (1 part acid to 2 parts water). Apply solution by brush or spray until surface is thoroughly wetted. When bubbling ceases (5-10 minutes), wash down surface with fresh water and scrub with a stiff brush. Rinse with plenty of water. If surface is acidic (pH below 7), neutralize surface by washing with 1-2% ammonia solution. Allow surface to dry below 8% moisture content before coating.

Caulking and filling recommendations shall be addressed in the complete lining specification furnished by International.

MIXING

Material is supplied in 2 containers as a unit. Always mix a complete unit in the proportions supplied. (1) Agitate Part A with a power agitator. (2) Combine entire contents of Part A and Part B and mix thoroughly with a power agitator.

A Jiffy mixer is required due to rapid viscosity increase after mixing. Do not allow sweat-in period due to limited pot life.

APPLICATION

Apply by conventional or airless spray. Application by other methods, brush or roller, may require more than two coats. Strain material before application. Apply at 7.7-9.2 mils (196-230 microns) wet film thickness which will give 5.0-6.0 mils (125-150 microns) dry film thickness.

Brush: inexpensive 4" wide commercial brush (small areas only).

Roller: use the "All purpose Roller Cover" (small areas only).

Conventional Spray: DeVilbiss MBG-510 gun; E tip and 704 air cap; 3/8" ID material hose; double regulated pressure tank with oil and moisture separator.

Airless Spray: minimum 30:1 ratio pump; .017"-.023" (425-575 microns) orifice tip; 1/4" ID high pressure material hose. Specific equipment utilized may vary by application. Contact International Technical Service for specific recommendations.

Inspection

After the last coat has cured hard, the coating system dry film thickness should be measured using a suitable non-destructive magnetic gauge (such as Mikrotest). The average total applied system thickness should be no less than specified (in accordance with Interline® 850 HS system sheet). The coating system should be free of all pinholes or other holidays as determined with a suitable high voltage pulsating type holiday detector, set at a minimum 100 volts/mil. The cured film should be essentially free of runs, sags, drips, inclusions or other defects. All deficiencies and defects should be corrected. The repaired areas shall be retested and allowed to cure as specified before placing the finished lining system into service. Contact International Technical Service for proper repair procedures.

WARNING

Do Not Tine

Interline® 850

Epoxy Phenolic

THINNING

DO NOT THIN BEYOND YOUR STATE'S COMPLIANCY. Material is supplied at spray viscosity and normally needs no thinning. If thinning is necessary, thin up to 1 pint (473 ml) per gallon with International GTA415 Thinner. Add thinner to Part A while agitating and prior to catalyzing.

WORK STOPPAGES

Do not allow material to remain in hoses. Release pressure from pressure tank and disconnect material hose. Thoroughly flush hose and spray gun with International GTA415 Thinner and reconnect to tank. Do not repressurize tank until ready to resume work. Monitor material condition. Do not exceed pot life limitations.

CLEANUP

Clean all equipment immediately after use with International GTA415 Thinner or ketone solvent. Spray equipment requires flushing with either of these solvents. It is good working practice to periodically flush out spray equipment during the course of the working day. Frequency should depend upon amount sprayed, temperature, elapsed time including delay, etc.

WELDING

In the event welding or flame cutting is performed on metal coated with this product, do so in accordance with instructions in ANSI/ASC 249.1 "Safety in Welding".

SAFETY

Prior to use, obtain and consult the "Material Safety Data Sheet" of this product for health and safety information. Read and observe all precautionary notices on container labels. Medical Advisory Number 1-800-854-6813.

WORLDWIDE AVAILABILITY

It is the policy of International to supply this product worldwide. However, in certain countries, product modifications may be required in order to comply with legislation or particular local conditions. Where this occurs, an alternative sales code and data sheet are used.

UNIT SIZE

5 Gallon Unit (18.9 lb)

Part A Interline® 850 HS
Part B THA724N

5 Gallon (short filled)
1 Quart

UNIT SHIPPING WEIGHT

55.6 lbs (25.23 kg)

STORAGE

Shelf Life

Three months from date of manufacture when maintained in protected storage at 40-100 °F (4-38 °C) (subject to reinspection thereafter).

All representations and statements concerning the product(s) in this data sheet are accurate to the best of International's knowledge. Any statements herein are not intended to be specific recommendations or warranties of any product, combination of products or fitness for any particular purpose. Any warranty, if given, or specific Terms and Conditions of Sale are contained in International's Terms and Conditions of Sale. You should request a copy of this document AND review it carefully.

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Tel: (713) 682-1711
Medical Advisory Number 1-800-854-6813

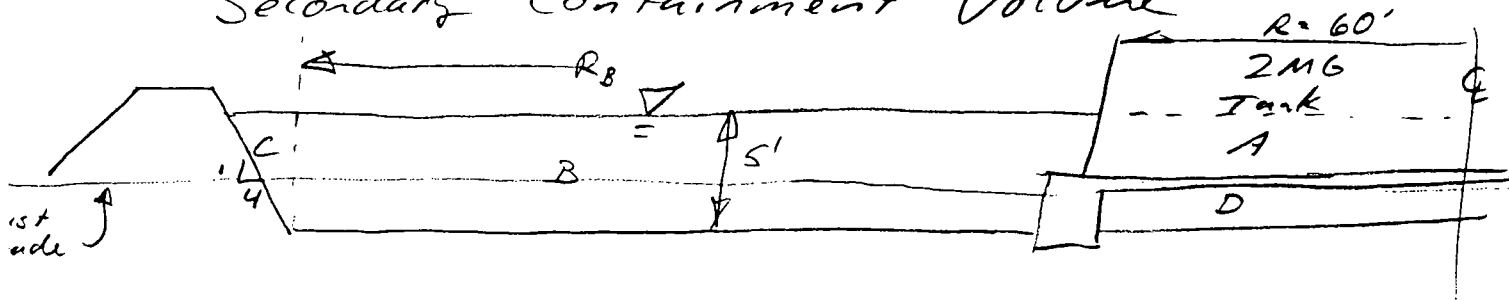


**COURTAULDS
COATINGS**

PIR214.J

APPENDIX B
SECONDARY CONTAINMENT CALCULATIONS

Secondary Containment Volume



$$\text{Volume A} = \pi 60^2 \times (5' - 1.5') = \underline{296,089 \text{ gallons}}$$

$$\text{Volume B} = (\pi R_8^2 - \pi 60^2) \times 5'$$

$$\text{Try } R_8 = 130' \quad V = \underline{1,562,691 \text{ gallons}}$$

$$\text{Volume C} = \left[\frac{1}{2} 20' \times 5' \right] \times 2\pi R_c$$

$$R_c = R_8 + 10'$$

$$\begin{aligned} VC &= 50 \text{ ft}^2 \times 879.64 \text{ ft} \\ &= \underline{328,988 \text{ gallons}} \end{aligned}$$

$$\text{Volume D} = \text{Storage under slab}$$

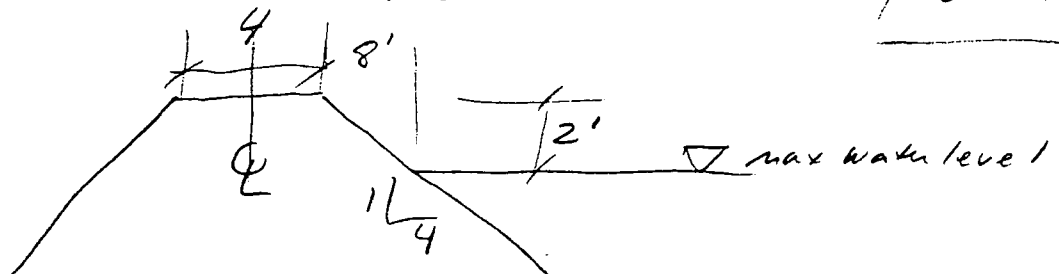
$$\text{Ave depth} = 6''$$

$$\text{Assume porosity} = 30\%$$

$$VD = \pi 60^2 \times 0.5 \text{ ft} \times 0.30 = \underline{12,689 \text{ gallons}}$$

$$\text{Total Volume} = \underline{2,200,458 \text{ gallons}}$$

$$R \text{ to Berm Center line} = 130 + 20 + 8 + 2 = \underline{160 \text{ ft}}$$



Mod. by
Dimensions
for Construction

Calculation of Required Discharge Rate From Secondary Containment System

- 1) Calc. 10% volume depth $10\% = 200,000 \text{ gal}$
 $= 26,738 \text{ Ft}^3$

$$\text{Depth} = 26,738 \text{ Ft}^3 / \pi 130^2 = \pi 60^2$$

$$= 0.64 \text{ Ft} = 7.7 \text{ inches}$$

$$\text{Water Elevation} = 51.9 (\text{feet}) + 7.7 \text{ inches}$$

$$= 52.54$$

- 2) Calculate rainfall accumulation rate when
 10% volume is reached using 25 year storm

- (a) Calc rainfall in inches over entire catchment
 area to accumulate 200,000 gal

$$\text{radius of catchment} = 160 \text{ Ft}$$

$$26,738 \text{ Ft}^3 / 80,425 \text{ Ft}^2 = 3.99 \text{ inches} \approx 4"$$

- (b) Look at Rainfall Distribution Curve to
 determine Rainfall intensity when 4" has fallen

@ 11.5 Hours Accum. = 2.77 inches $4" - 2.77" = 1.23" \text{ rem}$

@ 12th Hour 2.69 inches fall $(\frac{1}{2} 5.38" / \text{HR})$

$$2.69" - 1.23" = 1.46" \text{ excess must be discharged}$$

$$1.46" \text{ must be discharged in } \frac{1}{2} \text{ HR}$$

$$\text{in order not to exceed } 10\% \text{ volume}$$

All later rainfall intensities are less

$$1.46" \times 80,425 \text{ Ft}^2 = 9,785 \text{ gal} / 30 \text{ min}$$

$$= \boxed{5.44 \text{ CFS}}$$

③ Determine Pipe size to carry 5.44 cfs

a) Determine Hydraulic Slope

$$\text{Water level} = 52.54$$

$$\text{Discharge level} = 50.5 \quad (6" \text{ above peak pond stage of } 50.0)$$

$$\Delta H = 2.04 \text{ ft}$$

$$\text{Length of discharge pipe} = 106 \text{ ft}$$

$$S = 2.04 / 106 = 0.019$$

b) Use Manning nomograph to determine

required pipe size = close to 12" pipe

Manning uses $n = 0.013$ conservative for plastic pipe \therefore use 12" plastic pipe.

SCS TYPE II FL MOD

STORM EVENT SIZE =

PASCO COUNTY

9 INCHES

24 HOUR / 25 YEAR STORM EVENT

HOUR OF STORM	RATIO OF ACCUMULATED RAINFALL	FRACTION OF ACCUMULATED RAINFALL	TOTAL ACCUMULATE RAINFALL	PEAK INTENSITY IN/HR
0.0	0.000	0.000	0.00	0.00
0.5	0.006	0.006	0.05	0.11
1.0	0.012	0.006	0.11	0.11
1.5	0.019	0.007	0.17	0.13
2.0	0.025	0.006	0.23	0.11
2.5	0.032	0.007	0.29	0.13
3.0	0.039	0.007	0.35	0.13
3.5	0.047	0.008	0.42	0.14
4.0	0.054	0.007	0.49	0.13
4.5	0.062	0.008	0.56	0.14
5.0	0.071	0.009	0.64	0.16
5.5	0.080	0.009	0.72	0.16
6.0	0.089	0.009	0.80	0.16
6.5	0.099	0.010	0.89	0.18
7.0	0.110	0.011	0.99	0.20
7.5	0.122	0.012	1.10	0.22
8.0	0.134	0.012	1.21	0.22
8.5	0.148	0.014	1.33	0.25
9.0	0.164	0.016	1.48	0.29
9.5	0.181	0.017	1.63	0.31
10.0	0.201	0.020	1.81	0.36
10.5	0.226	0.025	2.03	0.45
11.0	0.258	0.032	2.32	0.58
11.5	0.308	0.050	2.77	0.90
12.0	0.607	0.299	5.46	5.38
12.5	0.719	0.112	6.47	2.02
13.0	0.757	0.038	6.81	0.68
13.5	0.785	0.028	7.07	0.50
14.0	0.807	0.022	7.26	0.40
14.5	0.826	0.019	7.43	0.34
15.0	0.842	0.016	7.58	0.29
15.5	0.857	0.015	7.71	0.27
16.0	0.870	0.013	7.83	0.23
16.5	0.882	0.012	7.94	0.22
17.0	0.893	0.011	8.04	0.20
17.5	0.904	0.011	8.14	0.20
18.0	0.913	0.009	8.22	0.16
18.5	0.923	0.010	8.31	0.18
19.0	0.931	0.008	8.38	0.14
19.5	0.940	0.009	8.46	0.16
20.0	0.948	0.008	8.53	0.14
20.5	0.955	0.007	8.60	0.13
21.0	0.962	0.007	8.66	0.13
21.5	0.969	0.007	8.72	0.13
22.0	0.976	0.007	8.78	0.13
22.5	0.983	0.007	8.85	0.13
23.0	0.989	0.006	8.90	0.11
23.5	0.995	0.006	8.96	0.11
24.0	1.000	0.005	9.00	0.09

use grades that should be made would they occur.

ng formula for 0.013. Use of the d to determine slope of 0.003. scale and also itedge cuts the that a 305-mm ng full. own the other ommercial size,

ng the expected erals and sub- outfall sewers. It is then e diagrams. la which intro- all shapes and

brickwork. The is 0.003. What ydraulic radius / a straightedge l line. From the t the hydraulic m/s. With this m^3/s .

ewage in a pipe ck computation g the diagram it itions when the own hydraulic

0.013 when the sewer is carrying

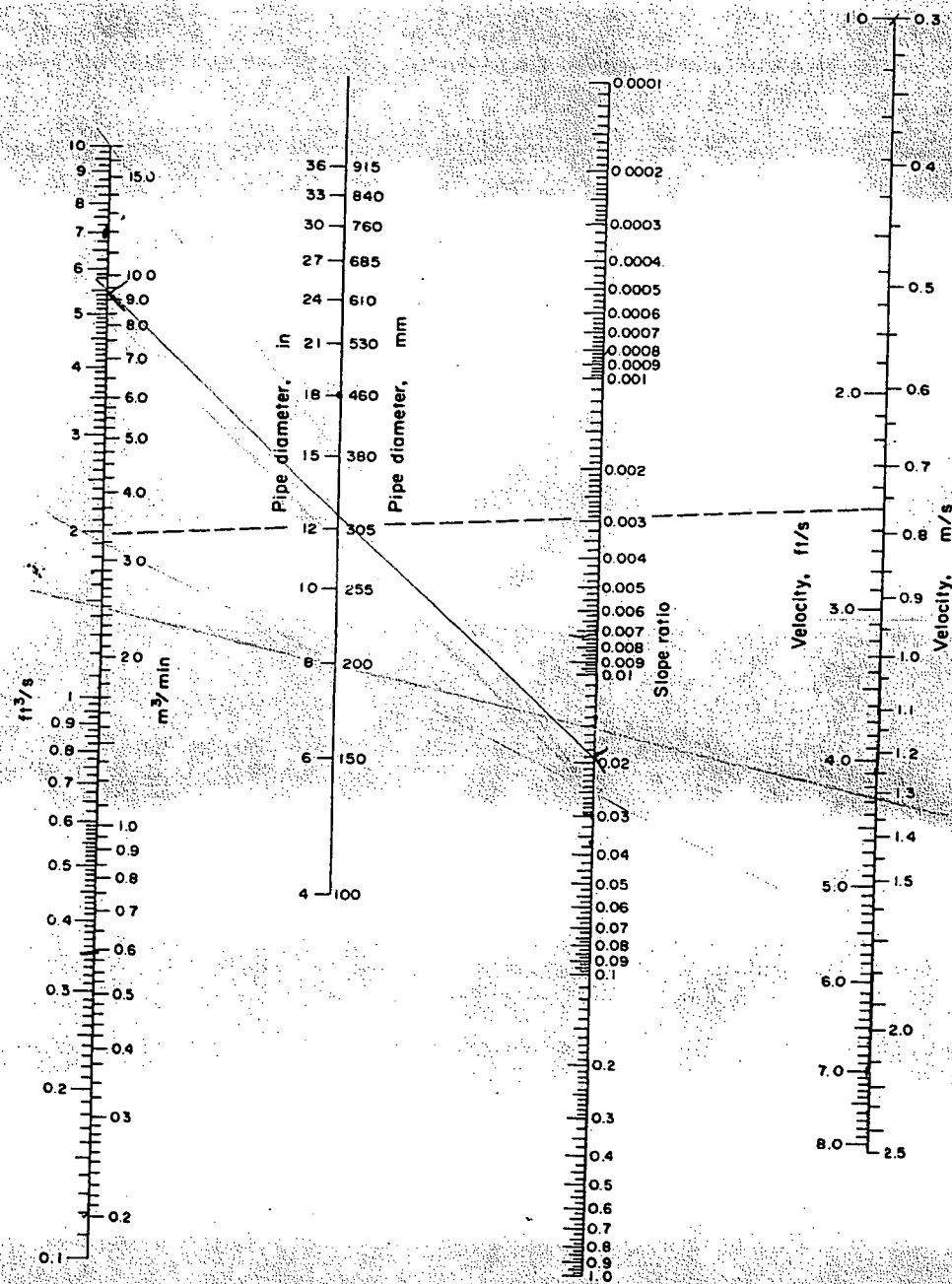


Figure 15-1 Diagram for solution of Manning formula for circular pipes flowing full. $n = 0.013$.

APPENDIX C
STORMWATER RETENTION CALCULATIONS

Storm drainage Calculations

Impervious Areas = 260 Ft diam. Containment Area
53,093 Ft²

Roadways & Structures = 9,156 Ft² Total 62,249 Ft²

Design Storm = 24 hr 25 year event = 9 inches

Assume 100% runoff

$$9 \text{ inches} \times 62,249 \text{ Ft}^2 = 46,686.75 \text{ Ft}^3$$
$$= 1.07 \text{ AC Ft}$$

From Power Plant Site Certification Nov 1987

Volume II Appendices

Appendix 10.11 Attachment 6

Retention Pond NO. 1

Storage Volume Required = 32.47 AC Ft

Storage Volume Provided = 81.48 AC Ft

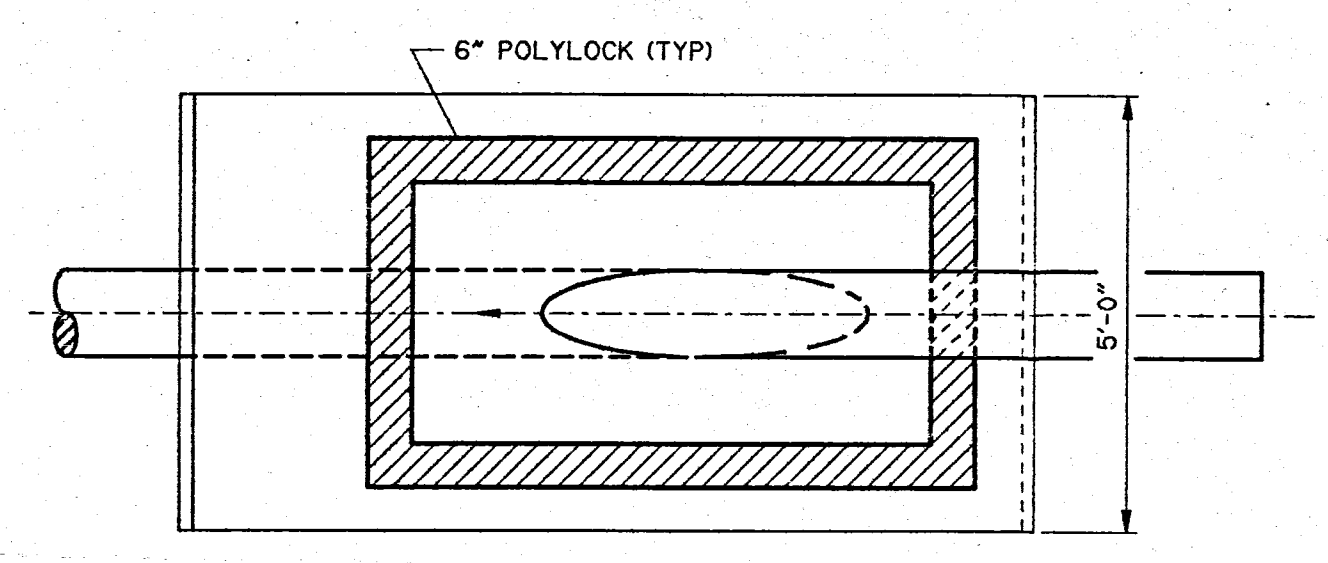
Excess Storage Volume = 49.01 AC Ft

Storage Volume Required from

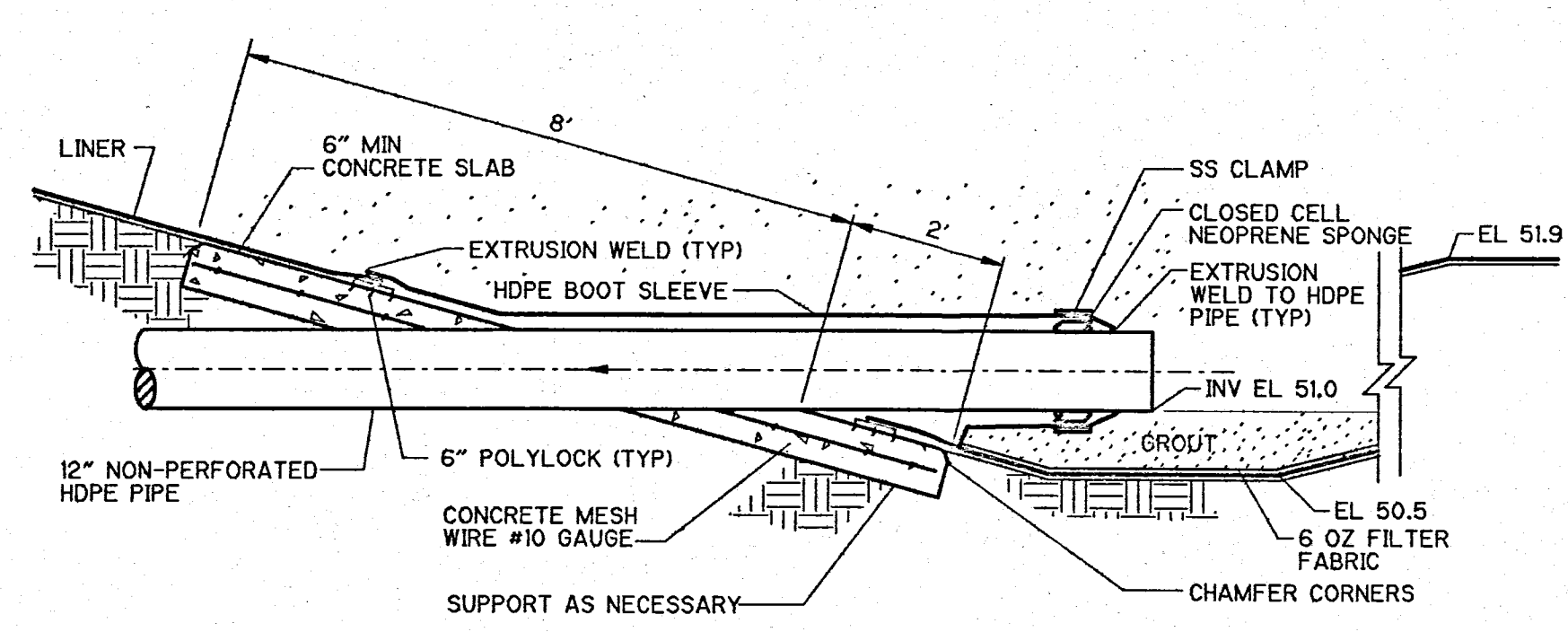
Leachate Management System

= 1.07 AC Ft

1431217 (1)



PLAN

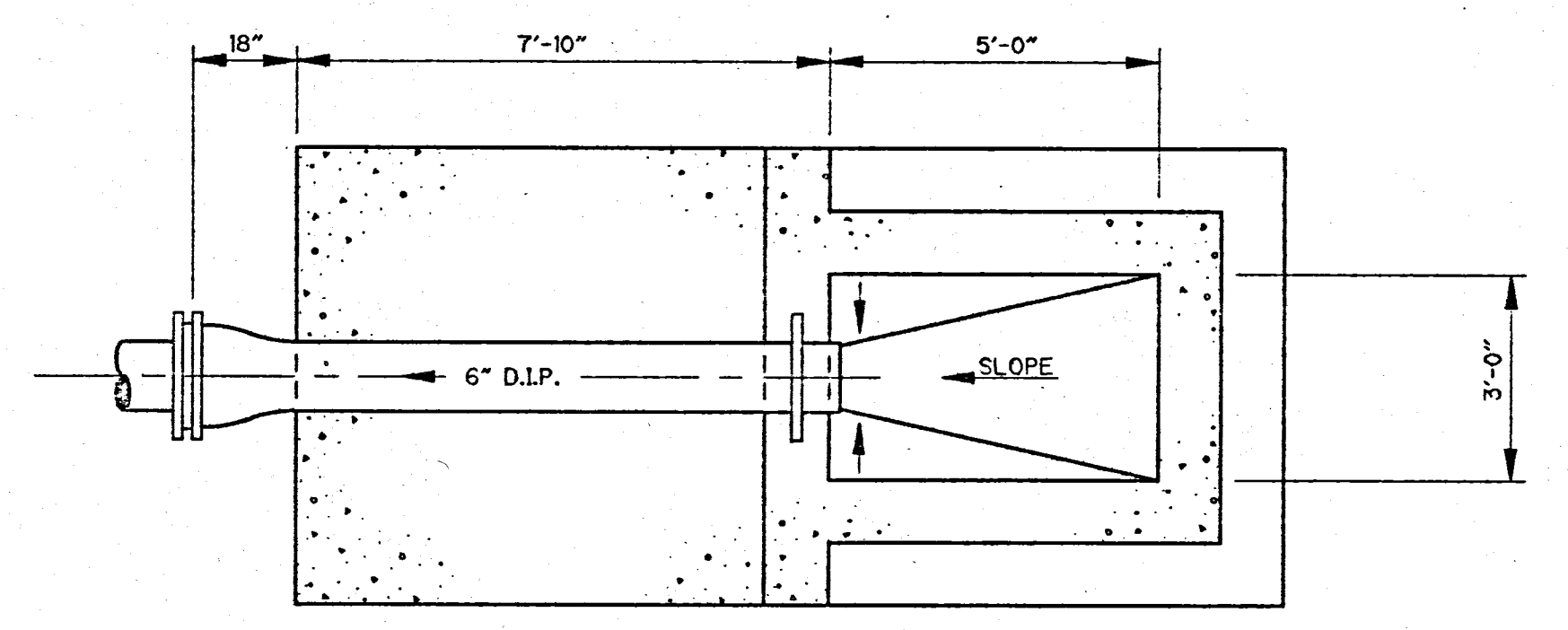


ELEVATION

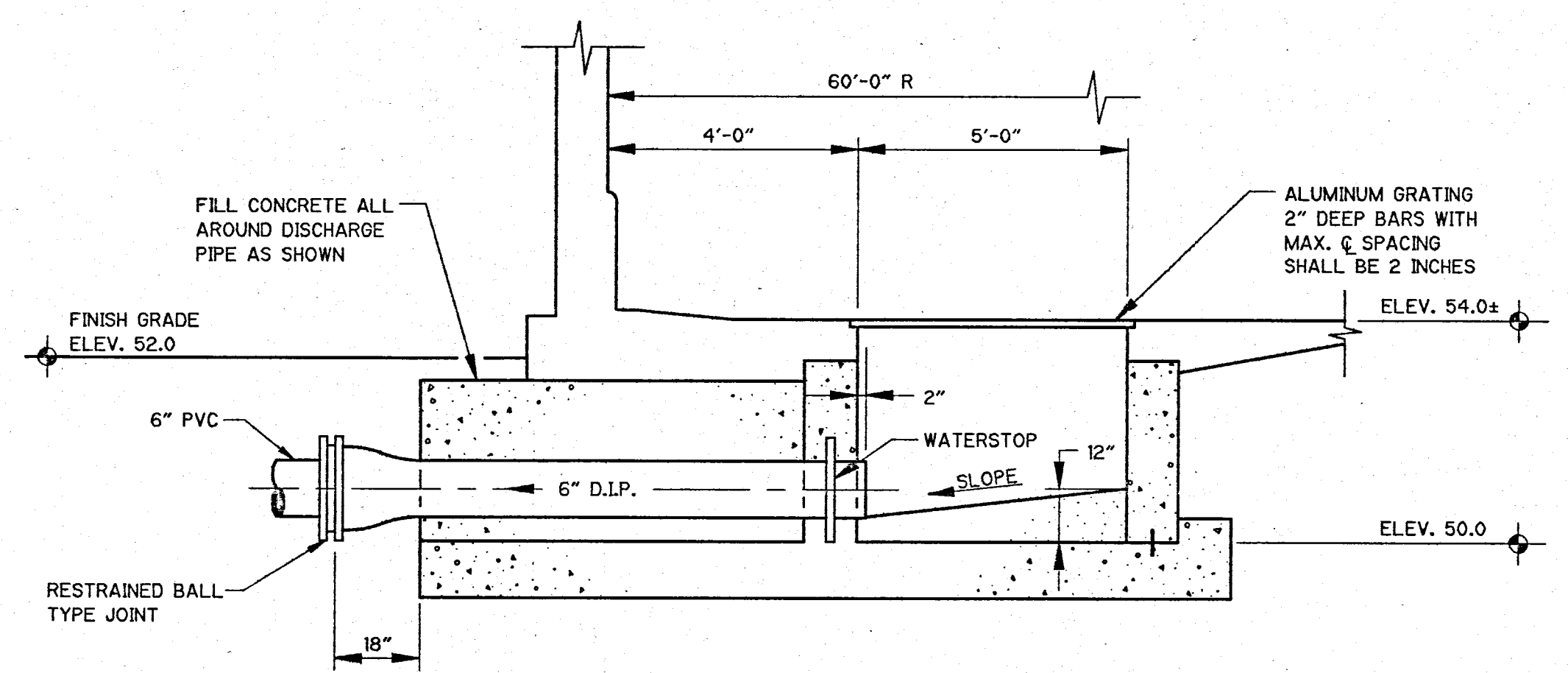
TYPICAL SINGLE PIPE LINER PENETRATION

DETAIL A

NTS C-1/CD-1



PLAN

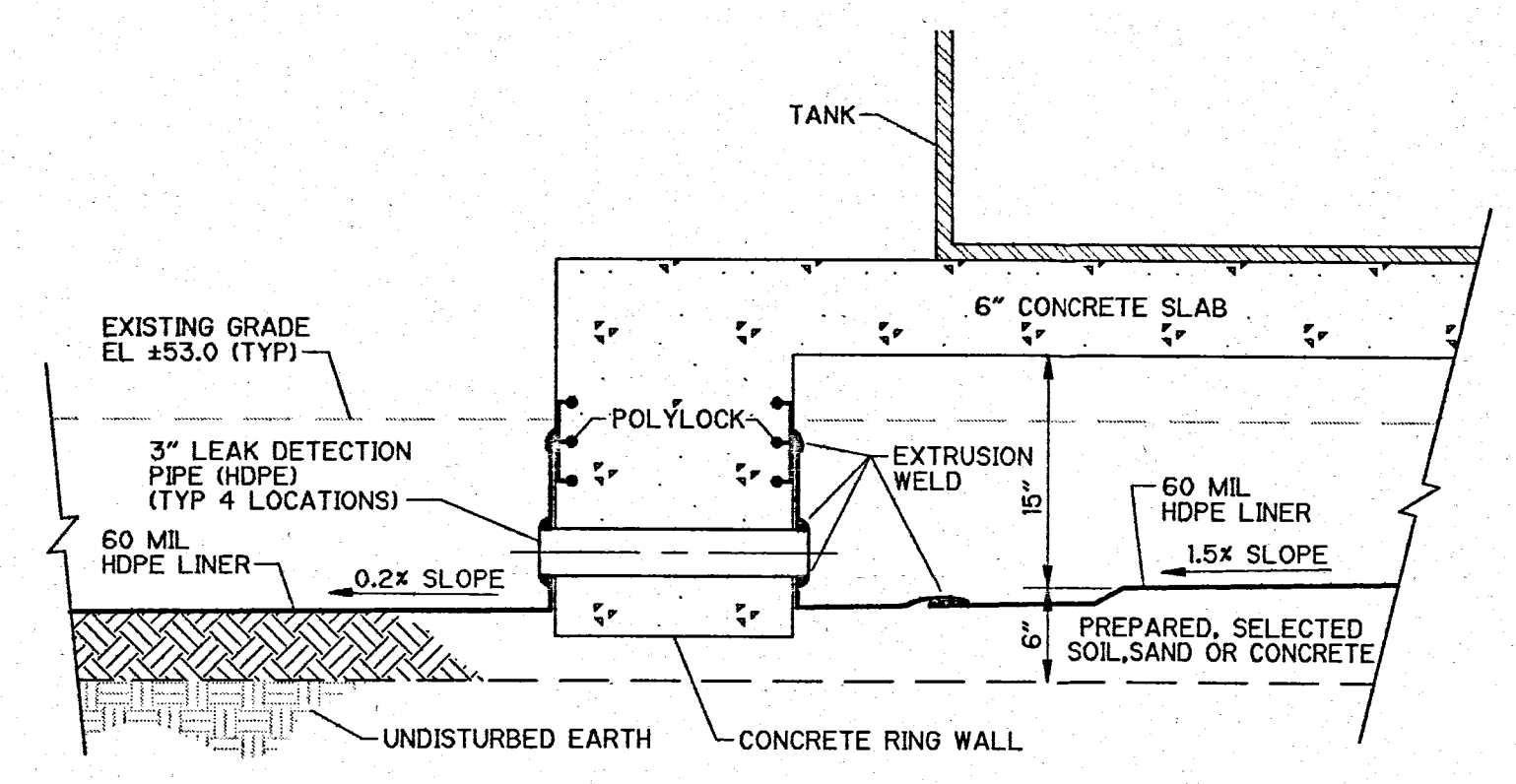


ELEVATION

TANK DISCHARGE PIPE PIT DETAIL

DETAIL B

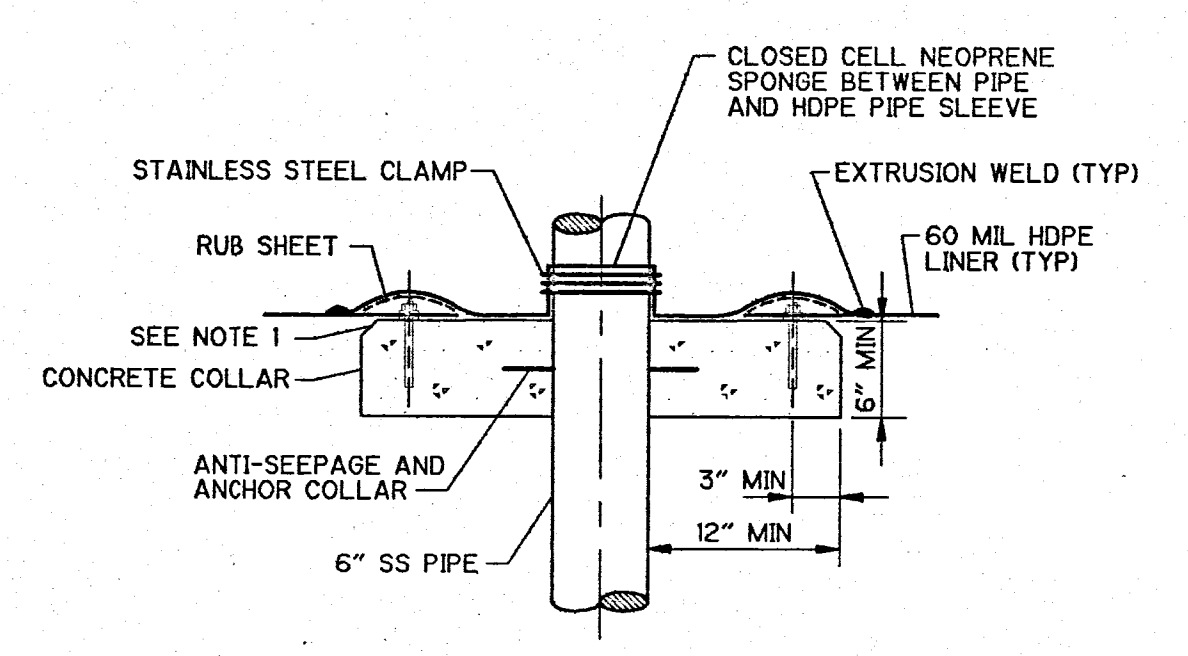
NTS C-1/CD-1



TYPICAL TANK RING WALL WITH LEAK DETECTION PIPE

DETAIL C

NTS CD-1



NOTES

1. ALL CONCRETE COLLARS TO BE CHAMFERED A MINIMUM OF 1" (TYP) AT ALL CORNERS IN CONTACT WITH LINER.

TYPICAL PIPE PENETRATION

DETAIL D

NTS CD-1

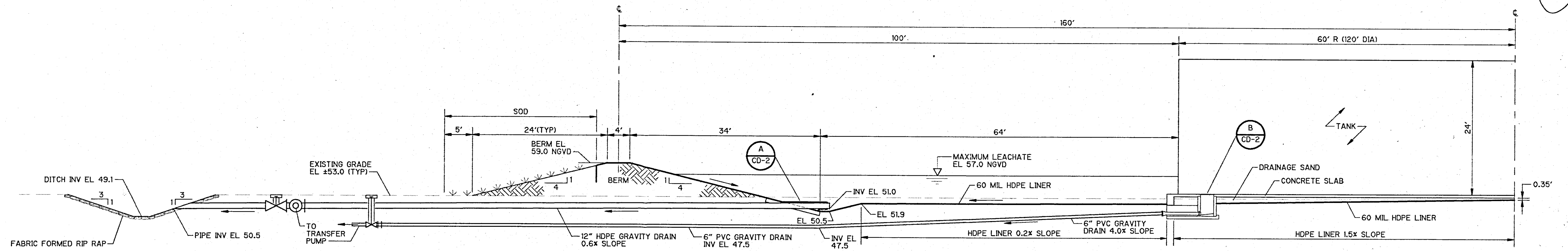
DESIGNED BY: J. BANKS	DATE: AUGUST 1995
DRAWN BY: S. ANDERSON	
SHEET CHK'D BY: J. BANKS	
CROSS CHK'D BY:	
APPROVED BY:	
REMARKS	

CAMP DRESSER & MCKEE INC.
environmental engineers, scientists,
planners, & management consultants
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HAYS ROAD SOLID WASTE DISPOSAL FACILITY
PASCO COUNTY, FLORIDA
LEACHATE STORAGE TANK AND TREATMENT FACILITY

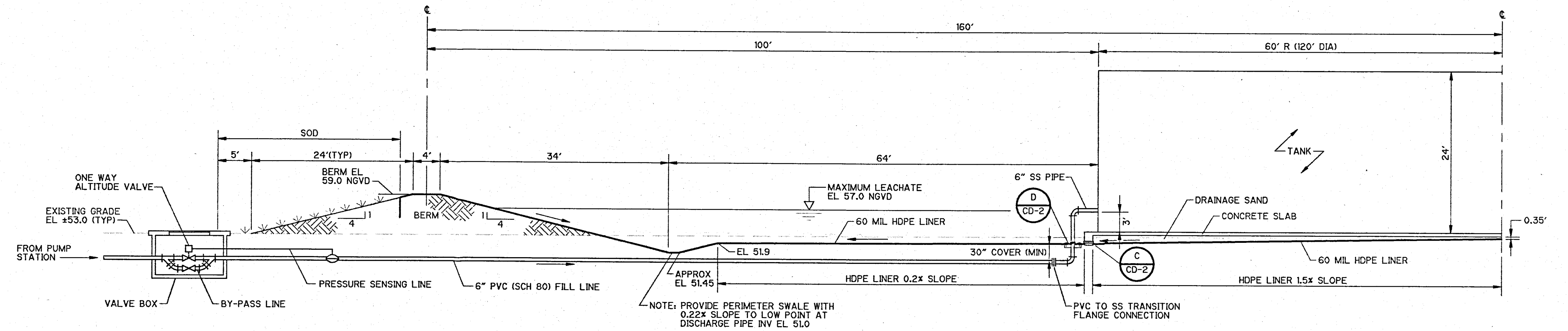
MISCELLANEOUS DETAILS

PROJECT NO. 8089-04
SHEET NO. CD-2



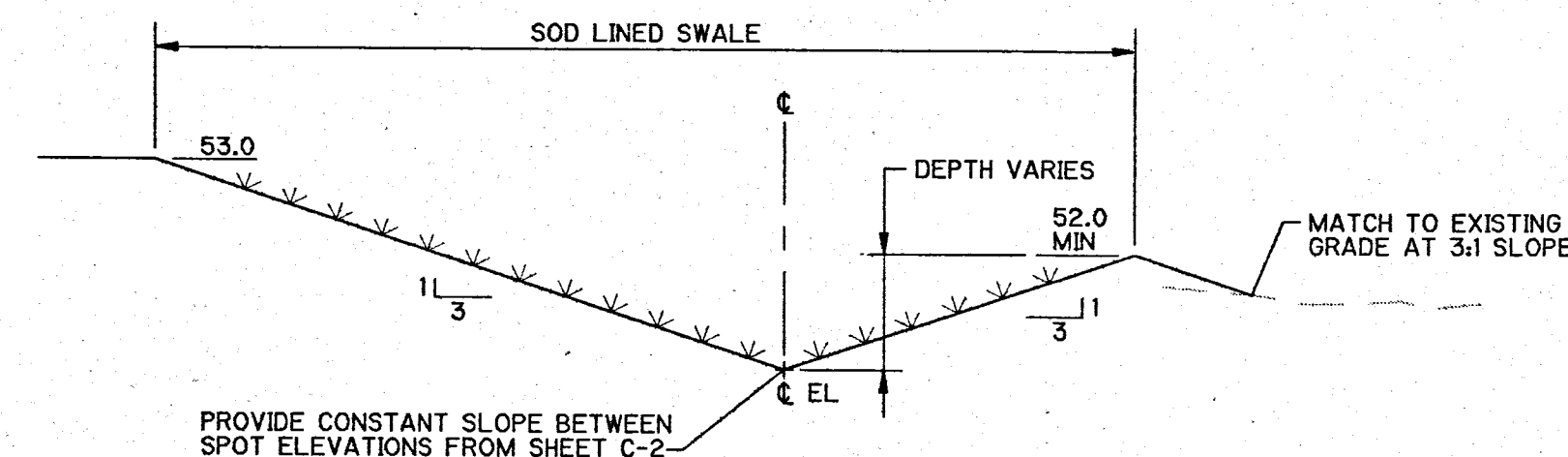
8" HDPE GRAVITY DRAIN FROM SECONDARY CONTAINMENT

SECTION 1
1" = 10'



6" HDPE FORCE MAIN FROM PUMP STATION

SECTION 2
1" = 10'



TYPICAL SWALE
SECTION 3
1" = 2'

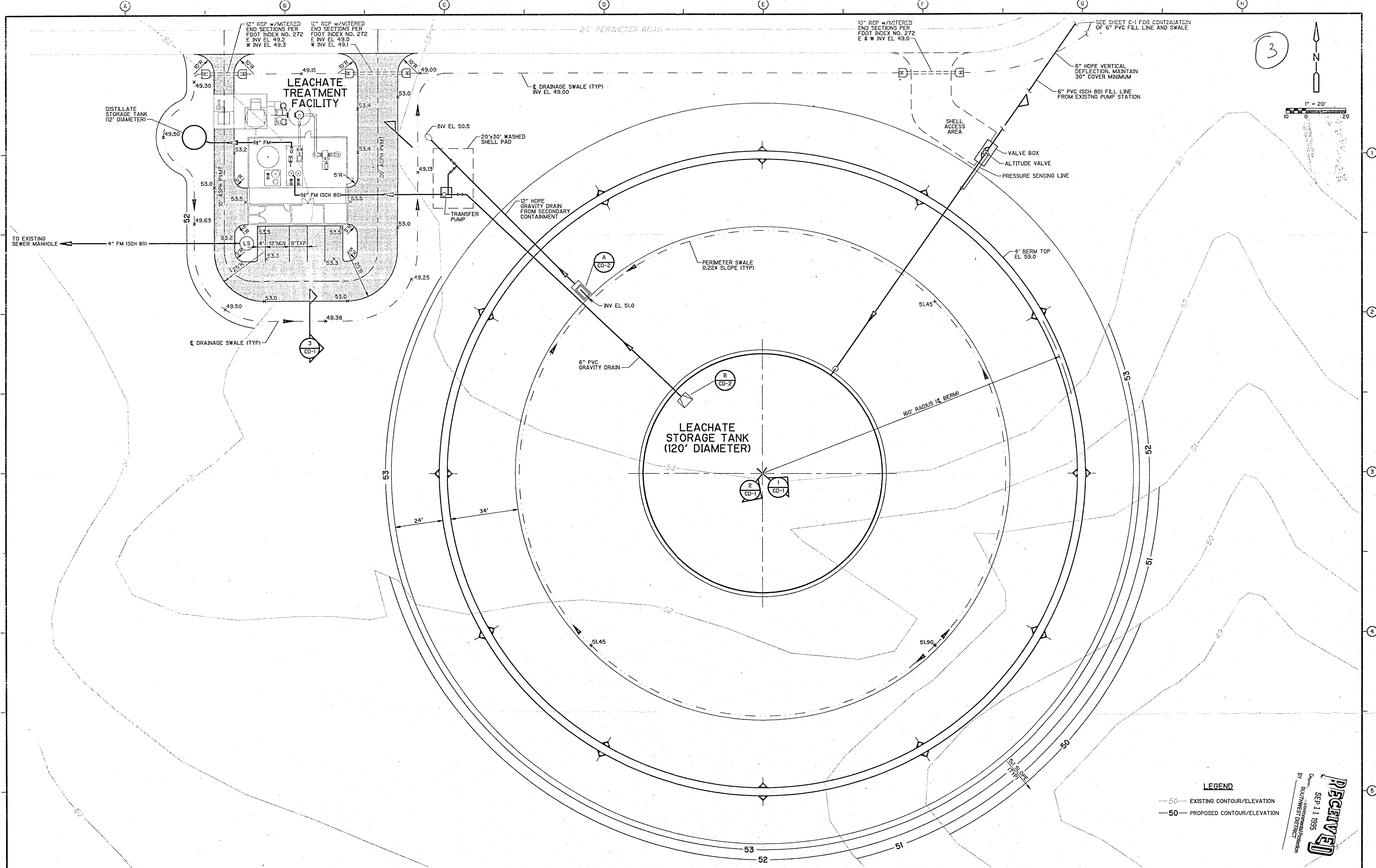
DESIGNED BY:	J. BANKS
DRAWN BY:	S. ANDERSON
SHEET CHK'D BY:	J. BANKS
CROSS CHK'D BY:	
APPROVED BY:	
DATE:	AUGUST 1995

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LEACHATE STORAGE TANK AND TREATMENT FACILITY

CROSS SECTION DETAILS
PROJECT NO. 8089-04
SHEET NO. CD-1

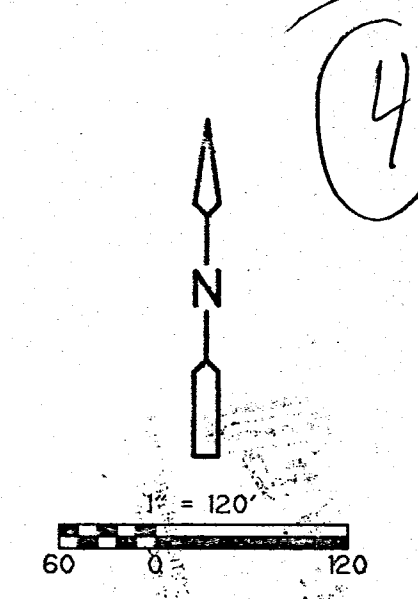
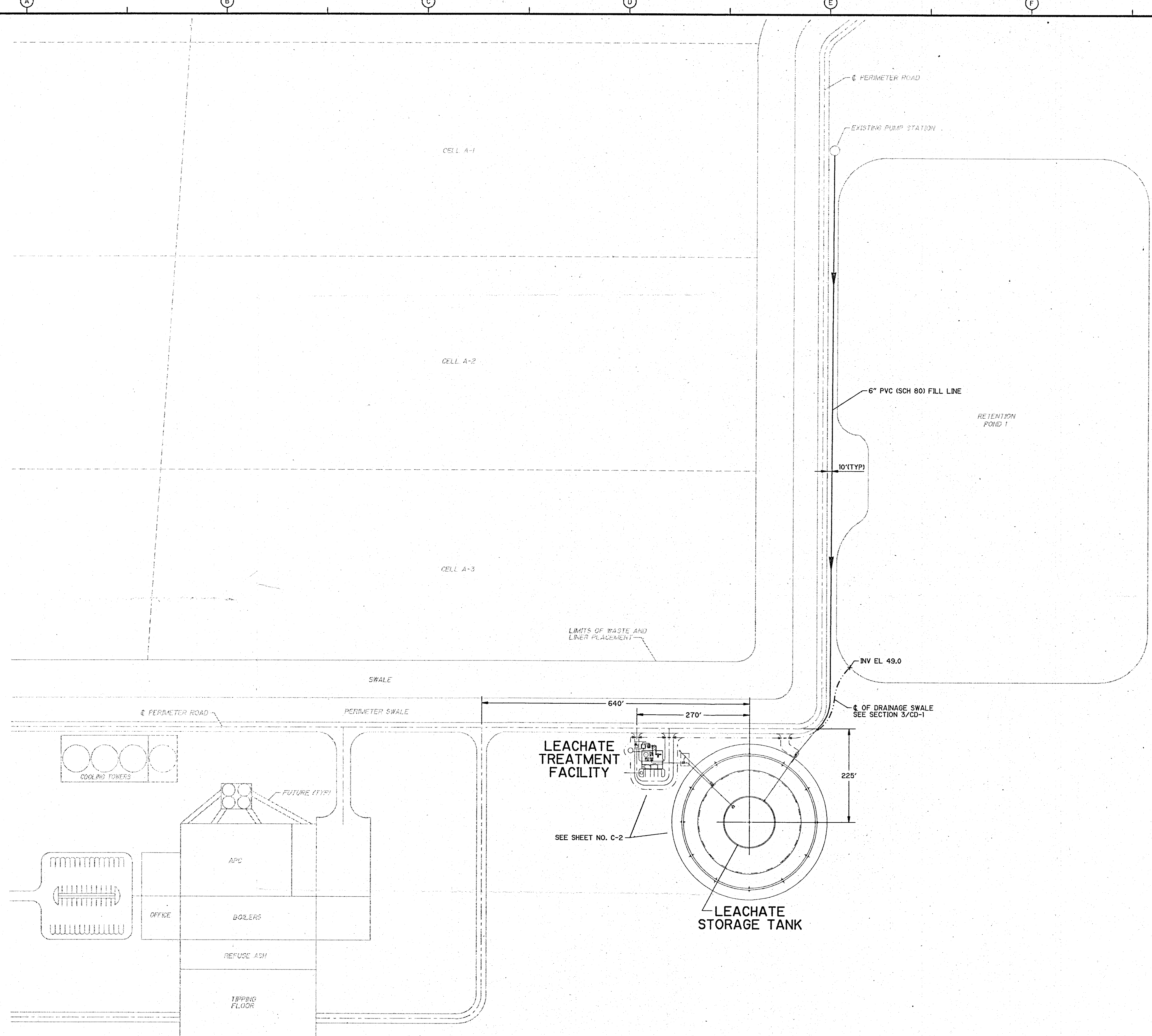
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Southwest District



LEGEND
—50— EXISTING CONTOUR/ELEVATION
—50— PROPOSED CONTOUR/ELEVATION

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Department of Environmental Protection
SOUTHWEST DISTRICT

REV. NO. DATE DRWN CHKD				DESIGNED BY: J. BANKS DRAWN BY: S. ANDERSON SHEET CHK'D BY: J. BANKS CROSS CHK'D BY: APPROVED BY: DATE: AUGUST 1995		CAMP DRESSER & McKEE INC. environmental engineers, scientists, planners, & management consultants		HAYS ROAD SOLID WASTE DISPOSAL FACILITY PASCO COUNTY, FLORIDA LEACHATE STORAGE TANK AND TREATMENT FACILITY		SITE PLAN NO. 2		PROJECT NO. 8089-04 SHEET NO. C-2	
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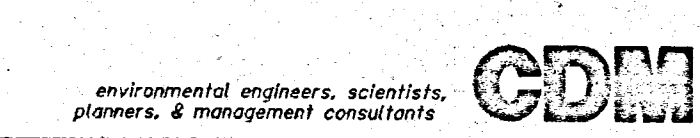
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SEP 11 1995

BY: [Signature]

FOR: [Signature]

					DESIGNED BY: J. BANKS	CAMP DRESSER & McKEE INC.	HAYS ROAD SOLID WASTE DISPOSAL FACILITY PASCO COUNTY, FLORIDA	SITE PLAN NO. 1	SHEET NO. C-1	
					DRAWN BY: S. ANDERSON					
					SHEET CHK'D BY: J. BANKS					
					CROSS CHK'D BY:					
					APPROVED BY:					
REV.	NO.	DATE	DRWN	CHKD	REMARKS	DATE: AUGUST 1995	LEACHATE STORAGE TANK AND TREATMENT FACILITY			



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08/22/95 10:124

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