

5101Permit1984 - Batch No. \_\_\_\_\_

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# RAGSDALE CONSULTANTS, P.A.

310 E. JOHNSTON STREET — P. O. BOX 1749 — SMITHFIELD, N. C. 27577  
TELEPHONE (919) 934-7154 / 934-0511

March 21, 1984

Mr. Gordon Layton, Environmental Engineer  
Solid & Hazardous Waste Management Branch  
Division of Health Services  
P. O. Box 2091  
Raleigh, North Carolina 27602-2091

Re: Permit Recordation  
Johnston County Landfill  
(Permit No. 51-01)

Dear Gordon,

In keeping with your permit conditions for the referenced project, we are returning herewith the certified copy of the permit as recorded in Book 952, Page 374 of the Johnston County Registry.

Please let me know if any additional action or discussion is needed in any way.

Respectfully yours,

Gene B. Cobb, P. E.  
RAGSDALE CONSULTANTS, P. A.

GBC/sp  
Enclosure  
cc: Mr. Harold Blizzard



CIVIL, ENVIRONMENTAL, & STRUCTURAL ENGINEERING — ARCHITECTURE  
LANDSCAPE ARCHITECTURE — LAND PLANNING — SURVEYING

LILLINGTON, OFFICE: P. O. BOX 757 LILLINGTON, N. C. 27546 (919) 893-2156



DIVISION OF HEALTH SERVICES  
P.O. Box 2091  
Raleigh, N.C. 27602-2091

*Johnston*  
Ronald H. Levine, M.D., M.P.H.  
STATE HEALTH DIRECTOR

*Permits*

March 13, 1984

Mr. Gene B. Cobb, P.E.  
Ragsdale Consultants, P.A.  
P.O. Box 1749  
Smithfield, N. C. 27577

Dear Mr. Cobb:

Subject: Addendum to Permit 51-01 Johnston County Landfill

The enclosed plan is approved in accordance with G.S. 130-166.18. The permit conditions are attached.

If you have questions, please advise.

Sincerely,

*O. W. Strickland*  
O. W. Strickland, Head

Solid & Hazardous Waste Management Branch  
Environmental Health Section

Enclosure

cc: Larry Perry  
Harold Blizzard

*file w Permit TX Johnston*



Ronald H. Levine, M.D., M.P.H.  
STATE HEALTH DIRECTOR

DIVISION OF HEALTH SERVICES  
P.O. Box 2091  
Raleigh, N.C. 27602-2091

*Permits*

CERTIFIED COPY OF SOLID WASTE PERMIT

I do hereby certify that the attached PERMIT is an exact and true copy  
of Permit No. 51-01.

*O. W. Strickland*

O. W. Strickland, Head  
Solid & Hazardous Waste Management Branch  
Environmental Health Section

North Carolina

Wake

County

I, Dee L Sellers, a Notary Public for said

County and State, do hereby certify that O. W. Strickland  
personally appeared before me this day and acknowledged the due  
execution of the foregoing instrument.

Witness my hand and official seal, this the 13<sup>th</sup> day of

March

, 1984.

(official seal)



*Dee L Sellers*

Notary Public

My commission expires July 24, 1987.

State of North Carolina, Department of  
Filed for registration at 5:00 P M  
Mar 15 1984 in the  
Register of Deeds Office.

Recorded in Book 252 Page 374

*Julia Curley Medlin*

Register of Deeds

*By: Phyllis Wallcut*

Sarah T. Morrow, M.D., M.P.H.

SECRETARY

RECORDED, VERIFIED  
& INDEXED

PERMIT NO. 51-01DATE ISSUED 3/13/84

STATE OF NORTH CAROLINA  
 DEPARTMENT OF HUMAN RESOURCES  
 Division of Health Services  
 P.O. Box 2091                      Raleigh 27602

## SOLID WASTE PERMIT

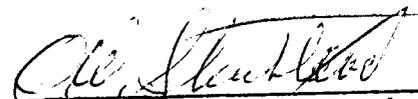
Johnston County is hereby issued a permit to  
 operate a Sanitary Landfill (Phase IV)

located on State Road 1503,

in accordance with Article 13B of the General Statutes of North Carolina and all  
 rules promulgated thereunder and subject to the conditions set forth in this  
 permit. The facility is located on the below described property.

Tract #1

Beginning at a concrete monument in the line of property owned by the  
 County of Johnston; said concrete monument being a common corner between Walt  
 Lassiter and Starling Johnson; thence from the above described beginning the  
 line runs as a new line with Walt Lassiter N 21° 00'W, 802 feet; thence N 08°-  
 30'W, 250 feet; thence N 06°-30'E, 1455.00 feet to a stake in a branch; thence  
 as the run of said branch the following courses and distances:  
 N 25°-30'-E, 130.00 feet, N 66°-00'E 350 feet, N 50°E 130 feet, N 82°-30'E,  
 95.00 feet, and N 50°-00'E, 258 feet to a stake; thence N 32°-00'E 758 to a stake  
 on the Bank of Middle Creek; thence the line runs along the Bank of Middle Creek  
 the following courses and distances:  
 S 63°-00'E 650 feet, N 88°-00'E 200 feet, N 69°-00'E, 400.00 feet, S 15°-00'E  
 180 feet, S 42°-00'W, 965 feet thence continuing along said Creek Bank to a  
 concrete monument, a corner with the County of Johnston; thence as the County of  
 Johnston line S 34°-24'W, 2899 feet to the point of beginning.



O. W. Strickland, Head  
 Solid & Hazardous Waste Management  
 Branch  
 Environmental Health Section

PERMIT NO. 51-01DATE ISSUED 3/13/84

## SOLID WASTE PERMIT

## Property Description (continued)

Containing 86.6± acres and being a portion of that tract recorded in Book 763, page 525 of the Johnston County Register of Deeds.

## Tract #2

Beginning at a concrete monument in the line of that tract owned by the County of Johnston and known as the Walt Lassiter tract; said concrete monument being located N 34°-24'E 820 feet from a concrete monument, a corner between Starling Johnson and Walt Lassiter; thence from the above described beginning the line runs N 34°-24'E 2079 feet to a concrete monument on the Bank of Middle Creek; thence down the run of Middle Creek to the mouth of Buzzard Branch; thence up the run of Buzzard Branch the following courses and distances S 23°-45'W 230 feet, S32°-45'W 640 feet, S 65°-30'W 500 feet, S39°-15'W 212 feet, S53°-45'W 252 feet, and S 46°-15'W 223 feet to a concrete monument; thence N 55°-08'-07" W, 928.04 feet to the beginning containing 83± acres.

PERMIT NO. 51-01

DATE ISSUED 3/13/84

### SOLID WASTE PERMIT

Conditions of Permit:

1. This permit may be subject to review at an administrative hearing upon petition of anyone whose legal rights, privileges and duties may have been affected by the issuance thereof.
2. This permit shall not be effective unless the certified copy is filed in the register of deeds' office, in the grantor index under the name of the owner of the land in the county or counties in which the land is located. After recordation, the certified copy shall be returned to the Solid & Hazardous Waste Management Branch and shall have indicated on it the page and book number, date of recordation and registrar's seal.
3. The following requirements shall be met prior to receiving solid waste at the site:
  - a. Site preparation shall be in accordance with construction plan.
  - b. Site inspection shall be made by a representative of the Division of Health Services.
4. This solid waste disposal site is permitted to receive solid waste as defined in 10 NCAC 10G, .0101(31), except that hazardous waste, liquid waste and any other wastes that may pose a threat to the environment or the public health are prohibited from disposal at this site unless prior authorization is obtained from the Division of Health Services.
5. This permit is for construction according to plans prepared by Ragsdale Engineers dated July, 1983. Any modification or deviation from the approved plans shall be approved by the N.C. Solid and Hazardous Waste Management Branch.
6. Groundwater monitoring wells are installed per the DHS monitoring well standard by August 31, 1984. Johnston County shall notify the Division of Health Services upon completion of monitoring well installation.
7. This facility shall conform to operating procedures in Rule .0505 of the Solid Waste Management Rules.



# RAGSDALE CONSULTANTS, P.A.

310 E. JOHNSTON STREET

P. O. BOX 1749

SMITHFIELD, N. C. 27577

TELEPHONE (919) 934-7154 / 934-0511

January 20, 1984



Mr. Gordon Layton, Environmental Engineer  
Solid & Hazardous Waste Management Branch  
Division of Health Services  
P. O. Box 2091  
Raleigh, North Carolina 27602-2091

Re: Additional Set of Plans and Report  
Phase IV Landfill Operations  
Johnston County, N.C.

Dear Gordon,

Please find enclosed one additional set of plans and report for the referenced project. The set I borrowed from you this afternoon I hand-delivered to Land Quality's regional office, as we discussed. (However, John Holley was not in.)

Thanks again for your time and consideration.

Respectfully yours,

Gene B. Cobb, P. E.  
RAGSDALE CONSULTANTS, P. A.

GBC/sp  
Enclosures

CIVIL, ENVIRONMENTAL, & STRUCTURAL ENGINEERING — ARCHITECTURE  
LANDSCAPE ARCHITECTURE — LAND PLANNING — SURVEYING

LILLINGTON, OFFICE: P. O. BOX 757 LILLINGTON, N. C. 27546 (919) 893-2156

51-01 AV



# RAGSDALE CONSULTANTS, P.A.

310 E. JOHNSTON STREET — P. O. BOX 1749 — SMITHFIELD, N. C. 27577  
TELEPHONE (919) 934-7154 / 934-0511

January 17, 1984



Mr. Gordon Layton, Environmental Engineer  
Solid & Hazardous Waste Management Branch  
Division of Health Services  
P.O. Box 2091  
Raleigh, North Carolina 27602-2091

Re: Additional Operational Plan  
Submittals and Revisions  
Phase IV Landfill Operations  
Johnston County, N.C.

Dear Gordon,

Please find enclosed three copies of revised plans and engineering report for the referenced project. We would appreciate your review and approval, if in order. Please let me know if you have further questions or if discussion is needed in any way.

Respectfully yours,

Gene B. Cobb, P. E.  
RAGSDALE CONSULTANTS, P. A.

GBC/sp  
Enclosures  
cc: Mr. Harold Blizzard

CIVIL, ENVIRONMENTAL, & STRUCTURAL ENGINEERING — ARCHITECTURE  
LANDSCAPE ARCHITECTURE — LAND PLANNING — SURVEYING

LILLINGTON, OFFICE: P. O. BOX 757 LILLINGTON, N. C. 27546 (919) 893-2156

Booklet-

51-01

Johnston County, North Carolina  
Solid Waste Disposal  
Phase IV

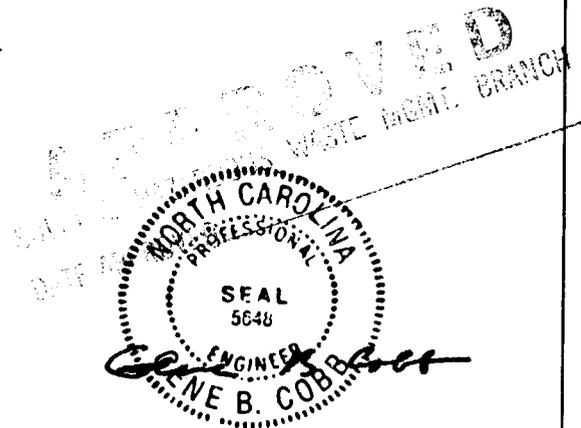
January 1984

ENGINEERING REPORT

JOHNSTON COUNTY, NORTH CAROLINA  
SOLID WASTE DISPOSAL  
PHASE IV



JANUARY 1984



RAGSDALE CONSULTANTS, P.A.

ENGINEERS & ARCHITECTS

SMITHFIELD, LILLINGTON, AND RALEIGH, NORTH CAROLINA

ENGINEERING REPORT

JOHNSTON COUNTY, NORTH CAROLINA  
SOLID WASTE DISPOSAL  
PHASE IV

JANUARY 1984



## ENGINEERING REPORT

### JOHNSTON COUNTY, NORTH CAROLINA SOLID WASTE DISPOSAL PHASE IV

Scope of Operations: The proposed Phase IV landfill operations shown on the drawings for this project represent the completion of landfilling activities on the present Johnston County Landfill site. The operations are proposed in two independent parts identified as Section 1 and 2. The upper and lateral extremities of portions of the proposed fill will tie into existing slopes of the previous Phase II and Phase III operations.

Phase IV operations therefore will consist of a continuation of Phase II and Phase III work. This report will outline conditions and construction specific to the new areas.

Population Area Served: The County continues to operate a county-wide collection system, in addition to receiving solid waste from the various municipalities within the County and from private haulers. As budget restraints allow, additional bulk container sites are being developed to replace the multiple 4- and 8-yard container sites that have been previously developed. The area and population served therefore is essentially that of Johnston County. The 1980 county population was 70,221. The growth from 1970 to 1980 amounted to approximately 1.3% per year.

Nature/Quantity of Solid Waste: The majority of solid waste received at the landfill is household waste, although in the past approximately 40 percent has been estimated to be received from commercial and industrial sources. From previous surveys, the total per-capita solid waste production to the landfill, including the commercial and industrial portion, has been estimated to be approximately 4.8 lb./day.

Using the 1980 census data, 1.3% annual growth rate, and 4.8 lb./day per-capita solid waste production, the 1984 loading for the landfill is estimated to be approximately 260 tons/working day (based on 250 working days per year).

Using the same assumptions, by 1994 solid waste production would rise to 295 tons/working day. The 10-year average loading would then be approximately 275 tons/working day, or 68,750 tons annually.

Site Characteristics: The general characteristics of the site will be only briefly discussed herein due to the close similarity with the existing operational areas. The landfill is reached via SR 1503, a paved dead-end road running north from NC 210 approximately 5 miles west of Smithfield. The site is bounded on the north by Middle Creek, a Class C stream. All drainage from the landfill site will be tributary to Middle Creek. The proposed Phase IV operations will extend the working area northward to the creek and will exhaust the land owned by the County in this direction.

Both sections have considerable relief, sloping gradually from the front (or south side) toward Middle Creek and dropping abruptly at the creek. (There are also some fairly steep slopes on the western and eastern sides of Sections 1 and 2, respectively.) No part of the proposed fill area will be located within the flood plain.

The characteristics of the soils are delineated in a separate report prepared by Soils and Materials Engineers, Raleigh, N.C. (Vertical and horizontal control surveys for the borehole locations were provided by Ragsdale Consultants, P. A.)

The lower portions of both tracts are fairly heavily wooded, including some large-diameter hardwoods. Significant manpower will be required to clear these portions.

Operational Facilities and Personnel: Again, this aspect of the project will be touched only briefly since no new facilities or personnel are proposed.

The landfill operation is under the administrative control of Mr. Harold Blizzard, Assistant County Manager. The landfill operation and personnel are supervised by Mr. R. B. Howell.

A fenced area at the front of the site contains the landfill office and garage, a pre-engineered metal building.

Order of Construction: An outline order of construction is presented in the following pages. For identification of the various work areas and hydrologic construction, please refer to the excavation drawings for each section. (For convenience, this order of construction has also been included on Drawings 8 and 9 in the plan set.)

JOHNSTON COUNTY LANDFILL, PHASE IV  
SECTION 1

Outline Order of Construction

Area A

1. Construct Sediment Basin No. 1.
2. Construct Diversion Ditch (No. 1) and temporary construction drainage outlet for excavation of Area A, including Dissipation Basin No. 1.
3. Construct Dike, using (excavation) from Area A.
4. Excavate and fill Area A; use excess excavation for initial lift of dike in Area B.
5. Provide final cover for Area A with excavation from Area B.
6. Close construction drainage outlet in dike between Areas A and B; construct slope drain; construct terraces on final cover.

Area B

1. Construct Sediment Basin No. 2.
2. Construct Diversion Ditch No. 2 and temporary construction drainage outlet for excavation of Area B, including Dissipation Basin No. 2.
3. Complete construction of Dike, using excavation from Area B.
4. Excavate and fill Area B; use excess excavation for initial lifts of dike in Area C.
5. Provide final cover for Area B with excavation from Area C.
6. Close construction drainage outlet in dike between Areas B & C; construct slope drain; construct terraces on final cover.

Area C

1. Complete construction of dike, using excavation from Area C.
2. Excavate and fill Area C.
3. Provide final cover for Area C with excavation from Area D.

Area D

1. Construct Diversion Ditch No. 3.
2. Construct Dike for Area D, using excavation from Areas D & E.
3. Excavate and fill Area D.
4. Provide final cover for Area D with excavation from Area E.
5. Close construction drainage outlet in dike between Areas C & D; construct slope drain.

Area E

1. Construct Sediment Basin No. 3.
2. Construct Diversion Ditch No. 4 up to point of (future) temporary drainage outlet.
3. Construct Dike for Area E, using excavation from Area E.
4. Excavate and fill Area E.
5. Provide final cover for Area E with excavation from Area F.
6. Close construction drainage outlet in dike between Areas D & E; construct slope drain; construct terraces on final cover.

#### Area F

1. Construct temporary drainage outlet between Areas E & F.
2. Construct remaining portion of Diversion Ditch No. 5, incl. Diss. Basin No. 5.
3. Construct Dike for Area F, using excavation from Area F.
4. Excavate and fill Area F.
5. Provide final cover for Area F with excavation from Area G.
6. Close temporary drainage outlet in dike between Areas E & F; construct terraces on final cover.

#### Area G

1. Construct temporary drainage outlet between Areas F & G.
2. Construct Diversion Ditch No. 4, including Diss. Basin No. 6.
3. Construct Dike for Area G, using excavation from Area G; stockpile excess for final cover.
4. Fill Area G.
5. Provide final cover for Area G from stockpiled material.
6. Close construction drainage outlet in dike between Areas F & G; construct slope drain; construct terraces on final cover.

JOHNSTON COUNTY LANDFILL, PHASE IV  
SECTION 2

Outline Order of Construction

Area A

1. Construct Diversion Ditch No. 6 and temporary construction outlet to Phase III sediment control facilities.
2. Construct dike, using excavation from Area A.
3. Excavate and fill Area A (leave area between Area A and Phase II Landfill Area open for future access to other areas). Stockpile excess excavation for final cover and future dike construction.
4. Close temporary construction outlet.
5. Provide final cover and terrace.

Area B

1. Construct Sediment Basin No. 4, including Dissipation Basin No. 8.
2. Construct Diversion Ditch No. 8.
3. Construct dike using stockpiled materials.
4. Excavate and fill Area B; use stockpiled materials for final cover; construct terrace on final cover.

Area C

1. Install silt fence below proposed dike.
2. Construct dike, using excavation from Area C.
3. Excavate and fill Area C; stockpile any excess excavation.
4. Close temporary construction outlet.
5. Provide final cover from stockpiled materials and upper levels of Areas D & E; provide final terrace and slope drain.

Note: Before proceeding with Areas D & E, the landfill manager should re-evaluate the remaining earthwork, considering that the remaining areas require significant fill material for dikes, and that no further source of cover material exists in proximity to this working area. The manager may desire to construct the remaining dikes (in either or both of the areas) further uphill than indicated, narrowing the area to be filled.

Area D

1. Construct Diversion Ditch No. 10 and construct temporary drainage outlet at south end of proposed dike.
2. Construct Sediment Basin No. 5, including Dissipation Basin No. 9, and temporary drainage outlet at southeastern end of diked area.
3. Construct Diversion Ditch No. 10 (lower portion).
4. Construct dikes, using excavation from Areas D & E.
5. Excavate and fill Area D.
6. Close temporary drainage outlets.
7. Provide final cover, terraces, and slope drain, using excavation from Area E.

Area E

1. Construct remainder of Diversion Ditch No. 11 and construct temporary drainage outlet.
2. Construct dike, using excavation from Area E.
3. Excavate and fill Area E; stockpile excess excavation.
4. Excavate and fill access area.
5. Provide final cover and terraces using stockpiled material.

Comments on Construction: The construction shown in the plans in several areas proposes dikes substantially higher than the average depth of fill. In these instances, it will be good practice to develop the dike in two or more lifts, as shown in the section sheets of the plans. Substantial cover material may be saved in this way.

The earthwork quantities as proposed, ignoring any savings in dike material as mentioned above, are as follows:

	<u>Section 1</u>	<u>Section 2</u>
Total Cut :	539,079 CY	527,590 CY
Fill for Dikes :	102,627 CY	154,277 CY
	<hr/>	<hr/>
Net Cover Material:	436,452 CY	373,313 CY
Total Fill :	917,072 CY	769,014 CY
Fill/Cover Ratio :	2.10	2.06

With reasonably careful construction, there should be more than adequate earth for covering operations. It will be readily recognized, however, that the surplus cover material is located on the upper and middle portions of the tracts, and that this surplus will be needed for dikes and cover on the lower portion of each tract. Economical operation will be achieved by constructing dikes in advance with surplus excavation.

The net fill material (quantity of solid waste) anticipated to be incorporated into each section is as follows:

Section 1 :	480,620 CY
Section 2 :	395,701 CY
	<hr/>
Total :	876,321 CY

Based on an average annual solid waste fill of 68,750 tons, and achieving 1000 lbs. per cubic yard compaction, the anticipated project life of each section is:

Section 1 :	3.5 Years
Section 2 :	2.9 Years
	<hr/>
Total :	6.4 Years

With careful conservation of material, sufficient soil may be made available to further raise the dike elevations beyond those shown on the plans, and the project life further extended.

The final cover material required for the two sections is roughly 185,000 CY leaving approximately 625,000 CY for working cover. Assuming that a fill/working cover ratio of 2.5:1.0 was attained, a solid waste fill of 1,562,500 CY could be incorporated. This would raise the average height of the fill area by an additional 7½ feet. The project lifespan would be increased to over 11 years.

Control of Surface Drainage: The plans show the general locations, dimensions, and construction of the diversion ditches, dissipation basins, flumes, and sediment control basins. (The computations for flow, velocity, and depth for each of these facilities is included in Appendix A herein.) In addition, locations for silt fence construction and rip-rap protection are indicated.

Seeding of Exposed Earth: In general, all open earthwork must be seeded within 30 days of exposure. The plans include an outline specification for seed and preparation.

Project Closeout: No specific use of the completed landfill has been established. The site is basically remote for any intensive use. It is recommended until some beneficial use might present itself that the area be maintained in grass.

Respectfully submitted,

RAGSDALE CONSULTANTS, P. A.

APPENDIX A  
HYDROLOGIC COMPUTATIONS

# AREA A (SECTION I)

AREA

$A = 4.86 \text{ AC}$   
 HIGH EL: 228'  
 LOW EL: 218'  
 LENGTH BASIN: 650'  
 SLOPE = 1.54%

$$T_c = \left[ \frac{(2)(.27)(650)}{3\sqrt{0.0154}} \right]^{0.467}$$

$T_c = 24.5 \text{ MIN}$

$$i = \frac{245.33}{24.5 + 31.67}$$

$i = 4.4 \text{ IN/HR}$

$Q = CiA$   
 $Q = (0.50)(4.4)(4.83)$   
 $Q = 10.6 \text{ cfs}$

## TERRACE DRAINAGE

DEPTH = 0.39' (WATER)  
 DITCH SIDE SLOPES = 60:1 & 3:1  
 DITCH BOTTOM SLOPE = 1.67%  
 $n = 0.28$   
 $WP = 24.64 \text{ FT}$   
 $A = 4.79 \text{ SF}$   
 $R = 0.19$   
 $Q = 11.0 \text{ cfs}$   
 $V = 2.3 \text{ fps}$

## FLUME = (No. 1)

DEPTH = 0.23'  
 FLUME SIDE SLOPES = 4:1 & 4:1  
 FLUME BOTTOM SLOPE = 33.33%  
 $n = 0.30$   
 $WP = 5.90 \text{ FT}$

BY FEJ DATE 11/21/83  
 CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_

SUBJECT Do. Co. SOLID WASTE  
DISPOSAL PHASE IV SECTION I  
DRAINAGE CALCULATIONS

SHEET NO. 1 OF 24  
 JOB NO. \_\_\_\_\_

$A = 1.13 \text{ SF}$   
 $R = 0.19$   
 $Q = 10.8 \text{ cfs}$   
 $V = 9.5 \text{ fps}$   
 FLUME BOTTOM WIDTH = 4.0'

DISSIPATOR.

DEPTH = 2.0'

SIZE =

$(4 \times 3) + (3 \times 2) = 18' \text{ LONG}$   
 $(4 \times 2) + (3 \times 2) = 14' \text{ WIDE}$

SEDIMENTATION BASIN (No. 1)

AREA = 4.86 AC

VOLUME NEEDED

$V = 4.86 \text{ AC} \times 43,560 \text{ SF/AC} \times .04 \text{ ACFT} \times 7.48 \text{ GAL/CF}$   
 $V = 63,341.12 \text{ GAL.}$

BASIN TO BE CLEANED 4 TIMES/YR

$V_{ACT} = 63,341.12 \div 4 = 15,835.28$

BASIN SIZE: WTR DEPTH = 6'  
 SIDE SLOPES = 2.5:1

$V = \frac{n}{3} (A_2 + A_1 + \sqrt{A_1 A_2})$   
 $V = \frac{1}{3} [(80.55) + (25.50) + \sqrt{(80.55)(25.50)}]$   
 $V = 15,990.42 \text{ GAL}$

SIZE AT WATER LEVEL - 80' X 55'

BY FEU DATE 11/21/83  
 CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_

SUBJECT Ho. Co. SOLID WASTE  
DISPOSAL, PHASE IV SECTION I  
DRAINAGE CALCULATIONS

SHEET NO. 2 OF 24  
 JOB NO. \_\_\_\_\_

DIVERSION DITCH (No.1)

AREA = 1.39 AC  
HIGH EL = 221'  
LOW EL = 194'  
LENGTH = 110'  
SLOPE = 24.55%

$$T_c = \left[ \frac{(2)(.27)(110)}{3\sqrt{0.2455}} \right]^{0.467}$$

$$T_c = 5.6 \text{ IN/HR}$$

$$i = \frac{245.33}{5.6 + 31.67}$$

$$i = 6.6 \text{ IN/HR}$$

$$Q = C i A$$
$$Q = (0.50)(6.6)(1.39)$$
$$Q = 4.6 \text{ cfs}$$

DEPTH: 0.35' (WATER)  
DITCH SIDE SLOPES = 3:1 & 3:1  
DITCH ~~SIDE~~ <sup>BOTTOM</sup> SLOPE = 2.10%  
n = 0.28  
WP = 5.21 FT  
A = 1.42 SF  
R = 0.27  
Q = 4.6 cfs  
V = 3.2 fps  
DITCH WIDTH = 3.0'

BY FBJ DATE 11/21/83  
CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_

SUBJECT Ho. Co. SOLID WASTE  
DISPOSAL PHASE IV, SECTION I  
DRAINAGE CALCULATIONS

SHEET NO. 3 OF 24  
JOB NO. \_\_\_\_\_

# AREA B

AREA = 3.77 AC  
HIGH EL = 220'  
LOW EL = 194'  
LENGTH = 480'  
SLOPE = 5.42%

$$T_c = \left[ \frac{(2)(.27)(480)}{3\sqrt{0.0542}} \right]^{0.467}$$

$$T_c = 15.8 \text{ MIN}$$

$$i = \frac{245.33}{15.8 + 31.67}$$

$$i = 5.1 \text{ IN/HR}$$

$$Q = C i A$$

$$Q = (0.50)(5.1)(3.77)$$

$$Q = 9.6 \text{ cfs}$$

## TERRACE DRAINAGE

$$\text{DEPTH} = 0.33'$$

$$\text{DITCH SIDE SLOPES} = 35:1 \text{ \& } 3:1$$

$$\text{DITCH BOTTOM SLOPE} = 4.09\%$$

$$n = 0.28$$

$$WP = 14.51 \text{ FT}$$

$$A = 2.74 \text{ SF}$$

$$R = 0.19$$

$$Q = 9.7 \text{ cfs}$$

$$V = 3.5 \text{ fps}$$

## FLUME (No. 2)

$$\text{DEPTH} = 0.22'$$

$$\text{FLUME SIDE SLOPES} = 4:1 \text{ \& } 4:1$$

$$\text{FLUME BOTTOM SLOPE} = 33.33\%$$

$$\text{FLUME BOTTOM WIDTH} = 4.0'$$

$$n = 0.30$$

$$WP = 5.81 \text{ FT}$$

$$A = 1.07 \text{ SF}$$

BY FEU DATE 11/21/83  
CHKD. BY DATE

SUBJECT No. Co. Solid Waste  
Disposal, Phase IV, Section I  
DRAINAGE CALCULATIONS

SHEET NO. 4 OF 24  
JOB NO.

R = 0.18  
Q = 10.0 cfs  
V = 9.3 fps

### DISSIPATOR

DEPTH = 2.0'

SIZE =

(4x3) (3x2) = 18' LONG  
(4x2) + (3x2) = 14' WIDE

### DIVERSION DITCH (No. 2A)

AREA = 0.88 AC  
HIGH EL = 194'  
LOW EL = 178'  
LENGTH = 60'  
SLOPE = ~~23.33%~~ 26.67%

$$T_c = \left[ \frac{(2)(.27)(60)^{0.467}}{3\sqrt{0.2667}} \right]$$

$T_c = 4.1 \text{ MIN}$

$$i = \frac{245.33}{4.1 + 31.67}$$

$i = 6.8 \text{ in/HR}$

$Q = CiA$   
 $Q = (0.50)(6.8)(0.88)$   
 $Q = 3.0 \text{ cfs}$

DEPTH = 0.21'  
DITCH SIDE SLOPES = 3:1 & 3:1  
DITCH BOTTOM SLOPE = 4.73%  
DITCH BOTTOM WIDTH = 3.0'  
 $n = 0.30$   
WP = 4.33 FT  
A = 0.78 SF

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SUBJECT Jo. Co. SOLID WASTE  
DISPOSAL, PHASE IV, SECTION I  
DRAINAGE CALCULATIONS

SHEET NO. 5 OF 2A  
JOB NO.

R = 0.10  
Q = 3.0 cfs  
V = 4.0 fps

### AREA C

AREA = 3.54 AC  
HIGH EL = 204'  
LOW EL = 168'  
LENGTH = 610'  
SLOPE = 5.90%

$$T_c = \left[ \frac{(1.2)(1.27)(610)}{3 \sqrt{0.0590}} \right]^{0.467}$$

$$T_c = 17.4 \text{ MIN}$$

$$i = \frac{245.33}{17.4 + 31.67}$$

$$i = 5.0 \text{ IN/HR}$$

$$Q = ciA$$
$$Q = (0.50)(5.0)(3.54)$$
$$Q = 8.85 \text{ cfs}$$

### TERRACE DRAINAGE

DEPTH = 0.38' (WATER)  
DITCH SIDE SLOPES = 35:1 & 3:1  
DITCH BOTTOM SLOPE = 3.51%  
n = 0.28  
WP = 14.51 FT  
A = 2.74 SF  
R = 0.19  
Q = 9.0 cfs  
V = 3.3 fps

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SUBJECT Ho. Co. SOLID WASTE  
DISPOSAL, PHASE IV, SECTION I  
DRAINAGE CALCULATIONS

SHEET NO. 6 OF 24  
JOB NO.

# AREA D

AREA = 5.43 AC  
 HIGH EL = 194.1'  
 LOW EL = 168'  
 BASIN LENGTH = 630'  
 SLOPE = 4.13%

$$T_c = \left[ \frac{(2)(0.27)(630)}{3\sqrt{0.0413}} \right]^{0.467}$$

$T_c = 19.1$  MIN.

$$i = \frac{245.33}{19.1 + 31.67}$$

$i = 4.8$  IN/HR

$$Q = ciA$$

$$Q = (0.50)(4.8)(5.43)$$

$Q = 13.0$  cfs

## TERRACE DRAINAGE

DEPTH = 0.67' (WATER)

DITCH SIDE SLOPES = 20:1 & 3:1

DITCH BOTTOM SLOPE = 1.00%

$n = 0.28$

WP = 15.64 FT

$A = 5.16$  SF

$R = 0.33$

$Q = 13.1$  cfs

$V = 2.6$  fps

## FLUME (COMBINE AREA C & D) (NO. 3)

$$Q = i \Sigma AC$$

$$Q = (4.8) [1.77 + 2.72]$$

$Q = 21.6$  cfs

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SUBJECT Uo. Co. SOLID WASTE  
DISPOSAL PHASE IV, SECTION I  
DRAINAGE CALCULATIONS

SHEET NO. 7 OF 24  
 JOB NO. \_\_\_\_\_



# DIVERSION DITCH (No 2A)

$\Sigma AC =$

FROM DITCH No 2 =  $.88 \times .50 = 0.44$

FROM AREA B FLUME =  $3.77 \times .50 = 1.89$

FROM DITCH No 2A =  $1.07 \times .50 = 0.54$

$\Sigma AC = 2.87$

$T_C$  FROM AREA B = 15.8 MIN

Assume 4 fps (MAX) FOR DITCH 2A = 2.8 MIN

$T_C = 18.1$  MIN

$i = \frac{245.33}{18.1 + 31.67}$

$i = \frac{245.33}{18.1 + 31.67}$

$i = 4.9$  IN/HR

$Q = i \Sigma AC$

$Q = (4.9)(2.87)$

$Q = 14.1$  cfs

DEPTH = 0.50' (WATER)

DITCH SIDE SLOPES = 3:1 & 3:1

DITCH BOTTOM SLOPE = 2.00%

DITCH BOTTOM WIDTH = 6.0'

WP = 9.16 FT

A = 3.75 SF

R = 0.41

n = 0.30

Q = 14.5 cfs

V = 3.9 fps

NOTE: LAST 50' OF DITCH TO BE @ 2.00% WITH RIP RAP

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SUBJECT Uo. Co. SOLID WASTE  
DISPOSAL PHASE IV, SECTION I  
DRAINAGE CALCULATIONS

SHEET NO. 9 OF 24  
JOB NO.

# DIVERSION DITCH (No 3)

AREA = 1.26 AC  
HIGH ELEV = 168'  
LOW ELEV = 138'  
LENGTH BASIN = 110'  
SLOPE = 27.27%

$$T_c = \left[ \frac{(2)(.27)(110)^{0.467}}{3\sqrt{0.2727}} \right]$$

$T_c =$ ~~5.5 MIN~~ 5.5 MIN

$$i = \frac{245.33}{5.5 + 31.67}$$

$$i = 6.6 \text{ IN/HR}$$

$$Q = ciA$$

$$Q = (650)(6.6)(1.26)$$

$$Q = 4.15 \text{ cfs}$$

DEPTH = 0.55' (WATER)

DITCH SIDE SLOPES = 3:1 & 3:1

DITCH BOTTOM SLOPE = 0.40%

DITCH BOTTOM WIDTH = 3.0

WP = 6.48 FT

A = 2.56 SF

R = 0.39

n = 0.28

Q = 4.6 cfs

V = 1.8 fps

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SUBJECT Ho. Co. SOLID WASTE  
DISPOSAL PHASE IV SECTION I  
DRAINAGE CALCULATIONS

SHEET NO. 10 OF 24  
JOB NO. \_\_\_\_\_

# AREA G

AREA = 4.87 AC  
HIGH EL = 228'  
LOW EL = 207.75'  
LENGTH = 790'  
SLOPE = 2.56%

$$T_c = \left[ \frac{(2)(.27)(790)}{3 \sqrt{0.0256}} \right]^{0.467}$$

$$T_c = 23.8 \text{ MIN}$$

$$C' = \frac{245.33}{23.8 + 31.67}$$

$$C' = 4.4 \text{ IN/HR}$$

$$Q = C' i A$$
$$Q = (0.50)(4.4)(4.87)$$
$$Q = 10.7 \text{ cfs}$$

## TERRACE DRAINAGE

DEPTH = 0.53' (WATER)  
DITCH SIDE SLOPES = 30:1 & 3:1  
DITCH BOTTOM SLOPE = 1.14%  
WP = 17.58 FT  
A = 4.63 SF  
R = 0.26  
n = 0.28  
Q = 10.80 ~~ft~~ cfs  
V = 2.3 fps

## FLUME (No. 5)

DEPTH = 0.23' (WATER)  
FLUME DITCH SIDE SLOPES = 4:1 & 4:1  
FLUME DITCH BOTTOM SLOPE = 33.33%  
FLUME DITCH BOTTOM WIDTH = 4.0'  
WP = 5.90 FT  
A = 1.13 SF  
R = 0.19  
n = 0.30

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SUBJECT Ho. Co. SOLID WASTE  
DISPOSAL, PHASE IV SECTION I  
DRAINAGE CALCULATIONS

SHEET NO. 11 OF 24  
JOB NO. \_\_\_\_\_

$$Q = 10.8 \text{ cfs}$$

$$V = 2.3 \text{ fps}$$

### DISSIPATOR (No. 4)

$$\text{DEPTH} = 2.0'$$

SIZE:

$$(4 \times 3) + (3 \times 2) = 18' \text{ LONG}$$

$$(4 \times 2) + (3 \times 2) = 14' \text{ WIDE}$$

### DIVERSION DITCH (No. 5)

$$\text{AREA} = 0.45 \text{ AC}$$

$$\text{HIGH EL} = 198'$$

$$\text{LOW EL} = 186.25$$

$$\text{LENGTH} = 100'$$

$$\text{SLOPE} = 11.75\%$$

$$T_c = \left[ \frac{(2)(1.27)(100)}{3\sqrt{0.1175}} \right]$$

$$T_c = 6.4 \text{ MIN.}$$

$$i = \frac{245.33}{6.4 + 31.67}$$

$$i = 6.4 \text{ IN/HR}$$

$$Q = CiA$$

$$Q = (0.50)(6.4)(0.45)$$

$$Q = 1.4 \text{ cfs}$$

$$\text{DEPTH} = 0.22 \text{ (WATER)}$$

$$\text{DITCH SIDE SLOPES} = 3:1 \text{ \& } 3:1$$

$$\text{DITCH BOTTOM SLOPE} = 2.17\%$$

$$\text{DITCH BOTTOM WIDTH} = 2.0'$$

$$\text{WIP} = 3.39 \text{ FT}$$

$$A = 0.59 \text{ SF}$$

$$R = 0.17$$

$$n = 0.28$$

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SUBJECT Ho. Co. Solid Waste  
DISPOSAL, PHASE II, SECTION I  
DRAINAGE CALCULATIONS

SHEET NO. 12 OF 24  
JOB NO. \_\_\_\_\_

$$Q = 1.4 \text{ cfs}$$

$$V = 2.4 \text{ fps}$$

### AREA E & F

AREA = 8.65 AC  
 HIGH EL = 220.5  
 LOW EL = 189  
 BASIN LENGTH = 920'  
 SLOPE = 3.42%

$$T_c = \left[ \frac{(2)(.27)(920)}{3\sqrt{0.0342}} \right]^{0.467}$$

$$T_c = 23.9 \text{ MIN}$$

$$i = \frac{245.33}{23.9 \text{ MIN} + 31.67}$$

$$i = 4.4 \text{ IN/HR}$$

$$Q = ciA$$

$$Q = (6.50)(4.4)(8.65)$$

$$Q = 19.0 \text{ cfs}$$

### TERRACE DRAINAGE

DEPTH = 0.37 (WATER)  
 DITCH SIDE SLOPES = 120:1 & 3:1  
 DITCH BOTTOM SLOPE 1.82%  
 WP = 45.57 FT  
 A = 8.42 SF  
 R = 0.18  
 n = 0.28  
 Q = 19.6 cfs  
 V = 2.3 fps

### FLUME = (No 4)

DEPTH = 0.22' (WATER)  
 FLUME SIDE SLOPE 4:1 & 4:1  
 FLUME BOTTOM SLOPE = 33.33%  
 FLUME BOTTOM WIDTH = 8.0'

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SUBJECT No. Co. SOLID WASTE  
 DISPOSAL, PHASE II, SECTION I  
 DRAINAGE CALCULATIONS

SHEET NO. 13 OF 24  
 JOB NO.

WP = 9.81 FT  
A = 1.95 SF  
R = 0.20  
n = 0.30  
Q = 19.0 cfs  
V = 9.7 fps

DISSIPATOR (No. 4)

DEPTH = 2.0'

SIZE =

$$(8 \times 3) + (3 \times 2) = 30' \text{ LONG}$$

$$(8 \times 2) + (3 \times 2) = 22' \text{ WIDE}$$

SEDIMENTATION BASIN (No 3)

AREA = 13.52 AC

$$V = 13.52 \text{ AC} \times 43,560 \text{ SF/AC} \times .04 \text{ AcFT} \times 7.48 \text{ GAL/CF}$$

$$V = 176,208.20 \text{ GAL}$$

BASIN TO BE CLEANED 4 TIMES/YR

$$V_{ACT} = 176,208.20 \div 4 = 44,052.05 \text{ GAL}$$

BASIN SIZE = WTR DEPTH = 6.0'  
SIDE SLOPE = 2.5:1

$$V = \frac{1}{3} [(40.118) + (70.148) + \sqrt{(40.118)(70.148)}]$$

$$V = 44,145.59 \text{ GAL}$$

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SUBJECT Ho. Co. SOLID WASTE  
DISPOSAL, PHASE IV, SECTION I  
DRAINAGE CALCULATIONS

SHEET NO. 14 OF 24  
JOB NO.

DIVERSION DITCH (No. 5)

$\Sigma AC =$

$$\begin{aligned} \text{FROM DITCH No 5} &= 0.45 \times 0.50 = 0.23 \\ \text{FROM AREA G} &= 4.87 \times 0.50 = 2.44 \\ \text{FROM DITCH No 4} &= 2.53 \times 0.50 = \underline{1.26} \\ \Sigma AC &= 3.93 \end{aligned}$$

$$\begin{aligned} T_c &= \text{FROM AREA G} &&= 23.8 \text{ MIN} \\ &\text{FROM DITCH No 5} &&= \underline{4.3 \text{ MIN}} \\ T_c &= 28.1 \text{ MIN} \end{aligned}$$

$$i = \frac{245.33}{28.1 + 31.67}$$

$$i = 4.1 \text{ IN/HR}$$

~~$Q = iA$~~   
 ~~$Q = (4.1)(6.0)$~~   
 $Q = i \Sigma AC$   
 $Q = (4.1)(3.93)$   
 $Q = 16.1 \text{ cfs}$

DEPTH = 0.56' (WATER)  
DITCH SIDE SLOPES = 3:1 & 3:1  
DITCH BOTTOM SLOPE = 1.47%  
DITCH BOTTOM WIDTH = 6.0'  
WP = 9.54 FT  
A = 4.30 SF  
R = 0.45  
n = 0.28  
Q = 16.3 cfs  
V = 3.8 fps

BY FEU DATE 11/21/83  
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SUBJECT No. Co. Solid Waste  
DISPOSAL, PHASE II, SECTION I  
DRAINAGE CALCULATIONS

SHEET NO. 15 OF 24  
JOB NO. \_\_\_\_\_

# AREA A (SECTION II)

AREA = 2.30 AC  
 HIGH EL = 218'  
 LOW EL = 210'  
 BASIN LENGTH = 440  
 SLOPE = 1.82%

$$T_c = \left[ \frac{(2)(.27)(440)}{3\sqrt{0.0182}} \right]^{0.467}$$

$T_c = 19.6 \text{ MIN}$

$i = \frac{245.33}{19.6 + 31.67}$

$i = 4.8 \text{ IN/HR}$

$Q = C i A$   
 $Q = (0.50)(4.8)(2.30)$   
 $Q = 5.5 \text{ cfs}$

## TERRACE DRAINAGE

DEPTH = 0.23' (WATER)  
 DITCH SIDE SLOPES = 120:1 & 3:1  
 DITCH BOTTOM SLOPE = 1.90%  
 WP = 28.33 FT  
 A = 3.25 SF  
 R = 0.11  
 n = 0.28  
 Q = 5.6 cfs  
 V = 1.7 fps

## FLUME (No. 6)

DEPTH = 0.16' (WATER)  
 FLUME SIDE SLOPES = 4:1 & 4:1  
 FLUME BOTTOM SLOPE 33.33%  
 FLUME BOTTOM WIDTH 4.0'  
 WP = 15.32 FT  
 A = 0.74 SF

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SUBJECT Uo Co. SOLID WASTE  
DISPOSAL, PHASE IV SECTION II  
DRAINAGE CALCULATIONS

SHEET NO. 16 OF 24  
 JOB NO.

R = 0.14  
n = 0.30  
Q = 5.7 cfs  
V = 7.7 fps

DISSIPATOR (No. 7)

DEPTH = 2.0'

SIZE =

(4x3) + (3x2) = 18' LONG  
(4x2) + (3x2) = 14' WIDE

DIVERSION DITCH (No. 6)

AREA = 2.53 AC.  
HIGH EL = 212'  
LOW EL = 188'  
BASIN LENGTH = 105'  
SLOPE = 22.86%

$$T_c = \left[ \frac{(2)(.27)(105)}{3 \sqrt{0.2286}} \right]^{0.467}$$

T<sub>c</sub> = 5.6 MIN

$$i = \frac{245.33}{5.6 + 31.67}$$

i = 6.6 IN/HR

$$Q = CiA$$
$$Q = (0.50)(6.6)(2.53)$$
$$Q = 8.3 \text{ cfs}$$

DEPTH = 0.32' (WATER)  
DITCH SIDE SLOPES = 3:1 & 3:1  
DITCH BOTTOM SLOPE = 2.83%  
DITCH BOTTOM WIDTH = 6.0'  
WP = 8.02 FT  
A = 223 SF

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SUBJECT No. Co. SOLID WASTE  
DISPOSAL, PHASE IV, SECTION II  
DRAINAGE CALCULATIONS

SHEET NO. 17 OF 24  
JOB NO. \_\_\_\_\_

R = 0.28  
n = 0.28  
Q = 8.5 cfs  
V = 3.8 fps

DIVERSION DITCH TO BASIN #2 PHASE III

ΣAC =

From AREA A =  $2.3 \times 0.5 = 1.15$   
From DIVERSION DITCH NO. 6 =  $2.53 \times 0.5 = 1.27$   
ΣAC = 2.42

Q = i ΣAC

Q = (4.8)(2.42)  
Q = 11.6 cfs

DEPTH = 0.49' (WATER)  
DITCH SIDE SLOPES = 3:1 & 3:1  
DITCH BOTTOM SLOPE = 1.20%  
DITCH BOTTOM WIDTH = 4.0'  
WIP = 9.10 FT  
A = 3.66 SF  
R = 0.40  
n = 0.28  
Q = 11.6 cfs  
V = 3.2 fps

AREA B & C

AREA = 12.19 AC  
HIGH EL = 218'  
LOW EL = 190'  
BASIN LENGTH = 1170  
SLOPE = 2.39%

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SUBJECT Ho. Co SOLID WASTE  
DISPOSAL, PHASE IV, SECTION II  
DRAINAGE CALCULATIONS

SHEET NO. 18 OF 24  
JOB NO.

$$T_c = \left[ \frac{(2)(.27)(1170)}{3 \sqrt{0.0239}} \right]^{0.467}$$

$$T_c = 29.1 \text{ MIN}$$

$$i = \frac{245.33}{29.1 + 31.67}$$

$$i = 4.0 \text{ IN/HR}$$

$$Q = CiA$$

$$Q = (0.50)(4.0)(12.19)$$

$$Q = 24.4 \text{ cfs}$$

### TERRACE DRAINAGE

$$\text{DEPTH} = 0.30' \text{ (WATER)}$$

$$\text{DITCH SIDE SLOPES} = 130:1 \text{ \& } 80:1$$

$$\text{DITCH BOTTOM SLOPE} = 3.33\%$$

$$\text{WIP} = 63.00 \text{ FT}$$

$$A = 9.45 \text{ SF}$$

$$R = 0.15$$

$$n = 0.28$$

$$Q = 25.8 \text{ cfs}$$

$$V = 2.7 \text{ fps}$$

### FLUME (No 7)

$$\text{DEPTH} = 0.22 \text{ (WATER)}$$

$$\text{FLUME SIDE SLOPES} = 4:1 \text{ \& } 4:1$$

$$\text{FLUME BOTTOM SLOPE} = 33.33\%$$

$$\text{FLUME BOTTOM WIDTH} = 11.0'$$

$$\text{WIP} = 12.81 \text{ FT}$$

$$A = 2.61 \text{ SF}$$

$$R = 0.20$$

$$n = 0.30$$

$$Q = 27.8 \text{ cfs}$$

$$V = 10.62 \text{ fps}$$

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SUBJECT Ho. Co. SOLID WASTE  
DISPOSAL, PHASE IV, SECTION II  
DRAINAGE CALCULATIONS

SHEET NO. 19 OF 24  
 JOB NO. \_\_\_\_\_

DISSIPATOR (NO. B)

DEPTH = 2.0'

SIZE =

$(11 \times 3) \times (3 \times 2) = 39' \text{ LONG}$

$(11 \times 2) + (3 \times 2) = 28' \text{ WIDE}$

SEDIMENTATION BASIN (NO. A)

AREA = 12.19 AC

VOLUME NEEDED

$V = 12.19 \text{ AC} \times 43,560 \text{ SF/AC} \times 0.04 \text{ AC FT} \times 7.48 \text{ GAL/CF}$

$V = 158,874.12 \text{ GAL}$

BASIN TO BE CLEANED 4 TIMES/YR

$V_{ACT} = 158,874.12 \div 4 = 39,718.53 \text{ GAL}$

BASIN SIZE = LWR DEPTH = 6.0'  
SIDE SLOPES = 2.5:1

$V = \frac{4}{3} [(40.104)(70.134) + \sqrt{(40.104)(70.134)}]$

$V = 39,573.33 \text{ GAL}$

SIZE AT WATER LEVEL - 70' x 134'

DIVERSION DITCH (NO. 8)

AREA = 0.39 AC

HIGH EL = 190

LOW EL = 164

BASIN LENGTH = 120

SLOPE = 21.67%

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SUBJECT DO. CO. SOLID WASTE  
DISPOSAL, PHASE IV, SECTION II  
DRAINAGE CALCULATIONS

SHEET NO. 20 OF 24  
JOB NO.

$$T_c = \left[ \frac{(2)(.27)(120)}{3 \sqrt{0.2167}} \right]^{0.467}$$

$$T_c = 6.00 \text{ MIN}$$

$$i = \frac{245.33}{6.0 + 31.67}$$

$$i = 6.5 \text{ IN/HR}$$

$$Q = CiA$$

$$Q = (0.50)(6.5)(0.39)$$

$$Q = 1.3 \text{ cfs}$$

DEPTH: 0.11 (WATER)

DITCH SIDE SLOPES = 3:1 & 3:1

DITCH BOTTOM SLOPE = 12.50%

DITCH BOTTOM WIDTH = 4.0

WP = 4.70 FT

A = 0.48 SF

R = 0.10

n = 0.30

Q = 1.81 cfs

V = 3.8 FPS

### AREA D & E

AREA = 6.42 AC

HIGH EL = 218'

LOW EL = 196.5'

BASIN LENGTH = 1135'

SLOPE = 1.89%

$$T_c = \left[ \frac{(2)(.27)(1135)}{3 \sqrt{0.0189}} \right]^{0.467}$$

$$T_c = 30.3 \text{ MIN}$$

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SUBJECT Do. Co. SOLID WASTE  
DISPOSAL, PHASE IV, SECTION II  
DRAINAGE CALCULATIONS

SHEET NO. 21 OF 24  
JOB NO. \_\_\_\_\_

$$i = \frac{245.33}{30.3 + 31.67}$$

$$i = 4.0 \text{ IN/HR}$$

$$Q = CiA$$

$$Q = (0.50)(4.0)(6.42)$$

$$Q = 12.8 \text{ cfs}$$

### TERRACE DRAINAGE

DEPTH = 0.31' (WATER)

DITCH SIDE SLOPES = 120:1 & 3:1

DITCH BOTTOM SLOPE = 2.00%

WP = 38.18 FT

A = 5.91 SF

R = 0.15

n = 0.28

Q = 12.8 cfs

V = 2.2 fps

### FLUME (NO 8)

DEPTH = 0.21

FLUME DITCH SIDE SLOPES = 4:1 & 4:1

FLUME DITCH BOTTOM SLOPE = 33.33%

FLUME DITCH BOTTOM WIDTH = 6.0'

WP = 7.73 FT

A = 1.44 SF

R = 0.19

n = 0.30

Q = 13.4 cfs

V = 9.3 fps

### DISSIPATOR (NO. 5)

DEPTH = 2.0 FT

SIZE =

$$(6 \times 3) + (3 \times 2) = 24' \text{ LONG}$$

$$(6 \times 2) + (3 \times 2) = 18' \text{ WIDE}$$

BY FEU DATE 11/21/83

CHKD. BY DATE

SUBJECT Ho. Co. SOLID WASTE  
DISPOSAL, PHASE IV, SECTION II  
DRAINAGE CALCULATIONS

SHEET NO. 22 OF 24  
JOB NO. \_\_\_\_\_

## SEDIMENTATION BASIN (NO. 5)

AREA = 6.42 AC

VOLUME NEEDED:

$$V = 6.42 \text{ AC} \times 43,560 \text{ SF/AC} \times 0.04 \text{ AC/FT} \times 7.48 \text{ GAL/CF} =$$
$$V = 83,672.84 \text{ GAL}$$

BASIN TO BE CLEANED 4 TIMES/YR

$$V_{\text{ACT}} = 83,672.84 \text{ GAL} \div 4 = 20,918.21 \text{ GAL.}$$

~~$V = \frac{4}{3} [ \dots ]$~~

BASIN SIZE WTR DEPTH = 6.0'  
SIDE SLOPE = 2.5:1

$$V = \frac{4}{3} [ (30.61) + (60.91) + \sqrt{(30.61)(60.91)} ]$$

$$V = 20,901.94 \text{ GAL}$$

## DIVERSION DITCH (NO. 11)

AREA = 3.12 AC.

HIGH EL: 196'

LOW EL: 162'

Basin LENGTH = 130'

SLOPE = 26.15%

$$T_c = \left[ \frac{(2)(.27)(130)}{3\sqrt{0.2615}} \right]^{0.467}$$

$$T_c = 6.0 \text{ MIN.}$$

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SUBJECT Jo. Co. SOLID WASTE  
DISPOSAL, PHASE III, SECTION II  
DRAINAGE, CALCULATIONS

SHEET NO. 23 OF 24  
JOB NO. \_\_\_\_\_

$$i = \frac{245.33}{6.0 + 31.67}$$

$$i = 6.5 \text{ IN/HR}$$

$$Q = CiA$$
$$Q = (0.50)(6.5)(3.12)$$
$$Q = 10.1A \text{ cfs}$$

DEPTH = 0.41' (WATER)  
DITCH SIDE SLOPES = 3:1 & 3:1  
DITCH BOTTOM SLOPE = 1.79%  
DITCH BOTTOM WIDTH = 6.0'  
LWP = 8.59 FT  
A = 2.96 SF  
R = 0.34  
n = 0.28  
Q = 10.4 cfs  
V = 3.5 fps

BY FEJ DATE 11/21/83  
CHKD. BY DATE

SUBJECT Ho, Co. SOLID WASTE  
DISPOSAL, PHASE II, SECTION II  
DRAINAGE CALCULATIONS

SHEET NO. 24 OF 24  
JOB NO.

