

~~44-06~~

# LAW ENVIRONMENTAL

44-01 (cp)



## *Response to July 27, 1992 Completeness Review*

**Proposed Landfill Vertical Expansion  
Sludge Landfill No. 6, Areas B and C  
Champion International Mill  
Canton, North Carolina**



*Carmen Johnson*  
Fac/Permi/Co ID # ~~44-06~~  
Date 3/20/12  
Doc ID#  
44-01 (cp)

**Prepared by:** Law Environmental, Inc.  
Charlotte, North Carolina  
Job No. 56-1621

**Prepared for:** Champion International Corp.  
Canton, North Carolina

September 3, 1992



**LAW ENVIRONMENTAL, INC.**

4333 WILMONT ROAD, SUITE 300  
CHARLOTTE, NORTH CAROLINA 28217  
P.O. BOX 240674  
CHARLOTTE, NORTH CAROLINA 28224-0674  
704-357-1747 704-357-1622 (FAX)

September 3, 1992

Ms. Sherri C. Hoyt  
Environmental Engineer  
North Carolina Department of Environment,  
Health, and Natural Resources  
Division of Solid Waste Management  
P. O. Box 27687  
Raleigh, North Carolina 27611-7687

Subject: Response to July 27, 1992 Completeness Review  
Proposed Landfill Vertical Expansion Plan  
Sludge Landfill No. 6, Areas B and C  
Champion International Mill  
Canton, North Carolina  
Law Environmental, Inc. Job No. 56-1621

Dear Ms. Hoyt:

On behalf of Champion International Corporation, Law Environmental submits this response to your July 27, 1992 completeness review letter for Landfill No. 6, Areas B and C at the Champion Canton mill. The objective of this document is to respond to the ten items set forth in your letter so that a permit can be issued to Champion for the vertical expansion. This response includes a brief outline of the project background, detailed discussion regarding each item from the completeness review letter, and supporting appendices.

## PROJECT BACKGROUND

Areas B and C of Landfill No. 6 at the Champion Canton facility were designed by Law Companies in 1984. The North Carolina Department of Human Resources, Division of Health Services issued Solid Waste Permit No. 44-06 for the site in March, 1984. In 1986, Law produced drawings in support of a permit amendment which was subsequently issued by the state. (For further information regarding previous design work, please refer to Law Engineering Job Nos. CH-4507G and CH-4507J. A copy of the 1986 bid documents and specifications for CH-4507J is attached to this submittal. Associated plan drawings are submitted as supplemental information.)

SFM:1621-TFB.T40



North Carolina Department of Environment,  
Health, and Natural Resources  
September 3, 1992  
Page 2

Construction of Landfill No. 6 was accomplished over a period of several years during the mid-1980's. The landfill currently accepts approximately 800 cubic yards per day of digester sludge, fly ash, cinders, and lime waste generated by the Champion Mill.

Areas B and C are currently nearing capacity. Area A is under construction, but will not be ready to accept waste in the near future. Champion therefore desires to extend the service life of Areas B and C at Landfill No. 6.

In late 1991, Law Environmental designed a vertical extension to perimeter dikes at Landfill No. 6, Areas B and C. The purpose of this work was to raise the main dike (parallel to the Pigeon River), thereby gaining additional landfill capacity. The work included soil test borings along the dike, laboratory triaxial tests on representative sludge samples, and computer analyses to determine the stability of the proposed slope.

Law determined that the maximum allowable increase in the height of the dike would be 25 feet. Design drawings were generated which reflected the new dike crest elevations (refer to Law Environmental Project Manual dated January 13, 1992).

In March, 1992, Law Environmental was retained to prepare a supplementary drawing which set forth proposed final contours for the landfill after dike construction. On April 8, 1992, our Drawing 3 for the dike extension project was issued to Champion.

On May 12, 1992, Mr. James A. Giauque of Champion sent these documents to Mr. James Coffey of the NCDEHNR Solid Waste Section with a cover letter requesting permission to proceed with the vertical dike extension project.

On July 27, 1992, Ms. Sherri Hoyt of the NCDEHNR issued a Completeness Review letter to Champion for this project. The letter indicated that a preliminary review had been conducted, and that ten items needed to be addressed in order to continue the review process. Champion contacted Law Environmental and asked for assistance in preparing a response to the ten items.

On July 31, 1992, representatives of Champion and Law Environmental participated in a conference call with Ms. Hoyt. Each item contained in the completeness review letter was discussed. It was agreed that Law would prepare a written response, as set forth in the following section.

## RESPONSE TO JULY 27 COMPLETENESS REVIEW LETTER

The completeness review letter indicated that ten items must be addressed in order to continue the review process. Each item is reproduced below along with our response.

**1. A total of four complete sets of plans are required.**

Law herewith submits three copies of our document and associated plan drawings. Drawings 1 through 4 are presented in the attached Appendix A. Drawings from Law Job No. CH-4507J (May, 1986) are provided under separate cover as supplemental information.

We note that one additional copy of the erosion/sediment control plan (presented as Appendix C herein) has been simultaneously forwarded to Mr. Dennis Owenby of the NCDEHNR Land Quality Section in Asheville for review.

**2. A map showing existing topography is required. As-built conditions in Area C/Cell II should be indicated on this drawing.**

Topographic information obtained in March, 1992 at the site was provided on Drawing 3 of our previous submittal. However, this drawing did not include existing topographic contours in Area C/Cell II.

An aerial survey of Landfill No. 6 was conducted in May, 1992 by Hampton, Hintz & Associates, Inc. of Fletcher, North Carolina. This survey has been reproduced as a topographic map in the attached Appendix B.

Topographic information shown in Area C/Cell II reflects as-built conditions during May. Since this area is an active landfill, current (August) conditions will vary slightly.

**3. Grading plan and final contour drawing should include provisions for controlled removal of surface water both during and after construction.**

Surface Water Control During Construction

During the remaining active life of Areas B and C, all stormwater runoff within the active areas of each cell will continue to be handled as leachate. Culverts and/or drop inlets which will eventually carry stormwater to the Pigeon River will be sealed until landfilling is completed and grass cover is reestablished.

A system of leachate collector drains ("strip drains") consisting of perforated PVC pipes encased in washed stone is currently in place on the landfill bottom and sides. As shown on the construction plans for Landfill No. 6 (reference Drawing No. 3, Law Engineering Job No. CH-4507J, copy included under separate cover as supplemental information) the leachate collection system consists of five ft. wide by two ft. thick strip drains. These strip drains extend upward along the outer edge of the landfill to surface interceptor ditches. Stormwater runoff is channeled from the interceptor ditches into the strip drains and flows by gravity to the main leachate line leading to the lower end of the landfill area and then through the main dike to the holding pond. Runoff accumulating in the holding pond is pumped directly to the Canton mill wastewater treatment plant.

Calculations verify that the capacity of the lined leachate collection pond is sufficient to accommodate runoff from a ten-year, 24-hour rainfall event. (Please refer to the erosion/sediment control plan in Appendix C). The pond has satisfactorily performed this function during the past eight years, and no future problems are anticipated. The leachate pond dimensions are presented on Drawing No. 8 of Law Engineering's May, 1986 Job No. CH-4507J (copy included under separate cover).

#### Permanent Surface Water Control Features

Once the capacity of the landfill cell has been reached, the sludge will be permanently covered with soil and an erosion-resistant grass cover will be reestablished. The existing culverts/drop inlets will then be unsealed so that stormwater runoff bypasses the leachate collection basin and flows directly to grass and rip-rap lined drainage ditches leading to the Pigeon River (please refer to the erosion/sediment control plan in Appendix C).

Until the cell is completed, the drop inlets will be sealed with steel plates so that runoff from the cell will be directed to the leachate collection system. The drop inlets will not be opened until the final cover is in place and well established.

- 4. A soil and erosion control plan must be included. An approval letter from the Land Quality Section must be obtained prior to issuance of the solid waste permit.**

An erosion control plan is included as Appendix C to this document. As previously noted, this plan is being simultaneously submitted to Mr. Dennis Owenby in the Asheville Regional Office for review. Construction of the vertical dike extension will not begin until approval of the erosion control plan is provided by the Land Quality Section.

- 5. Cross-sections of the disposal area (minimum two per operational area) showing original (existing) elevations and proposed final elevations are required. Inclusion of the final contours proposed in the 1986 amendment would be helpful.**

Three cross-sections of the disposal area are provided on the attached Drawing 4 (see Appendix A). The cross-sections depict the contour elevations proposed in the 1986 amendment and the final surface elevations proposed for the vertical expansion. The attached Drawing 5 provides this information plus existing grade elevations at the site.

- 6. A written report describing systematic usage of the area, operation, orderly development, and completion of the landfill should be included.**

A narrative which addresses the requested information is attached as Appendix D.

- 7. Ground water and surface water monitoring locations should be indicated on the revised final contour drawing. A discussion of the monitoring plan should be included and should address the adequacy of the existing plan or describe any proposed changes or updates necessary.**

Ground water and surface water monitoring information is presented in Appendix E. A drawing which shows the monitoring locations is included.

Champion believes that the monitoring program has been adequate. The proposed vertical expansion will not increase the total area covered by industrial waste. Therefore no changes to the monitoring program are planned.

- 8. Availability and adequacy of soils proposed for use in dike construction and as cover material must be demonstrated. Earthwork calculations should be included.**

Champion is currently using a borrow area located approximately one-half mile northeast of the dike extension site. In November, 1988, Law Engineering was retained to explore this site and determine its suitability for use as a borrow area. Law drilled three geotechnical borings and submitted a report dated November 3, 1988.

Law Environmental has reviewed the geotechnical report. Based on the report, we performed calculations to determine the volume of borrow soil which would be available from the area. The available volume was then compared to the required volume for construction of the dike extension and placement of final soil cover at Areas B and C. The calculations indicated that the borrow area would be adequate. Please refer to Appendix F for the calculations and geotechnical report.

Geotechnical borings in the borrow area revealed the presence of silty sands, sandy silts, and clayey silts in the upper 20 feet. The sandy soils will be used in construction of the dike vertical extension. These soils will provide adequate strength and will be relatively easy to compact as structural fill.

The silty and clayey soils identified in the borrow area will be set aside for use as final cover. These soils will provide adequate impermeability while allowing the establishment of an erosion-resistant stand of grass on the final landfill cover.

**9. Copies of the Bid Documents and Specifications for Preparation of Area C Landfill No. 6, dated May, 1986 should be provided.**

A copy of the requested documents is provided in Appendix G.

**10. Provide more information regarding the lime waste berm referenced in the Quality Assurance/Quality Control section of the technical specifications.**

Technical specifications for the vertical dike extension were included in our Project Manual (Law Environmental Job No. 56-1621 dated January 13, 1992 and submitted to the NCDEHNR by Champion on May 12, 1992). On page C-5 of the specifications, the following paragraph was included:

"Soil test borings will be made in Area C after the lime waste berm is in place but before new embankment fill is placed. Purpose of borings will be to verify that large pockets of sludge are not trapped beneath the lime waste berm in the zone affected by the new embankment. Borings will be spaced approximately 200 feet apart along inside toe of proposed soil dike vertical extension. Standard penetration tests (ASTM D 1586) will be performed at 5 foot depth intervals to check consistency of the lime waste."

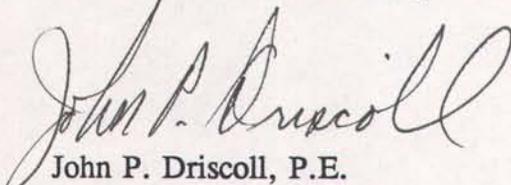
A detailed discussion of lime waste characteristics and the lime waste berm is presented in Appendix D: Narrative Describing Landfill Usage, Operation, and Development. The narrative also explains our rationale for conducting confirmatory borings.

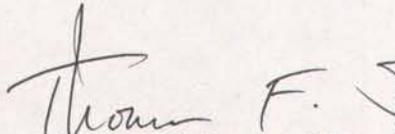
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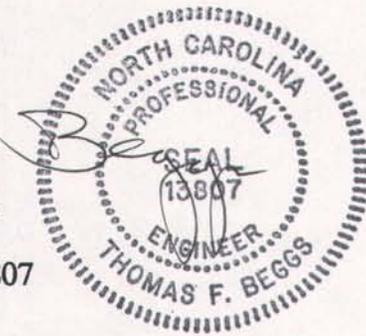
**CLOSURE**

If there are any questions regarding the information presented herein, or if additional information is required, please contact Law Environmental or Mr. James Giauque of Champion International Corp. at (704) 646-2028.

Sincerely,  
LAW ENVIRONMENTAL, INC.

  
John P. Driscoll, P.E.  
Senior Engineer

  
Thomas F. Beggs, P.E.  
Principal  
Registered NC No. 13807



attachments

cc: Mr. James A. Giauque  
Champion International Corporation

- APPENDIX A: DRAWINGS 1 THROUGH 4  
LEI JOB NO. 56-1621**
- APPENDIX B: MAY, 1992 TOPOGRAPHIC SURVEY**
- APPENDIX C: EROSION/SEDIMENT CONTROL PLAN**
- APPENDIX D: NARRATIVE DESCRIBING LANDFILL  
USAGE, OPERATION, AND DEVELOPMENT**
- APPENDIX E: GROUND-WATER AND SURFACE-WATER  
MONITORING PLAN**
- APPENDIX F: CALCULATIONS AND GEOTECHNICAL  
REPORT FOR SOIL BORROW AREA**
- APPENDIX G: BID DOCUMENTS AND SPECIFICATIONS  
FOR PREPARATION OF AREA C,  
LANDFILL NO. 6 (dated May, 1986)**



**LAW ENVIRONMENTAL, INC.**

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CHARLOTTE, NORTH CAROLINA 28217  
P.O. BOX 240674  
CHARLOTTE, NORTH CAROLINA 28224-0674  
704-357-1747 704-357-1622 (FAX)

September 3, 1992

Champion International Corporation  
P. O. Box C-10  
Canton, North Carolina 28716

Attention: Mr. James A. Giauque

Subject: Erosion/Sediment Control Plan  
Proposed Vertical Expansion  
Landfill No. 6, Areas B and C  
Champion International Corporation  
Canton, North Carolina  
LEI Job No. 56-1621

Gentlemen:

As requested, Law Environmental submits an erosion/sediment control plan for activities associated with the proposed vertical expansion of Landfill No. 6, Areas B and C. This plan is intended to conform to the North Carolina Sedimentation Pollution Control Act of 1973.

The erosion/sediment control plan is presented as follows:

- Attachment: A Ownership/Responsibility Form  
B Project Narrative  
C Drawings  
D Technical Specifications  
E Calculations

A total area of approximately 28 acres will be disturbed by the proposed dike extension and landfill expansion.

If you have any questions or comments regarding this submittal, please contact us.

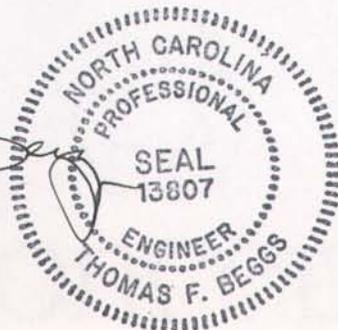
Sincerely,  
LAW ENVIRONMENTAL, INC.

*Tim LaBounty*

Tim LaBounty  
Engineer

*Thomas F. Beggs*

Thomas F. Beggs, P.E.  
Principal  
Registered NC No. 13807



**ATTACHMENT A: FINANCIAL RESPONSIBILITY OWNERSHIP FORM**

**FINANCIAL RESPONSIBILITY/OWNERSHIP FORM  
SEDIMENTATION POLLUTION CONTROL ACT**

No person may initiate any land-disturbing activity on one or more contiguous acres as covered by the Act before this form and an acceptable erosion and sedimentation control plan have been completed and approved by the Land Quality Section, N.C. Department of Environment, Health, and Natural Resources. (Please type or print and, if question is not applicable, place N/A in the blank.)

**Part A.**

1. Project Name CHAMPION INTERNATIONAL CORPORATION
2. Location of land-disturbing activity: County HAYWOOD, City \_\_\_\_\_  
or Township CANTON, and Highway / Street SR 1550
3. Approximate date land-disturbing activity will be commenced: OCTOBER 1, 1992
4. Purpose of development (residential, commercial, industrial, etc.): INDUSTRIAL - VERTICAL EXPANSION OF SLUDGE LANDFILL
5. Total acreage disturbed or uncovered (including off-site borrow and waste areas): 28 ACRES
6. Amount of fee enclosed \$ 570.
7. Has an erosion and sedimentation control plan been filed? Yes \_\_\_\_\_ No X
8. Person to contact should sediment control issues arise during land-disturbing activity.  
Name MR GEORGE W PICKARD Telephone (704) 646-2653
9. Landowner (s) of Record ( Use blank page to list additional owners.):  
CHAMPION INTERNATIONAL CORP.  
Name (s) \_\_\_\_\_  
P.O. BOX C-10  
Current Mailing Address \_\_\_\_\_ Current Street Address \_\_\_\_\_  
CANTON NC 28716  
City State Zip \_\_\_\_\_ City State Zip \_\_\_\_\_
10. Recorded in Deed Book No. \_\_\_\_\_ Page No. \_\_\_\_\_

**Part B.**

1. Person (s) or firms (s) who are financially responsible for this land-disturbing activity (Use the blank page to list additional persons or firms):  
CHAMPION INTERNATIONAL CORP  
Name of Person (s) or Firm (s) \_\_\_\_\_  
P.O. BOX C-10  
Mailing Address \_\_\_\_\_ Street Address \_\_\_\_\_  
CANTON NC 28716  
City State Zip \_\_\_\_\_ City State Zip \_\_\_\_\_  
Telephone (704) 646-2000 Telephone \_\_\_\_\_

2. (a) If the Financially Responsible Party is not a resident of North Carolina give name and street address of a North Carolina Agent.

CHAMPION INTERNATIONAL CORPORATION

Name

P.O. BOX C-10

Mailing Address

Street Address

CANTON NC 28716

City

State

Zip

City

State

Zip

(704) 646-2000

Telephone

Telephone

(b) If the Financially Responsible Party is a Partnership or other person engaging in business under an assumed name, attach a copy of the certificate of assumed name. If the Financially Responsible Party is a Corporation give name and street address of the Registered Agent.

N/A

Name of Registered Agent

Mailing Address

Street Address

City

State

Zip

City

State

Zip

Telephone

Telephone

The above information is true and correct to the best of my knowledge and belief and was provided by me under oath. ( This form must be signed by the financially responsible person if an individual or his attorney-in-fact or if not an individual by an officer, director, partner, or registered agent with authority to execute instruments for the financially responsible person ). I agree to provide corrected information should there be any change in the information provided herein.

Type or print name  
Signature

Title or Authority  
Date

I, \_\_\_\_\_, a Notary Public of the County of \_\_\_\_\_

State of North Carolina, hereby certify that \_\_\_\_\_ appeared personally before me this day and being duly sworn acknowledged that the above form was executed by him.

Witness my hand and notarial seal, this \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_\_.

Seal

Notary

My commission expires \_\_\_\_\_

ATTACHMENT B: PROJECT NARRATIVE

## PROJECT NARRATIVE

### Objective

The objective of erosion control measures at this site will be to minimize off-site migration of silt during construction of a dike extension and subsequent operation of an industrial landfill. A total area of approximately 28 acres (Landfill Area B and Area C/Cell II, see Drawings 1 through 4 attached) will be disturbed by the landfill vertical dike extension.

### Project Description

The Champion International Mill is located in Canton, North Carolina. Champion operates a permitted industrial waste landfill northwest of Canton, between Interstate 40 and the Pigeon River on State Road 1550. Active portions of the landfill (Areas B and C) were designed by Law Engineering and permitted by the NCDEHNR in March, 1984 (Solid Waste Permit No. 44-06). The landfill accepts approximately 800 cubic yards per day of digester sludge, fly ash, cinders, and lime waste generated at the mill.

Areas B and C are currently nearing capacity. Area A is under construction, but will not be ready to accept waste in the near future. Champion therefore needs to extend the service life of Areas B and C at Landfill No. 6.

The goal of this vertical expansion project will be to gain additional capacity in Areas B and C by raising the perimeter dike. The dike is approximately 2200 ft long and parallels the Pigeon River along the south side of the landfill. The top of the dike will be raised a maximum of 25 ft. Borrow soil for the project will be excavated from an area northeast of the site. Upon completion of the dike extension and placement of sludge (at a maximum slope of five percent), a two ft. thick soil cap will be placed over the sludge. An erosion-resistant stand of perennial grass will be sown over the cap.

We note that the landfill area will be unaffected by vertical expansion. The volume of stormwater currently leaving the site as runoff will therefore remain unchanged.

### Adjacent Property

Land adjacent to the landfill is either privately or industrially owned. The land consists of mountainous pasture, woods, and creeks. The site property is bounded to the south by the Pigeon River.

### Soils

The soils to be used for the dike vertical extension and cap are predominately silty sands with small amounts of clay (reference Law Engineering Report, Job No. AV-2066 dated November 3, 1988).

### Off-Site Borrow Area

Champion is currently using a borrow area located approximately one-half mile northeast of the dike extension site. Erosion control measures for this borrow area are currently in place. No additional measures are anticipated at the borrow area.

### Sequence of Construction

Prior to beginning earthwork, a silt fence will be erected near the top of the existing perimeter dike. The fence will extend along the entire area which will receive fill soil. The new embankment will then be constructed as noted on the attached Law Environmental Drawing 3 (Job No. 56-1621). The silt fence will remain in place until a grass cover is well established on the outside face of the new embankment. Please refer to the attached Drawing No. 2 of Law Engineering's May, 1986 Job No. CH-4507J for a detail of the proposed silt fence.

### Surface Water Control During Construction

During the remaining active life of Areas B and C, all stormwater runoff from the landfill cell will continue to be handled as leachate. Culverts and/or drop inlets which will eventually carry stormwater to the Pigeon River will be sealed until landfilling is completed and grass cover is reestablished.

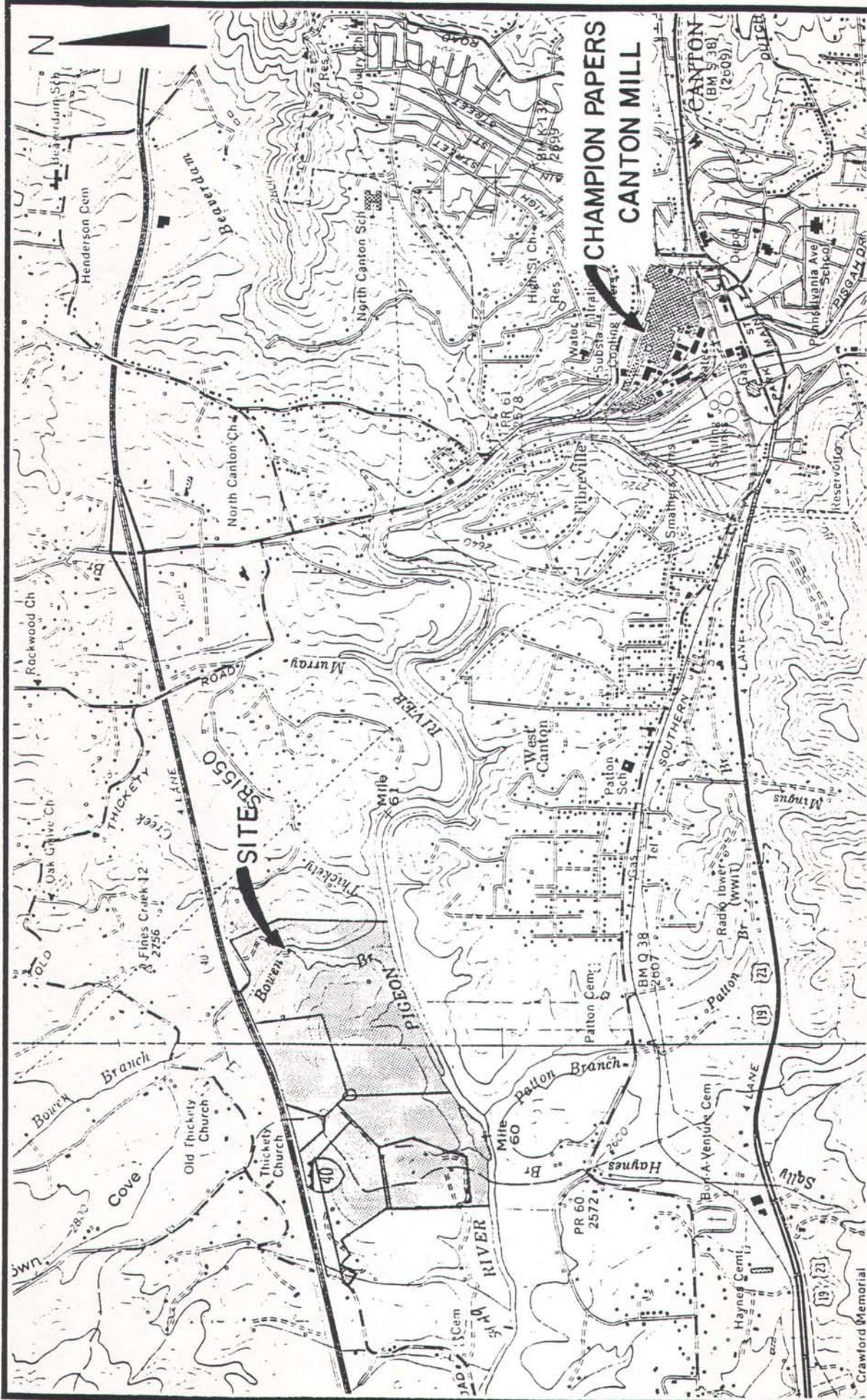
A system of leachate collector drains ("strip drains") consisting of perforated PVC pipes encased in washed stone is currently in place on the landfill bottom and sides. As shown on the construction plans for Landfill No. 6 (reference Drawing No. 3, Law Engineering Job No. CH-4507J, copy attached) the leachate collection system consists of five ft. wide by two ft. thick strip drains. These strip drains extend upward along the outer edge of the landfill to surface interceptor ditches. Stormwater runoff is channeled from the interceptor ditches into the strip drains and flows by gravity to a ten ft. wide by two ft. thick header pipe at the lower end of each cell. From the header pipe, the leachate flows into the main leachate line leading to the lower end of the landfill area and then through the main dike to the holding pond. Runoff accumulating in the holding pond is pumped directly to a wastewater treatment facility at the Champion mill.

The attached calculations verify that the capacity of the lined leachate collection pond is sufficient to accommodate runoff from a ten-year, 24-hour rainfall event. The pond has satisfactorily performed this function during the past eight years, and no future problems are anticipated. The leachate pond dimensions are presented on Drawing No. 8 of Law Engineering's May, 1986 Job No. CH-4507J (copy attached).

#### Permanent Surface Water Control Features

Until the vertical dike extension of each cell is completed, the associated drop inlets will be sealed with steel plates so that runoff from the cell will be directed to the leachate collection system. The drop inlets will not be opened until the final cover is in place and well established.

Once the capacity of the landfill cell has been reached, the sludge will be permanently covered with soil and an erosion-resistant grass cover will be reestablished. The existing culverts/drop inlets will then be unsealed so that stormwater runoff bypasses the leachate collection basin and flows directly to grass and rip-rap lined drainage ditches leading to the Pigeon River.



Ref: USGS Topographical  
 Maps, Canton and Clyde  
 Quadrangles, 7.5  
 Minute Series Dated  
 1967

**LAW ENGINEERING TESTING CO.**  
 CHARLOTTE, NORTH CAROLINA

SITE VICINITY MAP  
 LANDFILL NO. 6 SITE  
 CHAMPION PAPERS - CANTON, NORTH CAROLINA

DWN. BY	MH	SCALE: 1"=2000'
CKD. BY	RMP	FIGURE 1
APPR'D.	JNS	CH 4507 C

CHAMPION PAPERS  
 CANTON, NORTH CAROLINA

**ATTACHMENT C: DRAWINGS**

**Law Environmental Drawings**

- Figure 1: Site Vicinity Map**
- Drawing 1: Site Grading Plan**
- Drawing 2: Sections and Details**
- Drawing 3: Revised Final Contours**
- Drawing 4: Profiles A-A', B-B', and C-C'**

**Law Engineering Drawings (from May, 1986 Project)**

- Drawing No. 2: Erosion/Sediment Control Measures**
- Drawing No. 3: Landfill Operation and Leachate Control Measures**
- Drawing No. 8: Leachate Holding Pond Plan, Section, and Details**

**ATTACHMENT D: TECHNICAL SPECIFICATIONS**

## TECHNICAL SPECIFICATIONS

### 1.0 SILT FENCES

- A. Silt fences shall be installed as shown on Law Environmental Drawing 3 (copy attached).

### 2.0 GRASSING

- A. A permanent stand of erosion-resistant perennial grass shall be established on earth surfaces disturbed by the grading operations and not otherwise protected against surface erosion.
- B. The type and amount of seed, lime, and fertilizer shall be as recommended by the Haywood County Agent. Seeded areas shall be covered with an approved mulch.

### 3.0 INSPECTION AND MAINTENANCE

- A. Erosion control features shall be inspected weekly and after each major storm event. Repairs shall be made promptly following inspections in order to maintain erosion control measures in good working order for the duration of the project.
- B. Seeded areas will be fertilized, mulched, and reseeded as necessary to maintain a vegetative cover.

**ATTACHMENT E: CALCULATIONS**

(Calculations verifying that the existing leachate collection pond can accommodate runoff from a 10-year, 24-hour storm event).



LAW ENVIRONMENTAL, INC.

# CALCULATION COVER SHEET

PROJECT <i>CHAMPION INTERNATIONAL</i>		PROJECT No. <i>56-1621</i>	
CALCULATION TITLE <i>LEACHATE POND CAPACITY</i>			
ORIGINATED BY <i>TIM LABOUNTY</i>	DATE <i>7-30-92</i>	CHECKED BY <i>[Signature]</i>	DATE <i>8/6/92</i>

SUBJECT:  
*VERTICAL EXPANSION OF LANDFILL 6 AREAS B & C*

STATEMENT OF PROBLEM:  
*(A) DETERMINE IF CAPACITY OF EXISTING LEACHATE COLLECTION PONDS IS ADEQUATE TO STORE TOTAL VOLUME OF RUNOFF FROM A 10 yr. 24HR STORM.*  
*(B) CONSIDER PUMPING FROM PONDS*

SOURCES OF DATA:  
*LEI DWG #3*

SOURCES OF FORMULA & REFERENCES:  
*NC ESCPDM*

INTENDED USE:

PRELIMINARY CALC.       SUPERCEDES CALC. No. \_\_\_\_\_  
 FINAL CALC.                       OTHER \_\_\_\_\_

REV No.	DESCRIPTION	BY	DATE	CHK	DATE



**LAW ENVIRONMENTAL, INC.**  
a professional engineering and  
earth science consulting firm

JOB NO. 56-1621748 SHEET 1 OF 5

JOB NAME CHAMPION

BY JIM LABOUNTY DATE 7-30-92

CHECKED BY JPD DATE 8/6/92

CALCULATE STORAGE CAPACITY OF LEACHATE PONDS.

REFERENCE DNB CH 4507 G FOR HOLDING POND DIMENSIONS

ASSUME THAT CROSS-SECTION SHOWN IN SECTION 2/B OF THE  
LEACHATE HOLDING POND IS CONSTANT.

VOLUME OF CELLS #1, 2, 3

NOTE: CALCULATE VOLUME FOR THE FRUSTRUM OF A PYRAMID.

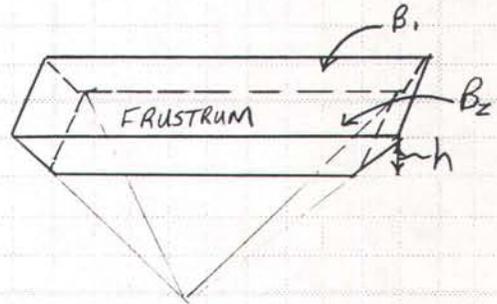
[REF. CRC STANDARD MATHEMATICAL TABLES - 24<sup>TH</sup> EDITION  
P. 14]

$$V = \frac{1}{3} h (B_1 + B_2 + \sqrt{B_1 B_2})$$

$B_1 \Rightarrow$  AREA OF LOWER BASE

$B_2 \Rightarrow$  " " UPPER BASE

$h \Rightarrow$  ALTITUDE



$$B_1 = 180 \times 80.0' = 14,400 \text{ ft}^2$$

$$B_2 = 140 \times 80.0' = 11,200 \text{ ft}^2$$

$$h = 2575 - 2565 = 10.0'$$

$$\sqrt{B_1 B_2} = 12,699.6 \text{ ft}^2$$

$$V = \frac{1}{3} 10.0' (14,400 + 11,200 + 12,699.6) \text{ ft}^2$$

$$V = 127,665.4 \text{ ft}^3 / \text{CELL}$$

$$V_{\text{TOT}} = 3 \times V$$

$$V_{\text{TOT}} = 382,996.1 \text{ ft}^3 \text{ SAY } 383,000 \text{ ft}^3 \checkmark$$

NOTE: PANDS ARE CONTINUOUSLY PUMPED TO PLANT FOR TREATMENT.



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JOB NO. 56-1621740 SHEET 2 OF 5

JOB NAME CHAMPION

BY TIM LABOUNTY DATE 7-30-92

CHECKED BY T. Beggs DATE 8/10/92

CALCULATE TOTAL VOLUME OF RUNOFF

\* RUNOFF WILL BE EITHER LEACHATE OR CLEAN WATER

DRAINAGE AREA: 45.0 ACRES = 1960,200 FT<sup>2</sup>

RUNOFF DEPTH (1041-ZFH) = [5.0" REF NCFSCPDN FIG. 8.03;]  
HAYWOOD CO

CURVE NUMBER: 74 [REF. NCFSCPDN - OPEN SPACES, LAWNS, PARKS,  
GOLF COURSES, CEMETRIES etc. GOOD CONDITION  
GRASS COVER ON 75% OR MORE OF THE AREA.  
SOIL GROUP "C".

RUNOFF DEPTH: ≈ 2.4 [REF. NCFSCPDN p. 8.03.17 TABLE 8.03 c]

V = 45.0 ACRES (2.4)

V = 392040 FT<sup>3</sup>

SUPPLIED BY PLANT SUPERINTENDANT

V<sub>TOT</sub> = V - V<sub>PUMP</sub> = 392040 - 30  $\frac{FT^3}{min}$  (1440 min / 24 hr)

V<sub>TOT</sub> = 348840 FT<sup>3</sup>

→ (Pump Rate = 220 gal/min)  
per Champion personnel

V<sub>TOT</sub> = 348840 FT<sup>3</sup>

V<sub>CAP</sub> = 383000 FT<sup>3</sup>

V<sub>TOT</sub> < V<sub>CAP</sub> ⇒ OK ✓

Table 8.03b  
Runoff Curve Numbers (CN)

Land Use/Cover	Hydrologic Soil Group			
	A	B	C	D
Cultivated land without conservation	72	81	88	91
with conservation	62	71	78	81
Pasture land poor condition	68	79	86	89
good condition	39	61	74	80
Meadow good condition	30	58	71	78
Wood or forest land Thin stand - poor cover, no mulch	45	66	77	83
Good stand - good cover	25	55	70	77
Open spaces, lawns, parks, golf courses, cemeteries, etc. good condition: grass cover on 75% or more of the area	39	61	74	80
fair condition: grass cover on 50 to 75% of the area	49	69	79	84
Commercial and business areas (85% impervious)	89	92	94	95
Industrial districts (72% impervious)	81	88	91	93
Residential: <sup>1</sup> Development completed and vegetation established				
Average lot size		Average % Impervious		
1/8 acre or less	65	77	85	90
1/4 acre	38	61	75	83
1/3 acre	30	57	72	81
1/2 acre	25	54	70	80
1 acre	20	51	68	79
2 acre	15	47	66	77
Paved parking lots, roofs, driveways, etc.	98	98	98	98
Streets and roads paved with curbs and storm sewers	98	98	98	98
gravel	76	85	89	91
dirt	72	82	87	89
Newly graded area	81	89	93	95
Residential: Development underway and no vegetation				
Lot sizes of 1/4 acre	88	93	95	97
Lot sizes of 1/2 acre	85	91	94	96
Lot sizes of 1 acre	82	90	93	95
Lot sizes of 2 acres	81	89	92	94

<sup>1</sup>Curve numbers are computed assuming the runoff from the house and driveway is directed toward the street.

source: USDA-SCS

10-year 1 day precipitation (inches)



RAINFALL DATA MAP

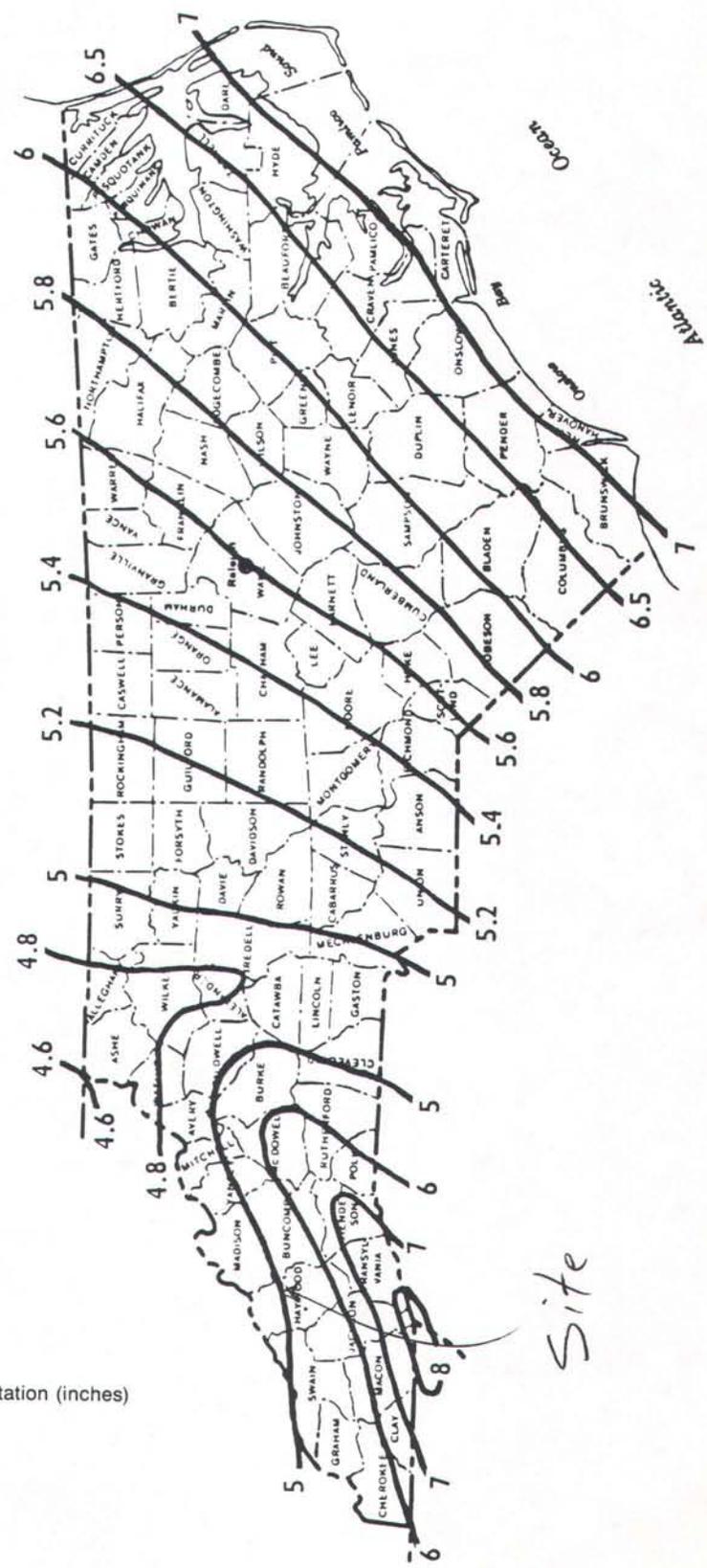


Figure 8.03] 10-year 1 day precipitation (inches)

b. Determine runoff depth (in inches) from the curve number and rainfall depth using Table 8.03c.

**Table 8.03c  
Runoff Depth**

Rainfall (inches)	Curve Number (CN) <sup>1</sup>							
	60	65	70	75	80	85	90	95
1.0	0.00	0.00	0.00	0.03	0.08	0.17	0.32	0.56
1.2	0.00	0.00	0.03	0.07	0.15	0.28	0.46	0.74
1.4	0.00	0.02	0.06	0.13	0.24	0.39	0.61	0.92
1.6	0.01	0.05	0.11	0.20	0.34	0.52	0.76	1.11
1.8	0.03	0.09	0.17	0.29	0.44	0.65	0.93	1.30
2.0	0.06	0.14	0.24	0.38	0.56	0.80	1.09	1.48
2.5	0.17	0.30	0.46	0.65	0.89	1.18	1.53	1.97
3.0	0.33	0.51	0.72	0.96	1.25	1.59	1.98	2.44
4.0	0.76	1.03	1.33	1.67	2.04	2.46	2.92	3.42
5.0	1.30	1.65	2.04	2.45	2.89	3.37	3.88	4.41
6.0	1.92	2.35	2.80	3.28	3.78	4.31	4.85	5.40
7.0	2.60	3.10	3.62	4.15	4.69	5.26	5.82	6.40
8.0	3.33	3.90	4.47	5.04	5.62	6.22	6.81	7.39
9.0	4.10	4.72	5.34	5.95	6.57	7.19	7.79	8.39
10.0	4.90	5.57	6.23	6.88	7.52	8.16	8.78	9.39
11.0	5.72	6.44	7.13	7.82	8.48	9.14	9.77	10.39
12.0	6.56	7.32	8.05	8.76	9.45	10.12	10.76	11.39

<sup>1</sup> To obtain runoff depths for CN's and other rainfall amounts not shown in this table, use an arithmetic interpolation.

The volume of runoff from the site can be calculated by multiplying the area of the site by the runoff depth.

**Step 4.** Determine the peak rate of runoff for the design storm by adjusting for watershed shape as follows:

- a. Determine an "equivalent drainage area" from the hydraulic length of the watershed using Figure 8.03n. Hydraulic length is the length of the flow path from the most remote point in the watershed to the point of discharge.
- b. Determine the discharge (cfs/inch of runoff) for the equivalent drainage area from Figure 8.03o through 8.03q:

Figure 8.03o - for average watershed slopes 0-3%

Figure 8.03p - for average watershed slopes 3-7%

Figure 8.03q - for average watershed slopes 8-50%

Calculate the peak discharge,  $Q_1$ , of the equivalent watershed by multiplying equivalent watershed area by runoff from Table 8.03c in Step 3b.

**APPENDIX D: NARRATIVE DESCRIBING LANDFILL  
USAGE, OPERATION, AND DEVELOPMENT**

## **Narrative Describing Landfill Usage, Operation, and Development**

### **Landfill Usage**

The Champion International Mill is located in Canton, North Carolina. Champion operates a permitted industrial waste landfill northwest of Canton, between Interstate 40 and the Pigeon River on State Road 1550. Active portions of the landfill (Areas B and C) were designed by Law Engineering and permitted by the NCDEHNR in March, 1984 (Solid Waste Permit No. 44-06). These areas are not lined; however leachate from the areas is directed to lined leachate collection basins at the south perimeter of the site. The leachate is pumped to the mill for treatment at Champion's wastewater treatment plant (NPDES Permit No. NC0000272) prior to discharge into the Pigeon River.

### **Landfill Operations**

The landfill accepts approximately 800 cubic yards of solid waste per day. Daily landfill operations are supervised by Mr. George Pickard of Champion (phone number 704-646-2653). Dump trucks from the mill are directed to the active landfill area and their contents dumped into the cell.

As noted previously, the Champion landfill accepts waste treatment plant sludge, fly ash and cinders, and lime waste. Champion has found that each of these waste products possesses different physical characteristics.

Waste treatment sludge is approximately 30% solids. When end dumped at the edge of a landfill cell, the sludge will slowly flow under its own weight toward the lowest point in the cell. Sludge will not support heavy equipment.

Fly ash is typically very dry and powdery. If dumped in a pile, fly ash will behave like a poorly graded silt soil. The consistency of fly ash is very loose.

Lime waste is approximately 60% solids when delivered to the landfill. It can be dumped into large piles and will stand at steep angles of repose. As it dries, it forms a hardened mass similar to low-strength concrete and will easily support heavy truck loads.

Champion has learned to use the physical characteristics of each type of waste product to increase landfilling efficiency.

When a cell is opened, dump trucks can easily back up to the edge of the cell and end-dump sludge down the steep slope to the bottom. The sludge then slowly flows to the lowest point. This process continues as sludge accumulates in the cell.

As the sludge elevation rises over time, end-dumping from the top of the cell is less effective. Dumping of fly ash is then begun at the edge of the landfill. The ash displaces sludge, forcing it downslope into the lower portion of the cell. The ash will support tracked bulldozers which help to shape the ash/sludge combination. An added benefit is that residual sludge moisture is absorbed into the ash.

This process is repeated along the perimeter landfill dike until the entire dike is covered with waste. Lime is then dumped on top of the ash/sludge mixture at the top edge of the dike. The lime displaces waste below it, creating a zone of lime waste over the soil embankment. Over time, this lime waste hardens to the point where it can support heavy dump truck traffic. This allows trucks to leave the perimeter dike and approach the center of the landfill to dump their loads, thereby spreading the waste throughout the available area.

Drawing 2 in Appendix A presents a cross-sectional representation of the lime waste over the soil embankment.

In Item 6 of the Quality Assurance/Quality Control section of the technical specifications (refer to Project Manual dated January 13, 1992, LEI Job No. 56-1621), the lime waste berm is mentioned. Law recommended that soil test borings be made in the lime waste at Area C prior to placement of the vertical dike extension. The purpose of these borings would be to verify that the lime waste has completely displaced underlying sludge to form a continuous connection with the embankment. This continuity is desired to strengthen the existing dike and increase stability of the vertical dike extension.

#### Landfill Development

Areas B and C of Landfill No. 6 are currently nearing capacity. Area A consists of a lined facility and is currently under construction. Area A will not be ready to accept waste in the near future, however. Champion therefore desires to extend the service life of Areas B and C.

The goal of this vertical expansion project will be to gain additional capacity in Areas B and C by raising the perimeter dike for continued mill operation prior to construction completion of Area A. The dike is approximately 2200 ft long and parallels the Pigeon River along the south side of the landfill. The top of the dike will be raised a maximum of 25 feet. It is estimated that the vertical expansion will provide additional capacity equivalent to approximately 200 days of disposal at the current rate.

Borrow soil for the project will be excavated from an area northeast of the site. Upon completion of the dike extension and placement of sludge (at a maximum slope of five percent), a two ft. thick soil cap will be placed over the sludge. An erosion-resistant stand of perennial grass will be sown over the cap. When all work is completed and the landfill is closed, the area will revert to an open field. No residential, commercial, or industrial use for the closed landfill is currently planned.

We note that the landfill area will be unaffected by vertical expansion. The volume of stormwater currently leaving the site as runoff will therefore remain unchanged.

**APPENDIX E: GROUND-WATER AND SURFACE-WATER  
MONITORING PLAN**

## GROUND-WATER AND SURFACE-WATER MONITORING PLAN

Champion International Corporation currently conducts comprehensive ground-water and surface-water monitoring at Landfill No. 6. Fifteen ground-water monitoring wells are located in the area (please refer to the attached Drawing No. G 9083-1 dated 9/29/89 by Serrine Environmental Consultants). Each of these wells is sampled twice per year; normally in May and November. In addition, two surface-water monitoring locations have been designated by Champion north and east of the landfill on the Bowen Branch. These two locations are also sampled twice each year. The approximate surface-water sampling locations are shown on the attached drawing.

Samples gathered from ground-water monitoring wells and surface-water monitoring locations are analyzed for the following parameters:

- pH
- Dissolved Solids
- Conductivity
- Ag, silver
- As, arsenic
- Ba, barium
- Ca, calcium
- Cd, cadmium
- Cr, chromium
- Fe, iron
- Hg, mercury
- Mn, manganese
- Na, sodium
- Ni, nickel
- Pb, lead
- Se, selenium
- Cl, chloride
- F, fluoride
- Nitrite (as N)
- Phenol
- Sulfate
- TOC
- TOH

Champion believes that the monitoring program is adequate. The proposed vertical expansion will not increase the total area covered by industrial waste. Therefore no changes to the monitoring program are planned.

**APPENDIX F:      CALCULATIONS AND GEOTECHNICAL  
REPORT FOR SOIL BORROW AREA**



LAW ENVIRONMENTAL, INC.

# CALCULATION COVER SHEET

PROJECT

CHAMPION INTL.

PROJECT No.

56-1621

CALCULATION TITLE

EARTHWORK CALCS.

ORIGINATED BY

TIM LABOUNTY

DATE

7-31-92

CHECKED BY

JPD

DATE

8/6/92

SUBJECT:

VERTICAL EXPANSION LANDFILL @ AREAS B & C.

STATEMENT OF PROBLEM:

DETERMINE IF CALCULATED CUT FROM DESIGNATED BORROW AREA IS ADEQUATE TO SUPPLY CALCULATED FILL FOR CAP & DIKE EXTENSION.

SOURCES OF DATA:

LAW ENG - ASHVILLE REPORT - BORROW AREA - 1988.  
LEI DWG 3

SOURCES OF FORMULA & REFERENCES:

N/A

INTENDED USE:

PRELIMINARY CALC.

SUPERCEDES CALC. No. \_\_\_\_\_

FINAL CALC.

OTHER \_\_\_\_\_

REV No.	DESCRIPTION	BY	DATE	CHK	DATE



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JOB NO. 56-1621740 SHEET 1 OF 3

JOB NAME CHAMPION

BY TIM LABOUNTY DATE 7-31-92

CHECKED BY JPD DATE 8/6/92

(I) CALCULATE AVAILABLE FILL <sup>VOLUME</sup> FROM BORROW PIT

$$A = 7.0 \text{ ACRES}$$

DEPTH = 16.0' [REF LAW ENGINEERING REPORT 11-3 '88 SOIL BORINGS]

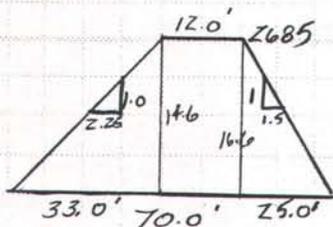
$$V_{\text{avail}} = 4,878,720.0 \text{ CU FT}$$

$$V_{\text{avail}} = 180,693.3 \text{ yd}^3$$

(II) CALCULATE FILL REQUIRED FOR DIKE EXTENSION

(A) AVERAGE 5 TYPICAL CROSS-SECTIONS

CS#1

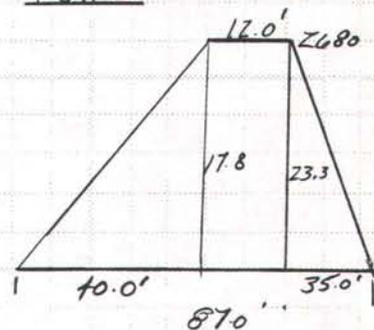


$$h_{\text{ave}} = \frac{14.6 + 16.6}{2} = 15.7$$

$$A_1 = \frac{70 + 12}{2} (15.7)$$

$$A_1 = 643.7 \text{ ft}^2$$

CS#2



$$h_{\text{ave}} = \frac{17.8 + 23.3}{2} = 20.6$$

$$A_2 = \frac{12 + 87.0}{2} (20.6)$$

$$A_2 = 1019.7 \text{ ft}^2$$



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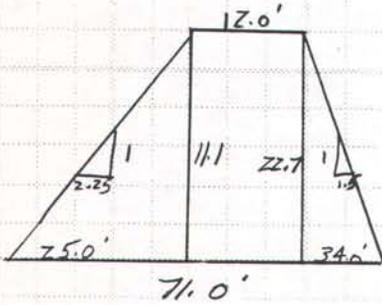
JOB NO. 56-1021 SHEET 2 OF 3

JOB NAME CHAMPION

BY TIM LADAVITY DATE 7-31-92

CHECKED BY JPL DATE 8/6/92

CS #3

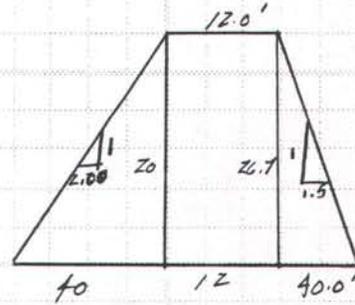


$$h_{avg} = \frac{11.1 + 22.7}{2} = 16.9$$

$$A_3 = \left( \frac{71 + 12.0}{2} \right) 16.9$$

$$A_3 = 701.9 \text{ ft}^2$$

CS #4

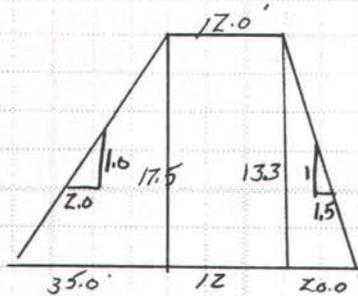


$$h_{avg} = \frac{20 + 26.7}{2} = 23.3'$$

$$A_4 = \left( \frac{92 + 12.0}{2} \right) 23.3'$$

$$A_4 = 1211.6 \text{ ft}^2$$

CS #5



$$h_{avg} = \frac{17.5 + 13.3}{2} = 15.4'$$

$$A_5 = \frac{12 + 67}{2} (15.4)$$

$$A_5 = 608.3 \text{ ft}^2$$



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JOB NO. 56-1621 T40 SHEET 3 OF 3

JOB NAME CHAMPION

BY TIM LABOUNTY DATE 7-31-92

CHECKED BY JPK DATE 8/6/92

CALCULATE AVERAGE CROSS-SECTIONAL AREA

$$A = \frac{A_1 + A_2 + A_3 + A_4 + A_5}{5} = \frac{643.7 + 1519.7 + 701.4 + 1211.6 + 608.3}{5}$$

$$A = 836.9 \text{ ft}^2 \text{ SAY } 850 \text{ ft}^2$$

CALCULATE VOLUME OF SOIL REQUIRED FOR DIKE EXTENSION

$$V = A \times L$$

$L \Rightarrow$  LENGTH OF DIKE EXTENSION

$$L = 2230.0' \text{ [SCALEMASTER]}$$

$$V = 850 \text{ ft}^2 \times 2230.0'$$

$$V = 1,895,500 \text{ cu ft} = 70,200 \text{ c.y.}$$

CALCULATE VOLUME OF SOIL REQUIRED FOR CAP (AREA B + C)

$$\text{AREA C: } \overset{\text{CELL 1}}{7.2 \text{ ACRES}} + \overset{\text{CELL 2}}{12.4 \text{ ACRES}} = 19.6 \text{ ACRES}$$

$$\text{AREA: } 13.0 \text{ ACRES}$$

$$A_{\text{TOT}} = 32.6 \text{ ACRES} = 1,420,056 \text{ ft}^2 = 52,600 \text{ c.y.}$$

CALCULATE VOLUME OF SOIL FOR 2.0' THICK CAP LAYER

$$V = A_{\text{TOT}} \times 2.0'$$

$$V = 2,840,112.0 \text{ ft}^3 = 105,200 \text{ c.y.}$$

SUMMARY

TOTAL VOLUME REQD: 175,400 cu. yd

TOTAL VOLUME AVAILABLE: 180,690 cu. yd.

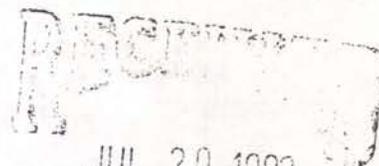
OK



## LAW ENGINEERING

GEOTECHNICAL, ENVIRONMENTAL  
& CONSTRUCTION MATERIALS  
CONSULTANTS

November 3, 1988



LAW ENGINEERING

Champion International Corporation  
Canton Mill  
P.O. Box C-10  
Canton, North Carolina 28716

Attention: Mr. George Pickard

Subject: Report of Geotechnical Exploration  
Champion Landfill Site Assessment  
Canton, North Carolina  
Law Engineering Job Number AV-2066

Gentlemen:

Based upon verbal authorization by Mr. George Pickard of Champion on October 21, 1988 and in accordance with our Confirming Proposal Number AV88-270 dated October 31, 1988. Law Engineering has completed a subsurface exploration for the subject project. The purpose of this exploration was to develop information about the site and subsurface conditions for Champion's use in assessing a proposed acquisition. This report describes the work performed and presents the results obtained.

### PROJECT INFORMATION

Project information is based on telephone conversations between Mr. George Pickard of Champion and our representatives. Champion Paper Company is assessing a site adjacent to an existing landfill for future acquisition. The site is north of the Canton, North Carolina mill just south of Interstate 40. Champion personnel cleared the

#### SITE CONDITIONS

The site is located northwest of the city of Canton, North Carolina just south of SR1550 where the road passes underneath I-40. The site is presently a tree covered hillside east of a house used as an office by Champion. A bulldozer cut road was used for access by our drilling crew. The topsoil had been removed by the bulldozer exposing a loose sandy silt surface soil with varying amounts of organic matter. No ground water or rock outcropping was observed at the site at the time of our site visit. However, the Thickey Creek could be seen several hundred feet north of the state road.

#### SUBSURFACE CONDITIONS

Generally the soils encountered were residual micaceous silty sands to at least 16.0 feet below the ground surface. Boring B-1 encountered residual silty sands to a depth of 16.0 feet below the ground surface underlain by a 12.0 feet layer of partially weathered rock. This partially weathered rock layer graded back into a silty sand soil layer until auger refusal was encountered at 39.0 feet below the ground surface. Refusal may result from boulders, lenses, ledges or layers of relatively hard rock underlain by partially weathered rock or residual soil; refusal may also represent the surface of relatively continuous bedrock. Core drilling procedures are required to penetrate refusal materials and determine their character and continuity. Core drilling was beyond the scope of this exploration.

Boring B-2 encountered residual silty sand the entire length of the boring with the exception of a 6.0 feet layer of sandy clayey silt at 6.0 feet below the ground surface.

Champion International Corporation  
Law Engineering Job Number AV-2066  
November 3, 1988  
Page 5

Thank you for the opportunity to provide our professional geotechnical services during this phase of your project. Please contact us when we can be of further service or if you have any questions concerning this report.

Yours very truly,  
LAW ENGINEERING

Kevin L. Privette, E.I.T.  
Staff Geotechnical Engineer

George W. Scott, P.E.  
Senior Construction Engineer  
Registered, North Carolina #8454

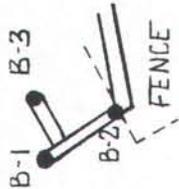
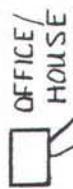
/jgw  
Attachments



APPROXIMATE NORTH

● APPROXIMATE BORING LOCATION

REFERENCE: A SKETCH MADE BY A LAW ENGINEERING REPRESENTATIVE, KEVIN PRIVETTE, ON 10-25-88.



ENTRANCE GATE TO LANDFILL

SR 1550

I AD

THICKETY CREEK



**LAW ENGINEERING  
GREENVILLE, SOUTH CAROLINA**

BORING LOCATION PLAN  
CHAMPION INTERNATIONAL CORPORATION  
LANDFILL SITE ASSESSMENT

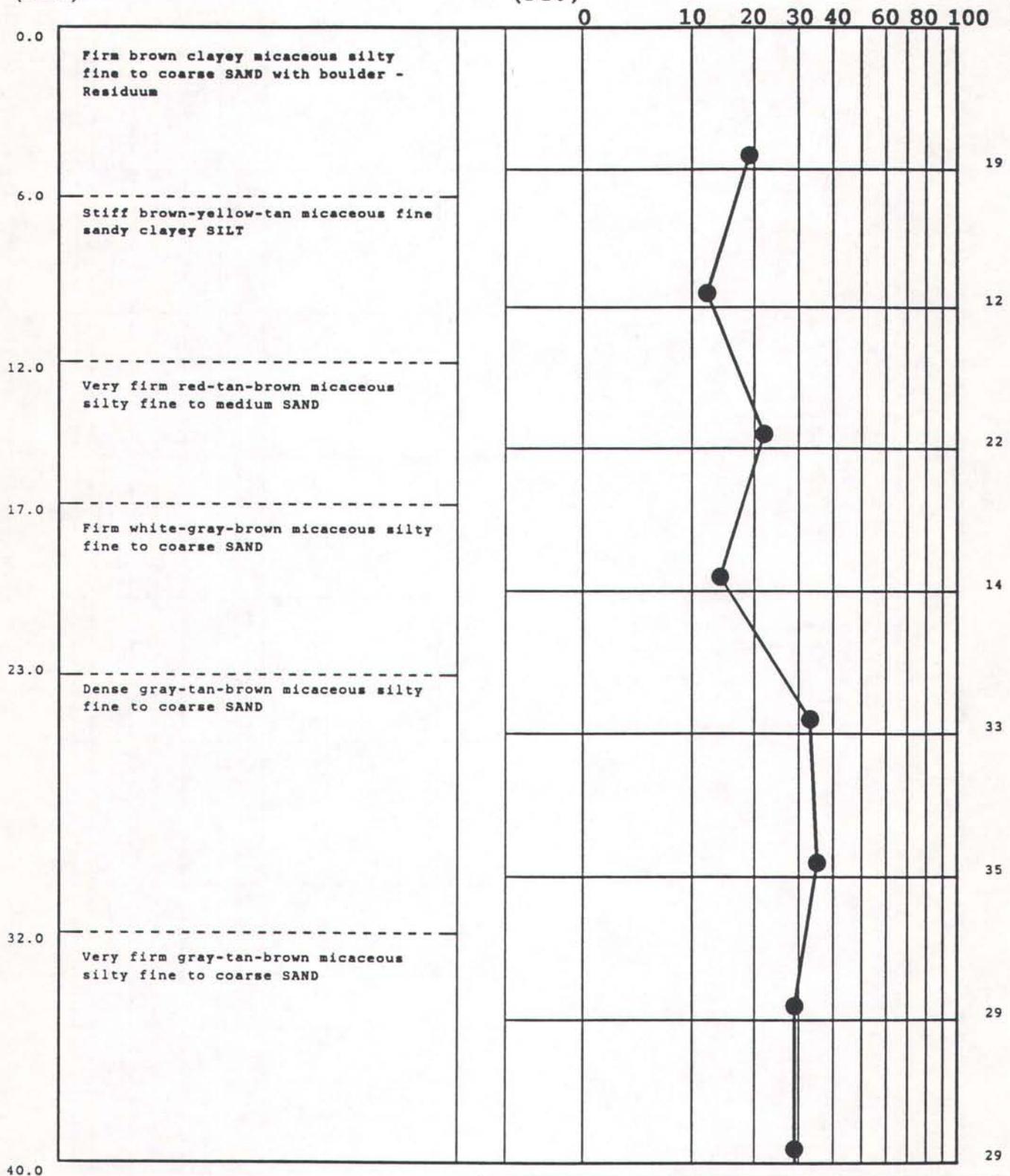
JOB NO. AV-2066      FIGURE 2

DEPTH  
(FT.)

DESCRIPTION

ELEVATION  
(FT.)

● PENETRATION - BLOWS/FOOT



TEST BORING RECORD

BORING NUMBER B-2  
 DATE DRILLED 10-24-88  
 PROJECT NUMBER AV-2066  
 PROJECT CHAMPION LANDFILL  
 PAGE 1 OF 2

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

▲ LAW ENGINEERING

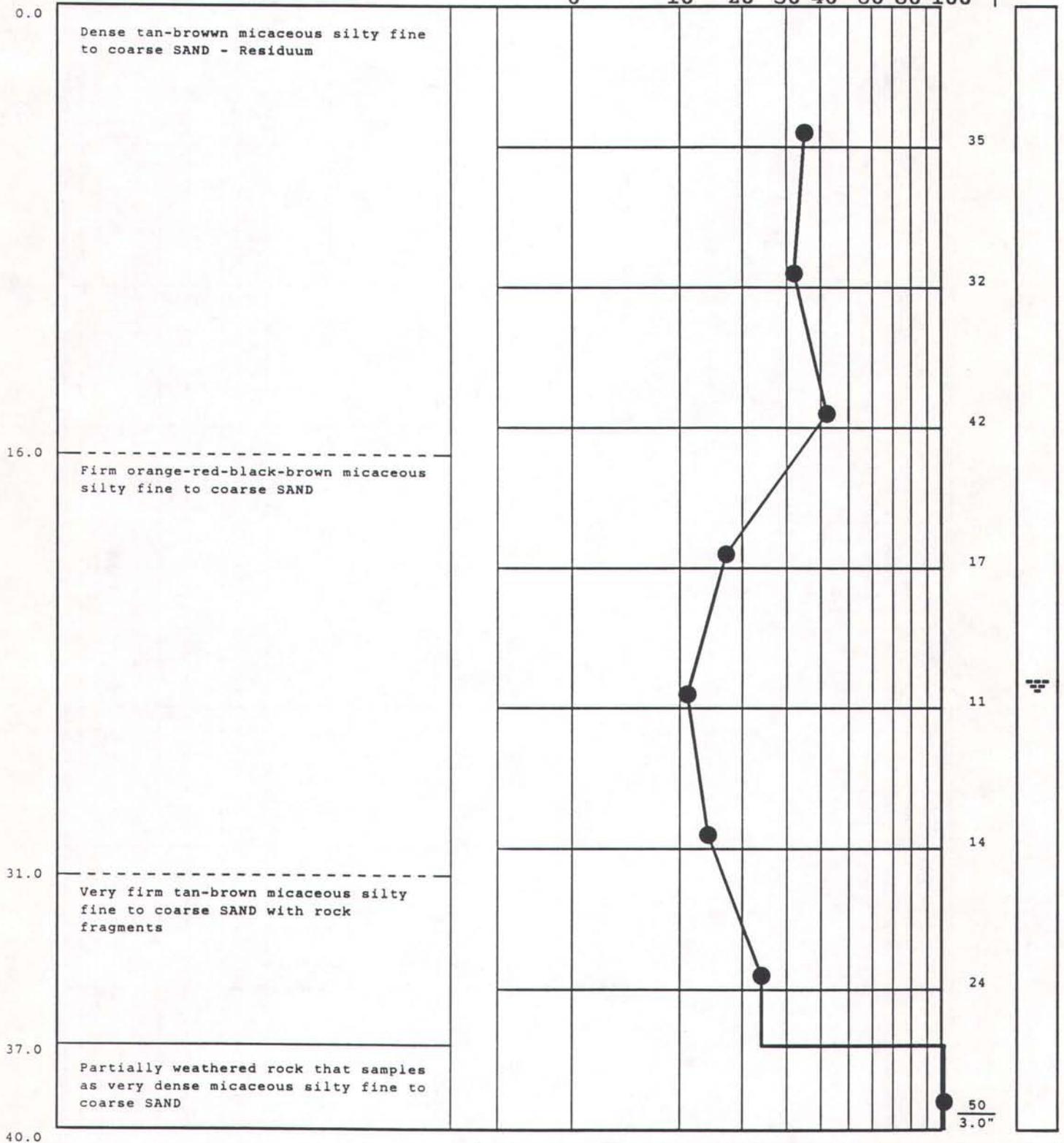
DEPTH  
(FT.)

DESCRIPTION

ELEVATION  
(FT.)

● PENETRATION - BLOWS/FOOT

0 10 20 30 40 60 80 100



TEST BORING RECORD

BORING NUMBER B-3  
 DATE DRILLED 10-25-88  
 PROJECT NUMBER AV-2066  
 PROJECT CHAMPION LANDFILL  
 PAGE 1 OF 2

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

▲ LAW ENGINEERING

KEY TO CLASSIFICATIONS AND SYMBOLS

CORRELATION OF PENETRATION RESISTANCE WITH  
RELATIVE DENSITY AND CONSISTENCY

	<u>No. of Blows, N</u>	<u>Relative Density*</u>
Sands	0 - 4	Very Loose
	5 - 10	Loose
	11 - 20	Firm
	21 - 30	Very Firm
	31 - 50	Dense
	51+	Very Dense
		<u>Consistency*</u>
Silts and Clays	0 - 1	Very Soft
	2 - 4	Soft
	5 - 8	Firm
	9 - 15	Stiff
	16 - 30	Very Stiff
	31+	Hard

SYMBOLS

-  - Undisturbed Sample (UD) Recovered
- 50=2" - Number of Blows (50) to Drive the Spoon a Number of Inches (2)
- BQ,NX,NQ,NW - Core Barrel Sizes Which Obtain Cores 1-7/16, 2-1/8 Inches, 1-7/8 Inches, 2-1/16 Inches in Diameter, Respectively
- 65% - Percentage (65) of Rock Core Recovered (Compared to Cored Length)
- RQD - Rock Quality Designation - Percentage of Recovered Cored Length Consisting of Moderately Hard or Better Core Segments 4 or More Inches Long
-  - Water Table Approximately 24 Hours or More After Drilling
-  - Water Table Approximately at Time of Drilling (Within 1 Hour)
-  - Loss of Drilling Fluid

\*Terminology may be altered if presence of gravel, cobbles or boulders interferes with accurate measurement of standard penetration resistances

**APPENDIX G: BID DOCUMENTS AND SPECIFICATIONS  
FOR PREPARATION OF AREA C,  
LANDFILL NO. 6 (dated May, 1986)**



**LAW ENGINEERING**

GEOTECHNICAL, ENVIRONMENTAL  
& CONSTRUCTION MATERIALS  
CONSULTANTS

November 3, 1988

RECEIVED  
JUL 20 1992

LAW ENGINEERING

Champion International Corporation  
Canton Mill  
P.O. Box C-10  
Canton, North Carolina 28716

Attention: Mr. George Pickard

Subject: Report of Geotechnical Exploration  
Champion Landfill Site Assessment  
Canton, North Carolina  
Law Engineering Job Number AV-2066

Gentlemen:

Based upon verbal authorization by Mr. George Pickard of Champion on October 21, 1988 and in accordance with our Confirming Proposal Number AV88-270 dated October 31, 1988. Law Engineering has completed a subsurface exploration for the subject project. The purpose of this exploration was to develop information about the site and subsurface conditions for Champion's use in assessing a proposed acquisition. This report describes the work performed and presents the results obtained.

**PROJECT INFORMATION**

Project information is based on telephone conversations between Mr. George Pickard of Champion and our representatives. Champion Paper Company is assessing a site adjacent to an existing landfill for future acquisition. The site is north of the Canton, North Carolina mill just south of Interstate 40. Champion personnel cleared the

site for our access by bulldozer. Three soil test borings drilled to a depth of 60 feet or auger refusal were requested.

## FIELD EXPLORATION

### Soil Test Borings

Three soil test borings were made at the site at locations shown on the attached Boring Location Plan. The boring locations were selected and located by Law Engineering representatives in the field, under the direction of Champion personnel. The elevations on the Test Boring Records were not available.

The borings were made by mechanically twisting a continuous flight steel auger into the soil. Soil sampling and penetration testing were performed in general accordance with ASTM D 1586. At regular intervals, soil samples were obtained with a standard 1.4-inch I. D., 2-inch O. D., split-tube sampler. The sampler was first seated 6 inches to penetrate any loose cuttings, and then driven an additional 12 inches with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final 12 inches was recorded and is designated the "penetration resistance". The penetration resistance, when properly evaluated, is an index to the soil's strength and foundation supporting capability.

Representative portions of the soil samples, thus obtained, were placed in glass jars and transported to the laboratory. In the laboratory, the samples were examined by a geotechnical engineer to verify the driller's field classifications. Test Boring Records are attached, showing the soil descriptions and penetration resistances.

#### SITE CONDITIONS

The site is located northwest of the city of Canton, North Carolina just south of SR1550 where the road passes underneath I-40. The site is presently a tree covered hillside east of a house used as an office by Champion. A bulldozer cut road was used for access by our drilling crew. The topsoil had been removed by the bulldozer exposing a loose sandy silt surface soil with varying amounts of organic matter. No ground water or rock outcropping was observed at the site at the time of our site visit. However, the Thickey Creek could be seen several hundred feet north of the state road.

#### SUBSURFACE CONDITIONS

Generally the soils encountered were residual micaceous silty sands to at least 16.0 feet below the ground surface. Boring B-1 encountered residual silty sands to a depth of 16.0 feet below the ground surface underlain by a 12.0 feet layer of partially weathered rock. This partially weathered rock layer graded back into a silty sand soil layer until auger refusal was encountered at 39.0 feet below the ground surface. Refusal may result from boulders, lenses, ledges or layers of relatively hard rock underlain by partially weathered rock or residual soil; refusal may also represent the surface of relatively continuous bedrock. Core drilling procedures are required to penetrate refusal materials and determine their character and continuity. Core drilling was beyond the scope of this exploration.

Boring B-2 encountered residual silty sand the entire length of the boring with the exception of a 6.0 feet layer of sandy clayey silt at 6.0 feet below the ground surface.

Boring B-3 encountered residual silty sands to a depth of on the order of 31.0 feet and then graded into a 6.0 feet silty sandy layer containing rock fragments. This layer was underlain by partially weathered rock to a depth of 58.5 feet. The boring encountered another silty sand layer beneath the partially weathered rock to a depth of 60.0 feet below the ground surface.

Ground water was encountered in all three borings at depths between 24.0 to 48.0 feet below the ground surface. Ground-water levels may fluctuate several feet with seasonal and rainfall variations and with changes in the water level in adjacent drainage features. Normally, the highest ground-water levels occur in late winter and spring and the lowest levels occur in late summer and fall.

The above descriptions provide a general summary of the subsurface conditions encountered. The attached Test Boring Records contain detailed information recorded at each boring location. These Test Boring Records represent our interpretation of the field logs based on engineering examination of the field samples. The lines designating the interfaces between various strata represent approximate boundaries and the transition between strata may be gradual.

#### QUALIFICATION OF REPORT

This exploration provides only general soil conditions over the subject site. No engineering analysis was performed. The assessment of site environmental conditions or the presence of pollutants in the soil, rock and ground water of the site was beyond the scope of this exploration.

Champion International Corporation  
Law Engineering Job Number AV-2066  
November 3, 1988  
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Thank you for the opportunity to provide our professional geotechnical services during this phase of your project. Please contact us when we can be of further service or if you have any questions concerning this report.

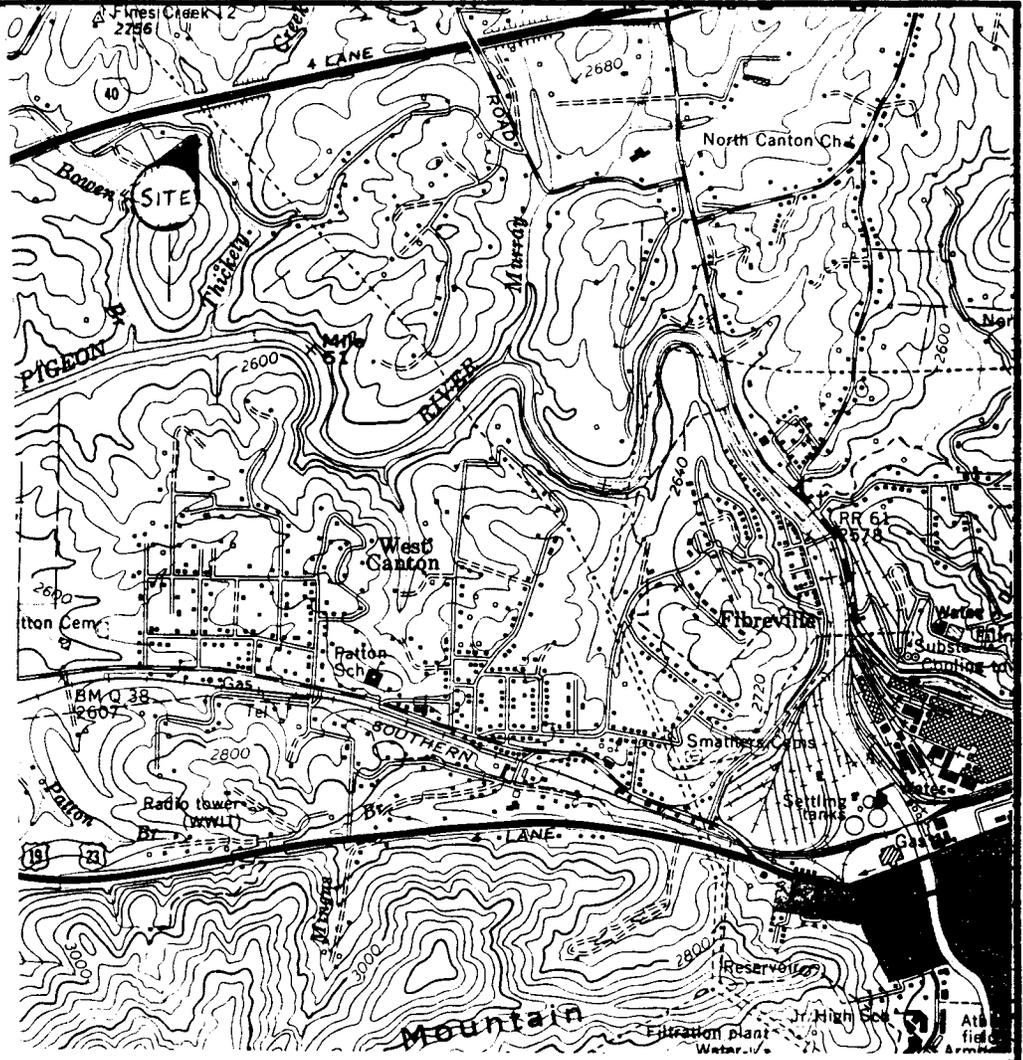
Yours very truly,  
LAW ENGINEERING

Kevin L. Privette, E.I.T.  
Staff Geotechnical Engineer

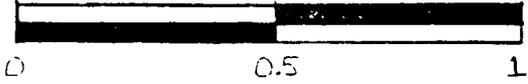
George W. Scott, P.E.  
Senior Construction Engineer  
Registered, North Carolina #8454

/jgw  
Attachments

APPROXIMATE  
NORTH



APPROXIMATE SCALE IN MILES

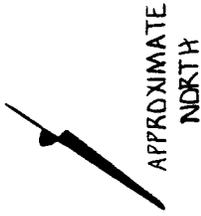


REFERENCE: CANTON QUADRANGLE  
7.5 MINUTE SERIES. U.S.G.S. DATED:  
1967



QUADRANGLE LOCATION

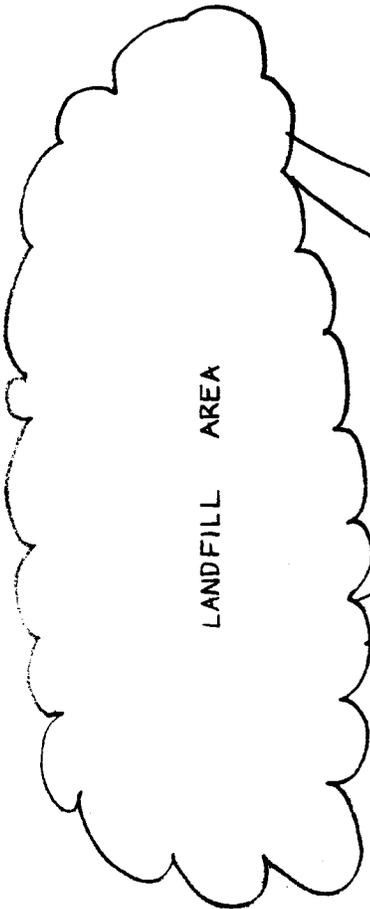
	<b>LAW ENGINEERING</b> <b>GREENVILLE, SOUTH CAROLINA</b>
	SITE LOCATION PLAN LANDFILL SITE ASSESSMENT CHAMPION INTERNATIONAL CORPORATION CANTON NORTH CAROLINA
JOB NO. AV-2066	FIGURE 1



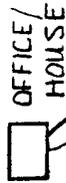
APPROXIMATE NORTH

● APPROXIMATE BORING LOCATION

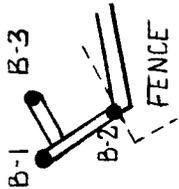
REFERENCE: A SKETCH MADE BY A LAW ENGINEERING REPRESENTATIVE, KEVIN PRIVETTE, ON 10-25-88.



LANDFILL AREA



OFFICE/HOUSE



B-1  
B-2  
B-3

FENCE

ENTRANCE GATE TO LANDFILL

SR 1550

I AD

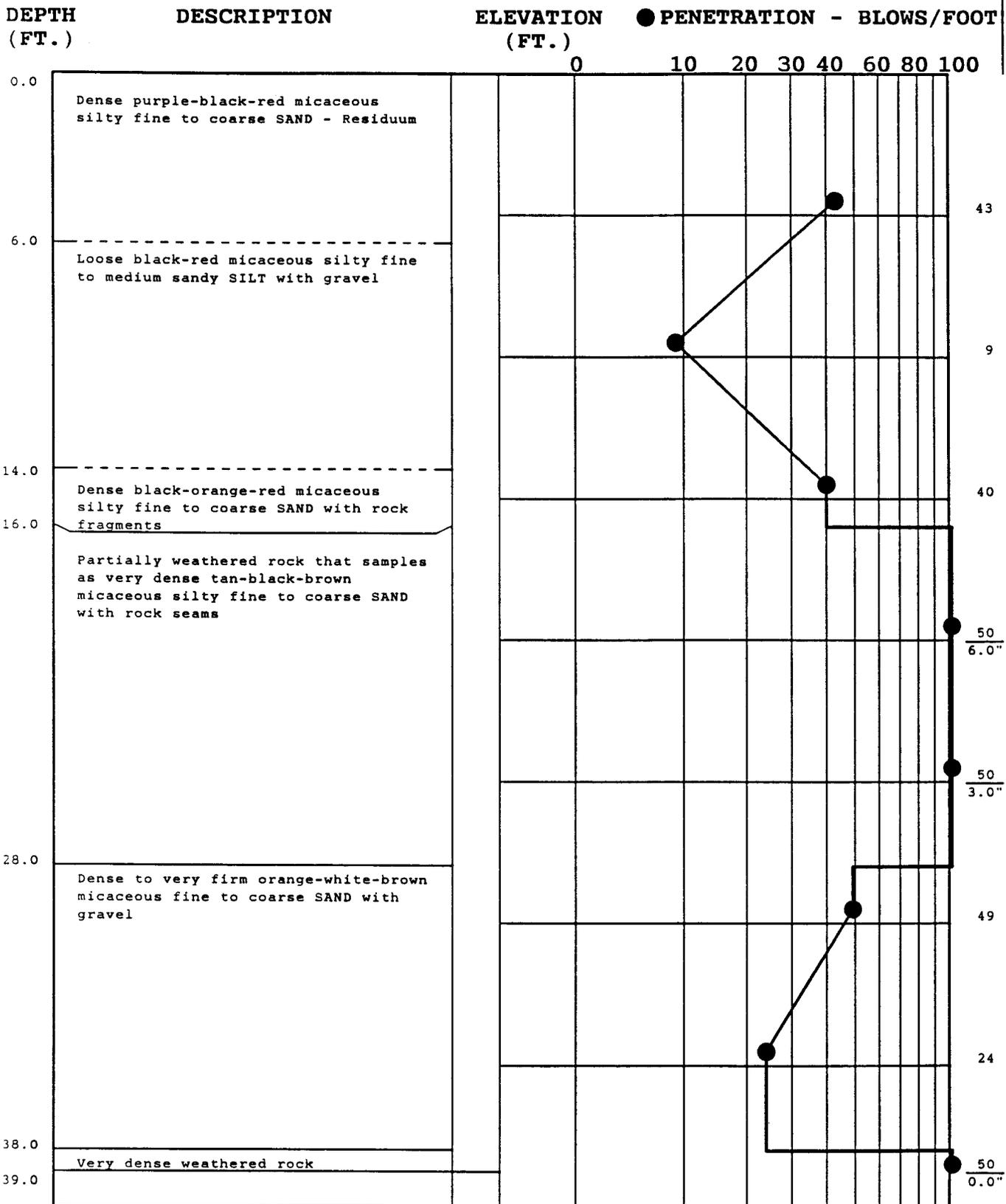
THICKETY CREEK



LAW ENGINEERING  
GREENVILLE, SOUTH CAROLINA

BORING LOCATION PLAN  
CHAMPION INTERNATIONAL CORPORATION  
LANDFILL SITE ASSESSMENT

JOB NO. AV-2066      FIGURE 2



Auger refusal at 39.0 feet  
 Ground water encountered at 29.0 feet  
 at time of boring  
 Borehole dry at 37.0 feet after 24  
 hours

TEST BORING RECORD	
BORING NUMBER	B-1
DATE DRILLED	10-24-88
PROJECT NUMBER	AV-2066
PROJECT	CHAMPION LANDFILL
PAGE 1 OF 1	
 <b>LAW ENGINEERING</b>	

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

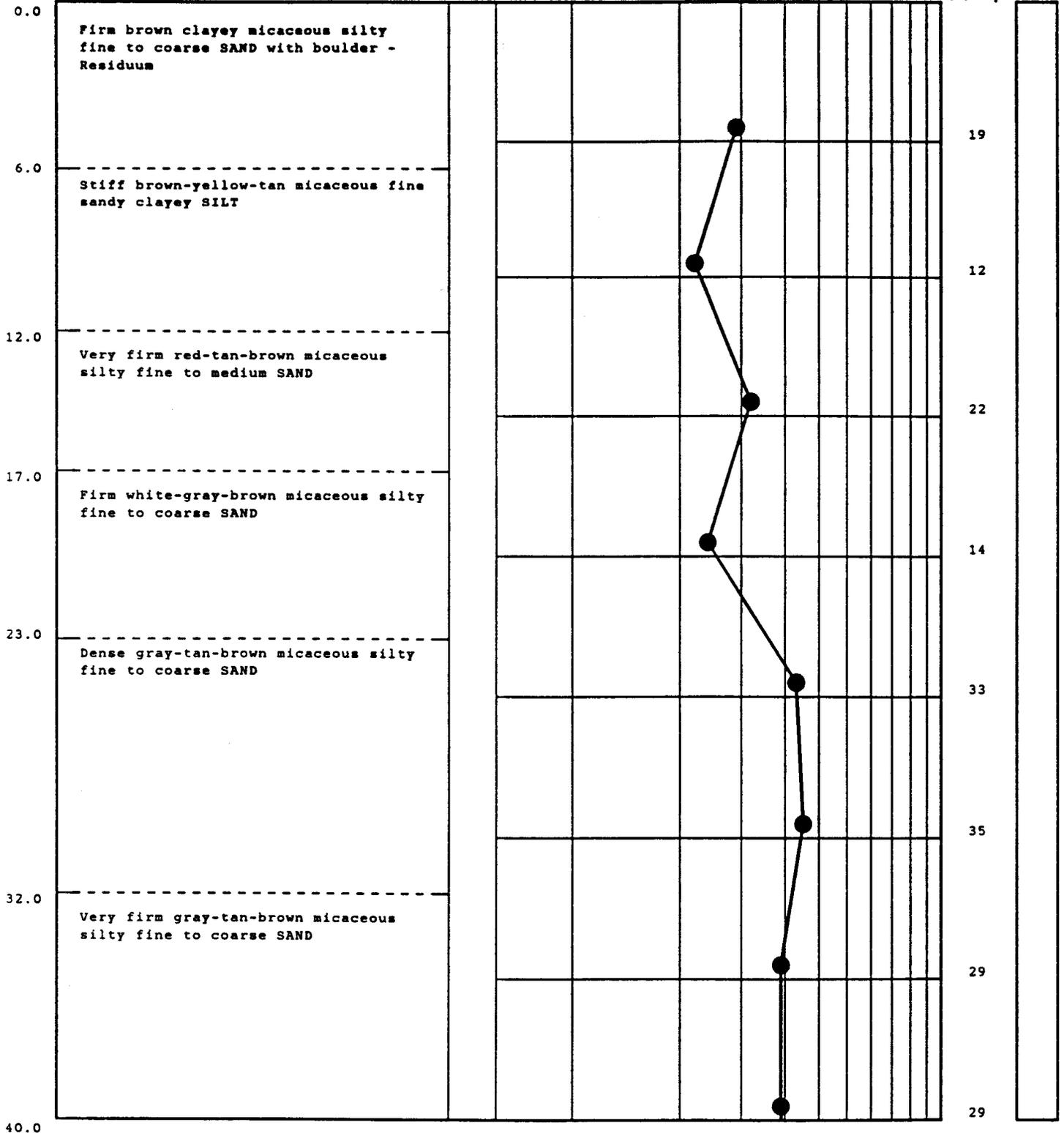
DEPTH  
(FT.)

DESCRIPTION

ELEVATION  
(FT.)

● PENETRATION - BLOWS/FOOT

0 10 20 30 40 60 80 100



TEST BORING RECORD

BORING NUMBER B-2  
 DATE DRILLED 10-24-88  
 PROJECT NUMBER AV-2066  
 PROJECT CHAMPION LANDFILL  
 PAGE 1 OF 2

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

▲ LAW ENGINEERING

DEPTH  
(FT.)

DESCRIPTION

ELEVATION  
(FT.)

● PENETRATION - BLOWS/FOOT

40.0

Very firm gray-tan-brown micaceous  
silty fine to coarse SAND

0 10 20 30 40 60 80 100

30

23

53.0

Very dense brown silty micaceous fine  
to medium SAND

73

60.0

Boring terminated at 60.0 feet  
Ground water encountered at 48.0 feet  
at time of boring  
Ground water encountered at 43.0 feet  
after 24 hours

78

TEST BORING RECORD

BORING NUMBER B-2  
DATE DRILLED 10-24-88  
PROJECT NUMBER AV-2066  
PROJECT CHAMPION LANDFILL  
PAGE 2 OF 2

SEE KEY SHEET FOR EXPLANATION OF  
SYMBOLS AND ABBREVIATIONS USED ABOVE

▲ LAW ENGINEERING





KEY TO CLASSIFICATIONS AND SYMBOLS

CORRELATION OF PENETRATION RESISTANCE WITH  
RELATIVE DENSITY AND CONSISTENCY

	<u>No. of Blows, N</u>	<u>Relative Density*</u>
Sands	0 - 4	Very Loose
	5 - 10	Loose
	11 - 20	Firm
	21 - 30	Very Firm
	31 - 50	Dense
	51+	Very Dense
		<u>Consistency*</u>
Silts and Clays	0 - 1	Very Soft
	2 - 4	Soft
	5 - 8	Firm
	9 - 15	Stiff
	16 - 30	Very Stiff
	31+	Hard

SYMBOLS

-  - Undisturbed Sample (UD) Recovered
- 50=2" - Number of Blows (50) to Drive the Spoon a Number of Inches (2)
- BQ,NX,NQ,NW - Core Barrel Sizes Which Obtain Cores 1-7/16, 2-1/8 Inches, 1-7/8 Inches, 2-1/16 Inches in Diameter, Respectively
- 65% - Percentage (65) of Rock Core Recovered (Compared to Cored Length)
- RQD - Rock Quality Designation - Percentage of Recovered Cored Length Consisting of Moderately Hard or Better Core Segments 4 or More Inches Long
-  - Water Table Approximately 24 Hours or More After Drilling
-  - Water Table Approximately at Time of Drilling (Within 1 Hour)
-  - Loss of Drilling Fluid

\*Terminology may be altered if presence of gravel, cobbles or boulders interferes with accurate measurement of standard penetration resistances



**APPENDIX G: BID DOCUMENTS AND SPECIFICATIONS  
FOR PREPARATION OF AREA C,  
LANDFILL NO. 6 (dated May, 1986)**

BID DOCUMENTS AND SPECIFICATIONS

FOR

PREPARATION OF AREA C  
LANDFILL NO. 6

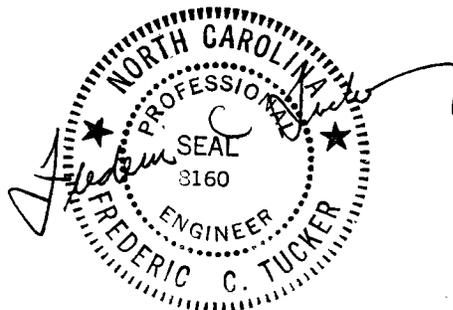
NEAR THE CHAMPION INTERNATIONAL MILL IN CANTON, NORTH CAROLINA

FOR

CHAMPION INTERNATIONAL

CANTON MILL

LAW ENGINEERING TESTING COMPANY  
CHARLOTTE, NORTH CAROLINA  
MAY, 1986



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### BID DOCUMENTS

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BID FORM  
STANDARD CONSTRUCTION TERMS AND CONDITIONS  
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APPENDIX

**CHAMPION INTERNATIONAL CORPORATION**  
**STANDARD CONSTRUCTION TERMS AND CONDITIONS**

The following terms and conditions are a part of our Purchase Order \_\_\_\_\_,  
and become effective and binding upon the parties hereto upon the acceptance of the  
purchase order by \_\_\_\_\_

\_\_\_\_\_

hereinafter referred to as the "Contractor". Champion International Corporation is  
hereinafter referred to as the "Owner".

1. **PERFORMING THE WORK** - Performing the work, hereinafter referred to as the "Work", shall include the furnishing of and paying for all labor, supervision, machinery, materials, tools, equipment, transportation, services, supplies and facilities, unless otherwise specified, necessary for and incidental to the completion of work in accordance with specifications and plans or drawings and as set forth in our Purchase Order. Time of performance by the Contractor is of the essence.
2. **CONTRACTOR STATUS AND DUTY** -
  - a) The Contractor is, and shall act in all respects as, an independent contractor and shall, subject to the limitations expressed herein, have exclusive control over the manner and method of performing the Work.
  - b) The Contractor represents that it is qualified and able to carry out and complete the Work, and agrees to perform the Work with due diligence and in a good and workmanlike manner.
  - c) The Contractor shall designate a competent superintendent or foreman for the Work who shall be fully authorized to act for it in all respects under this contract, and the person so designated shall not be changed for the duration of the Work except with written approval from the Owner.
  - d) Contractor and its employees and subcontractors and their employees shall comply with the rules and regulations of the Owner regarding their personal conduct on the premises of the Owner.
  - e) Contractor shall comply with all public laws, ordinances, regulations and requirements respecting the Work, obtain and pay for all required licenses and permits, and comply with regulations of any insurance company which issues a policy on any part of the Work or site. Contractor shall acquaint itself with limits of the property, including easements, if any, of Owner and shall not trespass on property of others.
3. **INSPECTION OF SITE AND DRAWINGS** - The Contractor shall be held to have examined the drawings and specifications and the work site in order to acquaint itself with the details of the work and with local conditions. It is understood the Contractor accepts conditions at the site on the date of this Contract and no allowances will be made after contract award for any claims for additional work which could have been determined by proper and careful examination of the drawing and specifications and of the work site.
4. **INSPECTION AND COORDINATION OF WORK** - It is understood and agreed by the Contractor that the Work will be subject to the coordination, scheduling and inspection by Owner's designated representative. Owner's representative shall at all times have complete access for the inspection of the Work and materials, machinery and equipment purchased by the Contractor for the Work. Notwithstanding each inspection, the Contractor shall be held responsible for the acceptability of the finished work.

5. **MATERIAL SUBSTITUTION** - Substitutions for the specified materials will not be allowed except on written approval of Owner based on a written proposal by the Contractor furnishing satisfactory evidence, including samples, where applicable, as to the kind and quality of the substitute material. The decision of Owner or its representatives as to the equality and acceptability of substitute articles or products will be final.
6. **QUALITY** - Unless otherwise provided in writing, all materials, machinery and equipment shall be new and of the most suitable for the intended purpose. Workmanship and materials shall be of the best quality.
7. **GUARANTEE**- The Contractor shall guarantee all workmanship and materials for a period of one year, or as otherwise specified in writing, from the date of written final acceptance of the Work by Owner. It is further agreed that such acceptance of the Work by Owner does not relieve the Contractor from the responsibility to correct faulty workmanship and/or to replace faulty materials at the Contractor's expense during the guarantee period.
8. **SUBCONTRACTING AND ASSIGNMENT** - This contract may not be assigned or encumbered, nor may the Contractor subcontract the Work, in whole or in part, without the prior written consent in each instance of the Owner. The Contractor shall bind each subcontractor to comply with all the terms and conditions of this contract, including the specifications and drawings. In the event the whole or any part of the work under this contract is subcontracted, Contractor shall remain liable for the performance of all of the Work as provided herein and shall not by approval of subcontracting the work, in whole or in part, be relieved in any way whatsoever of any liability or responsibility under this contract. Owner reserves the right to approve all Subcontractors who may be retained by the Contractor.
9. **TITLE TO MATERIALS AND EQUIPMENT** - The Owner shall have title to all work completed or in course of construction or installation, and shall also have title to all equipment, materials and supplies delivered to the premises, which are to become an integral part of the structure or systems, as well as such materials, etc., as may be considered for progress payments.
10. **INDEMNITY** - Contractor will indemnify and hold Owner, its officers, agents and employees, harmless against any and all suits, actions, damages, loss, liability, costs, penalties, expenses (including attorneys' fees) and compensation arising out of injuries (including death) and damages sustained by, or alleged to have been sustained by, any person or persons or any property, real or personal, which is, or is alleged to be occasioned in whole or in part by the acts or omissions of Contractor or any of Contractor's subcontractors, materialmen or anyone directly or indirectly employed by the Contractor or any of them while engaged in the performance of the Work.
11. **TERMINATION** - Should conditions arise which, in the Owner's opinion, make it advisable or necessary to discontinue work under the contract, the Owner may terminate this contract in whole or in part by giving two days written notice to the Contractor specifying the date and the extent to which the contract is terminated. In the event of such termination, the Contractor, not being in default, shall be paid in full for the work performed to date of cancellation, a pro rata portion of his profit and for the cost of the materials, machinery and equipment specifically purchased for the project work, but not installed.
12. **DEFAULT** - If the contractor becomes bankrupt or insolvent, commits an act of bankruptcy, takes advantage of bankruptcy, reorganization, composition or arrangement statute or defaults under the provisions of this contract, the owner may, in addition and without prejudice to any other rights or remedies provided by law, terminate the contract upon two days written notice to the Contractor, or his assignee or successor take possession of the premises and all materials, machinery and equipment thereon and finish the Work by whatever method Owner may deem expedient. If such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner.
13. **WAIVER OF DEFAULT** - Owner shall not be considered to have waived any of the terms and conditions of this contract unless evidenced by Owner's written waiver, and Owner's waiver of any one of the Contractor's defaults hereunder shall not be construed as a waiver of any subsequent default. Delay by the Owner in the enforcement of any remedy in the event of Contractor's default shall not be construed as a waiver of such default.

14. **PROTECTION OF WORK** - The Contractor, his employees, subcontractors, agents, etc. shall at all times until final acceptance protect the work from damage and during the course of the work protect all the Owner's products and equipment from dust, dirt, moisture and physical damage.
15. **SAFETY** - The Contractor shall comply with Champion's Safety Manual and all applicable provisions of Federal, State, and local safety laws, rules and regulations and shall take all necessary precautions for the safety of employees on the Work and to prevent accidents or injury to them or other persons on, about, or adjacent to the premises where the Work is being performed. It shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for the protection of workmen and the public and shall post danger signs warning against hazards including but not limited to protruding nails, hoists, well holes, hatchways, scaffolding, window openings, stairways and falling materials.
16. **CHANGES** - Owner without notice to sureties may increase, decrease or alter work to be done and materials to be furnished under the contract; provided, however, that the Contractor shall not be entitled to any additional payment for such additional work or materials, unless agreed to in writing by Owner, prior to the performance of such additional work or the furnishing of such additional materials, as the case may be. Contractor shall make no claim for additional work or materials or for additional time to perform such work or procure such materials unless so agreed to.
17. **PAYMENT OF BILLS** - Contractor shall promptly pay and discharge all liabilities to subcontractors and for labor and material employed in the performance of the Work hereunder, and agrees to furnish to Owner appropriate affidavits and documents, under the applicable Mechanics Lien Laws, evidencing the payment to or the waivers of subcontractors, laborers and materialmen.
18. **LIENS** - Contractor hereby waives all vendor's and mechanic's lien rights which may be provided by the law of the place of the work and will immediately take appropriate action to secure the removal of any lien or encumbrance upon the property or premises of Owner which is, or is alleged to be, caused by any act or omission of Contractor, any of Contractor's subcontractors or materialmen, or anyone directly or indirectly employed by them or any of them and will defend against any such lien or encumbrance, and will indemnify and hold Owner harmless from any losses, costs and expenses, including attorneys' fees resulting from the filing or assertion of any such lien or encumbrance.
19. **ROYALTIES AND PATENTS** - Contractor will indemnify and hold Owner harmless against any and all demands and claims on account of infringements or alleged infringements of patented or allegedly patented articles or inventions used on or for the Work or specified or called for in any construction drawings and will, at its own cost and expense, defend any and all suits which may be brought against Contractor or Owner on account of such infringements or alleged infringements and pay any and all expenses (including attorneys' fees), costs and damages resulting therefrom. Contractor shall not, however, assume any liability for patent infringements with respect to any article or invention which is specifically required to be used by the Owner's instruction, unless Contractor has knowledge of the infringing nature of such use.
20. **INSURANCE** - The Contractor shall provide and maintain in force throughout the term of the contract, insurance of the types and with minimum limits of not less than indicated below:

**STATUTORY**

- |  |   |
|--|---|
| A) Workers' Compensation & Employers Liability | \$500,000   |
| B) Comprehensive General Liability             |   |
| 1) Bodily Injury                               | \$300,000 Each Occurrence<br>\$300,000 Annual Aggregate |
| 2) Property Damage                             | \$100,000 Each Occurrence<br>\$100,000 Annual Aggregate |

3) Contractor shall provide the Certificate of Insurance that indicates the Comprehensive General Liability provides coverage for:

- a) Premises/Operations Liability
- b) Owners & Contractors Protective Liability
- c) Products/Completed Operations Liability
- d) Blanket Contractual Liability
- e) Explosion, Collapse & Underground Property Damage Liability (at the discretion of the Owner)

C) Comprehensive Automobile Liability

- |                    |  |
|--------------------|--|
|                    | <b>STATUTORY</b>                                   |
| 1) Bodily Injury   | \$100,000 Each Person<br>\$300,000 Each Occurrence |
| 2) Property Damage | \$100,000 Each Occurrence                          |

3) Contractor shall provide the Certificate of Insurance that indicates the Comprehensive Automobile Liability provides coverage for all owned, non-owned and hired automobiles.

D) Architects or Engineers Professional Liability

(Applicable only when this contract requires engineering work.)

- |                                 |           |
|---------------------------------|-----------|
| 1) Limit of Liability Per Claim | \$300,000 |
| 2) Aggregate Amount Payable     | \$300,000 |

All of the above described insurance to be maintained by the Contractor shall be obtained from an insurance carrier or carriers satisfactory to the owner.

Certificates of such insurance shall be filed with the Owner prior to commencing any part of the work.

Such Certificates shall provide that the insurance is not subject to change or cancellation until 20 days after written notice of such proposed action has been given to the Owner.

21. **TAXES** - All sales, use, consumer and similar taxes, duties and tariffs imposed by Federal, state or local laws and all assessments or charges for social security, medical, retirement, or unemployment benefits imposed by applicable law shall be paid by the Contractor. Such taxes, assessments and charges constitute a part of the cost of the Work for which the Contractor is compensated.
22. **BONDS** - If required by the Owner, the Contractor shall furnish such financial data as is required to secure a performance and payment bond under Owner's bonding agreement in form and amount and with such surety or sureties as shall be approved by the Owner. Such bond shall be for the full amount of the contract at all times.
23. **COOPERATION** - The Contractor shall prosecute the Work in such manner as to permit maintenance of plant traffic and manufacturing operations as near normal as possible. Also, the Contractor shall assist in keeping walks, roadways, and railroad sidings clear and unobstructed and shall cooperate with, and shall not in any way interfere with the operations of, other contractors and the Owner.
24. **SITE CLEANLINESS** - During the performing of the Work, the Contractor shall not unnecessarily encumber the premises with materials and equipment and shall maintain the work area in a clean and orderly condition. Upon completion of the Work, Contractor shall remove all scaffolds, construction tools and equipment, excess and unused construction materials, as well as rubbish, and leave the premises in a clean and satisfactory condition.
25. **BENEFIT** - The terms and provisions of the contract shall inure to the benefit of and be binding upon the Owner and Contractor, their respective heirs, executors, administrators, successors and assigns including without limitation those arising from merger, consolidation, sales of assets or otherwise.

26. **PAYMENTS WITHHELD** - The Owner may withhold payment to such extent as may be necessary to protect the Owner from loss on account of:
- (a) Defective or damaged work not remedied by the Contractor.
  - (b) Claims filed or reasonable evidence indicating the probable filing of claims.
  - (c) Failure of the Contractor to make payments properly to subcontractors or materialmen for labor, materials or equipment.
  - (d) Damage to another contractor, the Owner, one of its officers, agents or employees, or the public.
  - (e) Unsatisfactory prosecution of the Work by the Contractor.
  - (f) Reasonable doubt that the Work can be completed within the contract time.
  - (g) Reasonable doubt that the Work can be completed for the unpaid balance of the contract sum.

When the above grounds are removed, payment will be made for amounts withheld because of them.

27. **GENERAL** - The provisions on the face of the purchase order to which the terms and conditions are attached and the provisions of the drawing and specifications shall prevail over any conflicting provisions hereof and the provisions hereof shall prevail over any conflicting provisions on the reverse side of the purchase order.
28. **VERBAL AGREEMENTS** - No verbal agreement nor any conversation with any officer, agent or employee of the Owner, either before or after the execution of this Contract, shall affect or modify any of the terms of this Contract and related contract documents or the obligations created thereby.
29. **Safety & Housekeeping** - per the attached page.
30. **Lockout Procedure** - per the attached page.

## SAFETY & HOUSEKEEPING RULES.

WHILE AT CHAMPION WE KNOW THAT YOU WILL WANT TO OBSERVE ALL OUR SAFETY AND HOUSEKEEPING RULES. THESE RULES ARE INTENDED TO EMPHASIZE AND SERVE AS A REMINDER OF SOME OF OUR MORE IMPORTANT REQUIREMENTS TO INCLUDE, BUT NOT LIMITED TO THE FOLLOWING:

1. Smoking is prohibited except in certain designated areas.
2. The use of or possession of, or under the influence of intoxicating liquors and illegal drugs on Company premises is absolutely prohibited.
3. Visitors are not permitted in the plant without express authority of Management.
4. Contractors must obtain permit and fire watchers before doing any welding, cutting or use of open flame.
5. Should it be necessary for Contract personnel to enter a vessel or confined area, the Canton Mill Vessel Entry Procedure will be followed. This procedure can be obtained from the Mill Contractor Coordinator.
6. No machines or vehicles are to be started until the operator is certain that no one is in a position to be injured by such act.
7. No production equipment is to be started or stopped without the express approval of production department supervision.
8. Contractors must follow Lock-Out Procedure. (See attached.)
9. Excavations, floor openings and the like must be effectively barricaded as required by OSHA specifications.
10. Be sure all scaffolds and working platforms are constructed according to OSHA specifications.
11. No metal portable ladders are acceptable for your safety. Ladders needing repair will be tagged unsafe and will be taken out of service until proper repairs have been made.
12. When material is being raised, lowered or dropped from above, the area beneath must be effectively barricaded or someone stationed below to warn passers-by away from the area.
13. Your job is not complete until all unused or scrap materials have been removed and the entire area policed.
14. Contract personnel must wear appropriate personal protective equipment such as head protection, eye protection, hearing protection, respiratory protection, as required by OSHA specifications.
15. Contract personnel must enter and leave the plant area through designated gates at all times. Any and all personnel changes must be brought to the attention of the gate guard immediately so that pass authorization may be kept current.
16. Only vehicles necessary to the performance of the job will be permitted within the plant area. Under no circumstances will vehicles be allowed to block alleys, roadways, and railroad tracks.
17. Drinking water must come from drinking fountains only. If drinking water barrels are used they must be filled from city water lines only.

QUESTIONS REGARDING ANY OF THESE REQUIREMENTS SHOULD BE REFERRED TO THE SAFETY SECTION OFFI

## LOCKOUT PROCEDURE

All contractors performing work on company premises will follow a lockout procedure that is as effective as the Canton Mill Lockout Procedure. All locks and lockout devices, such as chains and adaptors used by contractors will be furnished by the contractor. Under no circumstances will a contractor "borrow" a lock assigned to a Canton Mill employee.

In the event that a lock has to be removed in an emergency condition, such as an employee of a contractor leaving the Mill with his lock on a piece of equipment that is essential to safety or Mill operation, the contractor's superintendent and the project coordinator will make the decision to remove the lock. If the contractor's superintendent or the project coordinator can not be reached, the Canton Mill Emergency Lock Removal Procedure (Page 6, Sec. I of the Lockout Manual) will be followed with the exception that the lock will be cut off because no key will be available to company personnel. The company will not be held responsible for cost of a contractor's lock when required to follow this procedure.

In certain situations not covered by established procedures, common sense and good safety practices should be used. The entire purpose of the Lockout program is to provide a safer working environment for both Champion and contractors' employees.

SPECIFICATIONS  
FOR PREPARATION OF AREA C  
LANDFILL NO. 6  
NEAR THE CHAMPION INTERNATIONAL MILL IN CANTON, NORTH CAROLINA  
FOR CHAMPION INTERNATIONAL, CANTON MILL

1. GENERAL

1.1 DEFINITIONS

The words and terms used in the Contract and Specifications will have the meanings given below:

- Owner:** Champion International Corporation, Canton Mill or its authorized representatives.
- Engineer:** Champion International, Canton Mill Engineering Department, acting directly through a designated engineer in its employ. The Engineer will provide direction in project matters related to the Owner's interests.
- Soils Engineer:** Law Engineering Testing Company, acting directly through a registered professional engineer in its employ, or through any assistant having the particular duties entrusted to him. The Soils Engineer is employed by the Owner for the purpose of monitoring construction of the improvements described in these specifications and for the purpose of providing technical guidance in soils and soils-related matters.
- Inspector:** Law Engineering Testing Company, acting directly through its technician(s), approved by the Owner, to inspect the Contractor's work and materials and to perform certain quality control tests.
- Contractor:** The person, persons, partnership, company or corporation entering into the Contract for the performance of the required work. No part of this work may be subcontracted without the written permission of the Owner. The Contractor shall be an independent contractor.
- Contract:** All of the covenants, terms and stipulations contained in the Bid Documents, Proposal, Specifications, Drawings, Bond and Agreement.
- Specifications:** All of the terms and stipulations contained (1) in the provisions described in Sections 1 through 15 (2) in the addenda and revisions which may be made in them, and (3) in all written agreements, made or to be made, pertaining to the method and manner of performing the work or to the quality and quantity of the material to be furnished.

Drawings: All of the drawings attached to the Contract, and those supplementary or additional drawings which the Engineer may issue to clarify or further detail the contract drawings or work.

Proposal: The Contractor's offer to do the specified work at certain stipulated prices or costs.

1.2 LOCATION OF WORK

The work as specified is for preparation of Area C (and associated roads) at the Champion International Landfill No. 6, located south of Interstate Highway I-40 and off Secondary Road S.R. 1550 (Thickety Road) and on the north side of the Pigeon River in Haywood County, North Carolina approximately 2 miles northwest of Canton, North Carolina.

1.3 SCOPE OF WORK

The work to be performed by the Contractor shall consist of furnishing all labor, materials, equipment, tools, supplies, transportation and all other goods and services required for the preparation of Area C and other development as indicated on the Contract Drawings at the Champion International Landfill No. 6 for the Champion International Canton Mill.

The Contract work includes the following principal features:

- Clearing, Grubbing and Stripping
- Undercutting and Unclassified Excavation
- Compacted Earth Fill Dike Construction
- Riprap and Filter Bedding Construction
- Leachate Drainage System Construction
- Uncontaminated Surface Drainage System Construction
- Surfacing Roadways
- Grassing

These principal work features are a general outline and do not in any way limit the responsibility of the Contractor to perform all work required by the specifications.

1.4 (Not Used)

1.5 CONTRACTOR'S ADMINISTRATION OF OWN FORCES

The Contractor shall place a competent and reliable superintendent in charge of the work to be done, who shall have the authority to act for the Contractor and who shall be accountable to the Engineer. The Contractor shall at all times employ labor and equipment which shall be sufficient to prosecute the several classes of work to full completion in the manner and times specified.

All workmen engaged on special or skilled work shall have had sufficient experience in such work to properly and satisfactorily perform it and operate the equipment involved.

Whenever the Contractor or his superintendent is not present on any part of the work where it may be desired to give directions, the Contractor shall designate a responsible supervisory employee to receive and execute such orders as the Engineer or his representative may give.

#### 1.6 CONSTRUCTION PROGRAM AND PROGRESS REPORTING

Prior to commencement of Contract work a complete construction schedule shall be established by the Contractor. This schedule shall show the proposed program of operations. This construction program shall provide for orderly performance of work in accordance with the specific requirements stated in these specifications. The construction program shall be in such form and such detail as to show the sequence of operations, the period of time required for completion of the work, the dates on which the Contractor will start the several salient features and the contemplated dates of completing same. If found satisfactory, the Engineer will approve, and the work will be performed in accordance with such program or approved amendment thereto.

The Contractor shall maintain current progress records which show the percentage of work scheduled for completion at any time and the actual percentage of work completed. The Contractor shall immediately submit 4 copies of the progress reports to the Engineer at the end of each month or at such intervals as directed by the Engineer.

#### 1.7 ACCIDENT AND ACCIDENT PREVENTION

The Contractor shall at all times exercise reasonable precautions for the safety of persons engaged in any sort of work or business on the jobsite.

The Contractor's safety program shall be subject to the periodic review of the Engineer. The wearing of hard hats by all persons in areas where work is in progress is to be mandatory. The Contractor shall be responsible for and shall enforce the wearing of such hats by all his personnel.

The Contractor shall comply with the latest State and Federal laws governing safety and health regulations, including the Occupational Safety and Health Act, at all times. The Owner will deduct from payments to the Contractor any fines or penalties imposed on the Owner for which the Contractor is responsible by failure to adhere to such regulations.

All accidents involving injury to persons on the jobsite or damage to property or equipment shall be reported immediately to the Engineer.

#### 1.8 SAFETY OF THE PUBLIC

The Contractor shall provide, erect and maintain any necessary barricades, danger signals, signs and take all necessary precautions for the protection of the work and safety of the public.

1.9 PROPERTY USE AND DAMAGE

The property on which the project is to be built is the property of the Owner. All of the Contractor's operations on the Owner's premises, including the storage of materials, shall be confined to areas authorized by the Engineer.

The Contractor's personnel shall abide by the Owner's regulations concerning entry into and exit from the project.

The Contractor shall be responsible for all damages to adjoining private or public property growing out of his operations, and shall hold the Owner free from all claims or suits due to any such damage. The Contractor shall take every precaution to avoid entering upon lands adjoining those of the Owner. Any agreement, verbal or written, between Contractor and any adjoining property owner affecting this contract must have written approval of the Engineer.

The Contractor shall be responsible for all damages to facilities of the Owner due to negligence or carelessness on the part of the Contractor. The Owner will deduct any costs incurred due to such damages from payments to the Contractor. The Owner shall not be liable for loss or damage of Contractor's tools, equipment or materials due to theft, pilferage, vandalism or any other cause whatsoever.

1.10 UTILITY SERVICES

The Contractor shall make all arrangements and payments necessary for the securing and use of any utility required for execution of the Contract provisions, such as water, fuels, electric power, telephones, and other similar or related items.

1.11 SUBSURFACE DATA

The Soils Engineer has performed a subsurface investigation program for the project. A copy of the Report of Subsurface Investigation and Engineering Recommendations by the Soils Engineer is included as part of the Bid Documents and a copy will be kept at the project during construction and will be available for inspection by the Contractor. The subsurface data, in any form and wherever shown, are not intended as a representation by the Owner or warranty by the Soils Engineer, but are furnished for information only. It is expressly understood that the Owner will not be responsible for the accuracy of the subsurface data, nor for any deduction, interpretation, or conclusion drawn therefrom by the Contractor. The Test Boring Records represent the Soils Engineer's interpretation of the field logs based on examination of the field samples. The lines designating the interfaces between various strata represent approximate boundaries and the transition between strata may be gradual. The Soils Engineer does not guarantee that materials other than those disclosed by the borings will not be encountered or that the proportions and character of the various materials between the borings will not vary from those indicated on the Test Boring Records.

1.12 SPECIFICATIONS AND DRAWINGS

The Specifications and Drawings form integral parts of the Contract. They show, explain, or indicate the work to be accomplished and the materials to be used. Any material or work shown or mentioned in either the Specifications or Drawings, and not specifically shown or mentioned in the other, shall be furnished or carried out by the Contractor as if shown or mentioned in both.

Should disputes arise with respect to the Specifications or Drawings, or should discrepancies be found between them, or should any part of either or both appear to be obscure or unclear, or should there be questions relative to implications beyond specific descriptions, the Engineer's explanation or decision shall be final and binding.

1.13 WORKMANSHIP AND MATERIALS

All workmanship and materials of any kind or for any purpose, shall be approved quality throughout and satisfactory to the Engineer.

If any part of the work is damaged in any manner, except through the fault of the Owner, or if defects not readily detected by inspection should develop prior to final completion and acceptance of the contract work, the Contractor shall remedy such damage or defects in a manner satisfactory to the Engineer. Such work shall be done at the expense of the Contractor.

Any material that is deposited at any location other than the place designated or approved by the Engineer will not be paid for, and the Contractor may be required to remove such material and waste it or redeposit it as directed.

1.14 DELAYS AND DIFFICULTIES

The Owner will not be responsible for any damages, hindrances, or delays arising from rain, any sort of adverse weather or from similar contingencies. The Contractor shall bear the expense caused by such circumstances and shall be fully prepared to plan and perform work required with prudent regard for delays and difficulties which may be normally encountered.

Other delays and hindrances for which he is not responsible may entitle the Contractor to a contract-time extension, the length of which will be determined by the Engineer. Requests for time extension arising from such circumstances shall be made in writing and submitted to the Engineer within 14 days of requirements for such extensions. Such requests shall outline the cause and character of the delays or hindrances involved.

1.15 TIME OF COMPLETION AND LIQUIDATED DAMAGES

If all of the work or any portion thereof is not completed by the date inserted by the Contractor on the Bid Form, or any extension thereof, damage will be sustained by the Owner and it will be difficult to determine the actual damage

which the Owner will sustain by reason of such delay. Therefore the Contractor shall pay to the Owner, as liquidated damages, the amount specified herein for each day's delay in completing the work or any portion thereof beyond the time specified on the Bid Form by the Contractor, or any extension thereof. The Owner may deduct any amount of such liquidated damages from any money due or that may become due the Contractor under the Contract. If the Engineer is responsible for any portion of a delay in completing the work or any portion thereof beyond the time specified therefor, extension of time and adjustments in compensation will be made to the extent provided in Section 1.14, and the Contractor shall pay liquidated damages to the Owner for the remaining portion of the delay in accordance with the foregoing provisions.

Pursuant to the provisions herein, the Contractor shall complete the work by the date specified by him on the Bid Form.

Liquidated damages for failure to complete the portion of the work as described above within the time specified shall be \$500.00 per calendar day. (The Contractor is reminded that the date he specifies forms a part of his bid and will have a value to be determined by the Owner during bid selection.)

#### 1.16 LINES AND GRADES

The Engineer will establish baselines and benchmarks pertinent to the work. The Contractor will furnish or indicate location and limit marks necessary for construction of the project. All such marks and stakes shall be carefully preserved by the Contractor, and he shall be responsible for the proper building of the work to those lines and grades.

#### 1.17 MEASUREMENTS FOR PAYMENT

The Engineer will perform all necessary surveys and computations for measurement of quantities of materials to be used as a basis for payment. The Contractor or his designee may be present when final cross-sections are taken and computations are performed. The Contractor may inspect previously taken cross-sections by appointment. Field books will be retained by the Engineer.

Field surveys will utilize methods normally employed to obtain horizontal and vertical measurements. Volumes of materials will be determined using average-end-area methods if applicable.

Monthly payments to the Contractor will be based on estimates as agreed upon by the Contractor and Engineer. Weight scales used by the Contractor as a basis of payment for truck weight tickets shall be calibrated to the satisfaction of the Engineer. The Engineer shall be allowed to check the calibration of such scales at any time and may refuse payment for weight tickets which have serious errors. Weight tickets will be presented to the Owner's representative at time of delivery.

#### 1.18 EXTRA WORK

If the Contractor claims additional cost because of any additional or changed contract work, and requests extra compensation therefor, he shall give the

Engineer advance written notice of such cost, submitting a complete and detailed estimate thereof. Before starting such extra work, he shall secure a written order from the Owner covering such additions or changes. All claims not so established will be void. All extra-work cost estimates submitted for extra compensation shall be made on the basis of the unit prices named in the contract price schedule or, if not included in the unit cash bid, as mutually agreed upon.

1.19 CLEANING UP

The Contractor shall keep the work and grounds free from rubbish and waste material during the progress of the work. Immediately upon completion of the project, and before final payment is made, the Contractor shall remove all rubbish, temporary structures, equipment, and excess materials and shall leave the work and premises in a neat and orderly condition acceptable to the Engineer.

1.20 SAMPLING AND TESTING

The Inspector will monitor the quality of earthwork operations for work performed within the scope of these specifications with a program of inspection, sampling, and testing to verify conformance with provisions of the specifications and determine other engineering characteristics for the Owner's design requirements. This program will include monitoring for density, moisture content, shear strength, particle gradation, Atterberg Limits and other material properties as may be required by the Soils Engineer.

1.21 DETAILED PROVISIONS AND SCHEDULE OF DRAWINGS

Detailed provisions are stated in Sections 2 through 15. These sections describe, outline and stipulate: the scope of work to be performed, the quality of materials and workmanship required and the basis for payment. The work to be accomplished is illustrated on the Drawings listed in the following schedule.

SCHEDULE OF DRAWINGS

<u>Drawing No.</u>	<u>Title</u>
1	Location Plan
2	Erosion/Sediment Control Measures
3	Landfill Operation and Leachate Control Measures
4	Plan of Final Contours and Permanent Surface Drainage Control Measures
5	Layout and Grading Plan
6	Profiles
7	Profiles and Section
8	Sections
9	Details

## 2. CLEARING

### 2.1 SCOPE OF WORK

This item refers to the felling, cutting and removal of standing timber, underbrush, fallen trees, debris and other obstructions. Areas to be cleared include:

- a. All areas designated for excavation or filling on the applicable Drawings, and a strip 15 feet wide adjacent to the toe of dike and roadway fill.
- b. The entire area of Area C at Landfill No. 6.
- c. All borrow areas and spoil areas required during the course of the work.
- d. Corridors for equipment passage as mutually agreed upon by the Contractor and Engineer and other areas so agreed upon.

Areas not included in the above, which are not otherwise required for the prosecution of the work, shall be maintained in their undisturbed state. The Engineer and Contractor will agree on a convenient marking system for these areas prior to beginning of clearing operations. (NOTE: Most of Contract area is pasture and will require very minimal tree clearing; see Drawing Nos. 1 and 5 for indicated areas of woods at time of site N.C.D.O.T. Topographic Survey was updated by Hampton, Hintz & Associates in 1983.)

### 2.2 SPECIFICATION

That portion of salable timber and pulpwood, if any after the Owner's timber removal operations, shall be cut and stockpiled as directed by the Engineer and will remain the property of the Owner. Other trees and underbrush shall be cleared, in so far as possible, by bulldozers or other equipment. In other areas clearing may be accomplished by hand cutting.

Vegetation material derived from clearing shall be piled and burned, if permitted by local and state ordinances. The Contractor shall be responsible for all burning operations which he initiates and shall obtain any applicable permits for the same.

Vegetation material not permissible to burn or materials remaining after burning shall be buried in areas designated by the Engineer. Such material shall be covered with not less than two feet of earth compacted by equipment used for placing the cover.

2.3

MEASUREMENT AND PAYMENT

The quantity of clearing of vegetation will be determined by measuring horizontally the areas in which clearing is actually performed.

Payment for Clearing will be made at the contract price per acre.

### 3. GRUBBING

#### 3.1 SCOPE OF WORK

This item refers to the uprooting, dislodging and disposal of stumps, roots larger than one inch in diameter, matted roots and similar material. Loose stone more than 12 inches in maximum dimension dislodged by clearing operations or occurring naturally shall also be included for disposal under this item. Areas to be grubbed shall include the areas, except spoil areas, designated for Clearing as outlined in Section 2.1 and any other areas designated by the Engineer.

#### 3.2 SPECIFICATION

Grubbing shall uproot or dislodge all stumps, roots larger than one inch in diameter, matted roots and similar material. This material shall be piled in small piles and burned if permitted by local and state ordinances. Materials not permissible to burn or materials remaining after burning and loose stone shall be buried in areas as designated by the Engineer. Material shall be covered with not less than two feet of earth. Grubbing operations shall be staged, insofar as practical, to immediately precede the stripping or excavation operations.

#### 3.3 MEASUREMENT AND PAYMENT

The quantity of grubbing will be determined by measuring horizontally areas in which grubbing is actually performed.

Payment for Grubbing will be made at the contract price per acre.

## 4. STRIPPING

### 4.1 SCOPE OF WORK

This item refers to the stripping of, and the disposal of stripped materials from, the following areas:

- a. All areas designated for excavation, earth fill foundation areas and a strip 10 feet wide contiguous to all sides of the earth fill foundation areas.
- b. The entire area of Area C at Landfill No. 6.
- c. All borrow areas required during the course of the work.
- d. Any other areas designated by the Engineer.

### 4.2 SPECIFICATION

In areas to be stripped, all materials shall be removed to a depth necessary to eliminate topsoil and other soils containing more than 5 percent by weight fibrous organic matter, rubbish, vegetable matter, roots, small stones and all other perishable or objectionable matter. The minimum stripping depth shall be 6 inches. Any depth below this minimum depth will be determined by the Soils Engineer. Stripped material shall be placed in disposal areas for spoil materials as designated by the Engineer.

### 4.3 MEASUREMENT AND PAYMENT

Measurement of stripping will be the volume between the original ground surface and the final stripped surface as determined by two surveys. Computation of quantities between surveys will be made as described in Section 1.17. At the option of the Engineer, the volume of stripping may be based on an average of stripping mutually agreed to in writing by the Engineer and Contractor for each particular area.

Payment for stripping will include excavation, hauling and placement of the materials in designated disposal areas on the site. Payment for Stripping will be made at the contract price per cubic yard.

## 5. UNDERCUTTING

### 5.1 SCOPE OF WORK

This item refers to excavation and disposal of unsuitable materials that are not included in the Clearing, Grubbing or Stripping Sections specified herein. The undercut areas will be within the earth fill foundation area, an area 10 ft beyond the foundation area and any other area designated by the Soils Engineer. This item also includes any necessary dewatering required for proper placement of compacted earth fill in the undercut excavations. (NOTE: Areas that may require undercutting include the dike and roadway fill toe locations adjacent to the Pigeon River and next to or over creeks and natural drainage swales. The materials requiring undercutting will be soft or compressible alluvial soils, or old spoil materials or other materials judged to be unsuitable by the Soils Engineer.)

### 5.2 SPECIFICATION

The Contractor shall excavate, haul, and dispose of materials determined unsuitable by the Soils Engineer from a depth of 12 inches below the existing ground surface within the earth fill foundation area, the area 10 ft beyond the foundation area and any other area designated by the Soils Engineer. (Depths of removal 12 inches or less in areas designated above shall be considered stripping.) The lateral extent and required depth of undercutting will be determined by the Soils Engineer or the Inspector.

The Contractor shall dewater the area of undercutting to a depth of at least 2 ft below the bottom of the excavation and shall maintain the dewatered condition until compacted earth fill is placed to at least 3 ft above the original water level or to original ground level, whichever is higher.

The excavated material shall be disposed of as directed by the Engineer.

### 5.3 MEASUREMENT AND PAYMENT

The quantity of undercutting will be based upon the volume between the stripped surface and the undercut surface as determined by surveys after completion of the undercutting and before placement of the earth fill. In the case of small volume areas of undercutting, it will be acceptable to measure the pile of disposed material or use an average depth times area volume computation, if both the Contractor and Owner agree prior to measurement. Both the Contractor and Owner should be represented when average depth measurements are made.

Payment will be made at the contract price per cubic yard for Undercutting. This price will cover the excavation, hauling, and disposal of the undercut material and any dewatering associated with the undercutting.

## 6. UNCLASSIFIED EXCAVATION

### 6.1 SCOPE OF WORK

This item refers to excavation not defined, included or specified elsewhere in these Specifications and that is not defined, included or specified in an addendum to these Specifications.

### 6.2 SPECIFICATION

The Contractor shall by whatever means excavate, haul and dispose of material designated as unclassified excavation. The depths and limits of unclassified excavation and disposal area will be determined by the Engineer.

### 6.3 MEASUREMENT AND PAYMENT

Measuring methods will be those which the Engineer considers most suitable to the conditions, but measurement will be made of excavation only.

Payment will be made at the contract price per cubic yard for Unclassified Excavation.

## 7. COMPACTED EARTH FILL

### 7.1 SCOPE OF WORK

This item refers to (a) preparation of foundation for the earth fill including any drainage or dewatering that may be required to control surface water and high ground water in the dike and roadway fill foundation areas, but excluding any dewatering of undercut excavations (dewatering of undercut excavations is included in Section 5.); (b) excavation and haulage of material to the fill and final slope dressing in the borrow areas, including grading of permanent access roads and drainage ditches; (c) construction of the compacted fill including placement, spreading, watering and compaction, and any other work required such as scarifying of hardened layers and equipment ruts, slope dressing and building of haul roads and access roads not shown on the Drawings as permanent features; (d) any other work necessary to the proper construction and completion of the earth fill.

### 7.2 SPECIFICATION

#### 7.2.1 Lines, Grades, and Cross Sections

The earth fill shall be constructed to the elevations, lines, grades, and cross sections indicated on the Contract Drawings or revisions thereto. Increased heights and widths may be required to compensate for later shrinkage and settlement. Such overbuild requirement shall be as indicated on the Drawings or as directed by the Engineer.

The Owner reserves the right to vary the foundation widths and the fill slopes, and to make other changes in the sections of the compacted fill. Changes in lines and grades which result in changed material quantities will not be cause for revision of unit prices.

Excepting material which the grading equipment cannot remove, excavation shall be to the elevations and lines shown on the Drawings, or as specified by the Engineer.

#### 7.2.2 Origin of Fill Material

Materials for the earth fill shall be obtained from areas of excavation to reach final grades as shown on the Drawings. If the area of excavation is insufficient in quantity, the Engineer will designate an alternate borrow area. The Contractor shall excavate from borrow pits either inside or outside the landfill area, whenever the Soils Engineer decides that such special sequence is necessary to obtain the required type of material. Materials from two or more borrow pits may be required at the same part of the earth fill, and material from one pit or from any part of any pit, may be specified for use in different parts of the fill. If necessary, mixing of materials shall be accomplished in the process of excavation, dumping, and spreading. No separate payment will be made for the work in this paragraph, as the entire cost thereof shall be included in the contract price per cubic yard for Compacted Earth Fill.

### 7.2.3 Materials Excluded From The Fill

The following shall not be placed in the fill: logs, brush, roots larger than one inch diameter, sod, perishable materials, stones greater than 6 inches in maximum dimension, snow, ice, frozen earth, or any other materials which are disapproved by the Soils Engineer or Inspector. Fill shall not be placed upon a frozen surface.

The Contractor shall excavate and remove from the fill, after its placement therein, any material which the Soils Engineer or Inspector considers unsuitable. Such unsuitable material shall be placed in a spoil area designated by the Engineer.

### 7.2.4 Drainage and Preparation of Fill Foundation

Drainage of the dike foundation area shall be provided by the Contractor. The contractor shall install such ditches, trenches, pits or sumps as may be required to control both surface water and high ground water. Ground water shall be maintained at least 2 ft below the stripped foundation surface or undercut surface until the compacted earth fill dike is constructed to a height of at least 3 ft above the original water level, to original ground level, or until such time as determined by the Soils Engineer.

After establishing drainage and after stripping of foundation and removal of weak or unsuitable materials has been completed, and before start of material placement, clean soil shall be used to fill all test pits, stump holes, minor excavations and depressions or cavities inside the earth fill limits. These fillings shall be placed in layers over areas of practical size, and shall be moistened or dried to obtain the moisture requirements of the fill. In small areas where roller equipment cannot be employed, material shall be compacted by hand tampers. Layer thickness, moisture content and compaction requirements are detailed below.

After the filling of depressions and prior to the placement of compacted fill, the earth fill foundation shall be proofrolled to detect any soft surface zones. Proofrolling shall be done with a 50-ton rubber-tired roller or a fully loaded 20 yard pan. A total of four passes of the roller or pan shall be made over each spot of the foundation, two in mutually perpendicular directions. Areas that continue to deflect more than two inches after two or three repeated passes of the roller or pan shall be excavated and replaced with fill. Proofrolling shall not be undertaken on areas of the foundation saturated due to the presence of the water table or other critical areas if, in the opinion of the Soils Engineer, such proofrolling will cause deterioration of the foundation. In lieu of such proofrolling, visual inspection of the foundation, supplemented by dynamic cone penetrometer tests, standard penetration tests, auger borings, or such other means as the Soils Engineer may employ will be used to ascertain the presence of an acceptable foundation.

After acceptance of the foundation, the entire surface shall be thoroughly loosened to a depth of three to six inches by scarifying, plowing, disc harrowing or other approved method. After scarifying, the loosened area shall

be covered by a layer of fill material having proper moisture content and being placed to a depth of not more than six inches loose measurement. The scarified and deposited soils shall then be thoroughly mixed with a disc harrow or other approved equipment. The area so treated shall then be compacted to the density specified for Compaction of Fill Material.

No separate payment will be made for any of the above processes, as the entire costs thereof shall be included in the contract unit price for Compacted Earth Fill.

#### 7.2.5 Placement of Fill Material

Placement of a bonding layer shall, except for its thickness, be in accord with the provisions of this section. Materials shall, as far as practicable, be spread during dumping. Further spreading shall be accomplished by bulldozers or graders or other approved means. Layers shall be approximately horizontal with the thickness of each not greater than 9 inches, loose measure. Harrowing of the layer may be required to break up and blend the fill materials, or to obtain uniform moisture conditions.

The distribution and gradation of materials shall be such that there will be no lumps, pockets or layers of material differing substantially in texture and gradation from surrounding materials. Small stones and gravel shall not be allowed to accumulate at any point. Rock fragments larger than 6 inches in size will not be allowed to be placed in the compacted fill.

As soon as feasible after starting construction of the fill, the central portion thereof shall be built and maintained slightly higher than the sides so that the top of the fill will drain freely toward the side slopes. The fill surfaces shall be maintained in a free draining condition throughout construction.

Equipment shall not travel continuously over the same routes. All traveling shall be along the length of the fill insofar as possible, except for turning movements. Ruts shall be continuously broken up to facilitate proper bonding. When the fill has been otherwise completed, the Contractor shall dress the slope surfaces to the required limits of fill as directed by the Engineer. Any slopes which are not grassed immediately upon completion shall be "tracked" by movement of a clefted dozer up and down the slope to impede surface runoff during rainfall.

Rock encountered within the landfill area and, at the direction of the Engineer, is left in-place, shall be covered by at least a 2 ft thick layer of compacted soil fill as directed by the Inspector or Soils Engineer.

#### 7.2.6 Moisture Control

Compaction shall be done at moisture contents within the limits of 1 percent below to 4 percent above laboratory optimum. Regardless of source, materials that are too wet to permit proper compaction shall not be spread on the fill until the moisture content is satisfactorily reduced. When material is too dry, each layer of the fill shall be sprinkled prior to its compaction. This water shall be blended into the material, by harrowing or otherwise, until a uniform distribution of moisture has been obtained. The amount of water so applied

shall be sufficient to dampen the material to the required moisture content, and its application shall be so controlled that no free water will appear on the surface during compaction or afterwards. Should too much water be added to any part of the embankment so that material is too wet to obtain the desired density, the compaction and all work on that section of the embankment shall be delayed until the moisture content of the material is reduced to within the specified limits. Water jets shall not be directed at the embankment with enough force to cause separation of materials. If it is found impractical to add sufficient moisture to materials on the fill, the materials shall be prewetted at the source of excavation. The Contractor shall have an adequate supply of water available at all times.

#### 7.2.7 Compaction Of Fill Material

When the moisture content and other conditions in any layer are satisfactory, that layer shall be compacted as required to attain a density not less than the 95 percent of Standard Proctor maximum density as determined by Laboratory Tests (ASTM D 698) for the soil type in question. The entire fill area shall be covered by the number of passes necessary to produce a uniform compaction. When there is sufficient area, separate dumping, spreading, sprinkling and compacting operations may be carried on at the same time at different places on the fill.

The fill shall be compacted to create low permeability. Tamping type rollers, either sheepsfoot, or other approved type, shall be used. Weights of these rollers and arrangement of tamping feet shall be such that rollers will not completely "walk out" of a fill layer. Rollers shall leave a roughened surface for placement of the succeeding fill layer. Rubber tired equipment may be used for towing rollers on the fill provided excessive rutting does not occur. If such rutting occurs the Soils Engineer may require that the Contractor substitute crawler type equipment for towing rollers.

The fill shall be compacted to the full extent of the design slopes. It may be necessary to overbuild the slopes in order to obtain the required degree of compaction and then cut the slopes back to design grade.

#### 7.2.8 Protection Of Earth Fill

Responsibility for the protection of the earth fill against erosion shall rest with the Contractor until such fills are accepted as complete by the Engineer.

#### 7.2.9 Dust Control

Haul roads and other earth surfaces traveled by earthmoving equipment and other vehicles shall be watered as necessary to control dust.

### 7.3 MEASUREMENT AND PAYMENT

The quantity of compacted earth fill will be determined by measurement of the volume between the final surface of the fill foundation as determined by surveys made after the completion of stripping (and excavation of any unsatisfactory

material) and the final surface of the compacted earth fill determined by surveys made after the completion of slope dressing. Payment will not be made for fill placed outside the limits as shown on the Drawings except for allowances for overbuild or as designated by the Engineer. In addition, estimates will be made of small volumes of fill if any minor excavations, depressions or cavities that were filled in and the volume was not measured by survey.

Payment will be made at the contract price per cubic yard for Compacted Earth Fill. This price is to cover everything required to perform, to completion and final acceptance, the work outlined in Section 7.1 Scope of Work in accordance with these Specifications.

## 8. LEACHATE COLLECTION AND REMOVAL SYSTEM

### 8.1 SCOPE OF WORK

This item refers to furnishing of materials and installation of the leachate collection and removal system as designated on the Drawings. Included in this item are the preparation of the soil surface, furnishing, hauling and placement of the granular collection drains with perforated pipe, furnishing and placement of the leachate removal pipe lines in Cells I and II of Area C and through the main dikes, including the seepage cut-off collars and graded filters around the pipes in the dikes, and furnishing and placement of the leachate pipe line from the discharge point of Area C (junction box C-1) to the discharge point of Area B (junction box B-1) and associated plumbing in the junction boxes as indicated on the Drawings. The Owner reserves the right to change the dimensions and extent of the leachate collection and removal system and the gradation of granular materials. Changes which result in changed material quantities will not be cause for revision of unit prices.

### 8.2 SPECIFICATION

The leachate collection and removal system shall be constructed as shown on the Drawings and any revisions made thereto.

#### 8.2.1 Leachate Collection Strip Drains

The leachate collection strip drains shall consist of a layer of stone and interbedded perforated piping as shown on the Drawings.

All stone to be used for the leachate collection strip drains shall be graded as noted on the Drawings and placed as directed by the Engineer. The stone shall be durable, angular broken rock of suitable quality to insure permanence. It shall be free from cracks, seams and other defects that would tend to unduly increase its deterioration from natural causes. The inclusion of objectionable quantities of dirt, sand, clay, and rock fines will not be permitted.

Stone for the leachate collection strip drains shall be placed on a prepared surface in such a manner as to produce a reasonably well-graded mass of rock. The stone shall be placed to its full course thickness, as noted on the Drawings, in one operation. Compaction will not be required except as nominally achieved by passage of equipment used for spreading the stone. The interbedded pipe shall consist of 6-inch diameter perforated Schedule 40 PVC pipe sections. The pipe shall be placed as shown on the Drawings.

The soil surface on which the leachate collection drains are to be placed shall be prepared by compacting at least a 6-inch layer of soil in areas where 6 inches of compacted soil does not exist prior to gravel placement. The compaction of the soil surface shall conform to Section 7.2.7 Compaction Of Fill Material.

## 8.2.2 Leachate Removal Lines and Junction Box

The leachate removal pipe lines shall be as specified and installed as designated on the Drawings. The pipes, joints, valves and other fittings shall be capable of withstanding at least 100 psi of internal water pressure without leakage. The leachate removal pipes shall also be capable of safely withstanding the external overburden pressures. The leachate removal pipe lines passing through the main dikes of Cell I and Cell II at Area C shall be Class 150 PVC pipe, or equivalent, meeting American Water Works Association specification C900. The PVC pipes through the dikes shall be encased in galvanized corrugated metal pipes (CMPs), and the annular space between the outside of the PVC pipes and the inside of the CMPs shall be grouted as specified on the Drawings. The PVC pipes through the dikes shall have flexible joints that slip together and are sealed with rubber rings; glued joints will not be permitted.

The leachate removal pipe line through Cell II will join to a temporary perforated riser pipe of PVC surrounded by filter stone (ASTM #57). A PVC Tee connection between the riser of the leachate removal line shall be of such construction that a plug or cap can be installed in place of the perforated riser just before landfilling operations begin.

The last section(s) at the down-gradient end of the leachate removal line through Cell I will be left temporarily unconnected to allow uncontaminated runoff to drain from the upper cell (Cell II) to the lower cell (Cell I) and through the uncontaminated runoff drainage system through the main dike of Cell I. (Just prior to beginning landfilling operations in Cell II the perforated riser in the leachate removal line in Cell II will be replaced with a plug or cap, and the last section(s) of the leachate removal line through Cell I will be connected to allow leachate collected in Cell II to flow to the pumphouse and holding pond. These operations preparatory to landfilling will be done by the Owner.) The CMPs which encase the PVC pipes through the dikes shall have seepage cut-off collars at the locations shown and of the construction specified on the Drawings.

Compaction of the earth fill below, beside and above the pipes shall conform to Section 7.2.7 - Compaction of Fill Material. Compaction of fill near the pipes shall be with suitable equipment that will not damage the pipes. The pipes within the downstream portions of the dikes shall be enveloped with a graded filter as shown on the Drawings.

The graded filter shall be constructed as shown on the Drawings and any revisions made thereto. Compaction of filter material shall be by hand operated or light weight equipment approved by the Soils Engineer prior to the start of construction. The Contractor shall not place materials which do not meet requirements of gradation as indicated on the applicable Drawings. Material which degrades excessively under compaction, to limits outside those specified, shall be replaced at no cost to the Owner with material which meets gradation requirements. The materials for the filter shall be such that, after placement and compaction, the material will not preponderately be on or near the borderlines of the specified gradation limits.

The junction box which will house the pipe bends, valves and clean out fittings in the leachate removal line shall be located and constructed as shown on the Drawings. Concrete in the box shall have a minimum 28-day compressive strength

of 3000 psi. Reinforcing shall be grade 60 deformed bars of new billet steel conforming to the latest revisions of ASTM A 615. All reinforcing bars and concrete shall be accurately placed as shown on the Drawings and shall conform to the general practices outlined in ACI 301-72 and ACI 304-73 applicable sections.

### 8.2.3 Tests of Pressure Piping

Leachate removal pipe lines designed to carry fluids under pressure shall be tested as a whole, or in sections valved or bulkheaded at the ends. Testing shall be under a hydrostatic pressure equal to the design pressure, or at a higher test pressure specified by the Engineer.

Test pressure shall be applied by means of a hand pump and a tap in the pipe. The rate of leakage shall be determined at 15 minute intervals, by means of volumetric measurement of the water added during the test, until the rate has stabilized as a constant value for three consecutive 15 minute periods. Test pressure shall be maintained for a period of at least one hour.

All joints in exposed piping shall be examined during the tests and all leaks at joints shall be caulked or satisfactorily stopped. Any defective pieces discovered in any pipe line as a result of the test shall be removed, replaced with sound pieces at the expense of the Contractor and in a satisfactory manner and the line retested until tight.

No leakage will be acceptable. Joints in pressure pipe lines shall not be covered with backfill until after the completion of leakage tests. The PVC pipes which are to be sleeved through CMPs in the main dikes of Cells I and II shall be pressure tested before grouting these pipes in-place.

### 8.3 MEASUREMENT AND PAYMENT

Payment for the leachate collection stone in the strip drains will be at the contract price per ton for Leachate Drain Gravel. This price shall include furnishing, hauling, placing and preparation of the soil surface, including compaction of at least 6 inches of soil in areas where 6 inches of compacted soil fill does not exist prior to placement. Payment for the stone material will be based on truck weight tickets.

Payment for the 6-inch diameter perforated pipes interbedded in the leachate collection strip drains, the Leachate Removal Pipe lines and the CMPs encasing the leachate lines through the main dikes will be paid for at the contract price per linear foot. These prices shall include the excavation, trenching, furnishing, placing and backfilling of the pipes. Valves, fittings, bends etc., shall be included in the per linear foot cost.

Payment for the Junction-Box Concrete will be at the contract price per cubic yard. This price shall include excavating, forming, furnishing, placing and curing the concrete. The price shall also include the steel plate cover and the steel access rungs.

Payment for the grout around the sleeved leachate removal lines in the main dikes will be at the contract price per cubic yard. This price shall include furnishing and placing the grout.

Payment for the Seepage Cut-Off Collars will be at the contract price for each collar. This price shall include furnishing and installing the collars.

The temporary riser will be paid for at the contract price per linear foot for Perforated PVC Riser. The price will include furnishing and installing the perforated riser and the Tee connection where the riser joins the leachate removal line.

The Perforated Riser Filter Stone will be paid for at the contract price per ton. The price shall include furnishing, hauling and placing the filter store. Payment will be based on truck weight tickets.

Payment for the graded filter around the sleeved leachate lines in the main dikes will be at the contract price per ton for the Fine and Coarse Filter materials. This price shall include furnishing, hauling, placing and compacting the filter materials. Payment for the filter materials will be based on truck weight tickets.

## 9. INTERNAL FILTER DRAINAGE SYSTEM

### 9.1 SCOPE OF WORK

This item refers to furnishing of materials and installation of the internal graded filter strip drains as designated on the Drawings. The Owner reserves the right to change dimensions, gradation and extent of the required filter drains. Changes which result in changed material quantities will not be cause for revision of unit prices.

### 9.2 SPECIFICATION

Internal graded filter drains shall be constructed as shown on the Drawings and any revisions made thereto. Compaction of filter material shall be by one to three passes of a 3 to 5-ton vibratory roller. The type and size equipment shall be approved by the Soils Engineer prior to the start of construction of the drains. The Contractor shall not place materials which do not meet requirements of gradation as indicated on the applicable Drawings. Material which degrades excessively under compaction, to limits outside those specified, shall be replaced at no cost to the Owner with material which meets gradation requirements. The materials for the filter drains shall be such that, after placement and compaction, the material will not preponderately be on or near the borderlines of the specified gradation limits. The 6-inch diameter perforated pipe shall be PVC pipe, Schedule 40.

### 9.3 MEASUREMENT AND PAYMENT

There will be no separate payment for placement of the internal graded filter drain materials. Payment for placement and compaction of the filter material will be paid for at the applicable rate for Compacted Earth Fill. Payment for furnishing and hauling the fine and coarse filter materials shall be at the contract price per ton. These latter payments will be based on tonnages shown on truck weight tickets. Payment for furnishing and installation of the 6-inch diameter perforated PVC pipe shall be at the contract price per linear foot.

## 10. ROCK-LINED DITCHES AND SWALES

### 10.1 SCOPE OF WORK

This item refers to furnishing of materials and installation of rock-lined ditches and swales as designated on the Drawings. Included in this item are the excavation and preparation of the soil surface, and furnishing, hauling and placement of the bedding and ditch riprap material. The Owner reserves the right to change dimensions, gradation and extent of required rock-lined ditches and swales. Changes which result in changed material quantities will not be cause for revision of unit prices.

### 10.2 SPECIFICATION

Rock-lined ditches and swales shall consist of placed ditch riprap and crusher run stone bedding as detailed on the Drawings.

#### 10.2.1 Ditch/Swale Riprap

All riprap to be used for rock-lined ditches and swales shall be graded and placed as shown on the Drawings or as directed by the Engineer. The riprap shall be durable, angular broken rock of suitable quality to insure permanence. It shall be free from cracks, seams and other defects that would tend to unduly increase its deterioration from natural causes. The inclusion of objectionable quantities of dirt, sand, clay and rock fines will not be permitted. The placed riprap shall be of sizes and gradations shown on the Drawings.

Stone for ditch riprap shall be placed on the crusher run (or ASTM No. 78) bedding in such a manner as to produce a reasonably well-graded mass of rock with the minimum practical percentage of voids. Riprap shall be placed to its full course thickness, as shown on the Drawings, in one operation and in such a manner as to avoid displacing the bedding material.

The finished, placed rock shall be free from objectionable pockets of small stones and clusters of larger stones. The desired distribution of the various sizes of stones throughout the mass shall be obtained by selective loading of the material at the source, by controlled dumping of successive loads during final placing, or by other methods of placement which will produce the specified results. Rearranging of individual stones by mechanical equipment or by hand will be required to the extent necessary to obtain the distribution of stone sizes and course thickness as specified and shown on the Drawings.

#### 10.2.2 Crusher Run Bedding

Crusher run bedding shall consist of stone produced by secondary crushing of durable rock and shall meet the requirements of gradation as shown on the Drawings for such stone. The inclusion of soil, sand, clay or organic matter shall not be permitted.

Crusher run bedding shall be placed on the prepared surface in such a manner as to produce a reasonably well-graded mass of rock with the minimum practical percentage of voids. Compaction will not be required except as nominally achieved by passage of equipment used for spreading of the stone.

10.3 MEASUREMENT AND PAYMENT

Ditch and swale riprap will be paid for at the contract price per ton. This price shall include furnishing, hauling, placing on the bedding, and such reworking as may be required to achieve the specified results.

Crusher run bedding will be paid for at the contract price per ton. This price shall include furnishing, hauling, placing and spreading of bedding material. This price shall also include excavation and preparation of the soil surface.

Payment for ditch and swale riprap and crusher run bedding will be based on truck weight tickets.

## 11.0 DIKE TOE PROTECTION

### 11.1 SCOPE OF WORK

This item refers to furnishing of materials and installation of stone dike toe protection as noted on the Drawings. Included in this item are the preparation of the soil surface, and furnishing, hauling and placement of the bedding and riprap materials.

The Owner reserves the right to change dimensions, gradation and extent of required dike toe protection. Changes which result in changed material quantities will not be cause for revision of unit prices.

### 11.2 SPECIFICATION

Dike toe protection shall consist of placed toe riprap and crusher run stone bedding as noted on the Drawings.

#### 11.2.1 Toe Riprap

All riprap to be used for dike toe protection shall be graded as noted on the Drawings and placed as shown on the Drawings or as directed by the Engineer. The riprap shall be durable, angular broken rock of suitable quality to insure permanence. It shall be free from cracks, seams and other defects that would tend to unduly increase its deterioration from natural causes. The inclusion of objectionable quantities of dirt, sand, clay, and rock fines will not be permitted. The placed riprap shall be of sizes and gradations indicated on the Drawings.

Stone for toe riprap shall be placed on the crusher run bedding in such a manner as to produce a reasonably well-graded mass of rock with the minimum practical percentage of voids. Riprap shall be placed to its full course thickness, as noted on the Drawings in one operation and in such a manner as to avoid displacing the bedding material.

The finished, placed rock shall be free from objectionable pockets of small stone and clusters of larger stones. The desired distribution of the various sizes of stones throughout the mass shall be obtained by selective loading of the material at the source, by controlled dumping of successive loads during final placing, or by other methods of placement which will produce the specified results. Rearranging of individual stones by mechanical equipment or by hand will be required to the extent necessary to obtain the distribution of stone sizes and course thickness as specified on the Drawings.

#### 11.2.2 Crusher Run Bedding

Crusher run bedding shall consist of stone produced by secondary crushing of durable rock and shall meet the requirements of gradation as indicated on the Drawings for such stone. The inclusion of soil, sand, clay or organic matter shall not be permitted.

Crusher run bedding shall be placed on the prepared surface in such a manner as to produce a reasonably well-graded mass of rock with the minimum practical percentage of voids. Compaction will not be required except as nominally achieved by passage of equipment used for spreading of the stone.

11.3      MEASUREMENT AND PAYMENT

Toe riprap will be paid for at the contract price per ton. This price shall include furnishing, hauling, placing on the bedding, and such reworking as may be required to achieve the specified results.

Crusher run bedding will be paid for at the contract price per ton. This price shall include furnishing, hauling, placing and spreading of bedding material and preparation of the soil surface.

Payment for the toe riprap and crusher run bedding materials will be based on truck weight tickets.

## 12. SURFACING - CRUSHER RUN STONE

### 12.1 SCOPE OF WORK

This item refers to furnishing, hauling, spreading, and compacting of crusher run stone for site roadways as designated on the Drawings, or as may be required by the Engineer. Included in this item is the preparation of the soil surface on which the crusher run stone is to be placed. This item does not include such crusher stone as may be used by the contractor for his own convenience.

The Owner reserves the right to exclude portions of any of the above item from the contract. If this right is exercised the contract unit prices for other portions of the item will not be revised.

### 12.2 SPECIFICATION

Crusher run stone for roadways shall meet the criteria of North Carolina Standard Size No. ABC (Aggregate Base Course). The Contractor shall spread and shape the material to the lines and grades as shown on the Drawings. The material should be watered, as needed, and compacted to provide a firm and durable base. Acceptance of the compacted surfacing will be made on the basis of visual inspection and approval by the Engineer.

Preparation of the soil surface shall be by: a) compacting the upper 2 ft of any fill material to at least 98 percent of the maximum dry density as determined by Laboratory Tests (ASTM D 698) or b) proofrolling and repairing the subgrade surface in cut areas as specified in Section 7.2.4 Drainage and Preparation of Fill Foundation.

### 12.3 MEASUREMENT AND PAYMENT

Surfacing-Crusher Run Stone will be paid for at the contract price per ton. This price shall include furnishing, hauling, spreading and compacting of the crusher run material and preparation of the soil surface. Payment will be based on truck weight tickets.

### 13. UNCONTAMINATED SURFACE DRAINAGE CONDUITS AND CULVERTS

#### 13.1 SCOPE OF WORK

This item refers to furnishing and placement of a corrugated metal pipe drainage conduit (for uncontaminated runoff) through the main dike of Cell I at Area C and furnishing and placement of surface drainage culverts under the access roads and elsewhere as designated on the Drawings, or an addendum, or at the direction of the Engineer.

#### 13.2 SPECIFICATION

The uncontaminated surface drainage conduit and culverts shall be corrugated metal pipe constructed as shown on the Drawings and any revisions made thereto. The corrugated metal pipes shall have sufficient wall thickness to adequately withstand the external pressures from overlying fill dike or cover materials.

##### 13.2.1 Uncontaminated Surface Drainage Conduit

The uncontaminated surface drainage conduit passing through the dike of Cell I shall be galvanized corrugated metal pipe with joints sealed with double O-rings. The up-gradient end of this pipe shall join to a perforated corrugated metal pipe riser surrounded by filter stone (ASTM #57) as shown on the Drawings. The pipe shall have a seepage cut-off collar at the location and of the construction shown on the Drawings. Compaction of the earth fill below, beside and above the pipe shall conform to Section 7.2.7 - Compaction of Fill Material and shall be with suitable equipment that will not damage the pipe.

The pipe within the downstream portion of the dike shall be enveloped with a graded filter. The graded filter shall be constructed as shown on the Drawings and any revisions made thereto. Compaction of filter material shall be by hand operated or light weight equipment approved by the Soils Engineer prior to the start of construction. The Contractor shall not place materials which do not meet requirements of gradation as indicated on the applicable Drawings. Material which degrades excessively under compaction, to limits outside those specified, shall be replaced at no cost to the Owner with material which meets gradation requirements. The materials for the filter shall be such that, after placement and compaction, the material will not preponderately be on or near the border lines of the specified gradation limits.

The drainage conduit through the dike of Cell I shall be pressure tested in general accordance with the provisions of Specification Section 8.2.4 before the pipe is covered with fill. The test pressure shall be 10 psi. The test pressure may be applied with compressed air.

##### 13.2.2 Drainage Culverts

Drainage culverts shall consist of galvanized corrugated metal pipe, with bituminous coating, placed in an excavated trench and covered with compacted soil fill. The cover material shall consist of soil compacted as specified in 7.2.7 - Compaction Of Fill Material. Appropriate N. C. D.O.T. concrete end

walls should be constructed at the entrance end of the culverts. (See accompanying Std. Nos. 838.01A, 838.02A, 838.03A and 838.05A.)

### 13.3 MEASUREMENT AND PAYMENT

Payment for the uncontaminated surface drainage conduit and culverts will be at the contract price per linear foot for Uncontaminated Surface Drainage Conduits and Culverts. This price shall include trench excavating, furnishing, and placing the drainage conduit and culverts and placing compacted backfill around the conduit and culverts. The per linear foot costs for the Cell I drainage conduit shall also include double O-ring seals.

Payment for the Seepage Cut-off Collar will be at the contract price for the collar. This price shall include furnishing and installing the collar.

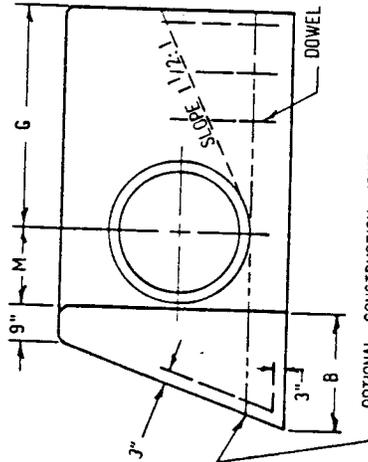
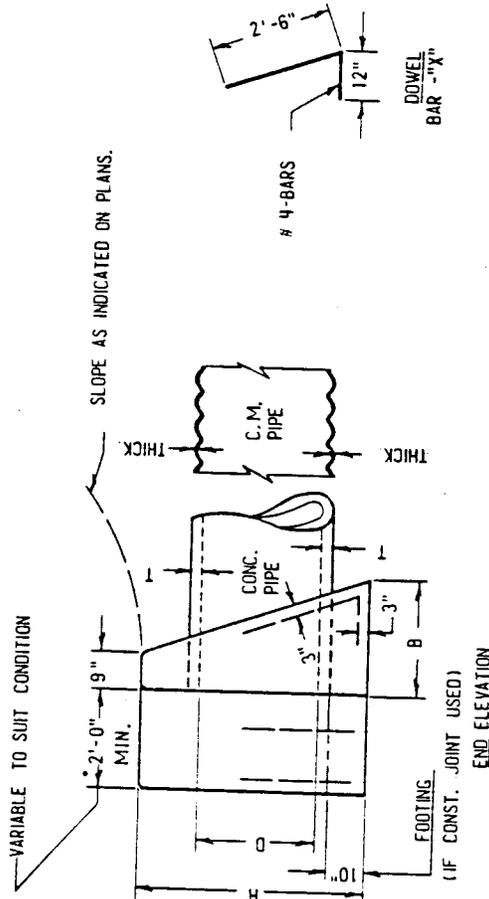
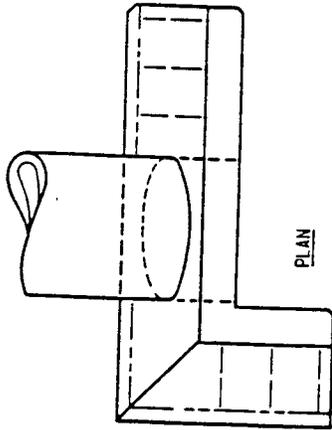
The riser will be paid for at the contract price per linear foot for Perforated CM Riser. The price shall include furnishing and installing the perforated riser and the Elbow connection where the riser joins the conduit.

Payment for the Culvert End Wall Concrete will be at the contract price per cubic yard. This price shall include excavating, forming, furnishing, placing and curing the concrete.

Payment for the graded filter around the drainage conduit in the main dike of Cell I and for the filter stone around the perforated riser will be at the contract price per ton for the Fine and Coarse Filter materials and for Perforated Riser Filter Stone. These prices shall include furnishing, hauling, placing and compacting the filter materials. Payment for the filter materials will be based on truck weight tickets.

**GENERAL NOTES:**

- ALL CORNERS TO BE CHAMFERED 1".
- THE CONTRACTOR WILL BE REQUIRED TO PLACE 2-#6 BARS "Y" IN THE TOP OF ALL ENDWALLS FOR PIPE CULVERTS 42" AND OVER WITH A MINIMUM OF 3" COVER AND A LENGTH OF 6" LESS THAN ENDWALLS.
- IF CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE, BAR X (DOWELS) SHALL BE PLACED IN THE BASE AS SHOWN ON PLANS. SPACING OF BARS TO BE APPROXIMATELY 12" CENTERS UNLESS ENGINEER DIRECTS OTHERWISE.
- WHEN CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE AND POURS BASE SEPARATELY, THE TOP OF BASE SHALL BE LEFT ROUGH.
- FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
- WALL THICKNESS (T) SHOWN IS NOT TO BE INTERPRETED TO MEAN THE THICKNESS ACCEPTABLE, BUT ARE USED ONLY IN COMPUTING ENDWALL DIMENSIONS AND QUANTITIES.
- CLASS "B" CONCRETE SHALL BE USED.



REINFORCING QUANTITIES		R.C. PIPE		C.M. PIPE		48" C.M. 48" R.C.	
DIA.	15"	18"	24"	30"	36"	42"	48"
BARS	"X"	"X"	"X"	"X"	"X"	"X"	"X"
QTY.	5	5	6	7	7	7	8
LBS.	12	12	14	16	16	47	52

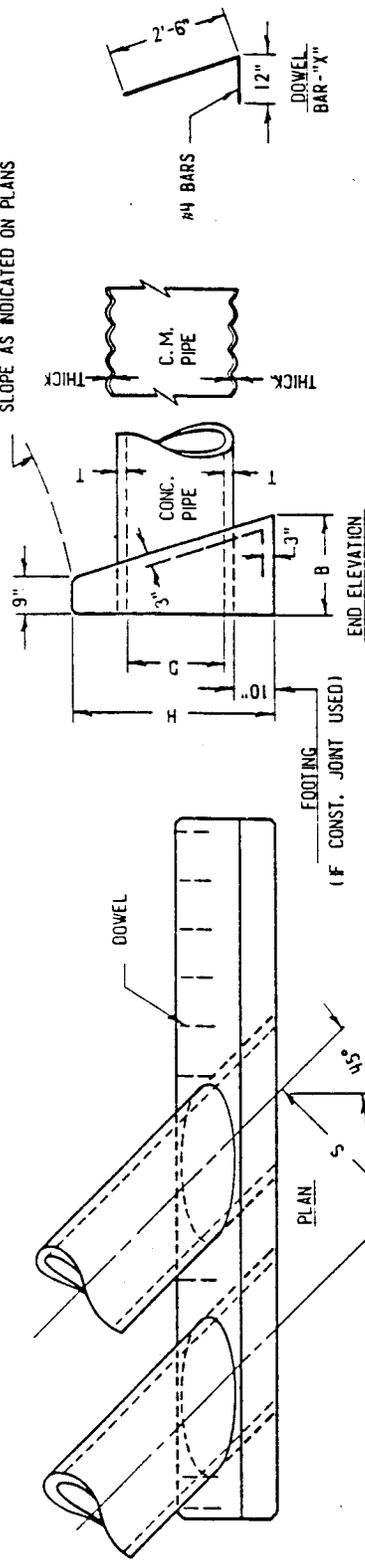
\* QUANTITIES BASED ON 2'-0"

NO.	DATE	DESCRIPTION
A	11-10-77	Changed from Cl. "C" to Cl. "B" Conc.

DIMENSIONS AND CONCRETE QUANTITIES									
COMMON DIMENSIONS					LISTING				
D	H	B	G	M	T	C.U. YD.	R.C. PIPE	C.M. PIPE	USING
									C.M. PIPE
15"	3'-4"	1'-8"	2'-9"	1'-0"	1 7/8"	0.960	3'-0"	1'-6"	M
18"	3'-7"	1'-10"	3'-2"	1'-2"	2"	1.193	3'-3"	2'-11"	G
24"	4'-2"	2'-1"	4'-0"	1'-5"	2 1/2"	1.711	3'-9"	1'-11"	M
30"	4'-9"	2'-5"	4'-7"	1'-9"	2 3/4"	2.394	4'-3"	2'-4"	G
36"	5'-3"	2'-8"	5'-6"	2'-0"	3"	3.169	4'-9"	2'-5"	M
42"	5'-10"	2'-11"	6'-4"	2'-4"	3 1/2"	4.139	5'-3"	5'-11"	G
48"	6'-5"	3'-3"	7'-2"	2'-8"	4"	5.422	5'-9"	2'-11"	M

**STANDARD CONCRETE "L" ENDWALL FOR SINGLE PIPE CULVERTS**  
**15" THRU 48" PIPE**  
 STATE OF NORTH CAROLINA

SLOPE AS INDICATED ON PLANS

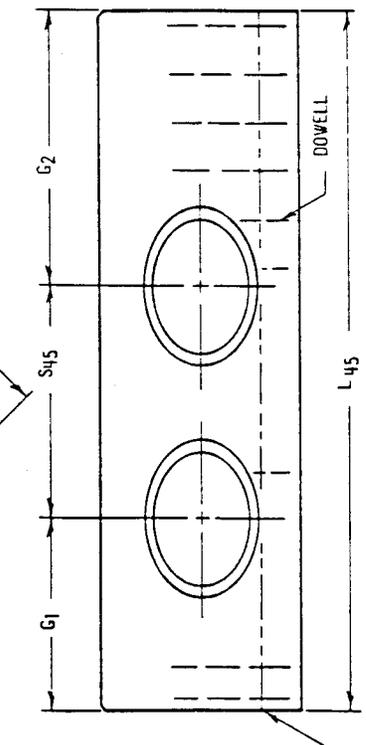


DOWEL IN ENDWALL WITH REINFORCED CONCRETE PIPE

L	SINGLE PIPE				DOUBLE PIPE			
	DIA.	BARS	QTY.	TOL. LBS.	DIA.	BARS	QTY.	TOL. LBS.
15"	18"	"X"	2	16	18"	"X"	2	16
18"	24"	"X"	2	19	24"	"X"	2	19
24"	30"	"X"	2	21	30"	"X"	2	21
36"	36"	"X"	2	26	36"	"X"	2	26
42"	42"	"X"	2	26	42"	"X"	2	26
48"	48"	"X"	2	26	48"	"X"	2	26
				73				81
				81				81
				117				117

DOWEL IN ENDWALL WITH CORRUGATED METAL PIPE

L	SINGLE PIPE				DOUBLE PIPE			
	DIA.	BARS	QTY.	TOL. LBS.	DIA.	BARS	QTY.	TOL. LBS.
15"	18"	"X"	2	14	18"	"X"	2	14
18"	24"	"X"	2	16	24"	"X"	2	16
24"	30"	"X"	2	19	30"	"X"	2	19
36"	36"	"X"	2	23	36"	"X"	2	23
42"	42"	"X"	2	23	42"	"X"	2	23
48"	48"	"X"	2	23	48"	"X"	2	23
				69				77
				77				77
				107				107



OPTIONAL CONSTRUCTION JOINT  
ELEVATION

DIMENSIONS AND CONCRETE QUANTITIES

D	USING CONCRETE PIPE										USING CORRUGATED METAL PIPE																				
	COMMON					SINGLE PIPE					DOUBLE PIPE					COMMON					SINGLE PIPE					DOUBLE PIPE					
	H	B	T	G1	G2	S	S45	S	G1	G2	S	S45	L45	CU. YD.	H	B	G1	G2	S	S45	L45	CU. YD.	H	B	G1	G2	S	S45	L45	CU. YD.	
15"	3'-4"	1'-8"	17/8"	2'-9"	3'-11"	2'-3"	3'-2 1/4"	2'-9 3/8"	3'-11 3/8"	2'-3"	3'-2 1/4"	9'-11"	1.274	3'-0"	1'-6"	2'-6"	3'-6"	6'-0"	6'-0"	6'-0"	6'-0"	0.676	2'-6 3/8"	2'-6 3/8"	2'-6 3/8"	3'-6 3/8"	6'-0"	6'-0"	6'-0"	6'-0"	0.977
18"	3'-7"	1'-10"	2"	3'-2"	4'-6"	2'-7"	3'-7 3/4"	3'-2 1/8"	4'-6 1/8"	2'-7"	3'-7 3/4"	11'-4"	1.562	3'-3"	1'-8"	2'-11"	4'-2"	7'-1"	7'-1"	7'-1"	7'-1"	0.916	2'-11 1/8"	2'-11 1/8"	2'-11 1/8"	4'-2 7/8"	7'-1"	7'-1"	7'-1"	7'-1"	1.335
24"	4'-2"	2'-1 1/2"	2 1/2"	4'-0"	5'-8"	3'-5"	4'-10"	4'-0"	5'-8"	3'-5"	4'-10"	14'-6"	2.483	3'-9"	1'-11"	3'-8"	5'-2"	8'-10"	8'-10"	8'-10"	8'-10"	1.412	3'-8"	3'-8"	3'-8"	5'-2"	8'-10"	8'-10"	8'-10"	8'-10"	1.975
30"	4'-9"	2'-5 1/2"	2 3/4"	4'-7"	6'-6"	4'-3"	6'-0"	4'-7"	6'-6"	4'-3"	6'-0"	17'-1"	3.603	4'-3"	2'-2"	4'-5"	6'-3"	10'-8"	10'-8"	10'-8"	10'-8"	2.066	4'-5"	4'-5"	4'-5"	6'-3"	10'-8"	10'-8"	10'-8"	10'-8"	2.927
36"	5'-3"	2'-8"	3"	5'-6"	7'-9"	5'-1"	7'-2 1/4"	5'-6 3/8"	7'-9 3/8"	5'-1"	7'-2 1/4"	20'-6"	5.072	4'-9"	2'-5"	5'-2"	7'-4"	12'-6"	12'-6"	12'-6"	12'-6"	2.885	5'-2 3/8"	5'-2 3/8"	5'-2 3/8"	7'-4 3/8"	12'-6"	12'-6"	12'-6"	12'-6"	4.076
42"	5'-10"	2'-11"	3 1/2"	6'-4"	8'-11"	6'-4"	8'-3"	6'-4"	8'-11"	6'-4"	8'-3"	23'-6"	6.772	5'-3"	2'-8"	5'-11"	8'-4"	14'-3"	14'-3"	14'-3"	14'-3"	3.866	5'-11"	5'-11"	5'-11"	8'-4"	14'-3"	14'-3"	14'-3"	14'-3"	5.442
48"	6'-5"	3'-3"	4"	7'-2"	10'-2 1/4"	7'-2 1/4"	10'-2 1/4"	7'-2 1/4"	10'-2 1/4"	7'-2 1/4"	10'-2 1/4"	26'-11"	9.181	5'-9"	2'-11"	6'-8"	9'-5"	16'-1"	16'-1"	16'-1"	16'-1"	5.052	6'-8 1/4"	6'-8 1/4"	6'-8 1/4"	9'-5 1/4"	16'-1"	16'-1"	16'-1"	16'-1"	7.142

REVISIONS

NO.	DATE	DESCRIPTION
A	11-10-77	Changed from Cl. "C" to Cl. "B" Conc.

\* SEE SHEET 2 OF 2 SHEET 1 OF 2

STANDARD CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS  
15" THRU 48" PIPE 45° OR 135° SKEW

STATE OF NORTH CAROLINA  
ON

STD. NO. REV.

GENERAL NOTES:

ALL CORNERS TO BE CHAMFERED 1".

\*THE CONTRACTOR WILL BE REQUIRED TO PLACE 2-#6 BARS "Y" IN THE TOP OF ALL ENDWALLS FOR PIPE CULVERTS 42" AND OVER WITH A MINIMUM OF 3" COVER AND A LENGTH OF 6" LESS THAN ENDWALL.

FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

WALL THICKNESS (T) SHOWN IS NOT TO BE INTERPRETED TO MEAN THE THICKNESS ACCEPTABLE, BUT ARE USED ONLY IN COMPUTING ENDWALL QUANTITIES.

IF CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE, BAR X (DOWELS) SHALL BE PLACED IN THE BASE AS SHOWN ON PLANS. SPACING OF BARS TO BE APPROXIMATELY 12" CENTERS UNLESS ENGINEER DIRECTS OTHERWISE.

WHEN CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE AND POURS BASE SEPARATELY, THE TOP OF BASE SHALL BE LEFT ROUGH.

WHEN SKEW ANGLE OF PIPE IS OVER 45° USE G-1 DIMENSION FOR 45° PLUS 6" FOR EACH 5° OVER 45°. G2 DIMENSION WILL BE THE NEW G-1 DIMENSION DIVIDED BY THE COSINE OF THE ANGLE OF PIPE SKEW.

CLASS "B" CONCRETE SHALL BE USED.

REVISIONS	
NO.	DATE

STANDARD CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS  
15" THRU 48" PIPE 45° or 135° SKEW

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS



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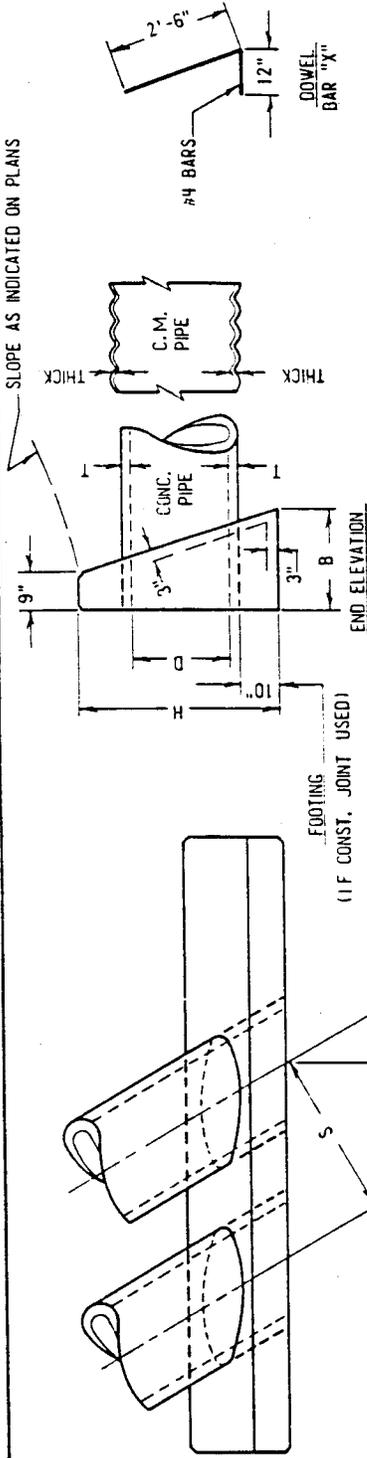
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CLASS "B" CONCRETE SHALL BE USED.

REVISIONS	
NO.	DATE DESCRIPTION

SLOPE AS INDICATED ON PLANS



DOWELS IN ENDWALL WITH REINFORCED CONCRETE PIPE													
L	PIPE DIA.	SINGLE PIPE			DOUBLE PIPE			G1	G2	S	S30	L30	CU. YD.
		15" 18" 24" 30" 36" 42" 48"	"X" "X" "X" "X" "X" "X" "X"	Y* Y* Y* Y* Y* Y* Y*	"X" "X" "X" "X" "X" "X" "X"	Y* Y* Y* Y* Y* Y* Y*							
G1	QTY.	2	2	2	3	3	4	4	4	4	4	4	4
S	QTY.	-	-	-	-	2	2	2	2	2	2	2	2
G2	QTY.	3	4	4	5	6	6	7	7	7	7	7	7
TOT.	LBS.	12	14	14	16	21	61	71	14	16	16	21	26
													86

DOWELS IN ENDWALL WITH CORRUGATED METAL PIPE													
L	PIPE DIA.	SINGLE PIPE			DOUBLE PIPE			G1	G2	S	S30	L30	CU. YD.
		15" 18" 24" 30" 36" 42" 48"	"X" "X" "X" "X" "X" "X" "X"	Y* Y* Y* Y* Y* Y* Y*	"X" "X" "X" "X" "X" "X" "X"	Y* Y* Y* Y* Y* Y* Y*							
G1	QTY.	2	2	2	3	3	4	4	4	4	4	4	4
S	QTY.	-	-	-	-	2	2	2	2	2	2	2	2
G2	QTY.	3	3	4	5	6	6	7	7	7	7	7	7
TOT.	LBS.	12	12	14	16	19	58	67	14	14	16	19	23
													81

DIMENSIONS AND CONCRETE QUANTITIES

USING CONCRETE PIPE												USING CORRUGATED METAL PIPE												
COMMON DIMS.			SINGLE PIPE			DOUBLE PIPE			SINGLE PIPE			DOUBLE PIPE			G1	G2	S	S30	L30	CU. YD.				
H	B	L30	CU. YD.	H	B	L30	CU. YD.	H	B	L30	CU. YD.	H	B	L30							CU. YD.			
15"	3'-4"	1'-8"	17/8"	2'-9"	3'-2"	5'-11"	0.782	2'-9"	3'-2"	2'-6"	8'-5"	1.055	3'-0"	1'-6"	2'-6"	2'-11"	5'-5"	0.617	2'-6"	2'-11"	2'-0"	2'-4"	7'-9"	0.848
18"	3'-7"	1'-10"	2"	3'-2"	3'-8"	6'-10"	1.024	3'-2"	3'-8"	2'-7"	9'-10"	1.391	3'-3"	1'-8"	2'-11"	3'-4"	6'-3"	0.816	2'-11"	3'-4"	2'-3 1/2"	2'-7 3/4"	8'-11"	1.110
24"	4'-2"	2'-1 1/2"	2 3/4"	4'-0"	4'-8"	8'-8"	1.614	4'-0"	4'-8"	3'-5"	12'-8"	2.208	3'-9"	1'-11"	3'-8"	4'-3"	7'-11"	1.283	3'-8 1/4"	4'-3 1/4"	3'-0"	3'-5 1/2"	11'-5"	1.749
30"	4'-9"	2'-5"	2 3/4"	4'-7"	5'-4"	9'-11"	2.290	4'-7"	5'-4"	4'-3"	14'-10"	3.188	4'-3"	2'-2"	4'-5"	5'-1"	9'-6"	1.869	4'-5 1/8"	5'-1 1/8"	3'-8"	4'-2 7/4"	13'-9"	2.532
36"	5'-3"	2'-8"	3"	5'-6"	6'-4"	11'-10"	3.222	5'-6"	6'-4"	5'-0"	17'-8"	4.450	4'-9"	2'-5"	5'-2"	6'-0"	11'-2"	2.823	5'-2 3/8"	6'-0 3/8"	4'-6"	5'-2 1/4"	16'-5"	3.598
42"	5'-10"	2'-11"	3 1/2"	6'-4"	7'-4"	13'-8"	4.378	6'-4"	7'-4"	5'-10"	20'-5"	6.016	5'-3"	2'-8"	5'-11"	6'-10"	12'-9"	3.519	5'-11 1/8"	6'-10 1/8"	5'-3"	6'-0 3/4"	18'-10"	4.823
48"	6'-5"	3'-3"	4"	7'-2"	8'-3"	15'-5"	5.853	7'-2 1/4"	8'-3 1/4"	6'-8"	23'-2"	8.062	5'-9"	2'-11"	6'-8"	7'-8"	14'-4"	4.594	6'-8 1/8"	7'-8 1/8"	6'-0"	6'-11 1/4"	21'-4"	6.324

REVISIONS	
NO.	DATE
A	11-10-27
	Changed from Cl. "C" to Cl. "B" Conc.

STANDARD CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS  
15" THRU 48" PIPE 60° OR 120° SKEW

STATE OF NORTH CAROLINA

STD. NO. 1 REV.

GENERAL NOTES:

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CLASS "B" CONCRETE SHALL BE USED.

REVISIONS	
NO.	DATE

STANDARD CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS  
 15" THRU 48" PIPE 60° OR 120° SKEW

STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

## 14. EROSION/SEDIMENT CONTROL

### 14.1 SCOPE OF WORK

This item refers to furnishing and installing an Erosion/Sediment Control system as designated on Drawing No. 2 - Erosion/Sediment Control Measures or as directed by the Engineer or as required by Haywood County or the State. Changes which result in changed material quantities will not be cause for revision of unit prices.

### 14.2 SPECIFICATION

Erosion/Sediment Control fencing shall be constructed as shown on Drawing No. 2 or as may be required to prevent uncontrolled discharge from the site at any time during project construction. The Contractor shall be responsible for complying with all State and County regulations concerning erosion and sediment control. The Contractor shall maintain the fencing in a functioning condition for the duration of the project. No stripping will be permitted until the fencing has been installed. Should the denuded area during construction differ from that shown within the Contract Limits shown on Drawing No. 2, the fencing locations shall be modified as needed to prevent uncontrolled discharge from the site.

### 14.3 MEASUREMENT AND PAYMENT

Erosion/Sediment Control fencing will be paid for at the contract price per linear foot. This price shall include furnishing, constructing and maintaining the fences as may be required to obtain the specified results.

## 15. GRASSING

### 15.1 SCOPE OF WORK

This item refers to establishment of an erosion resistant grass cover on earth fill surfaces, landfill cut slopes, borrow cut surfaces located outside the landfill, drainage ditches and drainage swales, and any other areas specified by the Engineer. This work will consist of the following: preparation of surfaces for sowing of grass seed; furnishing and placing lime, fertilizer and seed; compaction of seeded surfaces; furnishing and applying mulch and mulch anchorage; and all other related operations required to establish a permanent stand of perennial grass adequate to protect earth slopes and other graded surfaces against erosion.

It will be the Contractor's responsibility to do all that is required to protect fill surfaces from erosion damage during construction and to maintain them until the completed work is accepted by the Engineer. All fill surfaces not otherwise protected shall be provided with an erosion resistant cover within 30 days of completion of any phase of grading.

### 15.2 SPECIFICATION

#### 15.2.1 Soil Preparation

Soil preparation for cut slopes shall be limited to scarifying the slopes two to four inches deep perpendicular to the slope to provide a place for lodging of the seed and impedance of storm runoff. Fill slopes shall be "tracked" by movement of a clefted dozer up and down the slopes. Slopes flatter than three percent shall be prepared by scarifying or discing to a depth of two to four inches and shall be raked to true lines, free from all bumps, ridges or depressions for later mowing and maintenance.

#### 15.2.2 Liming and Fertilizing

Lime and fertilizer shall comply with the applicable North Carolina State Laws. Lime shall be ground limestone containing not less than 85 percent of total carbonates, and shall be ground to such fineness that 90 percent by weight will pass through a No. 20 mesh sieve and 50 percent by weight will pass through a No. 100 mesh sieve. Fertilizer shall contain not less than ten percent nitrogen, ten percent available phosphoric acid and ten percent water soluble potash (N-P-K, 10-10-10).

The Owner shall be furnished with duplicate signed statements from the vendor, certifying that all lime and fertilizer delivered to the Project is at least equal to the Specification requirements. Lime and fertilizer shall be delivered in unopened bags or other convenient standard containers, each fully labeled with the manufacturer's guaranteed analysis. Any fertilizer which becomes caked or otherwise damaged, making it unsuitable for use, will not be acceptable and shall be immediately removed from the job site.

Lime shall be distributed uniformly over the area to be seeded at a rate of 2 tons per acre. Distribution shall be by hand or by an approved distributor or other satisfactory equipment. Following distribution, lime shall be incorporated into the soil to the full depth of scarifying by discing, harrowing or other acceptable methods.

Fertilizer shall be distributed uniformly over the area to be seeded at a rate of 1000 pounds per acre. Distribution shall be by hand or by a common fertilizer distributor, or other approved equipment. Use of a grain or seed drill, equipped to sow seed and distribute fertilizer at the same time, will be permitted. Incorporating the fertilizer into the soil may be included as part of the discing or harrowing operation, providing it is done just prior to sowing seed (no more than 48 hours prior to sowing seed, unless otherwise permitted).

### 15.2.3 Seeding and Mulching

Kentucky 31 Fescue seed shall be used. Seed shall be received on the site in standard bags. Each bag shall be labeled to show that it meets requirements of the North Carolina Seed Law. All seed must be accompanied by evidence of testing within six months of the date of planting for purity, germination, and weed seed content by an approved seed testing laboratory.

The grass seed shall be free from undesirable weed seed and shall be uniformly spread at a minimum rate of 220 pounds per acre of live seed (actual weight of seed multiplied by percentage of germination). The seed shall be covered by means of a brush harrow, spike-tooth harrow, chain harrow, cultipacker or other approved device, so that the seed shall be placed within the depth range recommended by the supplier.

Immediately after the sowing operations have been completed, the seeded area shall be compacted by means of a cultipacker, roller or other approved equipment in order to reduce air pockets to a minimum. When a cultipacker or other equipment that leaves a roughened surface is used, the final rolling shall be along the contour and at right angles to the slopes to reduce water erosion, or at right angles to the prevailing wind to reduce dust. The Contractor may apply water to assist in obtaining a stand of grass. Such water shall not be applied at a rate sufficient to cause erosion.

All seeded areas shall be covered with an approved mulch. The mulch may be either wood cellulose fiber mulch or small grain straw tacked with asphalt emulsion. Wood cellulose fiber mulch shall be placed by hydro-seeder at a rate of 1500 pounds per acre. Straw mulch shall be placed at a rate of 1.5 to 2 tons per acre and tacked with 300-400 gallons per acre of asphalt emulsion immediately after seeding. Straw mulch material which contains excessive quantities of natural seed or noxious weeds, or other species detrimental to the planting or which could provide a menace to surrounding land will not be acceptable. Straw mulch material which is excessively brittle, or which is in an advanced stage of decomposition will not be accepted. Wood cellulose fiber mulch shall contain a nontoxic green dye to aid in gaging its application.

Unless otherwise approved by the Engineer, seed shall be sown for permanent grassing in the Spring between March 1 and May 31 and in the Fall between August 10 and September 30. Seeding shall be done in moderately dry to moist (not wet) soil and at times when the wind does not exceed a velocity of 5 miles per hour.

The seeded areas shall be maintained by the Contractor for a period of 45 days after sowing. Any areas which fail to show an adequate stand of grass after this period shall be reseeded and maintained for a like period at the Contractor's expense. Final acceptance will be made on the basis of visual inspection and approved by the Engineer.

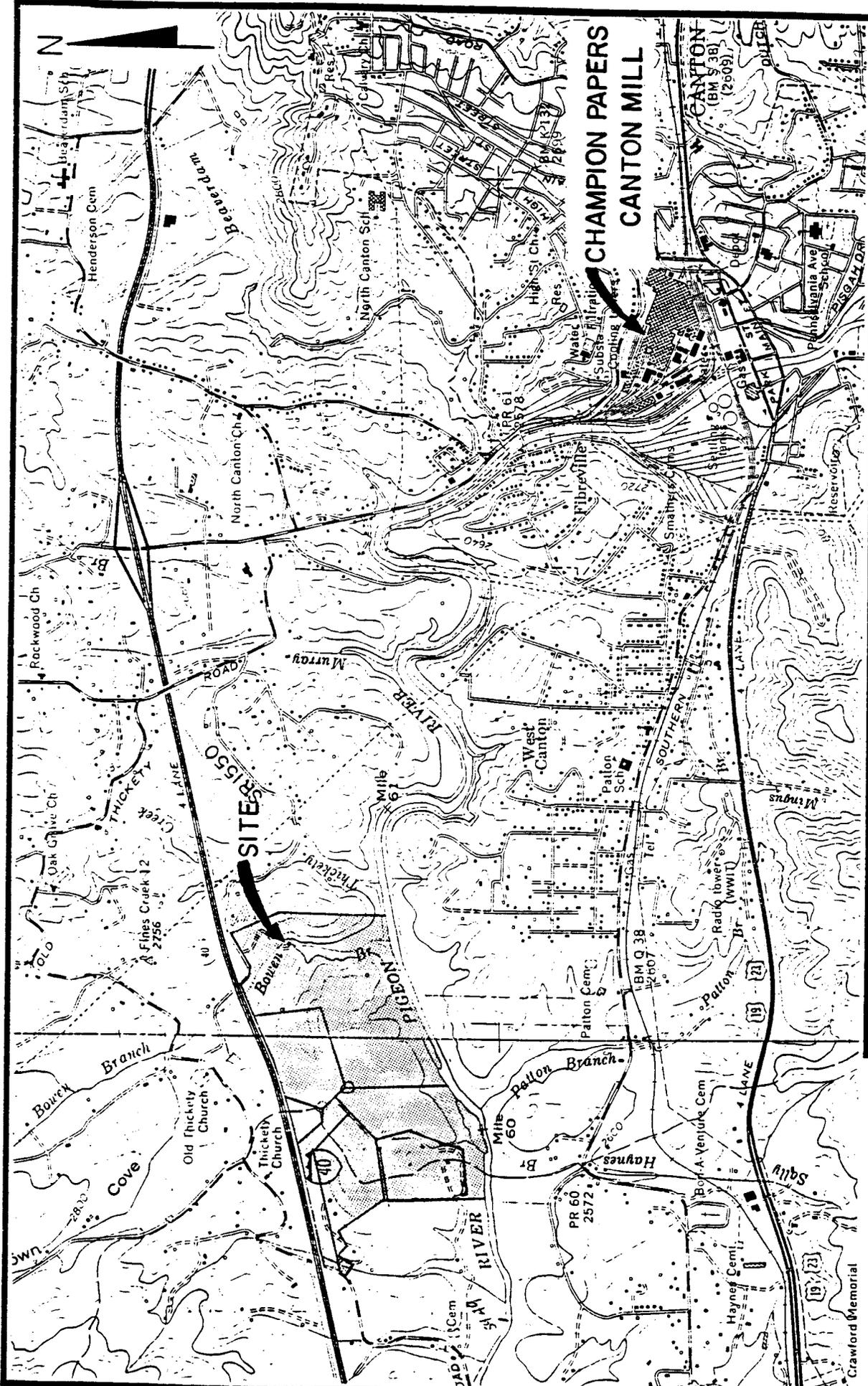
With consideration of the effect of current weather conditions and season of the year, the specified type and amount of seed, lime and fertilizer may be modified as recommended by the Haywood County Agent following soil tests made upon completion of earthwork and subject to final written approval of such modifications from the Engineer.

### 15.3 MEASUREMENT AND PAYMENT

Measurement of grassed areas will be by standard horizontal surveying techniques. Payment will be made at the contract price per acre for Grassing. This price shall include all labor, equipment and materials required to establish a permanent grass cover on all graded surfaces and maintain this grass cover until acceptance by the Engineer. This price shall also include any maintenance and protection required to control erosion on embankment fill surfaces prior to beginning permanent grassing operations.

APPENDIX  
SUBSURFACE DATA

- 1) Site Vicinity Map
- 2) Boring Location Plan
- 3) Test Boring Records
- 4) Summary of Plasticity Tests Data
- 5) Grain Size Distribution Sheets
- 6) Compaction Test Sheets
- 7) Triaxial Shear Test Sheets



**CHAMPION PAPERS  
CANTON MILL**

Ref: USGS Topographical  
Maps, Canton and Clyde  
Quadrangles, 7.5  
Minute Series Dated  
1967

**LAW ENGINEERING TESTING CO.**  
**CHARLOTTE, NORTH CAROLINA**

SITE VICINITY MAP  
LANDFILL NO. 6 SITE  
CHAMPION PAPERS - CANTON, NORTH CAROLINA

DWN. BY	MH	SCALE: 1"=2000'
CKD. BY	RMP	DRAWING NO. 1
APPR'D.	JNS	CH 4507 C

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