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South-Landfill-Remediation.*

ARCO

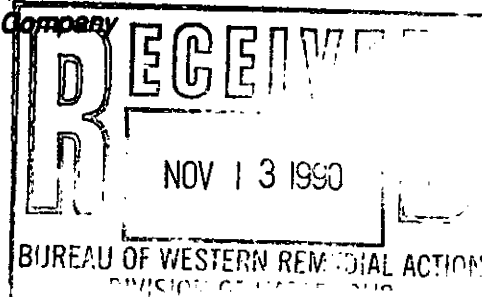
**Final Design For
South Landfill
Area Remediation
and West Bank Dike Extension
Sinclair Refinery Site
Wellsville, New York**

PREPARED BY

EBASCO

An ENSERCH® Engineering & Construction Company

November 1990



Project Plans and Final Design for South Landfill Area
Remediation, Sinclair Refinery Site, Wellsville, New York

General Comments

1. Regarding SLA placement, the design as presently submitted calls for a portion of the SLA material to be placed adjacent to the CELA. The 1985 Record of Decision (ROD) explicitly states that the SLA shall be consolidated onto the CELA. Any placement of SLA material outside the boundary of the CELA shall be designated as temporary storage and shall be consolidated onto the CELA prior to placement of the final cap.

Response

Excavated SLA material placed outside the boundary of the CELA shall be considered as temporary storage. Any material stored temporarily outside the CELA boundary shall be consolidated onto the CELA during CELA Remediation.

2. Regarding the site Contingency Plan (included as part of the Health and Safety Plan), concerns have previously been raised by the Allegany County Office of Emergency Services in a letter dated September 11, 1990 from John C. Tucker to Michael Turco. In light of these concerns, EPA requires that the Contingency Plan include a twenty-four hour emergency phone number and a list of hazardous chemicals that may be encountered during this phase of the project. EPA expects ARCO and its contractors to cooperate with the local emergency agencies during site activities.

Response

The site specific Health & Safety Plan (HASP) for work at the ARCO Wellsville site was developed in response to the requirements of 29 CFR 1910.120, and is designed to provide for the health and safety of site operations personnel. Because site operations are not an around the clock function, a twenty-four hour phone number was not published in the HASP.

During previous operations at the Wellsville site, ARCO/Ebasco have taken steps to identify to both the New York State Police and Wellsville Police, the names and phone numbers of responsible site contact personnel for off-hours emergencies. We will continue this practice during future operations at Wellsville and are willing to disseminate the names and numbers to other emergency services contact points.

2. Response (cont'd)

Regarding hazardous chemicals that may be encountered on-site, Ebasco has developed a hazard assessment which is addressed in the HASP which identifies major chemicals of concern. In addition, information regarding what contaminants have been found at the Wellsville site have already been made available and are currently available to both the public and emergency services agencies at the Wellsville public library. Ebasco has included with this response a list of hazardous chemicals that have been found on the site and thus "... may be encountered during this phase of the project". The list provided has not been ranked by any means other than alphabetical. Inclusion on the list solely indicates that the material was detected at some concentration within the boundaries of the landfill areas(s).

Arsenic
Beryllium
bis(2-ethyl hexyl) phthalate
Cadmium
Chromium
Copper
Cyclohexane
Docosane
1-Ethenyl-4-methyl cyclohexane
Heptadecane
Hexadecane
Lead
Methylene chloride
 1,3,5-Trimethyl benzene
Methyl cyclohexane
2-Methylnaphthalene
4-Methyl-4-hydroxyl-2-pentanone
Nickel
Octadecane
Pentadecane
Selenium
Silver
1,1,3-Trimethyl cyclohexane
m-Xylene
p-Xylene
Zinc

3. Descriptions of the indicator and verification soil sampling in the Sampling and Analysis Plan are confusing in a narrative format; a diagram or illustration needs to be provided for clarification purposes.

Response

Figures 3-2 and 3-3 have been added to the Sampling and Analysis Plan to clarify the indicator and verification soil sampling descriptions.

Specific Comments

1. Quality Assurance Project Plan (QAPP), Appendix B - This section of the submittal contains the design specifications for the SLA remediation. The following specific comments apply:

a) Page 02220-3, Para. 8.2.1 - This paragraph needs to reference section 8.3, as the excavation described may not be the full limit of excavation.

Response

The following sentence has been added to Paragraph 8.2.1.
"However, additional excavation may be required if it is determined that contamination exists beyond the visual waste/soil interface as determined by the Post-Excavation Sampling specified in Paragraph 8.3 of this section.

b) Page 02220-6, Para. 8.3.3, sub-para. 2 - Remove "and zinc which is proposed to be 96 ppm". As stated in previous comments, it is questionable whether or not ARCO's background values are indicative of the native soils. EPA and NYSDEC have concurred on allowing a 10 ppm buffer to exceed the cleanup criteria for soils established in the 1985 ROD. The correct cleanup criteria for zinc is 63 ppm.

Response

Paragraph 8.3.3, sub-paragraph 2 has been revised to delete the phrase "and zinc which is proposed to be 96 ppm".

c) Page 02225-1, Para. 1.1.1 - Add to this definition a statement that any excavated material placed outside of the CELA boundary as it is defined in the Contract Drawings shall be defined as temporary storage.

Response

As stated in response to General Comment No. 1, material excavated from the SLA placed outside the CELA boundary shall be considered as temporary storage. However, since the CELA boundary has been deleted from Drawings AR-2 and AR-6, as discussed in response to Specific Comment No. 1(g) below, Part 1 of Section 02225 has been revised to delete reference to the CELA and now reads as follows:

The work required under this section includes furnishing all plant, labor, equipment and materials for performing all operations for placement of the South Landfill Area (SLA) material at the locations shown on the Contract Drawings including SLA material placed as a test fill.

c) Response (cont'd)

1.1 Definitions

1.1.1 Placement: Placement shall consist of the siting and compaction of the excavated material at the location specified on the Contract Drawings.

d) Page 02225-1, Para. 2.1.1 - Include that the temporary contaminated storage area shall be bermed to prevent run-off and run-on.

Response

We do not see the merits of providing a berm for contaminated material storage areas to prevent run-off and run-on for the following reasons:

- a) Temporary storage areas will be covered with a geomembrane liner to avoid contamination of run-off.
- b) The side slopes of the temporary storage areas which are also covered with a geomembrane liner anchored along the perimeter will in fact act as a berm and avoid contact of run-on with contaminated material stored on the CELA and adjacent to the CELA. A typical detail of anchoring the geomembrane liner around the perimeter of temporary storage areas is added to the drawings.

e) Page 02225-2, Para. 2.2.1 - Include in this section a description of the geomembrane material. The geomembrane should also be covered to prevent shrinkage due to exposure to sunlight.

Response

A description and the required properties of the geomembrane is provided in Paragraph 6.1 of Section 02225. The geomembrane liner is used as a temporary cover for SLA material placed adjacent to the CELA and on the CELA to avoid direct contact with precipitation. The material selected is CSPE which does not require to be protected from sunlight for the period of time it will be utilized as a temporary cover (approximately 2-3 years).

f) Page 02225-2, Para. 2.3.1 - Specify that after its use, the access road will be removed and consolidated with the other waste material on the CELA.

Response

Paragraph 2.3.1 of Section 02225 has been revised to specify that upon completion of the SLA excavation, the portion of the access road between the SLA and the limits of storage for SLA material be removed and consolidated onto the CELA.

g) Appendix C, Drawings AR-2 and AR-6 - Both these drawings show the redefined CELA boundary as established in Ebasco's LFIR. EPA has not accepted this redefinition. These drawings need to be redrafted to show the CELA boundary as it appears in the 1985 ROD. This is especially crucial for drawing AR-6 which is the reference drawing for SLA placement (and any similar drawing that may be referred to regarding SLA placement). The 1985 ROD explicitly states that the SLA shall be consolidated onto the CELA, which is not reflected in the current drawings. As previously stated, contaminated material placed outside of the CELA boundary shall be designated as temporary storage.

Response

The CELA boundary has been deleted from Drawings AR-2 and AR-6. Since the scope of work for SLA Remediation involves storage of excavated SLA material at locations specified on the Contract Drawings, it is not necessary to show the boundary of the CELA on these drawings. As stated in response to General Comment No. 1, consolidation of contaminated material onto the CELA shall be performed during CELA Remediation. Therefore, it is not addressed in the Contract Documents for SLA Remediation.

2. Sampling and Analysis Plan (SAP):

a) Page 10, Para. 2 - The samples for semi-volatiles and metals need to be collected from 4-6 inches below ground surface and the text changed accordingly.

Response

Paragraph 3.1 (page 10) of the Sampling and Analysis Plan has been revised to specify that samples for semi-volatiles and metals be collected from 4-6 inches below the ground surface.

b) Page 10, Para. 2 and Page 11, Section 3.1.1, Item 6 - The samples for TCL VOC analysis need to be collected from a depth of at least 2 feet and the text changed accordingly.

Response

Paragraph 3.1 (Page 10) of the Sampling and Analysis Plan has been revised to specify that samples for volatile organic analysis be collected from a minimum depth of 2 feet. Reference to depth of samples for TCL VOC analysis has been deleted from Item 6 of Paragraph 3.1.1 which now reads as follows:

6. Samples for TCL VOC analysis will be collected as discrete samples utilizing an auger or split spoon.

c) Page 10-11, Section 3.1.1 - It is recommended that an auger rather than scoop be used for soil sampling and that a drive tube sampler be used to collect the sample after the correct sampling depth is reached.

Response

Paragraph 3.1.1, Item 2 has been revised to specify a scoop for obtaining samples for semivolatile and metal analysis and a drive tube sampler for volatile organic analysis samples.

DIVISION II - TECHNICAL SPECIFICATION
FOR
SOUTH LANDFILL AREA REMEDIATION AND
WEST BANK DIKE EXTENSION

Prepared by
EBASCO SERVICES INCORPORATED
NOVEMBER 1990

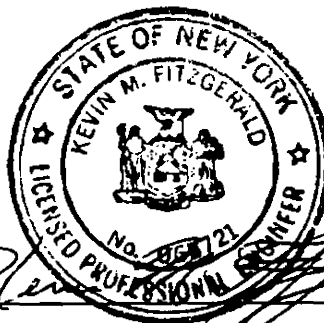
CLIENT: ATLANTIC RICHFIELD COMPANY
LOS ANGELES, CALIFORNIA

PROJECT: SINCLAIR LANDFILL
SOUTH LANDFILL AREA REMEDIATION
AND WEST BANK DIKE EXTENSION

LOCATION: WELLSVILLE, ALLEGANY COUNTY
NEW YORK

TECHNICAL SPECIFICATIONS

DIVISION 2 - SITEWORK



APPROVED BY:

P.E. NO. 065721
EBASCO SERVICES INC.
NEW YORK, NEW YORK

Revision	Prepared By	Reviewed By	Approved By	Date	Pages Affected
R1	R J Locsin	V.K. Patel-	<i>[Signature]</i>	11-2-90	02220-3, 02225-1,2

APPROVED BY:

Michael A. Turco
M. TURCO
(PROJECT MANAGER - ARCO)

APPROVED BY: See USEPA approval letter from Carole Petersen
to Michael A. Turco dated September 26, 1990
UNITED STATES ENVIRONMENTAL
PROTECTION AGENCY

TECHNICAL SPECIFICATIONS

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SECTION # 02000

INTRODUCTION

The Sinclair Landfill site is located in the southern portion of the former Sinclair Oil Refinery property. The former 103-acre refinery is located in Allegany County, New York, in the Town of Wellsville, southeast of the Village of Wellsville, and is bound on the west by South Brooklyn Avenue, on the north by a residential area, and on the south and east by the Genesee River.

The site is divided into two sub-sites: the refinery portion, consisting of approximately 90 acres where the original refinery operations took place (now utilized as a light industrial park and agricultural and technical college campus), including tank farm areas; and the 12.5 acre landfill portion, which contains waste from the original refinery operation.

The landfill portion, which is located along the bank of the Genesee River, consists of the "Central Elevated Landfill Area" (CELA), an approximately 7.0 acre area and the "South Landfill Area" (SLA), an approximately 1.2 acre area. Between the two landfill areas is a 1 acre sand and gravel borrow area. It is estimated that 145,000 cubic yards of refinery waste was disposed of in the CELA and 14,500 cubic yards was disposed of in the SLA.

The CELA is wooded and covered with vegetation, and has approximately 300 rusted and corroding 55-gallon drums, the majority of which are empty. A small pool of oil, probably the remains of a lagoon, is located on top of the landfill. A chain link fence partially restricts access to the landfill from the roadway, and access from the river bank is unrestricted.

The topography of the site is generally sloping toward the Genesee River. There is little relief throughout the site with elevations ranging from 1495 to 1515 feet above mean sea level.

The reach of the Genesee River, which runs along the south and east boundary of the landfill site, displays a typical meandering pattern. The northerly flow of the Genesee River around the partially protected landfill is causing bank erosion and point bar accretion. As the meanders have migrated downstream toward the sheet pile weir, the channel orientation with respect to the landfill and flow conditions approaching the weir have become unfavorable. This has resulted in increased bank erosion, especially during floods, eroding several hundred feet of the landfill. This increased bank erosion and possible inundation of the landfill led to the construction of a dike and a channel relocation at the upstream portion of the landfill site in 1983. The existing riprap lined dike protects the west bank at the upstream end of the landfill.

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In July 1982, EPA and NYSDEC entered into a Cooperative Agreement to undertake a Remedial Investigation (RI) and Feasibility Study (FS) at the Sinclair Refinery Site. The RI was divided into two phases: Phase I was a detailed characterization of the landfill portion and reconnaissance of the refinery portion of the site. The Phase II RI will provide a more focused investigation of those areas on the refinery portion of the site where additional data requirements were identified.

The USEPA signed a Record of Decision (ROD) on September 30, 1985, officially selecting a remedy for the landfill portion of the site. The remediation contains the following measures:

- 1) Removal and off-site disposal of approximately 300 drums on the surface of the Central Elevated Landfill Area.
- 2) Excavation of the wastes from the South Landfill Area (SLA).
- 3) Filling of the excavated SLA area with clean fill.
- 4) Consolidation of the excavated South Landfill Area wastes onto the Central Elevated Landfill Area.
- 5) RCRA capping of the consolidated wastes on the Central Elevated Landfill Area.
- 6) Partial Genesee River Channelization to protect the landfill from erosion and flood inundation from the Genesee River.
- 7) Erection of a fence to secure the entire Landfill Site.

The work covered by these specifications is only for Items 2, 3, 4 and part of 6 above.

The Contractor shall perform all work stated in the contract. The contract consists of all work described by the specifications and shown on the drawings, plus all provisions, conditions, terms, and requirements found in the proposal package, along with any addendum, modifications, amendments or changes issued to the contract.

The Contractor is advised that the work will be performed on a hazardous waste site as identified on the National Priorities List. This listing was established pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and the National Contingency Plan. The Contractor is responsible for developing a Site Specific Health and Safety Plan (SSHSP) for his operations. The Contractor shall implement this plan taking precautions necessary to protect the public and work force personnel from potential hazards. The Contractor shall utilize personnel with approved hazardous waste training as required.

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SECTION 02040

DUST AND VAPOR CONTROL

PART 1 - GENERAL

The work required under this Section includes furnishing all plant, labor, materials and equipment and performing all operations required for providing dust and vapor control as specified herein.

PART 2 - REQUIRED WORK

2.1 The Contractor shall be responsible for providing adequate dust and vapor control measures.

2.2 Dust control shall consist of furnishing water supply, required equipment, additives, accessories and incidentals, and carrying out proper and efficient measures wherever and as often as necessary to reduce dust nuisance, and to prevent dust originating from construction operations and causing damage to open fields and dwellings, or causing a nuisance to persons during the completion of the Contract, as required by the Construction Manager or his designee.

2.3 All equipment used for application of water shall be equipped with a positive means of shut-off.

2.4 At least one mobile unit with a minimum capacity of 5,000 gallons shall be available for applying water for dust control.

2.5 To conserve water, the Contractor may use chemical additives in dust-control water. The use, location of application, amount and type of additives proposed for use by the Contractor shall be subject to approval by the Construction Manager or his designee and the EPA.

END OF SECTION

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SECTION 02060

SITE PREPARATION

PART 1 - GENERAL

The work required under this Section includes furnishing all plant, labor, equipment, and materials to perform all preparatory work as shown on the Contract Drawings and as specified herein. All work shall be conducted in a manner to prevent damage to the structures which are to remain and to maintain or improve the aesthetics and ecology of the site. The Contractor is cautioned that work required is located in the vicinity of existing utilities and at a hazardous waste site. All necessary precautions shall be taken to provide for safety of personnel in these areas.

PART 2 - EQUIPMENT

Prior to starting work, a list of all equipment, tools, machines, including their sizes, capacities and operating speeds, to be used in the performance of the work shall be submitted to the Construction Manager or his designee for information purposes. All items shall be maintained in safe and satisfactory working condition at all times.

PART 3 - PROTECTION OF EXISTING UTILITIES

The Contractor shall determine the locations of existing utilities in the project area. Information on known locations of utilities are shown on the Contract Drawings. However, the Contractor shall verify all such information in the field and shall assume all liability for damage to all utilities whether or not identified on the Contract Drawings. The Contractor shall contact the Wellsville Utility Coordinator (Telephone (716) 593-1780) and all potentially affected utilities prior to starting any construction activity. It shall be the Contractor's responsibility to take whatever measures are necessary to prevent damage to utilities.

END OF SECTION

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SECTION 02110

SITE CLEARING AND GRUBBING

PART 1 - GENERAL

The work required under this Section includes furnishing all plant, labor, equipment, and materials for performing all operations required for clearing the South Landfill Area (SLA), the West Bank Dike Extension, and a portion of the Central Elevated Landfill Area (CELA) at the Sinclair Refinery Site, as well as grubbing the foundation of the West Bank Dike Extension outside of the SLA as shown on the Contract Drawings.

1.1 Definitions

1.1.1 Clearing: Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish occurring in the areas to be cleared.

1.1.2 Grubbing: Grubbing shall consist of the removal and disposal of stumps, roots larger than 1-1/2 inches in diameter, and matted roots from the designated grubbing areas.

1.2 Dust Control: The Contractor shall comply with dust control requirements specified in Section 02040 of the Specifications.

PART 2 - REQUIRED WORK

2.1 Clearing: Clearing shall consist of the removal of all trees (cut just above ground surface), brush, logs, limb wood, rubbish, and all other obstructions on the surface of the original ground, except such trees and vegetation as may be directed by the Construction Manager or his designee to be left standing. Trees directed to be left standing within the cleared areas shall be trimmed of dead branches 1-1/2 inches or more in diameter and shall be trimmed of all branches to the heights directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than 1-1/2 inches in diameter shall be painted with a tree-wound paint approved by the Construction Manager or his designee. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require.

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2.2 Grubbing: Grubbing shall consist of the removal of stumps, roots larger than 1-1/2 inches in diameter and decayed matter to a depth of not less than 18 inches below original ground in the dike foundation areas outside the limits of the SLA only.

2.3 Disposal of materials from clearing: Material from clearing shall be disposed of off-site, in accordance with all applicable laws and regulations, or, at the discretion of the Contractor, shall be chipped and stored on site in an area to be designated by the Construction Manager.

2.4 Disposal of materials from grubbing: Roots and other debris from grubbing shall be placed in an area on the CELA to be designated by the Construction Manager.

END OF SECTION

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SECTION 02200

DIKE EARTHWORK

PART 1 - GENERAL

The work required under this Section includes furnishing of all plant, labor, equipment and materials to perform stripping, excavation, and construction of the West Bank Dike Extension and filling of the excavated SLA area as shown on the Contract Drawings and as specified herein. The work required under this section includes, but is not limited, to:

- (1) Stripping topsoil.
- (2) Temporary drainage.
- (3) Erosion and sediment control (Section 02485)
- (4) Excavation.
- (5) Furnishing materials from off-site sources.
- (6) Stockpiling materials.
- (7) Hauling material from stockpiles or borrow areas to points of placement.
- (8) Placing and compacting fill.
- (9) Disposing of material.

PART 2 - APPLICABLE PUBLICATIONS

American Society for Testing and Materials (ASTM)

- | | |
|-----------------|--|
| D 422-63 (1972) | Particle-Size Analysis of Soils |
| D 1556-82 | Density of Soil in Place by the Sand-Cone Method |
| D 698-78 | Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5-1/2-lb (2.49-kg) Rammer and 12-in. (304.8 mm) Drop |
| D 2216-80 | Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures |

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D 2488-84	Description and Identification of Soils (Visual - Manual Procedure)
D 2850-87	Unconsolidated, Undrained Compressive Strength of Cohesive Soils in Triaxial Compression
D 2922-81	Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
D 3017-78	Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
D 4318-84	Liquid Limit, Plastic Limit and Plasticity Index of Soils

PART 3 - CONSTRUCTION PLAN FOR EXCAVATION AND DISPOSAL

3.1 General: The Contractor shall prepare a construction plan for excavation and disposal for approval by the Construction Manager or his designee. The construction plan shall be approved by the Construction Manager or his designee prior to starting any excavation.

3.2 Requirements: At a minimum the construction plan shall include:

- (1) Proposed method(s) of excavation.
- (2) Proposed method(s) of transport and disposal.
- (3) Procedures for crossing and protecting existing structures and utilities from damage.
- (4) Sequencing of operations.

3.3 Submittal: The Contractor shall submit the construction plan to the Construction Manager or his designee for approval twenty days prior to the anticipated start of work.

PART 4 - MATERIALS

4.1 Compacted Dike Fill Material: Material classification for dike construction in all areas 0.5 feet above standing water level shall be in conformance with ASTM D 2488. Compacted dike fill materials shall be obtained and furnished by the Contractor from approved sources outside of the project site. Compacted dike fill material shall consist of silty clay with a minimum of 30 percent fines of inorganic silts and clays in accordance with the Unified Soil Classification System, typically SC, CL or combinations thereof. The compacted dike fill material shall be free from large stones 3" and larger in

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equivalent diameter, ice, snow, frozen earth, topsoil, debris, rubble, organic matter, vegetation and other unacceptable materials.

4.1.1 The liquid limit and plasticity index of the compacted dike fill material shall be less than 50 and 30, respectively in accordance with ASTM D 4318. At 95 percent of maximum dry density in accordance with ASTM D698, material shall have undrained shear strength greater than 500 pounds per square foot in accordance with ASTM D2850, and permeability as determined in the laboratory of equal or less than 1×10^{-5} cm/ sec in accordance with U.S. Army Corps of Engineers Testing Procedures.

4.1.2 Moisture content of earth materials shall be controlled to achieve specified compaction. Moisture content shall be within plus or minus two percent of optimum.

4.2 Compacted Dike Fill Material for Areas Below Water: Materials required for dike construction in all areas below standing water in the Genesee and for up to six inches above the water surface shall be pit run gravel from locally excavated sources, or similar material from off site sources.

4.3 Fill Material: Fill material required to fill the area behind the Dike Extension on the land side of the dike shall be clean common fill material and obtained from off-site sources.

4.4 Material replaced 6 inches above the water surface in the key trench shall be compacted to 95 percent of maximum dry density in accordance with ASTM D698. This material shall be free from stones 3" and larger in equivalent diameter, ice, snow, frozen earth, topsoil, debris, rubble, organic matter, vegetation or other unacceptable materials. Materials required for key trench below G.W.L. and for up to 6 inches above the water surface shall comply with Paragraph 4.2.

PART 5 - CONSTRUCTION

5.1 Stripping

5.1.1 Stripping shall consist of the removal of all topsoil and organic material to a minimum depth of 6 inches within the limits of dike foundation outside the SLA as shown on the Contract Drawings.

5.2 Excavation

5.2.1 Excavation shall be performed for key trench and toe protection trench as shown on the Contract Drawings.

5.2.2 Excavation shall be carried out to the dimensions indicated on the Contract Drawings.

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5.2.3 During excavation, the contractor shall monitor for the presence of contaminated material in accordance with the Section 02260 of this specification and the Sampling and Analysis Plan (SAP). For identification and disposal of contaminated and waste material see Section 02260.

5.3 Transporting of Borrow Material for Dike Compacted Fill

5.3.1 Borrow material shall be obtained by the Contractor from off-site borrow area(s) approved by the Construction Manager or his designee.

5.3.2 In transporting off-site borrow material, the Contractor shall avoid spillage from trucks onto roads. Spilled material shall be removed immediately.

5.4 Compacted Dike Fill

5.4.1 Earth surfaces upon which compacted fill materials are to be placed shall be scarified to allow for binding of new material with existing material.

5.4.2 Materials shall be placed so that grades and cross sections shown on the Contract Drawings are obtained. A tolerance of plus or minus 0.1 feet will be permitted. Earth core of dikes to receive stone protection shall not be constructed more than 100 feet in advance of completed stone protection. If the Construction Manager or his designee can reasonably anticipate that dike construction will be interrupted for more than two continuous days, including weekends and holidays, the Contractor shall provide approved protection for exposed ends of work prior to start of interruption. The Contractor shall inform the Construction Manager or his designee of situations that may result in possible interruption of work. The above required protection shall be equivalent to protection provided in completed structure and shall be at no additional cost to the Owner.

5.4.2.1 Placement in Water: Materials shall not be deposited from a height greater than two feet above water surface. Material placed in water shall be brought to a height of 0.5 feet above the water surface prior to beginning placement and compaction of materials above water.

5.4.2.2 Placement Above Water: Materials placed above water surface shall be compacted to 95 percent of maximum dry density in accordance with ASTM D 698. The maximum lift thickness prior to compaction shall be 12 inches.

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5.4.2.3 During compaction, moisture content of compacted fill material shall be within $\pm 2\%$ of optimum moisture content as determined by laboratory analysis to achieve specified density. Uniform moisture distribution shall be obtained by disking, blading, or other methods approved by the Construction Manager or his designee prior to compaction of a layer.

5.4.2.4 If surface of any layer of fill in place is too wet for proper compaction of layer of fill material to be placed thereon, it shall be removed, allowed to dry or worked with harrow, scarifier, other suitable equipment to reduce water content to required amount, and then recompacted before next succeeding layer of fill is placed.

5.5 Fill Material: The area behind the west dike extension shall be filled with material specified in paragraph 4.3. Fill shall be placed and compacted to achieve 85 percent of maximum dry density in accordance with ASTM D 698. During compaction, the moisture content of the fill material shall be within $\pm 3\%$ of optimum moisture content as determined by laboratory analysis to achieve the specified density.

5.6 Drainage

5.6.1 The Contractor shall provide for temporary surface drainage during construction to prevent ponding and runoff erosion.

5.6.2 Filling of ponding areas and grading for temporary drainage ditches shall be performed.

5.7 Geotextile: Geotextile shall be placed as specified in Section 02400 of the Specifications.

PART 6 - QUALITY CONTROL

6.1 The Contractor shall comply with quality control requirements of the Specifications.

6.2 Field Inspection and Testing

6.2.1 The tests listed below shall be performed as specified. Field test reports shall be submitted daily for record as required.

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- (1) Laboratory Maximum Density: Laboratory maximum density tests shall be performed on all fill material in accordance with ASTM D698. Prior to placing, at least two tests for compacted dike fill and two tests for fill material shall be performed on representative samples of the fill material to be placed. Additional tests shall be performed if the composition of the material being used is different than that previously tested.
- (2) Gradation: Gradation tests shall be performed on borrowed fill material in accordance with ASTM D 422. One gradation test shall be performed for each sample used for laboratory maximum density testing, and for each 1000 cubic yards of material to be used for compacted dike fill. In addition, gradation tests shall be performed whenever it appears material may not meet specified gradation.
- (3) Moisture Content: At least two tests for compacted dike fill and two tests for fill material for moisture content shall be performed in accordance with ASTM D 2216.
- (4) In-place Testing: In-place density and moisture content testing on compacted dike fill material and fill material shall be performed by nuclear methods in accordance with ASTM Standards D2922 and D3017 or the Sand Cone Method for density in accordance with ASTM Standard D1556. However, prior to use, calibration of the nuclear equipment shall be performed using either laboratory or field methods in accordance with ASTM D2922 and D3017. A comparison to results from sand cone testing in accordance with ASTM D1556 shall be performed at least once for each 10 tests performed using nuclear density equipment. In-place density shall be determined at a depth of 12 inches below grade and the tests shall be performed for each 750 cubic yards placed but not less frequently than one test each day for each area being compacted. The nuclear density equipment shall be recalibrated whenever a different borrow soil is used for dike construction.

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6.2.2 Field inspection notification to the Construction Manager or his designee is required for the following witness points:

- (1) Prior to covering with borrowed fill, inspection of dike foundation material at bottom of key trench.
- (2) Prior to performing in-place density test, inspection of point selected for testing.

PART 7 - SUBMITTALS

Documents shall be submitted in accordance with the attached form: "Document Submittal Requirements".

END OF SECTION

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DOCUMENT SUBMITTAL REQUIREMENTS

SUBMIT DOCUMENTS PRIOR TO THE POINTS INDICATED BY THE CODE BELOW:

F - FABRICATION

C - CONSTRUCTION/INSTALLATION

T - TESTING

A - FINAL ACCEPTANCE

S - SHIPMENT

DOCUMENT REQUIREMENTS	See Paragraph	For Approval	For Record
1. Laboratory maximum density test reports	6.2.1 (1)		*
2. Gradation test reports	6.2.1 (2)		*
3. Moisture content test reports	6.2.1 (3)		*
4. In-place density test reports	6.2.1 (4)		*
* Daily			

SECTION 02220

EXCAVATION OF SLA

PART 1 - GENERAL

The work under this Section shall include furnishing all labor, materials, equipment and services required for excavation of the contaminated South Landfill Area (SLA) material at the Sinclair Refinery Site as shown on the Contract Drawings.

PART 2 - REQUIRED WORK

2.1 The depths of excavation shall be as specified on the Contract Drawings and as described in this section.

2.2 All equipment and material supplies shall be in good working condition and shall not be contaminated.

2.3 The Contractor shall provide protection to assure that precipitation does not cause SLA material to be transported out of the SLA area. The protection shall consist of temporary runoff/runon diversion, and covering the excavated portion of the SLA daily.

2.4 The Contractor shall handle contaminated material in a manner that will protect site personnel, the public, and the environment in accordance with all applicable Federal, state, and local laws and regulations.

2.5 The Contractor shall decontaminate all equipment prior to removal from the site in accordance with the health and safety project plan of this Contract.

2.6 The Contractor shall maintain all work areas free from excess dust to such reasonable degree as to avoid causing a hazard or nuisance to others. Dust control shall be performed as the work proceeds and wherever a dust nuisance or hazard occurs. Refer to Section 02040 for dust control requirements.

2.7 The Contractor shall design, furnish, install and maintain all erosion control measures during the course of excavation in accordance with Section 02485.

2.8 The Contractor shall develop a cost effective excavation plan considering the following factors:

- (1) Time required for sampling and testing of soil to determine if further excavation is required.
- (2) Minimum disruption to other construction activities on the site.

- (3) All other factors required to meet the scheduled completion date.

PART 3 - REGULATORY REQUIREMENTS

Excavation activities specified in this Section shall conform to safety requirements as specified in OSHA part 1926.

PART 4 - QUALITY ASSURANCE

4.1 The Contractor shall survey and stake all excavations.

4.2 The Contractor shall assist the inspection and test personnel for elevation checks during the excavation operations, for cross-section surveys for quantity and for soil tests at the end of the excavation, as requested by the Construction Manager.

4.3 The Contractor shall ensure that the material and workmanship provided will properly reflect the specified requirements.

PART 5 - SUBMITTALS

The Contractor shall submit the excavation plan to the Construction Manager for review and acceptance prior to proceeding with the work.

PART 6 - EXCAVATION LIMITS

Excavation limits shown on the Contract Drawings are from earlier field investigations and are meant to include known contaminated material requiring excavation. However, additional excavation may be required if it is determined either visually, or by sampling and analysis, that additional contaminated material exists. (See Part 8 - Items 8.2 and 8.3 for visual and sampling and analysis requirements).

PART 7 - MATERIALS

The Contractor shall furnish sufficient amounts of backfill soil borrow from approved off-site locations as defined in Section 2200.

PART 8 - EXECUTION

8.1 Temporary Drainage

8.1.1 The Contractor shall provide temporary runoff and runoff diversion by constructing berms or trenches around the SLA

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excavation area. The diversion will be adequate to prevent any runoff and runoff from the excavated area.

8.1.2 When excavating the mounded portion of the SLA (i.e., above the existing adjacent natural terrain), the Contractor shall cover the excavation at the end of each working day with a CSPE geomembrane. The cover shall prevent precipitation from coming into contact with the SLA material and causing potential contaminated material to leave the SLA area.

8.2 Excavation

8.2.1 The extent and depth of the excavation shall be determined by the visual characterization of the waste/soil interface.

The interface is identified as the point at which consolidated, undisturbed silty sand and gravel, tan to olive gray in color exists just below or adjacent to the waste material. The excavation limits shown on the Contract Drawings are based on a field investigation program consisting of soil borings and trenches. The actual limits of excavation shall be to the visual waste/soil interface or ground water level. However, additional excavation may be required if it is determined that contamination exists beyond the visual waste/soil interface as determined by the Post-Excavation Sampling specified in Paragraph 8.3 of this section. R1

8.2.2 All excavated material (stumps, roots and other debris) shall be placed on the Central Elevated Landfill Area (CELA) as specified in Section 02225.

8.2.3 If, in the course of the excavation, waste drums are encountered, the rusted, damaged, and open ones shall be shredded and placed on the CELA, and the intact ones shall be overpacked, staged and covered in an area approved by the Construction Manager. These drums will eventually be removed for off site disposal together with drums from the CELA requiring removal and disposal.

8.2.3.1 All handling, moving and transport of drums shall be by use of mechanical equipment only, no drums shall be handled manually. All equipment shall be site dedicated until the completion of the work. Equipment shall be decontaminated prior to removal from site.

The Contractor shall take all steps necessary to identify and preserve any potential evidence (labels, documents, etc.) that could establish or aid in establishing the identity of the party or parties responsible for the presence of hazardous substances at the site. This shall include, but is not limited to, notifying construction Manager or designee, and providing logging, mapping and photographic documentation.

The Contractor shall eliminate or stabilize any hazardous conditions from drums which are smoking, smoldering, excessively hot or burning prior to their removal from the excavated material. A grappler equipped backhoe or front end loader shall be used to remove drums from the excavated areas. The guidelines for the drum removal and staging are presented below:

- (1) Determine drum conditions, i.e., open drum, leaking drum, bulged drum and empty drum.
- (2) Drums which potentially may be under internal pressure, as evidenced by bulging, shall be sampled in place. Extreme care shall be exercised when working adjacent to potentially pressurized drums. All openings of pressurized drums shall be performed by remote operated equipment only.
- (3) Should movement of a pressurized drum be unavoidable, handling shall be by a grappler unit constructed for explosive containment. The bulged drum shall be moved only as far as necessary to allow seating on firm ground or shall be carefully overpacked.
- (4) Openings into pressurized drums shall be plugged and the bung holes fitted with pressure venting caps set at 5 psi release.
- (5) Personnel involved in handling and transporting of drummed waste shall work in teams containing no fewer than two people. Visual contact shall be maintained between members of the working team at all times. All team members shall be able to communicate between themselves and with the Industrial Hygienist or the Health and Safety Specialist by two-way radio during all times on the work site.
- (6) Removed drums shall be trucked to the designated drum storage area and staged by forklift.
- (7) The drums in the storage area will be covered with a CSPE geomembrane. Refer to Section 02225 for material requirements.
- (8) The Contractor will be responsible for the collection and disposal of runoff and leachate from the drum storage area.

8.2.3.2 Handling of drummed waste shall be, at all times, conducted in a controlled and safe manner which will minimize damage to structurally sound drums, or overpacks. If during transport or handling, leakage or spillage of waste occurs, the drums shall immediately be placed within an overpack unit and spills will be immediately cleaned up. Overpack units shall be provided at the staging area, at areas of existing drums and along all site roadways. All containerized storage of drums shall comply with 40 CFR 264.175.

8.2.3.3 The Contractor should be prepared to provide all labeling and services, at the direction of the Construction

Manager or Designee including overpacking and/or repacking any non-compatible waste or laboratory reagents in Federal DOT approved containers.

8.3 Post-Excavation Sampling

8.3.1 Because of the time elapsed between site investigations and the actual construction work, it is possible that some contamination may have migrated into deeper layers of soils beyond the limits shown on the Contract Drawings or the visual waste/soil interface. After excavation to the visual waste/soil interface, the Contractor shall sample and test the soil below this depth to verify that the required remediation criteria has been achieved.

8.3.2 After excavation to the limits shown on the contract drawings and the visual waste/soil interface, a horizontal grid will be established on 14 foot centers and soil samples from center of each 14x14 cell will be collected and composited in three samples per 4704 square feet, each one with equal number of 14 x 14 cells adjoining each other. These samples will be analyzed for the following indicator organic compounds.

<u>SLA Analyte</u>	<u>ROD Criteria for Soils (ppb)</u>
Pentadecane	332,945
Hexadecane	227,408
Heptadecane	181,950
Octadecane	167,163

Also, the field sampling team will select three discrete samples, one from each group of 8 adjoining 14 x 14 cells, to be analyzed for the following indicator organic compounds.

<u>SLA Analyte</u>	<u>ROD Criteria for Soils (ppb)</u>
Methylcyclohexane	2,500
Cyclohexane	1,345
Xylene (all isomers)	637

If any of the compounds above are detected at levels above the ROD cleanup criteria, additional excavation will be performed followed by similar sampling and analysis to determine whether or not the ROD criteria has been achieved. Once the subject areas, each approximately 4704 square feet, are determined to be within the ROD criteria for indicator organic compounds, three discrete samples, one from each group of 8 adjoining cells, will be collected from the surface of the excavation for semivolatile and metal analysis. These samples will be composited into one sample for each 4704 square foot area. Also, one discrete sample from the determinate area (4704 square feet) will be collected from 2'-0 depth below the excavation limit for volatile organic analysis.

8.3.3 The confirmational samples will be analyzed for all chemicals having ROD criteria for soils, including metals (See Table No. 1). If chemicals other than metals are detected in excess of the ROD criteria, additional excavation will be performed. If not, backfilling will be performed as follows:

- (1) If the analysis for metals show compliance with the ROD criteria, backfilling will be performed under the dike using compacted dike material and behind the dike using fill material (see Dwg. AR-4, Section A-A).
- (2) If the analysis for metals show that they are within the ROD criteria plus 10 ppm (except for selenium which is still non detect), the entire SLA will be backfilled with compacted dike fill material in order to prevent contact with plant or animal life.
- (3) If the analysis for metals show that they exceed the limits in (2) above, additional excavation and sampling will be performed until the criteria limits are not exceeded or an alternate plan will be developed to ensure contaminant levels in excess of ROD criteria do not runoff or otherwise contact plant or animal life.

8.3.4 Use of an EPA-CLP/NYSDOH approved offsite laboratory is acceptable provided the transportation of samples would not contribute to any significant delay of the construction process.

8.4 Backfilling, Filling, Testing and Grading

Backfilling, filling, testing and grading shall be as defined in Section 02200.

8.5 Seeding

8.5.1 Prior to seeding, any damage to prepared areas compacted shall be reworked or restored to the condition previously specified.

8.5.2 The Contractor shall accomplish seeding and mulching application in accordance with Section 02485 of these specifications.

END OF SECTION

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TABLE NO. 1
SOIL CLEAN-UP CRITERIA

<u>Compound</u>	<u>Criteria (ppb)</u>
Priority Volatile Organics	
benzene	24
chlorobenzene	36
trans-1,2-dichloroethylene	325
1,1,2,2-tetrachloroethane	5
toluene	72
vinyl chloride	207
Priority Base/Neutral Extractables	
fluoranthene	91
Priority Acid Extractables	
2,4-dimethylphenol	
Cyanides and Phenolics	
Total Cyanide	
Total recoverable phenols	19
Priority Metals	
arsenic	15,000
copper	9,700
nickel	26,300
selenium	ND
silver	600
zinc	53,000
Priority Pesticides	
chlordane	4
toxaphene	
endrin	
heptachlor and heptachlor epoxide	
4,4'-DDD	0.6
4,4'-DDE	8.4
PCBs	12.1
Nonpriority Volatile Organics	
cyclohexane	1,345
methylcyclohexane	2,500
methyl-1-pentene	995
3,4,4-trizethyl-4-pentene	
xylene	637

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TABLE NO. 1 (Cont'd)
SOIL CLEAN-UP CRITERIA

<u>Compound</u>	<u>Criteria (ppb)</u>
Nonpriority Base/Neutral Extractables	
docosane	
eicosane	
heptadecane	181,950
hexadecane	227,408
octadecane	167,163
pentadecane	332,945
1,3,5-trizethylbenzene	
siloxane	
4-hydroxyl-4-methyl-2 pentanone	
hexadecanoic acid	

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SECTION 02225

PLACEMENT OF SLA MATERIAL

PART 1 - GENERAL

The work required under this section includes furnishing all plant, labor, equipment and materials for performing all operations for placement of the South Landfill Area (SLA) material at the locations shown on the Contract Drawings including SLA material placed as a test fill. R1

1.1 Definitions

1.1.1 Placement: Placement shall consist of the siting and compaction of the excavated material at the location specified on the Contract Drawings.

1.1.2 Test Fill: The test fill shall consist of the placement of a portion of the SLA material and installation of instrumentation to primarily test the structural capacity of the in-situ CELA waste material.

PART 2 - REQUIRED WORK

2.1 Placement of SLA Material

2.1.1 Placement shall consist of hauling the SLA material to the location specified on the Contract Drawings, compaction of the material, and covering the material with a geomembrane.

2.1.2 The test fill shall not be placed until the Test Fill area has been inspected and accepted by the Construction Manager. Fill shall not be placed upon a frozen surface, nor shall snow, ice, or frozen material be incorporated in the fill.

2.1.3 Fill shall be placed in approximately horizontal layers. The thickness of each layer before compaction shall not exceed 12 inches. Materials placed by dumping in piles or windrows shall be spread uniformly to not more than 12 inches before being compacted.

2.1.4 Density of the compacted SLA material shall be a minimum of 90% of the maximum dry density achieved in standard proctor tests (ASTM D698). The water content shall not vary more than plus or minus 3% of the optimum moisture content according to test results submitted to the Construction Manager.

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2.2 Cover System

2.2.1 The SLA material placed adjacent to the CELA and on the CELA as a Test Fill shall be covered with a geomembrane to avoid direct contact with precipitation.

2.2.2 Each panel of the CSPE geomembrane shall be laid out and installed in accordance with the manufacturer's recommendations and the approved shop drawings prepared by the Contractor. The layout shall be designed to keep joining of the membrane to a minimum and consistent with proper methods of installation.

2.2.3 The CSPE geomembrane shall be installed as shown on the Contract Drawings by crews experienced in making installations.

2.2.4 The geomembrane shall be properly weighted to avoid uplift due to wind.

2.3 Access Road

2.3.1 Contractor shall provide a construction access road from SLA excavation area to the top of the CELA for transportation of the material as shown on Contract Drawings. The portion of the access road between the SLA and the limits of storage for SLA material (See Dwg. AR-6) shall be constructed with clean material from off-site sources. The remainder of the road shall be constructed with excavated SLA material. Upon completion of SLA excavation the portion of the access road between the SLA and the limits of storage for SLA material shall be removed and consolidated onto the CELA. R1

2.3.2 Contractor shall provide a drainage collection system to collect rain water.

PART 3 - QUALITY ASSURANCE

3.1 The materials supplied under these specifications shall be first quality products designed and manufactured specifically for the purpose of this work and which have been satisfactorily demonstrated by prior use to be suitable and durable. The installers of the materials shall have demonstrated, by previous experience their ability to do the work. A representative from each manufacturer shall be available a minimum of one day during the installation and shall provide technical assistance, if required.

3.2 Field Inspection and Testing for Compaction of The Test Fill

3.2.1 The tests listed below shall be performed as specified. Field test reports shall be submitted daily for record as required.

- (1) Laboratory Maximum density: Laboratory maximum density tests shall be performed on all SLA material in accordance with ASTM D698. Prior to placing, at least two tests for SLA material shall be performed on representative samples of the SLA material to be placed. Additional tests shall be performed if the composition of the material being used is different than that previously tested.
- (2) Moisture Content: At least two tests for SLA material for moisture content shall be performed on SLA material in accordance with ASTM D 2216.
- (3) In-place Testing: In-place density and moisture content testing on SLA material shall be performed by nuclear methods in accordance with ASTM Standards D2922 and D3017 or the Sand Cone Method for density in accordance with ASTM Standard D1556. However, prior to use, calibration of the nuclear equipment shall be performed using either laboratory or field methods in accordance with ASTM D2922 and D3017. A comparison to results from sand cone testing in accordance with ASTM D1556 shall be performed at least once for each 10 tests performed using nuclear density equipment. In-place density shall be determined at a depth of 12 inches below grade and the tests shall be performed for each 750 cubic yards placed but not less frequently than one test each day for each area being compacted. The nuclear density equipment shall be recalibrated whenever a different borrow soil is used for the test fill construction.

PART 4 - SUBMITTALS

Prior to furnishing and installation of the materials, the Contractor shall submit to the Construction Manager, for approval, the following:

- (1) The name of the manufacturer and the type of material chosen for use.

- (2) Manufacturer certification that the materials are in compliance with the requirements of the standards specified herein. Samples of the proposed materials shall be submitted.
- (3) Shop drawings showing the proposed layout of the materials, details of joining the materials, anchoring, connecting and other construction details.
- (4) The testing, maintenance and repair procedures of the materials.

PART 5 - MATERIAL AND TEST FILL INSTRUMENTATION WARRANTY

The Manufacturers shall warrant the materials against manufacturing defects and chemical incompatibility for a period of at least one year from the date of installation. The manufacturers shall replace at no expense, materials which fail from the above causes within the warranty period. The manufacturers shall furnish a written warranty covering the requirements.

PART 6 - MATERIALS AND TEST FILL INSTRUMENTATION

6.1 Geomembrane

The geomembrane liner shall be manufactured of new, first-quality products designed and manufactured specifically for the purpose of soil and liquid containment. The liner material shall be produced free of any sign of contamination by foreign matter. Any defect shall be repaired using the manufacturer's recommendations. The liner shall be chlorosulfonated polyethylene (CSPE) with material properties shown on Table No. 1.

TABLE NO. 1

Property	Test Method	Value
Gauge (Mills Nominal)		36.0
Plies Reinforcing		
10x10 1000d Polyestr		1.0
Thickness, Minimum Mills	ASTM D751	
1. Overall	Optical Method	34.0
2. Over scrim		11.0
Breaking Strength-Fabric		
Minimum (lbs)	ASTM D751, Method A	200.0
Tear Strength		
(pounds, minimum)		
1. Initial	ASTM D751, Modified	80.0
2. After Aging		35.0
Low Temperature°F	ASTM D2136, 1/8 in. mandrel, 4 hrs., Pass	-40.0
Dimensional Stability		
(each direction percent change maximum)	ASTM D1204 212°F, 1 hr.	2.0
Volatile Loss, Maximum, for 30 mil Unsupported Sheet (percent)	ASTM D1203, Method A	0.5
Resistance to Soil Burial (percentage change maximum in Original value)		
a. 30 Mil Unsupported Sheet	ASTM D3084 (per	
1. Breaking Factor	ASTM paragraph 9.5)	0.5
2. Elongation at Break		20.0
3. Modulus at 100° Elongation		20.0
b. Membrane Fabric Breaking Strength	ASTM D751, Method A	25.0
Hydrostatic Resistance, (pounds/sq.in. minimum)	ASTM D751, Method A Procedure 1	250.0
Ply Adhesion, Each Direction, (pounds/sq.in. minimum)	ASTM D413, Machine Method	8.0
Water Absorption, Maximum	ASTM D471	
30 Mil Unsupported Sheet		
(percent weight gain)	14 days @ 70°F	1.5
	30 days @ 70°F	2.0
	120 days @ 70°F	2.0
	14 days @ 158°F	30.0
	30 days @ 158°F	30.0
	120 days @ 158°F	30.0
Factory Seam Requirements**		
Bonded Seam Strength	ASTM D751, Modified	160.0
(factory seam, breaking factor, ppi width)		
** Factory bonded seam strength is the responsibility of the fabricator		

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SECTION 02260

IDENTIFICATION AND DISPOSAL OF CONTAMINATED AND WASTE MATERIAL

PART 1 - GENERAL

The work required under this Section includes furnishing all plant, labor, materials, and equipment and performing all operations required for identification and disposal of contaminated and waste material as shown on the Contract Drawings and as specified herein.

1.1 A dike investigation program was completed to determine the presence of waste material in the area of construction. A dike investigation report was issued indicating that the dike is not located in waste material. However, during construction of the project, there may be soil and other material encountered which are considered contaminated. This material generally may consist of materials contaminated with petroleum hydrocarbons. The Contractor will be required to monitor for the presence of contamination during excavation in accordance with a sampling and analysis plan (SAP) provided by the Construction Manager. Materials which meet the following criteria will be considered contaminated:

- (1) By a reading of 1 ppm above background on a photoionization detector meter (HNU or equivalent), or
- (2) By petroleum odor.

1.2 Material excavated from the key trench which is determined to be non-contaminated using the screening criteria specified in Para. 1.1 and is free of topsoil and organic matter shall be used as compacted fill in the key trench. The material is classified as SM or GM in the dike investigation boring data. Topsoil and other structurally unsuitable material shall be stockpiled at a location approved by the Construction Manager for later use.

1.3 Excavated materials which meet the criteria for contamination as specified in Para. 1.1 shall also be examined visually for oil staining. Materials free of oil staining, organic matter and topsoil shall be used as compacted fill in the key trench. Materials free of oil staining but containing organic matter and topsoil shall be placed in the CELA. Materials showing oil stains shall be sampled in accordance with the SAP for determination of the amount of total petroleum hydrocarbons (TPH). Materials exceeding 5% TPH will be considered waste material. Construction Manager shall be notified when the Contractor encounters waste material during excavation. If waste material is encountered locally, it shall be excavated, placed in the CELA, and the area backfilled with suitable excavated material or material meeting the dike fill

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requirements specified in Section 02200. If waste material is encountered over a large area, the Construction Manager and Engineer shall evaluate the condition to determine appropriate action. The dike foundation shall not be located on waste material.

Contaminated and oil stained materials having TPH less than or equal to 5% which are free from organic matter and topsoil shall be used as a compacted fill in the trench area. Other unsuitable materials (organic matter, topsoil, etc.) shall be placed in the CELA.

1.4 Contractor's personnel who may come in contact with contaminated material shall be required to wear tyvek suits, boots, and gloves. If contamination levels exceed allowable permissible exposure limits, the Contractor shall follow procedures specified in the health and safety plan.

1.5 Materials required to be excavated under Section 02200 and requiring placement into the "Central Elevated Landfill Area" (CELA) as described above shall be placed in the temporary contaminated storage area within the CELA as shown on the Contract Drawings. This temporary contaminated storage area shall be bermed and covered with a layer of clean material.

1.6 The Contractor shall minimize activities on the landfill to those approved and as directed by the Construction Manager or his designee.

1.7 Soils excavated during the west dike construction, including the material taken from the key trenches, shall not be removed from the site.

1.8 Handling of contaminated soils/materials during excavation and placement in the temporary storage area shall be conducted to minimize the requirements for decontamination of personnel and equipment.

- 1) Crew size shall be kept at a minimum.
- 2) Excavation equipment shall operate on clean surfaces as much as possible.
- 3) Excavated material shall be loaded into drop boxes (10 C.Y.) with liners. Each box and adjacent ground surface will be covered with HDPE blankets during loading.
- 4) Drop box haul units shall travel on clean surface haul roads to temporary storage area

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- 5) Placement equipment shall remain at the temporary storage area throughout dike key trench excavation.
- 6) Exposed portions of excavation equipment shall be decontaminated as required. Transportation boxes and placement equipment shall be decontaminated at completion of key trench excavation. (reference HASP Section 10.3)
- 7) Upon completion of excavation of waste material, contaminated portions of the excavation equipment shall be decontaminated (reference HASP Section 10.3) such that all material resulting from decontamination activity is contained for placement in the CELA.

END OF SECTION

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SECTION 02400

RIPRAP, BEDDING, AND GEOTEXTILE

PART 1 - GENERAL

The work required under this Section includes furnishing all plant, labor, material, and equipment and performing all operations required for placing riprap, bedding, and geotextile as shown on the Contract Drawings and as specified herein.

PART 2 - MATERIALS

2.1 Riprap: Riprap stone shall be durable and of a suitable quality to assure permanence in the application and the climate in which it is to be used. Stone shall be free of cracks, seams, and other defects that would tend to increase unduly its deterioration from natural causes or breakage in handling or dumping. Stone shall weigh, when dry, not less than 145 pounds per cubic foot (specific gravity of the stone equal to or greater than 2.3). The inclusion of objectionable quantities of dirt, sand, clay and rock fines will not be permitted. Selected granite, quartzite, rhyolite, traprock and certain dolomitic limestone generally meet the requirements of these specifications. Riprap shall be reasonably well graded from a minimum of 25 lbs to a maximum of 400 lbs (see gradation table below). At least 50 percent shall be greater than 200 lbs, and no more than 15 percent shall be less than 100 lbs. Stone for riprap shall be roughly cubical in shape. Flat pieces, such that the average thickness is less than 1/3 of the average width, will be rejected. Stone shall have a mean diameter D₅₀ of 12 inches.

Riprap

<u>Weight of Stones</u> (lbs)	<u>Percent Finer by Weight</u>
400	100
200	15-50
100	0-15
25	0

Subject to the approval of the Construction Manager, heavy riprap gradation in accordance with Figure 620-1 of Section 620-2.02 of the New York State Department of Transportation Standard Specifications may be used.

2.2 Bedding: Aggregate for bedding shall be composed of crushed stone or gravel, free of soft, non-durable particles, organic material, and thin or elongated particles.

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Bedding material shall comply with Section 620-2.05 of the New York State Department of Transportation Standard Specifications, excluding blast furnace slag (see table below for gradation).

Bedding Material

<u>US Standard Sieve Size</u>	<u>Percent Finer by Weight</u>
4 in.	100
1 in.	15-60
1/4 in.	0-25
No. 4	0-10

2.3 Geotextile

2.3.1 Material: Geotextile shall be GTF 400E as manufactured by Exxon Chemicals or equal as approved by the Construction Manager. Geotextile shall be a woven pervious sheet of plastic yarn as defined by ASTM D 123 and shall meet the physical requirements listed in Table No. 1. The geotextile fiber shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of propylene, ethylene, ester, amide, or vinylidene-chloride, and shall contain stabilizers and/or inhibitors added to the base plastic if necessary to make the fiber resistant to deterioration due to ultraviolet and heat exposure. Edges of geotextile shall be finished to prevent outer fiber from pulling away from geotextile. Apparent opening size shall be within a range of 0.0083 inch and 0.0059 inch.

2.3.2 Seams: Seams of geotextile shall be constructed in accordance with manufacturer's recommendations. Seams shall be tested in accordance with ASTM D 1683, using 1-inch square jaws and 12 inches per minute constant rate of traverse. Strength shall be not less than 90 percent of the required tensile strength (Table No. 1) of the unaged geotextile in any principal direction.

2.3.3 Acceptance Requirements: The Contractor shall furnish the Construction Manager or his designee, in duplicate, a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the geotextile. Mill certificate or affidavit shall attest that geotextile meets specified chemical, physical, and manufacturing requirements. If requested by the Construction Manager or his designee, the Contractor shall provide geotextile samples for testing to determine compliance with specified requirements. Samples shall be submitted prior to beginning of installation. All samples shall be from same production lot as will be supplied for the Contract, and shall be full manufactured width of geotextile but at least 10 feet long, except that samples for seam strength may be a full-width sample folded over and edges stitched for a length of at least 5 feet. Samples submitted for testing shall be identified by manufacturer's lot designation.

TABLE NO. 1 - PHYSICAL REQUIREMENTS

<u>Physical Property</u>	<u>Test Procedure</u>	<u>Acceptable Values (+ +)</u>
Tensile strength (+) (unaged geotextile)	ASTM D 4632 Grab Test Method using 1-inch x 2 inches jaws and 12 inches per minute constant rate of traverse.	200 pound minimum in any principal direction
Breaking elongation (+) (unaged geotextile)	ASTM D 4632 Determine Apparent Breaking Elongation	15 percent minimum in any principal direction
Puncture strength (+) (unaged geotextile)	ASTM D 3787 except polished steel ball replaced with a 5/16-inch diameter cylinder with a hemispherical tip centered within the ring clamp.	80 pound minimum
Abrasion resistance	ASTM D 3884 Rubber-base abrasive wheels equal to CS-17 "Calibrase" by Taber Instrument Company; 1 kilo-gram load per wheel; 1000 revolutions, determine residual breaking load.	25 pound minimum residual breaking load in any principal direction
Tear strength	ASTM D 4533 Trapezoidal Tear Strength	30 pound minimum in any principal direction
Geotextile permeability (kg)	ASTM D 4491 Test Methods for Water Permeability of Geotextiles by Permittivity	Permeability of geotextile shall be greater than 0.01 centimeters per second

(+) Unaged geotextile is defined as geotextile in the condition received from manufacturer or distributor.

(++) All numerical values represent minimum average roll values (i.e., any roll in a lot shall meet or exceed the minimum in the table).

PART 3 - QUALITY INSPECTION

Quality inspection for stone shall be performed by the Contractor's inspection staff at the quarry prior to delivery of stone to project site.

PART 4 - SHIPMENT AND STORAGE

During all periods of shipment and storage, geotextile shall be protected from direct sunlight, ultraviolet rays, temperatures greater than 140 degrees Fahrenheit, mud, dirt, dust and debris. Fabric shall be maintained wrapped in a heavy-duty protective covering.

PART 5 - PLACEMENT

5.1 Geotextile

5.1.1 Geotextile shall be placed at the locations shown on the Contract Drawings. At the time of installation, geotextile will be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation, or storage. Surfaces to receive geotextile shall be free of debris. Geotextile shall be installed in accordance with manufacturer's recommendations.

5.1.2 Geotextile shall be protected at all times during construction. Any damage to geotextile during installation or placement of granular backfill shall be replaced by the Contractor at no cost to the Owner. Work shall be scheduled so that covering of geotextile with a layer of the specified material is accomplished within seven calendar days after placement of geotextile. Failure to comply shall require replacement of geotextile. Geotextile shall be protected from damage prior to and during placement of granular backfill. Before placement of granular backfill, the Contractor shall demonstrate that placement technique will prevent damage to geotextile. In no case shall any type of equipment be allowed on unprotected geotextile.

5.2 Bedding: Aggregate bedding shall be placed on installed geotextile filter fabric. Bedding shall be placed to full specified thickness in one operation, using methods which will not cause segregation of particle sizes or damage geotextile.

5.3 Riprap: Riprap shall be placed so as not to disturb bedding material and to produce a well graded and distributed protection. Riprap shall be placed over areas shown on the Contract Drawings to a uniform depth to a tolerance of minus 0 to plus 3 inches. Riprap shall not be dropped from heights in excess of two feet. Riprap shall be placed in position starting from bottom of the slope.

END OF SECTION

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SECTION 02485

SEEDING AND EROSION PROTECTION

PART 1 - GENERAL

The work required under this Section includes furnishing all plant, labor, equipment, and materials to:

- (1) Provide fertilizer, mulching, and seeding for the landside dike slope, the fill area behind the dike extension and other disturbed areas requiring vegetation.
- (2) Construct a sediment control barrier along the Genesee River side of the west dike and in other areas of soil disturbance as required.

PART 2 - APPLICABLE PUBLICATIONS

American Society for Testing and Materials (ASTM)

D 751-79 Coated Fabrics

D 1682-64 Breaking Load and Elongation of Textile Fabrics

Federal Specifications (FS)

FS O-F-241D Fertilizer, Mixed, Commercial

FS JJJ-S-181B Seeds, Agricultural

PART 3 - MATERIALS

3.1 Fertilizers

3.1.1 Quality and Formulation: Fertilizer may be either fluid or dry formulations of commercial carriers of available plant nutrients. Fertilizer shall contain total nitrogen, available phosphoric acid, and soluble potash in the ratio of 10-6-4.

3.1.2 Basis of Acceptance: Manufacturer's label or certificate indicating compliance with specifications. The Construction Manager or his designee reserves the right to reject any material that has become caked or otherwise damaged.

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3.2 Seeds

3.2.1 Quality: Each species, variety, and strain of grasses, legumes, and cereals shall be as specified unless otherwise approved.

3.2.1.1 Materials other than pure live seed shall comprise only nonviable seed, chaff, hulls, live seed of crop plants other than those specified, harmless inert matter and weed seeds except that weed seeds other than seed of noxious weeds will be permitted up to 1 percent of gross weight of each kind of seed. Legume seeds shall be accompanied by adequate amounts of proper inoculants unless accompanied by certification of preinoculation.

3.2.1.2 The percentage of purity as shown on the label shall be acceptable. The percentage of germination as shown on the label shall be not less than the minimum percentage specified.

3.2.2 Nomenclature: The common and scientific names of grasses, legumes, and cereals under this Contract are in conformity with Standard Plant Names.

3.2.3 Weight of Pure Live Seed: Weight of pure live seed in each lot of seed is computed by labeled purity percent, times labeled germination percent, times weight. (Example: 34 pounds of pure live seed of a particular grass is required. Stock available has 85 percent purity and 80 percent germination, which meets the minimum requirements in this example and equals 68.0 percent pure live seed, 34 divided by 68 percent equals 50 pounds gross as being required to furnish 34 pounds of pure live seed). Other material shall comprise the remaining 32 percent, between 68 percent of pure live seed and 100 percent in the example.

3.2.4 Legume Inoculants: Inoculants for treating seeds of legumes shall be standard culture of nitrogen fixing bacteria not more than one year old. Each inoculant shall be the specific culture required by each legume. It shall be supplied only from manufacturers licensed to sell legume inoculants in the State of New York.

3.2.5 Packaging: Each kind of seed shall be furnished and delivered, unless otherwise approved, in separate, sealed containers, or bags acceptably sewn tight or sealed.

3.2.6 Labeling: All seed and seed labels shall be in accordance with state and federal laws, rules, and regulations.

3.2.7 Basis of Acceptance: Seeds shall meet minimum specified requirements regardless of guarantee of qualities or dates of testing and after the application of tolerances approved by the

Department of Seed Investigations, New York State Agricultural Experiment Station, Geneva, New York. Seed which has become wet, moldy, or otherwise damaged in transit or storage will not be acceptable. Seed, after delivery to the Contractor, shall be stored to protect it from damage and deterioration. Provisional acceptance of seeds shall be obtained before the seed is sown. Final acceptance may be subject to results of official sampling and testing.

3.2.8 Seed Mixture: Seed mixture shall be:

<u>Name</u>	<u>Variety</u>	<u>Wt. of Pure Live Seed/Acre (lbs)</u>
Red Fescue (Festuca rubra)	Commercial	40
Perennial Ryegrass (Lolium perenne)	Commercial	15
White Clover (Trifolium repens)	Commercial Max 25 percent hard seed	5
Total		60 lbs/acre

3.3 Mulch: Either hay or straw may be used for mulch. Hay for mulching shall be mowings of acceptable herbaceous growth free from noxious weeds. Straw for mulching shall be stalks of oats, wheat, rye or other approved crops free from noxious weeds. Materials which are low grade and unfit for farm use such as "U.S. Sample Grade" will be acceptable. Weight shall be calculated on the basis of material having not more than 15 percent of moisture content.

3.4 Silt Fence: Silt fence material shall meet the following requirements:

<u>Property</u>	<u>Test Method</u>	<u>Minimum Avg.</u>
Tensile strength (lbs)	ASTM D 1682	90
Elongation (percent)	ASTM D 1682	15-35
Burst strength (psi)	ASTM D 751 (Diaphragm Method)	200
Accelerated weathering (strength retained - percent)	Federal Test Method CCC-T-191-Method 5804 (500 Hrs. Exposure)	70

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<u>Property</u>	<u>Test Method</u>	<u>Minimum Avg.</u>
Slurry flow rate (gpm/ft ²)	VTM-51-79	0.3
Retention efficiency (percent)	VTM-51-79	75
Equivalent opening size	CW-02215, US Sieve No. Equivalent	30/50

PART 4 - APPLICATION AND CONSTRUCTION

4.1 Fertilizer Application: Fertilizer shall be evenly spread over surface of soil in areas as directed. Rates of application shall be as required to promote plant growth. Tests required to determine rate of fertilizer application shall be made by the Contractor and the rate approved by the Construction Manager or his designee. Any method of application which will ensure an even distribution will be acceptable.

4.2 Seeding Application

4.2.1 Rates: Rates for seeding shall be as specified.

4.2.2 Season: Unless otherwise directed by the Construction Manager or his designee, work shall be performed during normal planting seasons of the year. The Contractor shall notify the Construction Manager or his designee at least 48 hours in advance of the time he intends to begin sowing seed and shall not proceed with such work until permission has been obtained. When delays in operations carry the work beyond dates which are specified, or when conditions of high winds, excessive moisture or ice are such that satisfactory results are not likely to be obtained for any stage of the work, the Construction Manager or his designee will stop work. Work shall be resumed with the Construction Manager or his designee's approval when desired results are likely to be obtained or when approved corrective measures and procedures are adopted.

4.2.3 Sampling, Mixing, and Inoculating Seeds: Provisional acceptance of seeds shall be obtained before seeds are mixed. Each lot of seed shall be subject to sampling and testing before mixing. Sowing seed shall not be delayed pending reports of these tests. Sampling shall be performed by the Contractor and will be verified by the Construction Manager or his designee. Testing for compliance with these specified requirements shall be performed by the Department of Seed Investigations, New York State Agricultural Experiment Station, Geneva N.Y., and results obtained will be considered official. Seeds of kinds specified shall be mixed on the job in formula specified unless otherwise approved. Seed mixed prior to delivery may be approved on the basis of a certification by the vendor stating minimum percentage of germination and purity

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of each kind of seed and quantity of each kind of seed in mixture. All seed of leguminous plants shall be inoculated prior to mixing or sowing unless otherwise specified or approved or unless accompanied by a certification preinoculation. When seed is to be sown dry and is to be inoculated, culture shall be applied as directed by the manufacturer and seed allowed to dry sufficiently to be in the proper condition for mixing or sowing. Seed shall be sown within thirty hours after this treatment. Where seed is to be distributed by water pressure, proper proportion of inoculant may be added to water and seed mixture, together with fertilizer specified, providing the alkalinity of solution does not exceed 8 pH.

4.2.4 Ground Preparation and Seeding

4.2.4.1 Areas to be seeded shall be maintained at approved grades. Irregularities and low places which will hold water shall be eliminated. Fertilizers and seeds shall be evenly distributed on the surfaces to be seeded. All mechanical equipment for soil preparation or seeding shall be as approved and shall pass parallel to the contours unless otherwise approved.

4.2.4.2 When directed by the Construction Manager or his designee, measured plots shall be established to determine if specified quantities of seed, fertilizer, and mulch are being applied. The finished surface of any area that is seeded shall not be rougher, more uneven or have more or larger stones, clods, roots, or other foreign materials than the area it adjoins.

4.2.4.3 Areas to be seeded shall be scarified sufficiently to break up surface crust immediately before seeding except where ground is loose and friable as immediately following grading or as otherwise approved. All stones over six inches in greatest dimension which are loose and subject to rolling or sliding or other sizes as specified and all other objects detrimental to mowing shall be removed and disposed of as approved. Fertilizers and seed may be mixed together immediately before placing. Methods of distribution such as by air or water pressure will be acceptable except that the seed shall not be injured in the process of spreading.

4.3 Mulching

4.3.1 Surface of areas where mulch is to be applied shall be cleared of stones, stumps, wire, and other obstacles which might hinder subsequent seeding operations. Ground shall be harrowed or disked to produce a state of suitable tillage.

4.3.2 Mulch shall be spread uniformly in a continuous blanket of sufficient thickness to completely hide soil from view. Mulch may be spread before or not later than three days after seeding unless otherwise approved. Anchorage to hold mulch in place may be applied by an approved method during mulching operation or subsequently.

4.4 Erosion and Sediment Control

4.4.1 Contractor shall prepare an erosion and sediment control plan for submittal and acceptance by the Construction Manager and the New York State Conservation Engineer, USDA Soil Conservation Service. The plan shall comply with the New York State Guidelines for Urban Erosion and Sediment Control.

4.4.2 Contractor shall conduct his operations in accordance with his certified erosion and sediment control plan. Surface drainage from cuts and fills within the limits of work shall be held in suitable sedimentation ponds or the surface shall be graded to control erosion within acceptable limits. Temporary erosion and sediment control measures shall be provided and maintained until the permanent work is completed. The area of bare soil exposed at any given time by construction shall be restricted to a minimum.

4.4.3 Borrow area erosion and sediment control is the responsibility of the Contractor.

4.4.4 Contractor shall construct a silt fence sediment control barrier along the river side of the dike prior to clearing, grubbing, stripping and excavation.

PART 5 - CARE DURING CONSTRUCTION

The Contractor shall care for seeded and mulched areas until final acceptance. Such care shall consist of providing protection against traffic by approved warning signs or barricades, and repairing areas damaged following seeding or mulching operations due to wind, water, fire or other causes. Damaged areas shall be repaired to re-establish condition and grade of area prior to seeding and shall be refertilized, reseeded, and remulched as specified herein. The Contractor shall keep seeded areas mowed until acceptance by cutting to a height of three inches when growth reaches six inches, or as directed.

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PART 6 - QUALITY CONTROL

6.1 Liability: Final acceptance of seed may be subject to results of official sampling and testing. Weight of seed sown is based on labeled purity and germination. Tolerances approved by the Department of Seed Investigations, New York State Agricultural Experiment Station, Geneva, New York, for seed species, shall be used in the determination of whether seed conforms to labeled purity and germination statements and meets the minimum specified. When, after application of the appropriate tolerances, purity and germination of seed except cereal grain and legumes are shown by official tests to be less than that shown on label but germination meets minimum specified with the appropriate tolerance applied, and specified weight of pure live seed has not been sown, deficiency shall be sown.

6.1.1 When the germination of seed except cereal grains and legumes is shown by official tests to be less than minimum specified, after appropriate tolerances have been applied, it will be considered a total deficiency. Such deficiency shall require complete reseeding of kind of seed which was deficient.

6.1.2 Reseeding together with necessary grading and trimming shall be done at the expense of the Contractor by spreading seed by an approved method during an approved season.

6.1.3 When, in the judgment of the Construction Manager or his designee, at any time prior to acceptance, any area which has been seeded fails to produce a satisfactory growth of grass after a suitable period of time has elapsed, the Contractor shall reseed and refertilize such areas as specified. If deemed necessary by the Construction Manager or his designee, the Contractor shall also remulch such areas at the rate specified.

END OF SECTION

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SECTION 02546

AGGREGATE-SURFACED ROADS

PART 1 - GENERAL

The work required under this Section includes furnishing all plant, labor, material, and equipment and performing all operations required to construct an aggregate-surfaced road on top of the completed dike as shown on the Contract Drawings and as specified herein.

PART 2 - PREPARATION

All areas on which aggregate-surfaced roads are to be placed shall be constructed in accordance with Section 02200 of the Specifications.

PART 3 - MATERIALS

3.1 Source: All materials shall be obtained and furnished by the Contractor from sources outside of the project site.

3.2 Aggregates

3.2.1 General: Aggregate shall comply with Section 304-2 of the New York Department of Transportation Standard Specifications. Aggregate shall consist of stone which is the product of crushing ledge rock, sand and gravel or blends of these materials. All materials furnished shall be well graded from coarse to fine and free from organic and other deleterious materials.

3.2.2. Quality Requirements: Material shall consist of hard, durable particles or fragments of granular aggregates. Aggregates shall be free from dirt and other objectionable matter and shall contain not more than 8 percent of flat, elongated, soft, or disintegrated pieces.

3.2.2.1 Material will be accepted on the basis of a magnesium sulfate soundness loss after 4 cycles of 20 percent or less. Plasticity index of the material passing the No. 40 mesh sieve shall not exceed 5.0.

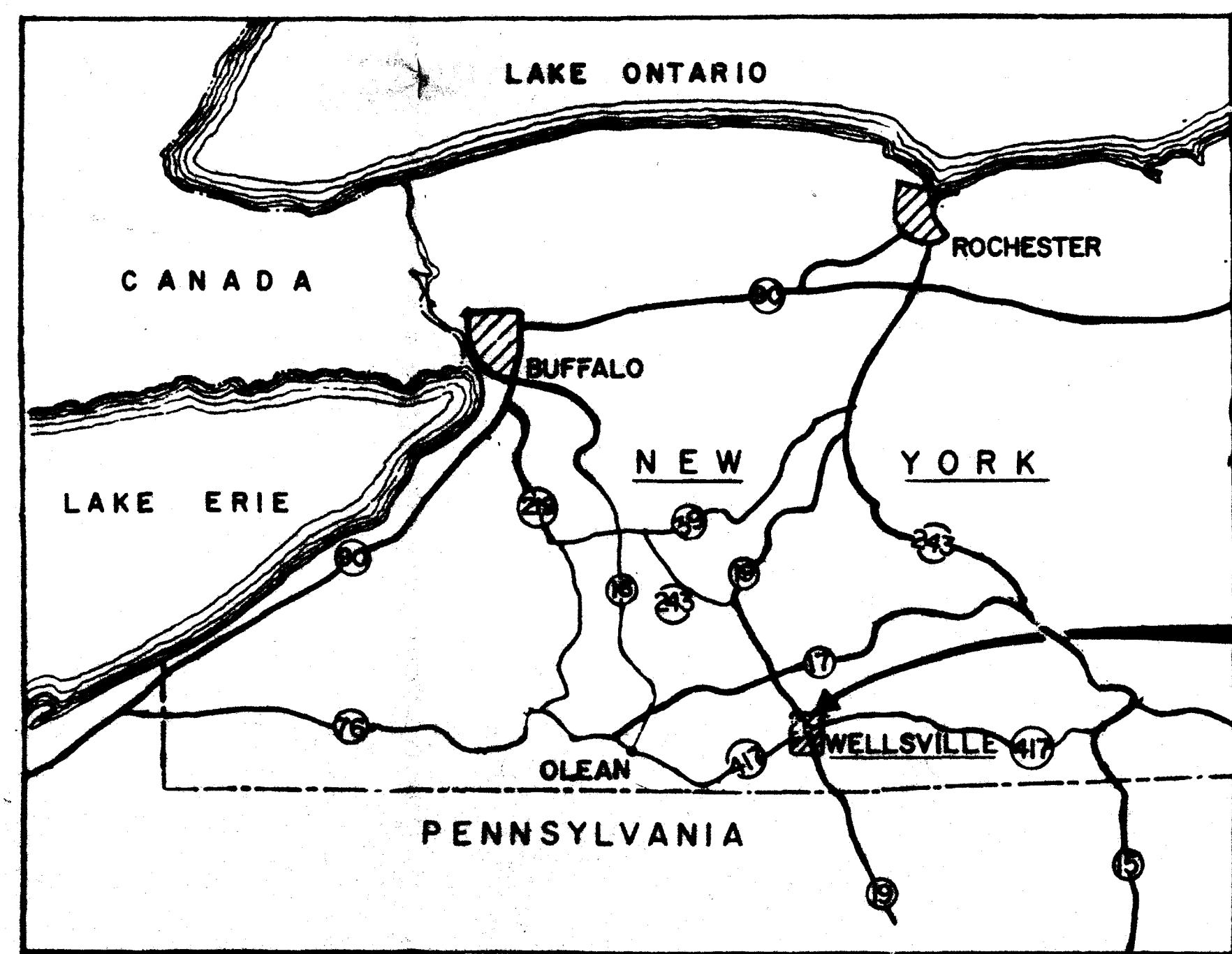
3.2.2.2 Material shall meet specified gradation prior to placement on grade. Processing shall be completed at source.

3.2.3 Gradation: Material shall meet the following gradation requirements:

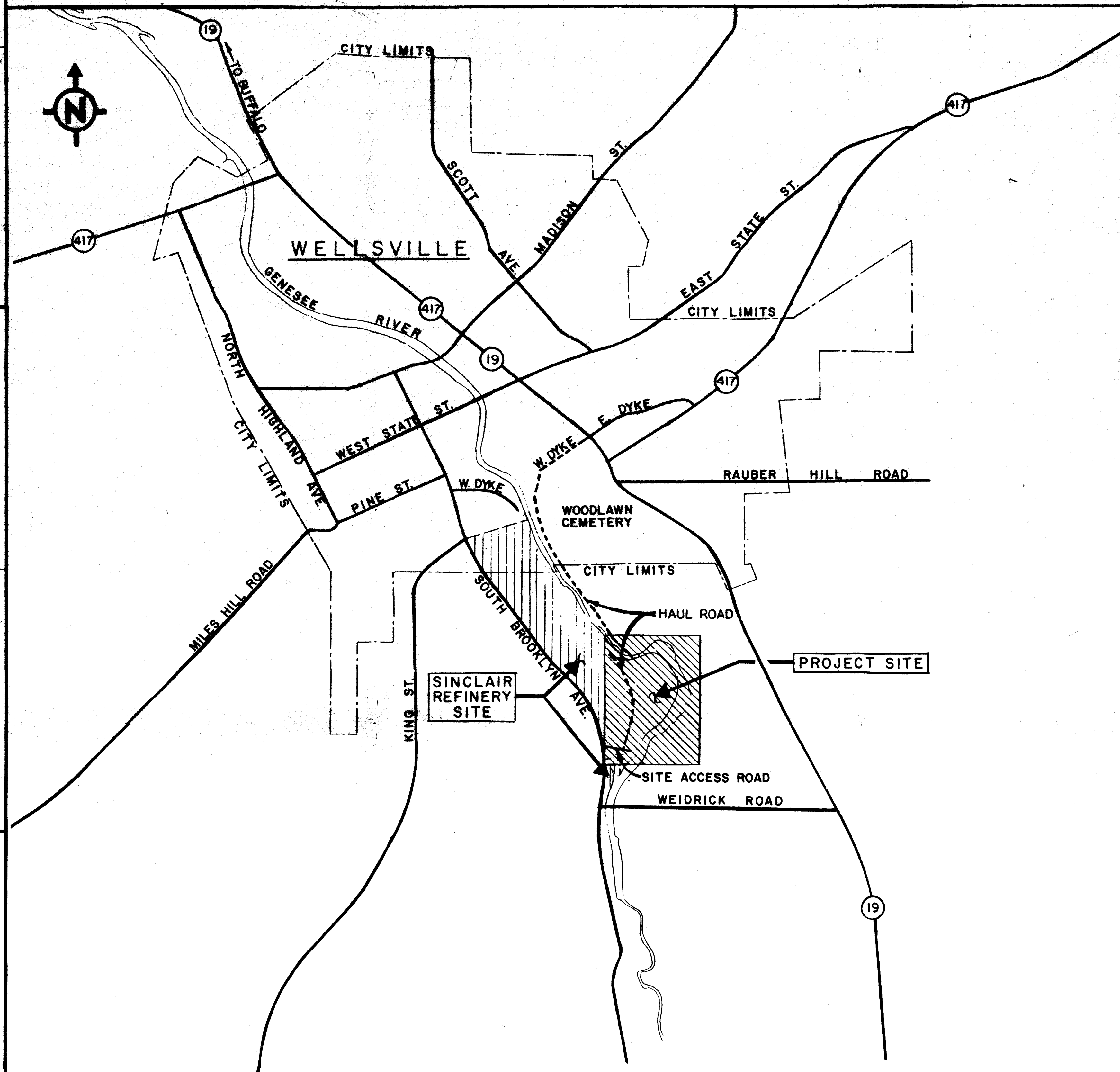
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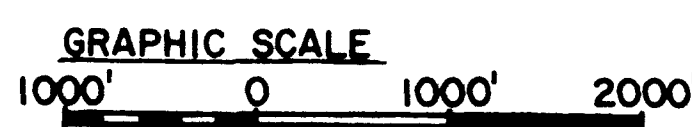
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LOCATION MAP
NOT TO SCALE



VICINITY MAP
1" = 1000'



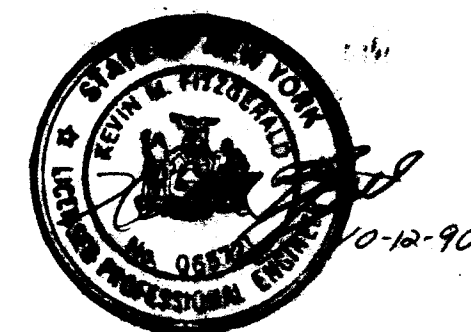
DRAWING INDEX		
DWG. NO.	REV.	DRAWING TITLE
AR-1	1	LOCATION MAP, VICINITY MAP AND DRAWING INDEX
AR-2	1	CLEARING SLA REMEDIATION & DIKE EXTENSION, GRUBBING DIKE EXTENSION
AR-3	1	SLA RESTORATION PLAN, DIKE EXTENSION PLAN, AND SOIL BORING PROFILE
AR-4	1	DIKE EXTENSION PROFILE, SECTIONS AND DETAILS
AR-5	1	SLA EXCAVATION PLAN AND SECTIONS
AR-6	1	TEST FILL AND ACCESS ROAD PLAN SECTION AND DETAILS

ABBREVIATIONS

- AB--- AUGER BORINGS
- CELA---CENTRAL ELEVATED LANDFILL AREA
- DET---DETAIL
- EL---ELEVATION
- CSPE---CHLOROSULFONATED POLYETHYLENE
- S---SLOPE
- SLA---SOUTH LANDFILL AREA
- STA---STATION
- TOB---TOP OF BANK
- TOD---TOP OF DIKE
- TP---TEST TRENCH
- TYR---TYPICAL
- W.E---WATER ELEVATION

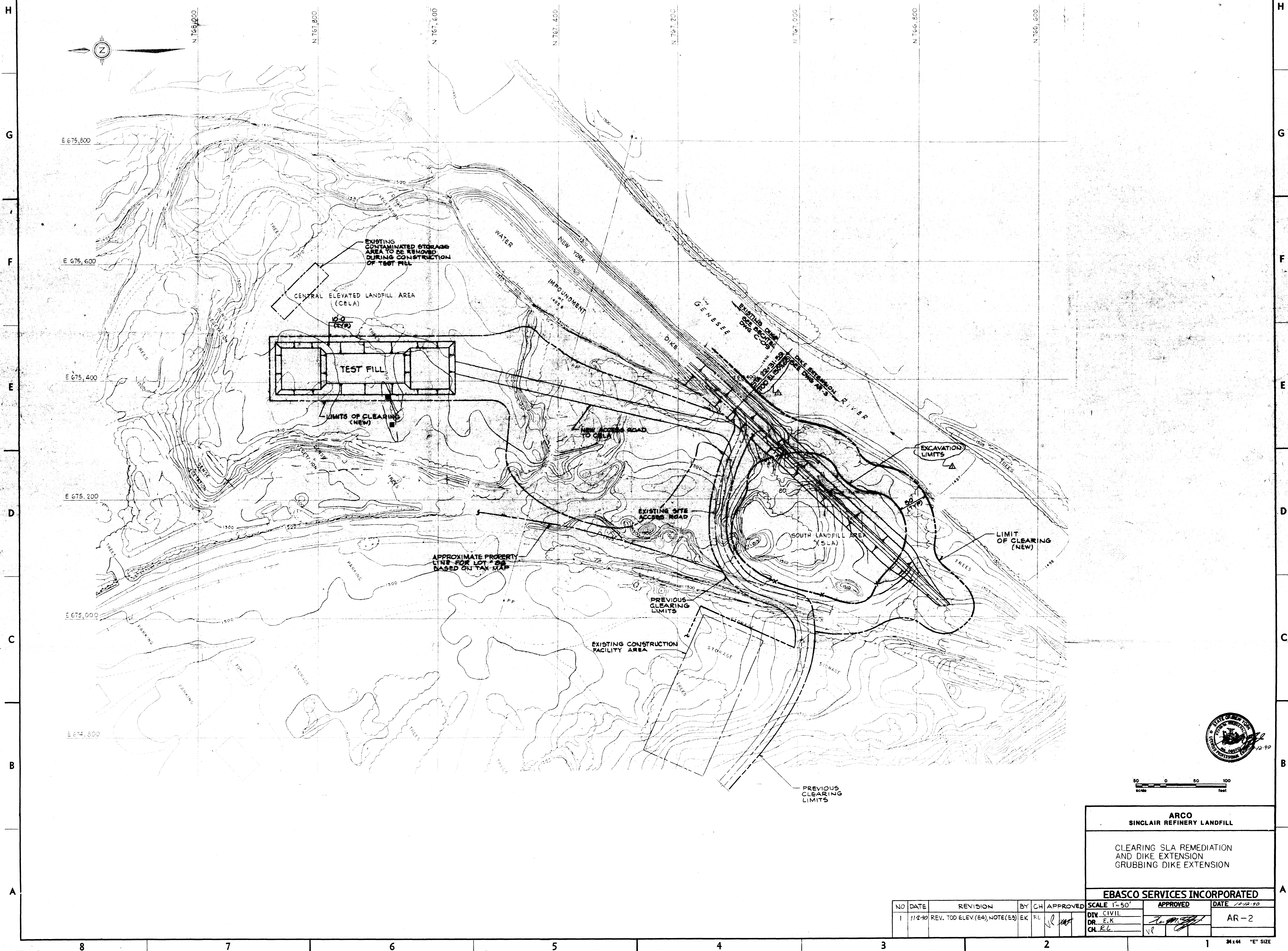
SYMBOLS

- EXISTING GAS LINE
- EXISTING POWER LINE
- EXISTING FENCE
- SIDE SLOPE (2:1 TOP, BOTTOM)
- BOREHOLE LOCATION
- REFERENCE POINT
- EXISTING CONTOUR (1500)
- CENTERLINE OF DIKE
- RIPRAP
- BEDDING
- LANDFILL AREA
- GRAVEL
- GEOTEXTILE
- EXISTING ROAD
- CULVERT
- FLOW LINE
- POINT OF INTERSECTION



ARCO SINCLAIR REFINERY LANDFILL	
LOCATION MAP VICINITY MAP AND DRAWING INDEX	
EBASCO SERVICES INCORPORATED	
SCALE AS NOTED	APPROVED
DATE 11-2-90	DATE 10-12-90
DTY CIVIL	AR-1
DR E.K.	
CL E.L.	

NO	DATE	REVISION	BY	CH	APPROVED
1	11-2-90	REV. DWG INDEX	E.K.	RL	VP



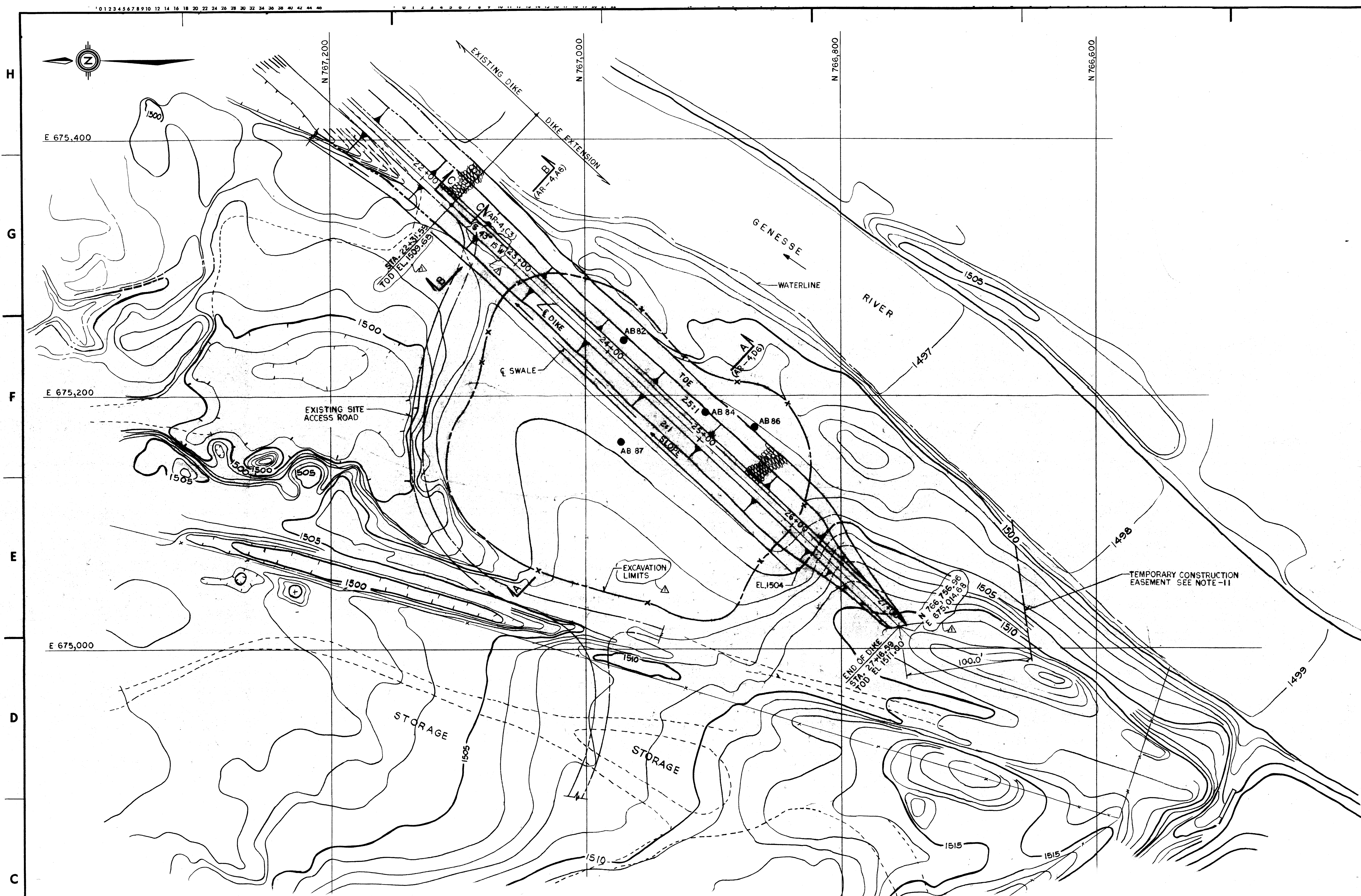
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Feet

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SINCLAIR REFINERY LANDFILL

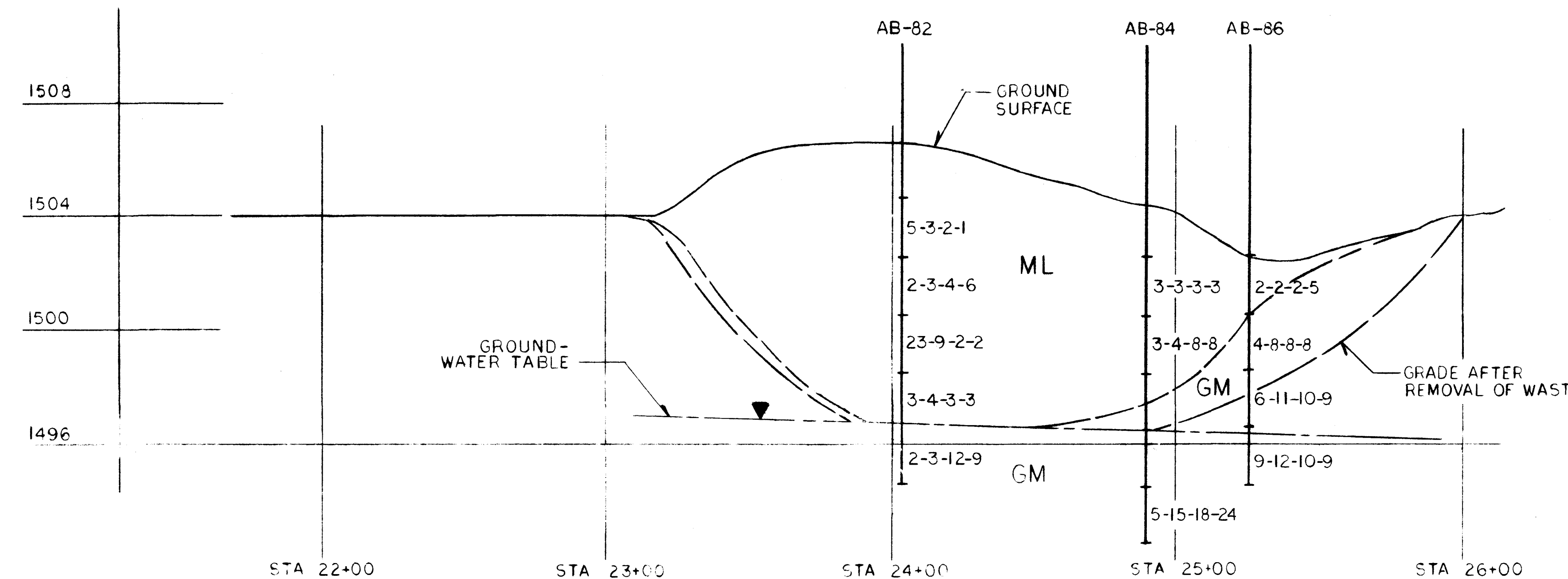
CLEARING SLA REMEDIATION
AND DIKE EXTENSION
GRUBBING DIKE EXTENSION

EBASCO SERVICES INCORPORATED

NO	DATE	REVISION	BY	CH	APPROVED	SCALE 1"=50'	APPROVED	DATE 10-10-90
1	11-2-90	REV. TO ELEV (E4) NOTE (E3)	EK	RL	<i>[Signature]</i>	DTV CIVIL DR E.K. CH RL	<i>[Signature]</i>	AR-2



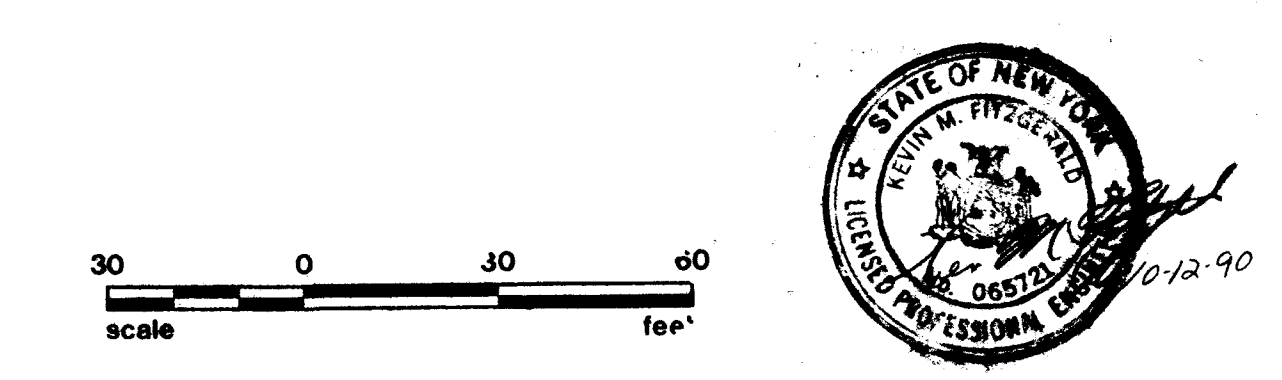
- NOTES:**
1. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE PROVIDED ALONG THE RIVER SIDE BY CONTRACTOR AS SPECIFIED IN SECTION 02485 OF THE CONTRACT SPECIFICATIONS.
 2. FOR DIKE EXTENSION PROFILE AND DETAILS SEE DRAWING ARC-4.
 3. STRIP 6 INCHES OF TOPSOIL UNDER THE WEST DIKE FOUNDATION AS SHOWN ON PROFILE ON DWG. ARC-4.
 4. CONTRACTOR SHALL VERIFY LOCATION AND TYPE OF UNDERGROUND UTILITIES AND STRUCTURES IN THE FIELD, OR BY CONTACTING THE FOLLOWING COMPANIES:
 - NIAGARA-MOHAWK POWER CORPORATION
 535 WASHINGTON STREET
 BUFFALO, NEW YORK (716) 857-4238
 - MARY STOUT
 WELLSVILLE UTILITY COORDINATOR
 (716) 593-1780
 - BOB ALLIARD
 NATIONAL FUEL COMPANY
 ENGINEERING DEPARTMENT
 10 LAFAYETTE SQUARE
 BUFFALO, NEW YORK (716) 857-7060
 5. THE CONTRACTOR SHALL CONTACT THE UNDERGROUND UTILITY LOCATION SERVICE PRIOR TO START OF CONSTRUCTION - THE CONTRACTOR SHALL ASSUME ALL LIABILITY FOR DAMAGE TO UNDERGROUND UTILITIES.
 6. FILL MATERIAL BEHIND THE DIKE SHALL BE COMPACTED TO 85 PERCENT OF MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D698.
 7. GRUB AREA UNDER DIKE FOUNDATION FROM STA. 22 + 31.59 TO STA. 23 + 20 AND FROM STA. 26 + 00 TO 26 + 15.59 ONLY.
 8. WATERLINE SHOWN ON THE DWG IS BASED ON TOPOGRAPHIC BASE MAP FIGURE 3-5 OF PHASE I REMEDIAL INVESTIGATION, SINGULAR REFERENCE SITE, WELLSVILLE, NEW YORK BY SEC HARTIS INC., MARCH 1985.
 9. COORDINATES SHOWN ARE BASED ON NEW YORK STATE COORDINATE SYSTEM.
 10. CONTOURS SHOWN WERE PREPARED BY TOPOGRAPHIC DATA CONSULTANTS INC. FROM AERIAL PHOTOGRAPHS.
 11. ELEVATIONS SHOWN ARE BASED ON 1989 MEAN SEA LEVEL DATUM.
 12. THE CONTRACTOR SHALL MAINTAIN ALL ACTIVITIES WITHIN THE TEMPORARY CONSTRUCTION EASEMENTS ESTABLISHED FOR THIS PROJECT.
 13. COMPACTED DIKE FILL MATERIAL SHALL HAVE A PERMEABILITY, AS DETERMINED IN THE LABORATORY, OF EQUAL TO OR LESS THAN 1×10^{-5} CM/SEC.



SOIL BORING PROFILE
 SCALE: 1" = 30' HORIZ
 1" = 3' VERT

LEGEND

- TEMPORARY CONSTRUCTION EASEMENT
- x- LIMIT OF SOUTH LANDFILL AREA
- BOTTOM OF KEY TRENCH
- [Hatched] BEDDING
- [Hatched] RIPRAP
- [Hatched] GRAVEL
- GEOTEXTILE
- TOP
- SIDE SLOPE
- BOTTOM
- LIMIT OF SLA
- LIMIT OF CLEARING
- AB BORING
- WATER LINE
- ML SILT-DARK BROWN, SILT, MOIST
- GM GRAVEL-TAN TO GRAY, SAND AND GRAVEL MOIST TO SATURATED
- A-BORING LOCATION AND NUMBER
- B-LOCATION OF SOIL SAMPLE
- C-HAMMER BLOWS PER 6" OF PENETRATION UNLESS OTHERWISE STATED.



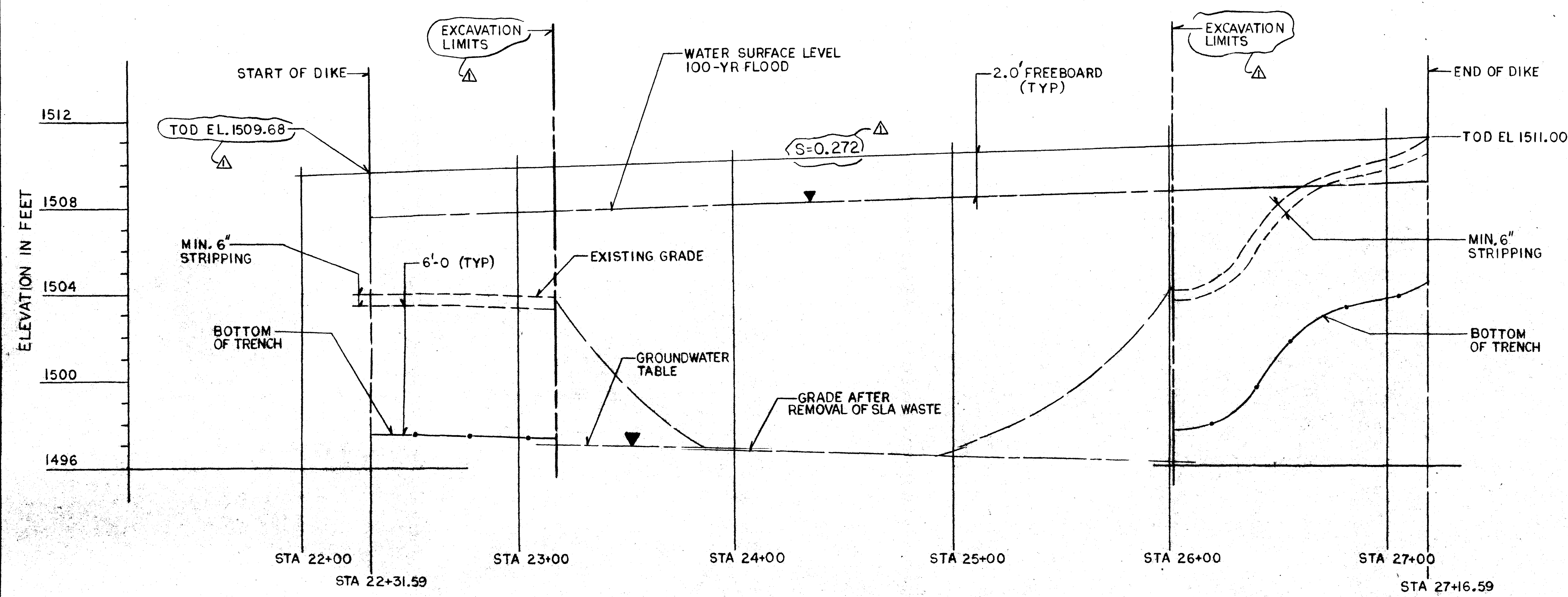
NO	DATE	REVISION	BY	CH	APPROVED
1	11-2-90	REV. TO ELEV. (GG) CO-ORDINATES (E4) NOTES (E5) (G6)	EK	RL	VP

ARCO
SINCLAIR REFINERY LANDFILL

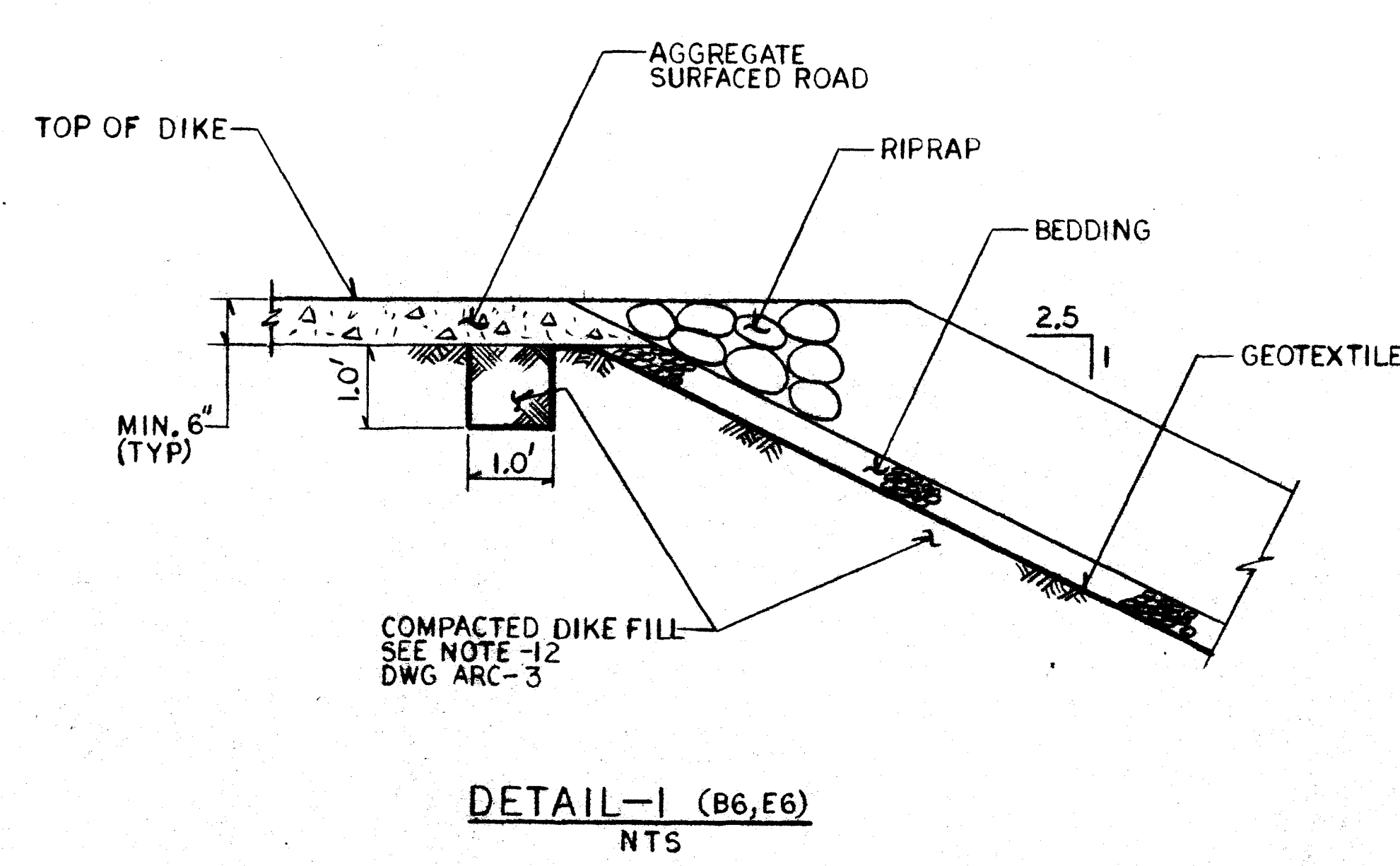
SLA RESTORATION PLAN
 DIKE EXTENSION PLAN
 AND
 SOIL BORING PROFILE

EBASCO SERVICES INCORPORATED		
SCALE AS NOTED	APPROVED	DATE 10-12-90
DIV. CIVIL		
DR. E.K.		
CH. R.L.		
		AR-3

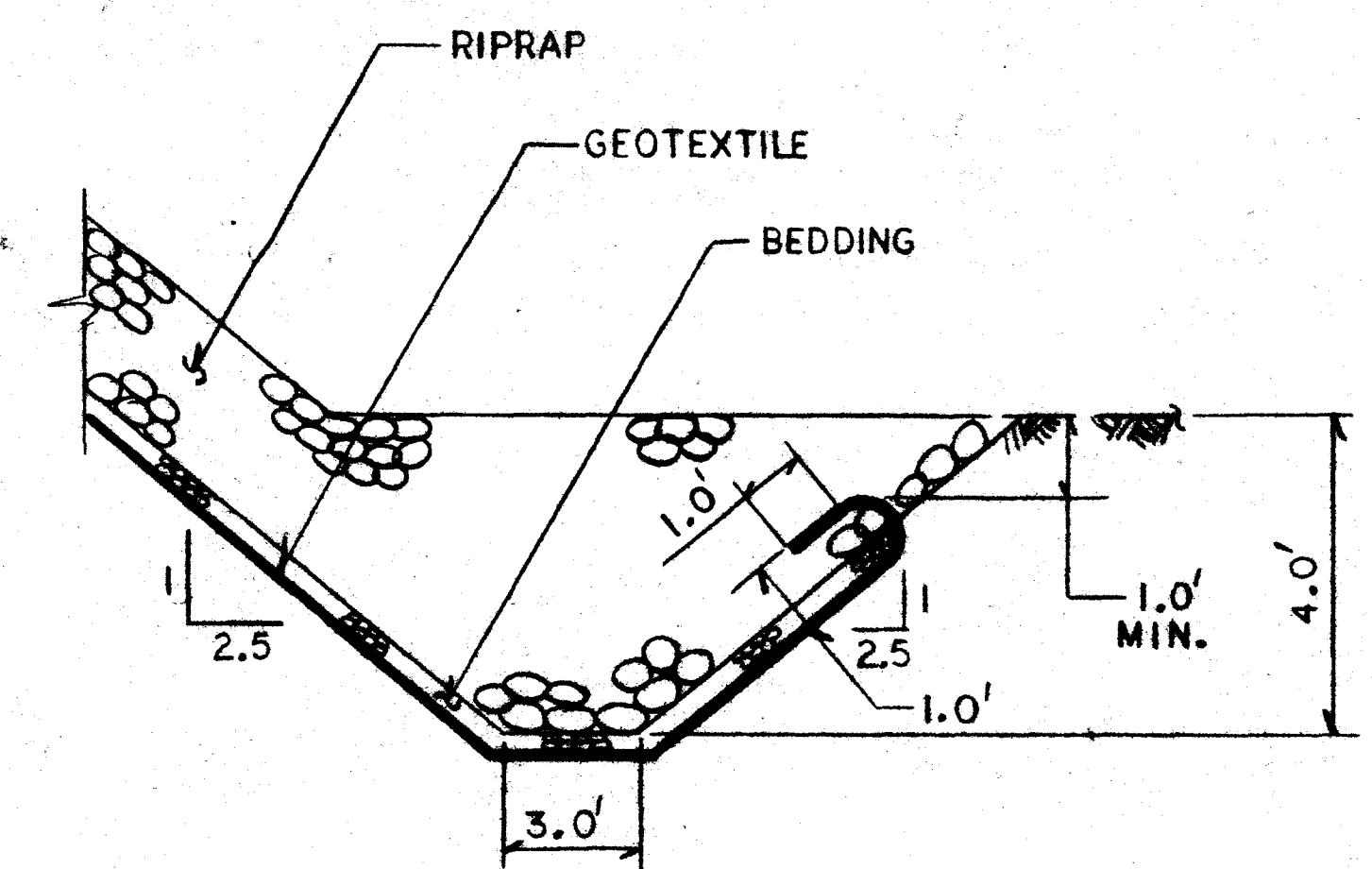
NOTES
FOR GENERAL NOTES SEE DRAWING ARC-3



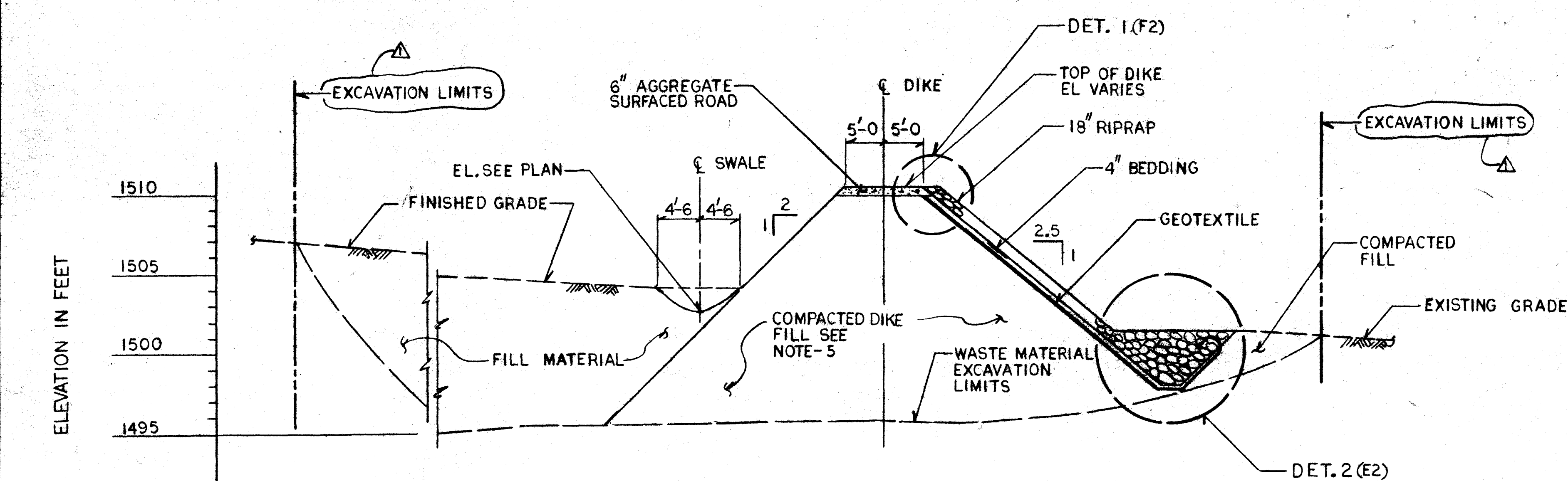
DIKE EXTENSION PROFILE
(FOR PLAN SEE DRAWING AR-3)
SCALE: 1" 30' HORIZ.
1" 3' VERT.



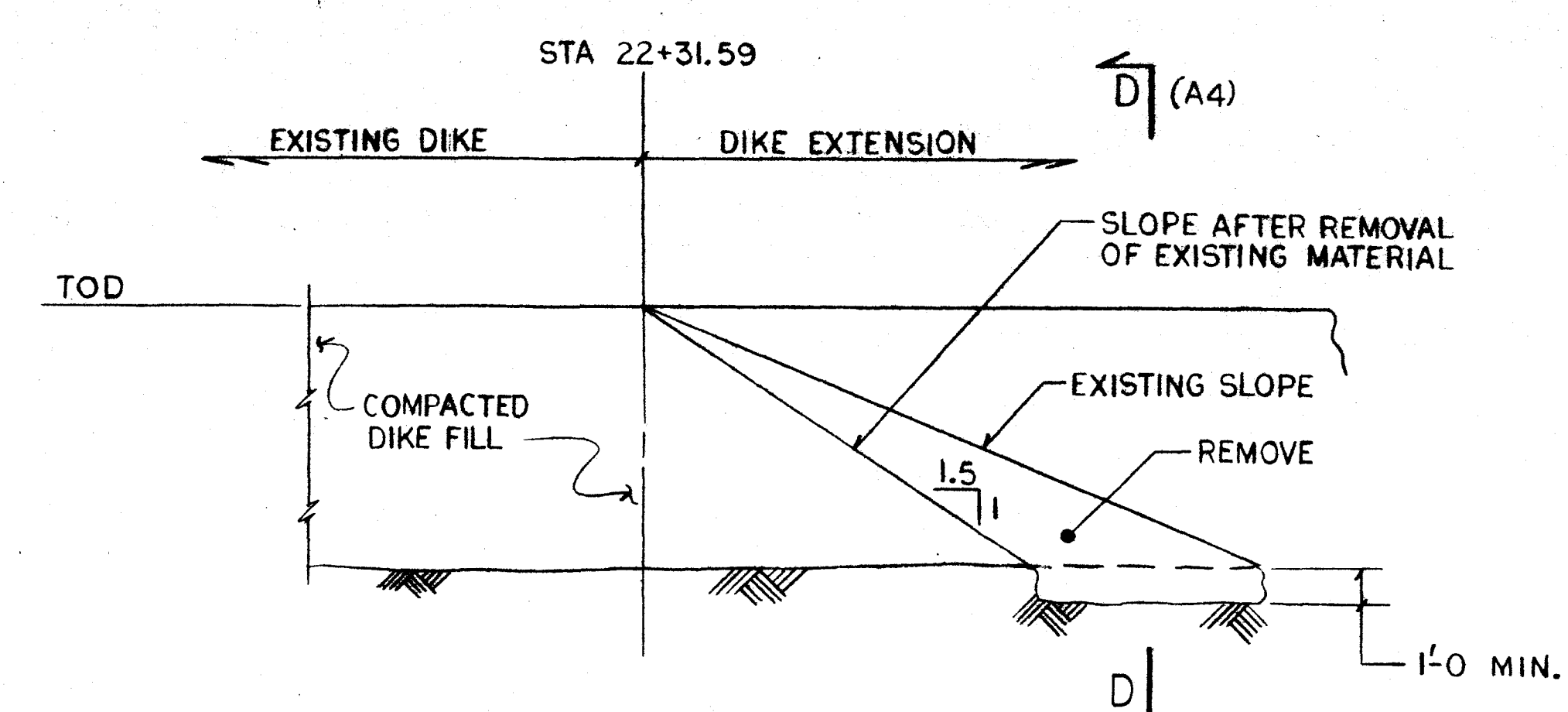
DETAIL-1 (B6,E6)
NTS



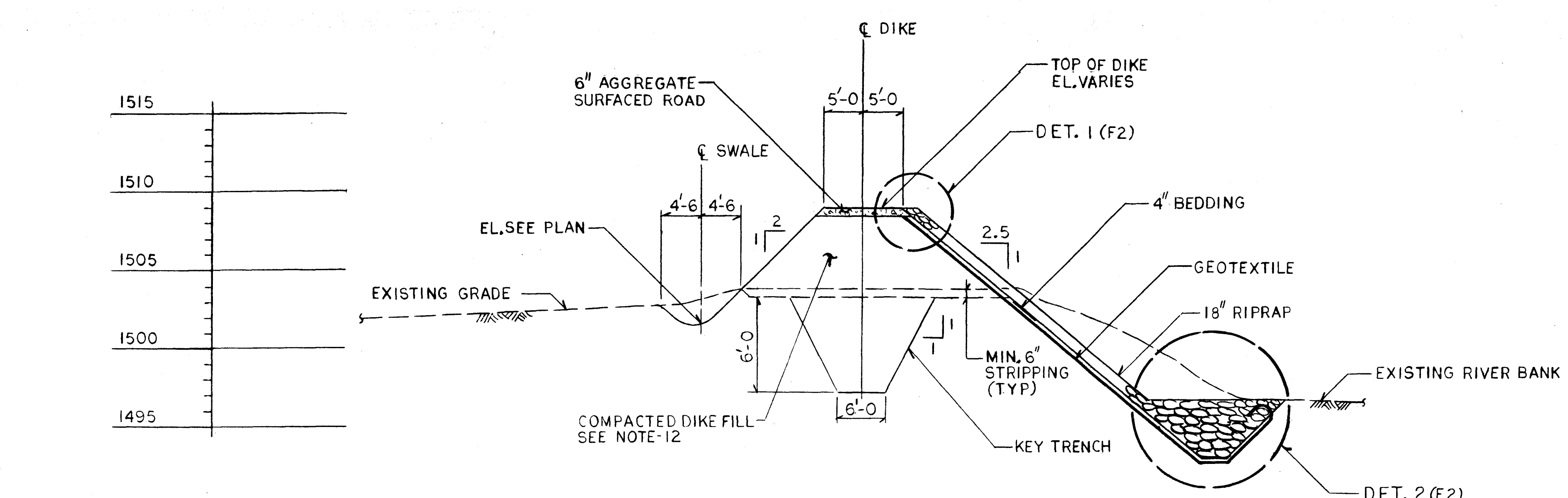
DETAIL-2 (B5,D6)
NTS



SECTION-A-A (AR-3, F5)
SCALE: 1" 10' HORIZ.
1" 5' VERT.

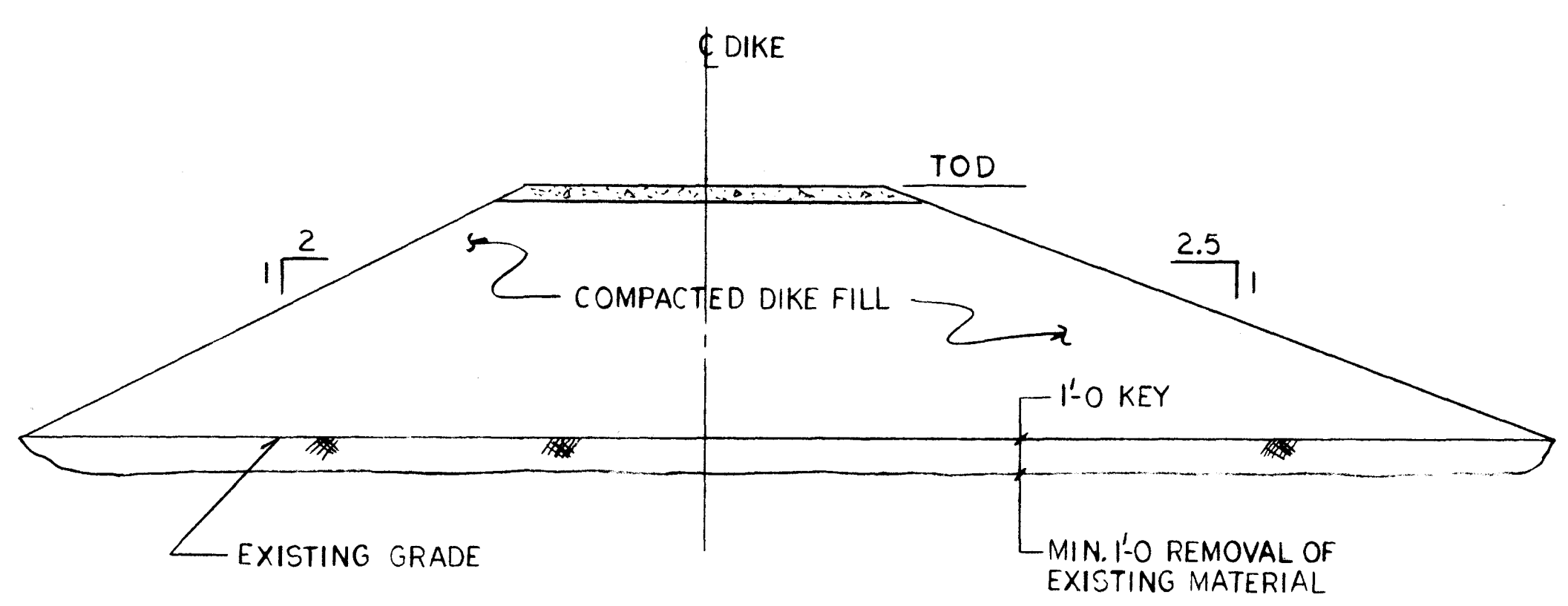


SECTION C-C (AR-3, G6)
NTS



SECTION-B-B (AR-3, G6)
SCALE: 1" 10' HORIZ.
1" 5' VERT.

TYPICAL FOR DIKE STA 22+31.59 TO 23+20.00
STA 26+00.00 TO 27+16.59



SECTION D-D (D3)
NTS



ARCO SINCLAIR REFINERY LANDFILL	
DIKE EXTENSION PROFILE SECTIONS & DETAILS	
EBASCO SERVICES INCORPORATED	
SCALE AS NOTED	APPROVED
DIV. CIVIL	DATE 10-12-90
DR. E. K.	AR-4
CH. E. L.	

NO	DATE	REVISION	BY	CH	APPROVED
1	11-2-90	REV. TOP ELEV. (G6) NOTE (H7) (G6) (H5) (E5)	EK	RL	VP

H

G

F

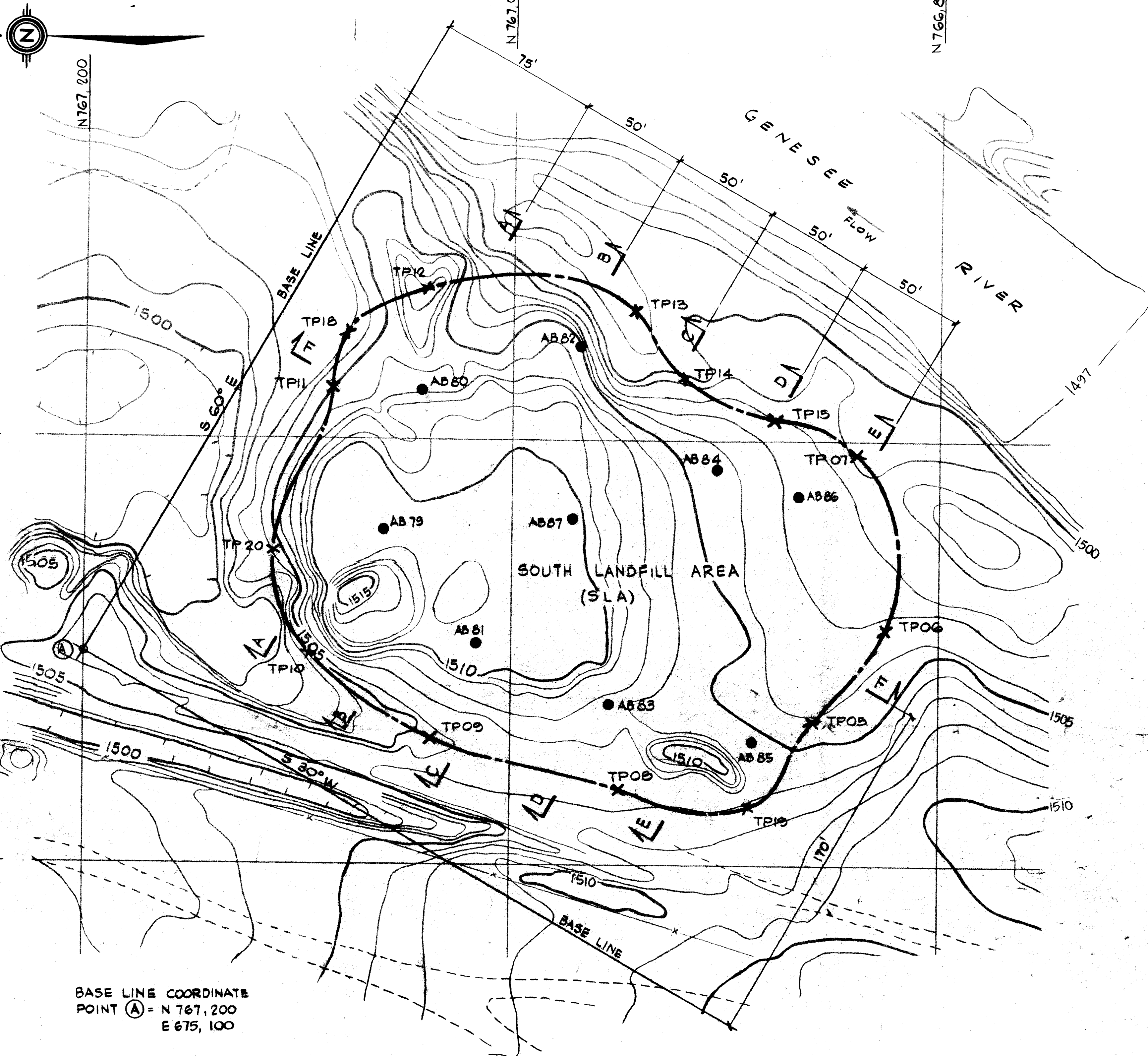
E

D

C

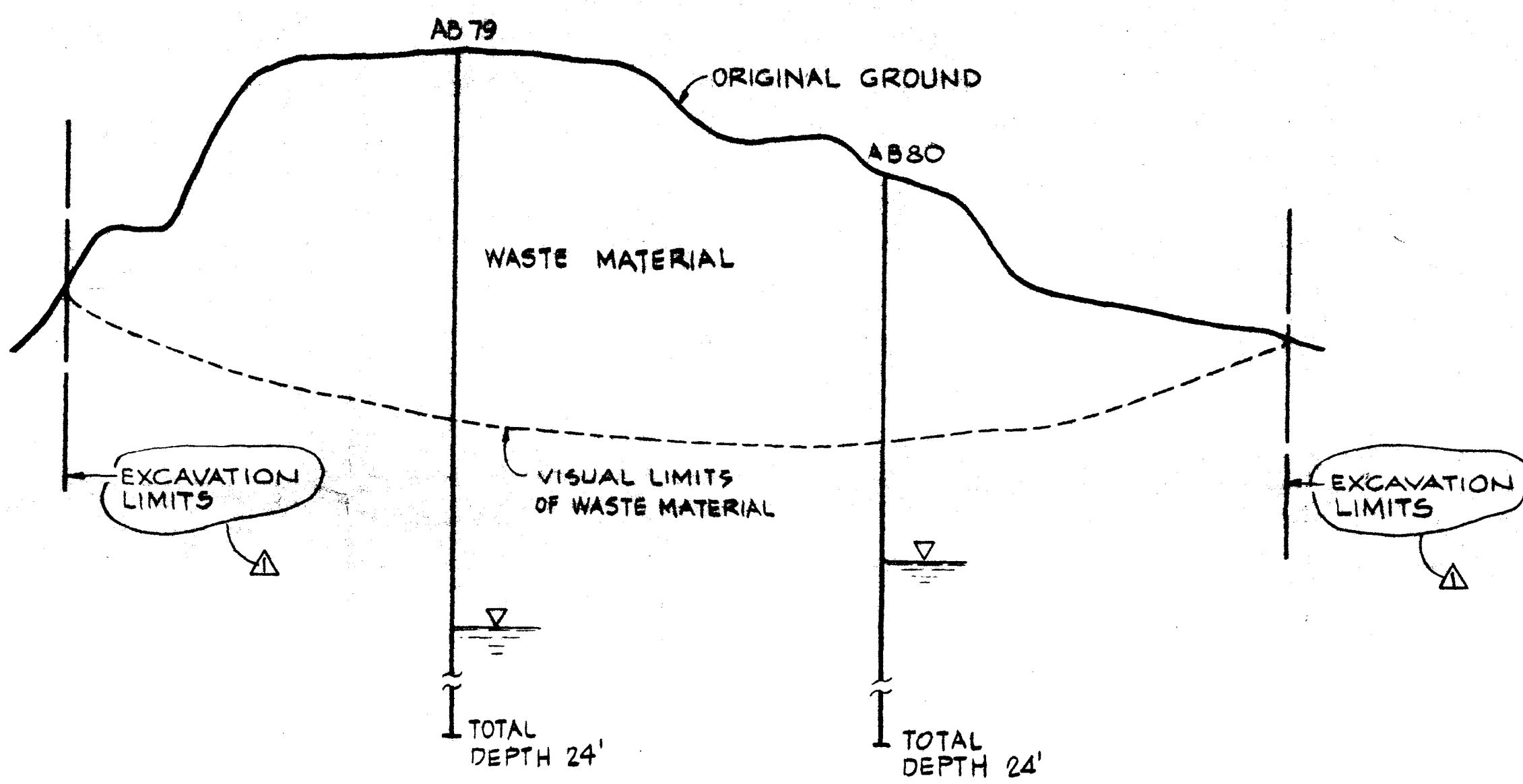
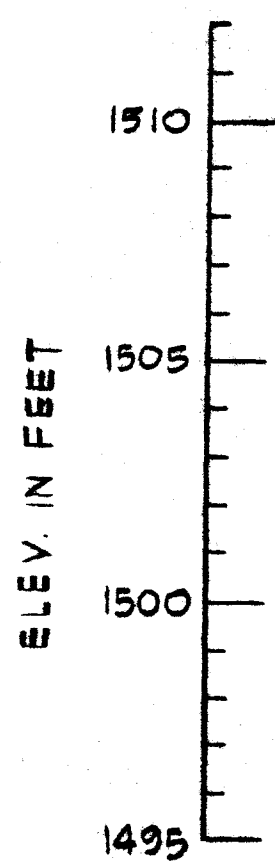
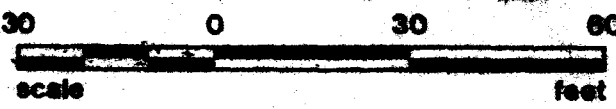
B

A

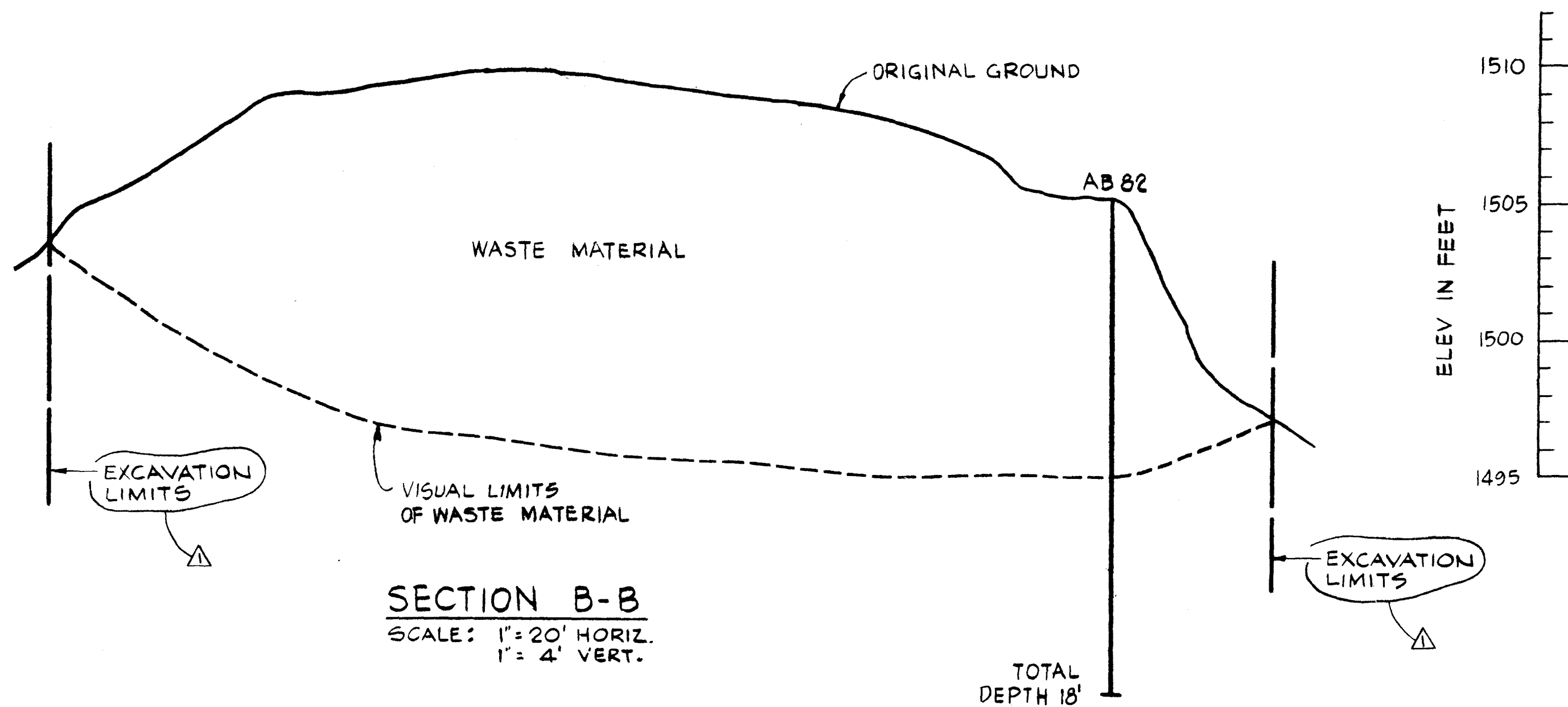
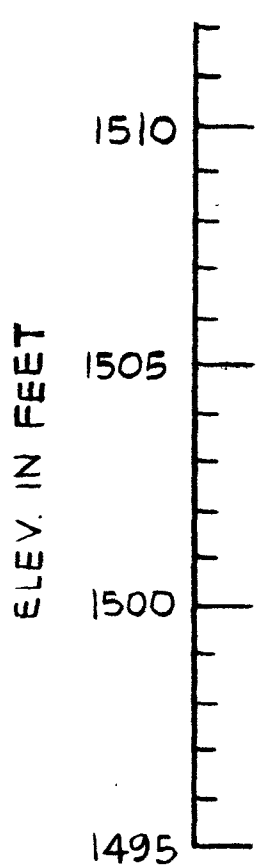


BASE LINE COORDINATE
POINT (A) = N 767,200
E 675,100

PART PLAN



SECTION A-A
SCALE: 1" = 20' HORIZ.
1" = 4' VERT.



SECTION B-B
SCALE: 1" = 20' HORIZ.
1" = 4' VERT.

8

7

6

5

1510

1505

1500

1495

1510

1505

1500

1495

1510

1505

1500

1495

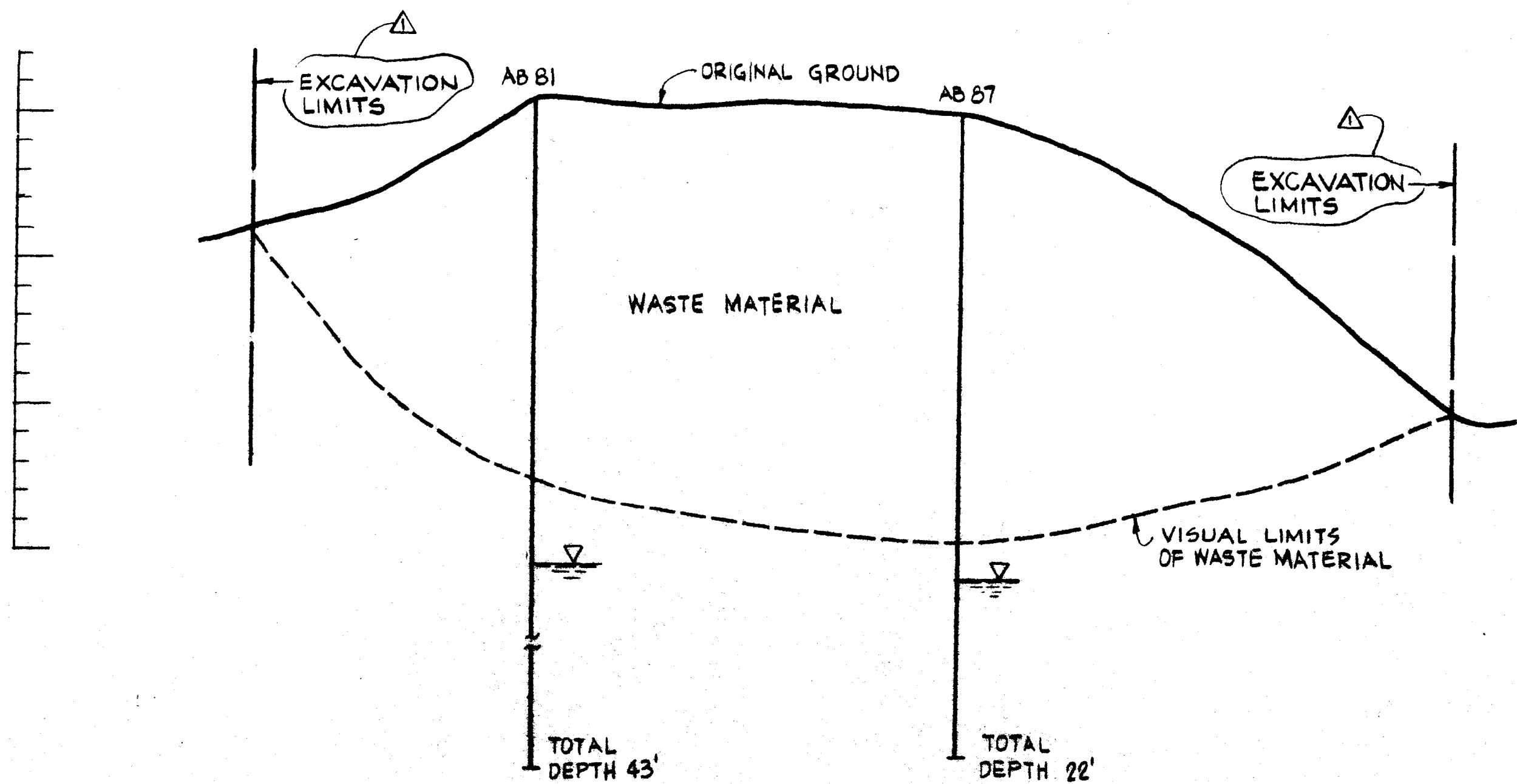
1510

1505

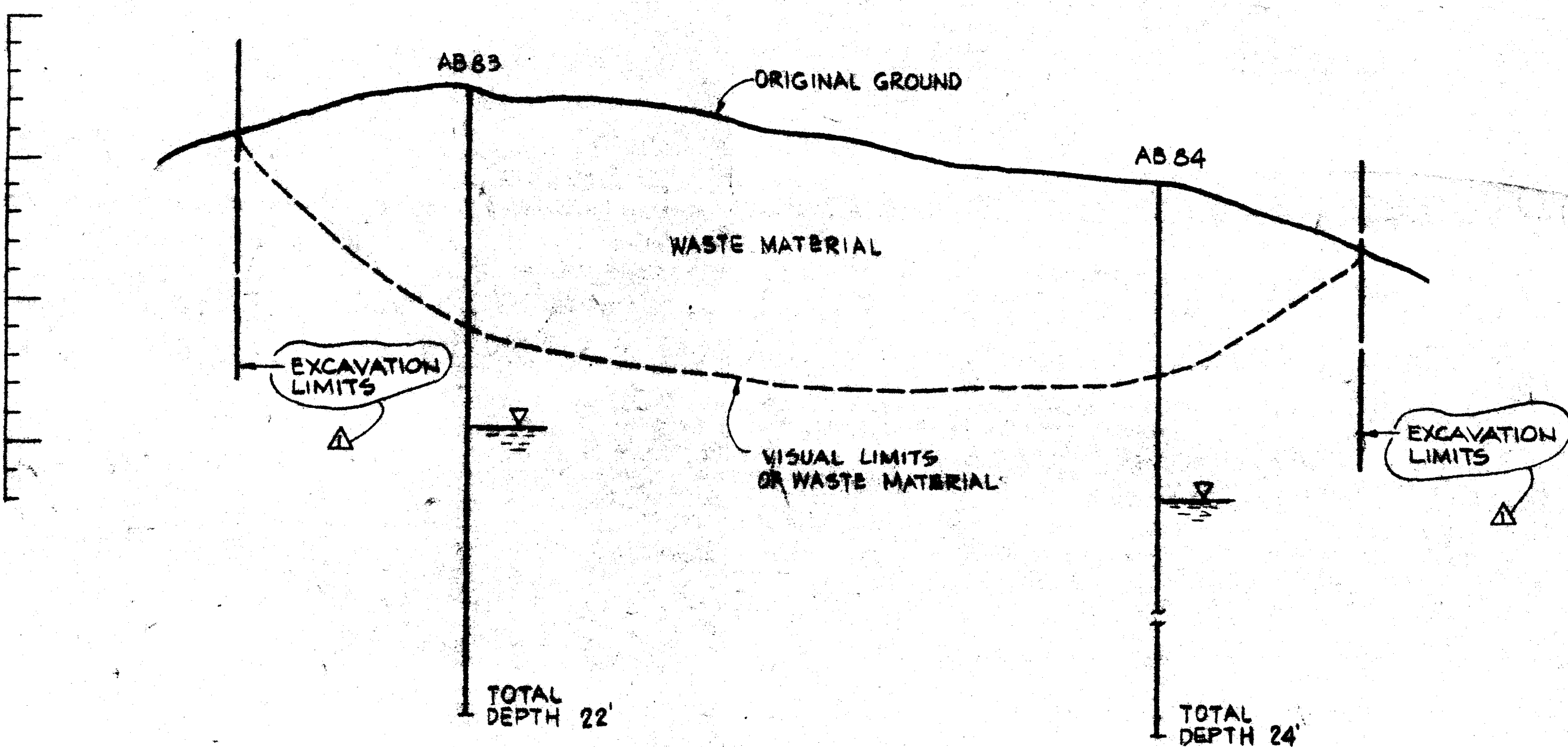
1500

1495

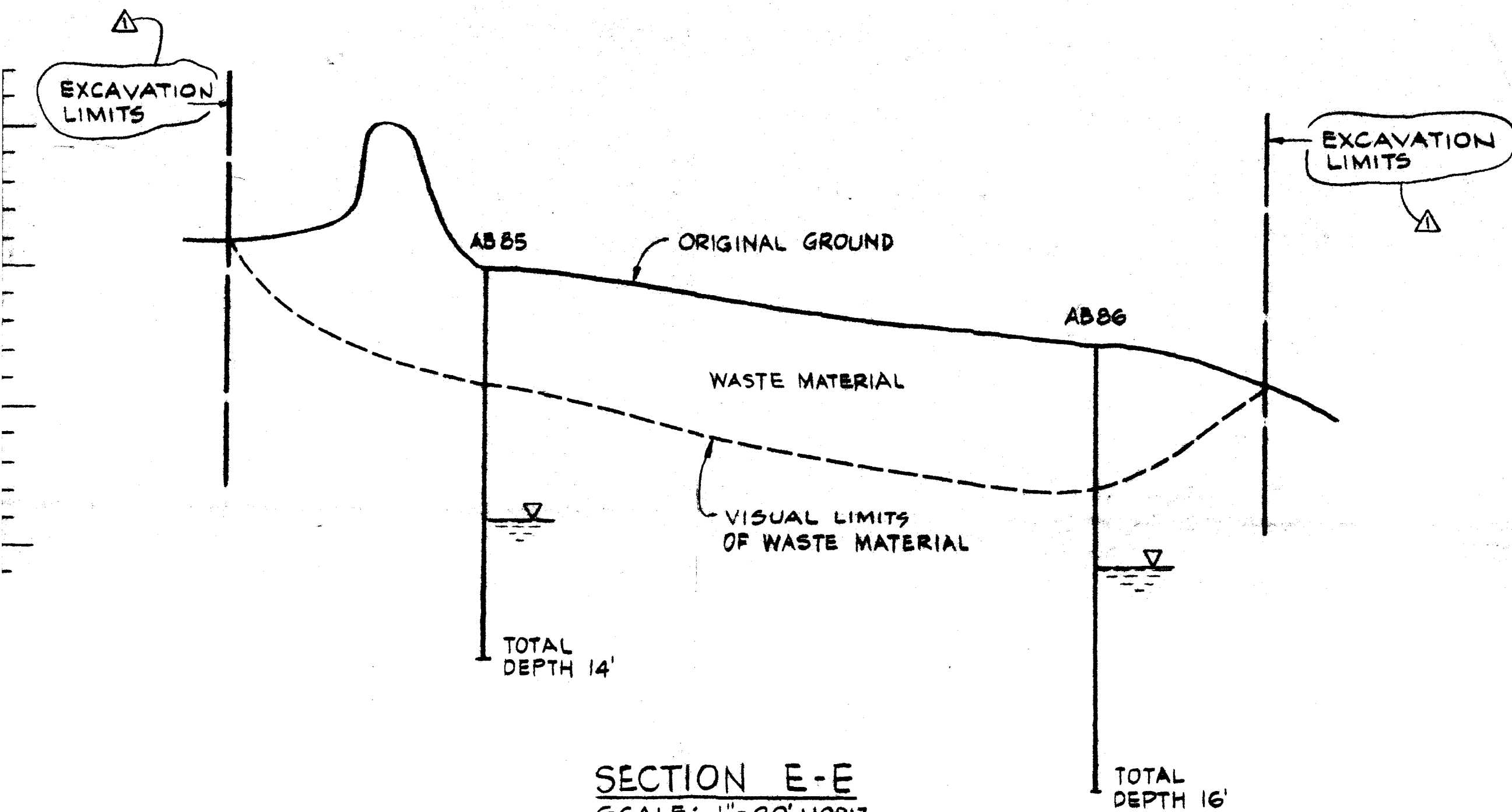
EXCAVATION LIMITS



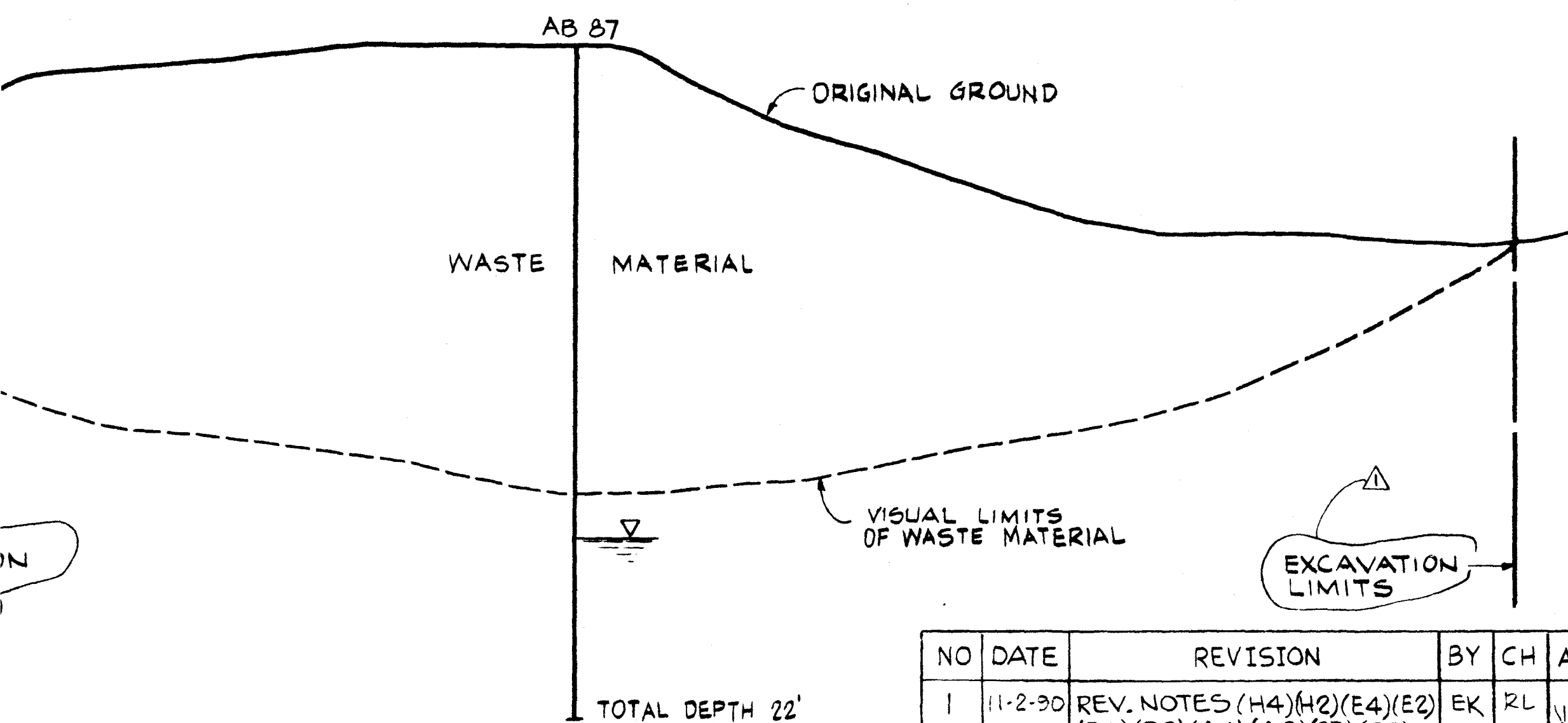
SECTION C-C
SCALE: 1" = 20' HORIZ.
1" = 4' VERT.



SECTION D-D
SCALE: 1" = 20' HORIZ.
1" = 4' VERT.



SECTION E-E
SCALE: 1" = 20' HORIZ.
1" = 4' VERT.



SECTION F-F
SCALE: 1" = 20' HORIZ.
1" = 4' VERT.

LEGEND:

- AB79 TO AB87 - DENOTES AUGER BORINGS
TP05 TO TP20 - DENOTES TEST TRENCHES
▽ DENOTES GROUNDWATER LEVEL
DETERMINED FROM SPLIT SPOON SAMPLING

LOCATION CO-ORDINATES
FOR TEST TRENCHES

NO.	NORTH	EAST
TP05	766859.68	675067.56
TP06	766825.00	675113.43
TP07	766837.57	675192.69
TP08	766950.10	675035.38
TP09	767035.84	675060.20
TP10	767095.00	675100.00
TP11	767085.03	675227.22
TP12	767040.00	675271.00
TP13	766945.45	675262.31
TP14	766921.79	675229.90
TP15	766878.56	675208.31
TP18	767079.10	675250.99
TP19	766890.00	675028.00
TP20	767112.00	675148.00

LOCATION CO-ORDINATES
FOR AUGER BORINGS

NO.	NORTH	EAST
AB79	767060.12	675156.42
AB80	767042.46	675224.98
AB81	767016.29	675104.68
AB82	766971.65	675244.98
AB83	766954.36	675077.04
AB84	766906.11	675187.01
AB85	766889.72	675058.06
AB86	766867.60	675173.90
AB87	766972.31	675163.19



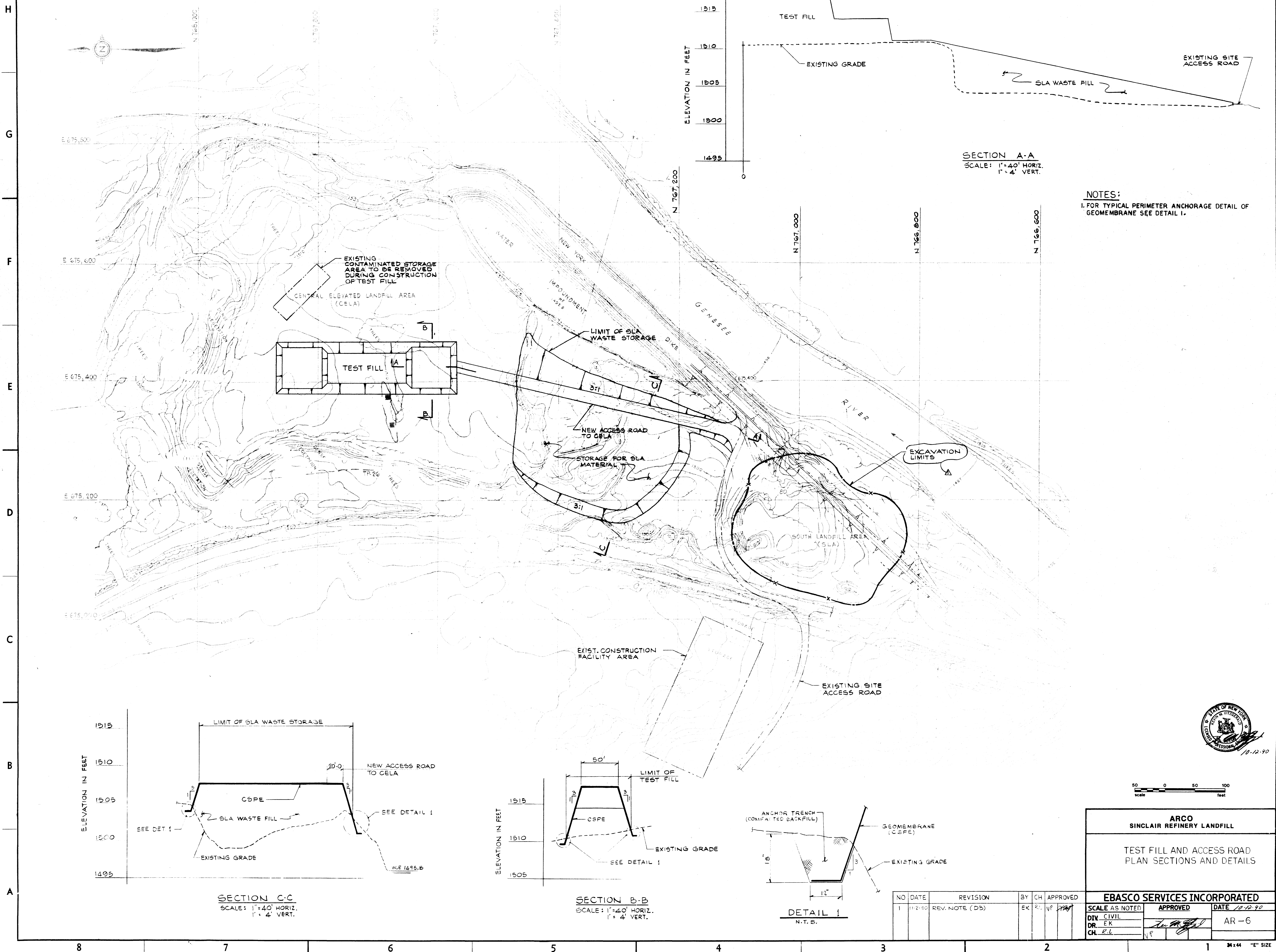
ARCO
SINCLAIR REFINERY LANDFILL

SLA EXCAVATION
PLAN AND SECTIONS

EBASCO SERVICES INCORPORATED

SCALE AS SHOWN	APPROVED	DATE 10-12-90
DIV. CIVIL		AR-5
DR. AEN		
CH. R.L.		

NO	DATE	REVISION	BY	CH	APPROVED
1	11-2-90	REV. NOTES (H4)(H2)(E4)(E2) (D4)(D2)(A4)(A2)(C7)(C5) (A7)(A5)	EK	RL	VP



NOTES:
1. FOR TYPICAL PERIMETER ANCHORAGE DETAIL OF GEOMEMBRANE SEE DETAIL 1.



ARCO SINCLAIR REFINERY LANDFILL	
TEST FILL AND ACCESS ROAD PLAN SECTIONS AND DETAILS	
EBASCO SERVICES INCORPORATED	
SCALE AS NOTED	APPROVED
DIV. CIVIL	DATE 12-12-90
DR. EK	AR-6
CH. RL	

NO	DATE	REVISION	BY	CH	APPROVED
1	11-2-90	REV. NOTE (DB)	EK	RL	VP