GW - 32

8/86

PERMITS, RENEWALS, & MODS

Application

GIANT
REFINING COMPANY

ROUTE 3, BOX 7 • GALLUP, NEW MEXICO 87301
(505) 722-3833 • TWX 910-981-0504

August 28, 1986

Mr. David B. Boyer
Environmental Bureau Chief
New Mexico Oil Conservation Division
P.O. Box 2088
State Land Office Bldg.
Santa Fe, NM 87501-2088

RE: GW-32 Aeration Basin Design

Dear Mr. Boyer:

Enclosed is the information on our aeration basin requested by your office.

The three attachments are:

Geoscience's Technical Specifications
Fox Engineering's Soil Study Report, and
Data taken on organics migration in the existing pond bottom.

We are currently preparing a bid package to select a contractor for this work. Excavation will proceed as soon as one is chosen and your approval is received. We have not yet specified the aeration equipment, but the aerators will most likely be a surface mechanical type in order to maximize the units flexibility. In addition, we plan to remove the remaining organic sludge and apply it to the Land Treatment Area as the first phase of construction.

If you have any questions regarding this information, please contact Bob McClenahan of my staff.

Very truly yours,

Carl D. Shook
Vice President Refining Operations

CDS:ds

cc: File
Carlos Guerra, Esq.,Giant Industries
Claude Schleyer, Geoscience Consultants, Ltd.
Bob McClenahan, Jr.

TECHNICAL SPECIFICATIONS FOR CONSTRUCTION OF AN AERATED LAGOON API SEPARATOR EFFLUENT TREATMENT FACILITY

GIANT REFINING CO. - CINIZA PLANT

Revised August 5, 1986

Prepared for:

GIANT REFINING CO.
Ciniza Plant
Route 3, Box 7
Gallup, New Mexico 87301

Prepared by:

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Albuquerque, New Mexico 87102

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SECTION I

GENERAL CONDITIONS

I-1. DEFINITIONS:

The term "Engineer" as used herein means the engineer or construction inspector duly appointed or authorized to represent the owner.

I-2. VISIT TO SITE AND CONDITIONS:

Bidders are requested to visit the site and inform themselves concerning all the conditions under which the work is to be done. Failure to visit the site will in no way relieve the Contractor from the responsibility of furnishing any materials and performing any work that may be required to complete the contract in strict accordance with the true intent and meaning of the specifications without additional expense to the owner.

Information contained in the specifications as it relates to quantities or conditions at the site is furnished only for the convenience of the bidders, and no guarantee of the accuracy of the information is made or implied.

I-3. EXISTING UTILITIES AND STRUCTURES:

The Contractor shall be held responsible for any damage to existing utilities and structures which may be encountered during construction operations. All utilities and structures encountered shall be maintained in good operating condition, and be protected from damage by the Contractor. Utilities and structures which are damaged by the Contractor shall be immediately repaired at the Contractor's expense. The repairs will be made with the same type of materials which were damaged, and the repair work shall be done in a method acceptable to the Engineer.

I-4. TOOLS, PLANT AND EQUIPMENT:

If, at any time before the commencement of or during the progress of the work, tools, plant or equipment, in the opinion of the Engineer, seem to be insufficient, inefficient or inappropriate to secure the quality of the work required or the proper rate of progress, the Engineer may order the Contractor to increase their efficiency, to improve their character, to augment their number, or to substitute new tools, plant or equipment as the case may be, and the Contractor must conform to such order; but the failure of the Engineer to demand such increase of efficiency, number or improvement shall not relieve the Contractor of his obligation to secure the quality of work and rate of progress necessary to complete the work within the time required by the contract to the satisfaction of the owner.

I-5. QUALITY OF MATERIALS:

It is the intent of these specifications that new first-class materials shall be used throughout the work and that they shall be incorporated in such a manner as to produce complete construction work which is workmanlike and acceptable in every detail. Only materials which conform to the requirements of these specifications shall be incorporated in the work.

All materials not conforming to the requirements of these specifications shall be considered defective and shall be removed from the work; if in place, they shall be removed by the Contractor at his expense and replaced with acceptable materials. Upon failure of the Contractor to comply forthwith with any order of the Engineer pursuant to the provisions of this article, the Engineer shall have authority to remove and replace defective materials and to deduct the cost of removal and replacement for any moneys due, or to become due, the Contractor.

When requested by the Engineer, the Contractor shall furnish a complete written statement of the origin, composition and manufacture of any or all materials that are to be used in the work.

I-6. COPIES OF DRAWINGS FURNISHED:

The owner will furnish to the Contractor, free of charge, all copies of drawings and specifications reasonably necessary for the execution of the work.

I-7. CONTRACTORS NOTICE OF COMPLIANCE:

The Contractor shall give all notices and comply with all applicable State laws and regulations and local ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. If the Contractor observes that the drawings and specifications are at variance therewith, he shall promptly notify the Engineer in writing, and any necessary changes shall be adjusted as provided in the contract of changes in the work. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Engineer, he shall bear all costs arising therefrom.

I-8. POINTS AND INSTRUCTIONS:

The Contractor shall provide reasonable and necessary opportunities and facilities for setting points and making measurements. He shall not proceed until he has made timely demands upon the Engineer for, and has received from him, such points and instructions as may be necessary as the work progresses. The work shall be done in strict conformity with such points and instructions.

The Contractor shall carefully preserve bench marks, reference points and stakes, and in case of willful or careless destruction, he shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.

I-9. CLIMATIC CONDITIONS:

The Engineer may order the Contractor to suspend any work that may be subject to damage by climatic conditions. In the event of any such ordered suspension of work, the Contractor will be granted an extension of time equal to but not in excess of the period of delay occasioned by the conditions bringing about the suspension. No extra payment will be allowed for expenses due to any suspension of work ordered as a result of weather conditions.

I-10. MATERIALS:

The Contractor will be required to furnish all materials and equipment necessary to complete the work satisfactorily and in accordance with the specifications. All materials furnished by the Contractor may be subject to inspection and approval by the Engineer, and any rejected materials shall be promptly replaced with satisfactory materials at no additional expense to the owner.

Any reference to trade names and/or catalog numbers is intended to be descriptive but not restrictive, and is only to indicate to prospective bidders articles that will be satisfactory. Bids on other trade names or catalog numbers will be considered, provided each bidder clearly states on the face of his proposal what he intends to furnish, or provides with his bid a cut or illustration or other descriptive matter which will indicate the character of the article covered by his bid.

I-11. INSPECTION:

All workmanship, equipment, and materials will be subject to inspection at any time by the Engineer. If, during the course of the work or at any time, such inspection indicated that materials used or work performed is not in accordance with the contract requirements, the owner will order the Contractor to make all necessary corrections, and if conditions warrant, to halt the work operations until the corrections have been made. Any such work stoppages ordered for the above reasons shall not be deemed acceptable justification for extension of the contract time or for additional compensation.

I-12. ACCEPTANCE OF PROJECT:

When all work or materials required by the drawings and specifications for the project have been performed and furnished acceptance of the work will be given by the owner. The acceptance of the work will be given in writing and until such acceptance the Contractor will be responsible for the work covered by the Contract. The Contractor's responsibility will cease, except as provided by guarantees, when acceptance of the work is given.

I-13. SHOP DRAWINGS:

The Contractor shall submit to the owner for approval one copy of shop drawings, manufacturer's data or catalog sheets for each item of equipment and materials to be furnished. No work shall commence on any item until the applicable materials have been approved.

I-14. GUARANTEES:

All work shall be constructed in compliance with standard construction codes, and must be guaranteed for a period of one year from the date of final acceptance. Equipment and supplies installed by the Contractor shall have a manufacturer's written guarantee of performance. Any component of this project which fails to function satisfactorily, according to the specifications, shall be replaced or repaired by the Contractor at no expense to the owner. Claims to the guarantee may be made by the owner at any time during the 1 year guarantee period and adjustments shall be made by the Contractor in a timely manner.

SECTION II

TECHNICAL PROVISIONS - SEWAGE TREATMENT LAGOON

II-1. SCOPE:

The work within this section consists of furnishing all labor, equipment, materials, and incidentals in connection with constructing an aerated lagoon in the area indicated on the construction drawings in strict accordance with the drawings and these specifications. The lagoon will be constructed on the site of existing Lagoon No. 1 of the Giant Industries Oil Refinery at Ciniza, near Gallup, New Mexico.

II-2. MATERIALS:

A. Pipe, Joints, and Fittings

1. Polyvinyl Chloride Pipe

All PVC pipe shown on the drawings shall be class 160, SDR 26, PVC water pipe, meeting ASTM D2241, and ASTM D1784, Type I, Grade I, PVC 1120, rigid polyvinyl chloride (PVC) pipe. Fittings for joining PVC pipe in special structures shall be cast iron conforming to quality requirements of AWWA C110. Pipe joints shall be made with rubber gaskets as recommended by the pipe manufacturer and approved by the Engineer.

2. Ductile Iron Pipe: All ductile iron pipe shall be Type I, meeting AWWA C150, and AWWA C151. Joints shall meet AWWA C111, and fittings shall meet AWWA C110.

3. Gate Valves and Boxes: Gate valves shall be of cast iron body construction, bronze mounted, solid wedge, resilient seal, with 2 inch square operating nut, 150 psi operating pressure, nonrising stems and conform to AWWA C500. All valves used on PVC pipe shall be equal to the Watrous 500 series.

One valve key shall operate all valves and two such keys shall be furnished to the engineer by the Contractor.

All valves boxes shall be cast iron and of the sliding type, sized for use with the appropriate valve to the finished grade. Valve boxes shall be Tyler Series 6855, or equal. All valve boxes shall be provided with locking covers. Lids for gate valves shall be marked "Sewer". Collars shall be constructed as indicated in the plans and detail drawings. Two valve keys for use on all valve covers shall be provided to the engineer.

4. Concrete: Concrete shall be as specified in Section III.

5. Wastewater Lines: Wastewater Lines shall be as specified in Section IV.

6. Parshall Flume: A 3" Parshall Flume, made of polyester reinforced fiberglass sealed with smooth white gel coat shall be provided. It shall be equal to that manufactured by Hinde Engineering Co. of California, Inc. Recommended supplier is Barnhardt - Taylor, Inc. 2501 Alamo, SE Albuquerque, NM 87106.

II-3. LAGOON EARTHWORK

A. Soils Testing and Inspection: The engineer shall supply to the contractor the results of a pre-construction soil study indicating the baseline modified proctor density, in accordance with ASTM D1557 or latest revision. Additional tests may be provided at the contractor's request and expense. These results shall be used as the basis for determination of acceptability of all compaction under this contract.

During the course of construction, periodic checks of soil compaction will be made as directed by the Engineer to assure compliance with these specifications.

B. Clearing and Grubbing: The area within the limits shown on the drawings and extending a minimum of 5 feet beyond the embankment foundation limits shall be cleared of all objectionable material, to include trees, logs, stumps, brush, vegetation, and rubbish to a minimum depth of 1 foot. Stumps and roots larger than 1 1/2 inches in diameter shall be removed to a depth of 3 feet below subgrade. Spoil material shall be collected and removed by the Contractor to a location selected by the Contractor and approved by the Engineer. The existing drain and transfer pipes shall be removed from the berm on the west side.

C. Excavation: Excavation shall be performed at such places as are indicated on the drawings, and to the lines, grades and elevations shown.

During the process of excavation, the grade shall be maintained in such condition that it will be well drained at all times. When necessary, temporary drains and drainage ditches shall be installed to intercept or divert surface water which may affect the prosecution or condition of the work.

The rough excavation shall be carried to such depth that sufficient material will be left above the designated grade to allow for compaction to this grade. Should the Contractor

through negligence or other fault, excavate below the designated lines, he shall replace such excavation with approved material in an approved manner and condition, at his own expense.

All soft or unstable material, and material which will not readily compact when rolled or tamped, shall be removed as directed by the Engineer, and replaced with suitable material. All sand lenses and other permeable zones will be excavated to a minimum depth of 2 feet below the finish grade and shall be removed and deposited adjacent to the lagoon site as directed by the Engineer. The top 6 inches of excavated areas comprising the final embankment shall be compacted to a density equal to 90% of maximum density as determined by the Modified Proctor Test, ASTM D1557 or latest revision. Such a sand lens is thought to exist on the east side as evidenced by a readily observed natural seep.

D. General Fill Methods: Prior to placement of compacted fill in any section, the foundation of such section shall be loosened thoroughly by scarifying, plowing or harrowing to a depth of 8 inches. After removal of roots or other debris turned up in the process of loosening, the entire surface of the area shall be compacted to 90% of maximum density as determined by the Modified Proctor Test, ASTM D1557 or latest revision.

After an 8" loose layer of fill material has been deposited and spread, it shall be harrowed if required to break up and blend the materials, unless harrowing is to be performed to obtain uniform moisture distribution. Harrowing, if required, shall be performed with a spring-tooth harrow, or other approved harrow, to a depth of at least 8 inches. If one pass of harrowing does not accomplish the breaking up and blending of the materials, additional passes of the harrow may be required. When the moisture content and the condition of the layer is satisfactory, the lift shall be compacted to 90% of maximum density as determined by the Modified Proctor Test, ASTM D1557 or latest revision. Backfill placed adjacent to structures shall be compacted to 90% of maximum density as determined by the Modified Proctor Test, ASTM D1557 or latest revision. Portions of the fill which are not accessible to the roller shall be placed in 8-inch layers and compacted to the required density by approved mechanical tampers.

E. Dike Embankments: The dike embankments shall be constructed with approved excavated material obtained from the lagoon site or nearby approved borrow sites, shall be placed in 8 inch thick layers and compacted to a density equal to 90% of that of the maximum dry density as determined by the Modified Proctor Test, ASTM D1557 or latest revision.

Compacted surfaces of fill materials shall be lightly scarified to break up stratification before the succeeding layer is placed upon it. When fill is placed against the existing slopes, the existing slopes shall be deeply benched to prevent construction of a slip surface.

All embankments shall be filled and compacted as specified above, to the lines, grades and elevations as shown on the plans or as directed by the Engineer, with all surfaces trimmed and fine graded so as to produce a neat, regular appearance.

Rolling of the embankment areas shall be done with an approved sheepsfoot or segmented steel wheeled compactor. Any irregularities or depressions that develop under rolling shall be corrected by loosening the material at these places and adding, removing or replacing material until the surface is smooth and uniform. Any portion of the area which is not accessible to a roller shall be compacted to the required density by approved mechanical tampers.

All soft or unstable material and material which will not readily compact when rolled or tamped, shall be removed as directed by the Engineer, and replaced with suitable material. All permeable zones will be excavated to a minimum depth of 2 feet below the finish grade and shall be removed and deposited adjacent to the lagoon site as directed by the Engineer. The top 8 inches of excavated areas comprising the final embankment shall be compacted to a density equal to 90% of maximum density as determined by the Modified Proctor Test, ASTM D1557 or latest revision.

F. Lagoon Bottom: The lagoon bottom shall be constructed to the finished grade as shown on the drawings, and shall be as smooth as possible at all points. The bottom of the lagoon shall be checked for smoothness and accuracy with surveying instruments, and if any portion is found to vary more than two tenths (0.20) of a foot above or below the finished grade, such portions shall be scarified, reshaped and recompacted until the required accuracy is obtained.

The top 8 inches of the lagoon bottom shall be scarified and compacted to a density equal to 90% of the maximum dry density as determined by the Modified Proctor Test, ASTM D1556 or latest revision. Compaction and rolling shall conform to all provisions as specified under "Dike Embankment". All soft and yielding material, and material which will not readily compact when rolled or tamped, shall be removed, and replaced with suitable material as directed by the Engineer. All sand lenses and other permeable zones will be excavated to a minimum of 2 feet below finish grade and shall be removed and deposited adjacent to the lagoon site as directed by the Engineer. Backfill for these areas shall be obtained from the most select

material encountered in excavation as designated by the Engineer.

G. Key Trench: To reduce the possibility of piping through the soils and to reduce settlement, a key trench shall be excavated along the interior edge of the existing embankment on the western edge of the existing pond. The key trench should be a minimum of five (5) feet deep and a minimum of ten (10) feet in width at the base. The side slopes should be no steeper than 1 1/2:1 (horizontal: vertical). The bottom of the key trench should be moisture conditioned and compacted as described under "General Fill Methods". The key trench shall then be backfilled with controlled structural fill as detailed in "General Fill Methods". Schematic drawings of the key trench are presented in the plans. The foundation for the interior dikes shall be prepared as described in in "General Fill Methods" and as directed by the engineer.

H. Sludge Drains Protection: Since there is a potential for seepage or leakage along the sludge drain pipes, it is necessary that the pipes be supported by at least two (2) feet of controlled structural fill as described under "General Fill Methods". This fill zone shall consist of either excavated and recompacted foundation soils or borrow soils from other areas on the site. the excavation and recompaction shall extend at least two (2) feet beyond the perimeter of the pipes. Prior to replacement of excavated soils, the moisture conditioning and densification treatment described under "General Fill Methods" shall be performed along the sludge drain alignments. The recompacted materials should be placed at optimum moisture content (± 2%) and compacted to a dry density of at least 90% of the maximum dry density as determined in accordance with ASTM D-1557.

As a further control of seepage along the sludge trains, seepage collars shall be installed along the drain pipes as described in "Special Structures".

I. Natural Seepage Area: Flow from the natural seepage will create unfavorable conditions for the abutment of the interior embankment on the East side of the pond between Cell 1 and Cell 3, and the flow shall be diverted around the pond. A cut off trench shall be excavated east of the abutment area down to weathered shale bedrock or dry, low permeability soils. A perforated drain pipe shall be installed, and the trench backfilled to near the surface with clean gravel. The drain pipe shall drain to a gravity outfall downhill from the pond.

J. Permanent Reference Markers: Permanent reference markers shall be installed along the embankment centerlines for possible future monitoring of embankment settlement. Two markers shall be placed in the crest of each embankment, and two reference

markers placed in areas away from embankment fill on natural soils. These shall be permanent markers cast in concrete.

K. Trenches and Excavations: All trenches and excavations greater than five (5) feet deep must be sloped, shored, sheeted, braced, or otherwise supported according to OSHA construction safety and health standards. Where unstable soil conditions are encountered in trenches shallower than five (5) feet, these trenches must also be sloped, shored, or supported.

Material excavated from the trench or spoil must be placed a minimum of two (2) feet from the edge of the excavation or trench. The spoil must be barricaded or retained in an effective manner such that no loose material can fall into the excavation or trench. Additional measures shall be taken to provide an adequate support system in trenches which are excavated below the water table, in backfill areas, in loose unstable soils, and in "brittle" clays.

II-4. MOISTURE CONTROL:

The materials in each layer of the fill shall contain the amount of moisture, within the limits specified below, necessary to obtain the desired compaction.

The moisture content shall be as uniform as practicable throughout any one layer of selected materials and shall be $\pm$ 2% of the optimum moisture content or as directed by the engineer. Material that is too wet shall be spread and permitted to dry, assisted by discing or harrowing, if necessary, until the moisture content is reduced to an amount within the specified limits. When material is too dry, the Contractor shall be required to wet each layer of the fill, and harrowing or other approved methods shall be required to work the moisture into the material until a uniform distribution or moisture is obtained. Water applied on a layer of fill shall be accurately controlled in an amount so that free water shall not appear on the surface during or subsequent to rolling. Should too much water be added to any fill so that the material is too wet to obtain the desired compaction, the rolling and all work on that section of the fill shall be delayed until the moisture content of the material is reduced to an amount within the specified limits.

If, in the opinion of the Engineer, the top or contact surfaces of a partial fill section become too dry to permit suitable bond between these surfaces and the additional fill to be placed thereon, the Contractor shall loosen the dried materials by scarifying or discing to such depths as may be directed by the Engineer and shall dampen the loosened material to an acceptable moisture content, and shall compact this layer in accordance with the applicable requirements.

II-5. SURPLUS EXCAVATION MATERIAL:

The surplus excavated material from the lagoon site not used for construction of the embankment dikes and other construction, shall be disposed and wasted in those areas adjacent to the lagoon site as directed by the Engineer during construction. No extra compensation shall be made for this disposal and wasting.

II-6. SPECIAL STRUCTURES:

A. Lagoon Inlet Piping Structure: The lagoon inlet piping shall be constructed as shown on the drawings. The lagoon inlet piping structure shall include all piping from the existing API separator extending to and including the distribution box and inlet collars. This includes the connection of new pipe to the existing outlet of the existing API separator. Materials and construction shall be as indicated in Section II. Provision must be made for continued operation of the API Separator during construction. Pumping of the effluent may be required in order to make the new pipe connection to the API Separator.

B. Lagoon Transfer Structures: The lagoon inter-connecting structures shall be constructed as shown on the drawings. Piping conforming to ASTM D2241 shall be required. Materials and construction shall be as indicated in Section II and applicable drawings.

C. Lagoon Sludge Drain Structures: The lagoon sludge drain structures shall be constructed as shown on the drawings. Piping conforming to ASTM D2241 shall be required. The discharge ends of the sludge drain structures shall have flanged connections to facilitate the connection and fittings to be used for sludge removal. They shall also have flange type valves, and concrete splash pads and collars as shown on the detail drawings. Materials and construction shall be as indicated in Section II.

D. Seepage Collars: Seepage collars shall be fitted on pipes traversing the berms as shown on the drawings. They shall be made of concrete reinforced with 6" x 6" 10 x 10 WWF. The minimum dimensions for 6" pipes shall be 3' x 3' x 1' thick and for 12" pipes shall be 4' x 4' x 1' thick. On the berm slopes, the seepage collars may be combined with concrete pads as shown on the drawings.

II-7. CLEANUP:

Upon completion of the work, the entire site shall be cleared of all debris, and the ground surface shall be finished to smooth, uniform slopes and shall present a neat and workmanlike appearance. Cleanup shall be considered an incidental item and no additional payment shall be made for it, but rather its costs shall be merged with the applicable pay

item regardless of whether cleanup is specifically included in the measurement and payment section.

II-8. AS-BUILT DRAWINGS:

The contractor shall be responsible for keeping accurate records of all installed items under this section of the specifications, and indicating revisions of the furnished construction drawings in sufficient detail to be accepted by the Engineer for as-built drawings. For the Contractor's information sufficient detail under this contract means that the Contractor shall take accurate measurements and record them on the drawings to provide the minimum information of at least two swing ties and distance to permanent objects and/or marker posts for the location of any stabilization material placed; the location and depth of rock encountered; the location of any berm center line corners; all centerline distances; and berm and bottom elevations at all corners and centers; and control structure elevations. Also to be noted on the plans is the final elevation of all access lids, inverts, and ground immediately adjacent to the access lid and the distance and angles between the access structures.

The recording of the as-built information is considered an integral part of the progress of this construction and shall be reviewed with the Engineer in determining progress under this contract.

II-9. MEASUREMENT AND PAYMENT:

A. Lagoon Construction: The payment for the lagoon, including hauling, grubbing, clearing topsoil, excavation, embankment construction, moisture control, bottom construction, diversion ditches, surplus excavation, as-builts, and clean-up shall be merged with and paid for at the lump sum Bid Price. A topographic map and Earthwork Summary, Section V, are presented as guides for use in determining the earth work required.

   This shall be full compensation for the construction of the sewage lagoon except for the below items.

B. Transfer Structures: Payment for construction of transfer structures shall be based on the lump sum bid price and shall include all compensation for form work, concrete, reinforcing steel, piping, valves, valve boxes, labor, equipment, miscellaneous material, as-builts, and clean-up required to provide complete and operational structures as indicated in the plans and detail drawings.

C. Inlet Structure: Payment for construction of the inlet structures shall be based on the lump sum bid price and shall include compensation for all piping, valves, flume, form work, concrete, reinforcing steel, labor, miscellaneous material, as-builts, and clean-up required to provide a complete and operational structure as indicated in the plans and detail drawings.

D. Sludge Removal Structures: Payment for construction of the sludge removal structures shall be based on the lump sum bid price and shall include compensation for all piping, valves, form work, concrete, reinforcing steel, labor, miscellaneous material, as-builts, and clean-up required to provide complete and operational structures as indicated in the plans and detail drawings.

II-10. SUBMITTALS:

1. Earth work equipment to be used

2. Manufacturers specification sheets for:
   a. pipe
   b. pipe fittings
   c. valves
   d. valve boxes
   e. parshall flume

SECTION III

CONCRETE

III-1. SCOPE:

The work covered by this section of the specifications consists of furnishing all plant, labor, equipment and other materials necessary to perform all concrete work, complete, in strict accordance with this section of the specifications and the applicable drawings, subject to the terms and conditions of the contract.

III-2. GENERAL:

Concrete Classifications: Unless otherwise indicated, all concrete shall have a compressive strength of not less than 4,000 pounds per square inch as determined from test cylinders at 28 days, made, cured, and broken in accordance with Standard ASTM Methods.

III-3. TESTING OF CONCRETE:

During the progress of the work, a reasonable number of compression tests shall be made when and if required by the Engineer. Each test shall consist of not less than 3 cylinders. At least one test shall be made for each 50 cubic yards of concrete placed. All cylinders shall be made and tested in accordance with the Standard Methods of the American Society for Testing Materials. The contractor shall pay for all expenses in connection with the tests and shall furnish to the Engineer certified reports on the tests.

III-4. RESPONSIBILITY OF CONTRACTOR FOR STRENGTH:

It is the intent of these specifications that the contractor shall guarantee to the Owner that concrete of the specified compressive strength is incorporated in the structures and that the responsibility for producing the required grades of concrete is assumed by the contractor.

Should the average strength shown by test cylinders fall below the strengths required, the Engineer shall require a change in the amount of cement, or grading of aggregate, or of the ratio of the water of the cement used, or any, or all. If the tests disclose that the strength of the concrete is insufficient for the structure as built, the Engineer may condemn the part of the structure in which concrete of insufficient strength has been placed and the contractor, at his cost, shall remove and replace such concrete with concrete meeting with these specifications.

III-5. MIXING:

The concrete shall be mixed in an approved batch machine or mixer. The ingredients shall be accurately measured before being placed in the mixer. Measuring boxes or other approved measuring apparatus shall be used so that the proportions can be accurately determined. The quantities of water to be added, which will vary with the degrees of dryness of the material and with the weather conditions, shall be accurately measured for each batch of concrete.

Means shall be provided by which a measured quantity of water can be introduced at any stage of the process. The mixing shall be done in a thorough and satisfactory manner and shall continue until every particle of aggregate is completely covered with mortar. The mixing time for each batch shall not be less than 1 minute after the materials are in the mixer. The entire contents of the drum shall be discharged before recharging.

III-6. READY MIX CONCRETE:

Ready mix concrete may be used provided the strength, density and other requirements of these specifications can be met and provided that the concrete conforms to ASTM Designation C94-58 or latest revision thereof, using Type II cement.

Retempering of concrete which has partly hardened will not be permitted.

III-7. CONSISTENCY:

All reinforced concrete which is required to be spaded or puddled in forms or around reinforcement shall be of such consistency that:

a. All aggregates will float uniformly throughout the mass, without settling or segregating.

b. When dripped directly from the discharge chute of the mixer, it will flatten out at the center of the pile but will stand up at the edges, the pile spreading from internal expansion and not be flowing.

c. It will flow sluggishly when tamped or spaded.

d. It can be readily puddled into the corners and angles of forms, and around reinforcement steel.

e. It can be readily spaded to the bottom of the pour or to a depth of several feet at any time within 30 minutes after placing.

A desirable consistency is one which results in a very slight accumulation of water at the top of a layer several feet in thickness, but with no segregation or accumulation of laitance.

If, through accident, intention, or error in mixing, any concrete shall contain an excess amount of water, and in the opinion of the Engineer, is too wet, such concrete shall not be incorporated in the work, but shall be discharged as waste material.

III-8. PLACING CONCRETE:

Before beginning a run of concrete, surfaces of the forms, reinforcing steel, and concrete previously placed, shall be thoroughly cleaned of hardened concrete or foreign materials. Forms shall be thoroughly wetted or oiled.

Concrete shall be placed in the forms immediately after mixing. It shall be so deposited that the aggregates are not separated. Dropping the concrete any considerable distance, depositing large quantities at any point and running or working it along the forms, or any other practice tending to cause segregation of the ingredients, will not be allowed. It shall be compacted by continuous mechanical tamping. Care shall be taken to fill every part of the forms, to work the coarser aggregate back from the face, and to force the concrete under and around the reinforcement without displacing it.

The concrete shall be deposited in continuous horizontal layers and, wherever practicable, concrete in structures shall be deposited continuously for each monolithic section of the work. Chutes used for conveying shall be mortar tight.

Work shall be so arranged that each part of the work shall be poured as a unit, if this is possible. Where necessary to stop pouring concrete, the work shall be brought up in level courses and against a vertical stop board.

The placing of concrete under water, where permitted, must be done by special approved methods.

III-9. PLACING IN COLD WEATHER:

No concrete shall be placed without the specific permission of the Engineer when the air temperature is at or below 35 degrees F.

If concreting in freezing weather is permitted by the Engineer, care shall be taken to prevent the use of any frozen material. In addition to adequate provision for protecting the concrete against chilling or freezing, the contractor shall be required to heat the water and aggregate so that when deposited in the forms, the concrete will have a temperature of not less than 50 degrees F. nor more than 100 degrees F. The concrete shall be adequately protected so as to maintain this temperature for a minimum of 72 hours after it has been placed and a temperature above 32 degrees F. for a period of two additional days. The work shall be done entirely at the contractor's risk.

No chemicals or other foreign matter shall, without the approval of the

Engineer, be added to the concrete for the purpose of preventing freezing.

III-10. CONSTRUCTION JOINTS:

Construction joints shall be located as shown upon the plans and at other points as may be necessary during construction, provided that the location and nature of additional joints shall be approved by the Engineer. In general, joints shall be located at points of minimum sheer, shall be perpendicular to the principal lines of stress, and shall have suitable keys having areas of approximately 1/3 of the area of the joints.

In resuming work, the surface of the concrete previously placed, shall be thoroughly cleaned of dirt, scum, laitance, or other soft material and shall be roughened. The surface shall then be thoroughly washed with clean water and covered with cement mortar, after which concreting may proceed.

III-11. FINISH OF CONCRETE SURFACES:

All surfaces exposed to view shall be free from conspicuous lines, affects, or other irregularities caused by defects in the forms. If for any reason this requirement is not met, or if there are any conspicuous honeycombs, the Engineer may require the correction of the defects by rubbing with carborundum bricks and water until a satisfactory finish is obtained. Floors shall be finished monolithically by screening and troweling to a smooth, hard finish.

Immediately after removing the forms, all wires or other exposed metal shall be cut back to the concrete surface, and the depression thus made shall be pointed with mortar and then rubbed smooth. Any honeycomb or other defect determined by the Engineer to require treatment shall be cut out to a depth sufficient to expose the reinforcement and immediately dry packed with mortar and rubbed smooth. Exposed concrete shall be hand rubbed with carborundum brick and water to give a continuously uniform appearance. Air holes to be filled with grout and excess rubbed off.

III-12. CURING CONCRETE:

Exposed surface of concrete shall be protected from premature drying for a period of at least 7 days. The Engineer may require the frequent wetting of the concrete and the use of means to protect it from the direct rays of the sun.

III-13. PLACING REINFORCEMENT:

All reinforcement, when placed, shall be free from mill scale, loose or thick rust, dirt, paint, oil or grease, and shall present a clean surface. When bending is required, it shall be accurately and neatly done. The placing and fastening of reinforcement shall be approved by the Engineer before any concrete is deposited. Care shall be taken not

to disturb the reinforcement after the concrete has taken its initial set.

III-14. FORMS:

Forms shall be so designed and constructed that they may be removed without injuring the concrete. The material to be used in the forms for exposed surfaces shall be sized and dressed lumber or metal in which all bolt and rivet heads are countersunk. In either case, a plain smooth surface of the desired contour must be obtained. Undressed lumber may be built true to line and if necessary to close cracks due to shrinkage, shall be thoroughly soaked in water. Forms for re-entrant angles shall be filleted, and for corners shall be chamfered. Dimensions affecting the construction of subsequent portions of the work shall be carefully checked after the forms are erected and before any concrete is placed. The interior surfaces of the forms shall be adequately oiled with a non-staining mineral oil to insure the non-adhesion of mortar.

Form lumber which is to be used a second time, must be free from bulge or warp and shall be thoroughly cleaned. The forms shall be inspected immediately preceding the placing of concrete; and bulging or warping shall be remedied and all dirt, sawdust, shavings, or other debris within the form shall be removed. No wood device of any kind used to separate forms shall be permitted to remain in the finished work. Temporary openings shall be placed at the bottom of the column and wall forms and at other points where necessary to facilitate cleaning and inspection immediately before depositing concrete.

III-15. REMOVAL OF FORMS:

Removal of form work shall depend on the weather conditions and shall be subjected to the approval of the Engineer. The minimum time for removal of forms unless otherwise approved by the Engineer, shall be 3 days after the concrete has been poured for walls, beam sides, and columns; slab forms and beam soffits may be removed in 7 days, provided a reasonable amount of vertical supports are retained. These vertical supports shall remain until the supported slabs and beams are able to withstand the superimposed load without undue deflection or damage of any kind. Under any circumstances, the removal of the forms shall be performed at the risk of the Contractor.

III-16. MATERIALS:

a. Cement: All cement used in the work shall be a well-known brand of sulfate resistive Portland Cement, and shall conform to the "Standard Specifications for Portland Cement", Serial Designation C150, Type II of the American Society for Testing Materials, and latest revision thereof.

b. Acceptance or Rejection of Cement: The acceptance or rejections of cement shall rest with the Engineer and any cement failing to meet the requirements specified herein may be

rejected at his direction. All rejected cement shall be plainly marked for identification, shall be immediately removed from the work, and shall not again be offered for inspection. Cement kept in storage for several months may be subject to repeated tests if required.

c. Water: All water used in mixing mortar or concrete shall be free from acid, alkali, oil, salt, vegetable or other matter in sufficient quantity to be injurious to the finished product, and shall be reasonably clear.

d. Fine Aggregate: The fine aggregate for concrete shall consist of the best available sand and shall be composed of sharp, clean, hard, durable grains and shall be sensibly free from lumps, clay balls, soft or flaky material, salt, alkali, organic matter and loam and conform to ASTM Designation C33-57 or latest revision thereof. Fine aggregate shall be graded from coarse to fine within the limits shown in the following table.

Sieve Size	Total Passing, % in Weight
3/8"	100
No. 4	95 - 100
No. 16	45 - 80
No. 50	5 - 30
No. 100	0 - 8

e. Coarse Aggregate: Coarse aggregate shall consist of the best available river gravel or crushed limestone or other approved material. Coarse aggregate shall be clean, tough, sound, durable rock and shall not contain harmful quantities of foreign material and to conform to ASTM Designation C33 or latest revision thereof. Samples shall be submitted to the Engineer for approval before any aggregate is used in the work. The coarse aggregate shall be uniformly graded from coarse to fine and shall conform approximately to the following gradation requirements:

For Concrete in Members Less Than 8" in Thickness	Percentage Passing Various Screens
Passing a 1-1/2" Screen	100
Passing a 3/4" Screen	40 - 70
Passing a 1/4" Screen	0 - 5

In case the concrete resulting from the mixture of the aggregates is not of a workable character or does not make the

proper finished surface, the Engineer may require a different grading in order to secure the desired result.

III-17. STEEL REINFORCEMENT:

All reinforcing steel shall be welded wire fabric as designated in the drawings. The Engineer reserves the right to require a test of the reinforcing material.

III-18. EMBEDDED ITEMS:

Before placing concrete, care shall taken to determine that all embedded items are firmly and securely fastened in place as indicated on the drawings. Embedded items shall be free of oil and other foreign matter such as loose coatings of rust, paint, and scale.

III-19. NONSHRINK GROUT:

Use applicable following mix where nonshrink grout is specified or desirable in connection with structures.

a. Unexposed Surfaces: Where discoloration from rust stains are not objectionable, use nonshrink grout proportioned by weight as follows. One part Portland cement; 3 parts clean, well graded sand screened through No. 4 sieve; 1/4 part Embeco, manufactured by Master Builders Company, Cleveland, Ohio, or approved equal; and sufficient water to obtain required consistency.

b. Surfaces Exposed to Sight or Weather: Basic proportions as above, except surface shall be furnished 1/4" low, and then 1/4" of plaster made from cement mortar shall be used to match adjoining concrete work. Mortar having lost plasticity or ability to adhere to surfaces shall be wasted and not used.

III-20. PATCHING CONCRETE:

Concrete out of level or alignment, or defective areas which cannot be patched satisfactorily, shall be removed and replaced. Patching shall be done in a workmanlike manner to restore original quality and appearance, using applicable nonshrink grout as specified for the location. Patched areas unsatisfactory in workmanship or appearance shall be filled or removed and replaced, as directed. Tie holes shall be filled and defective areas patched immediately following removal of forms. Defective areas shall be chipped to solid concrete or a minimum depth of one inch, the patching area and surrounding space wetted liberally, and mortar forced into place and compacted. Mortar shall be finished flush and to match adjacent areas and cured as specified for concrete.

III-21. GROUTING PIPES:

Annular spaces around pipes passing through masonry or concrete shall be filled with nonshrink grout finished flush with faces of walls and bottoms of slabs, and built up to form a cone terminating not less than 3 inches above floor level where leakproof construction is specified or required.

SECTION IV

WASTEWATER PIPELINES

IV-1. SCOPE:

This section covers the construction of the wastewater lines, including connections to existing API Separator.

IV-2. GENERAL:

Wastewater pipelines, conforming to these specifications and of the respective size shown on the drawings for the particular location, shall be constructed to proper line and grade, resulting in an unobstructed conduit having a smooth and uniform invert.

IV-3. TRENCHING AND BACKFILLING:

Bottom of trench shall be manually graded and shaped to provide uniform support for lower quadrant of pipe throughout each entire length, with recesses excavated to receive bells. Final grading and shaping shall be done only when the trench bottom is dry and pipe laying is ready to proceed. Material obtained from final preparation of trench bottom may be deposited along the sides of pipe already placed provided pipe alignment is not disturbed and there is no interference with construction of joints.

IV-4. INSTALLATION OF PIPELINES:

Pipe shall not be laid when trench or weather conditions are unsuitable for such work. Water shall be kept out of the trench. All pipe and fittings shall be protected to prevent entrance of foreign material.

Pipe laying shall proceed up grade, with spigots pointing in direction of flow. Trench bottom shall be shaped to receive and support lower quadrant of pipe barrel, with recesses at bells, and entire run of pipe straight and true to grade. Pipe shall be inspected for defects prior to being placed and interior of bell and exterior of spigot cleaned carefully. The joints shall form a continuous watertight conduit with a uniform interior surface and shall provide for slight movement of any pipe in the line due to expansion, contraction, settlement or lateral displacement.

IV-5. PVC PLASTIC SEWER PIPE:

The PVC Plastic Sewer pipe shall meet the following: Gasket jointed, designed and manufactured for use as sanitary sewer pipe, in accordance with ASTM standard D-3034 or D-3212 as they apply. Gaskets will conform to ASTM F-477 standard specifications. Each shipment shall be accompanied by a certificate from the manufacturer certifying that the material has been tested in accordance with ASTM D 1784 and conforms with the

above requirements. All materials must be inspected on the job site for purposes of rejecting defective or damaged pipe.

IV-6. ALIGNMENT OF SEWERS:

Sewers may be checked by the Engineer to determine whether any displacement of the pipe has occurred. These tests will be made with artificial light or by the sunlight reflected in the sewer lines with mirrors. If the illuminated interior of the pipe shows poor alignment, displaced pipe, or any other defects, the defects shall be corrected by the Contractor at his own expense.

IV-7. TESTING SEWER MAINS:

Testing for watertightness of the completed sewer lines must be performed by surcharging the system with water and measuring exfiltration.

The maximum allowable exfiltration, including the distribution box, shall not exceed 50 gallons per 24 hours per 1,000 feet of sewer, per inch of pipe diameter.

The average internal pressure in the system under test shall not be greater than five pounds per square inch (11.6 ft. head), and the maximum internal pressure in any part of the system under test shall not be greater than 10.8 pounds per square inch (25 ft. head).

The Contractor shall make any necessary repairs to reduce exfiltration leakage below the specified rate, and at his own expense. Pipe having cracked or broken barrels shall be replaced.

Sufficient leakage tests will be required to assure the Engineer that the materials and workmanship are acceptable.

All labor, equipment, and materials (including water) necessary for making the tests shall be furnished by the Contractor.

SECTION V

EARTH WORK SUMMARY

Total Area (sq. ft.)	166,550
Compaction Factor (shrink at 90% compaction)	8.6%
Volume of Cut (CY)	9,630
Volume of Fill (CY)	6,648
Volume of Compacted Fill	7,220
Excess Material (CY)	2,410
Cut Area (sq. ft.)	95,500
Fill Area (sq. ft.)	71,050
Average Depth of Cut (ft.)	2.72
Average Depth of Fill (ft.)	2.53

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GEOTECHNICAL INVESTIGATION

THREE CELL SLUDGE POND

GIANT INDUSTRIES REFINERY

CINIZA, NEW MEXICO

Prepared for:

Geoscience Consultants, Ltd.

Job No: 0118980

July 22, 1986

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GENERAL

This report presents the results of a geotechnical investigation conducted at the site of the proposed three (3) cell sludge pond, to be located northwest of the Giant Industries Refinery, Ciniza, New Mexico. The location of this project is shown on the Site Location Map, Figure 1.

The investigation was made to determine the geotechnical criteria pertinent to design and to determine special precautions which should be taken into consideration during design and construction of the sludge pond. Included in this report are recommendations and conclusions concerning slope stability, seepage, drainage, settlement, general geotechnical design criteria, and guideline specifications for quality control testing during construction.

The conclusions, recommendations, and design criteria presented are based on data compiled during the field investigation, on the results of laboratory testing, and upon the applicable standards of our profession at the time this report was prepared. Data gathered during the geotechnical investigation is presented on the attached figures and Appendices A through C.

SITE CONDITIONS

The proposed three (3) cell sludge pond will be constructed from an existing pond located north of the API burn-off tower, which is located northwest of the main facilities of the refinery. Access to the pond is by way of unimproved dirt roads.

Gently rolling, small hills are located toward the north and east of the existing pond. Relatively flat ground and a waste water ditch are located toward the south, while relatively flat ground and large sludge ponds are located toward the west.

The existing pond consists of 1:1 (horizontal:vertical) slopes on both the interior and exterior. The north, east, and south slopes of the pond are all primarily cut slopes with one (1) to two (2) feet of fill placed on top. The west slope consists of some cut slopes with seven (7) feet of fill placed on top of the natural soils. The bottom of the pond gently slopes down toward the northwest corner to a local elevation of eighty-two (82) feet. The crest of the pond is ten (10) feet wide and has a local elevation of ninety-six (96) feet. A sludge drain and an effluent transfer pipe are located north of test hole 1. At the time of the field investigation, the bottom of the pond was very muddy and had areas of ponded effluent and sludge.

In the area of test hole 3 and the proposed cell 1, there is

a relatively large natural seepage area. This area is very muddy and has a moderate growth of small bushes and weeds. The remainder of the site has a scattered growth of weeds, grasses, and small bushes.

PROPOSED CONSTRUCTION

The proposed three (3) cell sludge pond will be constructed utilizing the embankments of the existing pond with the addition of three (3) interior embankments. The additional embankments and the additional fill to be placed on the existing embankments will consist of homogeneous materials obtained from the bottom of the pond and possibly from adjacent hill sides to the north and east of the site. The pond will hold very slightly oily water and sewage from the refinery and the Giant Travel Center.

The crest of the pond embankments will be at a local elevation of ninety-six (96) feet and will be ten (10) feet wide. The base of the embankments will be from seventy (70) to eighty (80) feet wide. The bottom of the pond will be cut into the natural soils at a local elevation of eighty-two (82) feet. The maximum effluent level will be at a local elevation of ninety-four (94) feet giving a maximum effluent depth of twelve (12) feet and a minimum free board of two (2) feet. The interior embankment slopes will have a maximum slope of 2:1 (horizontal:vertical) and the exterior (downstream) slopes will

have a maximum slope of 3:1.

The inlet pipes for the pond will be located in the southern end of cells 1 and 2. Effluent transfer pipes will inter-connect all three (3) cells. Effluent transfer pipes will also be located on the western sides of cells 2 and 3 to transfer effluent out of the pond. The effluent transfer pipes will be at a local elevation of ninety-four (94) feet. Sludge drains will be located near the bottom of cells 2 and 3 on the western sides.

FIELD AND LABORATORY TESTING

To evaluate the site subsurface conditions, three (3) exploratory borings were advanced at the locations indicated on the Test Hole Location Plan, Figure 2. The test holes were drilled with a CME 55 truck mounted drill rig equipped with six (6) inch hollowstem continuous flight auger.

During drilling, penetration tests were performed and relatively undisturbed soil samples were obtained in typical soil strata. The depth at which the samples were taken and the penetration tests performed are indicated on the Logs of Test Holes, Figures 3 and 4. In addition, bulk samples of the embankment materials were obtained for laboratory testing. During the field investigation an in-situ permeability test was conducted in the embankment fill material. The field

permeability test was performed using two (2) inch diameter casing and falling head methods. Permeability test results are presented on Table A-2.

All samples were inspected and classified in our laboratory. The Unified Soil Classification System was used for identification. Laboratory tests were conducted on both the undisturbed and bulk samples in accordance with the applicable ASTM Standards to determine the grain size distribution, moisture-density relationship of the soils, Atterberg Limits, cohesion, and permeability. Test results are presented in Appendix A.

SUBSURFACE CONDITIONS

As shown on the Logs of Test Holes, Figures 3 and 4, the subsurface conditions vary with depth and are fairly uniform across the site. The test holes encountered a variable amount of embankment fill. The fill consists of clayey to very clayey sand, which is moist and medium dense. Beneath the embankment fill the test holes encountered slightly sandy to sandy clay and clayey to very clayey sand. The clay is stiff to very stiff and moist to wet, while the sand is loose to medium dense and moist. The clay is moderately plastic. With depth the test holes encountered weathered shale with occasional sandstone interbeds. The shale is clayey, slightly sandy, hard, and slightly moist.

Test hole 3, which was drilled adjacent to a natural seepage area, encountered water at a depth of three and one-half (3.5) feet below the surface. The water is perched on top of the weathered shale layer, which was encountered at a depth of twelve (12) feet. Groundwater was not encountered in the other test holes to a depth of forty (40) feet.

The clayey sands and sandy clays encountered in the test holes are relatively stable at their natural moisture content but are susceptible to a decrease in void ratio and subsequent settlement upon an increase in moisture content. Refer to the Swell-Consolidation Tests, Figures A-1 and A-2.

EMBANKMENT ANALYSIS AND DESIGN

In order to decrease post-construction settlement and reduce the potential for piping beneath the embankment, a foundation treatment which will decrease both the moisture sensitivity and permeability of the foundation soils is recommended for this structure. This treatment includes excavation and replacement of a portion of the natural soils beneath the proposed embankments. This treatment will provide a foundation for the embankments that is less susceptible to post-construction settlement and will decrease the permeability of the foundation. Both a seepage and a settlement analysis were performed for the embankments, and

both are discussed in more detail in following sections of this report.

KEY TRENCH

To reduce the possibility of piping through the soils and to reduce settlement, a key trench should be excavated along the interior edge of the existing embankment on the western edge of the existing pond. The key trench should be a minimum of five (5) feet deep and a minimum of ten (10) feet in width at the base. The side slopes should be no steeper than 1 1/2:1 (horizontal:vertical). The bottom of the key trench should be moisture conditioned and compacted as described under "Foundation Preparation". The key trench should then be backfilled with controlled structural fill as detailed in Appendix B. Schematic drawings of the key trench are presented on the Embankment Cross Sections, Figures 5 and 6.

FOUNDATION PREPARATION

The foundation preparation will include clearing, grubbing, and stripping of the foundation area, and the densification of the foundation and abutment materials in place. All uncompacted fill and oily or wet materials should be completely removed from the site prior to foundation preparation.

The entire area within the limits of the embankments, together with an area extending a minimum of five (5) feet horizontally beyond the embankment foundation limits should be thoroughly cleared, grubbed, and stripped of all organic or unsuitable materials to a minimum depth of one (1) foot. In addition all tap roots, lateral roots, or other projections over one and one-half (1.5) inches in diameter within the foundation area shall be removed to a depth of three (3) feet below the natural surface of the ground. The existing sludge drain and effluent transfer pipe should be removed unless it will be refurbished for use in the new pond.

Borrow areas should be completely stripped prior to a borrow operation. The depth of stripping of the borrow area shall be sufficient to insure that borrow materials will contain no deleterious or organic materials.

Prior to the placement of the embankment fill, and subsequent to the excavation of the key trench, the ground surface resulting from stripping should be scarified to a minimum depth of eight (8) inches. The soils should then be brought to optimum moisture content ($\pm$2%) and then compacted to a minimum of 90% of maximum density as determined by ASTM D-1557. The resulting compacted foundation should be smooth and free of ruts, boulders, and other uneven features and should meet the required

density.

EMBANKMENT PLACEMENT

The gradation and distribution of material throughout the embankments shall be free of lenses, pockets, streaks, and layers of material differing substantially in texture or gradation from surrounding materials. Some blending of borrow materials may be required. Successive loads of material shall be placed at locations on the fill as directed by the Soils Engineer. No fill shall be placed upon a frozen or thawing surface nor shall snow or frozen earth be incorporated in the embankments. The slope of compacted fill against which additional fill is to be placed shall be dressed back to materials with the required compaction and moisture content immediately prior to placement of additional fill materials against the in-place materials. The existing embankment slopes and cut slopes should be heavily benched prior to placement of embankment fill to avoid constructing a slip surface.

The embankment fill shall consist of clayey sands and sandy clays obtained from designated borrow areas and foundation excavation. It is our opinion that materials on the site which are free of deleterious substances will be suitable for use as fill and that all materials which were auger drilled can be excavated by conventional equipment. Fill material shall contain

no cobbles larger than three (3) inches and shall contain a minimum of thirty-five (35) percent soil by weight passing a Number 200 Sieve.

The fill materials shall contain the optimum moisture (±2%) necessary for compaction. The fill materials shall be compacted to within a minimum of 90% and a maximum of 95% of the maximum density as determined by ASTM D-1557. As soon as practicable after commencement of construction of any section of the embankment, the central portion should be raised or crowned with grades not to exceed 2% so that the surface of the fill will drain freely. If the compacted surface of any layer of material is determined to be too smooth to bond properly with succeeding layers during construction, it shall be loosened by discing or by any other approved method, before the succeeding layer is placed upon it. Compacted surfaces of fill materials shall be lightly scarified to break up stratification before the succeeding layer is placed upon it.

Any areas of the pond bottom requiring fill placement should be treated as foundation areas, and fill should be compacted to within a minimum of 90% and a maximum of 95% of maximum density as determined by ASTM D-1557. When fill is placed against the existing slopes the existing slopes shall be deeply "benched". This will prevent construction of a potential slip surface.

A shrinkage factor of 9% may be used for earthwork calculations. This is an average value based on laboratory tests of typical soils found on the site and assumed ground surface subsidence due to foundation soil preparation.

STABILITY ANALYSIS

The stability evaluation of earth slopes requires that a mathematical model be established to accurately simulate the conditions of the proposed embankments. For this analysis, the Modified Bishop method of slope stability analysis was employed, i. e., a common slice and slip circle method. This method utilized principals of static analysis where certain conditions are assumed, so that an idealized system can be created for model simulation. The primary assumption in this analysis is that the materials composing the embankments are isotropic and homogeneous in each unitized stratum. Different conditions were incorporated into the analysis by simulating phreatic surface and rapid drawdown conditions. The analysis was conducted at the maximum embankment section. Material properties used in the analysis area as follows:

	Cohesion (psf)	Angle of Internal Friction (degrees)	Total Unit Weight (pcf)
Embankment Fill	5000	0	133
Foundation Soils	2630	0	119

These material values are average values determined from the field and laboratory test data.

Static and pseudo-static analyses were conducted for interior slopes at 2:1 (horizontal:vertical) and exterior slopes of 3:1. Seismic analysis was based on a pseudo-static acceleration of 0.1g. Rapid drawdown conditions were simulated and analyzed on the interior slope, and steady state seepage conditions were simulated and analyzed on the exterior slope. The minimum factor of safety for each slope, and the condition under which it occurs, are as follows:

Slope	Factor of Safety	Condition
Exterior	Greater than 4	dry - static
3:1	Greater than 4	dry-pseudo-static
	Greater than 4	saturated steady state seepage pseudo-static
Interior	Greater than 4	dry-static
2:1	Greater than 4	dry-pseudo-static
	Greater than 4	rapid drawdown pseudo-static

The critical slip circles are shown on the Stability Analysis, Appendix C. Based on this analysis, it is our opinion that the slopes will be safe, with the possibility of minor maintenance requirements on the upstream or downstream faces, due to minor slippage and possible erosion. To minimize erosion from precipitation, it is recommended that the exterior embankment slopes be vegetated with grass or covered with riprap. If the pond remains dry for a lengthy period after containment of effluent, the interior slopes should be inspected for excessive dessication cracking prior to refilling.

SETTLEMENT ANALYSIS

A settlement analysis was performed on the subject structure and its foundation to determine the total amount of settlement which may be expected during and subsequent to construction.

The results of the settlement analysis indicate that total static settlement, exclusive of the effects of foundation preparation, will be approximately one (1) inch. We estimate that approximately one-half of the total settlement will occur during construction.

Based on the type of material that will be used for embankment construction, the type of materials which exist for

foundations, and considering foundation preparation procedures, it is our opinion that these settlement estimates are conservative, and that actual settlement will not be damaging to the subject structure.

Some settlement and cracking could occur if seismic loading should occur while the embankment and foundation are saturated. However, based upon the strength of the foundation and embankment materials, significant damage resulting from liquefaction or dynamic consolidation is not anticipated.

SEEPAGE AND DRAINAGE CONDITIONS

Seepage analyses were conducted for the embankments using flownet techniques, Darcy's law, and applying the results of the field and laboratory investigations. These analytical techniques are based on steady state seepage and laminar flow conditions. The results of these analyses indicate that the total flow at maximum pond level under steady state seepage conditions will be less than 3 x 10-6 cubic feet per day per foot of embankment at maximum section. Exit velocities at the downstream toe are not critical. Average permeabilities from field and laboratory investigations were utilized in the calculations. However, the permeability of the soils can be highly variable, and actual flows may vary from that determined by analysis.

SLUDGE DRAINS

Since there is a potential for seepage or leakage along the sludge drain pipes it is recommended that the pipes be supported by at least two (2) feet of controlled structural fill. This fill zone may consist of either excavated and recompacted foundation soils or borrow soils from other areas in the site. The excavation and recompaction should extend at least two (2) feet beyond the perimeter of the pipes. Prior to replacement of excavated soils, the moisture conditioning and densification treatment described for "foundation treatment" should be performed along the sludge drain alignments. The recompacted materials should be placed at optimum moisture content (±2%) and compacted to a dry density of at least 90% of the maximum dry density as determined in accordance with ASTM D-1557.

As a further control of seepage area along the sludge drains, it is recommended that seepage collars be installed along the drain pipes.

NATURAL SEEPAGE AREA

Flow from the natural seepage will create unfavorable conditions for the abutment of the interior embankment on the east side of the pond between Cell 1 and Cell 3. The flow should be diverted around the sludge pond. A cut off trench should be

excavated east of the abutment area. The trench should be excavated down to weathered shale bedrock or dry, low permeability soils. A perforated drain pipe should be installed, and the trench should be backfilled to near the surface with clean gravel. The drain pipe should drain to a gravity outfall downhill from the pond.

PERMANENT REFERENCE MARKERS

It is recommended that permanent reference markers be installed along the embankment centerlines for possible future monitoring of embankment settlement. At least two markers should be placed in the crest of the embankment, and two reference markers should be placed in areas away from embankment fill on natural soils. These should be permanent markers, preferably cast in concrete.

TRENCHES AND EXCAVATIONS

All trenches and excavations greater than five (5) feet deep must be sloped, shored, sheeted, braced, or otherwise supported according to OSHA construction safety and health standards. Where unstable soil conditions are encountered in trenches shallower than five (5) feet, these trenches must also be sloped, shored, or supported.

Material excavated from the trench or spoil must be placed a minimum of two (2) feet from the edge of the excavation or trench. The spoil should be barricaded or retained in an effective manner such that no loose material can fall into the excavation or trench. Additional measures should be taken to provide an adequate support system in trenches which are excavated below the water table, in backfill areas, in loose unstable soils, and in "brittle" clays.

CONSULTATION

The recommendations outlined are based on our understanding of the current plans for the proposed structure. In the event that any changes in the nature, design or the location of the structure as set forth in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report are modified or verified in writing.

In any subsurface investigation it is necessary to assume that the soil conditions do not vary greatly from the conditions encountered in the test holes. The analyses and recommendations submitted in this report are based in part upon the data obtained from the soil borings. The nature and extent of any variations between the soil borings may not become evident until construction. Therefore, it is recommended that we be retained

to provide engineering services during excavation for the foundation and during embankment construction. This is to observe compliance with the design assumptions and to allow changes in the event that subsurface conditions differ from those anticipated prior to start of construction.

Fox & Associates of NM, Inc.

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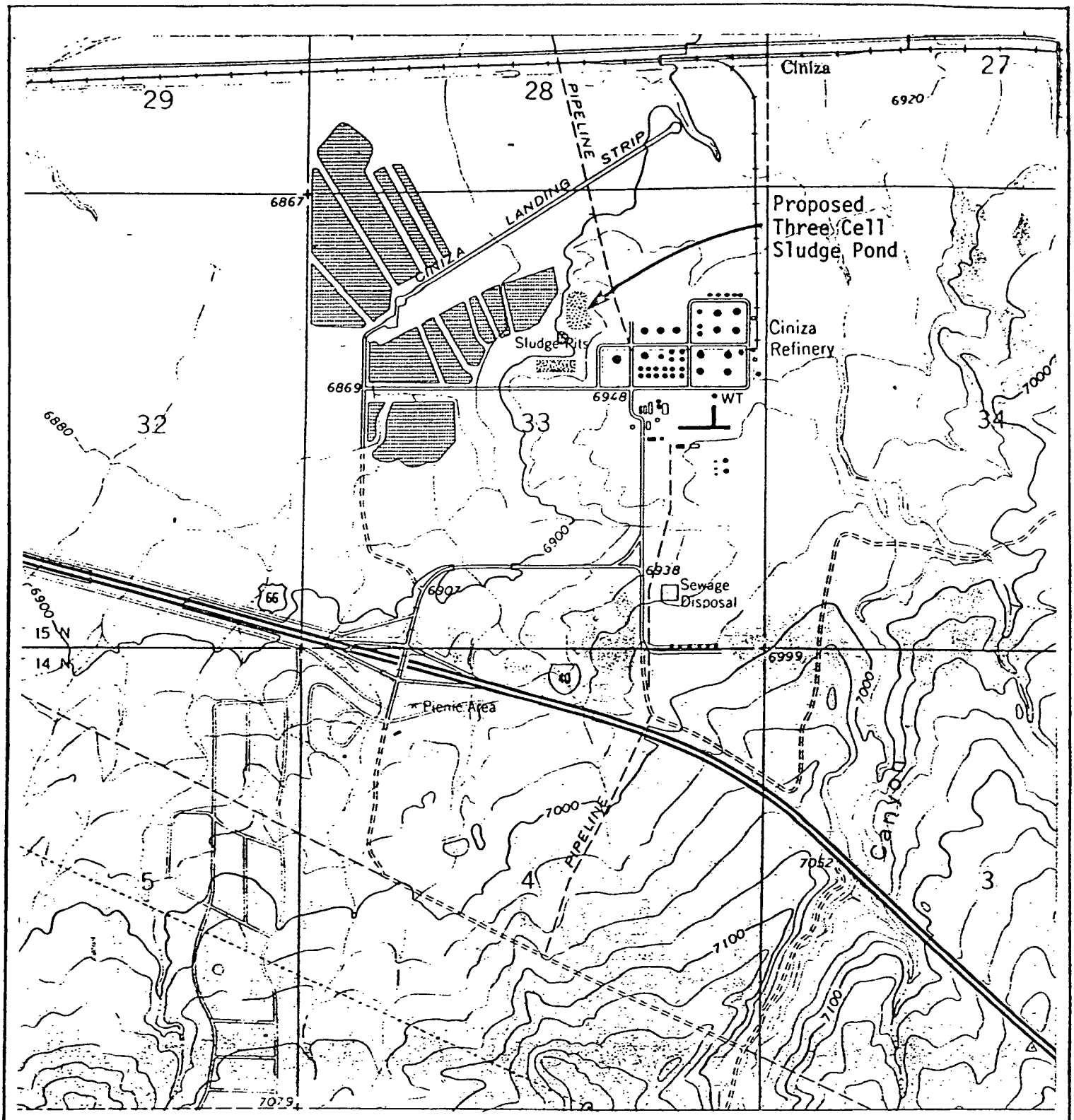
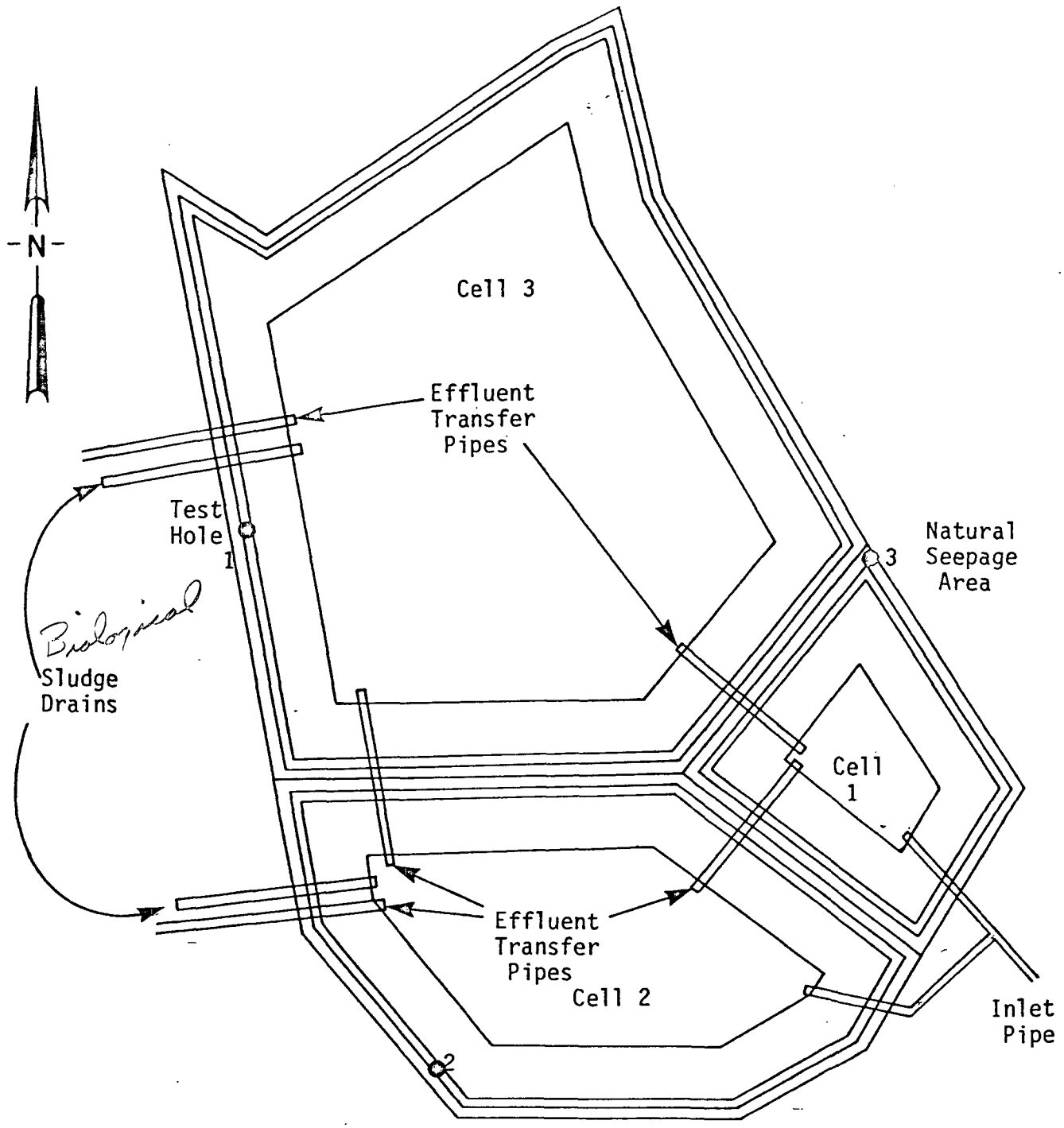


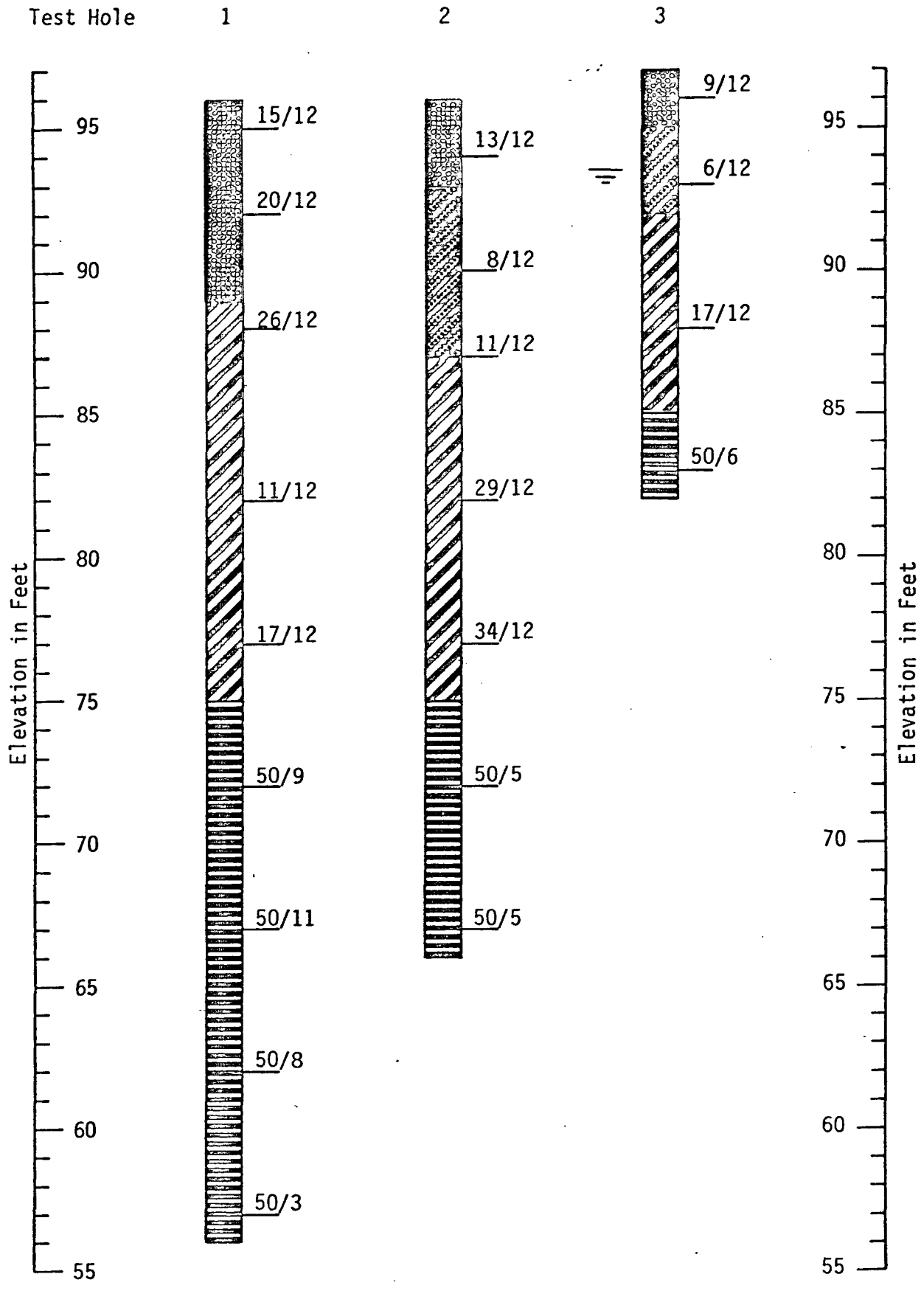
Scale in Miles

0 1/2 1

VICINITY MAP	Job No: 0118980
FOX Consulting Engineers and Geologists	Date: 7/22/86
	Figure 1



TEST HOLE LOCATION PLAN	Job No: 0118980
FOX Consulting Engineers and Geologists	Date: 7/22/86
	Figure 2



LOGS OF TEST HOLES	Job No: 0118980
FOX Consulting Engineers and Geologists	Date: 7/22/86
	Figure 3

LEGEND

EMBANKMENT FILL, sand, medium to fine-grained, clayey to very clayey, medium dense, moist, reddish brown

CLAY, slightly sandy to sandy, stiff to very stiff, moist to wet, reddish brown (CL)

SAND, medium to fine-grained, clayey to very clayey, loose to medium dense, moist, reddish brown (SC)

WEATHERED SHALE, occasional sandstone interbeds, clayey, slightly sandy, hard, slightly moist, reddish brown

indicates water table at time of drilling

NOTES

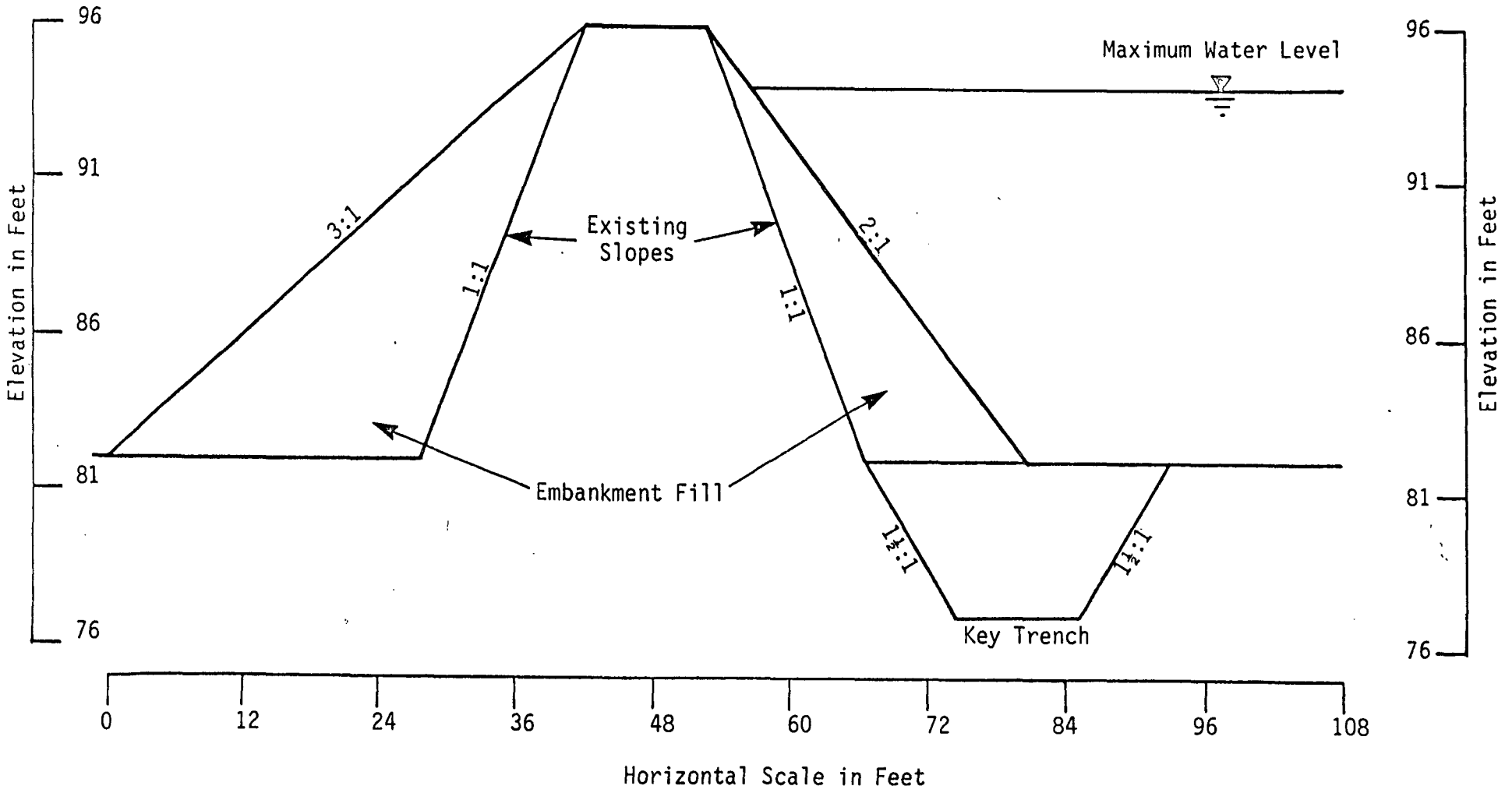
1. Test holes were drilled on June 5, 1986, with a 6 inch djameter hollowstem continuous flight power auger.

2. (47/12) location of Standard Penetration Test; indicates that 47 blows with a 140 pound hammer, falling 30 inches, were required to drive a 2 inch diameter sampler 12 inches.

3. The locations of borings were determined by measurement from existing topography. Elevations of borings were approximately determined by interpolation between topographic map contours. The locations and elevations of the borings should be considered accurate only to the degree implied by the method used.

4. The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOGS OF TEST HOLES	Job No: 0118980
FOX Consulting Engineers and Geologists	Date: 7/22/86
	Figure 4

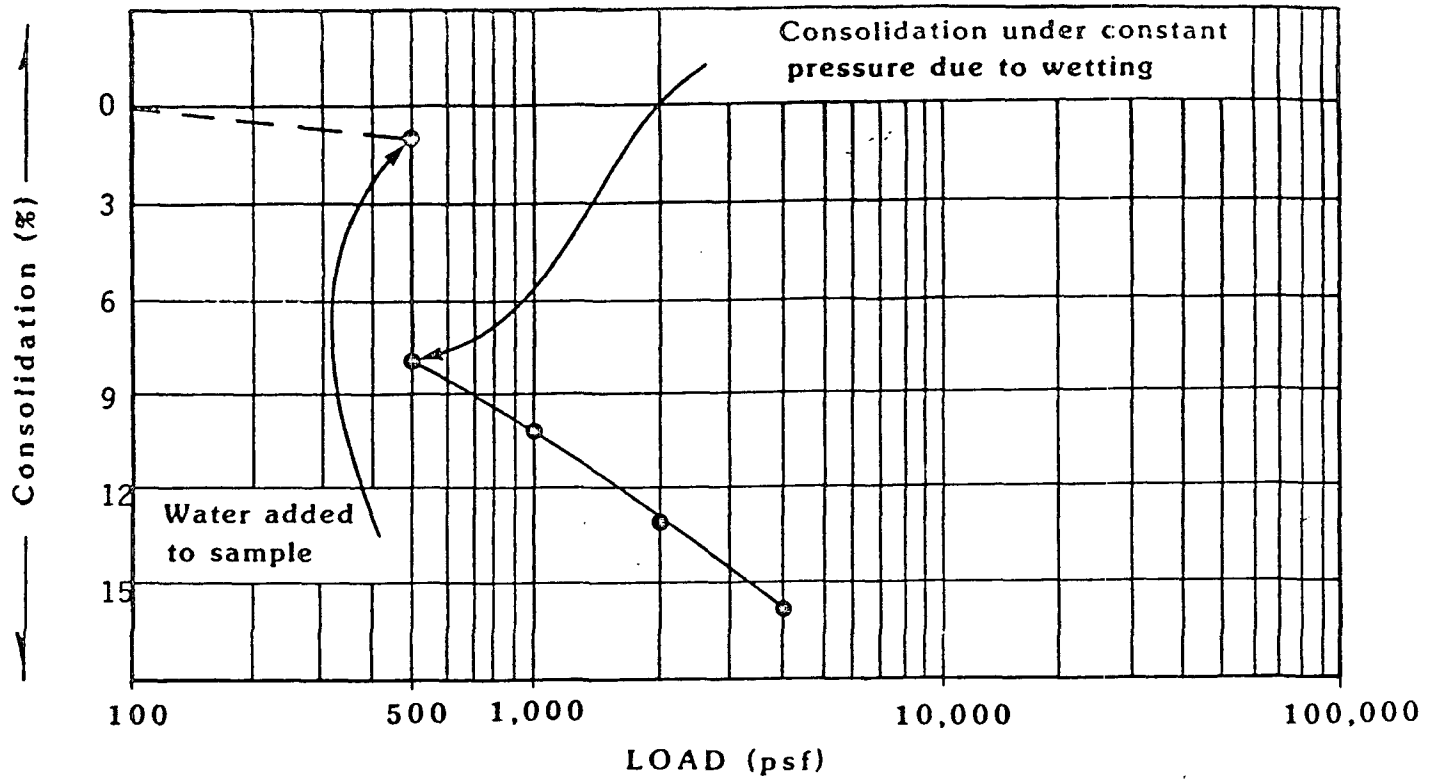


EXTERIOR EMBANKMENT CROSS SECTION

FOX Consulting Engineers and Geologists

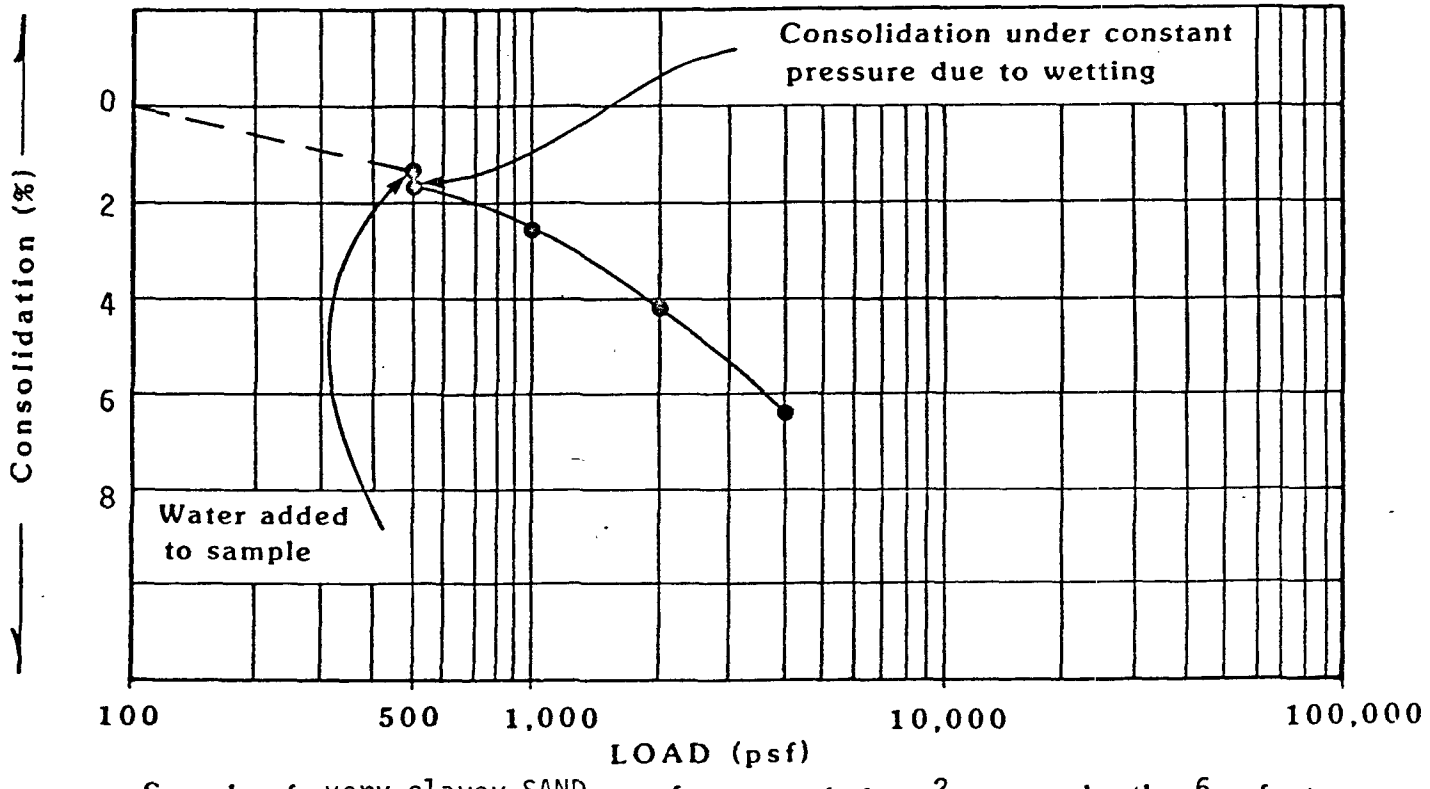
Job No:	0118980
Date:	7/22/86
Figure	5

APPENDIX A
RESULTS OF FIELD AND LABORATORY TEST DATA



Sample of clayey SAND from test hole 1 at depth 4 feet.

Natural Moisture Content 4.9 % Natural Dry Density 102 pcf.

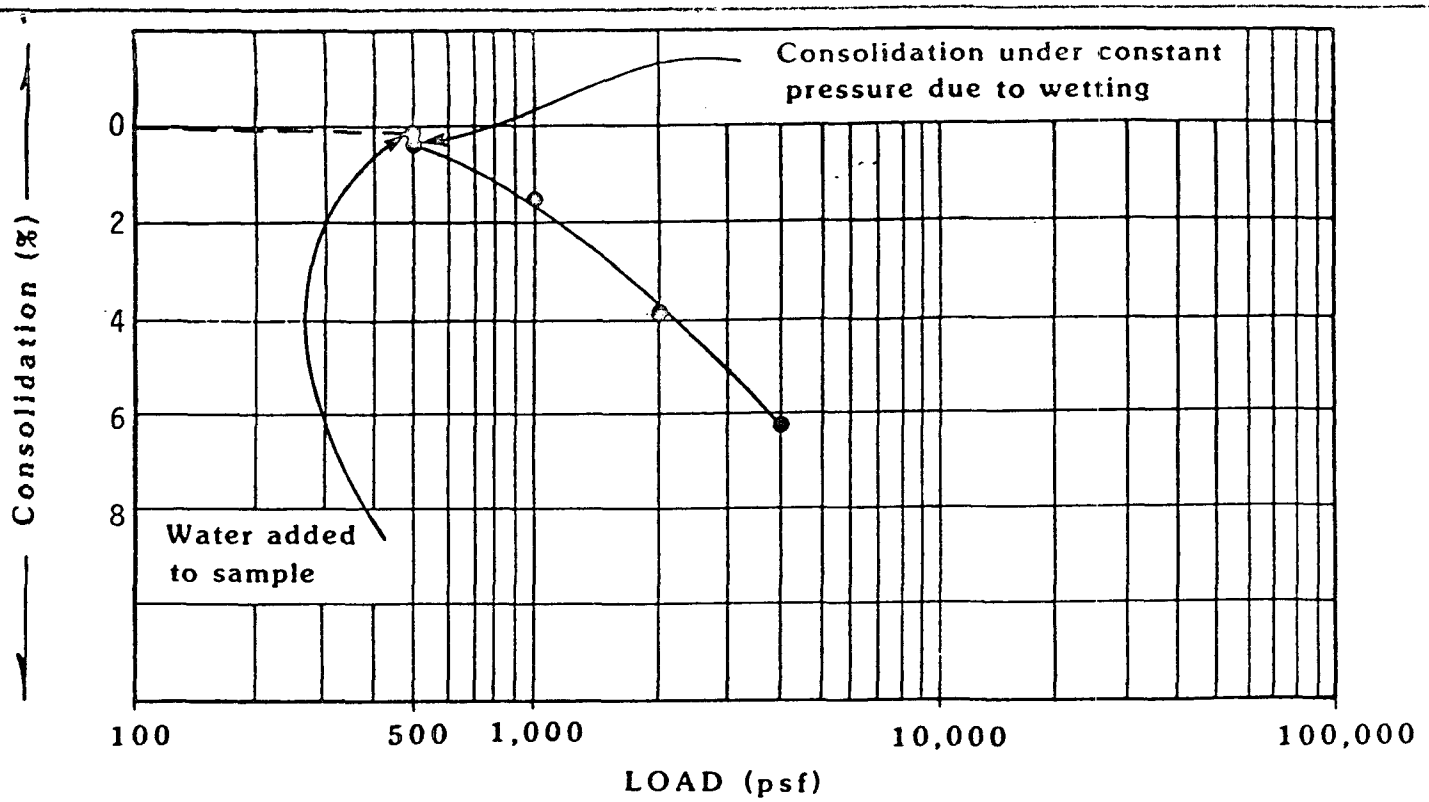


Sample of very clayey SAND from test hole 2 at depth 6 feet.

Natural Moisture Content 17.8 % Natural Dry Density 111 pcf.

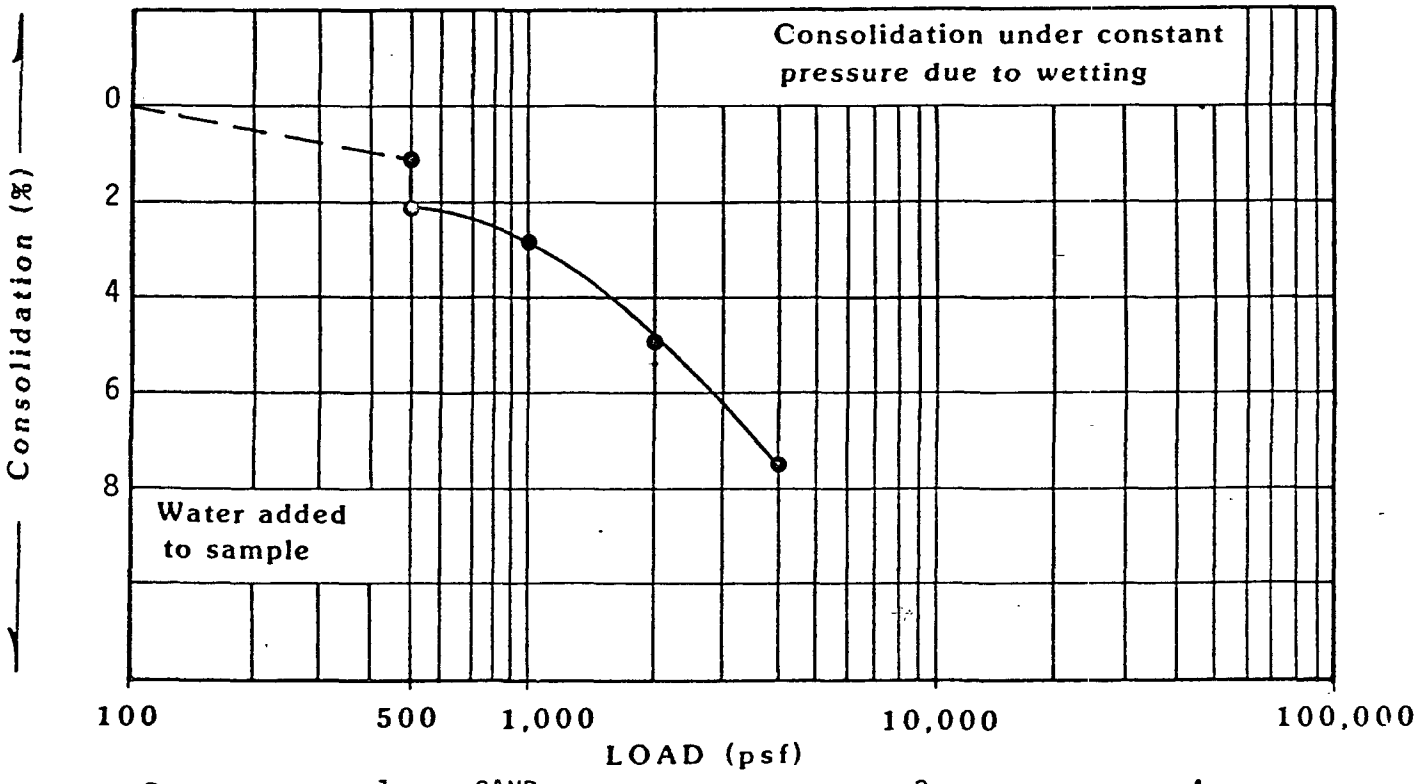
SWELL - CONSOLIDATION TESTS	Job No: 0118980
FOX Consulting Engineers and Geologists	Date: 7/22/86
	Figure A-1

SLB-8b



Sample of sandy CLAY from test hole 2 at depth 9 feet.

Natural Moisture Content 24.4 % Natural Dry Density 95 pcf.

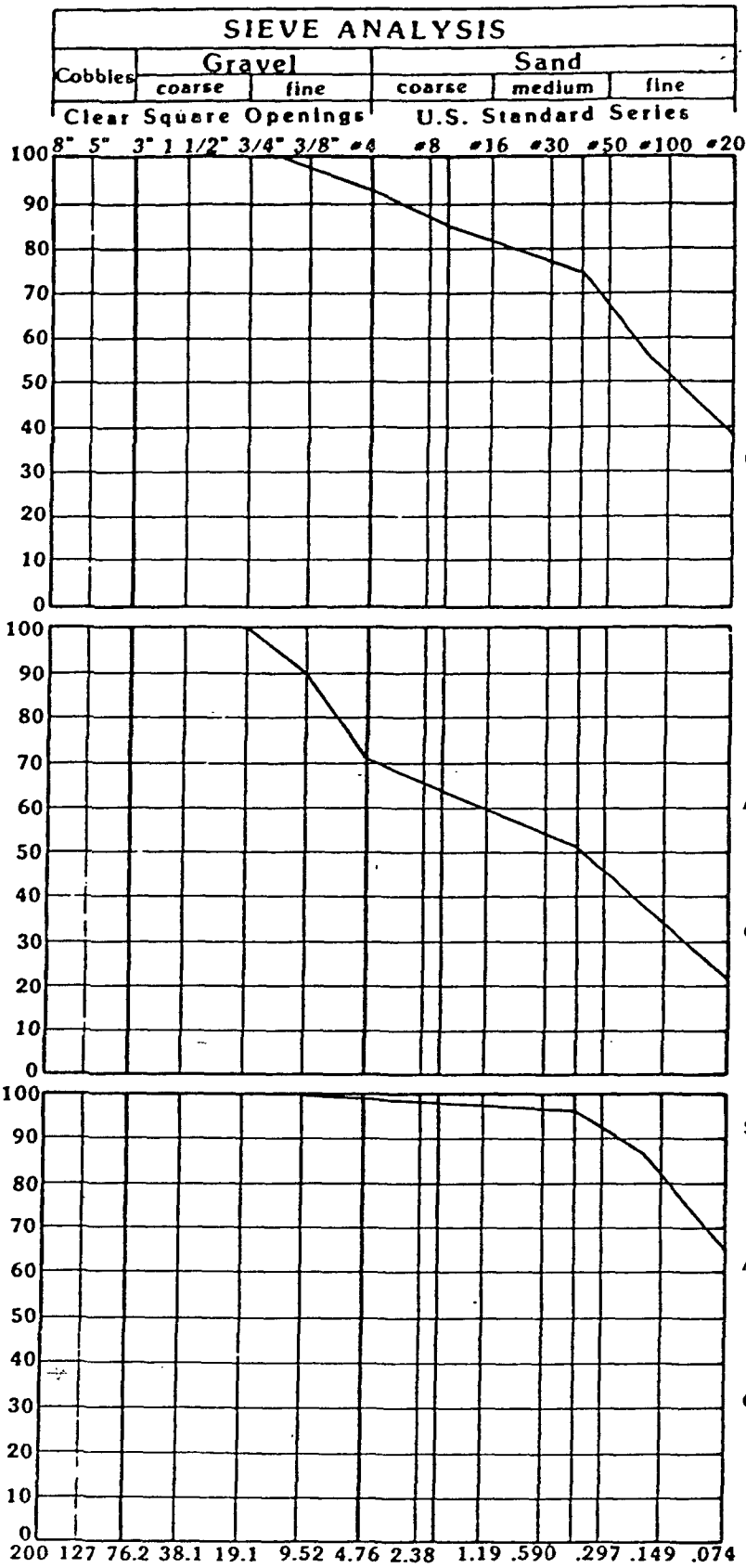


Sample of clayey SAND from test hole 3 at depth 4 feet.

Natural Moisture Content 14.5 % Natural Dry Density 112 pcf.

SWELL - CONSOLIDATION TESTS	Job No: 0118980
FOX Consulting Engineers and Geologists	Date: 7/22/86
	Figure A-2

SLR-8b



Sample of very clayey SAND
from test hole 1
at depth 1 feet.
Atterberg limits:
Liquid Limits 29
Plasticity Index 14
Classification: Unified SC

Sample of clayey SAND
from test hole 1
at depth 4 feet.
Atterberg Limits:
Liquid Limits 26
Plasticity Index 8
Classification: Unified SC

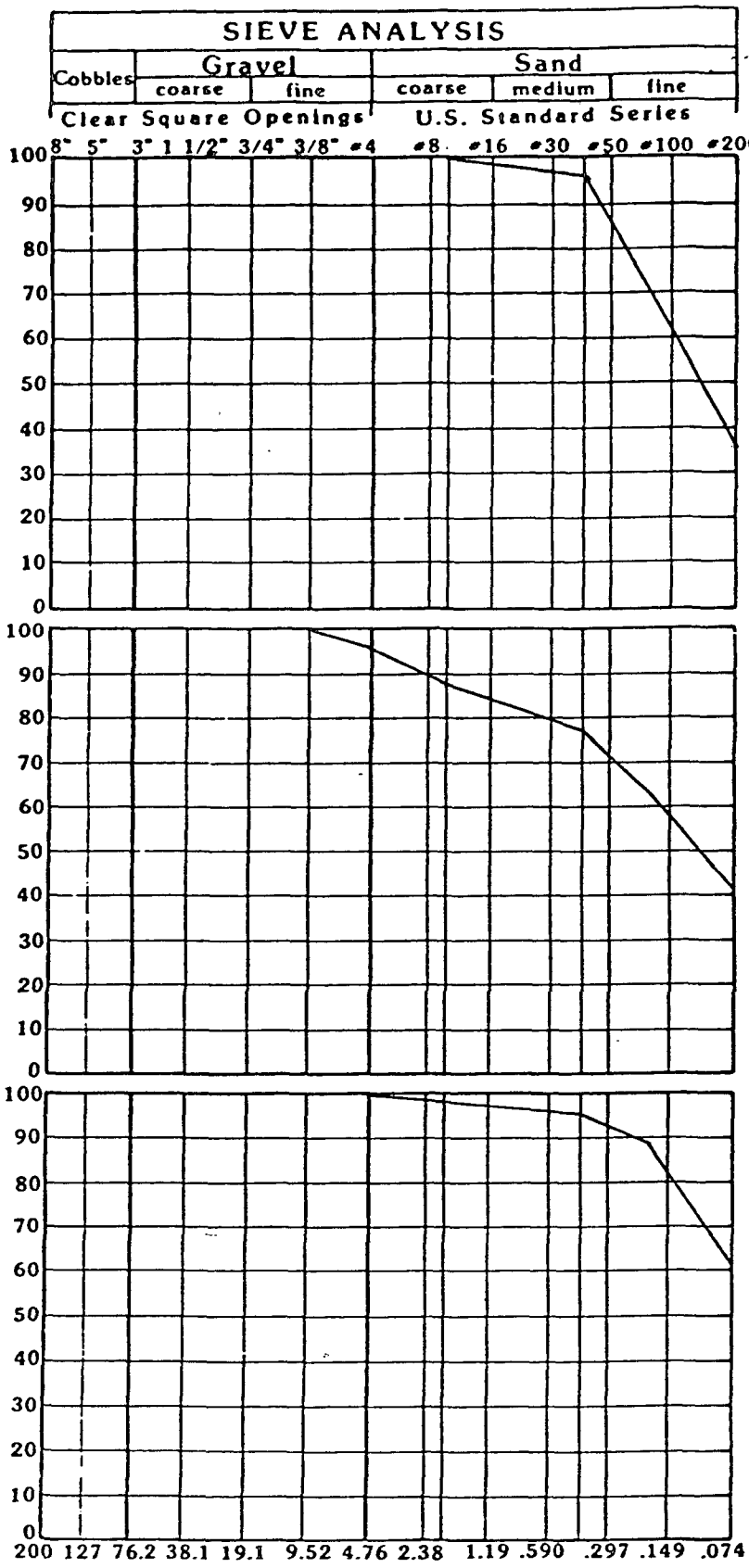
Sample of sandy CLAY
from test hole 1
at depth 8 feet.
Atterberg Limits:
Liquid Limits 31
Plasticity Index 11
Classification: Unified CL

Job No ____ Hole ____ at depth ____ Hole ____ at depth ____ Hole ____ at depth ____

MECHANICAL ANALYSIS CHART

FOX Consulting Engineers and Geologists

Job No: 0118980
Date: 7/22/86
Figure A-3



Sample of clayey SAND
from test hole 2
at depth 2 feet.
Atterberg limits:
Liquid Limits
Plasticity Index
Classification: Unified SC

Sample of very clayey SAND
from test hole 2
at depth 6 feet.
Atterberg Limits:
Liquid Limits 32
Plasticity Index 15
Classification: Unified SC

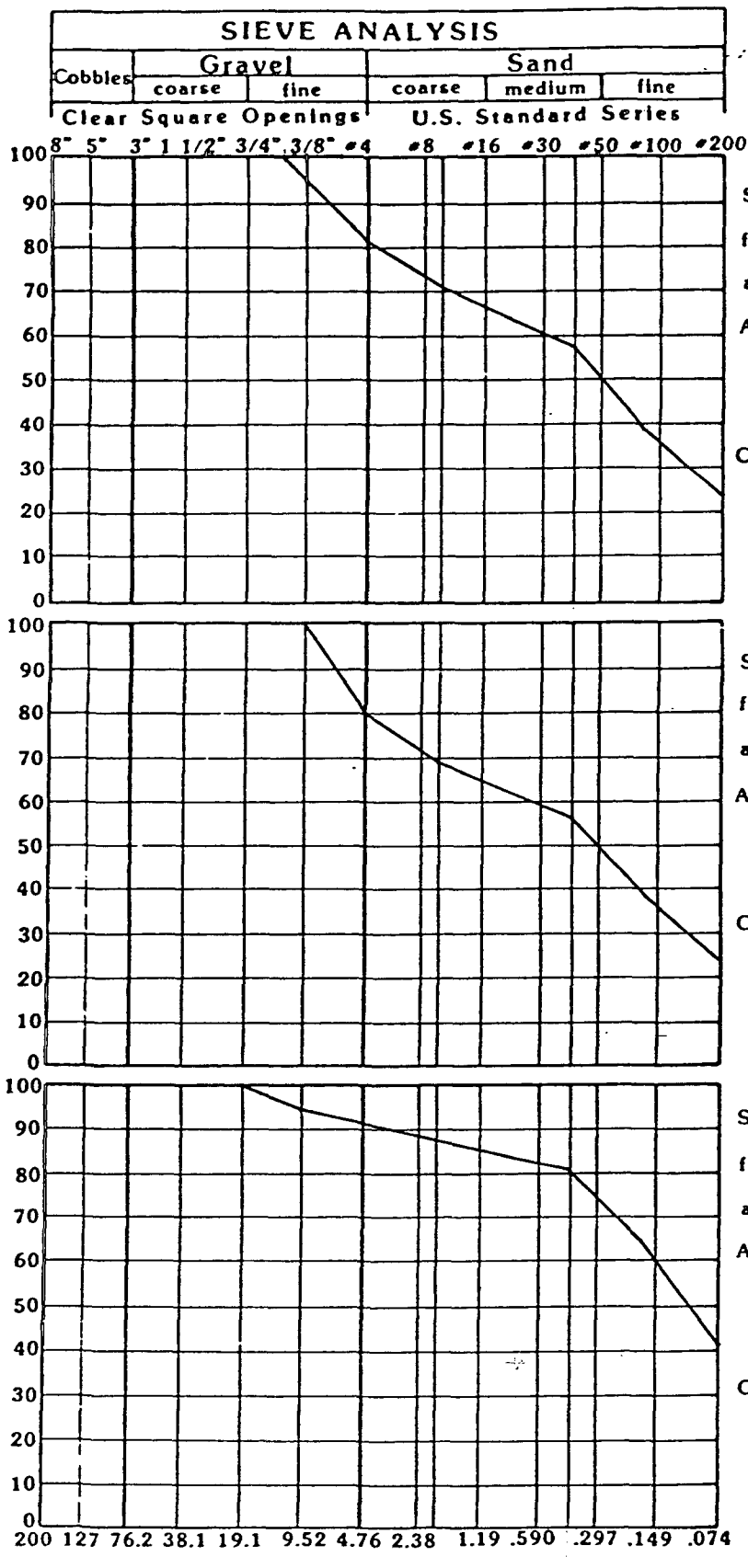
Sample of sandy CLAY
from test hole 2
at depth 9 feet.
Atterberg Limits:
Liquid Limits 36
Plasticity Index 13
Classification: Unified CL

Job No ____ Hole ____ at depth ____ Hole ____ at depth ____ Hole ____ at depth ____

MECHANICAL ANALYSIS CHART

FOX Consulting Engineers and Geologists

Job No: 0118980
Date: 7/22/86
Figure A-4



Sample of clayey SAND
from test hole 3
at depth 1 feet.
Atterberg limits:
Liquid Limits -
Plasticity Index -
Classification: Unified SC

Sample of clayey SAND
from test hole 3
at depth 4 feet.
Atterberg Limits:
Liquid Limits 28
Plasticity Index 11
Classification: Unified SC

Sample of very clayey SAND
from test hole 1 and 2
at depth 0-10 feet.
Atterberg Limits:
Liquid Limits 28
Plasticity Index 10
Classification: Unified SC

Hole ____ at depth ____
Hole ____ at depth ____
Hole ____ at depth ____
Job No. ____

MECHANICAL ANALYSIS CHART

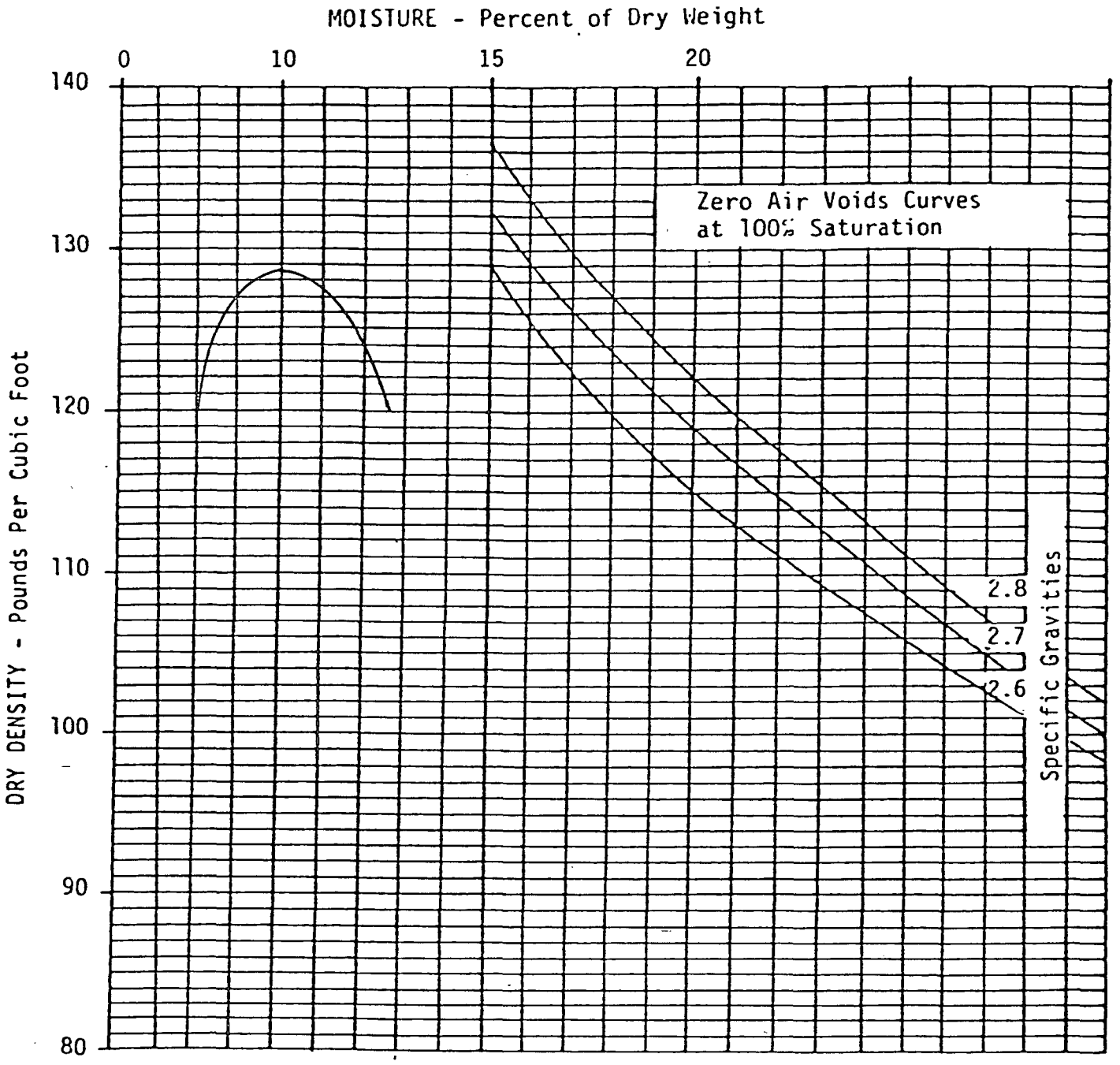
FOX Consulting Engineers and Geologists

Job No: 0118980
Date: 7/22/86
Figure A-5

FOX Consulting Engineers and Geologists

F.M. FOX & ASSOCIATES, INC
3412 BRYN MAWR DRIVE, N.E.
ALBUQUERQUE, NEW MEXICO 87107
(505) 345-3681 — FMFOX

COMPACTION TEST RESULTS



Maximum Dry Density (pcf) 128.7
Optimum Moisture Content (%) 10.0
Amount of Material Finer Than #200 Sieve 41%
Atterberg Limits: LL 28 PL 18 PI 10
Sample Description: very clayey SAND (SC)
From: combined materials from test holes 1 and 2
Compaction Test Procedure: ASTM D-1557, Method C

NOTE:
NV indicates No Value
NP indicates Non Plastic

FIGURE A-6

SUMMARY OF LABORATORY TEST DATA

Test Hole No.	Depth of Sample (ft)	Natural Dry Density (pcf)	Natural Moisture Content (%)	Atterberg Limits LL	PI	Sieve Analysis % Passing 3/4"	1/2"	3/8"	No.4	No.10	No.40	No.80	No.200	Soil Description
1	1	109	9.2	29	14	-	100	98	93	86	75	57	39	very clayey SAND (SC)
1	4	102	4.9	26	8	100	93	90	71	63	51	35	22	clayey SAND (SC)
1	8	110	14.9	31	11	-	-	100	99	99	97	87	66	sandy CLAY (CL)
2	2	110	4.0	32	14	-	-	-	-	100	97	70	36	clayey SAND (SC)
2	6	111	17.8	32	15	-	-	100	96	88	78	62	42	very clayey SAND (SC)
2	9	95	24.4	36	13	-	-	-	100	98	96	89	61	sandy CLAY (CL)
3	1	105	13.9	-	-	-	100	95	81	71	58	39	23	clayey SAND (SC)
3	4	112	14.5	28	11	-	-	100	80	69	57	39	24	clayey SAND (SC)
Bulk Sample				28	10	100	96	95	92	87	81	64	41	very clayey SAND (SC)

Job No: 0118980
Date: 7/22/86
Table: 1

SUMMARY OF LABORATORY TEST DATA

Unconfined Compression Test

Test Hole No.	Depth of Sample (ft)	Unconfined Compressive Strength (psf)
1	1	6236
1	8	13251
2	6	926
2	9	633
Bulk Sample of typical embankment materials (remolded to 90% of maximum density)		29000

Job No: 0118980
Date: 7/22/86
Table: 1 Cont.

RESULTS OF PERMEABILITY TESTING

Hole No.	Depth (ft)	Permeability (ft/min)	Type of Test
1	4	3.87×10^{-6}	Lab - Undisturbed - Falling Head
1	4	5.90×10^{-6}	Field - Falling Head
2	2	2.94×10^{-8}	Lab - Undisturbed - Falling Head
Bulk Sample	Combined	3.06×10^{-8}	Lab - Remolded - Falling Head

Job No: 0118980
Date: 7/22/86
Table: 2

APPENDIX B
GUIDELINE SPECIFICATIONS FOR EARTHWORK

Section I
ENVIRONMENTAL PROTECTION

INDEX

1. GENERAL. The Contractor shall perform all work in such a manner as to minimize the polluting of air, water or land, and shall, within reasonable limits, control noise and the disposal of solid waste materials, as well as other pollutants.

2. PRECONSTRUCTION SURVEY. Prior to the start of any on-site construction activities, the Contractor and the Owner, or his designated representative, shall make a joint survey after which the Contractor shall prepare a brief report indicating on a layout plan, the condition of the site including shrubs and grassed areas immediately adjacent to the site of the work and adjacent to his storage area and access routes. This report will be signed by both parties upon mutual agreement as to its accuracy and completeness.

3. PROTECTION OF LAND AREAS. Except for any work or storage areas and access routes specifically assigned for use of the Contractor under this contract, the land areas outside the limits of permanent work performed under this contract shall be preserved in their present conditions.

4. PROTECTION OF WATER RESOURCES. The Contractor shall control the disposal of fuels, oils, bitumens, acids, or other harmful materials, both on and off the work areas, and shall comply with applicable Federal, State, County and Municipal laws concerning pollution of rivers and streams while performing work under this contract. Special measures shall be taken to prevent chemicals, fuels, oils, greases, and bituminous materials from entering public waters.

6. WASTE DISPOSAL. Any waste materials resulting from the work under this contract, that is dumped in unauthorized areas, shall be removed by the Contractor, and the area restored to the condition of the adjacent undisturbed areas. Where directed, contaminated ground shall be excavated, disposed of as approved, and replaced with suitable fill materials, all at the expense of the Contractor.

7. BURNING. Air pollution restrictions applicable to this project shall conform to all Federal, State, County, and Municipal regulations.

8. DUST CONTROL. The Contractor shall maintain all excavations, stockpiles, access roads, waste areas and all work areas free from excess dust to such reasonable degree as to avoid causing a hazard or nuisance to himself or others. Approved temporary methods consisting of sprinkling, chemical treatment, or similar methods will be permitted to control dust. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs.

9. EROSION CONTROL. Surface drainage from cuts and fill within the construction limits, whether or not completed, and from borrow and waste disposal areas, shall be graded to control erosion within acceptable limits. Temporary control measures shall be provided and maintained until permanent drainage facilities are completed and operative.

10. CORRECTIVE ACTION. The Contractor shall, upon receipts of a notice in writing of any noncompliance with the foregoing provisions, take immediate corrective action. If the Contractor fails or refuses to comply promptly, the Owner or his representative may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time loss due to any such stop order shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor, unless it was later determined that the Contractor was in compliance.

11. POST-CONSTRUCTION CLEANUP OR OBLITERATION. The Contractor shall, unless otherwise instructed in writing by the Owner, obliterate all signs of temporary construction facilities, such as haul roads, work areas, service areas, structures, stockpiles or excess or waste materials, and other vestiges of construction prior to final acceptance of the work. In addition, the Contractor shall be required to vegetate or revegetate any exposed slopes, fills or other areas exposed or constructed as part of this contract.

Section 2
CLEARING AND GRUBBING

INDEX

1. GENERAL. The Contractor shall perform all work in such a manner as to minimize the polluting of air, water or land, and shall, within reasonable limits, control noise and the disposal or solid waste materials, as well as, other pollutants.

2. DEFINITIONS. For the purpose of this section, the terms used herein shall be defined as follows:

2.1 Trees shall be defined as wood growth two (2) inches or more in diameter measured at a point six (6) inches from the ground on the level, or uphill side as applicable, and is six (6) feet or more in height measured from the ground on the level or uphill side as applicable.

2.2 Brush shall be defined as brush and other growth not covered by the definitions of trees or vegetation.

2.3 Vegetation shall be defined as all heavy growth of crops, grass and weeds.

2.4 Debris shall be defined as down timber, logs, stumps, snags and miscellaneous material determined by the Engineer.

2.5 Rubbish shall be defined as garbage, clothing, cloth and paper.

2.6 Objectionable Matter shall be defined as material not suitable for embankments or foundations. Materials containing debris, brush, roots, sod, or other perishable materials will not be considered as suitable. Wet or oily materials will also not be considered as suitable.

3. SPECIAL REQUIREMENTS

3.1 Protection of Existing Vegetation. In performing the work under this section, the Contractor shall protect the existing vegetation to remain in place as specified in the Section, ENVIRONMENTAL PROTECTION.

4. CLEARING. Clearing shall consist of the complete removal of all obstructions above the ground surface in accordance with the following:

4.1 Embankment. All trees, brush, vegetation, miscellaneous structures, miscellaneous construction debris, and rubbish shall be cleared within the limits of the embankment structure. For these specifications, the limits of the embankment include the entire area to be covered by the embankment together with strips of five (5) feet width beyond and contiguous thereto.

4.2 Structures, Riprap, Channels, and Ditches to be Constructed or Placed Under this Contract. All trees, brush, vegetation, miscellaneous construction debris, and rubbish shall be cleared within the limits of the work.

4.3 Borrow Areas. Clearing of borrow areas is required and shall be to the extent necessary to provide materials free from objectionable material.

4.4 Waste Areas. All trees, brush, vegetation, miscellaneous structures, miscellaneous construction debris, and rubbish shall be cleared within the limits of all required waste fill areas. Clearing of other waste areas will not be required.

5. GRUBBING. Grubbing shall consist of the removal of all stumps, roots, buried logs, boulders, and other objectionable matter.

5.1 Embankment. The entire area within the limits of the embankment, together with strips five (5) feet wide beyond and contiguous thereto, shall be thoroughly grubbed as required above in paragraph 5. In addition, all tap roots, lateral roots, or other projections over 1.5 inches in diameter within the foundation area shall be removed to a depth of three (3) feet below the natural surface of the ground.

5.2 Structures to be Constructed Under this Contract. The entire area within the limits of all structures shall be thoroughly grubbed as required above in paragraph 5.

5.3 Channels, Riprap, or Ditches to be Constructed or Placed Under this Contract. Grubbing as specified above in paragraph 5 will be required within the limits of all channels, ditches, and riprap. In addition, all exposed stumps, roots and other obstructions shall be removed from slopes and bottoms of channels, ditches, and riprap after excavation is completed.

5.4 Filling of Holes. All holes caused by grubbing operations shall be filled in layers to the lower level of adjacent excavation operations, and each layer tamped to a density equal to the adjoining undisturbed material.

6. DISPOSAL OF DEBRIS. All logs, brush, and other debris which are the products of the clearing and grubbing operations shall be disposed of as specified in the Section, ENVIRONMENTAL PROTECTION.

Section 3
EXCAVATION

INDEX

1. GENERAL. Excavation shall consist of removal, hauling, stockpiling (if required), and disposal of any class of material necessary for the construction of the embankment or associated structures. The excavation shall be to the lines and grades shown on the drawings. Care should be exercised by the Contractor not to excavate below the grades shown on the drawings. Any excessive excavation due to the fault or negligence of the Contractor shall be backfilled to grade with compacted fill, by and at the expense of the Contractor.

2. DEFINITIONS.

2.1 Suitable Materials include material that is free of debris, roots, organic matter, frozen matter, and which is free of stones with any dimension greater than one half of the specified loose layer thickness.

2.2 Unsuitable Materials include all material that contains debris, roots, organic matter, frozen matter, stones with any dimension greater than one half of the specified loose layer thickness, or other materials that are determined by the Engineer as unsuitable. Otherwise suitable materials, which are unsuitable due to excess moisture content, will not be classified as unsuitable material unless it cannot be dried by manipulation, aeration, or blending with other materials satisfactorily as determined by the Engineer.

3. CLASSIFICATION. All excavation shall be considered to fall within the "Common" excavation classification.

4. EXCAVATION.

4.1 Disposal of Materials. Excavated materials which are suitable for use in the embankment or other fills may be placed directly therein, or stockpiled for future use. All embankments and backfills shall be constructed of suitable earth material from required excavation.

4.2 Excess and Unsuitable Material unsuitable for foundation or embankment material shall be disposed in waste or spoil areas as approved by the Owner or his designated representative. Compaction of waste fill will not be required, but waste fill

areas shall be left in a neat and sightly condition, sloped to provide drainage as approved by the Engineer. The cost of disposal of waste and excess material from required excavation, and the cost of placing and spreading the material in designated or approved waste fill areas, and the dressing of slopes in the waste fill areas, shall be subsidiary to the embankment construction.

Section 4
EMBANKMENT

INDEX

1. APPLICABLE PUBLICATIONS. The following standards of the issues listed below, but referred to hereafter by the basic designation only, form a part of this specification to the extent indicated by the references thereto.

AMERICAN SOCIETY OF TESTING AND MATERIALS STANDARDS (ASTM)

D 422	Particle Size Analysis of Soils
D 423	Liquid Limit of Soils
D 424	Plastic Limit and Plasticity Index of Soils
D 1557	Moisture-Density Relations of Soils Using a 10 Pound Hammer and an 18-inch Drop
D 1556	Density of Soils In-Place by the Sand Cone Method
D 2216	Laboratory Determination of Moisture Content of Soil
D 2922	Density of Soils and Soil Aggregate In-Place by Nuclear Method
D 3017	Moisture Content of Soil and Soil Aggregate In-Place by Nuclear Methods

2. GENERAL. The work covered by this section shall consist of furnishing all plant, labor, equipment, and materials, and performing all operations in connection with preparing embankment, foundations, and placing and compacting fills and backfills in accordance with the contract drawings and their specifications.

3. DEFINITIONS.

3.1 Embankment as used in these specifications is defined as the earth fill portions of the pond structure, composed of the following:

3.1.1 Homogeneous Embankment Fill shall consist of clayey sands and sandy clays obtained from designated borrow areas. The material shall contain no cobbles larger than three

(3) inches in any dimension and shall contain a minimum of thirty-five (35) percent soil by weight passing a Number 200 Sieve.

3.2 Compacted Fill includes all fill, except backfill, deposited in layers and compacted by rolling or tamping.

3.3 Backfill as used in these specifications, is defined as the excavation refill which cannot be placed around or adjacent to the structure, until the structure is completed, or until a specified time interval has elapsed after completion.

4. GENERAL PROVISIONS.

4.1 Lines and Grades. The embankments shall be constructed to the lines, grades, and cross sections indicated on the drawings, unless otherwise directed by the Engineer. The Owner reserves the right to increase or decrease the foundation widths or the embankment slopes, or to make such other changes in the embankment sections as may be deemed necessary to produce a safe structure.

4.2 Conduct of Work. The Contractor shall maintain the embankment in a satisfactory condition at all times until final completion and acceptance of all work under the contract. If, in the opinion of the Engineer, the hauling equipment causes horizontal shears or slicken sides, rutting, quaking, heaving, cracking, or excessive deformation of the embankment, the Contractor shall limit the type, load or travel speed of the hauling equipment on the embankment. An approved embankment material which is lost in transit, or rendered unsuitable after being placed in the embankment, and before final acceptance of the work, shall be replaced by the Contractor in a satisfactory manner, and no additional payment will be made therefor. The Contractor shall excavate and remove from the embankment any material which the Engineer considers objectionable, and shall also dispose of such material, and refill the excavated areas as directed, all at no cost to the Owner. The Contractor may be required to remove, at his own expense, any embankment material placed outside of prescribed slope lines.

4.3 Haul Roads. Haul roads shall be located and constructed as approved by the Owner. They shall be designed to maintain the intended traffic, to be free-draining, and shall be maintained in good condition throughout the contract period, unless otherwise directed by the Engineer. Dust control may be required.

4.4 Stockpiling from Required Excavation Areas. When the excavation from required common excavations progresses at a faster rate than placement in the fill is being accomplished, such excavated material shall be stockpiled. No payment will be made for such stockpiling nor for the reloading and hauling of

this material to its final position in the embankment.

4.5 Quality Control Sampling and Testing. During the construction, the Engineer shall sample and test the embankment materials and the compacted fills and backfills for conformance with all specification requirements. All sampling and testing, including the equipment, labor and laboratory facilities necessary to perform the tests as herein required, shall be at the expense of the Owner.

5. MATERIALS.

5.1 General. The origin of any fill material in no way determines where it may be used in the embankment. Materials for embankment fills shall be secured from required excavations indicated on the drawings. The intention is to use the most suitable materials obtainable from these sources. Material to be wasted will be specifically designated by the Engineer at the time the material is excavated. Materials containing brush, roots, sod, or other perishable materials will not be considered suitable.

6. PLACEMENT.

6.1 Foundation Preparation. No fill shall be placed on any part of the embankment foundation until such areas have been prepared as specified below, and have been inspected and approved by the Engineer. The ground surface resulting from stripping, clearing, grubbing operations and removal of man-made fill should be brought to optimum moisture content (±2%). Moisture may be added to the foundation surface by temporary sprinkler systems, water tankers, or by ditching, diking, and flooding. The depth of moisture penetration shall be verified by the Engineer prior to compaction of the foundation materials. Subsequent to approval by the Engineer, the entire foundation area should be compacted to a minimum of 90% of maximum density as determined by ASTM D-1557. The resulting compacted foundation should be free of ruts, boulders and other uneven features.

6.2 General. The gradation and distribution of materials throughout the embankment shall be free from lenses, pockets, streaks, and layers of material differing substantially in texture or gradation from surrounding material of the same class. Successive loads of material shall be dumped at locations on the fill as directed or approved by the Engineer. No fill shall be placed upon a frozen surface, nor shall snow, ice, or frozen earth be incorporated in the embankment. Slope of compacted fill against which additional fill is to be placed shall be dressed back to materials with the required compaction and moisture content immediately prior to placement of additional fill materials against the in-place materials.

6.3 Rate of Placement. Unless otherwise directed, the embankment shall be maintained at approximately the same level regardless of the number of types of materials being placed.

6.4 Spreading. After dumping or depositing, the materials shall be spread by bulldozers, or other approved means in approximately horizontal layers over the entire fill areas. Unless otherwise directed, the thickness of layers shall not be more than eight (8) inches before compaction. As soon as practicable after commencement of construction of any section of the embankment, the central portion thereof shall be raised or crowned with grades not to exceed 2% so that the surface of the fill will drain freely and shall be so maintained throughout construction. If the compacted surface of any layer of material is determined to be too smooth to bond properly with the succeeding layers, it shall be loosened by discing, or by any other approved method, before the succeeding layer is placed thereon. Compacted surfaces of previous fill material layers shall be lightly scarified to break up stratification before the succeeding layer is placed thereon. During the dumping and spreading process, the Contractor shall maintain at all times a force of men adequate to remove all roots and debris from all embankment materials. Stones so removed shall be spoiled as directed. Roots and debris shall be removed from the embankment and disposed of in an approved manner. The entire surface of any section of the embankment under construction shall be maintained in such condition that construction equipment can travel on any part of any one section. Ruts in the surface of any layer shall be filled satisfactorily before compacting. Existing slopes against which fill is to be placed shall be deeply benched.

7. MOISTURE CONTROL. The materials in each layer of the fill shall contain the optimum moisture content ($\pm$2%), or as directed by the Engineer as necessary to obtain the required compaction of 90% to 95% of maximum density. Material that is not within the specified limits after compaction shall be reworked, regardless of density.

7.1 Fill Material. The moisture content after compaction shall be as uniform as practicable throughout any one layer of fill materials.

7.2 Quality Control Sampling and Testing. Samples of fill materials for quality control moisture content and laboratory compaction tests shall be taken at scheduled or periodic intervals during construction. The samples shall be representative of the material being placed and compacted, shall be of such size, weight or volume to be representative of the material samples, and shall be the size, weight or volume required for moisture content and laboratory compaction tests. Samples for moisture content tests shall be taken from sources of materials, or from materials placed on the fill before or after

compaction.

7.2.1 Moisture Content Tests. Moisture content tests of samples shall be performed in accordance with ASTM D 2216 or D 3017. Results of moisture content tests shall be compared to optimum moisture content of the material to verify conformance with specification moisture control requirements prior to placement of the next layer of fill materials.

7.2.2 Laboratory Compaction Tests. Laboratory compaction tests to determine optimum moisture content and maximum density characteristics of representative samples of fill materials shall be in accordance with ASTM D 1557. Gradation and Atterberg Limits tests shall be performed on each laboratory compaction test sample.

8. COMPACTION.

8.1 Equipment. Compaction equipment shall consist of towed or self-propelled, static or vibratory, sheepsfoot or segmented steel wheeled compactors. All compaction equipment shall be properly maintained and shall be of sufficient size and weight so as to obtain the specified compaction with a reasonable number of passes, and shall be approved by the Engineer. The use of equipment causing rutting of the fill surface shall be discontinued.

8.1.1 Power Tampers. Compaction of material, in areas where it is impracticable to use equipment as provided above, shall be performed by the use of approved power tampers.

8.2 Fill Material. After a layer of fill material has been dumped and spread, it shall be disced, if required, to break up and blend the fill materials, unless discing, as specified under paragraph 7, is performed to obtain uniform moisture distribution. Discing shall be performed with a heavy disc plow, or other approved means, to the full depth of the layer. If one pass of the disc does not accomplish the breaking up and blending of the materials, additional passes of the disc may be required, but in no case will more than three passes of the disc on any one layer be required for this purpose.

When the moisture content and the condition of the layer is satisfactory, the lift shall be compacted to a minimum of 90% and to a maximum of 95% of maximum density as determined by ASTM D-1557.

The Contractor shall be required to add moisture in the borrow areas, if, in the opinion of the Engineer, the proper and uniform moisture content cannot be obtained by adding moisture on the fill surface. Portions of the fill which are not accessible to the roller shall be placed in four (4) inch layers, loose

measurement, and compacted with power tampers to a degree equal to that obtained on the other portions of the compacted fill by rolling as specified. Dumping, spreading, sprinkling, and compacting may be performed at the same time at different points along a section when there is sufficient area to permit these operations to proceed simultaneously. When, in the prosecution of the work, excavation precedes fill to such an extent that the materials excavated cannot be placed directly in the embankment, such materials shall be stockpiled at approved locations adjacent to the work until their use is authorized. No additional payment will be made for such stockpiling, nor for the reloading and hauling of this material to its final position.

9. UNCOMPACTED FILL. Material to be disposed of in the required uncompacted fill areas shall be placed in the areas indicated on the drawings, or otherwise required. The fill shall be dumped and spread in horizontal layers not to exceed (12) inches in thickness. Compaction other than that obtained by the controlled movement of the hauling and spreading equipment over the area will not be required.

10. SLIDES. In the event of slides in any part of the embankment prior to final acceptance of the work, the Contractor shall remove material from the slide area as directed, and shall rebuild such portion of the embankment. In case it is determined that the slide was caused through the fault of the Contractor, the removal and disposal of material and the rebuilding of the embankment shall be performed without cost to the Owner; the work will be paid for at the applicable contract unit prices for excavation common and compacted fill or backfill.

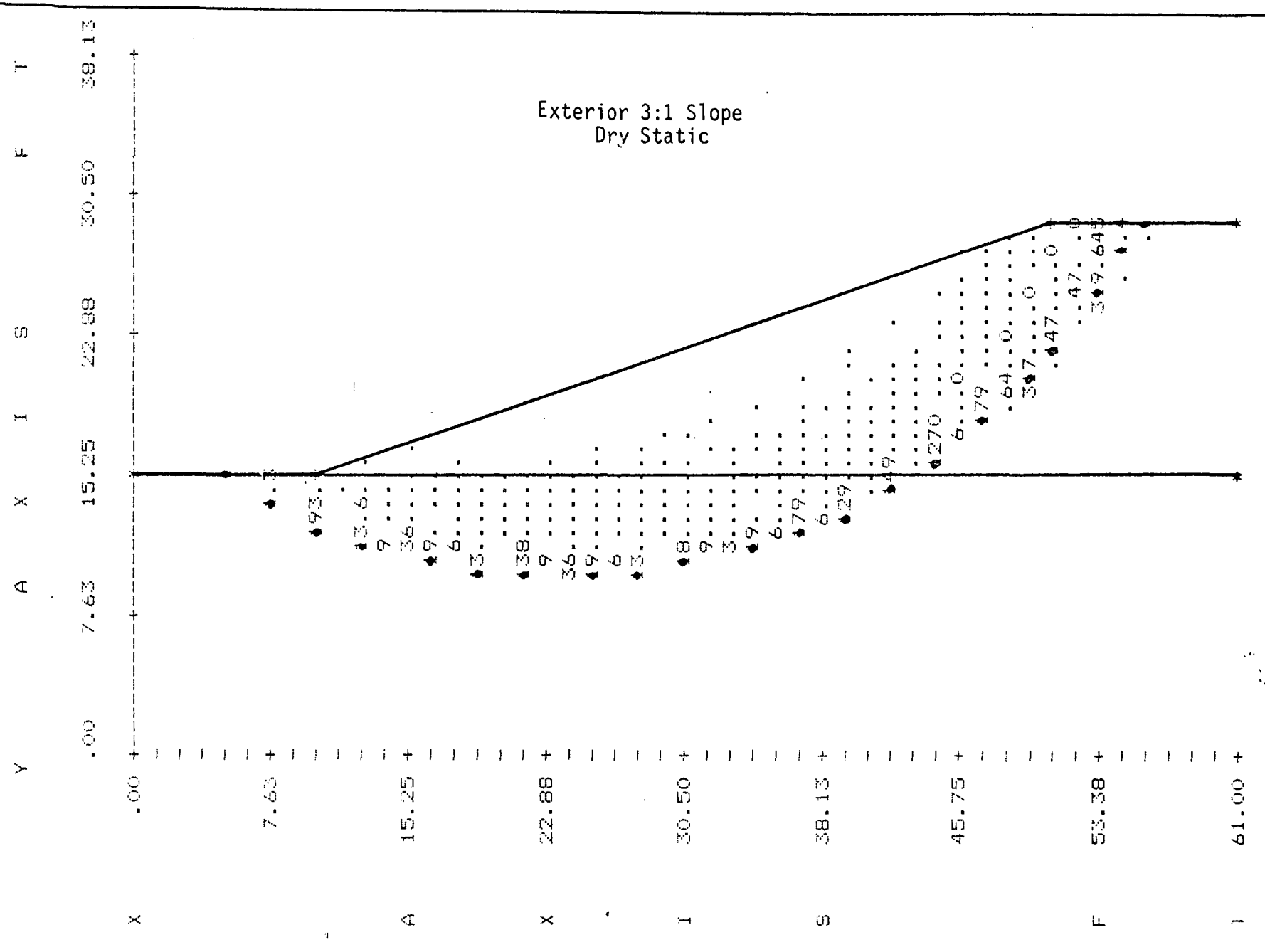
11. FIELD DENSITY AND LABORATORY COMPACTION TESTS.

11.1 Sampling and Testing. Sampling and testing of each principal type of material shall be the responsibility of the Engineer or his representative.

11.2 Moisture-Density Determination. Tests for the determination of maximum density and optimum moisture shall be performed in accordance with the requirements of ASTM D-1557. The above testing shall include Atterberg Limits, Mechanical Analysis and Specific Gravity, if requested by the Engineer. A moisture-density determination test will be performed for each principal type of material, or combination of materials encountered or utilized.

11.3 Density Control. Density shall be controlled in the field in accordance with ASTM D-1556, or by approved nuclear devices in accordance with ASTM D-2922 and D-3017. A minimum of one test shall be made for each 1,000 square yards, or less, for each layer. Deficiencies in construction shall be corrected by the Contractor at no additional cost to the Owner.

APPENDIX C
SLOPE STABILITY ANALYSIS



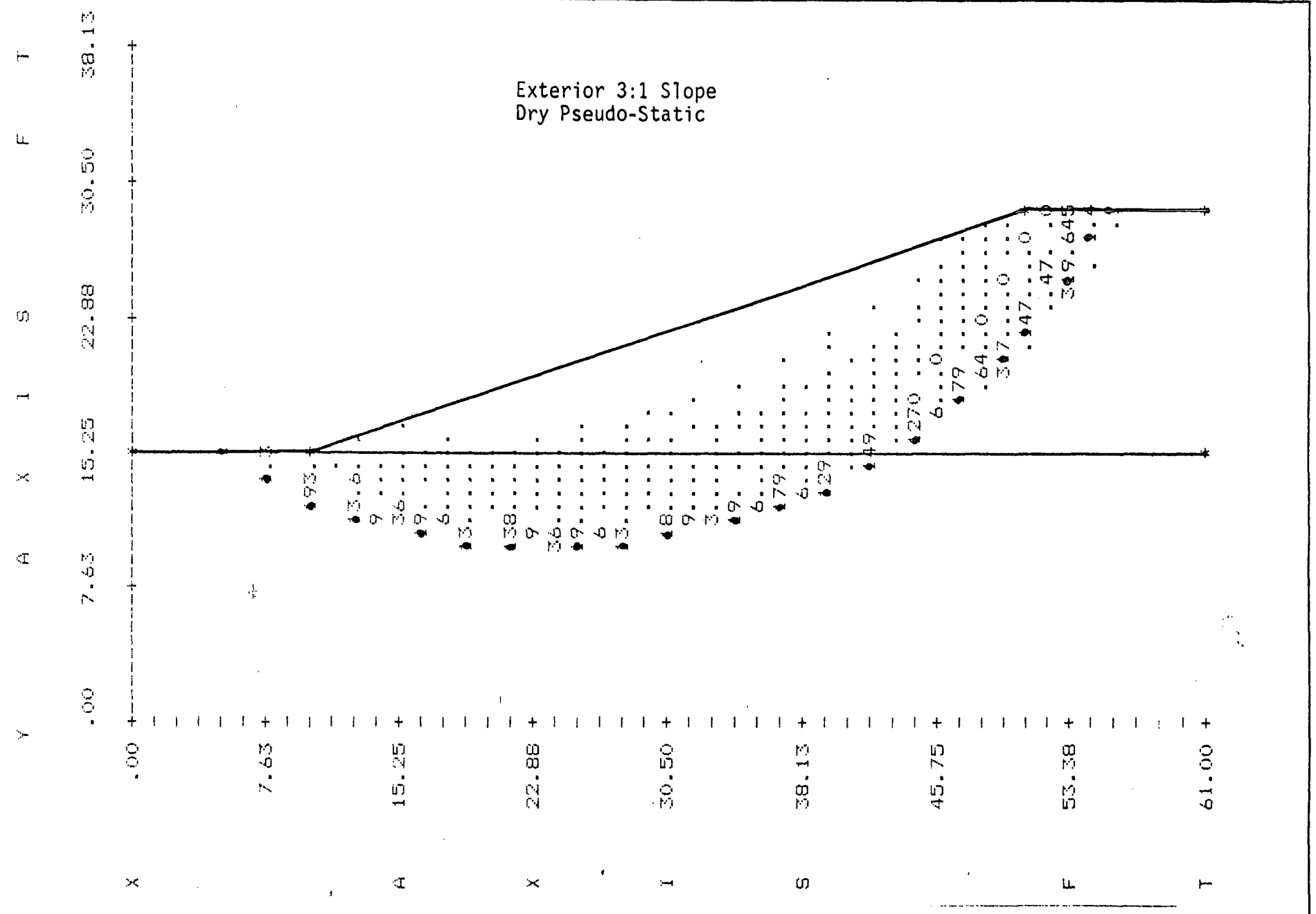
SLOPE STABILITY ANALYSIS

FOX Consulting Engineers and Geologists

Job No: 0118980

Date: 7/22/86

Figure C-1



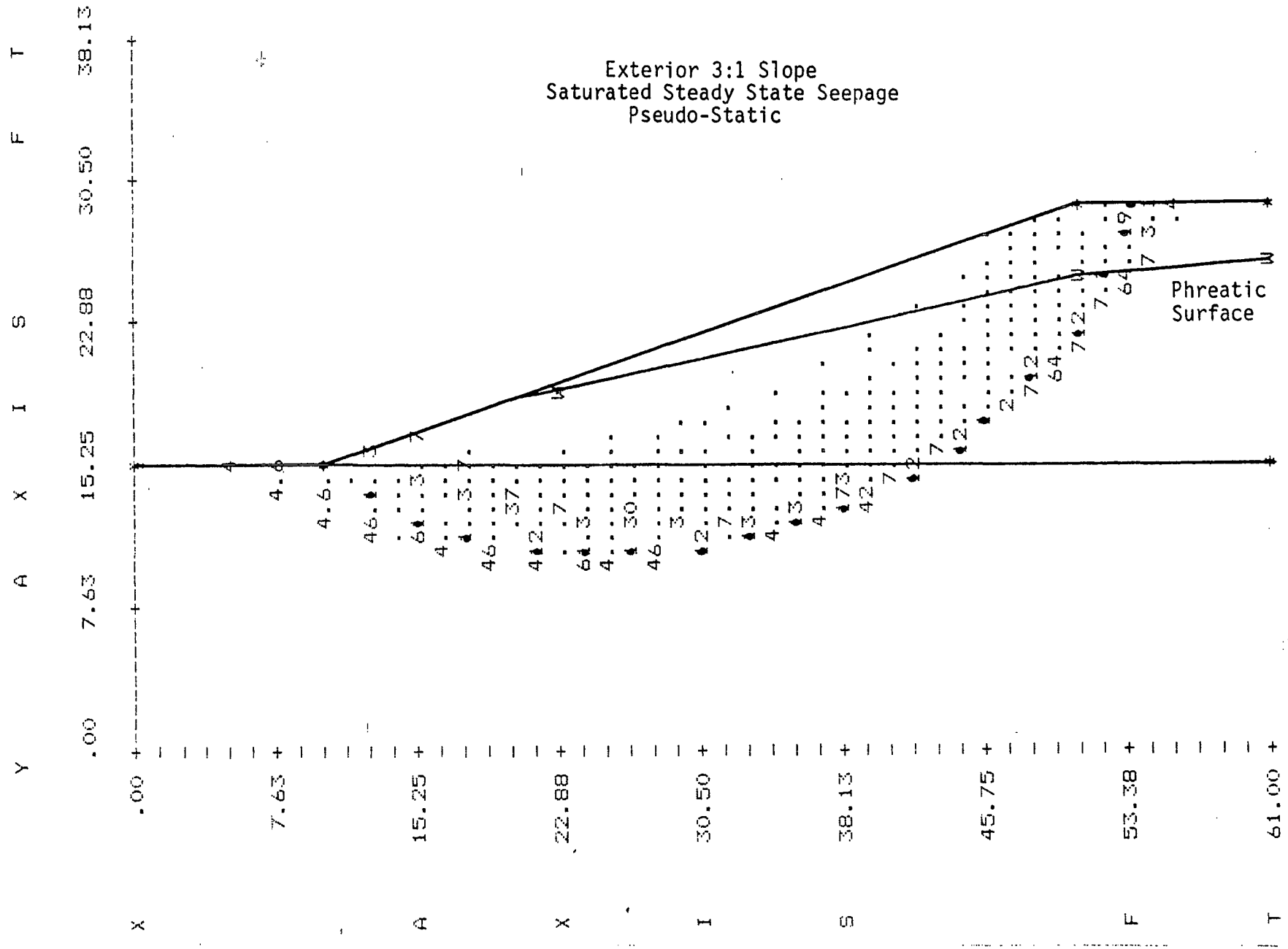
SLOPE STABILITY ANALYSIS

FOX Consulting Engineers and Geologists

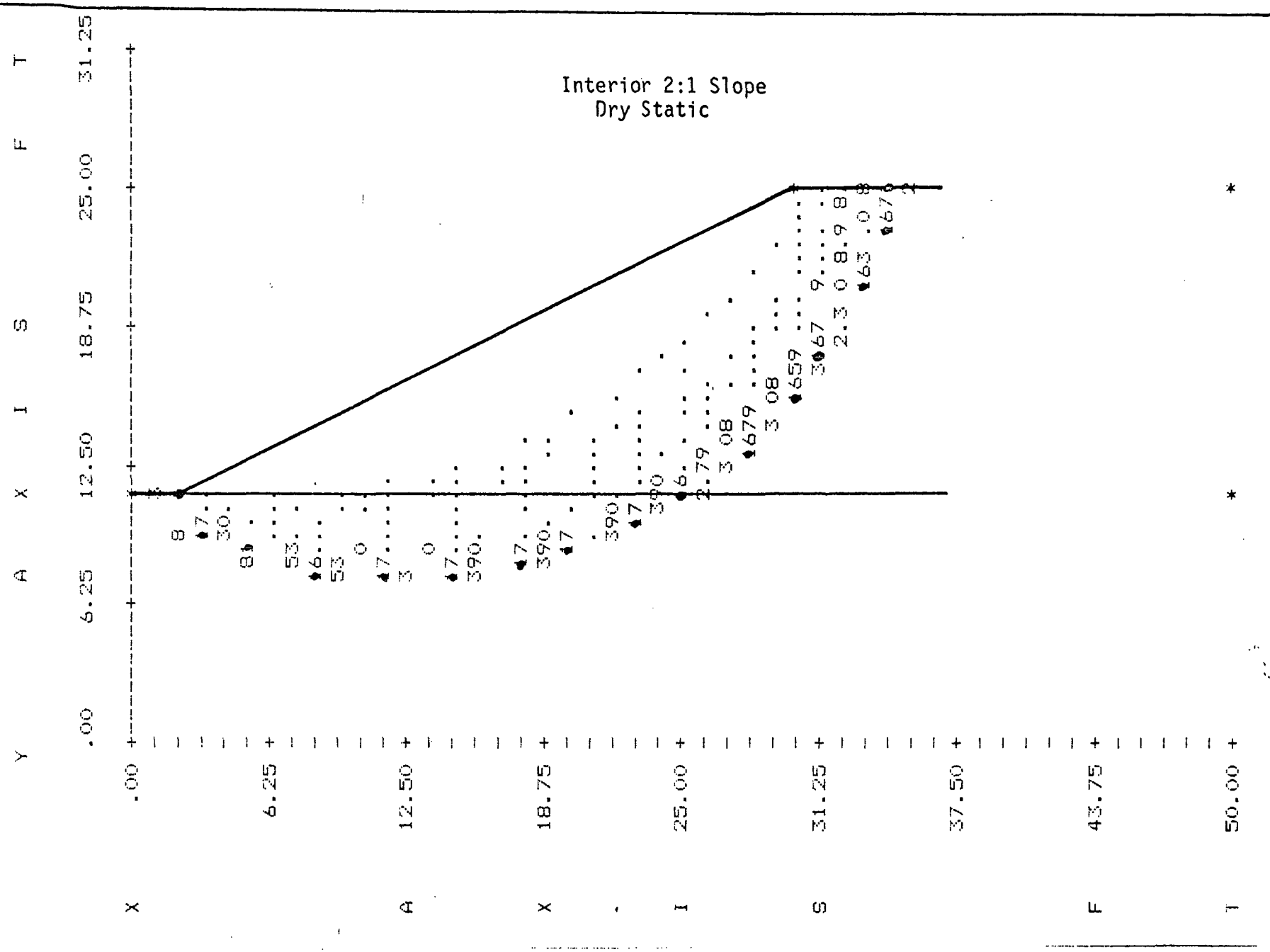
Job No: 0118980

Date: 7/22/86

Figure C-2



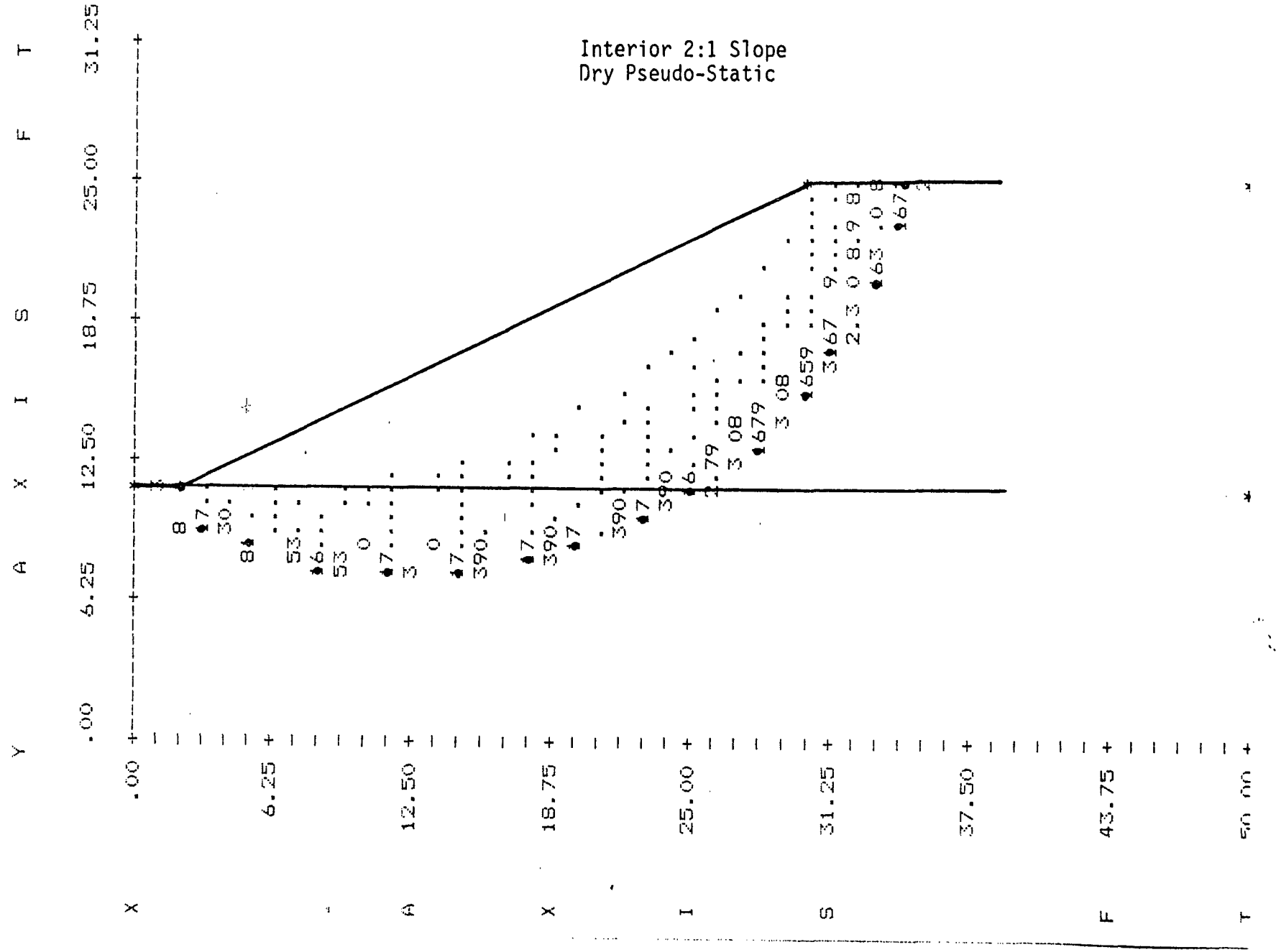
SLOPE STABILITY ANALYSIS	Job No: 0118980
FOX Consulting Engineers and Geologists	Date: 7/22/86
	Figure C-3



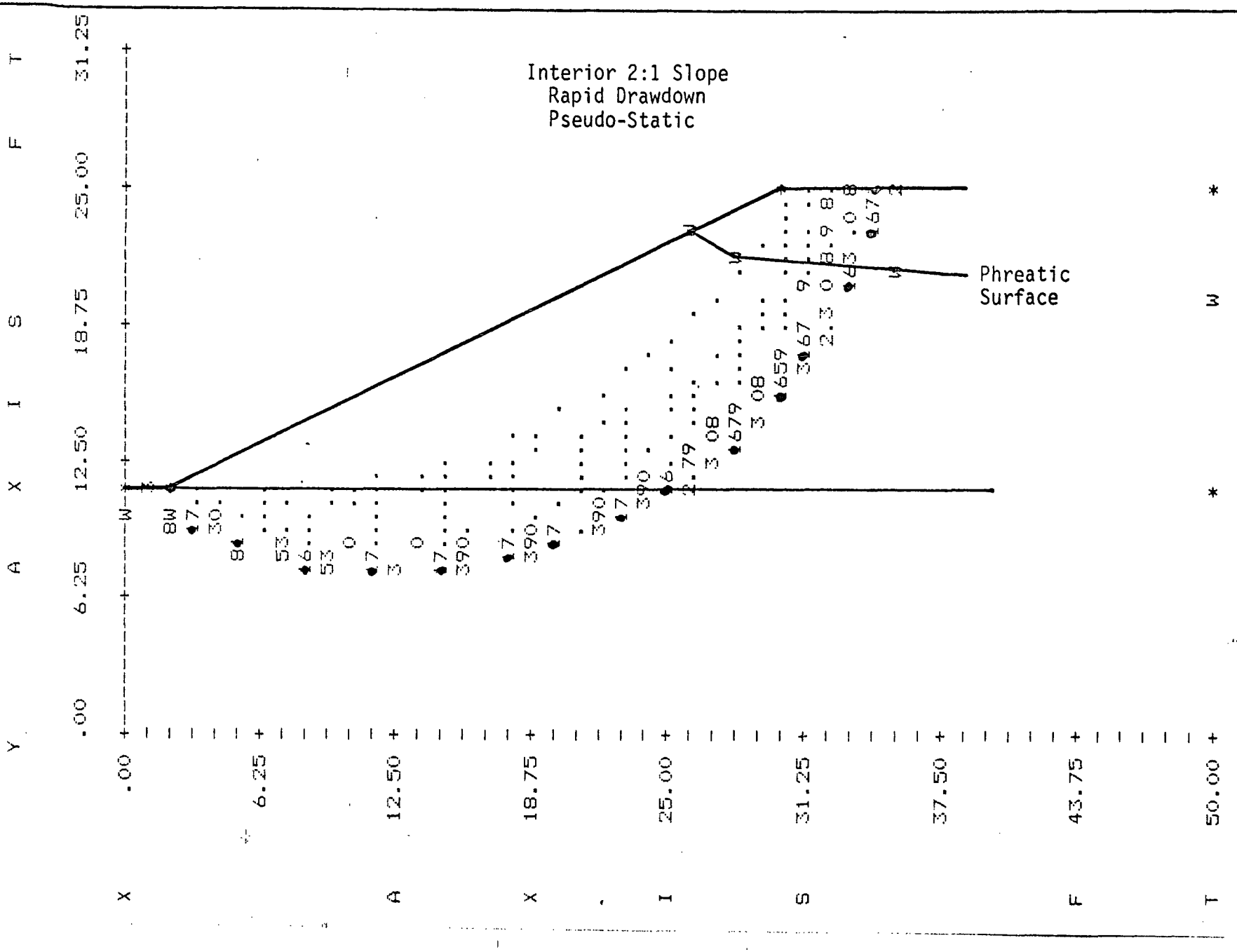
SLOPE STABILITY ANALYSIS

FOX Consulting Engineers and Geologists

Job No:	0118980
Date:	7/22/86
Figure	C-4



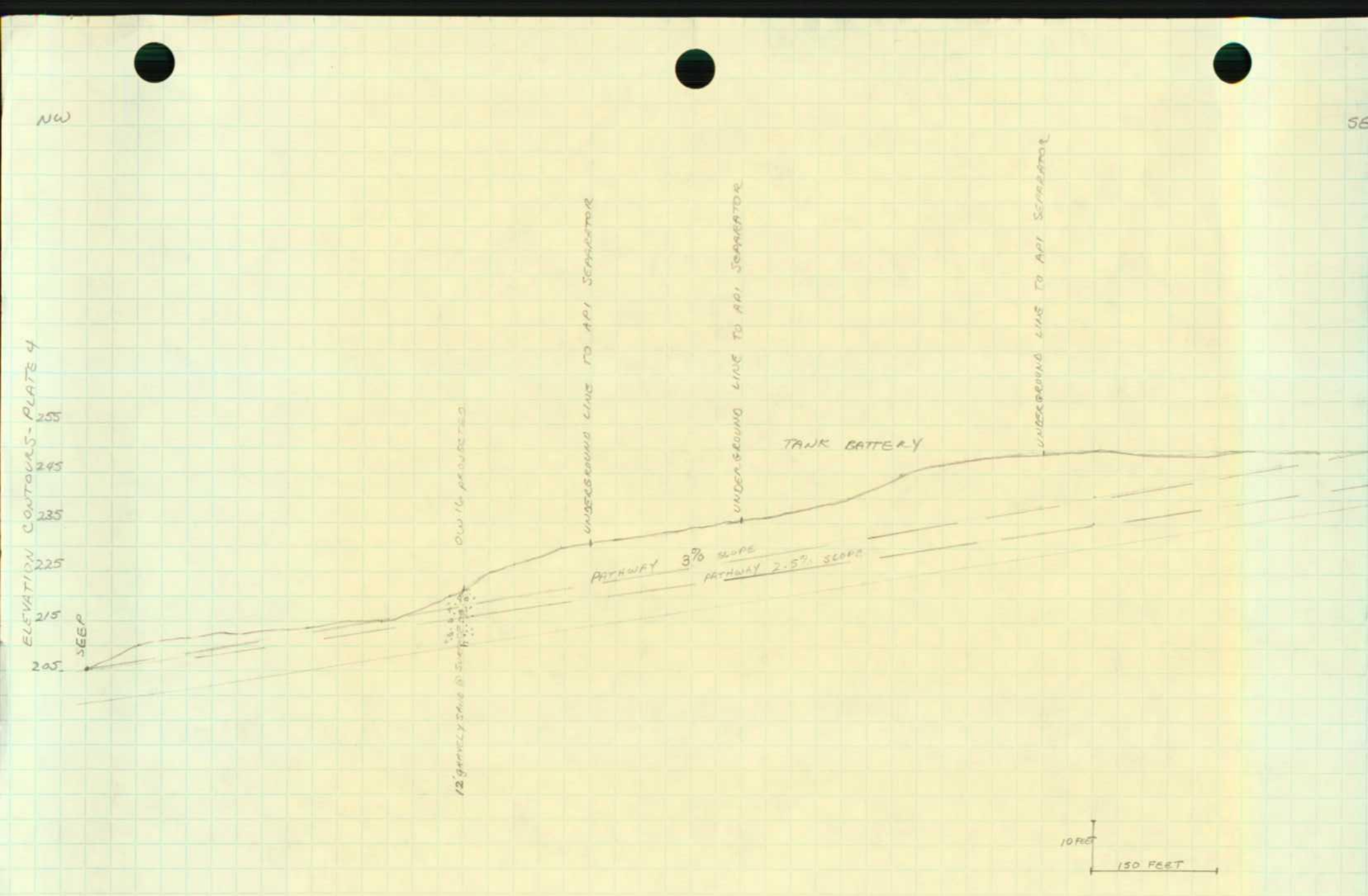
SLOPE STABILITY ANALYSIS	Job No: 0118980
FOX Consulting Engineers and Geologists	Date: 7/22/86
	Figure C-5



SLOPE STABILITY ANALYSIS

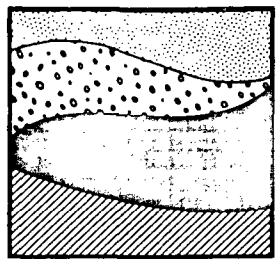
FOX Consulting Engineers and Geologists

Job No:	0118930
Date:	7/22/86
Figure	C-6



CROSS-SECTION UPDIP FROM SEEP AT POND 1

Geoscience
Consultants, Ltd.



August 20, 1986

Mr. Bob McClenahan
Giant Refining Company
Ciniza Refinery
Route 3, Box 7
Gallup, NM 87301

RE: Pond No. 1 Soil Samples

Dear Mr. McClenahan:

Enclosed are copies of the laboratory report on soil samples taken from the bottom of Pond No. 1 on June 5, 1986.

Samples 8606051035, 40, 45 and 50 were taken from the approximate center of the pond bottom at depths of 2, 4, 6 and 8 feet.

Samples 8606051100, 05, 10 and 15 were taken from the northwest corner of the pond bottom at depths of 2, 4, 6 and 8 feet.

Samples 8606051130, 35, 40, 45 and 50 were taken from the southwest area at depths of 2, 4, 6, 8 and 10 feet.

It can be concluded from these results that there has been no significant migration of hazardous constituents from Pond No. 1 and that further excavation or treatment of the soil under the pond prior to lagoon construction should not be necessary.

These results should be sent to NMOCD along with the plans and specs for the aerated lagoon by August 30, 1986.

Yours very truly,
GEOSCIENCE CONSULTANTS, LTD.

Claude Schleyer, P.E.
Senior Engineer

CS/ls/GIANT/MCCLE002.LTR

Enclosures

Headquarters
500 Copper Avenue N.W., Suite 325
Albuquerque, New Mexico 87102
(505) 842-0001

Washington Area Office
5513 Twin Knolls Rd., Suite 216
Columbia, Maryland 21045
(301) 596-3760

FROM: Assaigai Analytical Laboratories
7300 Jefferson NE
Albuquerque, NM 87109

TO: Geoscience Consultants Ltd.
500 Copper NW Suite 325
Albuquerque, NM 87102

DATE: 22 July 1986
0927

ANALYTE	SAMPLE ID/ ANALYTICAL RESULTS				
	8606051105 Lagoon No 1	8606051110 Lagoon No 1	8606051115 Lagoon No 1	8606051130 Lagoon No 1	8606051135 Lagoon No 1
Benzene	<0.1 ug/g	<0.1 ug/g	<0.1 ug/g	<0.1 ug/g	<0.1 ug/g
Toluene	0.2 ug/g	0.3 ug/g	0.3 ug/g	0.2 ug/g	0.2 ug/g
Xylenes	0.3 ug/g	0.5 ug/g	0.6 ug/g	0.5 ug/g	1.2 ug/g
Napthalene	ND	ND	4.7 ug/g	6.1 ug/g	ND
Acenaphthene	ND	0.1 ug/g	ND	ND	ND
Acenaphythylene	ND	0.7 ug/g	ND	ND	ND
Anthracene	0.1 ug/g	2.3 ug/g	0.1 ug/g	ND	ND
Phenanathrene	0.1 ug/g	2.3 ug/g	0.1 ug/g	ND	ND
Fluoranthene	ND	ND	ND	ND	ND
Fluorene	0.3 ug/g	0.3 ug/g	0.2 ug/g	ND	ND
Pyrene	ND	ND	ND	ND	ND
Benzo(a)anthracene	3.9 ug/g	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	ND	ND	ND	ND	ND
Benzo(j)fluoranthene	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ND	ND	ND	ND	ND
Chrysene	5.5 ug/g	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND
Dibenz(a,h)acridine	ND	ND	ND	ND	ND
Dibenz(a,j)acridine	ND	ND	ND	ND	ND
Dibenz(a,h)anthracene	ND	ND	ND	ND	ND
7H-Dibenzo(c,g)carbazole	ND	ND	ND	ND	ND
Dibenzo(a,e)pyrene	ND	ND	ND	ND	ND
Dibenzo(a,h)pyrene	ND	ND	ND	ND	ND
Dibenzo(a,i)pyrene	ND	ND	ND	ND	ND
Ideno(1,2,3-cd)pyrene	ND	ND	ND	ND	ND
3-Methylcholanthrene	ND	ND	ND	ND	ND

FROM: Assaigai Analytical Laboratories
7300 Jefferson NE
Albuquerque, NM 87109

TO: Geoscience Consultants Ltd.
500 Copper NW Suite 325
Albuquerque, NM 87102

DATE: 22 July 1986
0927

ANALYTE	SAMPLE ID/ ANALYTICAL RESULTS				
	8606051035 Lagoon No 1	8606051040 Lagoon No 1	8606051045 Lagoon No 1	8606051050 Lagoon No 1	8606051100 Lagoon No 1
Benzene	<0.1 ug/g	<0.1 ug/g	<0.1 ug/g	<0.1 ug/g	<0.1 ug/g
Toluene	0.5 ug/g	0.3 ug/g	0.3 ug/g	0.2 ug/g	0.3 ug/g
Xylenes	0.6 ug/g	0.2 ug/g	0.5 ug/g	0.4 ug/g	0.5 ug/g
Napthalene	1.8 ppm	ND	ND	0.1 ug/g	ND
Acenaphthene	ND	ND	ND	ND	ND
Acenaphythylene	ND	ND	ND	ND	ND
Anthracene	ND	ND	ND	0.1 ug/g	ND
Phenanathrene	ND	ND	ND	0.1 ug/g	ND
Fluoranthene	ND	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND	ND
Pyrene	ND	ND	ND	ND	ND
Benzo(a)anthracene	4.7 ug/g	0.6 ug/g	1.3 ug/g	0.7 ug/g	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ND	3.3 ug/g	ND	ND	ND
Benzo(g,h,i,)perylene	ND	ND	ND	ND	ND
Benzo(j)fluoranthene	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ND	2.2 ug/g	ND	ND	ND
Chrysene	6.6 ug/g	0.8 ug/g	1.9 ug/g	0.8 ug/g	ND
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND
Dibenz(a,h)acridine	ND	ND	ND	ND	ND
Dibenz(a,j)acridine	ND	ND	ND	ND	ND
Dibenz(a,h)anthracene	ND	ND	ND	ND	ND
7H-Dibenzo(c,g)carbazole	ND	ND	ND	ND	ND
Dibenzo(a,e)pyrene	ND	ND	ND	ND	ND
Dibenzo(a,h)pyrene	ND	ND	ND	ND	ND
Dibenzo(a,i)pyrene	ND	ND	ND	ND	ND
Ideno(1,2,3-cd)pyrene	ND	ND	ND	ND	ND
3-Methylcholanthrene	ND	ND	ND	ND	ND

FROM: Assaigai Analytical Laboratories
7300 Jefferson NE
Albuquerque, NM 87109

TO: Geoscience Consultants Ltd.
500 Copper NW Suite 325
Albuquerque, NM 87102

DATE: 22 July 1986
0927

ANALYTE	SAMPLE ID/ ANALYTICAL RESULTS			NOMINAL DETECTION LIMITS
	8606051140 Lagoon No 1	8606051145 Lagoon No 1	8606051150 Lagoon No 1	
Benzene	0.2 ug/g	<0.1 ug/g	<0.1 ug/g	0.1 ug/g
Toluene	0.3 ug/g	0.2 ug/g	0.2 ug/g	0.1 ug/g
Xylenes	0.2 ug/g	0.4 ug/g	0.9 ug/g	0.1 ug/g
Napthalene	1.7 ug/g	10.4 ug/g	ND	0.1 ug/g
Acenaphthene	ND	0.2 ug/g	ND	0.1 ug/g
Acenaphythylene	ND	1.9 ug/g	ND	0.1 ug/g
Anthracene	0.4 ug/g	ND	ND	0.1 ug/g
Phenanathrene	ND	0.5 ug/g	ND	0.1 ug/g
Fluoranthene	ND	ND	ND	0.1 ug/g
Fluorene	ND	1.8 ug/g	0.1 ug/g	0.1 ug/g
Pyrene	ND	ND	ND	0.1 ug/g
Benzo(a)anthracene	ND	ND	ND	0.1 ug/g
Benzo(a)pyrene	ND	ND	ND	0.1 ug/g
Benzo(b)fluoranthene	ND	ND	ND	0.1 ug/g
Benzo(g,h,i,)perylene	ND	ND	ND	0.1 ug/g
Benzo(j)fluoranthene	ND	ND	ND	0.1 ug/g
Benzo(k)fluoranthene	ND	ND	ND	0.1 ug/g
Chrysene	ND	ND	ND	0.1 ug/g
Dibenzo(a,h)anthracene	ND	ND	ND	0.1 ug/g
Dibenz(a,h)acridine	ND	ND	ND	0.1 ug/g
Dibenz(a,j)acridine	ND	ND	ND	0.1 ug/g
Dibenz(a,h)anthracene	ND	ND	ND	0.1 ug/g
7H-Dibenzo(c,g)carbazole	ND	ND	ND	0.1 ug/g
Dibenzo(a,e)pyrene	ND	ND	ND	0.1 ug/g
Dibenzo(a,h)pyrene	ND	ND	ND	0.1 ug/g
Dibenzo(a,i)pyrene	ND	ND	ND	0.1 ug/g
Ideno(1,2,3-cd)pyrene	ND	ND	ND	0.1 ug/g
3-Methylcholanthrene	ND	ND	ND	0.1 ug/g

GRADING & DRAINAGE PLAN

SCALE: 1" = 100'

NORTH

ABBREVIATION:
C.M.P. - CORRUGATED METAL PIPE

Discharge Plan
Plate 1

DRAWN	S J D
CHECKED	
DATE	6-23-80
SCALE	1" = 100'
JOB NO.	8504
SHEET	A-7
OF SHEETS	

STATE OF NEW MEXICO
No. 1004
SALVATORE J. DE LUCA
REGISTERED ARCHITECT

Salvatore J. De Luca, Architect
6412 E. Calle Del Paisano Scottsdale, Arizona 85251 (602) 947-4936

GIANT

Giant Travel Center

Gallup, New Mexico

Owner: Giant Industries, Inc.

REVISIONS	BY

DIESEL SALES BUILDING
FIN. FLOOR @ EL 6935.0 = DATUM EL 0'-0"

TOWER
FIN. FLOOR @EL 6935.4 = DATUM EL 0'-0"

7" HIGH CONC. CURB

7" HIGH CONC. CURB

UNIFORM SLOPE

FLOW LINE

HIGH POINT

LOW POINT AT TROUGH DRAINS

0.1' SLOPE TYPICAL

TYPICAL SLOPE AT ALL DISPENSER ISLANDS

Cover sloped south

GRADING & DRAINAGE PLAN AT DIESEL FUELING AREA

SCALE : 1/16" = 1'-0"

NORTH

Discharge Plan
Plate 2

REVISIONS	BY
1 G-23-86	

Giant Travel Center Gallup, New Mexico
Owner: Giant Industries, Inc.

GIANT

Salvatore J. De Luca, Architect
6412 E. Calle Del Paisano Scottsdale, Arizona 85251 (602) 947-4936

DRAWN	SJD
CHECKED	
DATE	4-15-86
SCALE	
JOB NO.	85002
SHEET	A-8
OF	SHEETS

MAIN BUILDING
FINISH FLOOR AT EL 6933.0
= DATUM EL. 0'-0"

RV DUMP DRAIN @ EL 26.3

UNIFORM FLOW LINE SLOPE

FLOW LINE UNIFORM SLOPE

Gasoline Sales Islands

TOP OF ISLAND @ 31.9

TOP OF ISLAND @ 32.2

TOP OF ISLAND @ 32.5

CANOPY

HIGH POINT

CROWN OF ROAD

HIGHWAY RIGHT-OF-WAY LINE

NORTH

1 GRADING & DRAINAGE PLAN AT MAIN BUILDING AREA

SCALE: 1/16" = 1'-0"

Discharge Plan Plate 3

REVISIONS	BY
1 6-23-86	

Giant Travel Center

Gallup, New Mexico

Owner: Giant Industries, Inc.

GIANT

Salvatore J. De Luca, Architect
6412 E. Calle Del Paisano Scottsdale, Arizona 85251 (602) 947-4936

DRAWN	SJD
CHECKED	
DATE	4-15-86
SCALE	
JOB NO.	85002
SHEET	A-9
OF	SHEETS

TELEDYNE NATIONAL TRACING PAPER NO. 188A-30X42

REVISIONS	BY
1 Changed Note	MS
2 Changed Note	MS
3 Changed Note	MS
4 Changed Note	MS
5 Changed Note	MS
6 Changed Note	MS
7 Moved Septic Tank	MS
8 Added Note	DG

8 Revised Note TM

Evaporation Lagoon #9

Match Stationing

Sta. 25+60, Line 1 - Manhole

Sump With Overflow To Pond 9 And Lift Station To Be Designed By Refinery Personnel

to Pond 1

4"

8" PVC - SDR35

Sta. 21+60, Line 1 Manhole

Sta. 29+60, Line 1 Manhole

Match Stationing

See Typical Road Crossing Detail, Sheet 15
14" Steel Casing 9

Sta. 17+60, Line 1 Manhole

8" PVC SDR 35

To Refinery

N

Sta 13+60 Line 1 Manhole Lift Station

Sta 13+55, Line 1 Sta 1+00 Line G Manhole

25± of 6" PVC SDR 26

Sta 0+75, Line G G - 45° Bend

Sta 0+00 Line G

2000 Gallon Septic Tank w/ Buried Inspection/Cleaning Ports (See RV Dump Detail) 1

483' of 8" PVC - SDR35

8" PVC Pipe SDR 35

8" PVC Pipe SDR 26

262' of 8" PVC SDR 26

Sta 8+97 Line Y Manhole

Sta 4+35, Line 1 Manhole

Main Building

Service Building

Sta 0+80 Line E

Sta 0+00 Line 1

Sta 0+10 Line 1 Sta 0+00 Line E

2000 Gallon Septic Tank w/ Buried Inspection/Cleaning Ports (See Septic Tank Detail) 1

Sta 0+20 Line 1 - SDR 26 8" - 45° PVC Bend

Sta 3+75 Line 1 Sta 0+90 Line 3 Manhole

250± of 8" PVC - SDR 26

Sta 0+10 Line 3 2000 Gal Septic Tank w/ Buried Inspection/Cleaning Ports

Sta 3+35, Line 4A

Sta 0+60 Line 3

45° Long Sweep Tee

Line 4A 4" PVC - SDR 26

Sta 0+00 Line 4A

Sta 0+20 Line 4A

Trench Drain Pre Mark Reading Area

(Large) Covered Trench Drains See Sheet 4 For Location of 10 Drains 2

Sta 0+00 Line 4B 11/4" PVC Bend - SDR 26

Sta 2+40 Line 4A 4" PVC - SDR 26 90° Tee - SDR 26

Sta 0+90 Line 4A 11/4" PVC Bend - SDR 26

Sta 1+98 Line 4A 11/4" PVC Bend - SDR 26

Diesel Sales

To Camp Housing

Make All Wastewater Connections To Pipe Exiting From Building at 5' From Building

6"x4" Adapter To 4" Building Sewer

45° Bends

6" PVC SDR 26

8" 45° PVC Bend SDR 26

2000 Gal Septic Tank w/cleanout

INTERSTATE 40

2 - 2000 Gallon Septic Tank (See Septic Tank Detail) w/ Buried Inspection/Cleaning Ports 4

Sta 8+97 Line Y Sta 0+80 Line G Manhole

8" PVC

2' of 8" PVC SDR 26

8" PVC - 45° Bend SDR 26

2' of 6" PVC SDR 26

6" PVC - 45° Bend - SDR 26

2' of 6" PVC - SDR 26

Make All Wastewater Connections to Pipe Exiting From Building at 5' From Building 4

Sta 0+00 Line 5

4' of 6" PVC SDR 26

6" PVC Connect To 6" Building Sewer

Notes: 1. Make All Wastewater Connections To Pipe Exiting From Building at 5' From Building 4

Discharge Plan Plate 4

GCL

GEOSCIENCE CONSULTANTS LTD.

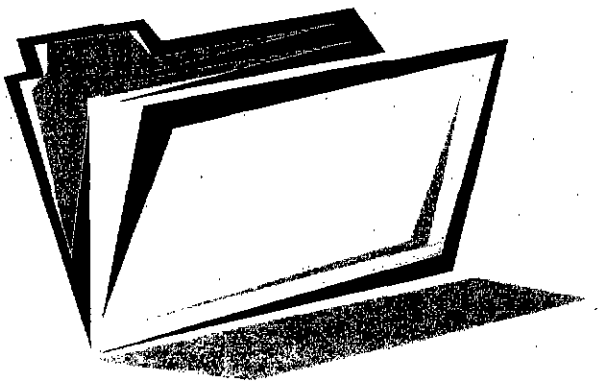
GIANT TRAVEL CENTER

WASTEWATER SYSTEM LAYOUT

STATE OF NEW MEXICO GEORGE PASLEY NO. 9353 REGISTERED PROFESSIONAL ENGINEER

CLIENT	GIANT
CHECKED	
DRAWN	P.T.
SCALE	1"=100'
DATE	4-15-86
SHEET NO.	4 of 15
	REV 6-27-86

TELEDYNE NATIONAL TRACING PAPER NO. 188A-30X43



REPRODUCTION OF DOCUMENTS

IN THIS FILE CANNOT BE

IMPROVED DUE TO CONDITION

OF ORIGINALS

SEWAGE LAGOON #1

SEWAGE LAGOON #4

ASPHALT PIT

CONTAINER STORAGE (INACTIVE)

SEWAGE LAGOON #3

ABANDONED U. S.T.

LANDFILL AREA #4

LANDFILL AREA #3

LANDFILL AREA #2

LANDFILL AREA #1

RAILROAD RACK

LAGOON

REPAIR EXISTING BERM TO CATCH STORMWATER RUNOFF

CONTAINER STORAGE (ACTIVE)

NEUTRALIZATION TANK

SEWAGE LAGOON #2

BURIED 6" PVC LINE

WELL

SURFACE LINE

UNDERGROUND LINE

AIR SEPARATOR

WEIR

EVAPORATION

AIR STRIP

4" OF 35% COMPACTED GRAVEL

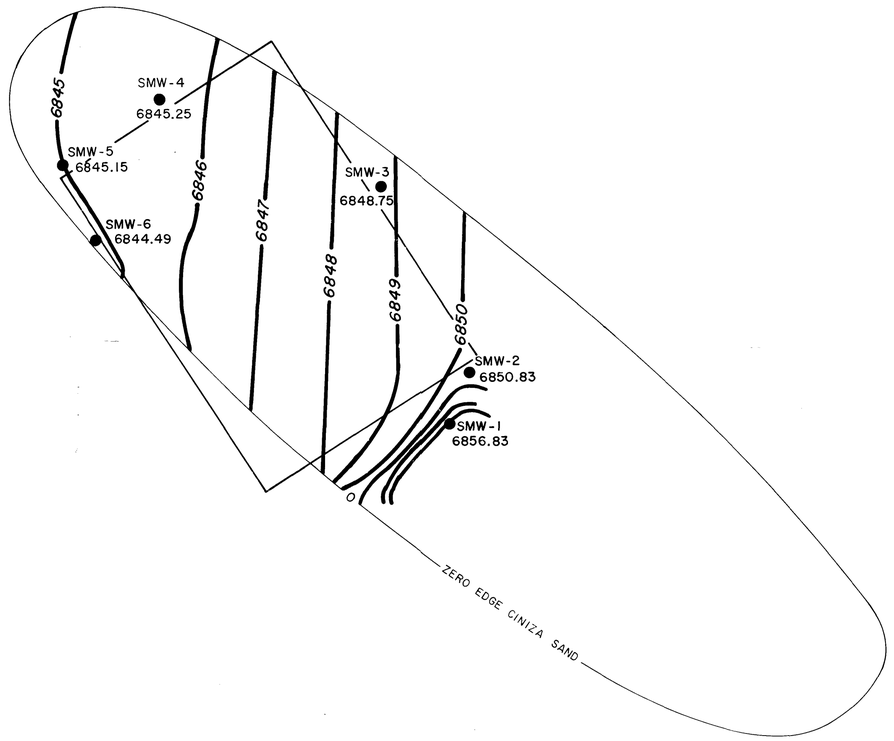
LEAK

N 60+00
W 10+00

N 39+25
W 41+80

LAND TREATMENT AREA

N 6000



N 4000

W 5000

W 2000

EXPLANATION

● SMW-1 MONITOR WELL
6856.83 WATER LEVEL ELEVATIONS

6850 WATERLEVEL CONTOUR

CONTOUR INTERVAL = 1.0 FEET
GRID LINES MATCH PLATES 1, 2

NORTH

0 150
FEET

Geoscience Consultants, Ltd.

PLATE 3
WATER-LEVEL ELEVATIONS
CINIZA SAND

CLIENT:
DATE:
DRAWN BY:
CHECKED BY:
REVISED:
SCALE:

AMERICAN INSTITUTE OF PROFESSIONAL GEOLOGISTS
CERTIFICATE NUMBER
6421
CERTIFIED PROFESSIONAL GEOLOGIST

LAND TREATMENT AREA

SMX-7 (NO SAND)

6820 (116)

SMW-4 (6818)

SMX-1 (6818)

SMW-5 (6815)

6830 (126)

SMW-3 (6846)

SMW-6 (6817)

6840 (136)

6850 (146)

SMX-8 (NO SAND)

SMW-2 (6848)

SMW-1 (6852)

6860 (156)

6870 (166)

SMX-4 (6874)

6880 (176)

SMX-5 (6883)

SMX-2 (6861)

SMX-3 (NO SAND)

11

12B

12A

1

2

3

4

5

6

40' x 40' PARKING AREA

75' x 100' PARKING AREA

EVAPORATION

AIR STRIP

50'

4" OF SOIL

LANDFILL AREA #1

LANDFILL AREA #2

LANDFILL AREA #5

LANDFILL AREA

LANDFILL AREA

API SEPARATOR

PAD

EXPLANATION

- ● SMW-1 MONITOR WELL
- ○ SMX-1 EXPLORATORY BOREHOLE

6850 (146) STRUCTURE CONTOUR WITH ELEVATION, FIGURE IN PARENTHESIS (146) IS ELEVATION KEYED TO MAP CONTOURS

NORTH

0 150

RECEIVED
FEB 05 1986
OIL CONSERVATION DIVISION
SANTA FE

Geoscience Consultants, Ltd.

PLATE 2
STRUCTURE CONTOUR, CINIZA SAND

CLIENT: GIANT
DATE: OCT., 1985
DRAWN BY: JCH
CHECKED BY:
REVISED:
SCALE: 1"=150'