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Informal Report

Geology of the 241-S Tank Farm

April 1976

W. H. Price

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Environmental Engineering Section
Research Department
Research and Engineering Division

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Atlantic Richfield Hanford Company
Richland, Washington 99352

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GEOLOGY OF THE 241-S TANK FARM

by

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ATLANTIC RICHFIELD HANFORD COMPANY
RICHLAND, WASHINGTON 99352

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INTRODUCTION

A series of maps have been compiled to document the structure and stratigraphy of the sediments underlying the high-level radioactive waste storage tank farms located within the Energy Research and Development Administration Hanford Reservation. The primary purpose of these maps is to provide basic geologic information to be utilized to evaluate the impact of suspected and confirmed tank leaks. For convenience of usage map sets for each tank farm have been published in separate document packets (see Table I). The contents of this packet (see Table II) contain maps compiled only for the 241-S Tank Farm.

TABLE I

TANK FARM GEOLOGY DOCUMENTS AVAILABLE
AS OF APRIL, 1976*

Title	Document Number
Geology of the 241-A Tank Farm	ARH-LD-127
Geology of the 241-AX Tank Farm	ARH-LD-128
Geology of the 241-B Tank Farm	ARH-LD-129
Geology of the 241-BX Tank Farm	ARH-LD-130
Geology of the 241-BY Tank Farm	ARH-LD-131
Geology of the 241-C Tank Farm	ARH-LD-132
Geology of the 241-S Tank Farm	ARH-LD-133
Geology of the 241-SX Tank Farm	ARH-LD-134
Geology of the 241-T Tank Farm	ARH-LD-135
Geology of the 241-TX Tank Farm	ARH-LD-136
Geology of the 241-TY Tank Farm	ARH-LD-137
Geology of the 241-U Tank Farm	ARH-LD-138
Generalized Geology of the 241-SY Tank Farm	ARH-LD-139

*Additional documents will be completed as new tank farms are built and well monitoring networks installed.

TABLE II

241-S TANK FARM GEOLOGY MAPS

Title	Drawing Number
241-S Tank Farm Geologic Map Legend and Plot Plan	H-2-38984
241-S Tank Farm Geologic Characterization Cross Section A-A'	H-2-38948
241-S Tank Farm Geologic Characterization Cross Section B-B'	H-2-38949
241-S Tank Farm Geologic Characterization Cross Section C-C'	H-2-38950
241-S Tank Farm Geologic Characterization Cross Section D-D'	H-2-38951
241-S Tank Farm Geologic Characterization Cross Section E-E'	H-2-38952
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241-S Tank Farm Geologic Characterization Cross Section G-G'	H-2-38954
241-S Tank Farm Geologic Characterization Cross Section H-H'	H-2-38955
241-S Tank Farm Geologic Characterization Cross Section I-I'	H-2-38956
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241-S Tank Farm Geologic Characterization Paleotopography of Silt Horizon	H-2-38946
241-S Tank Farm Geologic Characterization Paleotopography of Silty Medium to Very Fine Sand Horizon	H-2-38947

PROCEDURES

During the drilling of 27 dry wells and 2 water wells in and around the 241-S Tank Farm, sediment samples were collected from one to 5-foot depth intervals. Information utilized to prepare this series of maps was obtained by the analysis of these samples, numbering approximately 500.

Each sediment sample was quantitatively analyzed according to grain size and $CaCO_3$ content. Size analysis was carried out utilizing a nest of 9 sieves selected for coincidence with the Wentworth (1922) grain size nomenclature (see H-2-38984). The $CaCO_3$ content of each sample was determined utilizing a semiquantitative CO_2 displacement method (Horwitz, 1970). Size and $CaCO_3$ data was input into the Rocksan Computer Program (Parr, 1974) which categorized each sediment sample into 1 of 19 classes (classification scheme modified after Folk, 1968; see H-2-38984). After analysis, each sample was visually examined to aid in further characterization. Each sample was subsequently stored in the Hanford Well Library for future reference.

For convenience of usage, the geologic maps were prepared at the same scale (1" = 16') as drawing H-2-36943 (Wells in 241-S Farm As-built). Steps outlining the preparation of the maps are listed in Figure 1.

GENERALIZED GEOLOGY

Included within this section is a brief discussion of the geology underlying the 241-S Tank Farm. The stratigraphic descriptions included, along with the Glossary (see page 12), are designed only to provide sufficient information to permit a general understanding of the Tank Farm maps presented. For a more detailed discussion of the regional geologic setting of the 241-S Tank Farm, the reader is referred to articles listed in the Selected References (see page 14).

The 241-S Tank Farm is underlain by four major stratigraphic units (see Figure 2); (1) basalt of the Columbia River Group which forms the bedrock beneath the area; (2) semiconsolidated sediments of the Ringold Formation which directly overlie the bedrock; (3) unconsolidated eolian silt; and

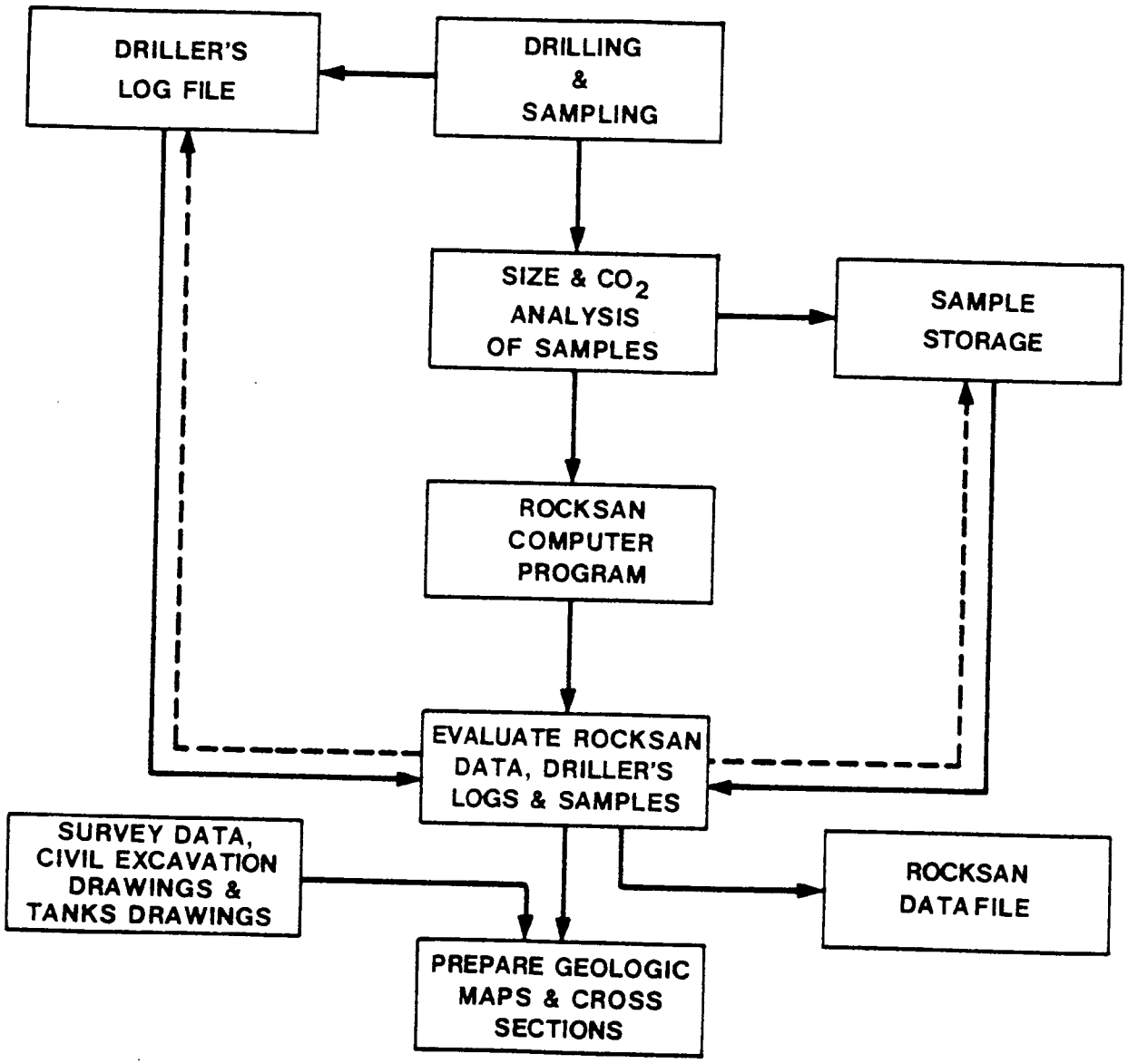

FIGURE 1

STEPS OUTLINING THE PREPARATION OF TANK FARM GEOLOGY MAPS

ERA	PERIOD	EPOCH	YEARS B. P.	STRATIGRAPHIC NAME AND/OR UNIT		LITHOLOGY DESCRIPTION
CENOZOIC	QUATERNARY	MODERN		BACKFILL		VERY POORLY SORTED GRAVEL, SAND & SILT
		PLEISTOCENE	30	GLACIOFLUVIAL SEDIMENTS		FAIRLY WELL SORTED FLUVIAL SAND & SILT WITH SOME GRAVEL
				EOLIAN SILT		FINE SAND & SILT DERIVED FROM THE UPPER RINGOLD
	TERTIARY	PLIOCENE	1,000,000	RINGOLD FORMATION	UPPER RINGOLD	WELL SORTED FLUVIAL OR LACUSTRINE SILT & SAND WITH SOME CALCAREOUS LAYERS
					MIDDLE RINGOLD	FLUVIAL GRAVEL & SAND VARIABLY CEMENTED WITH CALCIUM CARBONATE & SILICA
		MIOCENE	11,000,000	COLUMBIA RIVER BASALT GROUP	ELEPHANT MOUNTAIN MEMBER	DENSE BLACK EXTRUSIVE IGNEOUS ROCK, MICRO VESICULAR, BRICK BAT ENTABULATURE & NO COLUMNADE
					RATTLESNAKE RIDGE MEMBER	TUFFACEOUS SANDSTONE
					POMONA MEMBER	DENSE BLACK EXTRUSIVE IGNEOUS ROCK, SCATTERED OLIVINE PHENOCRYSTS, UPPER & SOMETIMES BASAL ENTABLATURE WELL DEVELOPED, FAN JOINTING IN COLUMNADE

WHP/KRF 1976

FIGURE 2

GENERALIZED STRATIGRAPHIC COLUMN FOR
THE 200 AREA TANK FARMS

(4) unconsolidated sand, silt, and gravel, collectively termed glaciofluvial sediments, which directly overlie the eolian silt. A more detailed description of the character of these units underlying the Tank Farm follows.

COLUMBIA RIVER BASALT GROUP

About 20 million years ago a series of fissures opened around the periphery of the subsiding Pasco Basin and large volumes of basaltic lava poured out over the land surface. The highly fluid lava was extruded intermittently from these fissures until approximately 8 million years ago. At the cessation of Columbia River Basalt volcanism, the basin had been filled with more than 12,000 feet of basalt.

The surface of the Columbia River Basalt lies beneath 241-S Tank Farm at an elevation of 90 feet (all elevations based on feet above mean sea level measured at approximate center of Tank Farm). On the 241-S Tank Farm maps, this surface occurs approximately 270 feet below the bottom border of the prepared cross sections.

RINGOLD FORMATION

Following the cessation of Columbia River Basalt volcanism the ancestral Columbia River transported sediments from the surrounding highlands into the Pasco Basin where they accumulated to form the Ringold Formation. Beneath the Hanford Reservation, this formation is up to 1200 feet thick and can generally be divided into three units on the basis of lithology; the clays and silts of the lower Ringold unit; the pebbles and cobbles of the middle Ringold unit; and the silts and fine sands of the upper Ringold unit.

Within the region beneath 241-S Tank Farm, the lower Ringold unit is missing. The combined thickness of the middle and upper Ringold units present is approximately 422 feet.

Middle Ringold

Beneath the 241-S Tank Farm, the 411-foot thick middle Ringold unit lies unconformably on the Columbia River Basalt and dips to the southeast about

50 feet per mile. The unit consists predominantly of well-rounded pebbles and cobbles with the interstitial spaces filled with medium to fine sand and silt cemented in places with SiO_2 or $CaCO_3$. Table III summarizes the grain size and $CaCO_3$ values of the middle Ringold sediments.

TABLE III

TYPICAL GRAIN SIZE AND CALCIUM CARBONATE VALUES FOR MAJOR MIDDLE RINGOLD LITHOLOGIES BENEATH 241-S TANK FARM

Lithology	%Pebbles & Cobbles	% Sand					%Silt & Clay	$\%CaCO_3$
		Very Coarse	Coarse	Medium	Fine	Very Fine		
Sandy Gravel	77	2	3	4	9	5	1	.3
Cemented Calcarous to Siliceous Slightly Silty Sandy Gravel	70	4	6	6	8	5	1	0-12.0
Coarse to Medium Sand	2	11	25	29	15	11	7	1.0
Slightly Cemented Calcareous to Siliceous Slightly Silty Sand Gravel	72	4	5	6	7	5	1	0-12.0
Coarse to Medium Sand	1	9	26	36	15	10	4	1.0
Cemented Calcarous to Siliceous Slightly Silty Sandy Gravel	67	8	7	6	6	5	1	0-12.0

The lower portion of the middle Ringold unit (elevation 90-233 feet) is blue-gray in color suggesting that the sediments have not undergone oxidation and have continuously been below the water table since their deposition. In contrast, sediments of the middle Ringold unit above the 223-foot elevation level have undergone oxidation as evidenced by their gray-brown color and their well developed weathering rinds.

Although the middle Ringold unit consists predominantly of pebbles and cobbles, a few sand units up to 17 feet in thickness occur beneath 200 West Area. Such units represent either lacustrine or fluvial deposits layed down during periods of decreased velocity of the ancestral Columbia River. Two such units are found beneath the 241-S Tank Farm at elevations of 378 feet and 398 feet.

Upper Ringold

The upper Ringold unit, which overlies the middle Ringold unit, occurs between elevations 501 and 512 feet. The unit consists predominately of coarse to medium sand and silt. These sediments, like the sand units of the middle Ringold, are representative of a period of decreased velocity of the ancestral Columbia River or temporary ponding. Table IV summarizes the grain size and $CaCO_3$ values of the upper Ringold unit.

TABLE IV

TYPICAL GRAIN SIZE AND CALCIUM CARBONATE VALUES
FOR UPPER RINGOLD LITHOLOGY
BENEATH 241-S TANK FARM

		% Sand						
Lithology	%Pebbles & Cobbles	Very Coarse	Coarse	Medium	Fine	Very Fine	%Silt & Clay	$\%CaCO_3$
Slightly Silty Coarse to Medium Sand	1	10	21	22	15	11	20	1.2

EOLIAN SILT DEPOSIT

After deposition of the upper Ringold, the top of the unit was subjected to subaerial erosion. The surface of the unit was altered by wind which winnowed, reworked, and redeposited the sands and silts. These wind-deposited sediments, termed Early Palouse soil or eolian silt, occur beneath the 241-S Tank Farm between elevations 512 and 573 feet. Table V summarizes the grain size and $CaCO_3$ content of the eolian silt.

TABLE V

TYPICAL GRAIN SIZE AND CALCIUM CARBONATE VALUES
FOR 241-S TANK FARM EOLIAN SILT

		% Sand						
Lithology	%Pebbles & Cobbles	Very Coarse	Coarse	Medium	Fine	Very Fine	%Silt & Clay	$\%CaCO_3$
Silty Very Fine Sand to Sandy Silt	0	0	1	9	20	34	36	2.0

GLACIOFLUVIAL DEPOSITS

During the close of the Ice Age, approximately 20,000 years ago, a continental ice sheet covered much of northern Washington. As the ice sheet retreated northward, the breakup of ice dams resulted in catastrophic floods in which large volumes of glacial meltwater were released. During one of these floods, over 500 cubic miles of water is estimated to have poured into the Pasco Basin at a rate of more than 9 cubic miles of water per hour. Sediments deposited within the basin by such flooding now comprise the glaciofluvial unit. The characteristic variability of sediment size and degree of sorting within this unit can be attributed to changes in water velocity and water level which occurred during the flooding process.

Glaciofluvial deposits are found beneath the 241-S Tank Farm between elevations 573 and 617 feet. The 44-foot thick section of these deposits consists predominently of coarse to very fine sand with some silt and pebbles. Table VI summarizes the grain size and $CaCO_3$ values of the glaciofluvial sediments.

TABLE VI

TYPICAL GRAIN SIZE AND CALCIUM CARBONATE VALUES
FOR MAJOR GLACIOFLUVIAL LITHOLOGIES
BENEATH 241-S TANK FARM

Lithology	%Pebbles & Cobbles	% Sand					%Silt & Clay	$\%CaCO_3$
		Very Coarse	Coarse	Medium	Fine	Very Fine		
Slightly Pebbly Very Coarse to Medium Sand to Silty Sandy Medium to Very Fine Pebble	14	17	21	19	10	9	10	1.3
Slightly Silty Medium to Very Fine Sand to Medium to Very Fine Sand	1	4	12	20	23	24	16	1.6
Silty Medium to Very Fine Sand	0	0	3	18	25	26	26	2.0

CLASTIC DIKES

Throughout the Pasco Basin, clastic dikes are found cross-cutting the Ringold Formation and glaciofluvial sediments. These dikes, which range from a few inches to several feet in width, are known to exist to depths of more than 100 feet below the ground surface. Generally, the dikes are composed of fine silts to coarse sands. The origin of the clastic dikes is still in refute and will not be discussed here (see Selected References). Identification of clastic dikes by drilling is difficult and although some dikes were detected in the 241-S Tank Farm, they could not be mapped.

BACKFILL MATERIAL

In preparation for tank construction, glaciofluvial material was excavated at the 241-S Tank Farm site. This material, consisting predominantly of pebbles, and coarse to medium sands to silts, was subsequently used as backfill from the base of the completed tanks (617 feet) to the ground surface (664 feet). An inherent characteristic of the backfill is its poor sorting. Grain size and $CaCO_3$ values for the backfill are found in Table VII.

TABLE VII

TYPICAL GRAIN SIZE AND CALCIUM CARBONATE VALUES FOR THE 241-S TANK FARM BACKFILL

Lithology	%Pebbles & Cobbles	% Sand					%Silt & Clay	%$CaCO_3$
		Very Coarse	Coarse	Medium	Fine	Very Fine		
Slightly Pebbly Slightly Silty Coarse to Fine Sand to Slightly Silty Pebbly Coarse to Fine Sand	12	12	17	18	17	11	13	1.2

WATER TABLE

The water table beneath the 241-S Tank Farm is located within the middle Ringold unit at an elevation of 478 feet, 139 feet below the base of the tanks. For further information concerning contours on the water table beneath 200 West Area the reader is referred to drawings H-2-38397 (200 West Area Water Table Map) and H-2-38877 (200 West Area Depth to Water Map).

GLOSSARY

Basalt. Fine-grained, dark-colored, extrusive igneous rock.

Calcareous. Containing calcium carbonate.

Caliche. Gravel, sand, or silt cemented by calcium carbonate.

Cement. Chemically precipitated material occurring in the interstices between particles of gravel, sand, or silt.

Clastic. A textural term applied to rocks composed of fragmental material derived from pre-existing rocks.

Clastic dike. A tabular body of clastic material transecting the bedding of a sedimentary formation, representing extraneous material that has invaded the containing formation along a crack.

Dip. The angle at which a stratum or any planar feature is inclined from the horizontal.

Eolian. A formation formed by, or deposited from, the wind or currents of air.

Fluvial. Produced by the action of a river or stream.

Formation. The ordinary unit of geologic mapping consisting of a large and persistent stratum of some one kind of rock.

Glaciofluvial. Pertaining to streams flowing from glaciers or to the deposits made by such streams.

Grain. The particles or discrete crystals which comprise a rock or sediment.

Group. A local or provincial subdivision of a series, based on lithologic features and contains two or more formations.

Lacustrine. A formation deposited in a lake environment.

Lava. Fluid rock such as that which issues from a volcano or a fissure in the earth's surface and the same material solidified by cooling.

Lithology. The description of rocks or sediments on the basis of such characteristics as color, minerologic composition and grain size.

Sediment. Descriptive term for gravel, sand, and silt transported from their sources and deposited by air, water, or ice.

Sieve. A utensil having many small perforated openings, used to separate fine particles from coarser ones.

Siliceous. Containing silica.

Silt. Fine grained material between sand and clay in size.

Sorting. The grain size range of the sediments.

Stratigraphy. The part of descriptive geology of an area that pertains to the discrimination, character, thickness, sequence, age and correlation of the sediments and rocks of the area.

Subaerial. Formed, existing, or taking place on the land surface.

Unconformity. A surface of erosion or nondeposition that separates younger strata from older strata.

Water table. The upper surface of a zone of saturation except where that surface is formed by an impermeable body.

Winnowing. Separation of fine particles from coarser ones by wind action.

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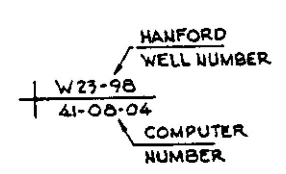
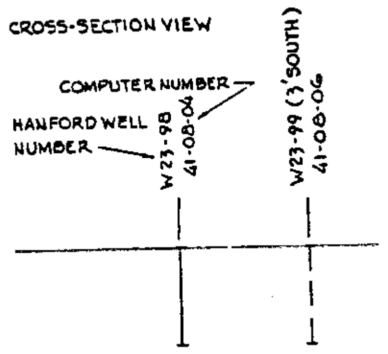
1 - WELL DESIGNATION
WELL NUMBERS PREFIXED BY 299-

PLOT PLAN VIEW



CROSS-SECTION VIEW

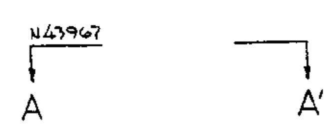


SOLID LINE ON CROSS-SECTION.
DASHED LINE WHEN PROJECTED TO CROSS-SECTION: DISTANCE AND DIRECTION FROM CROSS-SECTION ARE GIVEN.

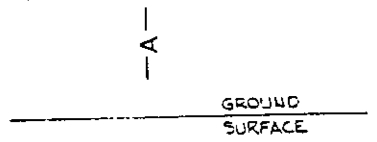
2 - COORDINATES
BASED ON HANFORD COORDINATE SYSTEM.

3 - PLANE OF CROSS-SECTION

PLOT PLAN VIEW



CROSS-SECTION VIEW



4 - TANK DESIGNATION
TANKS PREFIXED BY 241-

5 - CONTACT BETWEEN LITHOLOGIES
SOLID LINE WHERE ACCURATELY KNOWN
DASHED LINE IF APPROXIMATELY KNOWN
QUERIED DASHED LINE WHERE INFERRED
BASE OF BACKFILL

6 - LENSES OR STRINGERS
DISCONTINUOUS SEDIMENTS LESS THAN TWO FEET THICK
DISCONTINUOUS SEDIMENTS GREATER THAN TWO FEET THICK

7 - WATER TABLE
CROSS-SECTION VIEW
DATUM - MEAN SEA LEVEL

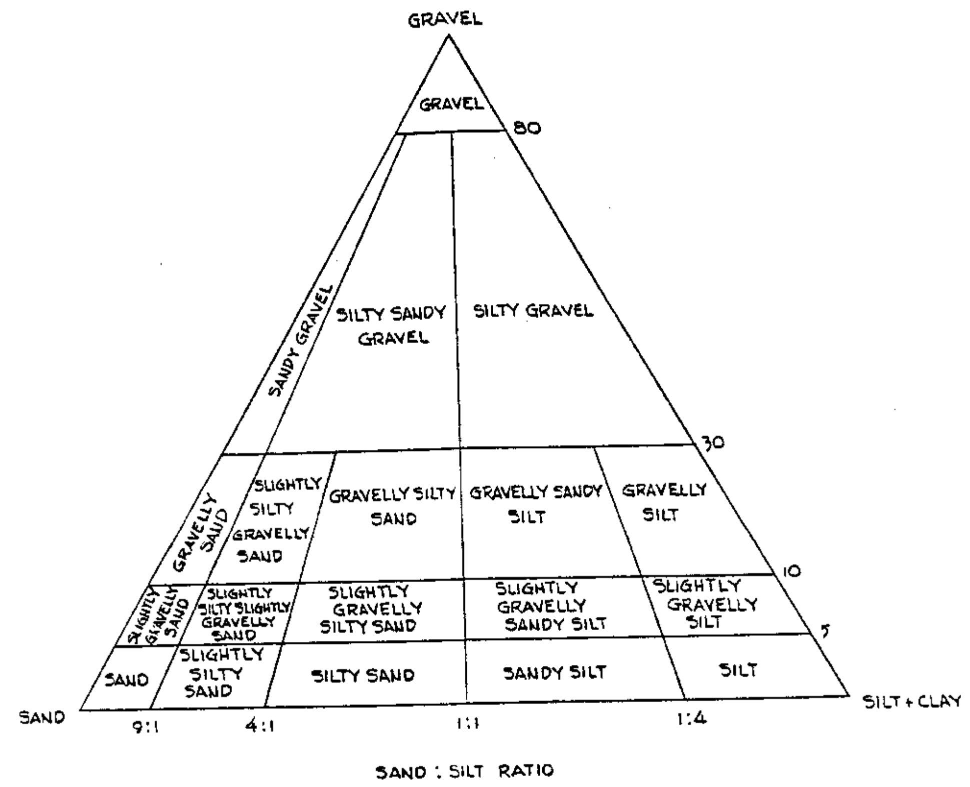
WATER TABLE (12/75)
DATE WATER LEVEL MEASUREMENTS TAKEN

8 - HORIZONTAL AND VERTICAL SCALES
VERTICAL EXAGGERATION - 1X
VERTICAL SCALE - FEET ABOVE MEAN SEA LEVEL

20 10 0 10 20 30 40 50
1:920

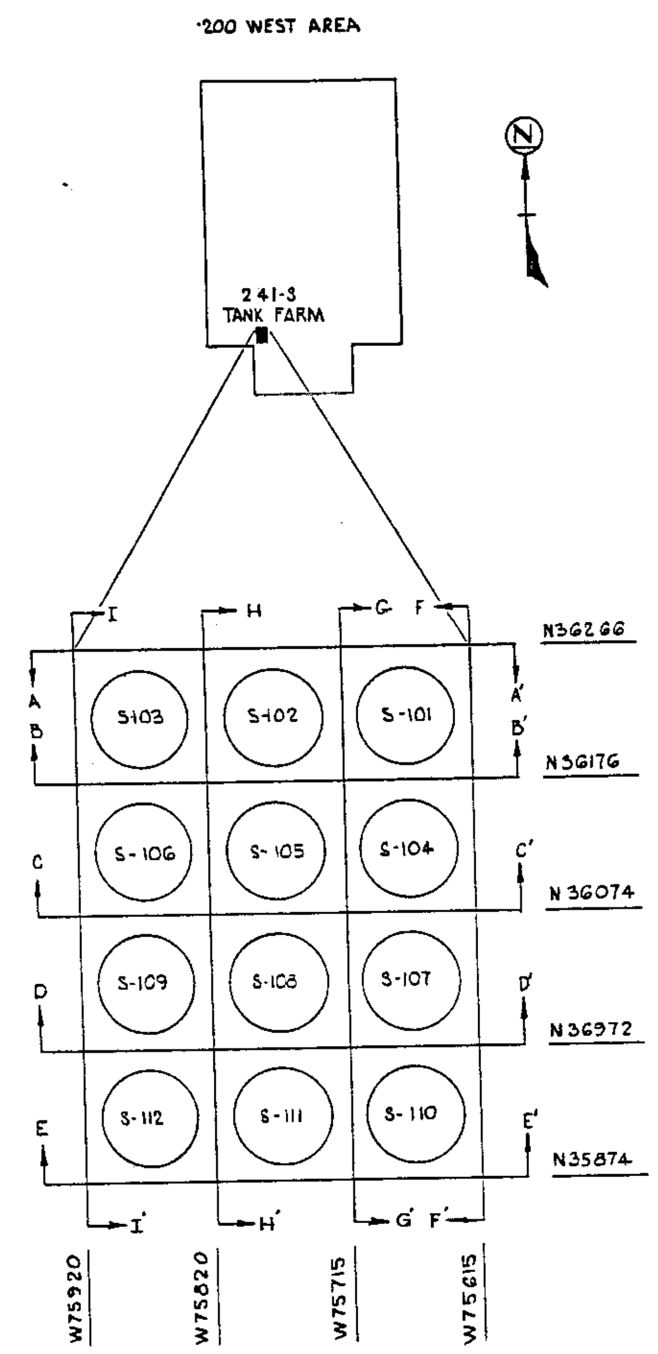
9 - SEDIMENT DESCRIPTION
SEDIMENTS BENEATH THE TANK FARMS ARE CLASSIFIED ON THE BASIS OF ONE OF NINETEEN SEDIMENT TYPES (SEDIMENT CLASSIFICATION). FURTHER DETAIL IS GIVEN USING MODIFIERS FROM THE GRAIN SIZE NOMENCLATURE. SEDIMENTS WITH CHEMICALLY PRECIPITATED MATERIALS OCCURRING IN THE INTERSTICES BETWEEN GRAINS ARE PREFIXED BY THE TERM CEMENTED. SEDIMENTS WITH GREATER THAN 10% CALCIUM CARBONATE ARE PREFIXED BY THE MODIFIER CALCAREOUS. SEDIMENTS CONTAINING SILICA IN THE INTERSTICES BETWEEN GRAINS ARE MODIFIED BY THE TERM SILICEOUS.

SEDIMENT CLASSIFICATION (MODIFIED AFTER R.L. FOLK, 1968)



GRAIN SIZE NOMENCLATURE (MODIFIED AFTER C.K. WENTWORTH, 1922)

	PARTICLE DESIGNATION		PARTICLE DIAMETER (MM)
GRAVEL	BOULDER		>256
GRAVEL	COBBLE	LARGE	256 - 128
		SMALL	128 - 64
GRAVEL	PEBBLE	VERY COARSE	64 - 32
		COARSE	32 - 16
		MEDIUM	16 - 8
		FINE	8 - 4
		VERY FINE	4 - 2
	SAND	VERY COARSE	2 - 1
		COARSE	1 - 0.5
		MEDIUM	0.5 - 0.25
		FINE	0.25 - 0.125
		VERY FINE	0.125 - 0.0625
	SILT + CLAY		<0.0625



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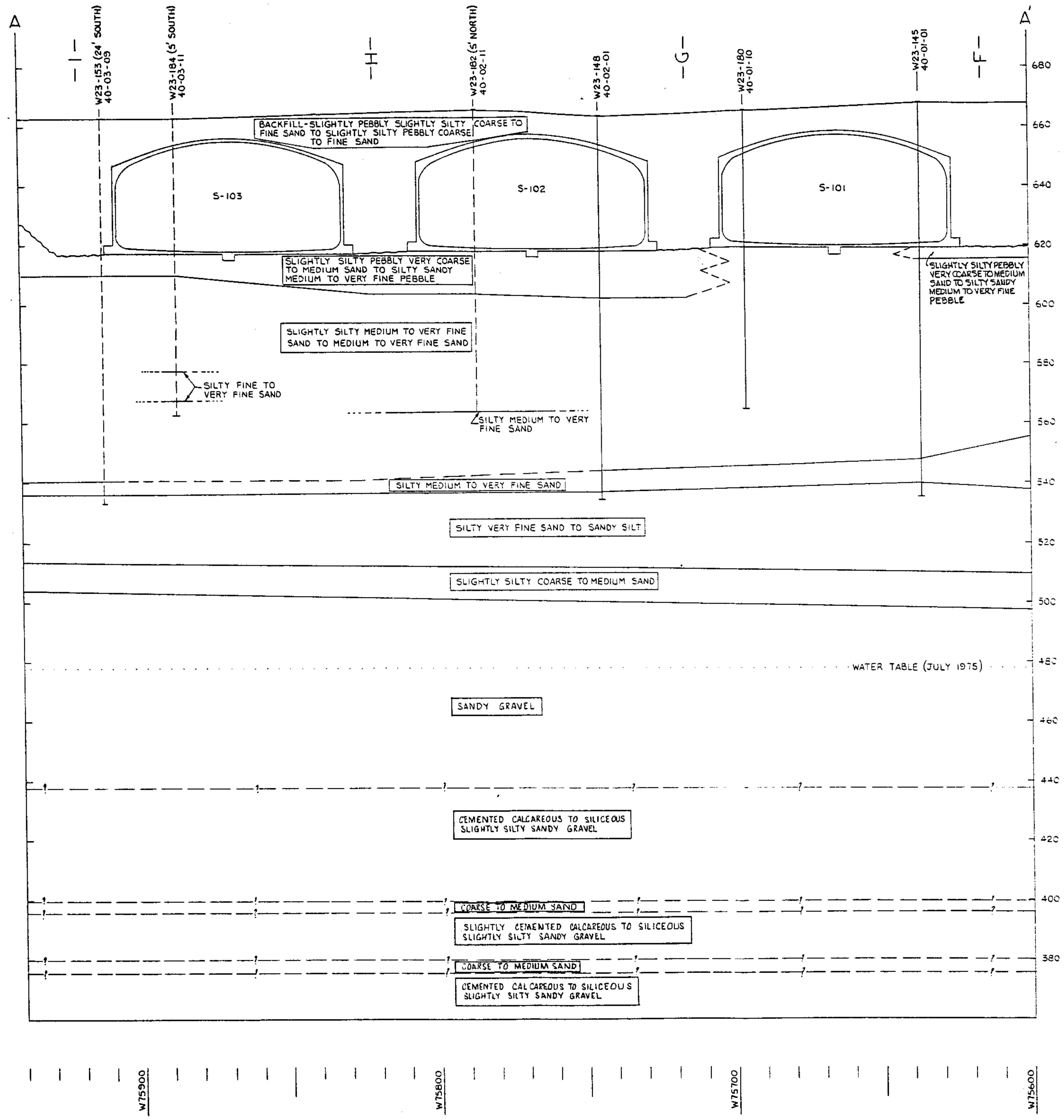
241-S TANK FARM
GEOLOGIC MAP
LEGEND AND PLOT PLAN

DRAWN: ERICKSON
SCALE: NONE
CLASSIFICATION: NOT REQUIRED
PROJECT: CK-0065 GEOLOGIC CHARACTERIZATION
BLDG. NO.: 241-S
INDEX NO.: 0000
NONE
H-2-38984

REVISIONS
REFERENCE DRAWINGS
NEXT USED ON
DRAWING STATUS



CROSS SECTION A-A'

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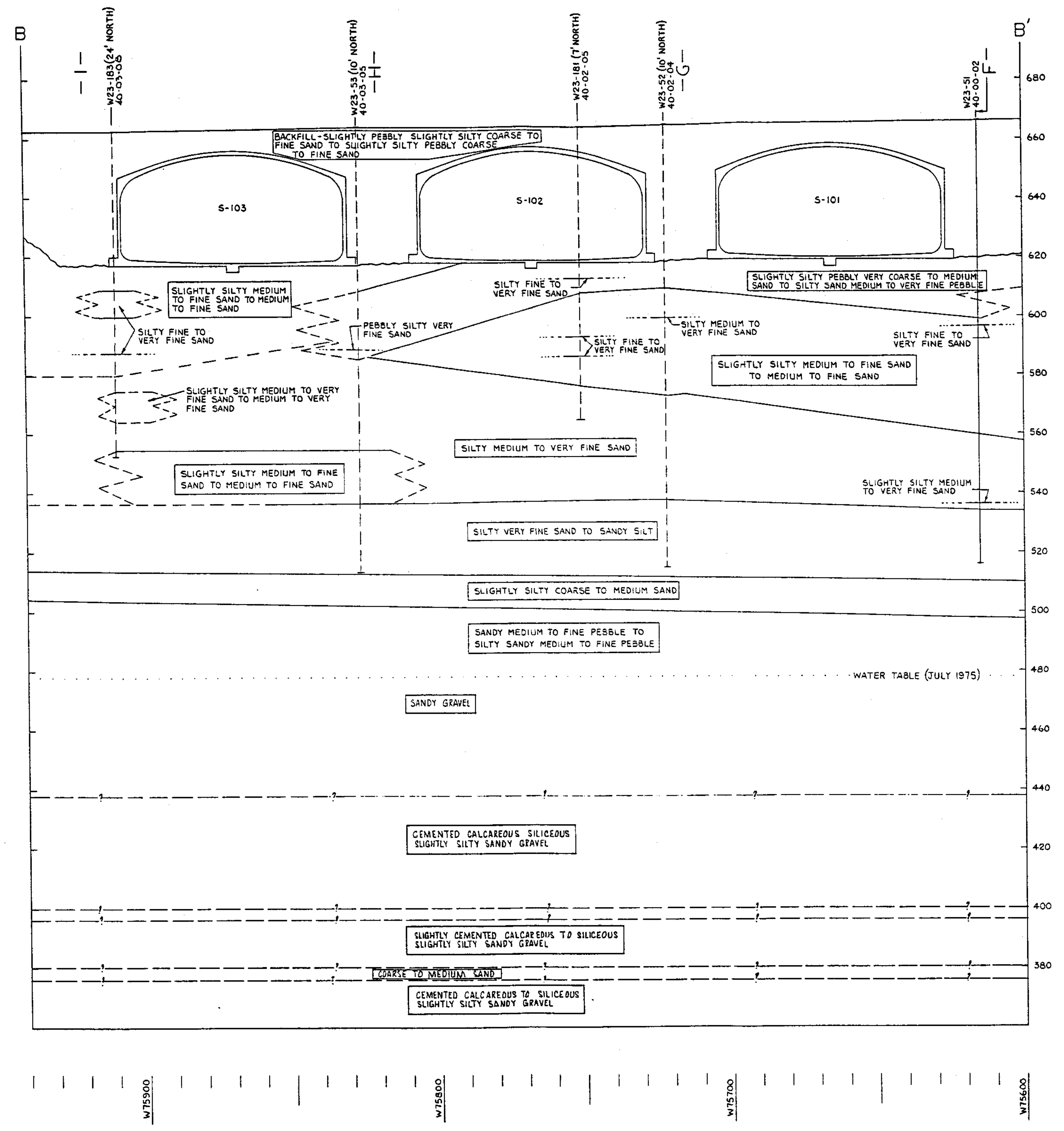
RICHLAND OPERATIONS OFFICE

VITRO ENGINEERING, a division of AUTOMATION INDUSTRIES, INC

241-S TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION A-A'

DRAWN	T. LIM
SCALE	1" = 16'-0"
PROJ. NO.	W.O. NO. C40565
PROJ. TITLE	GEOLOGIC CHARACTERIZATION
BLDG. NO.	241-S
INDEX NO.	0402, 0501
CLASSIFIED BY	NOT REQUIRED
CLASSIFICATION	NONE
DWG NO.	H-2-38948

REFERENCE DRAWINGS
REVISIONS
DRAWING STATUS
NEXT USED ON



CROSS SECTION B-B'

ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION

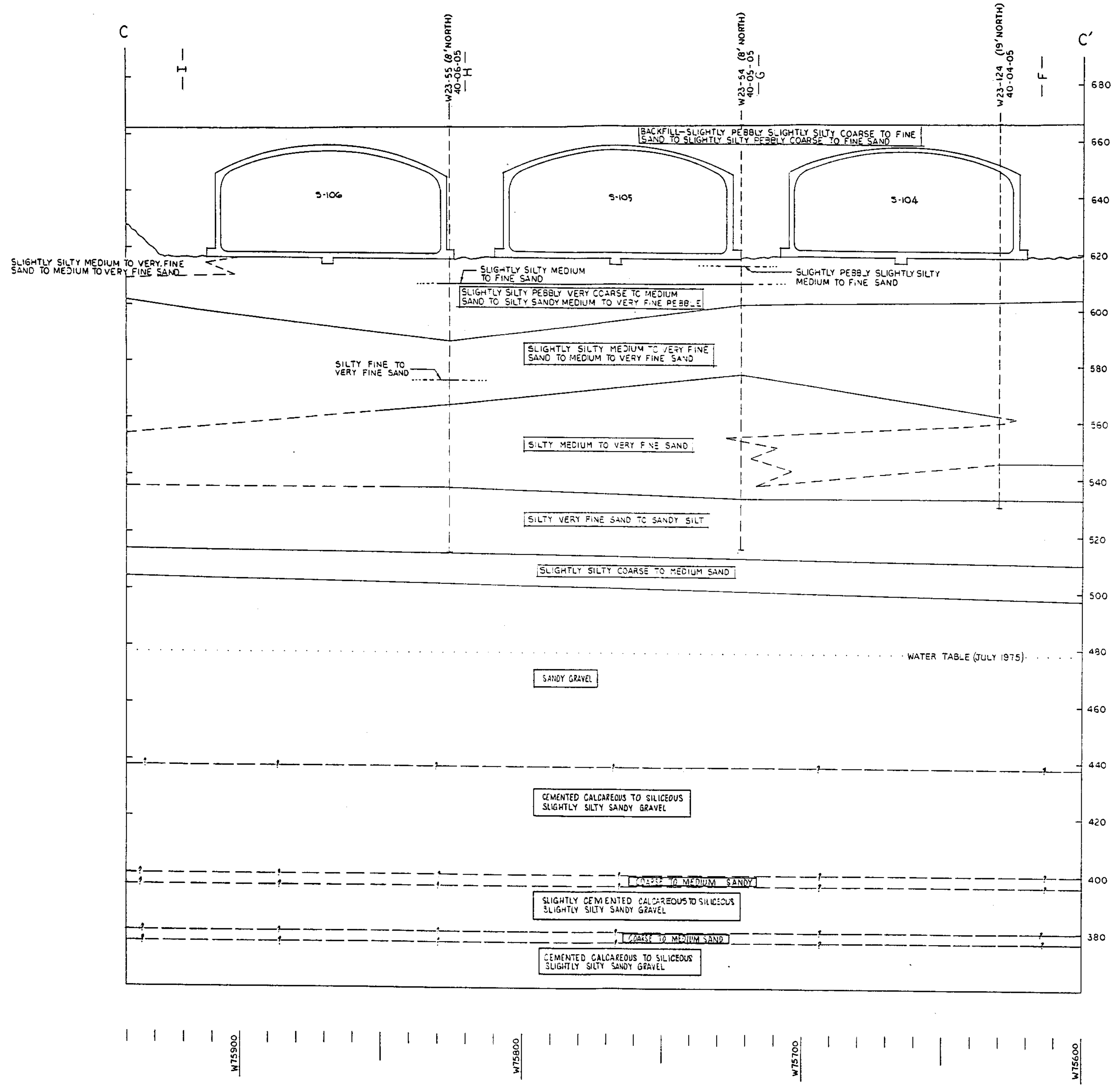
VITRO ENGINEERING, A DIVISION OF AUTOMATION INDUSTRIES, INC.

241-S TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION B-B'

DRAWN: T. LIM
SCALE: 1" = 16'-0"
W.O. NO. CK0065
PROJ. TITLE: GEOLOGIC CHARACTERIZATION
241-S
0402.0501
CLASSIFIED BY: NOT REQUIRED

NONE | H-2-38949 | 1

REFERENCE DRAWINGS | REVISIONS | DRAWING STATUS | NEXT USED ON



CROSS SECTION C-C′

ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE

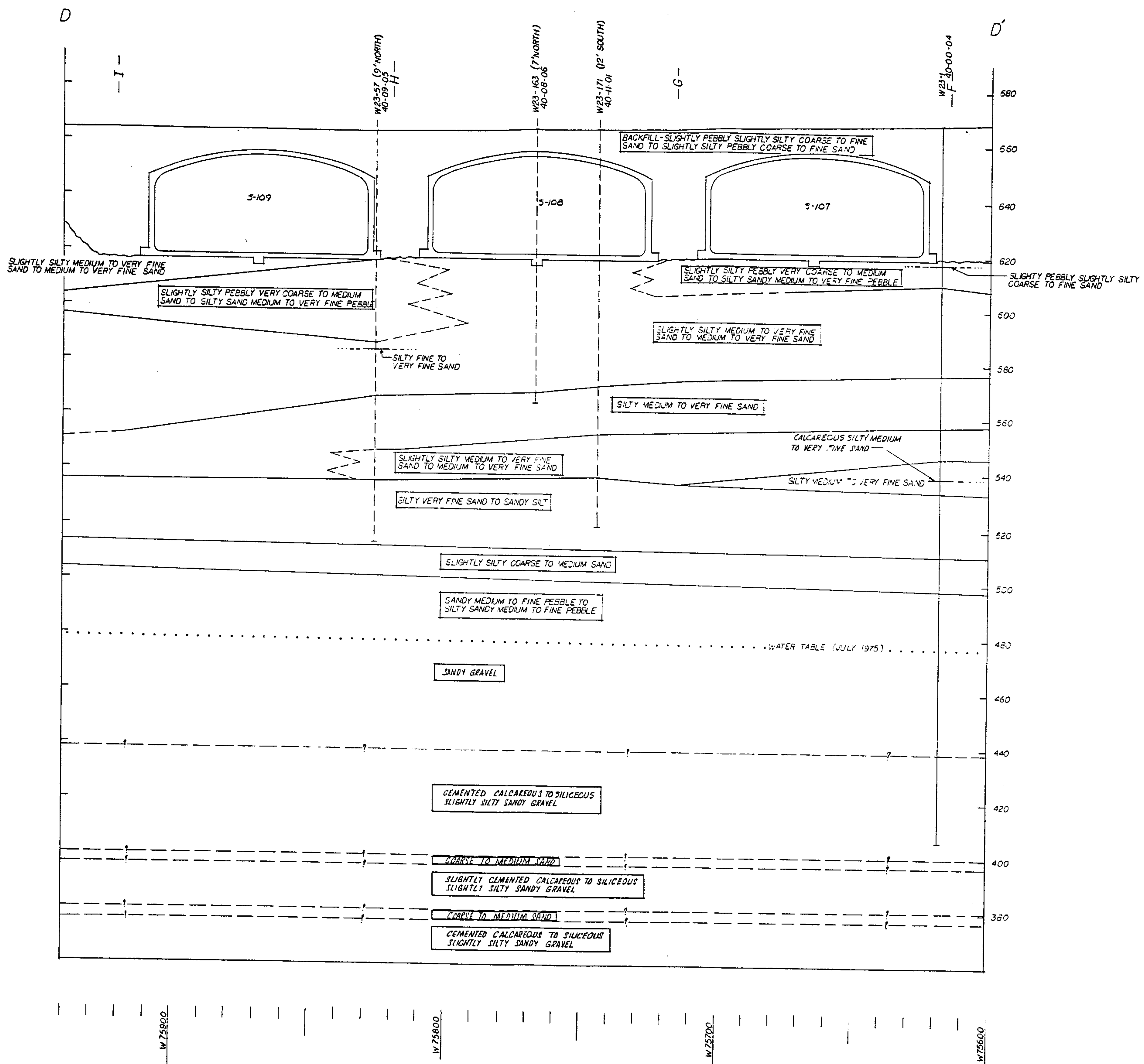
VITRO ENGINEERING • architects • engineers
a division of AUTOMATION INDUSTRIES, INC.

241-S TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION C-C′

SCALE 1″ = 16′-0″
PROJ. NO. 0402, 0501
PROJ. TITLE GEOLOGIC CHARACTERIZATION
BLDG. NO. 241-S
CLASSIFICATION NONE

H-2-38950

REFERENCE DRAWINGS
NEXT USED ON
REVISIONS
DRAWING STATUS



CROSS SECTION D-D'

ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE

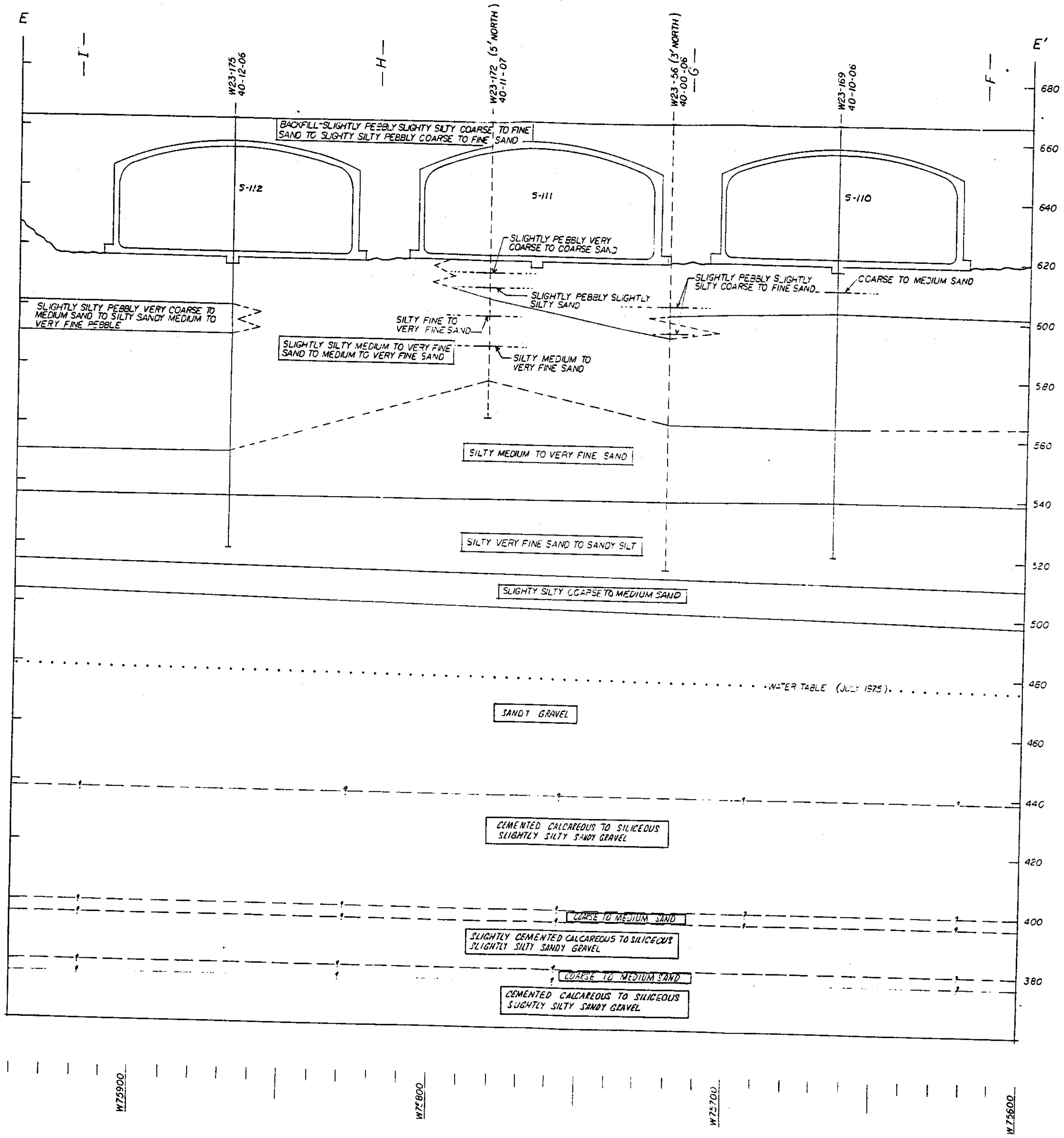
VITRO ENGINEERING • architects • engineers
a division of AUTOMATION INDUSTRIES, INC.

241-S TANK FARM
GEOLOGIC CHARACTERIZATION

CROSS SECTION D-D'

APPD. FOR CONFORMANCE WITH DESIGN CRITERIA BY	Date
ENGR D. LIEN	
SCALE	1" = 16'-0"
CLASSIFIED BY	NOT REQD
CLASSIFICATION	NONE
WO NO	CK0065
PROJ TITLE	GEOLOGIC CHARACTERIZATION
BLDG. NO.	241-S
INDEX NO.	0402, 0501
DWG NO.	H-2-38951
LAST REV.	0

REFERENCE DRAWINGS
NEXT USED ON
REVISIONS
DRAWING STATUS



CROSS SECTION E-E'

ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE

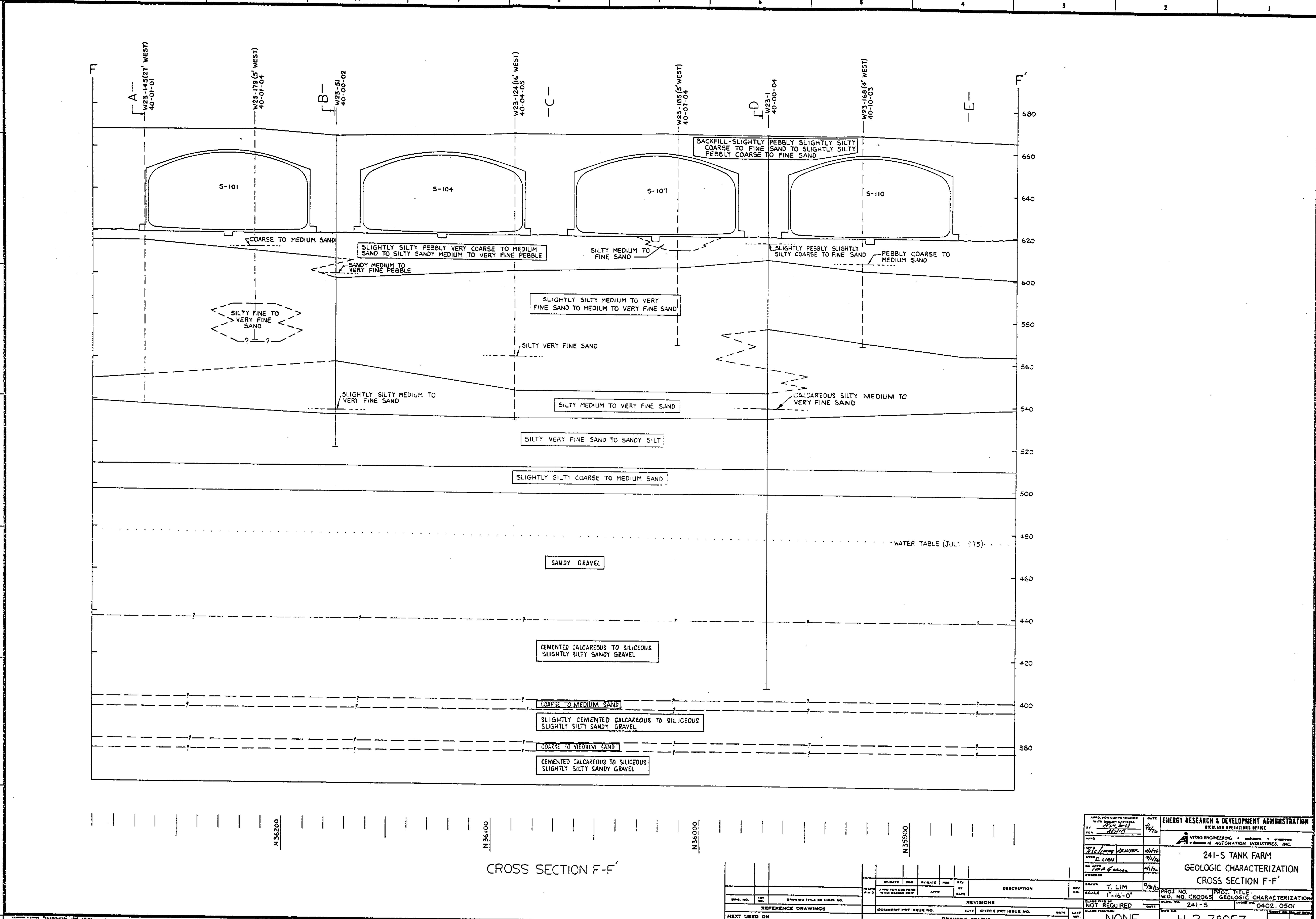
VITRO ENGINEERING, a division of AUTOMATION INDUSTRIES, INC.

241-S TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION E-E'

SCALE 1" = 16'-0"
CLASSIFIED BY: NOT REQD
PROJECT TITLE: GEOLOGIC CHARACTERIZATION
241 S
0402.0501
NONE

H-2-38952

REFERENCE DRAWINGS
NEXT USED ON
REVISIONS
DRAWING STATUS



CROSS SECTION F-F'

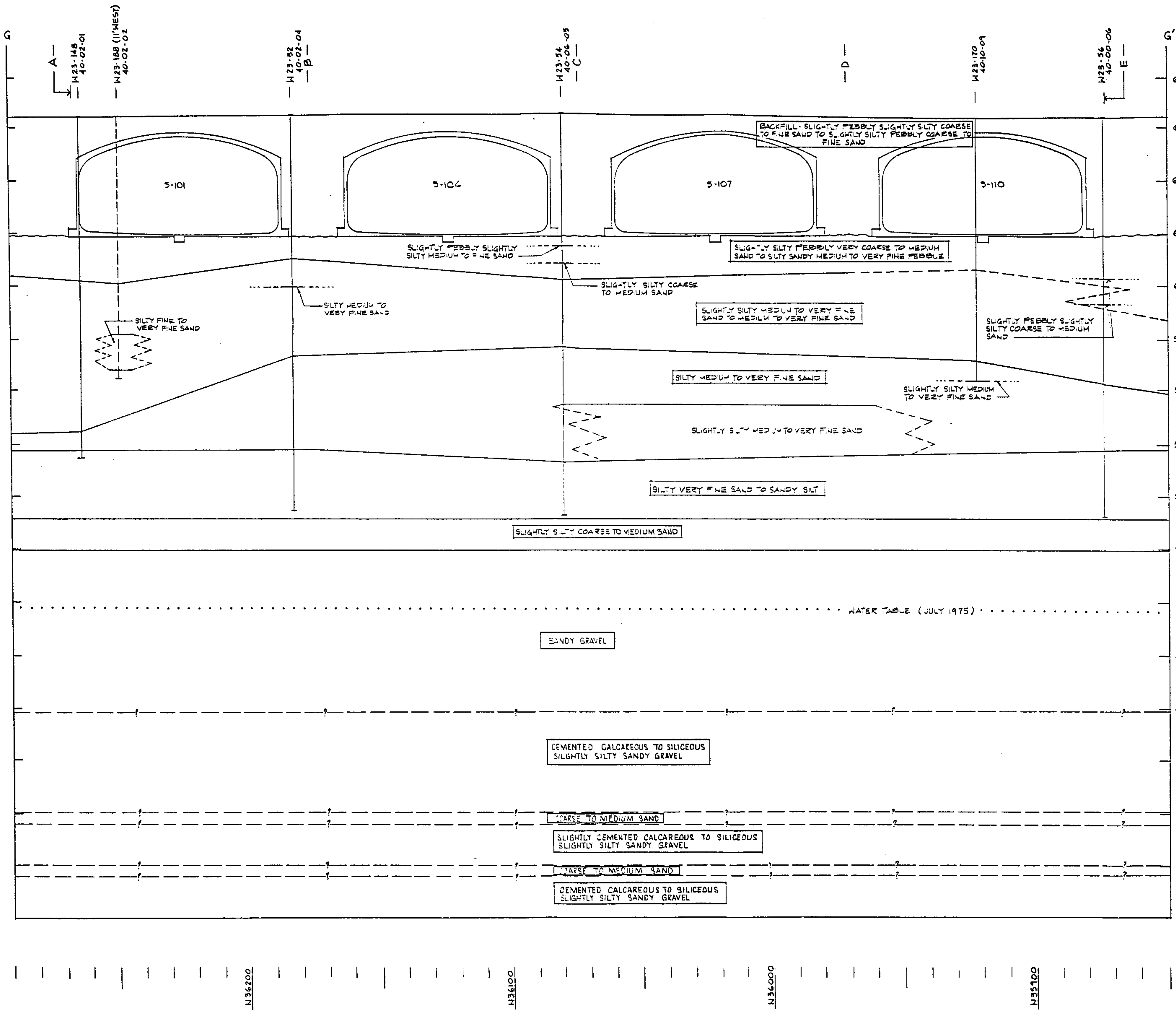
REFERENCE DRAWINGS	REVISIONS	DRAWING STATUS
NEXT USED ON	DESCRIPTION	COMMENT PRT ISSUE NO. / CHECK PRT ISSUE NO.

ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE

VITRO ENGINEERING – a division of AUTOMATION INDUSTRIES, INC.

241-S TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION F-F'

DRAWN: T. LIM
CHECKED: D. LIEN
SCALE: 1"=16'-0"
PROJ. NO. W.O. NO. CK0065
PROJ. TITLE: GEOLOGIC CHARACTERIZATION
BLDG. NO. 241-S
0402, 0501
CLASSIFIED BY: NOT REQUIRED
CLASSIFICATION: NONE
H-2-38953
0



CROSS SECTION G-G'

APPD. FOR CONFORMANCE WITH DESIGN CRITERIA BY	FOR
ENGR	D. LIEN
DRAWN	S Zdravkovich
SCALE	1" = 16'-0"
CLASSIFIED BY	NOT REQD
CLASSIFICATION	NONE
LAST REV.	0

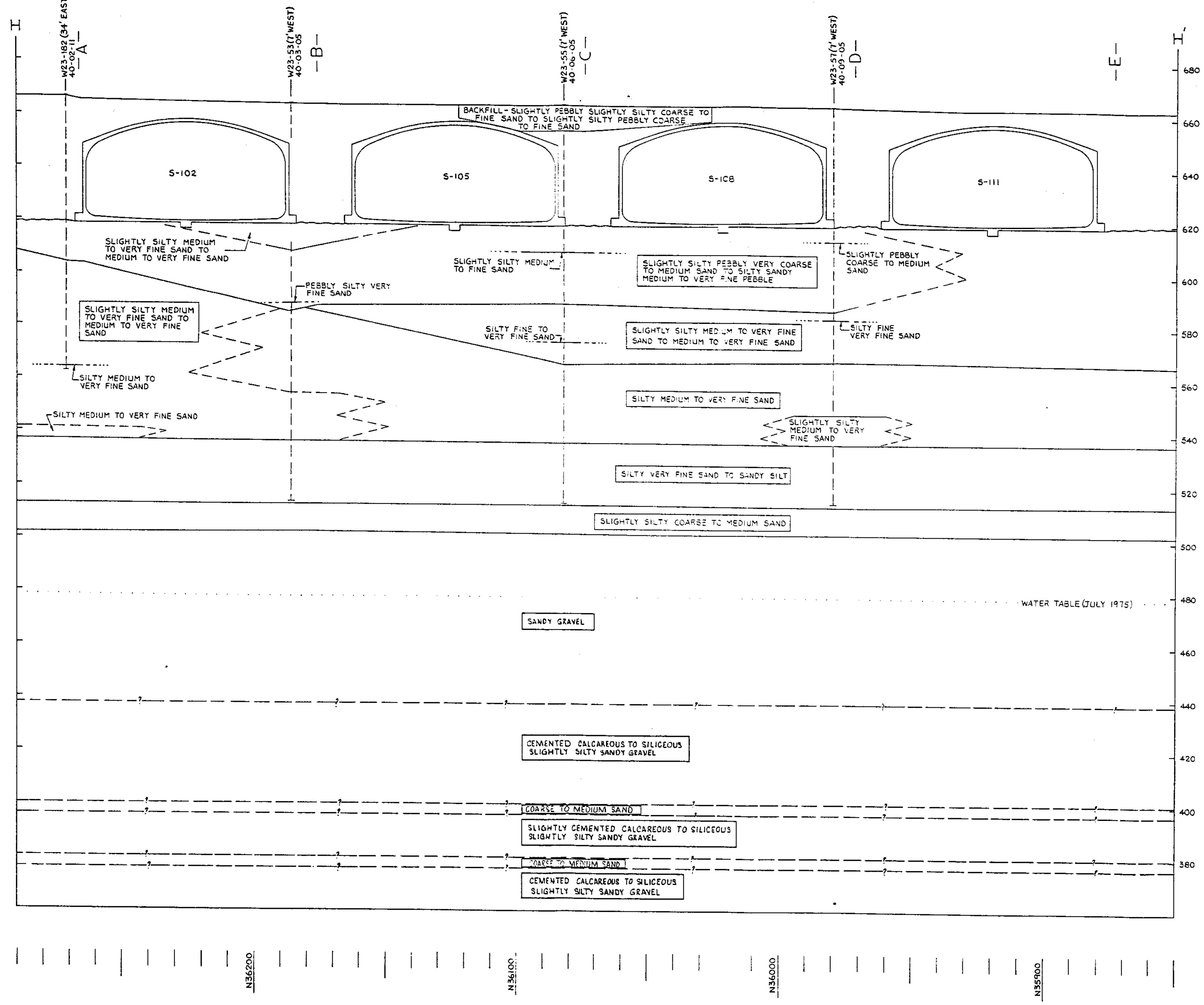
ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE

VITRO ENGINEERING • architects • engineers
a division of AUTOMATION INDUSTRIES, INC.

241-S TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION G-G'

PROJ NO: AG NO CX0065
PROJ TITLE: GEOLOGIC CHARACTERIZATION
BLDG. NO. 24.-S
INDEX NO. 0402-0501
DWG NO. H-2-38954
SHEET NO. — NO. OF SHTS —

REFERENCE DRAWINGS — NEXT USED ON — REVISIONS — DRAWING STATUS



CROSS SECTION H-H'

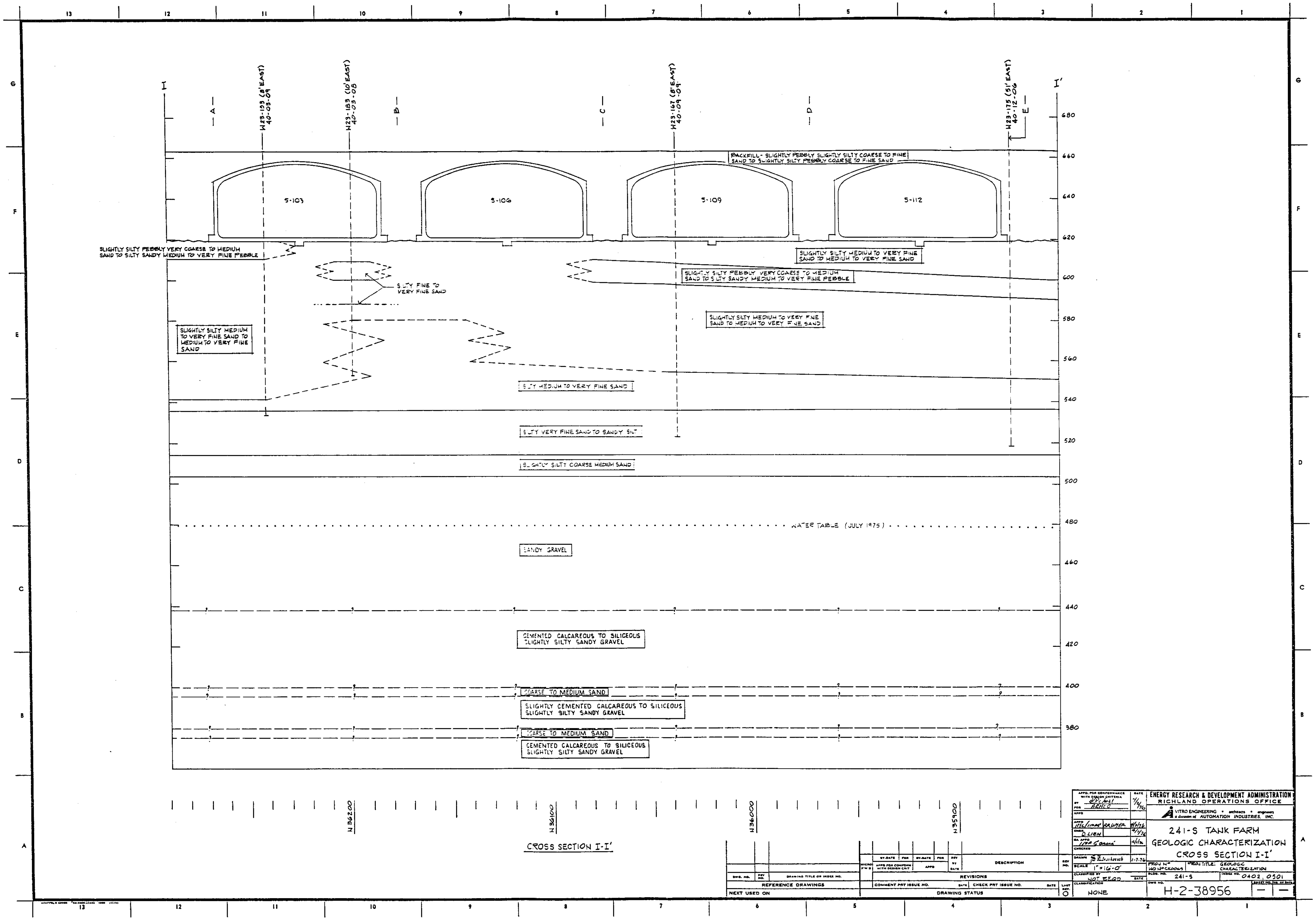
ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE

VITRO ENGINEERING • architects • engineers
a division of AUTOMATION INDUSTRIES, INC

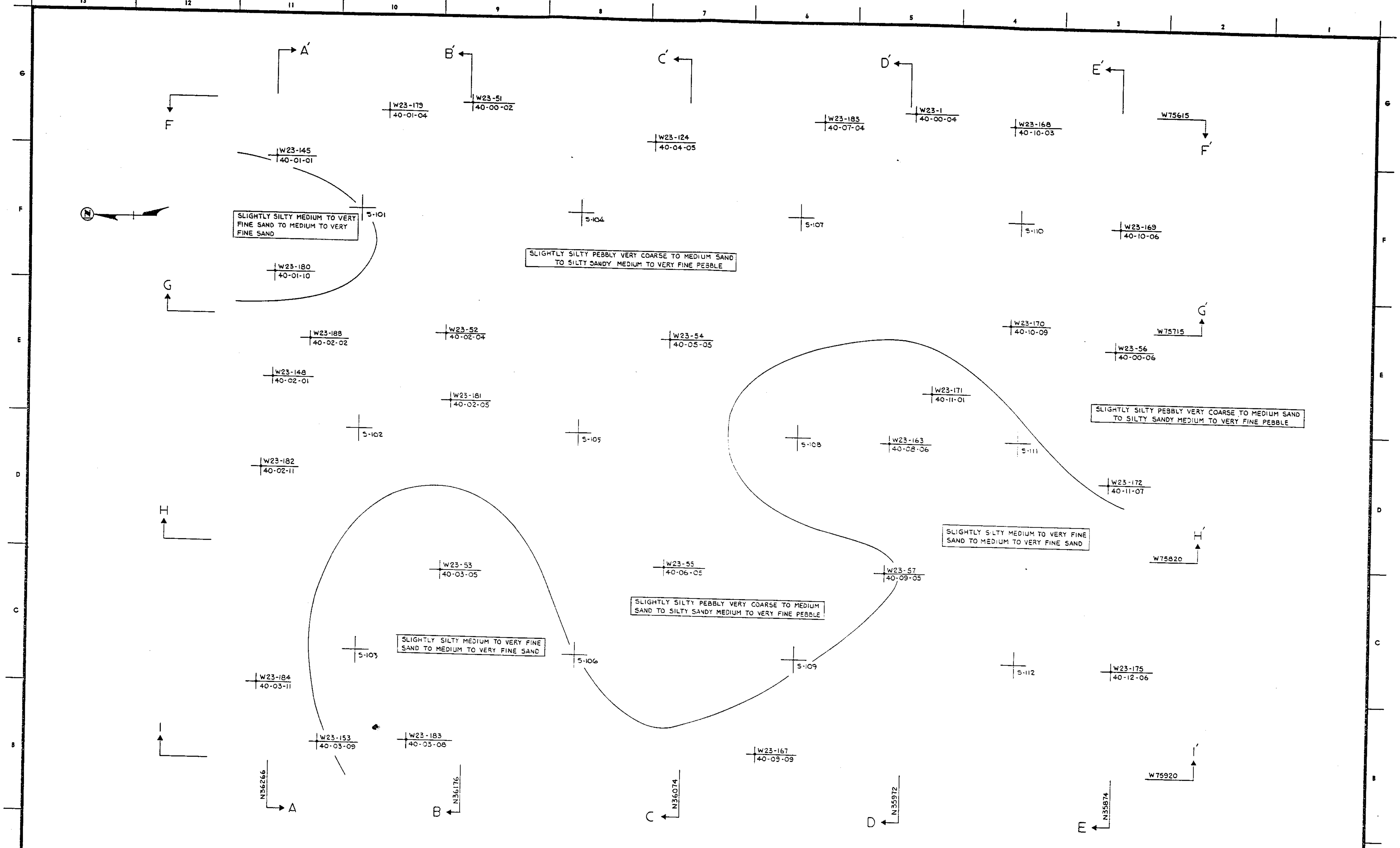
241-S TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION H-H'

DRAWN T LIM
SCALE 1"=16'-0"
NOT REQUIRED
NONE
PROJ NO W.O. NO CK0065
PROJ TITLE GEOLOGIC CHARACTERIZATION
241-S
0402.0501
H-2-38955

REFERENCE DRAWINGS
NEXT USED ON
REVISIONS
DRAWING STATUS



I
I'
A
B
C
D
E
W23-193 (8' EAST) 40-03-09
W23-183 (10' EAST) 40-03-08
W23-167 (8' EAST) 40-09-09
W23-175 (51' EAST) 40-12-06
S-103
S-106
S-109
S-112
BACKFILL - SLIGHTLY PEBBLY SLIGHTLY SILTY COARSE TO FINE SAND TO SLIGHTLY SILTY PEBBLY COARSE TO FINE SAND
SLIGHTLY SILTY PEBBLY VERY COARSE TO MEDIUM SAND TO SILTY SANDY MEDIUM TO VERY FINE PEBBLE
SLIGHTLY SILTY MEDIUM TO VERY FINE SAND TO MEDIUM TO VERY FINE SAND
SILTY FINE TO VERY FINE SAND
SLIGHTLY SILTY PEBBLY VERY COARSE TO MEDIUM SAND TO SILTY SANDY MEDIUM TO VERY FINE PEBBLE
SLIGHTLY SILTY MEDIUM TO VERY FINE SAND TO MEDIUM TO VERY FINE SAND
SLIGHTLY SILTY MEDIUM TO VERY FINE SAND TO MEDIUM TO VERY FINE SAND
SILTY MEDIUM TO VERY FINE SAND
SILTY VERY FINE SAND TO SANDY SILT
SLIGHTLY SILTY COARSE MEDIUM SAND
WATER TABLE (JULY 1975)
SANDY GRAVEL
CEMENTED CALCAREOUS TO SILICEOUS SLIGHTLY SILTY SANDY GRAVEL
COARSE TO MEDIUM SAND
SLIGHTLY CEMENTED CALCAREOUS TO SILICEOUS SLIGHTLY SILTY SANDY GRAVEL
COARSE TO MEDIUM SAND
CEMENTED CALCAREOUS TO SILICEOUS SLIGHTLY SILTY SANDY GRAVEL
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
380
N36200
N36100
N36000
N35900
CROSS SECTION I-I'
REFERENCE DRAWINGS
REVISIONS
DRAWING STATUS
NEXT USED ON
ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE
VITRO ENGINEERING • architects • engineers
a division of AUTOMATION INDUSTRIES, INC.
241-S TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION I-I'
APPD. FOR CONFORMANCE WITH DESIGN CRITERIA
FOR ARHCO
DRAWN 1-7-76
SCALE 1" = 16'-0"
CLASSIFIED BY NOT REQD
CLASSIFICATION NONE
PROJ Nº WO NºCK0065
PROJ TITLE: GEOLOGIC CHARACTERIZATION
BLDG. NO. 241-S
INDEX NO. 0402.0501
DWG NO. H-2-38956
LAST REV. 0



DWG. NO.	REV NO.	DRAWING TITLE OR INDEX NO.	
REFERENCE DRAWINGS			
NEXT USED ON			

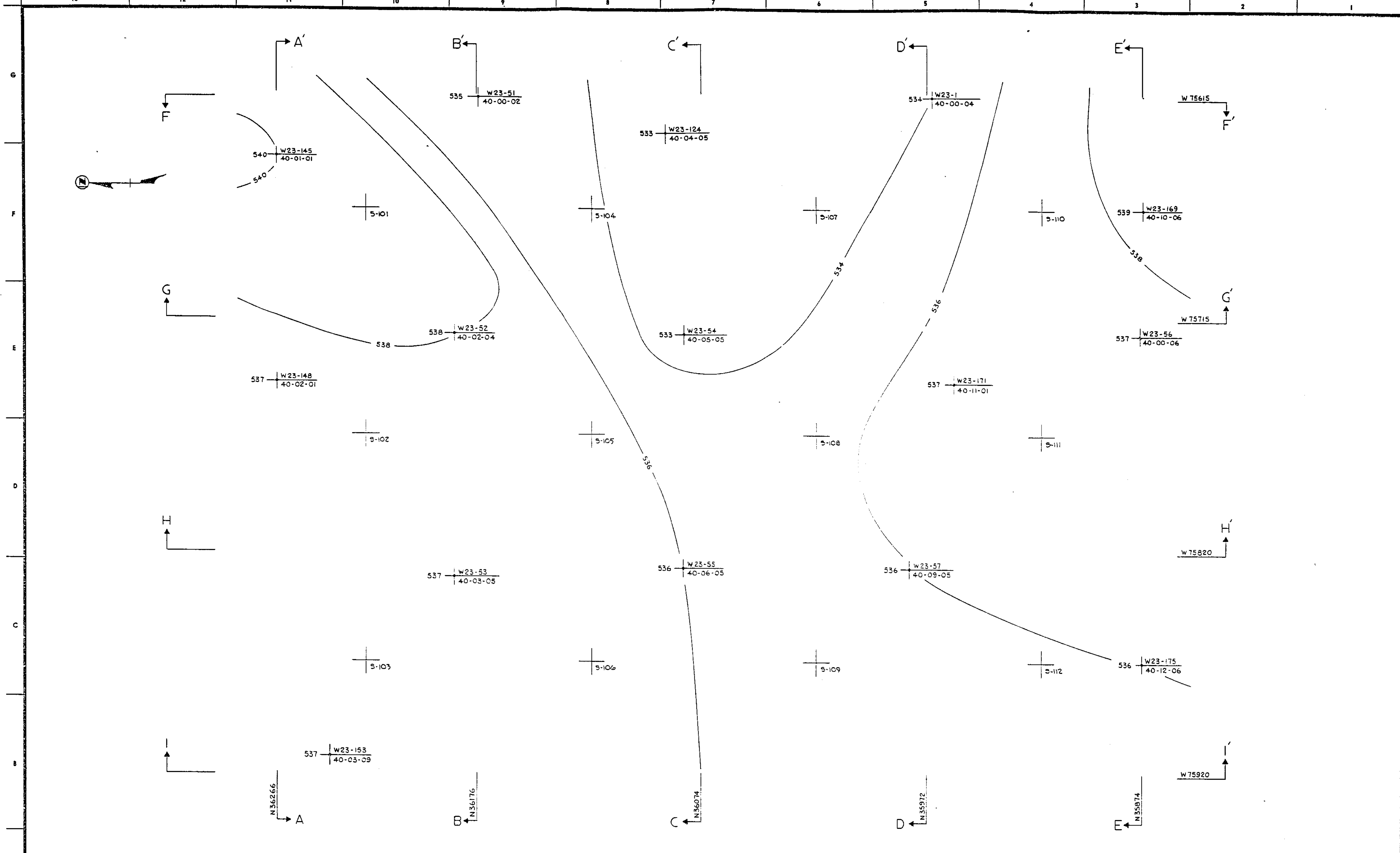
	REV	DESCRIPTION	BY-DATE	APPD	DATE
REVISIONS					
COMMENT PRT ISSUE NO.	DATE	CHECK PRT ISSUE NO.	DATE		
DRAWING STATUS					

ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE

VITRO ENGINEERING • architects • engineers
a division of AUTOMATION INDUSTRIES, INC.

241-S TANK FARM
GEOLOGIC CHARACTERIZATION
BASE OF BACKFILL

DRAWN T. LIM
SCALE 1"=16'-0"
NOT REQUIRED
PROJ NO. W.O. NO. CK0065
PROJ. TITLE: GEOLOGIC CHARACTERIZATION
241-S
0111
NONE
H-2-38945



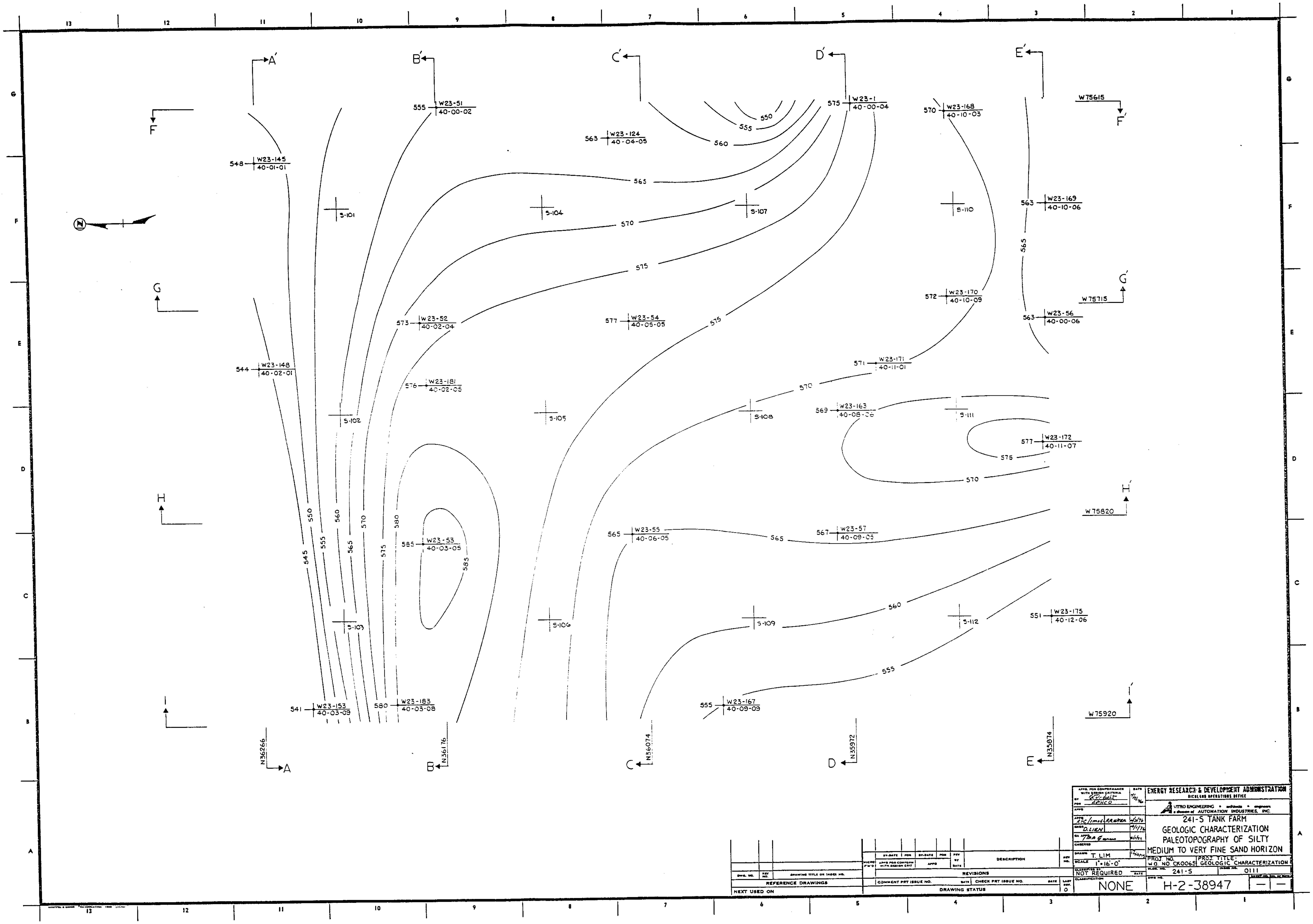
ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE

VITRO ENGINEERING, a division of AUTOMATION INDUSTRIES, INC.

241-S TANK FARM
GEOLOGIC CHARACTERIZATION
PALEOTOPOGRAPHY OF SILT HORIZON

DRAWN: T. LIM
SCALE: 1" = 16'-0"
PROJ NO. / W.O. NO. CK0065
PROJ TITLE: GEOLOGIC CHARACTERIZATION
BLDG. NO. 241-S
INDEX NO. 0111
CLASSIFIED BY: NOT REQUIRED
CLASSIFICATION: NONE
DWG. NO. H-2-38946
REV. 1

REFERENCE DRAWINGS
NEXT USED ON
REVISIONS
DRAWING STATUS


ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE
VITRO ENGINEERING
a division of AUTOMATION INDUSTRIES, INC.
241-S TANK FARM
GEOLOGIC CHARACTERIZATION
PALEOTOPOGRAPHY OF SILTY
MEDIUM TO VERY FINE SAND HORIZON
PROJ. NO. W.O. NO. CK0065
PROJ. TITLE: GEOLOGIC CHARACTERIZATION
SCALE 1"=16'-0"
T. LIM
NOT REQUIRED
241-S
0111
NONE
H-2-38947
REVISIONS
DRAWING STATUS
REFERENCE DRAWINGS
NEXT USED ON
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W23-148 40-02-01
W23-153 40-03-09
W23-183 40-03-08
W23-51 40-00-02
W23-52 40-02-04
W23-181 40-02-05
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W23-124 40-04-05
W23-54 40-05-05
W23-55 40-06-05
W23-167 40-09-09
W23-1 40-00-04
W23-171 40-11-01
W23-163 40-08-06
W23-57 40-09-05
W23-168 40-10-03
W23-170 40-10-09
W23-172 40-11-07
W23-175 40-12-06
W23-169 40-10-06
W23-56 40-00-06
S-101
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S-112
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N36176
N36074
N35972
N35874
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W75715
W75820
W75920