WATERSHED IDENTIFICATION CODE

NAE ROAD DITCH CALCULATIONS

****

**********INPUT VALUES**********

STORM DURATION	=	24.00	HOURS
PRECIPITATION DEPTH	=	2.45	INCHES

1

* *
JUNCTION 1, BRANCH 1. STRUCTURE 1
* *

*** HYDRAULIC INPUT VALUES FOR SUBWATERSHEDS ***

WATER SHED	AREA ACRES	CURVE NUMBER	TC HR	TT HR	ROUTING COEFFICIENTS K-HRS	X	UNIT HYDR
1	4.27	64.00	.045	.000	.000	.00	.0

* * * COMPUTED VALUES FOR INDIVIDUAL WATERSHEDS * * *

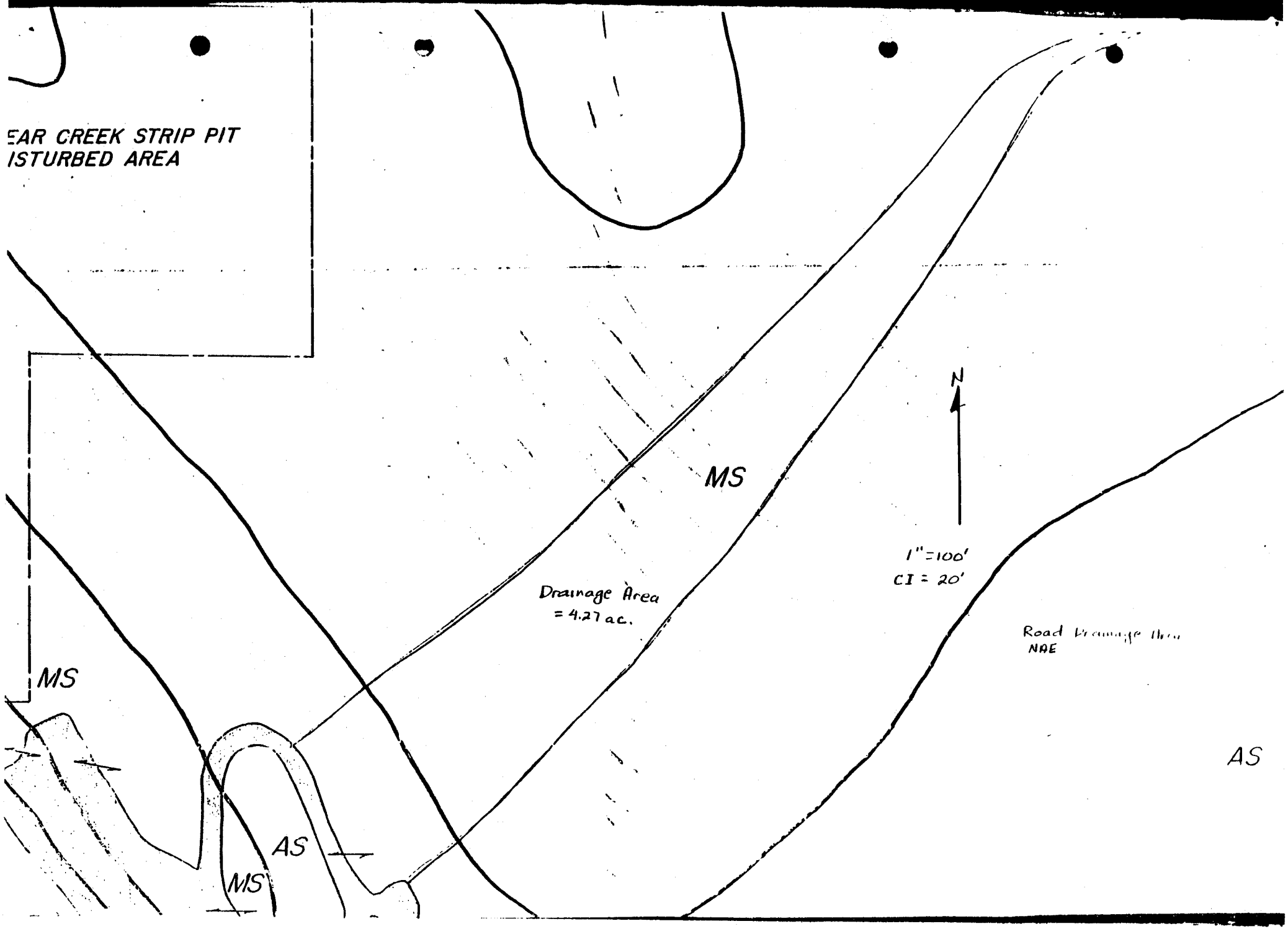
WATERSHED	PEAK FLOW (CFS)	RUNOFF (INCHES)
1	1.04	.25

NOTE: SEDIMENT DOES NOT INCLUDE POSSIBLE DEPOSITION BY DELIVERY RA

***** SUMMARY TABLE FOR TOTAL WATERSHED *****

RUNOFF VOLUME	=	.0899	ACRE-FT
PEAK DISCHARGE	=	1.0418	CFS
AREA	=	4.2700	ACRES
TIME OF PEAK DISCHARGE	=	12.00	HRS

* * * * * * * * * * * * *
NULL STRUCTURE
* * * * * * * * * * * * *


EAR CREEK STRIP PIT
ISTURBED AREA
MS
N
1" = 100'
CI = 20'
Drainage Area
= 4.27 ac.
Road Drainage Area
NAE
MS
AS
AS
MS

RESPONSE:

Peak flow calculations indicate that Ditch B will be required to pass 5.2 cfs during the 10-year, 24-hour precipitation event. Based on this 5.2 cfs, Ditch B has been designed per Figure 5, Ditch B Design Calculations. The drainage area for Ditch B is shown on the following page.

Design calculations on this ditch have resulted in a ditch design as shown on Figure 6, Ditch B. Design. The design of Ditch B requires that riprap with a d_{50} of 8" be installed in the last 170 feet of this ditch.

DITCH B

Figure 5

DITCH B DESIGN CALCULATIONS

Slope - Upper 20/170 = 0.118

Lower 10/530 = 0.019

Ditch sizing - minimum slope section, 2' bottom width, 2H:1V side slopes

$D = (Qn/KS^{\frac{1}{2}})^{0.375}$

Q = 5.2 cfs

n = 0.022

K = 8.50

S = 0.019

D = 0.42 ft

Velocity check, maximum slope section

D = 0.24'

$V = (1.49/n)R^{0.667}\ S^{0.5}$

where

n = 0.022

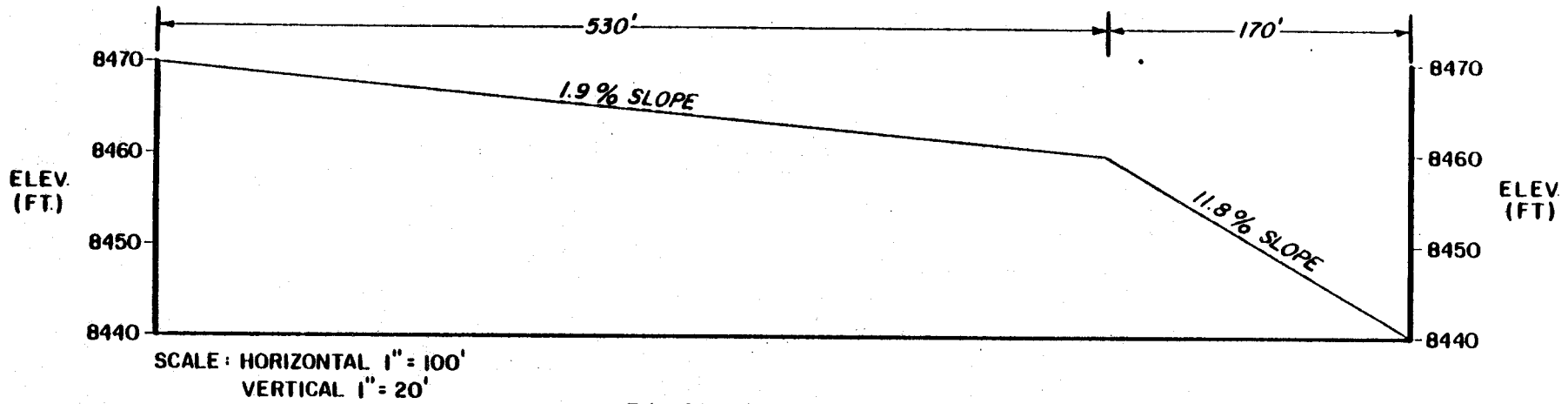
R = 0.201

S = 0.118

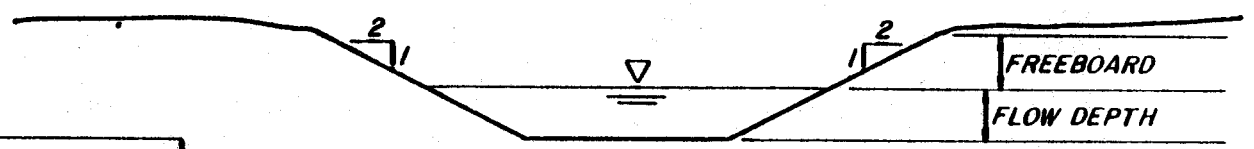
V = 8.0 ft/sec

P/r = 17

Riprap d_{50} = 8"



DITCH B - PROFILE



Slope	Flow Depth	Freeboard
1.9%	0.42 ft.	0.58 ft.
11.8%	0.24 ft.	0.76 ft.

DITCH B - CROSS SECTION

NO SCALE

DITCH B DESIGN

FIGURE 6

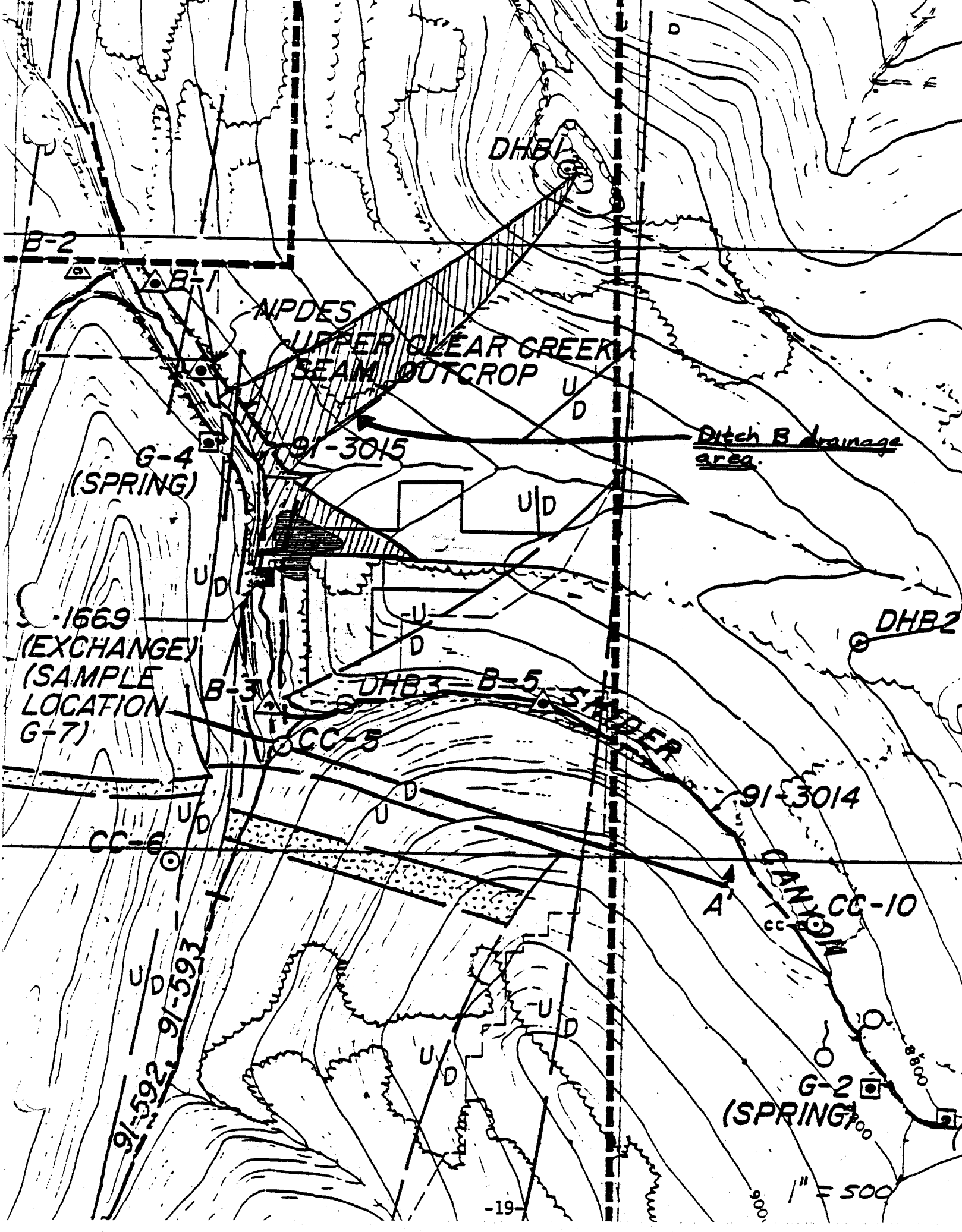

DHB1
B-2
B-1
NPDES
UPPER CLEAR CREEK
SEAM OUTCROP
Ditch B drainage area.
91-3015
G-4
(SPRING)
-1669
(EXCHANGE)
(SAMPLE
LOCATION
G-7)
B-3
DHB3
B-5
CC-5
DHB2
91-3014
CC-6
A'
CANYON
CC-10
91-593
91-592
G-2
(SPRING)
8800
8700
900
1" = 500

EXHIBIT 24

RECLAMATION BOND ESTIMATE

NORTH AMERICAN EQUITIES

RECLAMATION BOND ESTIMATE

I. CONTRACTOR MOBILIZATION

Estimate - $2,000.00

Sub-Total $ 2,000.00

II. REMOVAL OF STRUCTURES/FACILITIES

The following structures/facilities as identified in the Blazon No. 1 Mine Final Closure and Reclamation Plan have/will be sold by NAE and removed from the Blazon No. 1 Mine at no cost to NAE.

- Coal loading bin
- Mine fan (sold)
- Electrical substation
- Storage shed (sold)
- Diesel fuel tank
- Run-of-mine conveyors
- Conveyor structure

Sub-Total $ 0

III. REMOVAL OF FOOTINGS AND FOUNDATIONS

The footings and foundations from the following structures will be broken up and disposed of in the portal backfill:

- Coal loading bin
- Underground waste chute
- Conveyor transfer point
- Conveyor structure
- Mine fan
- Diesel fuel tank

Parameters

- 100 cu yd of material to be broken and removed (loose)
- Use 980 Cat loader
- Tram 1,200 feet to portal backfill
- 55 min per hour

Productivity - Haul

- Cycle
  - Load - 0.50 minutes
  - Haul - 2.74
  - Dump - 1.00
  - Return - 2.20
  - Total - 6.44 minutes

(55 min/hr)/(6.44 min/cy) x (5.25 cu-yd/cy) = 44.8 yd^3/hr

Cost - Haul

- From cost reference guide

  (100 cu-yd) / (44.8 cu-yd/hr) = 2.23 hr

  (2.23 hr) x ($85.91/hr) = $191.58

Productivity - Breaking Foundations

- Assume 85 cy-yd/hr

Cost

(80 cu-yd) / (85 cu-yd/hr) x ($85.91/hr) = $80.86

Sub-Total $ 272.44

IV. REMOVAL OF CULVERTS

Culverts to be removed:

- Culvert D 24" (portion)
- Culvert E 8"
- Culvert F 8"

Parameters

- 980C loader
- Haul - 150 feet to portal backfill

Cost

- Estimate 1 hour loader time

  (1 hr) x ($85.91/hr) = $85.91

Sub-Total $ 85.91

V. REMOVAL OF SIGNS AND MARKERS

- Assume 8 hours labor @ $12.00/hr

Sub-Total $ 96.00

VI. REMOVAL OF MINE DEVELOPMENT WASTE

Volume to be removed:

- 1,000 cu-yd hauled and placed at portal backfill
- 3,190 cu-yd hauled and placed at abandoned strip mine

A. Haul to portal backfill and covering of coal seams

Parameters:

- 1,000 cu-yd
- Pushed to loader by D-7 Cat
- Loaded on trucks by 980C loader
- Hauled by 12 cu-yd trucks

Productivity - Truck

Truck cycle time

Load 3 cycles @ 0.52 min/cycle	- 1.56 minutes
Haul (loader) 1,200 ft @ 8 mph	- 1.70
Dump	- 0.50
Return assume 8 mph	- 1.70
Total	5.46 minutes

(55 min/hr) / (5.46 min/cycle) = 10.07 cy/hr

(10.07 cy/hr) x (12 cu-yd/cy) = 120.8 cu-yd/hr

(1,000 cu-yd) / (120.8 cu-yd/hr) = 8.3 hr

Productivity - Loader/dozer

- Assume to work same hours as truck

Cost from Cost Reference Guide

Truck - ($48.76/hr) (8.3 hr) =	$ 404.71
Loader - ($85.91/hr) (8.3 hr) =	713.05
D7 - ($68.73/hr) (8.3 hr) =	570.46
Total	$1,688.22

B. Haul to abandoned strip mine

Parameters:

- 3,190 cu-yd
- Pushed to loader by D-7 Cat
- Loaded on trucks by 980C loader
- Use two (2) 12 cu-yd trucks

Productivity

Truck cycle time

Load 3 cycles @ 0.52 min/cycle	- 1.56 minutes
Haul (loader) 1,580 ft @ 15 mph	- 1.10
Dump	- 0.50
Return assume 20 mph	- 0.70
Total	3.86 minutes

(55 min/hr) / (3.86 min/cycle) = 14.25 cy/hr

Two (2) trucks x (14.25 cy/hr) = 28.4 cy/hr

(28.5 cy/hr) x (12 cu-yd/cy) = 342 cu-yd/hr

(3,190 cu-yd) / (342 cu-yd/hr) = 9.33 hr

Cost from Cost Reference Guide

Two (2) Trucks @ 9.33/hr = (18.66 hr) ($48.76/hr) =	$ 909.86
Loader ($9.33/hr) ($85.91/hr) =	801.54
D7 (9.33/hr) ($68.73/hr) =	641.25
Total	$2,352.65

Sub-Total $ 4,040.87

VII. TOPSOIL REPLACEMENT

Parameters 1410

- 14 10 cu-yd
- Average haul 750 feet
- Grade less than 4%
- Use 980C Cat loader
- Use two (2) 12 cu-yd trucks
- Spread with D-7 dozer

Productivity

Truck cycle time

Load 3 cycles @ 0.52 min/cycle	- 1.56 minutes
Haul (loader) 750 ft @ 8 mph	- 1.07
Dump	- 0.50
Return assume 8 mph	- 1.07
Total	4.20 minutes

(55 min/hr) / (4.20 min/cy)	= 13.1 cy/hr
Two (2) trucks	= 26.2 cy/hr
(26.2 cy/hr) x (12 cu-yd/cy)	= 314.4 cu-yd/hr
(1,410 cu-yd) / (314.4 cu-yd/hr)	= 4.48 hr

Cost from Cost Reference Guide

Two (2) Trucks (8.96 hrs) x ($48.76/hr)	= $ 436.89
Loader (4.48 hrs) x ($85.91/hr)	= 384.88
D7 (4.48 hrs) x ($68.73/hr)	= 307.91
Total	$1,129.68

Sub-Total $ 1,129.68

VIII. FINAL GRADING

A. Backfill Area and Area E

Parameters

- Assume 8 hrs work
- D-7 Cat dozer

Cost

(8 hrs) x ($68.73/hr) = $549.84

B. Fine Grading of Topsoil Areas

Parameters

- 1.5 acres to be graded
- 12G grader
- Assume grader worked during topsoil placement
- Use 8 hours

Cost from Cost Reference Guide
(8 hrs) x ($52.40/hr) = $419.20

Sub-Total $ 969.04

IX. SCARIFICATION

Parameters

- 1.5 acres
- Use plow mounted behind D-7
- Assume will need to be done twice

Productivity
(3.0 ac) / (0.5 ac/hr) = 6 hours

Cost
(6 hrs) x ($68.73/hr) = $412.38

Sub-Total $ 412.38

X. MULCH AND CRIMPING

Parameters

- 1.5 acres
- Cost-use 139.50/ac

Sub-Total $ 209.25

XI. EXCELSIOR BLANKET (Netting)

Parameters

- 0.75 acres
- Wood fiber, degradable blanket

Cost from Native Plants, Salt Lake City, Utah
Labor - $21/hr @ 25 hr/ac
Netting - $2,468/ac
(0.75 ac) [($21/hr)(25 hr/ac)] + (0.75 ac) ($2,468/ac)
= $2,244.75

Sub-Total $ 2,244.75

XII. SEEDING AND PLANTING

Parameters

- 1.5 acres
- Broadcast methods
- Cost from Native Plants, Salt Lake City, Utah (see Table 1)

Cost
Seed - (1.5 ac) x ($398.91/ac) = $598.37
Labor - (2 hrs) x ($18.00/hr) = 36.00

Sub-Total $ 634.37

XIII. VEGETATION MONITORING

- Two (2) site visits per year/Two (2) years
- Assume reseeding 25% of area
- Soil sampling

Cost
Four (4) visits @ $500/visit (includes record keeping) = $2,000

Reseeding

Use 25% of XII = $158.59

Soil sampling - cost from Bookcliffs Labs, Steamboat Springs, Colorado

Six (6) samples @ $26.50/sample = $159.00

1 hour labor (sample collection) @ $8.00/hr = $8.00

Sub-Total $ 2,325.59

XIV. MISCELLANEOUS

- Riprap placed at outflow of culverts
- 100 cy-yd (+ 6", - 24")

(100 cu-yd) x ($5.75 cu-yd) = $575.00

Sub-Total $ 575.00

Table 1

PROPOSED SEED MIXTURE - Part 1

Species	Lbs Pure Live Seed/Acre	Cost/Lb	Total Cost
Grasses:			
Agropyron riparium streambank wheatgrass	4.0	5.00	$ 20.00
Agropyron trachycaulum slender wheatgrass	4.0	1.25	5.00
Bromus marginatus mountain brome	5.0	4.00	20.00
Poa cambyi camby bluegrass	3.0	1.55	4.65
Poa pratensis Kentucky bluegrass	0.25	5.54	1.39
Sub-Total	16.25		$ 51.04
Forbs:			
Achillea millefolium western yarrow	0.15	30.00	$ 4.50
Hedysarum boreale sweet vetch	1.0	6.50	6.50
Linum lewesii blue flax	2.0	9.00	18.00
Medicago sativa var Ladak Ladak alfalfa	1.0	1.27	1.27
Osmorhiza occidentalis sweet anise	1.0	18.00	18.00
Melilotus officinalis yellow sweetclover	2.0	0.45	0.90
Sub-Total	7.15		$ 49.17

Table 1

PROPOSED SEED MIXTURE - Part 2

Species	Lbs Pure Live Seed/Acre	Cost/Lb	Total Cost
Woody Plants:			
Pseudotsuga menziesii Douglas fir	2.0	17.50	$ 35.00
Ribes spp. currant	2.0	42.00	84.00
Rosa woodsii woods rose	2.0	22.35	44.70
Symphoricarpos spp. snowberry	3.0	45.00	135.00
Sub-Total	9.0		$298.70
TOTAL	32.40		$398.91

EXHIBIT 25

TOPSOIL AND UNDERGROUND DEVELOPMENT WASTE CALCULATIONS

STEAMBOAT SPRINGS, CO

JOB NAE

EST. BY CHP

DATE 9/23/85

Underground Development Waste Disposal

Estimated Volume of Waste	4000 cu yd
Estimate space available on Portal Bench	6924 cu yd
Volume required for cover material @ 4' thickness	2859 cu yd
Volume remaining for waste material	4065 cu yd

Since the estimate of 4000 cubic yards for underground development waste is thought to be conservatively high, the waste material will probably all fit on the portal bench.

In the event that a portion of the waste material does not fit on the portal bench, an area on the lower bench has been designated to receive the waste. The area designated to receive waste is shown on Map 2 attached.

Cover material will be obtained by removing 3.5 feet of fill material from the face of the slope between the lower and upper bench areas. The area is 0.5 acres.

STEAMBOAT SPRINGS, CO

ITEM NO.

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EST. BY CHP

SHEET ___ OF ___ PAGE ___

DATE 9/23/85

Topsoil Requirements

Area C	0.25 ac @ .5 ft =	202 cu. yd
Area D	0.45 ac @ .5 ft =	363 cu yd
TOTAL Topsoil Required		565 cu yd

Topsoil Sources

Topsoil Stockpile	287 cu yd
Topsoil Borrow Area	278 cu yd
TOTAL Topsoil	565 cu yd

STEAMBOAT SPRINGS, CO

ITEM NO.

JOB NAE

EST. BY CHP

SHEET ____ OF ____ PAGE ____

DATE 9/19/85

Calibration of planimeter

1" sq = 006.9
006.8

Section	Planimeter	In²	ft²	Ave	Thick
A	0	0	0		
				38.9	2.0
B	5.3	.779	77.9		
				102	2.0
C	8.6	1.26	126.0		
				122	2.0
D	8.0	1.18	118.0		
				101	2.0
E	5.7	.834	83.4		
				41.7	11.5
F	0	0	0		

Topsoil volume = $\frac{7759}{27}$ = 287 Y

STEAMBOAT SPRINGS, CO

ITEM NO.

JOB NAE

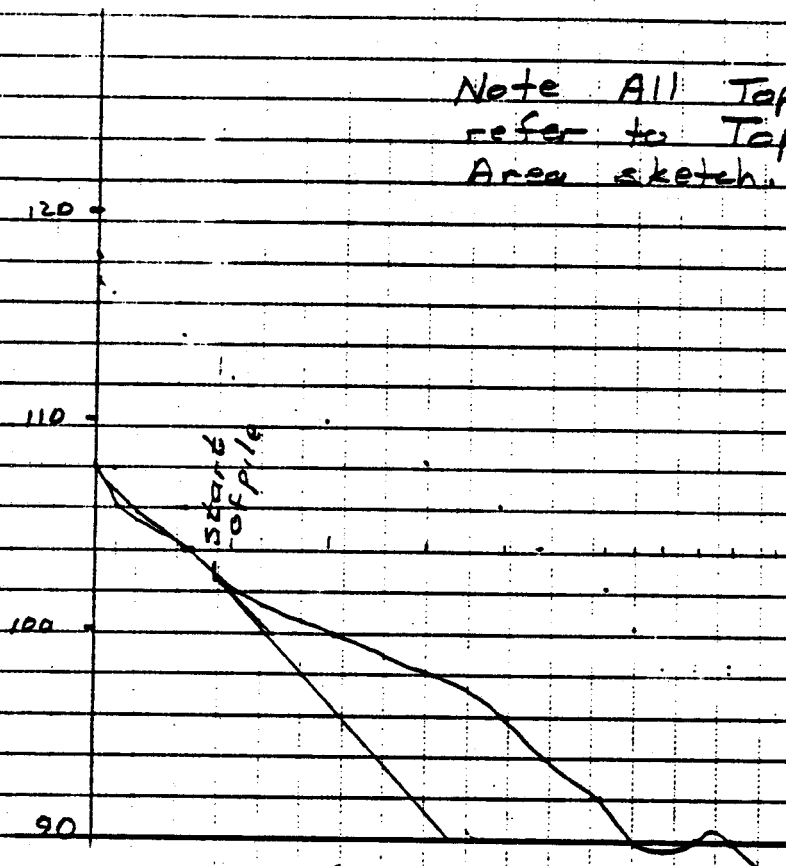
EST. BY CP

SHEET ___ OF ___ PAGE ___

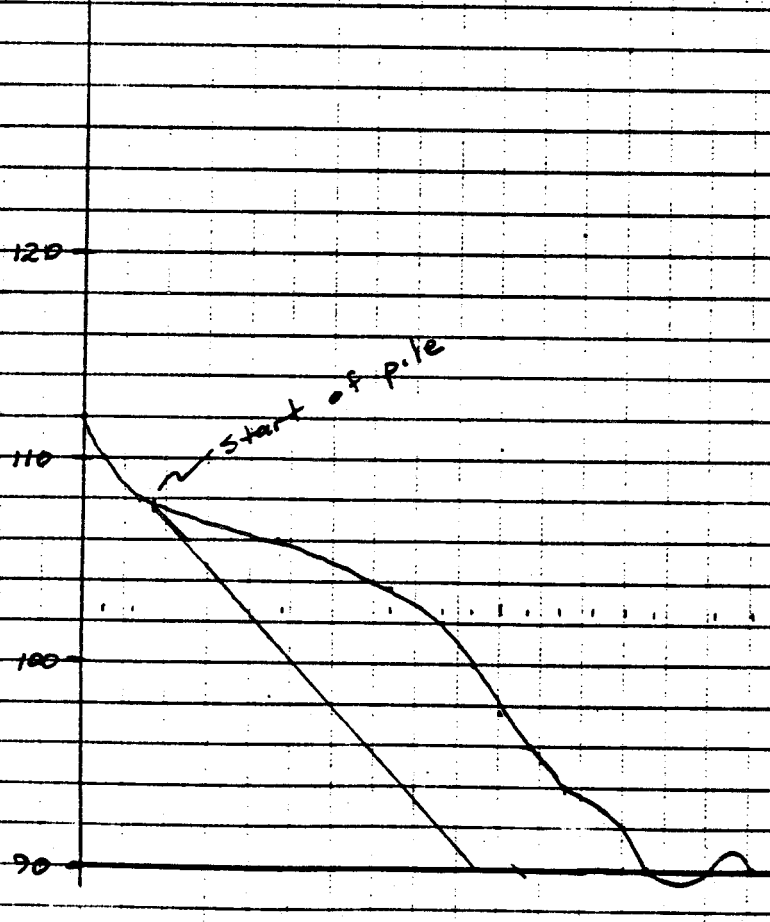
DATE 9/19/85

Section B Topsoil Stockpile 1" = 10'

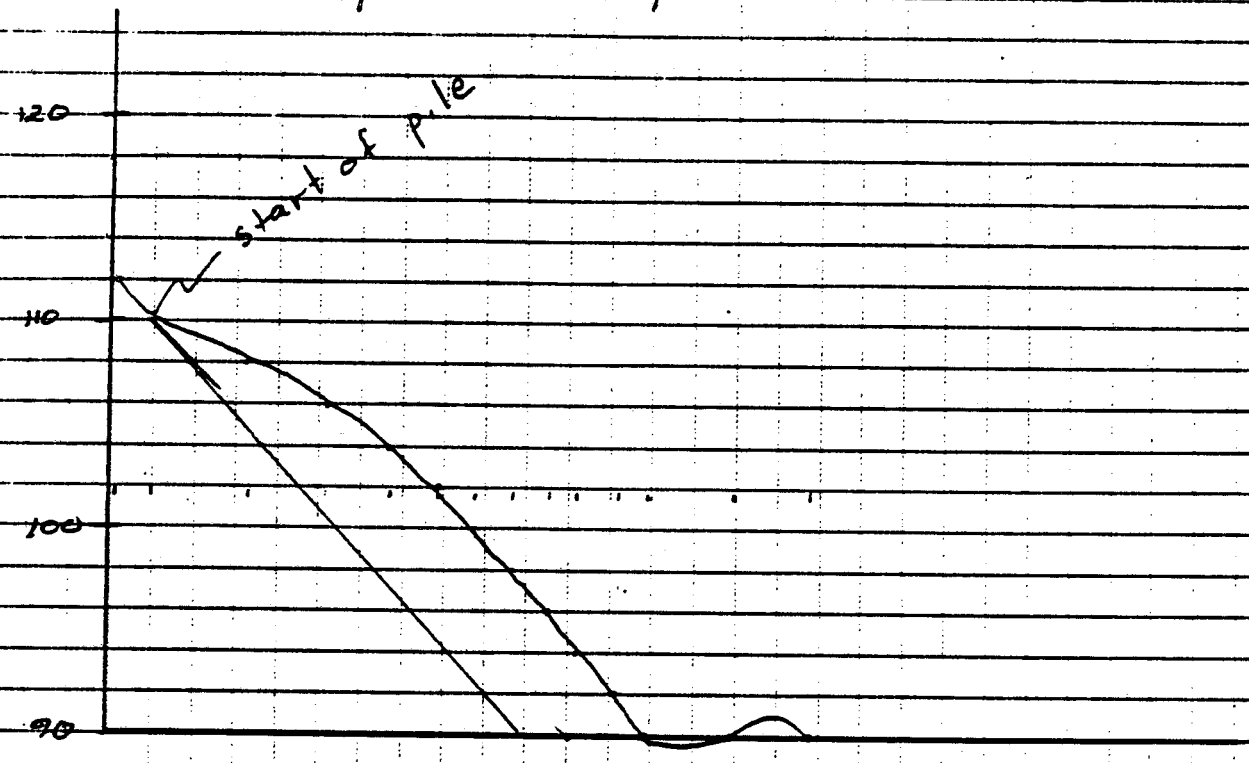
Note All Topsoil Stockpile Sections refer to Topsoil Stockpile and Borrow Area sketch.



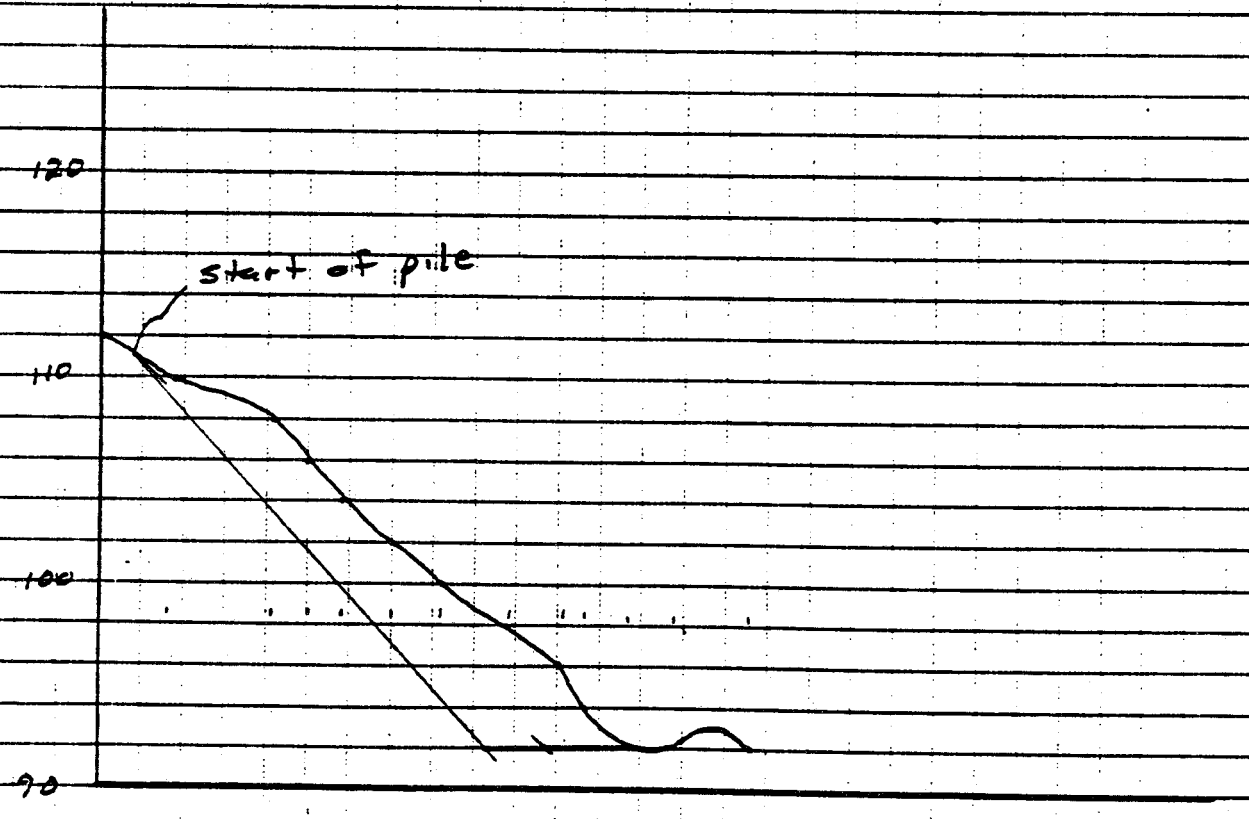
Section C



Section D Topsoil Stockpile



Section E Topsoil stockpile



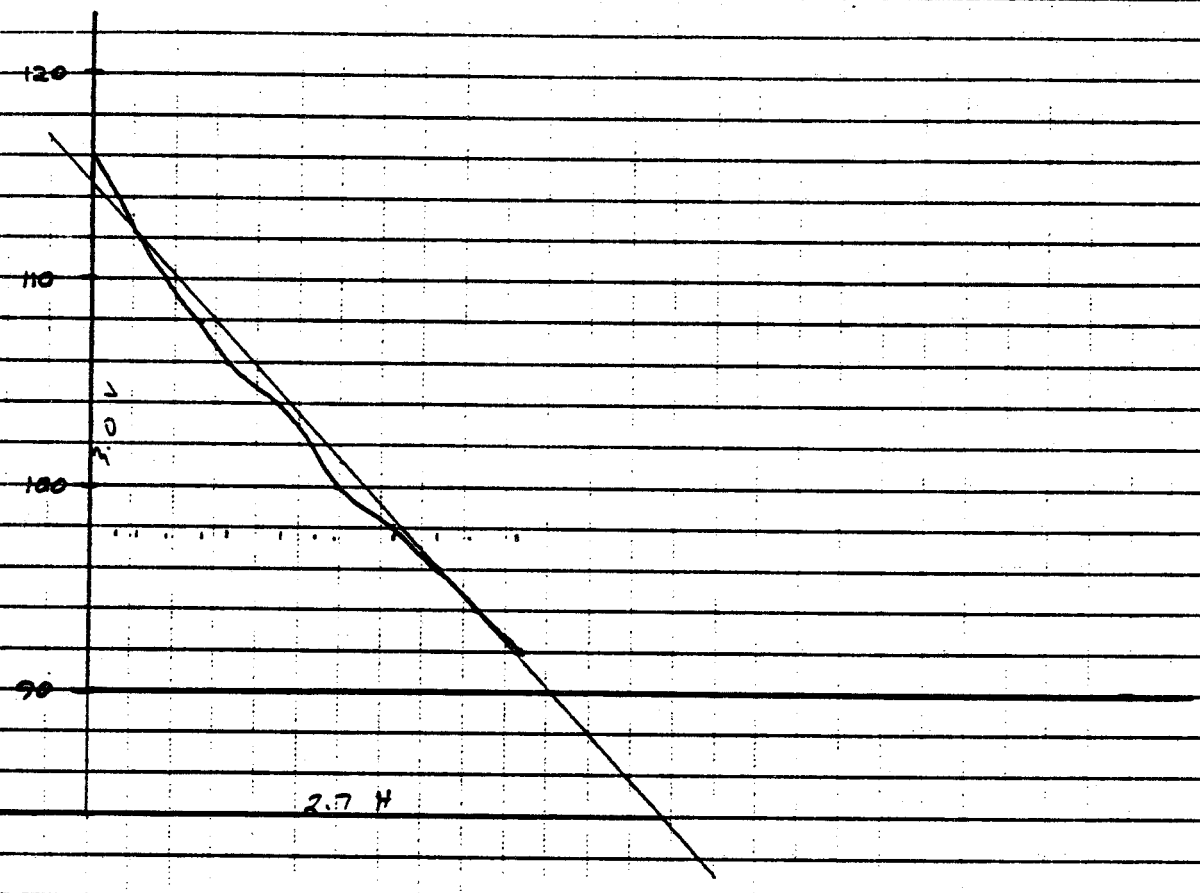
STEAMBOAT SPRINGS, CO

JOB NAE

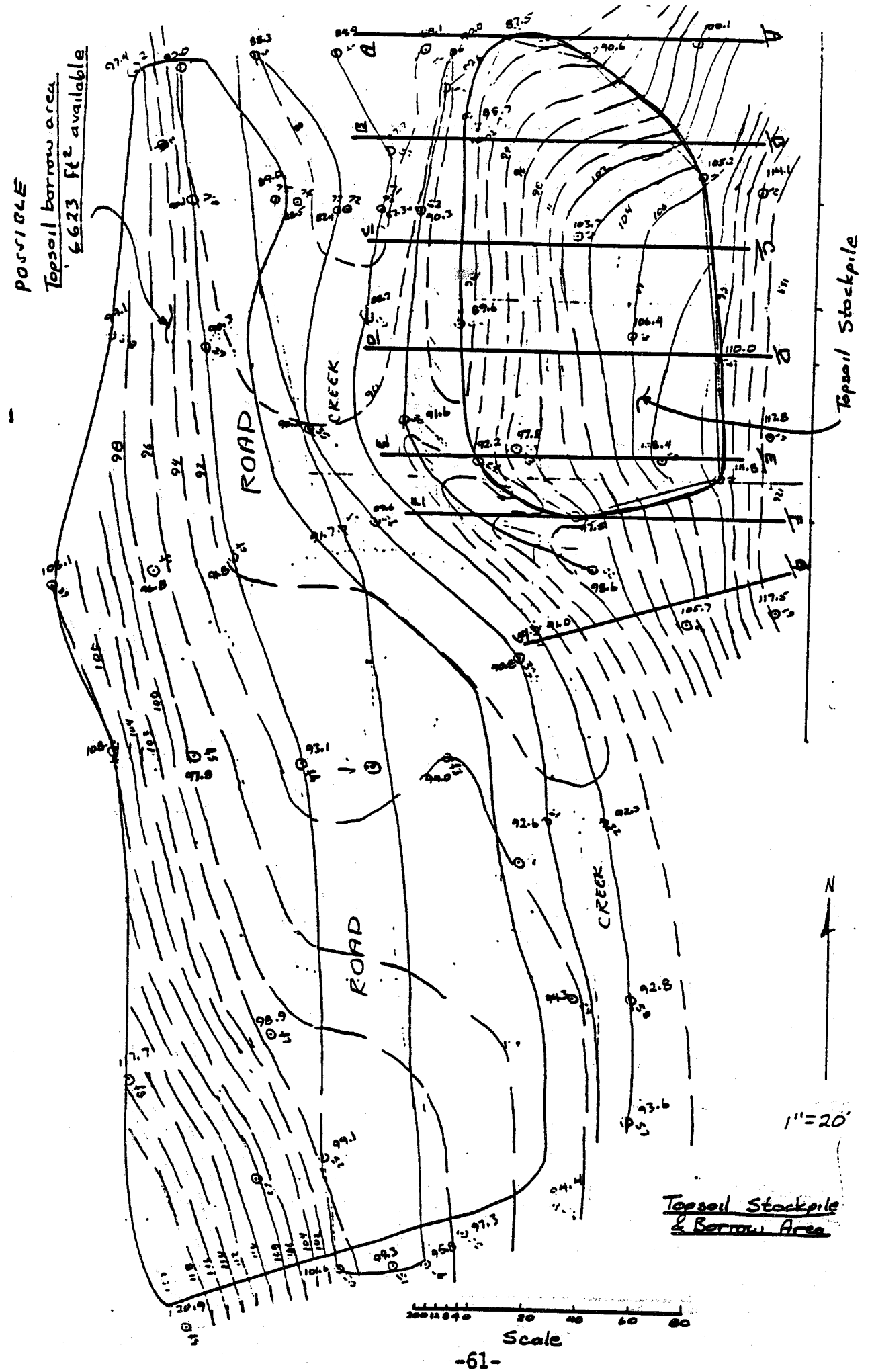
EST. BY CIP

DATE 9/19/85

Topsoil Area Section G



use slope = .9H:1V


POSSIBLE
Topsoil borrow area
6623 ft² available
Topsoil Stockpile
ROAD
CREEK
ROAD
CREEK
N
1"=20'
Scale
Topsoil Stockpile
& Borrow Area

STEAMBOAT SPRINGS, CO

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EST. BY CHP

DATE 9/21/85

TOTAL VOLUME

Section	Area	Ave	Thickness	Volume
E	0			
		136	50	6,800
F	272			
		448	50	22,400
G	623			
		822	50	41,100
H	1021			
		852	50	42,600
I	682			
		695	50	34,750
J	708			
		570	50	28,500
K	432			
		216	50	10,800
L	0			
			TOTAL	186,950 ÷ 27 = 6924 CY

Cover Volume @ 4'

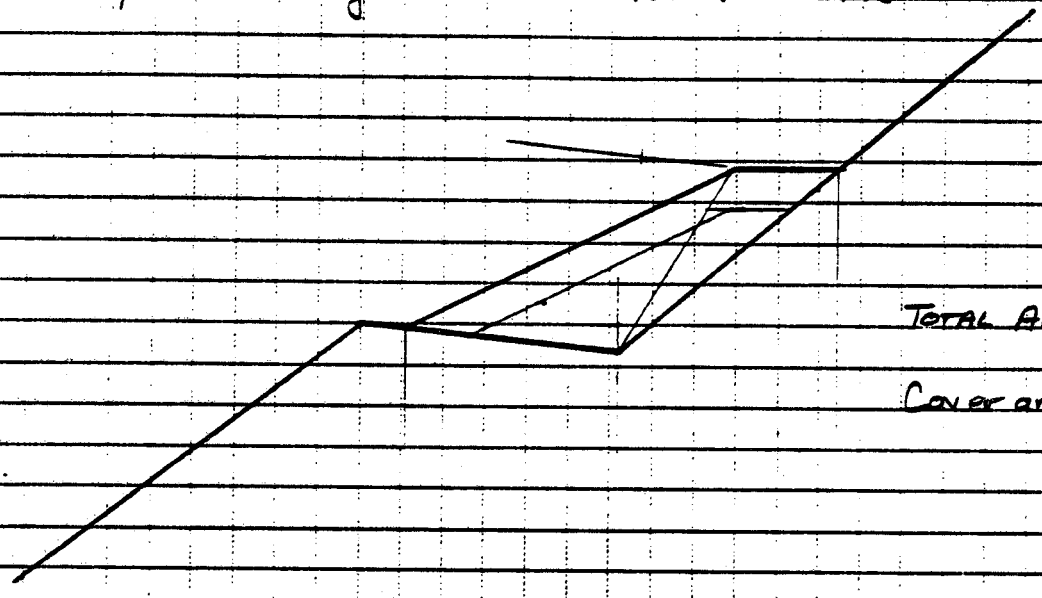
E	0			
		81	50	4050
F	162			
		230	50	11,500
G	298			
		327	50	16,350
H	356			
		320	50	16,000
I	284			
		266	50	13,300
J	248			
		222	50	11,100
K	196			
		98	50	4900
L	0			
				77,200 ÷ 27 2859 CY

Assume 2.5' cover

Volume = $2859 \times \frac{2.5}{4} = 1786$ CY

Section F F' 1" = 20'

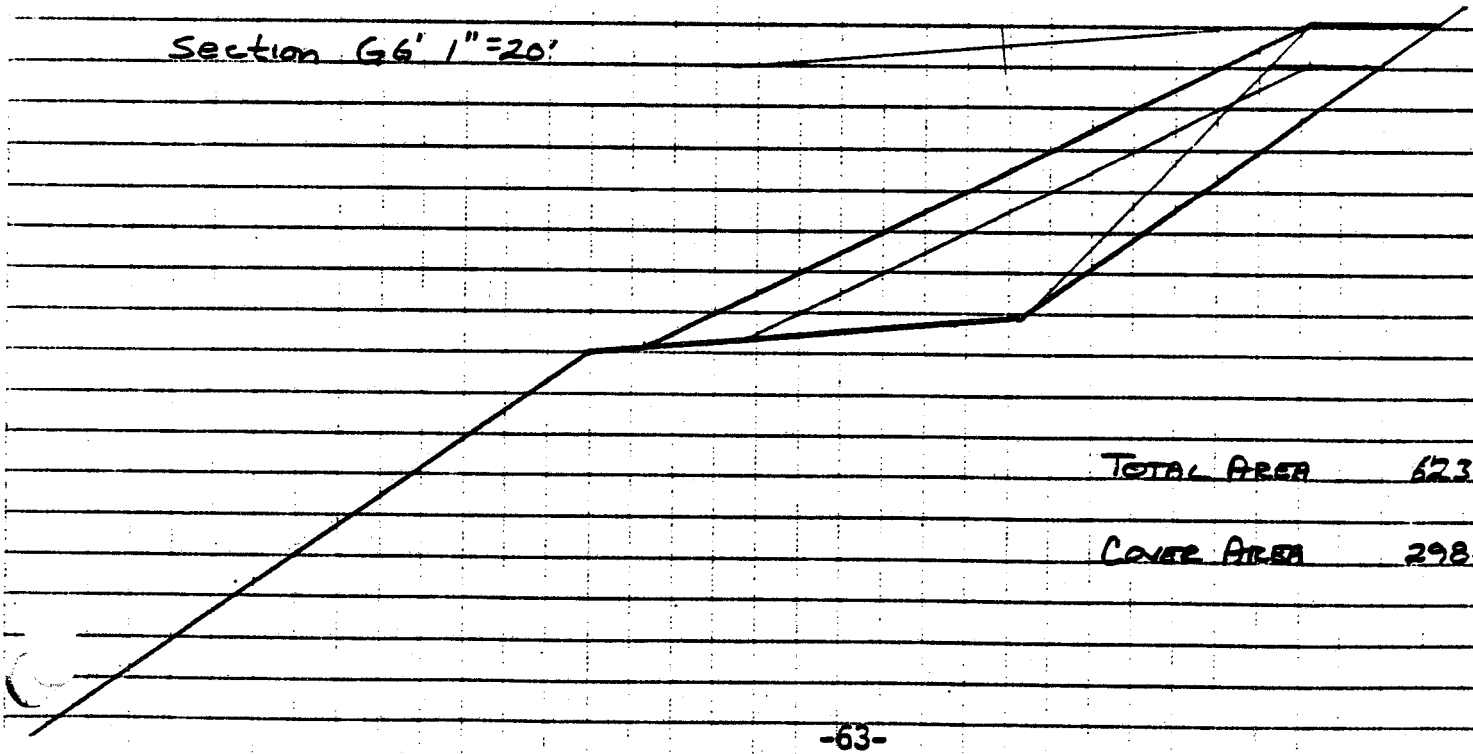
NOTE: All development waste sections Per Map 1 Surveyed Sections locations, Map 4, Surveyed Sections A-A' thru J-J' and Map 5 Surveyed Sections KK' thru RR'



TOTAL AREA 272 ft²

Cover area 162 ft²

Section GG' 1" = 20'



TOTAL AREA 623 ft²

COVER AREA 298 ft²

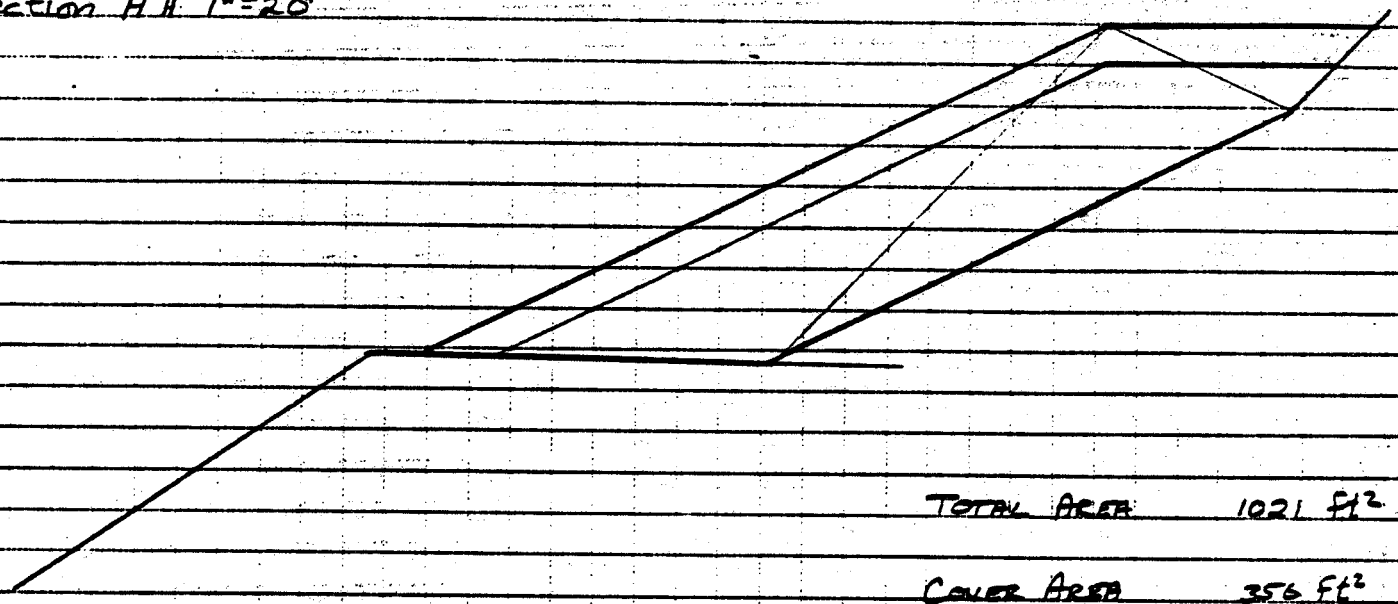
STEAMBOAT SPRINGS, CO

JOB NAE

EST. BY CIP

DATE 9/21/85

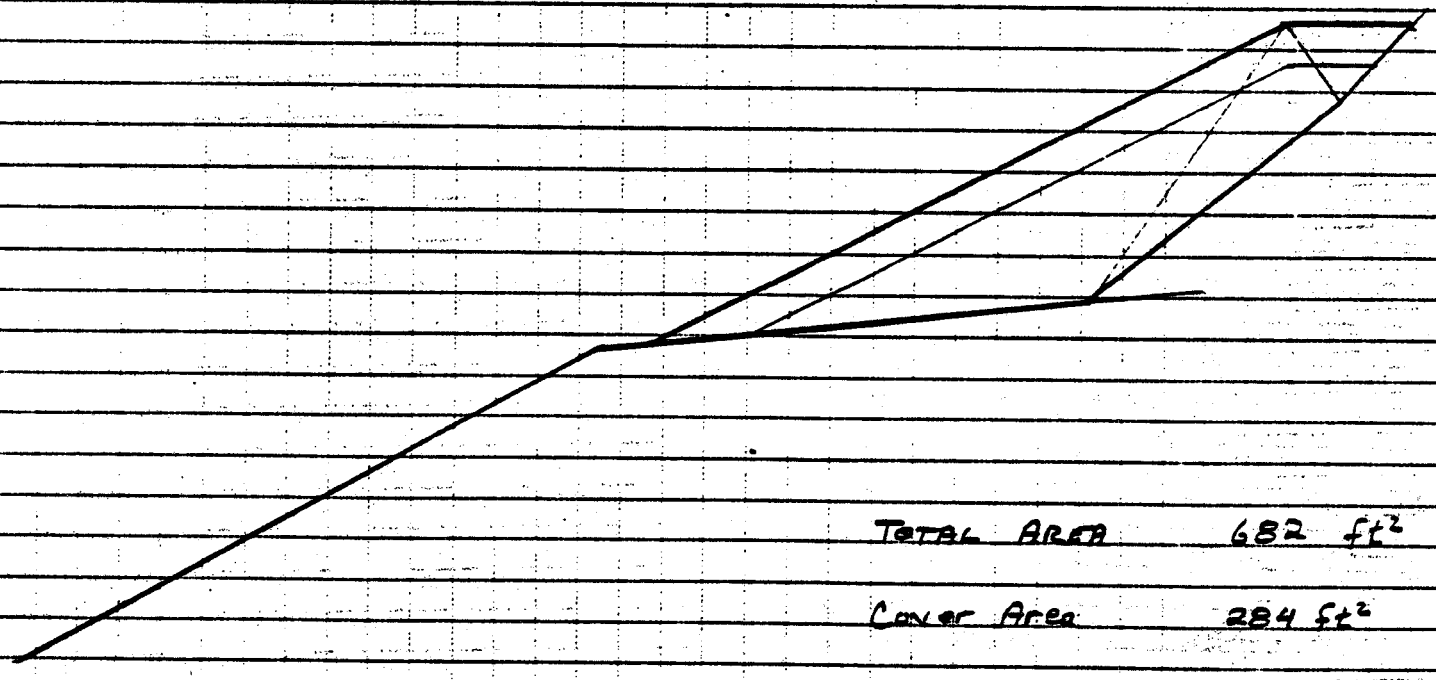
Section H H' 1" = 20'



TOTAL AREA 1021 ft^2

COVER AREA 356 ft^2

Section I I' 1" = 20'



TOTAL AREA 682 ft^2

Cover Area 284 ft^2

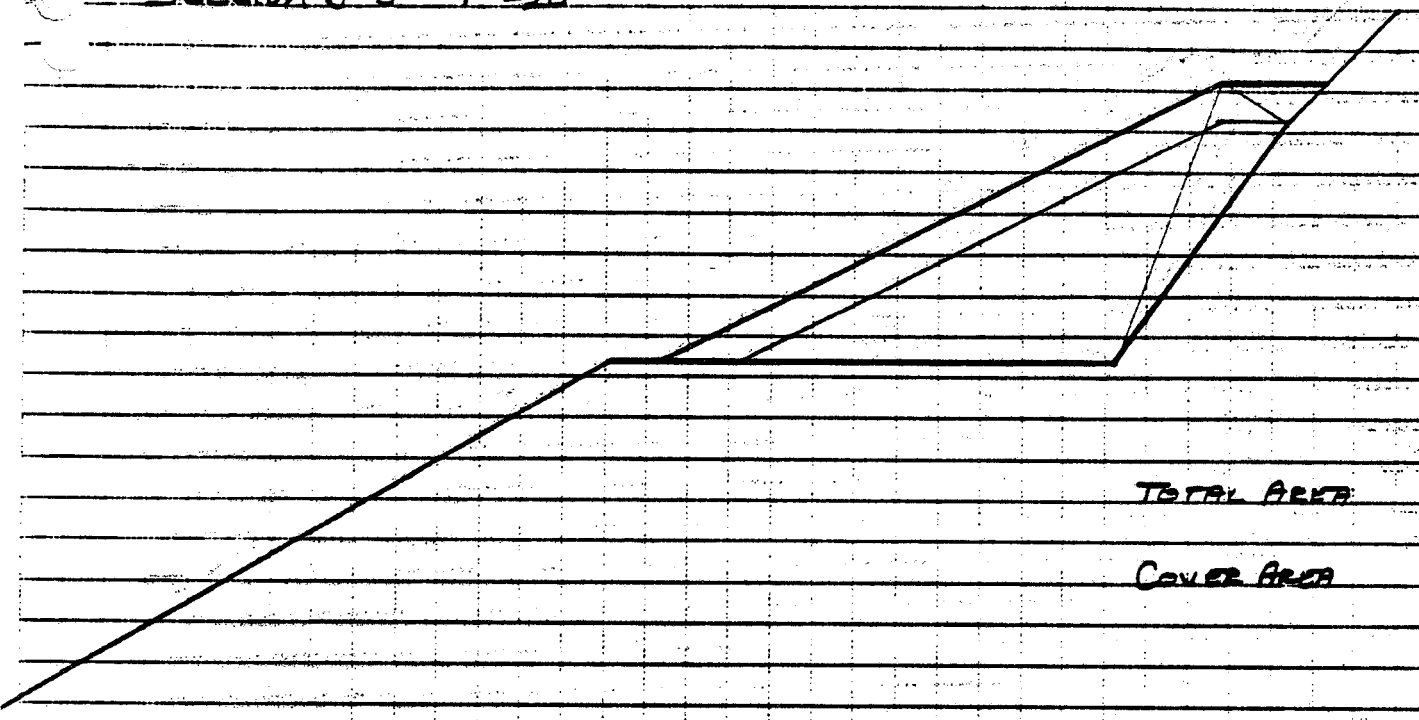
STEAMBOAT SPRINGS, CO

JOB NAE

EST. BY CHP

DATE 9/21/85

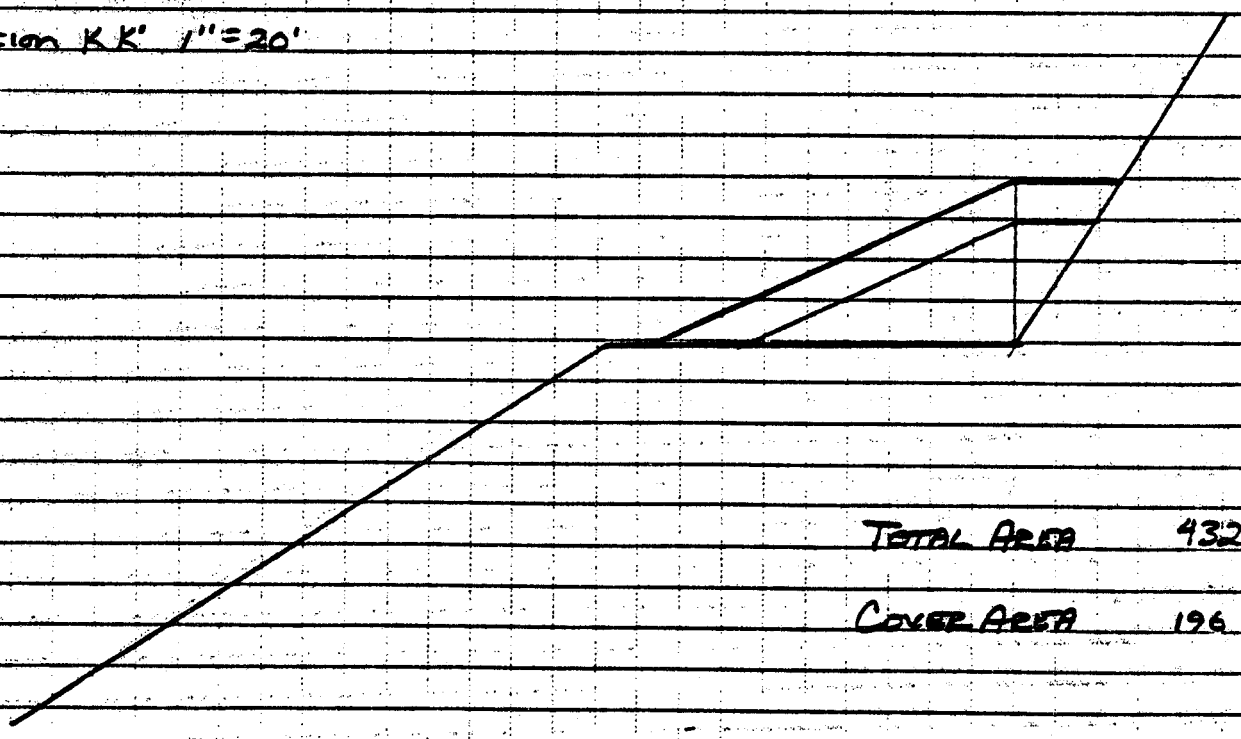
Section J J' 1" = 20'



TOTAL AREA 708 ft²

COVER AREA 248 ft²

Section K K' 1" = 20'



TOTAL AREA 432 ft²

COVER AREA 196 ft²