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Pam

File ACT/007/006 #2

CYPRUS
Plateau Mining

Cyprus Plateau Mining Corporation
P.O. Drawer PMC
Price, Utah 84501
(801) 637-2875

June 5, 1991

Mr. Lowell Braxton
Division of Oil, Gas & Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

RECEIVED
JUN 07 1991
DIVISION OF
OIL GAS & MINING

Dear Mr. Braxton,

Re: DIVISION ORDER ACT/007/006-DO-91A

Enclosed, please find a copy of a plan to address the Division order. This plan is presented with a lot of misgivings, as CPMC already has an approved refuse pile construction and drainage plan. The pile has been constructed according to that plan and has been certified every year as meeting the requirements.

Runoff from the pile is totally contained in sediment ponds and there is no environmental harm done from a little erosion off of the pile.

We recognize that the regulations require controlling the runoff from the top of the pile, however, the pile is a dynamic structure, the top is constantly being raised by the addition of refuse. The outslopes have to be regraded about once each year, which would make it very difficult to construct permanent diversion structures and maintain them.

The plan enclosed is one that we believe is workable, although it will create ongoing maintenance of a drainage pathway into the culvert, and the culvert will have to be extended periodically.

If this plan is adequate, we will modify the appropriate drainage maps to include the culvert.

Respectfully,

Ben Grimes
Sr. Environmental Engineer

File: ENV 2-5-2-5
Chron: BG910604

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE INC
6771 SOUTH 900 EAST
P.O. BOX 21146
SALT LAKE CITY, UTAH 84121-0146
(801) 566-5599

May 31, 1991

Mr. Ben Grimes
Plateau Mining Company
P.O. Drawer PMC
Price, Utah

RE: Refuse Pile Drainage Culvert Analysis.

Dear Ben:

Enclosed please find the calculations requested yesterday related to drainage from the coal refuse pile. The drainage pipe is designed based upon the following:

- A 100 Year, 6 Hour Precipitation event of 2.0 inches.
- A current surface area of the pile equalling 24.9 acres. As the pile is raised the surface area will decrease thereby making the calculations attached hereto conservative.
- A berm (consisting of refuse material) must be placed around the edge of the pile to contain runoff.
- Placement of refuse can be controlled such that surface runoff will be directed to the drainage culvert. It is understood that this may be extremely difficult to obtain, especially during winter periods.

The pipe may be placed on the surface or buried at your preference. We hope that this information will provide the design required to satisfy the State and Federal agencies involved. Should you have any questions, please call.

Sincerely,

David E. Hansen

David E. Hansen, Ph.D.,P.E.
Principal

DEH/dh

CHECK DESIGN CRITERIA FOR REFUSE PILE DRAINAGE CULVERT.

FROM MAY 1991 Refuse Pile Mapping:

Area = 24.9 acres
H_L = 1200 ft
CN = 90 (Refuse Material)
Slope = 5% (Long term average)
$P_{100yr-6hr}$ = 2.0 in

from "Hydro", Q = 24 cfs

CHECK PIPE HYDRAULICS - INLET CONDITIONS

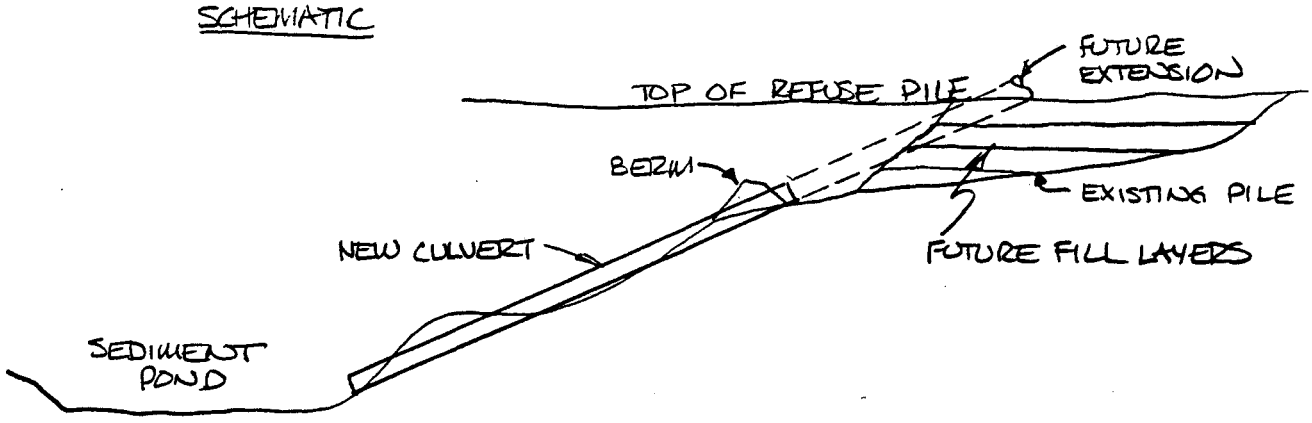
from Nomographs the following pipes can be used

PIPE SIZE	HW/D RATIO	FLOW (cfs)
33" CMP	1.0	26
27" CMP	1.5	24
43" x 27" CMP	1.0	26

This is the max size which will be required since the refuse pile surface area continues to decrease.

Recommend constructing refuse pile such that drainage is directed toward this single culvert. Fill in around culvert until culvert requires raising, then continue with refuse placement around culvert entrance.

SCHEMATIC

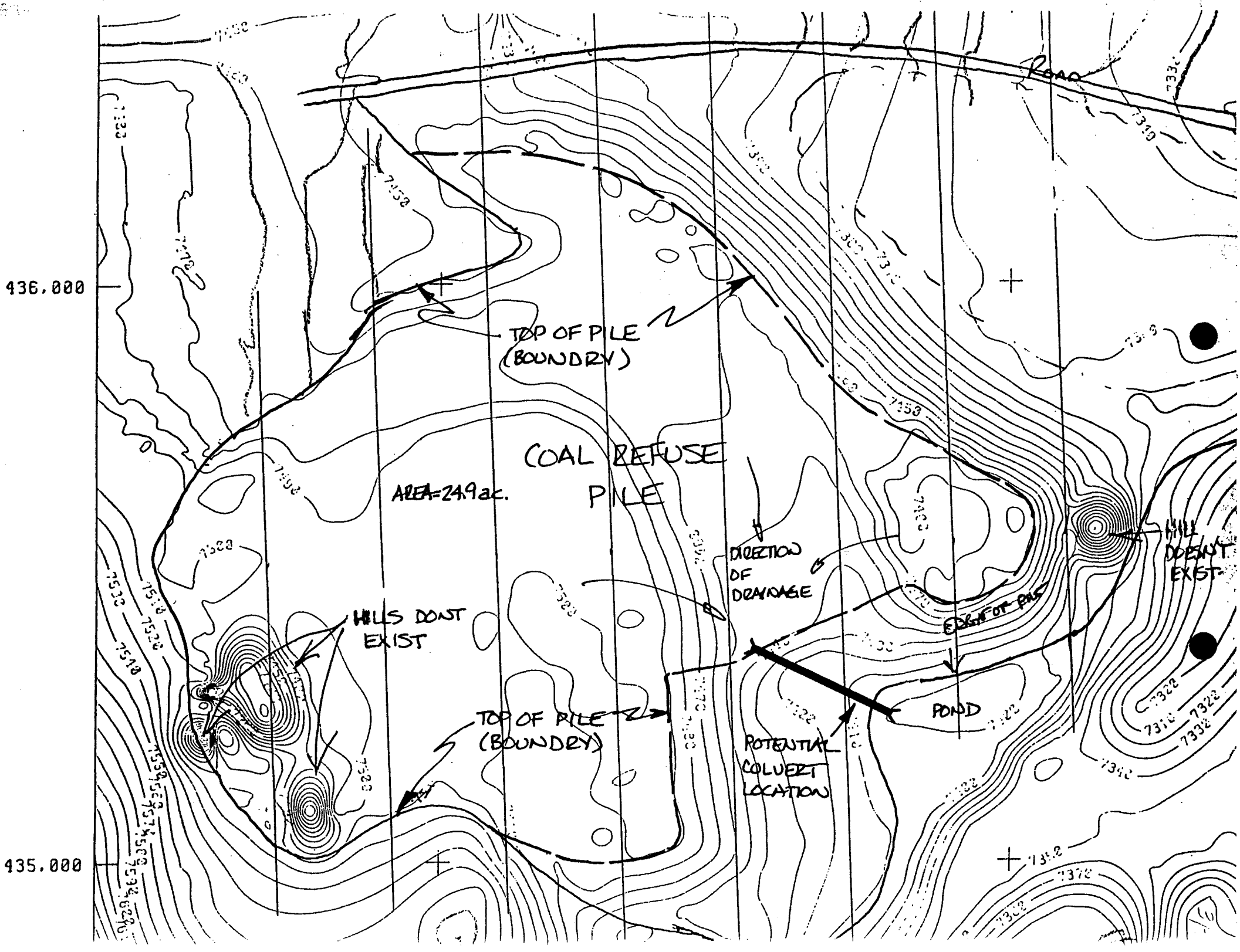


CHECK PIPEFLOW CONDITIONS

Use Mannings Equation with $\eta = 0.024$

$y = 2.25'$ (27") Full Pipe Flow
$D = 2.25'$
$S = 40/200 = 0.20$ (20%)

$Q = 75.0$ cfs >> 24 cfs Required ok


436.000
435.000
Road
TOP OF PILE
(BOUNDRY)
COAL REFUSE
PILE
AREA=24.9ac.
DIRECTION
OF
DRAINAGE
HILL
DOESNT
EXIST
EDGE OF POND
HILLS DONT
EXIST
TOP OF PILE
(BOUNDRY)
POND
POTENTIAL
COLVERT
LOCATION

PROJECT - Cyprus Pl[illegible]a Mine - Refuse Pile Drai[illegible]ge Culvert Design

AREA= 24.9 ACRES
AVERAGE BASIN SLOPE= 5.0 PERCENT
CURVE NUMBER= 90.0
DESIGN STORM= 2.00 INCHES
STORM DURATION= 6.0 HOURS
HYDRAULIC LENGTH= 1200. FEET
MINIMUM INFILTRATION RATE= .00 IN/HR

TP= .1202 HOURS QPCFS= 146.60 CFS QPIN= 5.8482 INCHES
CS= 28.0259 ITERATIONS= 8 SCS 6-hour

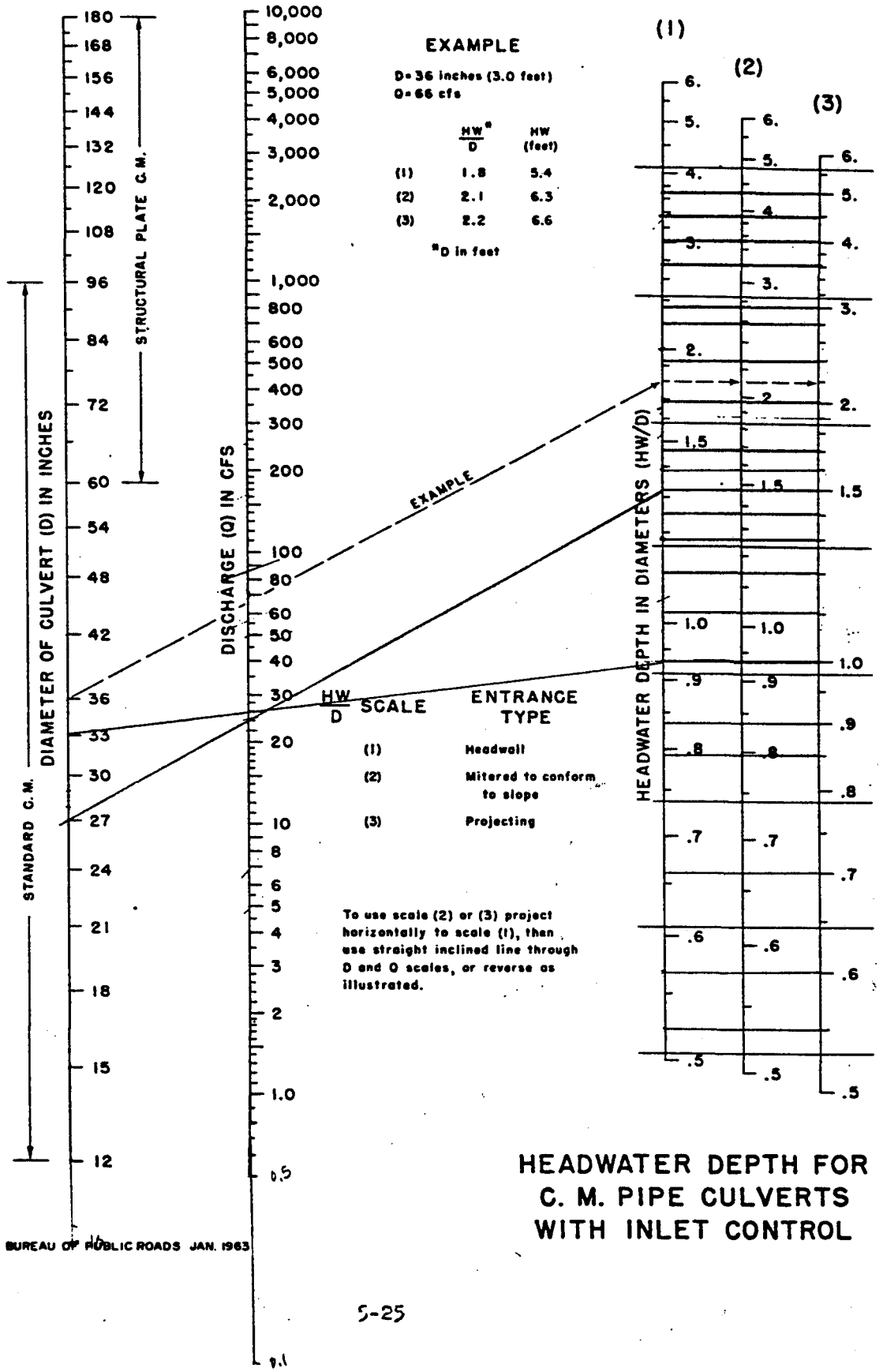
TIME HOURS	ACCUMULATED RAINFALL INCHES	RUNOFF INCHES	RAINFALL EXCESS INCHES	UNIT HYDROGRAPH CFS	OUTFLOW HYDROGRAPH CFS
1.28	.2221	.0000	.0000	.0	.00
1.31	.2278	.0000	.0000	7.4	.00
1.33	.2334	.0001	.0000	45.5	.00
1.36	.2391	.0003	.0001	97.3	.00
1.38	.2447	.0004	.0002	134.6	.02
1.41	.2503	.0007	.0002	146.6	.04
1.44	.2560	.0010	.0003	137.3	.07
1.46	.2616	.0013	.0004	115.9	.10
1.49	.2673	.0018	.0004	90.7	.14
1.51	.2750	.0024	.0006	66.9	.19
1.54	.2848	.0033	.0009	47.2	.24
1.56	.2945	.0044	.0011	32.0	.32
1.59	.3043	.0056	.0012	21.1	.42
1.62	.3140	.0070	.0014	13.5	.55
1.64	.3238	.0085	.0015	8.5	.69
1.67	.3335	.0101	.0016	5.2	.83
1.69	.3432	.0119	.0018	3.2	.97
1.72	.3530	.0138	.0019	1.9	1.12
1.74	.3627	.0158	.0020	1.1	1.26
1.77	.3725	.0179	.0021	.7	1.40
1.80	.3822	.0201	.0022	.4	1.53
1.82	.3920	.0225	.0024	.2	1.66
1.85	.4017	.0250	.0025	.1	1.78
1.87	.4115	.0275	.0026	.0	1.90
2.36	.9922	.3152	.0244	.0	20.13
2.39	1.0302	.3402	.0250	.0	20.92
2.41	1.0681	.3656	.0255	.0	21.65
2.44	1.1061	.3916	.0260	.0	22.32
2.46	1.1441	.4180	.0264	.0	22.95
2.49	1.1820	.4448	.0268	.0	23.53
2.51	1.2054	.4616	.0167	.0	24.01
2.54	1.2157	.4689	.0074	.0	23.97
2.56	1.2259	.4764	.0074	.0	22.99
2.59	1.2362	.4838	.0074	.0	21.07

PROJECT : Cyprus Plateau Mine - Refuse Pile Drainage Culvert Design
(Continued)

TIME HOURS	ACCUMULATED RAINFALL INCHES	RUNOFF INCHES	RAINFALL EXCESS INCHES	UNIT HYDROGRAPH CFS	OUTFLOW HYDROGRAPH CFS
2.62	1.2464	.4913	.0075	.0	18.60
2.64	1.2567	.4988	.0075	.0	16.05
2.67	1.2670	.5063	.0075	.0	13.75

HYDROGRAPH PEAK= 24.01 cfs
TIME TO PEAK= 2.51 Hours
RUNOFF VOLUME= 2.26 Acre-Feet

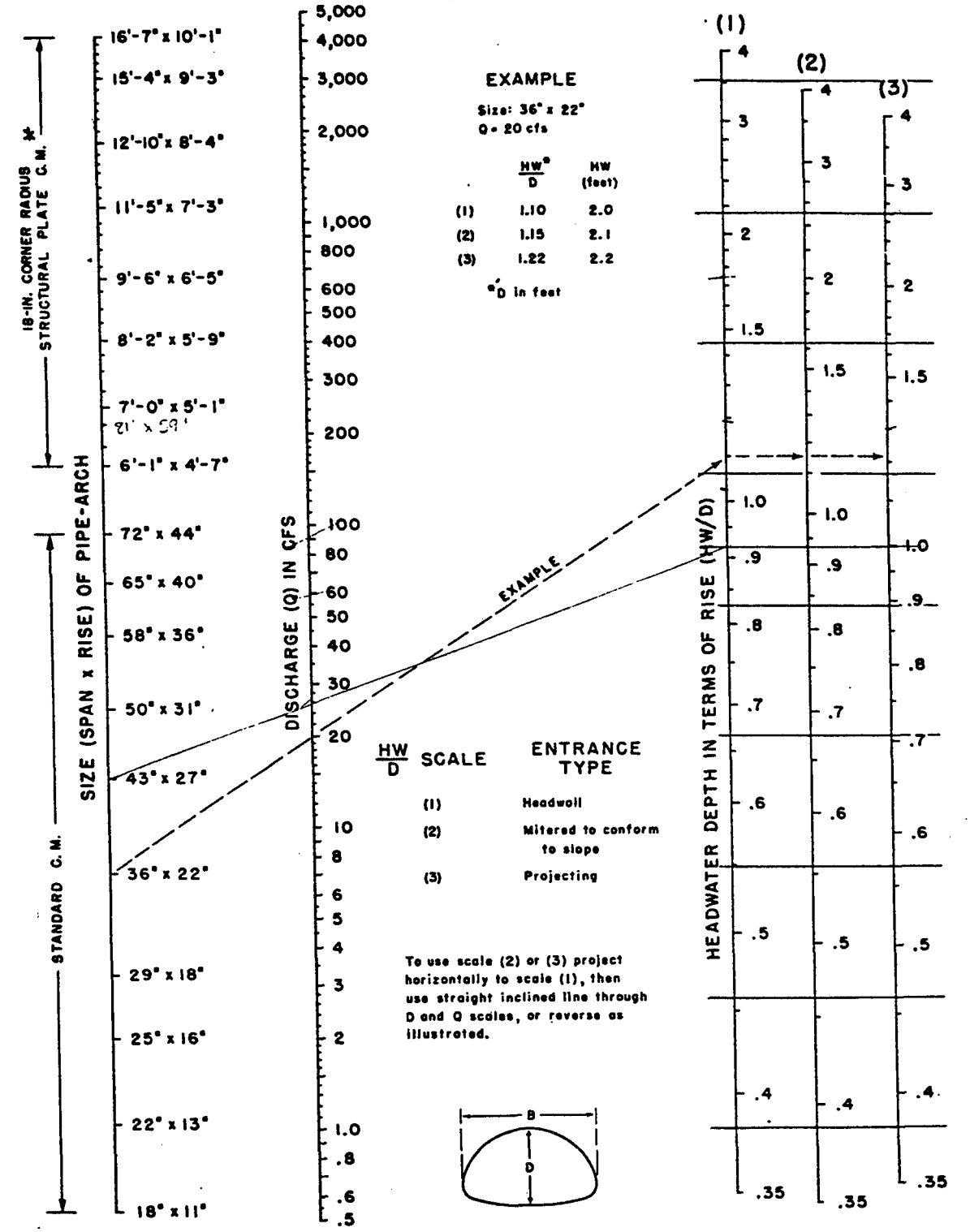
CHART 5



BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER DEPTH FOR C. M. PIPE CULVERTS WITH INLET CONTROL

CHART 6



*ADDITIONAL SIZES NOT DIMENSIONED ARE LISTED IN FABRICATOR'S CATALOG.

BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER DEPTH FOR C. M. PIPE-ARCH CULVERTS WITH INLET CONTROL