0037

Document Information Form

Mine Number: C/015/018

File Name: Incoming

To: DOGM

From:

Person N/A

Company Vaughn HanSen Accociates

Date Sent: May 12, 1983

Explanation:

Discharge Summury

cc:

File in:
C/ 015 , 018 , Incoming
Refer to:
- ☐ **Confidential**
- ☐ **Shelf**
- ☐ **Expandable**

Date _____ For additional information

VAUGHN HANSEN ASSOCIATES
CONSULTANTS / ENGINEERS

COMPUTED C.M.A. CLIENT UPL
CHECKED PROJECT Deer Creek Mine
DATE 5/5/83 FEATURE

I- Discharge from 500 ft. of conveyor and maintenance road.

Proceedure used:

SCS Emergency Spillway Design contained in Section 4-Hydrology-National Engineering Handbook.

Assumptions:

1- All runoff from the road and conveyor will concentrate at one point at the downstream edge of the water bar.

2- Curve Number = 87 for a dirt road: from Design of Small Dams- USBR- pg 536

3- Average slope = 10%

4- Drainage area = 500' x 30' = 15000 ft² = 0.0005 mi²

5- Hydraulic Length = 500 ft.

6- 10-year 24-hour precipitation = 2.0 inches

Calculations:

$$S = \frac{1000}{CN} - 10 = 2$$

$$Q = \frac{(P-0.2S)^2}{P+0.8S} = \frac{(2}{}$$

$$t_L = \frac{(L)^{0.8}(S+1)^{0.7}}{1900\,Y^{0.5}} = \frac{(\quad)^{0.8}}{1900(10)^{0.5}} = 0.045$$

$$t_p = 1.11\,t_L = 0.05 \text{ hrs.}$$

Peak Discharge = 0.07 cfs
(see attached computation sheet)

File in:
- ☐ Confidential
- ☐ Shelf
- ☐ Expandable

Refer to Record No. 0037 Date 5-12-83
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5- Hydraulic Length = 500 ft.

6- 10-year 24-hour precipitation = 2.0 inches

Calculations:

$$S = \frac{1000}{CN} - 10 = \frac{1000}{87} - 10 = 1.49$$

$$Q = \frac{(P-0.2S)^2}{P+0.8S} = \frac{(2-0.2(1.49))^2}{2+0.8(1.49)} = 0.906 \text{ inches.}$$

$$t_L = \frac{(L)^{0.8}(S+1)^{0.7}}{1900\,Y^{0.5}} = \frac{(500)^{0.8}(1.49+1)^{0.7}}{1900\,(10)^{0.5}} = 0.045$$

$$t_p = 1.11\,t_L = 0.05 \text{ hrs.}$$

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Peak Discharge = 0.07 cfs
(see attached computation sheet)

2/5

HYDROGRAPH COMPUTATION FORM

STREAM AND STATION Discharge from 500-ft Conveyor and Road Deer Creek Min

REMARKS Assuming all water along 500ft of Road would Concentrate at one poi

DR. AREA 0.0005 SQ. MI. T_c 0.07 HR. RUNOFF CONDITION NO. II

RUNOFF CURVE NO. 87. STORM DISTRIB. CURVE —. HYDRO. FAM. NO. 3

STORM DURATION 24 HR. RAINFALL: POINT 2.0 IN. AREAL 2.0 IN.

Q 0.906 IN. COMPUTED T_p 0.05 HR. T_o 15 HR.

(T_o/T_p): COMPUTED 300 : USED 75 . REVISED T_p 0.20

$q_p = \frac{484\ A}{REV.\ T_p}$ = 1.21 CFS. Qq_p = 1.096 CFS.

t(COLUMN) = (t/T_p) REV. T_p q(COLUMN) = $(qc/q_p)\ Qq_p$

LINE NO.	t HOURS	q CFS	LINE NO.	t HOURS	q CFS	LINE NO.	t HOURS	q CFS
1		0.00	21			41		
2		0.001	22			42		
3		0.006	23			43		
4		0.031	24			44		
5		0.07	25			45		
6		0.05	26			46		
7		0.03	27			47		
8		0.03	28			48		
9		0.02	29			49		
10			30			50		
11			31			51		
12			32			52		
13			33			53		
14			34			54		
15			35			55		
16			36			56		
17			37			57		
18			38			58		
19			39			59		
20			40			60		

II - Discharge from 250 ft. of conveyor and maintenance road.

Assumptions:

1- Same as 1,2,3, and 6 under item I.

2 - Drainage area = 250' x 30' = 7500 ft² = 0.00027 mi²

3- Hydraulic Length = 250 ft.

Calculations:

$S = 1.49$

$Q = 0.906$ inches

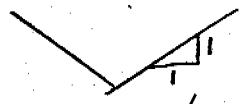
$$t_L = \frac{(250)^{0.8}(1.49+1)^{0.7}}{1900(10)^{0.5}} = 0.026$$

$$t_p = 1.11(0.026) = 0.03$$

Peak discharge = 0.039 cfs = 17.5 gpm.

III - Required ditch section for the above flowrates. assuming 1:1 side slopes.

Assumptions:



1- Diversion ditch cross-section with 1:1 side slopes. It is recognized that the upstream slope will be less than 10h:1v which will create a larger flow cross-section and therefore smaller flow depth.

2- Mannings $n = 0.025$

3- Water bar would be at a 30° angle to road, having a maximum channel slope of 7%

HYDROGRAPH COMPUTATION FORM

STREAM AND STATION Discharge from 250ft Conveyor and Road, Deer Creek Mine

REMARKS 10-year, 24-hour storm.

DR. AREA 0.00027 SQ. MI. T_c _____ HR. RUNOFF CONDITION NO. II

RUNOFF CURVE NO. 87. STORM DISTRIB. CURVE – . HYDRO. FAM. NO. 3

STORM DURATION 24 HR. RAINFALL: POINT 2.0 IN. AREAL 2.0 IN.

Q 0.906 IN. COMPUTED T_p 0.03 HR. T_o 15 HR.

(T_o/T_p): COMPUTED 500 : USED 75 . REVISED T_p 0.2

$$q_p = \frac{484\ A}{\text{REV. } T_p} = 0.65 \text{ CFS.} \qquad Qq_p = 0.59 \text{ CFS.}$$

$$t(\text{COLUMN}) = (t/T_p)\ \text{REV. } T_p \qquad q(\text{COLUMN}) = (qc/q_p)\ Qq_p$$

LINE NO.	t HOURS	q CFS	LINE NO.	t HOURS	q CFS	LINE NO.	t HOURS	q CFS
1		0.00	21			41		
2		0.001	22			42		
3		0.003	23			43		
4		0.034	24			44		
5		0.039	25			45		
6		0.026	26			46		
7		0.019	27			47		
8		0.015	28			48		
9		0.012	29			49		
10			30			50		
11			31			51		
12			32			52		
13			33			53		
14			34			54		
15			35			55		
16			36			56		
17			37			57		
18			38			58		
19			39			59		
20			40			60		

Results:

A - 500 ft Length

@ max slope = 7%

q = 0.07 cfs
Flow area = 0.029
Wetted perimeter = 0.48 ft
Hydraulic radius = 0.06 ft.
Velocity = 2.4 fps
Depth of flow = 0.17 ft.

@ min slope = 3%

q = 0.07 cfs
Flow area = 0.04 ft^2
Wetted perimeter = 0.564 ft
Hydraulic Radius = 0.07 ft
Velocity = 1.76 fps
Depth of flow = 0.20 ft.

Required height of water bar to allow 0.5 ft freeboard = 0.7 ft

B - 200 ft Length

@ max slope = 7%

q = 0.039 cfs
Flow area = 0.019 ft^2
Wetted Perimeter = 0.39 ft
Hydraulic Radius = 0.05 ft
Velocity = 2.09 fps
Depth of flow = 0.14 ft

@ min slope = 3%

q = 0.039 cfs
Flow area = 0.026 ft^2
Wetted perimeter = 0.453 ft
Hydraulic Radius = 0.057 ft
Velocity = 1.522 fps
Depth of flow = 0.16 ft.

Required height of water bar to allow 0.5 ft freeboard = 0.7 ft.