



# State of Utah

DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

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Governor  
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Executive Director  
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Division Director

355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203  
801-538-5340

November 3, 1992

Mr. Val Payne, Sr. Environmental Engineer  
PacifiCorp  
P.O. Box 1005  
Huntington, Utah 84528

**RECEIVED**

JAN 26 1994

DIVISION OF  
OIL, GAS & MINING

*File and Copy from*

Dear Mr. Payne:

Re: Approval of Abatement Deficiencies, PacifiCorp, Des-Bee-Dove Mine, ACT/015/017-92C, Folder #3, Emery County, Utah

The submittal dated October 29, 1992, relative to the deficiencies in the plan for the lower belted road drainage is approved. This work must be implemented by November 30, 1992.

If you have any questions, please call me.

Sincerely,

*Pamela Grubaugh-Littig*  
Pamela Grubaugh-Littig  
Permit Supervisor

jbe  
015017.92C

**ROUTE**

GUY DAVIS

VAL PRYDE

JERRY POLLOCK

DEBRA WARRINGTON

Karl Houskeeper

August 23, 1991

Ms. Pamela Grubaugh-Littig  
Permit Supervisor  
Division of Oil, Gas and Mining  
355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203

RE: ABATEMENT FOR NOV 91-20-2-1, PART 1, DES BEE DOVE MINE, ACT/015/017

#2  
Copy Pam

Dear Pamela:

I am enclosing the following text, calculations, designs and drawings for abatement of Part 1 of NOV 91-20-2-1. This part required a plan to help reduce erosion on the DBD Junction Road fillslope area west of the sediment pond.

If there are any questions, please contact Guy Davis at 653-2312 or myself at 220-4584.

Sincerely,

*Guy Davis (for)*

J. Blake Webster  
Permitting Administrator

GD/dw  
Enclosure

[Signature]

GUY DAVIS

VALERIE

JESSY TOLLACK

DEBRA WATSON

## **DES BEE DOVE LOWER BELTED ROAD DRAINAGE**

To help reduce the recent erosion on the Junction Road fillslope between STA 156+00 and 161+00 the following plan has been designed.

To divert the road runoff from the fillslope area, used mine belting will be installed along the existing guard rail. The installation would be as depicted on Figure 2.

To handle the diverted runoff and direct the flow into a natural channel, a designed rip-rap channel and culvert would be constructed and installed. These designs and cross-sections are shown on Figures 3 and 4. The culvert will have a metal collar at the inlet according to permit packet 5-1 drawing 19 of 38. Outlet velocity control will be accomplished by construction of a 4' x 10' rock impact basin of 1.5' angular rock. Monitoring after precipitation events for 1 year will be conducted to assure the basin is effective.

Flow calculations, designs and drawings are as follows:

### **DES BEE DOVE LOWER BELTED ROAD DRAINAGE DESIGN**

1. Area = 1.35 Acres (Figure 1)
2. Time of Concentration
  - a. Hydraulic Length - 1000 ft.
  - b. Average Slope - 7%
  - c. Velocity - 5.3 fps (Exhibit A)
  - d. Time of Concentration - .05 hr.
3. Curve Number
  - 80% at 98
  - 20% at 87

**Weighted Average - 96 (Exhibit B)**

**4. Design Flow**

**4.07 cfs (Table 1)**

**10 yr./6 hr. Storm Event**

**5. Guard Rail Belting Installation**

**Figure 2**

**Length - Approx. 600 ft.**

**To Divert Road Runoff Away From Fillslope.**

**6. Channel Design**

**Figure 3**

**Rip-rap Sizing Calculation**

**Length - Approx. 270 ft.**

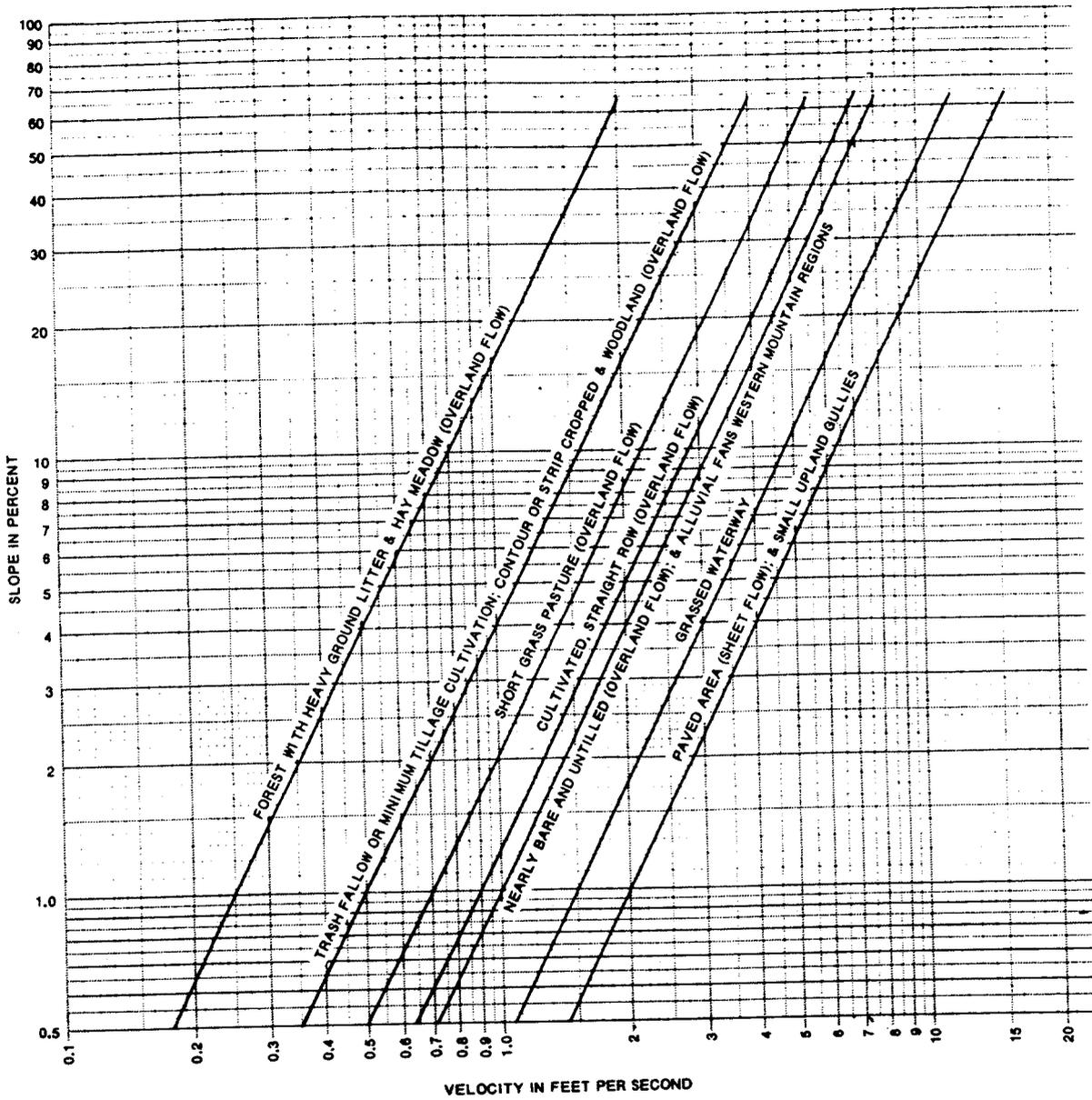
**7. Culvert Design**

**Figure 4**

**Length - Approx. 80 ft.**

**Rock Impact Basin**





FROM "NEH" SECTION 4

Figure 15.2.--Velocities for upland method of estimating  $T_c$

Table 9.1.--Runoff curve numbers for hydrologic soil-cover complexes  
(Antecedent moisture condition II, and  $I_a = 0.2 S$ )

Land use	Cover		Hydrologic soil group				
	Treatment or practice	Hydrologic condition	A	B	C	D	
Fallow	Straight row	----	77	86	91	94	
Row crops	"	Poor	72	81	88	91	
	"	Good	67	78	85	89	
	Contoured	Poor	70	79	84	88	
	"	Good	65	75	82	86	
	"and terraced	Poor	66	74	80	82	
	" " "	Good	62	71	78	81	
Small grain	Straight row	Poor	65	76	84	88	
		Good	63	75	83	87	
	Contoured	Poor	63	74	82	85	
		Good	61	73	81	84	
		"and terraced	Poor	61	72	79	82
		Good	59	70	78	81	
Close-seeded legumes <u>1/</u> or rotation meadow	Straight row	Poor	66	77	85	89	
		Good	58	72	81	85	
	Contoured	Poor	64	75	83	85	
		Good	55	69	78	83	
		"and terraced	Poor	63	73	80	83
		"and terraced	Good	51	67	76	80
Pasture or range		Poor	68	79	86	89	
		Fair	49	69	79	84	
		Good	39	61	74	80	
		Contoured	Poor	47	67	81	88
		"	Fair	25	59	75	83
		"	Good	6	35	70	79
Meadow		Good	30	58	71	78	
Woods		Poor	45	66	77	83	
		Fair	36	60	73	79	
		Good	25	55	70	77	
Farmsteads		----	59	74	82	86	
Roads (dirt) <u>2/</u> (hard surface) <u>2/</u>		----	72	82	87	89	
		---	74	84	90	92	

1/ Close-drilled or broadcast.  
2/ Including right-of-way.

FROM "NEH" SECTION 4

INPUT SUMMARY  
FOR W.S.: DBD LOWER BELTED ROAD DRAINAGE

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STORM:	WATERSHED:
DISTRIBUTION =SCS TYPE 2	LAND SLOPE = 0.0000 FCT
PRECIP.DEPH = 1.20 IN	CURVE NUMBER = 96.00
DURATION = 6.00 HR	CHANNEL LENGTH = 0.00 FT
NUMBER OF LINES = 915	TIME OF CONC. = 0.0500 HR
	AREA = 1.35 AC
	D = 0.0067 HR

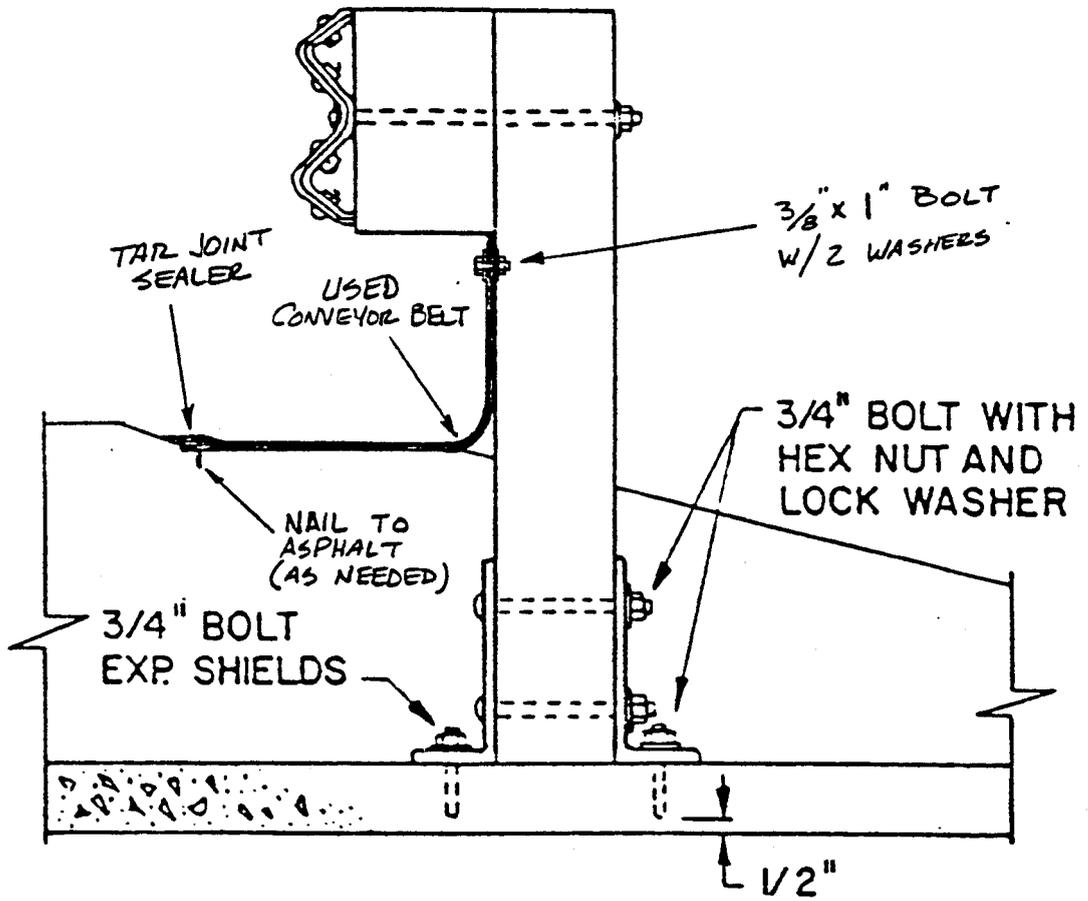
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OUTPUT SUMMARY

---

RUNOFF DEPTH = 0.8121 IN
INITIAL ABSTRACTION = 0.0833 IN
PEAK FLOW = 4.07 CFS ( 2.9903 IFH)
AT T = 3.13 HRS

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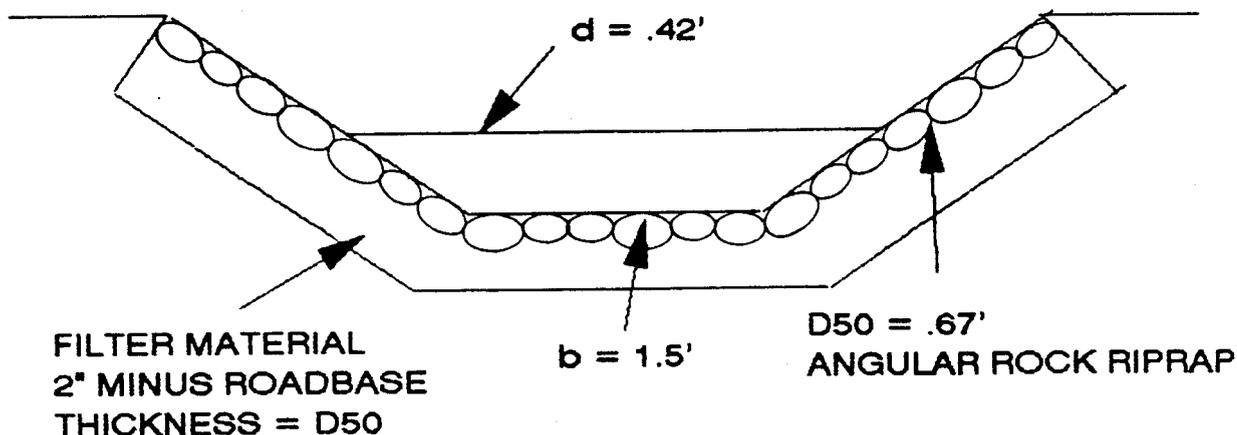


TYPICAL GUARD RAIL

BELTING INSTALLATION

FIGURE 2

DES-BEE-DOVE MINE  
CHANNEL AT  
STA 156 TO 161



Trapezoidal Channel Analysis & Design  
Open Channel - Uniform flow

Worksheet Name: DBD CHANNEL AT 156

Comment: CHANNEL AT STA 156 TO 161

Solve For Depth

Given Input Data:

Bottom Width.....	1.50 ft
Left Side Slope..	1.50:1 (H:V)
Right Side Slope.	1.50:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0600 ft/ft
Discharge.....	4.07 cfs

Computed Results:

Depth.....	0.42 ft
Velocity.....	4.60 fps
Flow Area.....	0.88 sf
Flow Top Width...	2.75 ft
Wetted Perimeter.	3.00 ft
Critical Depth...	0.51 ft
Critical Slope...	0.0280 ft/ft
Froude Number....	1.43 (flow is Supercritical)

Open Channel Flow Module, Version 3.21 (c) 1990  
Haestad Methods, Inc. \* 37 Brookside Rd \* Waterbury, Ct 06708

FIGURE 3

## RIPRAP SIZING

### RIPRAP SIZING FOR TRAPAZOIDAL DITCHES

ENTER LISTED PARAMETERS

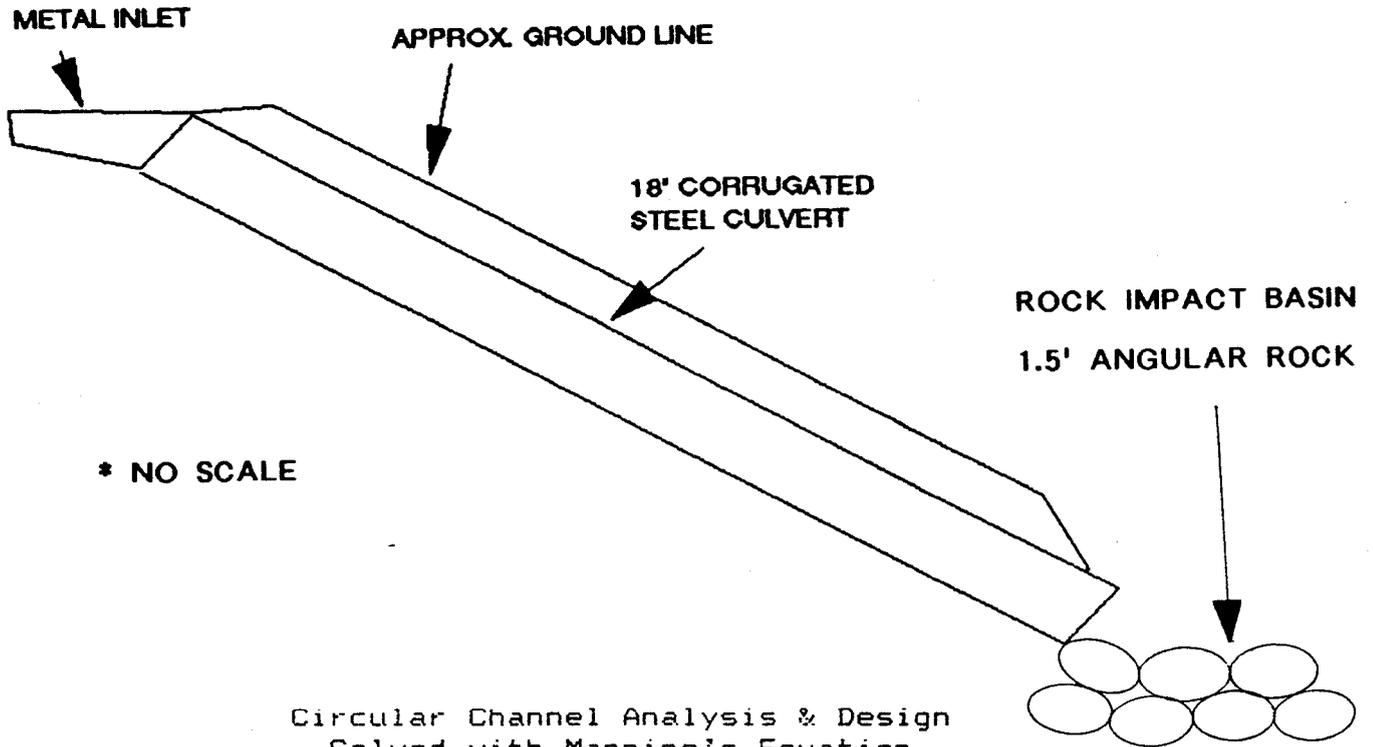
1. FLOW RATE (CFS) 4.07
2. CHANNEL SLOPE .06
3. BOTTOM WIDTH (FT) 1.5
4. SIDE SLOPE .66
5. PHI ANGLE 42
6. SPECIFIC GRAVITY OF RIPRAP 2.65

DESIRED SAFETY FACTOR FOR CHANNEL BOTTOM 1

DESIRED SAFETY FACTOR FOR CHANNEL BANKS 1

VELOCITY	DEPTH	D50	S.F. BTM	S.F. BANK
4.433	.427	.6716	1.806	1

# DBD CULVERT ROAD DRAINAGE AT STA 161



Circular Channel Analysis & Design  
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: DBD CULVERT AT 161

Comment: ROAD DRAINAGE CULVERT AT STA 161 OUTLET

Solve For Actual Depth

**Given Input Data:**

Diameter.....	1.50 ft
Slope.....	0.4000 ft/ft
Manning's n.....	0.014
Discharge.....	4.07 cfs

**Computed Results:**

Depth.....	0.26 ft
Velocity.....	19.75 fps
Flow Area.....	0.21 sf
Critical Depth....	0.77 ft
Critical Slope....	0.0063 ft/ft
Percent Full.....	17.40 %
Full Capacity.....	61.69 cfs
QMAX @.94D.....	66.36 cfs
Froude Number.....	8.18 (flow is Supercritical)

Open Channel Flow Module, Version 3.21 (c) 1990  
Haestad Methods, Inc. \* 37 Brookside Rd \* Waterbury, Ct 06708

FIGURE 4

## **DES BEE DOVE LOWER BELTED ROAD DRAINAGE**

To help reduce the recent erosion on the Junction Road fillslope between STA 156+00 and 161+00 the following plan has been designed.

To divert the road runoff from the fillslope area, used mine belting will be installed along the existing guard rail. The installation would be as depicted on Figure 2.

To handle the diverted runoff and direct the flow into a natural channel, a designed rip-rap channel and culvert would be constructed and installed. These designs and cross-sections are shown on Figures 3 and 4. The culvert will have a metal collar at the inlet according to permit packet 5-1 drawing 19 of 38. Outlet velocity control will be accomplished by construction of a 4' x 10' rock gabion energy dissipator of 18" angular rock. The angular rock will be contained by wire mesh.

Flow calculations, designs and drawings are as follows:

### **DES BEE DOVE LOWER BELTED ROAD DRAINAGE DESIGN**

1. Area = 1.35 Acres (Figure 1)
2. Time of Concentration
  - a. Hydraulic Length - 1000 ft.
  - b. Average Slope - 7%
  - c. Velocity - 5.3 fps (Exhibit A)
  - d. Time of Concentration - .05 hr.
3. Curve Number
  - 80% at 98
  - 20% at 87
  - Weighted Average - 96 (Exhibit B)

AMENDMENT TO  
APPROVED Mining & Reclamation Plan  
Approved, Division of Oil, Gas & Mining

no. ACT/05/07-92C TM date 11/3/92

**4. Design Flow**

**4.07 cfs (Table 1)**

**10 yr./6 hr. Storm Event**

**5. Guard Rail Belting Installation**

**Figure 2**

**Length - Approx. 600 ft.**

**To Divert Road Runoff Away From Fillslope.**

**6. Channel Design**

**Figure 3**

**Rip-rap Sizing Calculation**

**Rip-rap Gradation**

**% smaller than given size by weight**

<b>70-100</b>	<b>14"</b>
<b>50-70</b>	<b>12"</b>
<b>35-50</b>	<b>9"</b>
<b>2-10</b>	<b>3"</b>

**Length - Approx. 270 ft.**

**7. Culvert Design**

**Figure 4**

**Length - Approx. 80 ft.**

**8. Erosion Protection**

**Energy Dissipator - Rock Gabion, 4' x 10' of 18" angular rock. (See Fig. 4)**

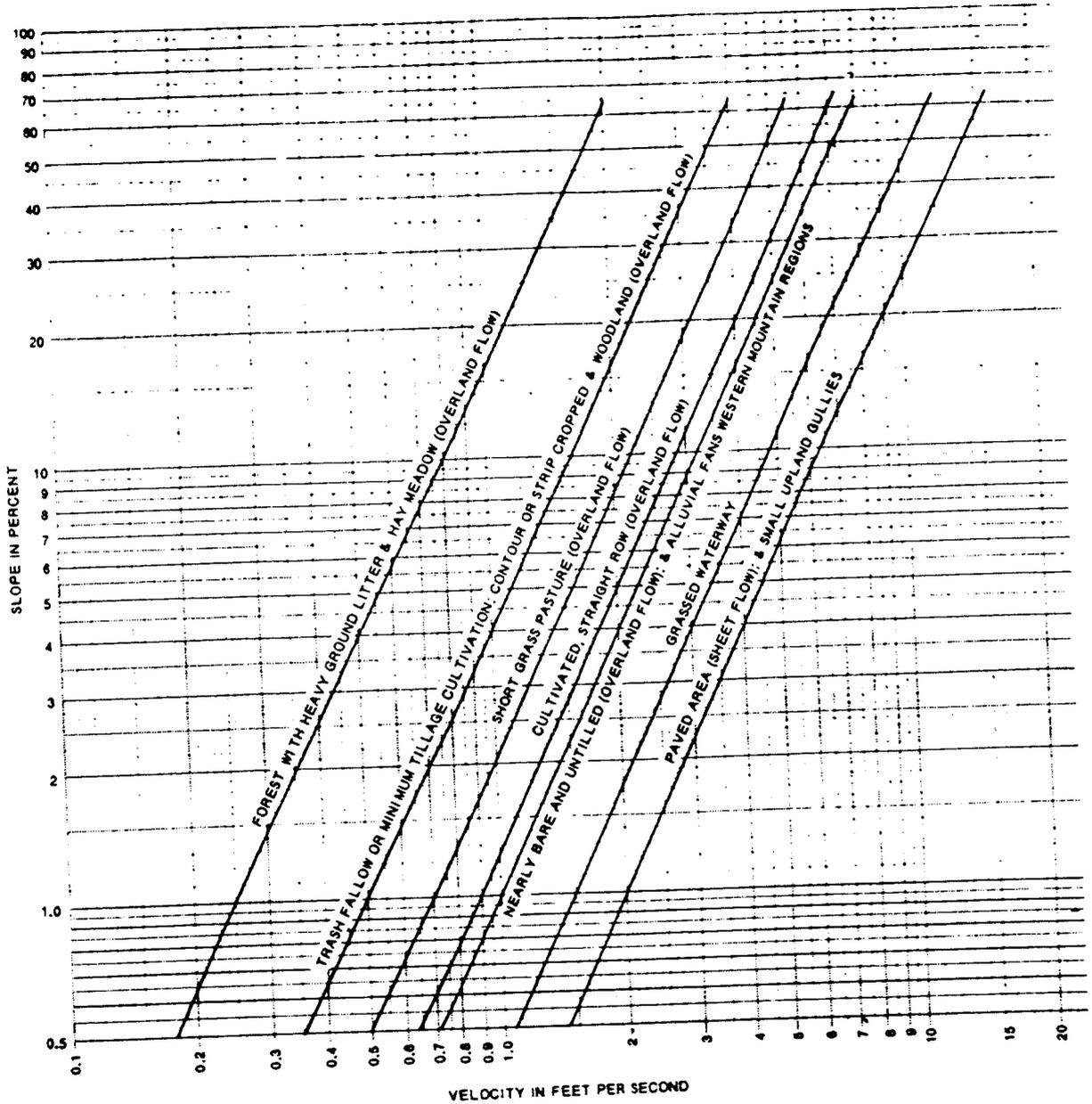
**Angular rock will be contained by wire mesh**

**AMENDMENT TO**

**APPROVED Mining & Reclamation Plan**  
**Approved, Division of Oil, Gas & Mining**

**ACT/015/017 - 92C IM date 11/3/92**





FROM "NEH" SECTION 4

Figure 15.2.—Velocities for upland method of estimating  $T_c$

AMENDMENT TO

APPROVED Mining & Reclamation Plan  
 approved, Division of Oil, Gas & Mining

ACT/015/07-92C TM date 11/3/92

EXHIBIT A

Table 9.1.--Runoff curve numbers for hydrologic soil-cover complexes  
(Antecedent moisture condition II, and  $I_a = 0.2 S$ )

Land use	Cover		Hydrologic soil group				
	Treatment or practice	Hydrologic condition	A	B	C	D	
Fallow	Straight row	----	77	36	91	94	
Row crops	"	Poor	72	81	88	91	
	"	Good	67	78	85	89	
	Contoured	Poor	70	79	84	88	
	"	Good	65	75	82	86	
	"and terraced " " "	Poor Good	66 62	74 71	80 78	82 81	
Small grain	Straight row	Poor Good	65 63	76 75	84 83	88 87	
	Contoured	Poor Good	63 61	74 73	82 81	85 84	
	"and terraced	Poor Good	61 59	72 70	79 78	82 81	
	Close-seeded legumes <u>1/</u> or rotation meadow	Straight row	Poor Good	66 58	77 72	85 81	89 85
		Contoured	Poor Good	64 55	75 69	83 78	85 83
"and terraced		Poor Good	63 51	73 67	80 76	83 80	
Pasture or range			Poor Fair Good	68 49 39	79 69 61	86 79 74	89 84 80
		Contoured	Poor Fair Good	47 25 6	67 59 35	81 75 70	88 83 79
	Meadow	Good	30	58	71	78	
	Woods		Poor Fair Good	45 36 25	66 60 55	77 73 70	83 79 77
		Farmsteads	----	59	74	82	86
Roads (dirt) <u>2/</u> (hard surface) <u>2/</u>		---- ---	72 74	82 84	87 90	89 92	

1/ Close-drilled or broadcast.  
2/ Including right-of-way.

FROM "NEH" SECTION 4

AMENDMENT TO  
 APPROVED Mining & Reclamation Plan  
 Approved, Division of Oil, Gas & Mining  
 by ACT 015/017-92C TWA date 11/3/92

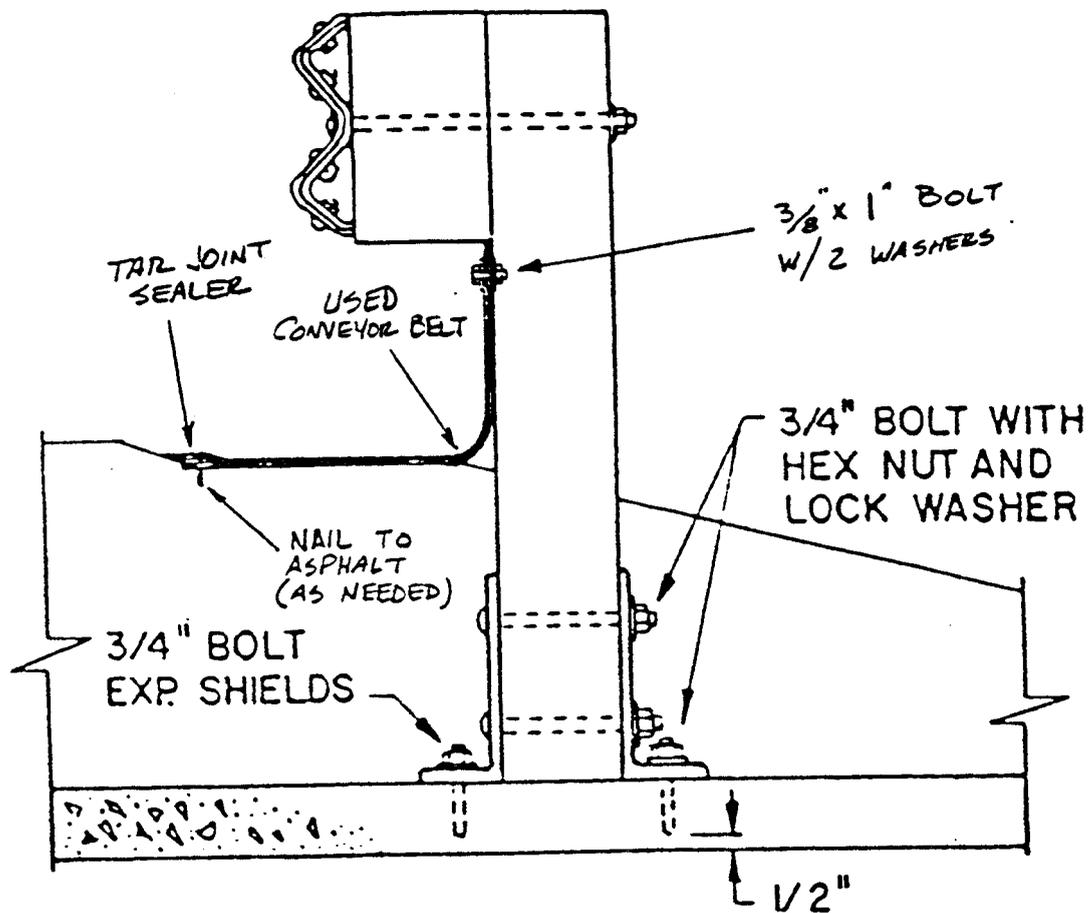
INPUT SUMMARY  
FOR W.S.: DBD LOWER BELTED ROAD DRAINAGE

STORM:	WATERSHED:
DISTRIBUTION =SCS TYPE 2	LAND SLOPE = 0.0000 PCT
PRECIP.DEPTH = 1.20 IN	CURVE NUMBER = 96.00
DURATION = 6.00 HR	CHANNEL LENGTH = 0.00 FT
NUMBER OF LINES = 915	TIME OF CONC. = 0.0500 HR
	AREA = 1.35 AC
	D = 0.0067 HR

OUTPUT SUMMARY

RUNOFF DEPTH = 0.8121 IN
INITIAL ABSTRACTION = 0.0833 IN
PEAK FLOW = 4.07 CFS ( 2.9903 IPH)
AT T = 3.13 HRS

AMENDMENT TO  
APPROVED Mining & Reclamation Plan  
Approved, Division of Oil, Gas & Mining  
by ACT/05/07-92C JM date 11/3/92



TYPICAL GUARD RAIL

BELTING INSTALLATION

AMENDMENT TO  
 APPROVED Mining & Reclamation Plan  
 Approved, Division of Oil, Gas & Mining  
 BY ACT/OS-D7-92C TWD date 11/3/92

FIGURE 2

# RIPRAP SIZING

## RIPRAP SIZING FOR TRAPEZOIDAL DITCHES

ENTER LISTED PARAMETERS

1. FLOW RATE (CFS) 4.07
2. CHANNEL SLOPE .06
3. BOTTOM WIDTH (FT) 1.5
4. SIDE SLOPE .50
5. PHI ANGLE 42
6. SPECIFIC GRAVITY OF RIPRAP 2.65

DESIRED SAFETY FACTOR FOR CHANNEL BOTTOM 1

DESIRED SAFETY FACTOR FOR CHANNEL BANKS 1

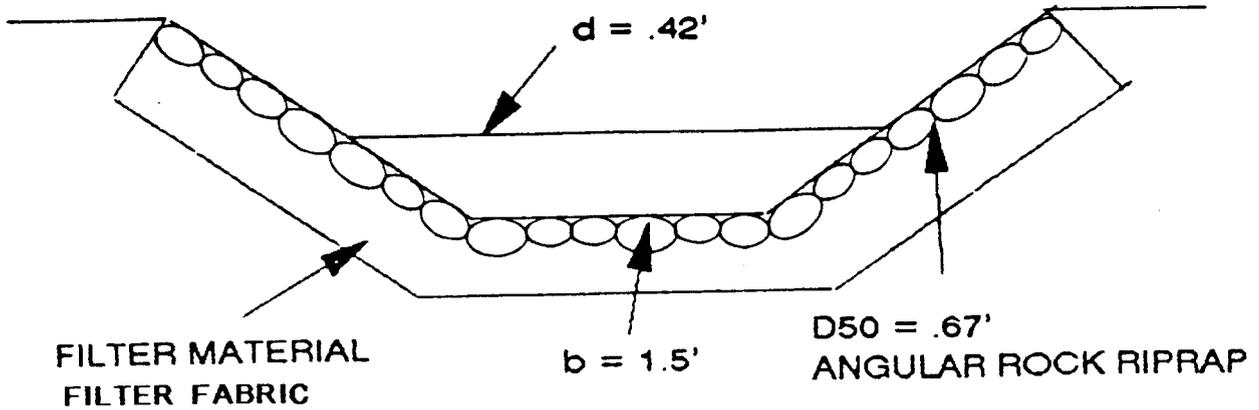
VELOCITY	DEPTH	SSO	S.F. STM	S.F. BANK
4.433	.427	.6716	1.806	1

AMENDMENT TO

APPROVED Mining & Reclamation Plan  
Approved, Division of Oil, Gas & Mining

by ACT/015/017-920 TM date 11/3/92

DES-BEE-DOVE MINE  
CHANNEL AT  
STA 156 TO 161



Trapezoidal Channel Analysis & Design  
Open Channel - Uniform flow

Worksheet Name: DBD CHANNEL AT 156

Comment: CHANNEL AT STA 156 TO 161

Solve For Depth

Given Input Data:

Bottom Width.....	1.50 ft
Left Side Slope..	1.50:1 (H:V)
Right Side Slope.	1.50:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0600 ft/ft
Discharge.....	4.07 cfs

Computed Results:

Depth.....	0.42 ft
Velocity.....	4.60 fps
Flow Area.....	0.88 sf
Flow Top Width...	2.75 ft
Wetted Perimeter.	3.00 ft
Critical Depth...	0.51 ft
Critical Slope...	0.0280 ft/ft
Froude Number....	1.43 (flow is Supercritical)

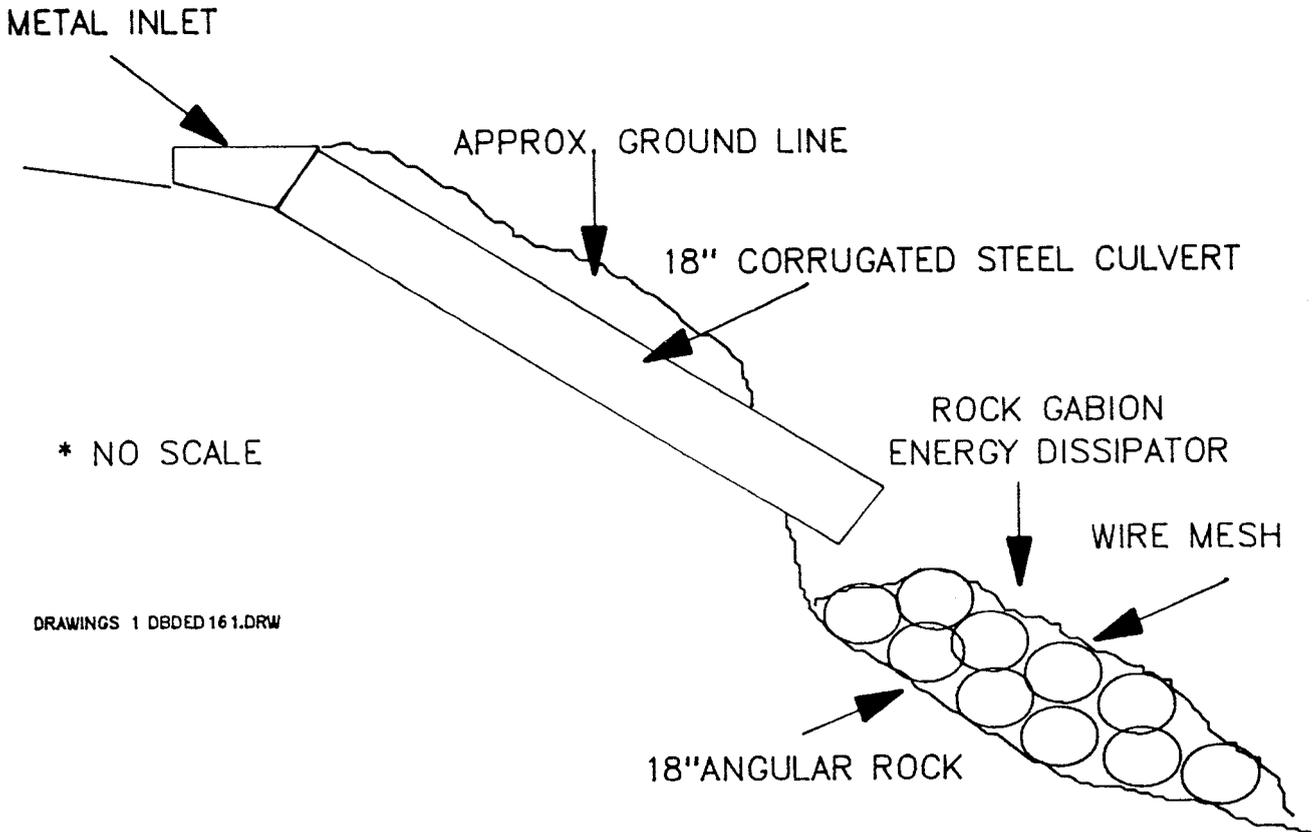
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 Approved, Division of Oil, Gas & Mining

DW ACT/015/017-92c-TM date 11/3/92

Open Channel Flow Module, Version 3.21 (c) 1990  
 Haestad Methods, Inc. \* 37 Brookside Rd \* Waterbury, Ct 06708

FIGURE 3

# DBD CULVERT ROAD DRAINAGE AT STA 161



\* NO SCALE

DRAWINGS 1 DBDED161.DRW

Circular Channel Analysis & Design  
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: DBD CULVERT AT 161

Comment: ROAD DRAINAGE CULVERT AT STA 161 OUTLET

Solve For Actual Depth

Given Input Data:

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Full Capacity.....	61.69 cfs
GMAX @.94D.....	66.36 cfs
Froude Number.....	8.18 (flow is Supercritical)

Open Channel Flow Module, Version 3.21 (c) 1990  
Haestad Methods, Inc. \* 37 Brookside Rd \* Waterbury, Ct 06708

**AMENDMENT TO**

**APPROVED Mining & Reclamation Plan**  
Approved, Division of Oil, Gas & Mining

by ACT/dsl/cl7 92C JMC date 11/3/92

**FIGURE 4**