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John J. Whitehead  
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Salt Lake City, Utah 84180-1203

**RECEIVED**  
NOV 14 1988

DIVISION OF  
OIL, GAS & MINING  
11 November 1988

Dear Mr. Whitehead:

Ref: Bear Canyon Mine, INA/015/025, Co-Op Mining Company, Emery  
County, Utah, Hiawatha Seam Drainage

Enclosed are two copies of the revision requested pertaining to  
the Hiawatha Seam Drainage structure which has been installed at  
Bear Canyon Mine.

I am working on the response to the Mid-Term Review which is  
presently due 14 November 1988; I will not be able to submit a  
complete response for all of the items on that date. All of the  
information that I need has not been received from others working  
on this project, such as maps from Dan Guy. I do not wish to  
excuse myself at the blame of anyone, but I have found more  
coordination problems in the text than I originally anticipated.  
Formatting of pages and sections is just one of the items that  
needs to be addressed, in addition to the content structure, before  
I will feel good about the MRP. Figure numbers were apparently not  
all corrected to match the text when the Mid-Term was submitted.  
I will call you about this matter and I hope that we can reach an  
agreement on a good time table, but I feel that there is a good 100  
hrs remaining simply to adequately address these coordination  
problems.

Thank you for your cooperation in this matter.

Sincerely,



Kimly C. Mangum, P.E.  
Permitting & Compliance Consultant.

cc: E. Kingston  
W. Owen

and D-2D. It is proposed to install a 15 in. flexible culvert as shown on Plate 7-1, and Plate 2-2 to convey the drainage from the upper areas of the channel beneath the pad to the coal storage pad below. Installation details are shown in Figures 7.2-1 (Downspout Structure), 7.2-2 (Collection Box), 7.2-3 (Open Culvert Section), 7.2-4 (Buried Cross Sections), 7.2-5 (Exposed Section Anchor) and 7.2-6 (Outlet Protection). Rip-rap specifications will be adhered to as specified.

The pad and channel will be constructed prior to placing the flexible culvert in the excavated channel. Where the culvert is on a slope too steep for backfilling to be practical, the culvert will be anchored as shown in Figure 7.2-5. The remaining sections will be backfilled (Figure 7.2-4) and all heavy equipment will be precluded from the area to avoid an accidental crushing of the culvert. The flexible culvert is designed to withstand being buried but will not hold up under heavy equipment traffic.

The channel is included in drainage area AD-1 (Plate 7-5). The maximum flow calculated for this channel is shown on Table 7.2-8 as 1.5 cfs (Ditch D-2D). Based on this flow, the new culvert designated C-4D, is sized matching the criteria for culvert C-1D, shown on Table 7.2-7. Calculations for this ditch are shown in Appendix 7-F under Run-off Ditch Sizing. The headwater depth above the top of the proposed culvert inlet is 1 ft more than adequate to carry the expected flow. Energy dissipaters will be placed as

indicated in the following sections (7.2.6.2.2 and 7.2.6.2.3).

The out-slope of the pad will be protected by the installation of 6 in. M.D. rock along the area where drainage will occur. The only drainage that will reach the toe of the pad is that from the upper pad to the lower; the majority of the drainage above will be conveyed through the culvert. The 6 in. rock will be more than adequate, since the approved plan calls for natural 6 in. rip-rap in the post-mining channel that will carry not only the disturbed drainage AD-1, but the undisturbed drainage from AU-3 as well.

The ditch in this area has been measured, and typical section is shown on Plate 7-8 as cross-section D-D. The ditch profile is also shown on this plate as Profile "F." Plate 7-8/A is a typical section of the proposed channel restoration in the area of the portal pad and culvert, after their removal and upon final reclamation.

DRAINAGE CONTROL SYSTEM BEAR CANYON NO. 1 MINE LOWER SEAM PORTAL AREA

- a. Upper Pad. Drainage from the disturbed area on the upper pad from the sub-station to culvert C-OD, will continue to flow into culvert C-OD, as approved; the only change will be the outlet location of the flexible culvert will be moved approximately 20 ft to the west to direct runoff onto the rock

ledge above the Lower Seam (Hiawatha) portals; water will then flow over the rock ledge to the portal pad below;

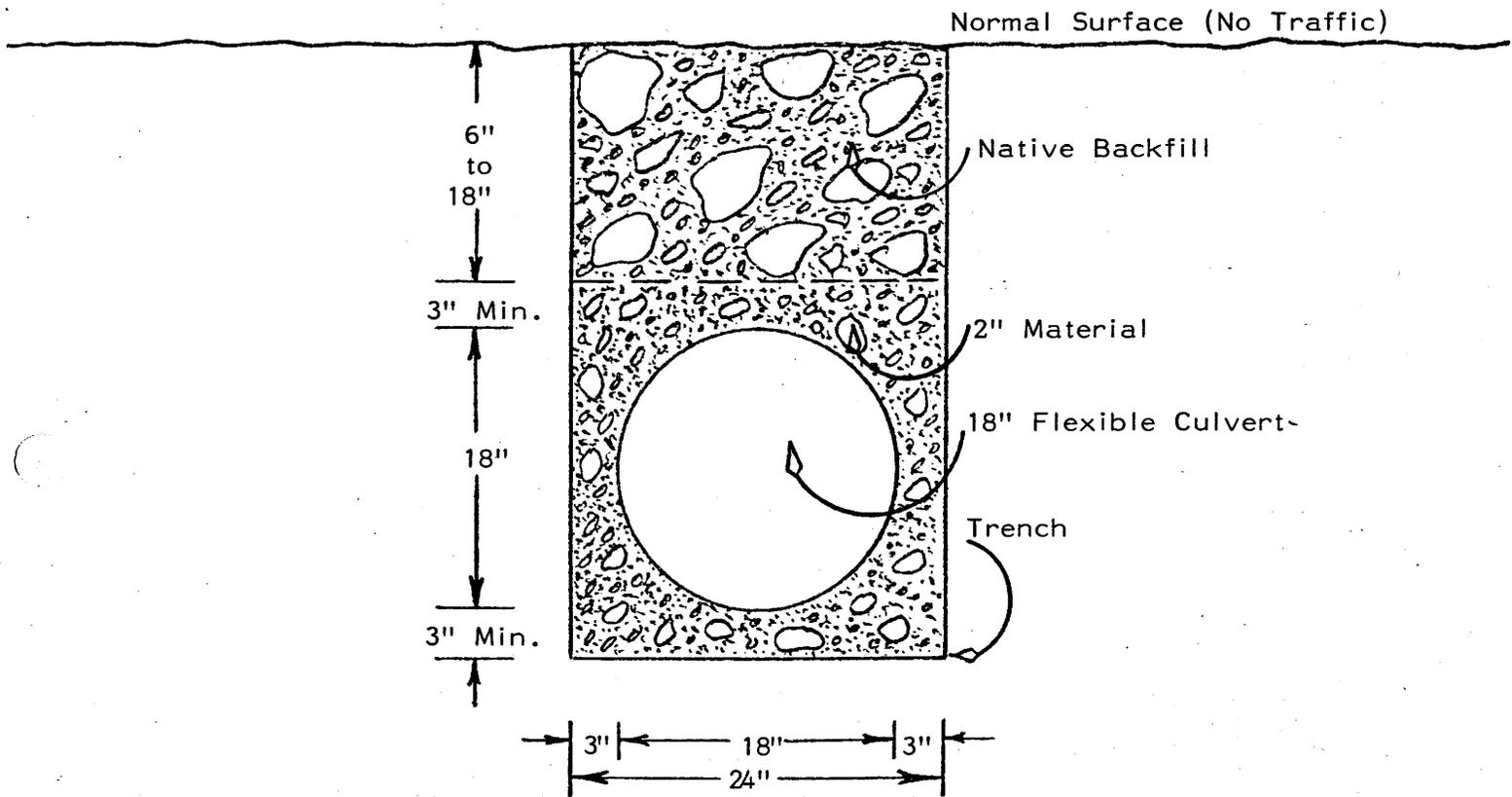
- b. Portal Pad. The northeast corner of the bin will be bermed a minimum of 30 in. high over to the highwall. Runoff water from the upper pad will flow southward around the bin and into a collection box at the edge of the portal pad area; the pad will be sloped to flow to the box;
- c. Flexible Culvert. The collection box at the portal pad will discharge into a flexible culvert with a minimum diameter of 15 in. (a larger pipe may be used, depending on availability); the culvert will drop onto the next lower pad area (Conveyor Support Pad);
- d. Conveyor Support Pad. This pad will be sloped to drain to the flexible culvert area; the flexible culvert will be opened (or replaced with 1/2 round culvert) for a distance of at least 8 ft to allow surface water to enter the culvert; the entrance to the culvert will be protected by a trash rack and grouted as shown on the attached typical drawing; water will then flow down the flexible culvert to the Coal Processing pad area.
- e. Coal Processing Pad. This pad will also be sloped to drain to the culvert; another 8 ft opening will be left in the

culvert for the surface runoff; water will then be conveyed down to the lower (Lump Coal) pad area;

- f. Lump Coal Pad. The flexible culvert will parallel the conveyor down to the lump coal bin, pass beneath the bin supports, and empty into a catch basin/energy dissipater just south of the bin; runoff will then flow south into ditch D-4D and pass through culvert C-2D and onto Sediment Pond "A."

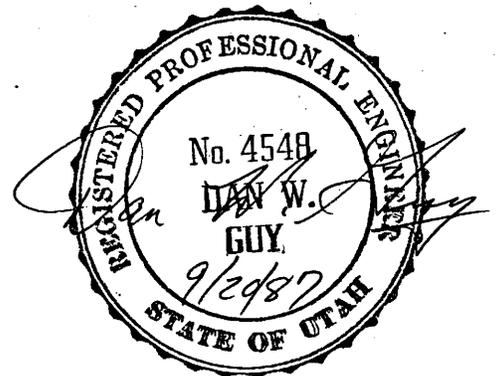
The revised drainage is shown on Plate 2-2. Detailed drawings of the various drainage controls are shown in the attached typicals. Sizing calculations are summarized on the following sheet: "Lower Seam Portal Area - Drainage Sizing Calculations."

CROSS-SECTION OF  
BURIED FLEXIBLE CULVERT



Scale 1" = 1'

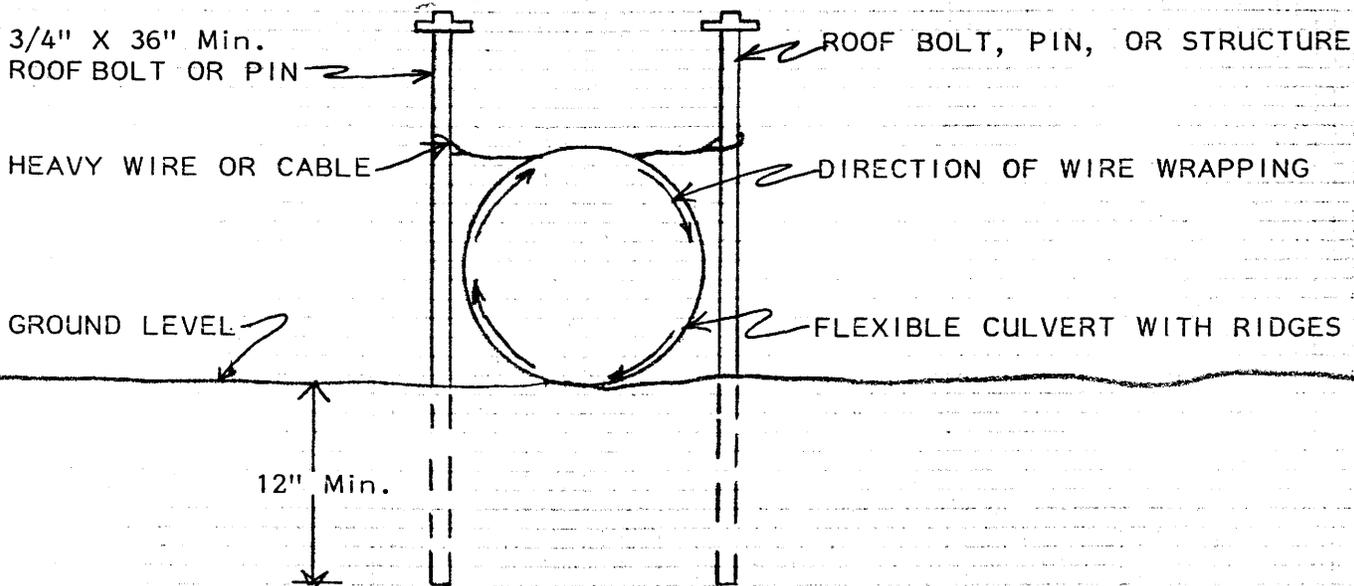
FIGURE 7.2-4 Buried Flexible Culvert



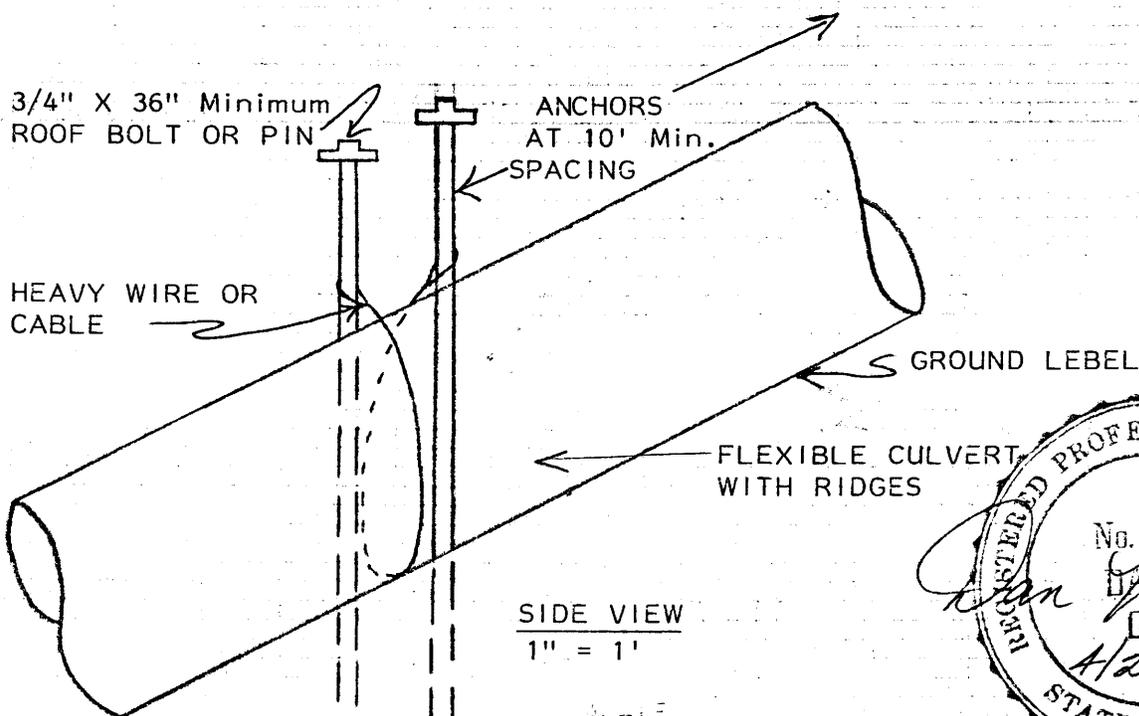
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TYPICAL ANCHOR FOR  
EXPOSED FLEXIBLE CULVERT

NOTE: In all areas where the flexible culvert is not buried, it will be anchored per this typical.

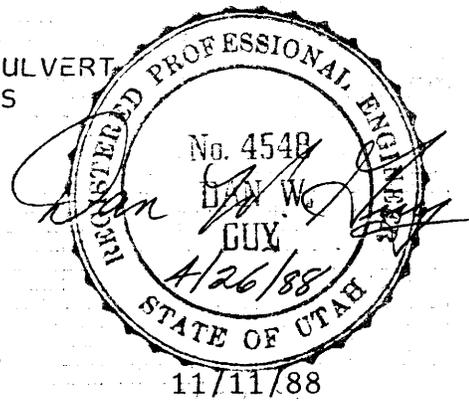


END VIEW  
1" = 1'



SIDE VIEW  
1" = 1'

FIGURE 7.2-5 Exposed Culvert Anchor



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DOWNSPOUT STRUCTURE

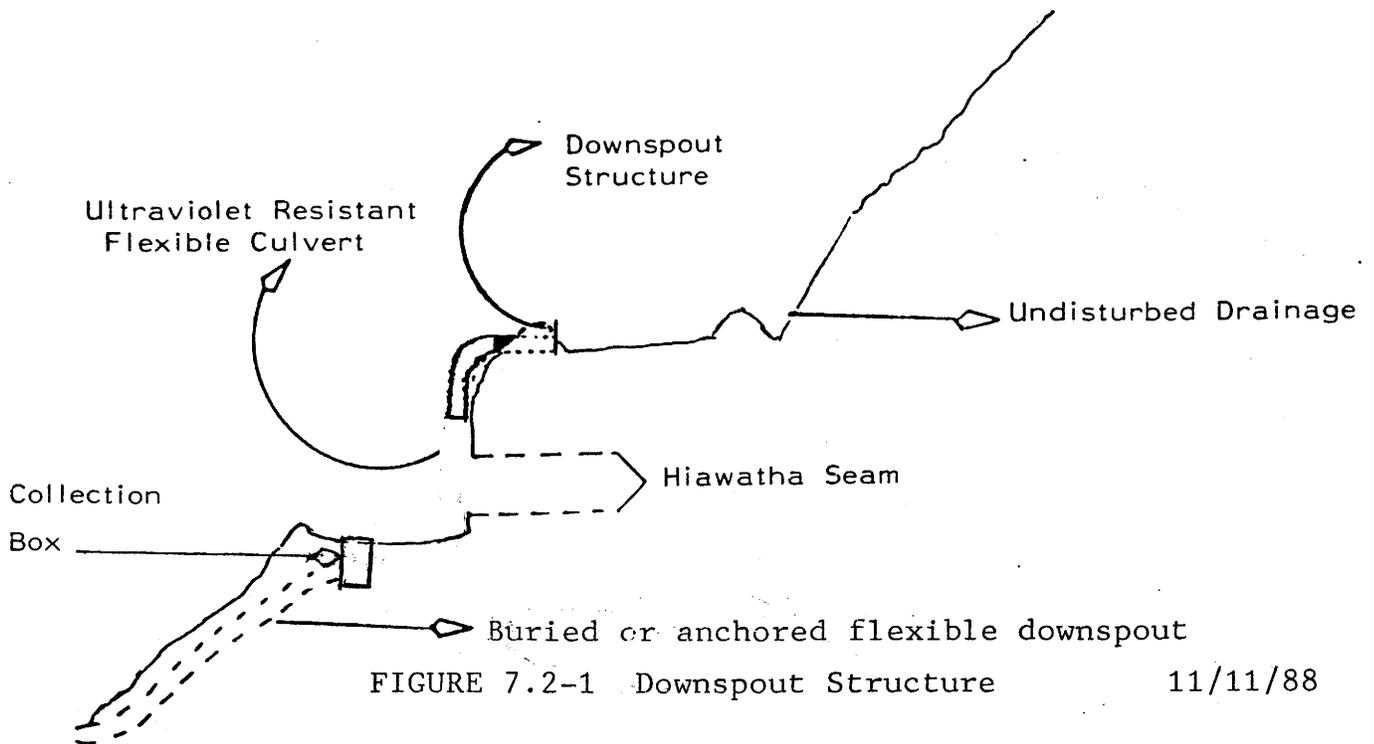
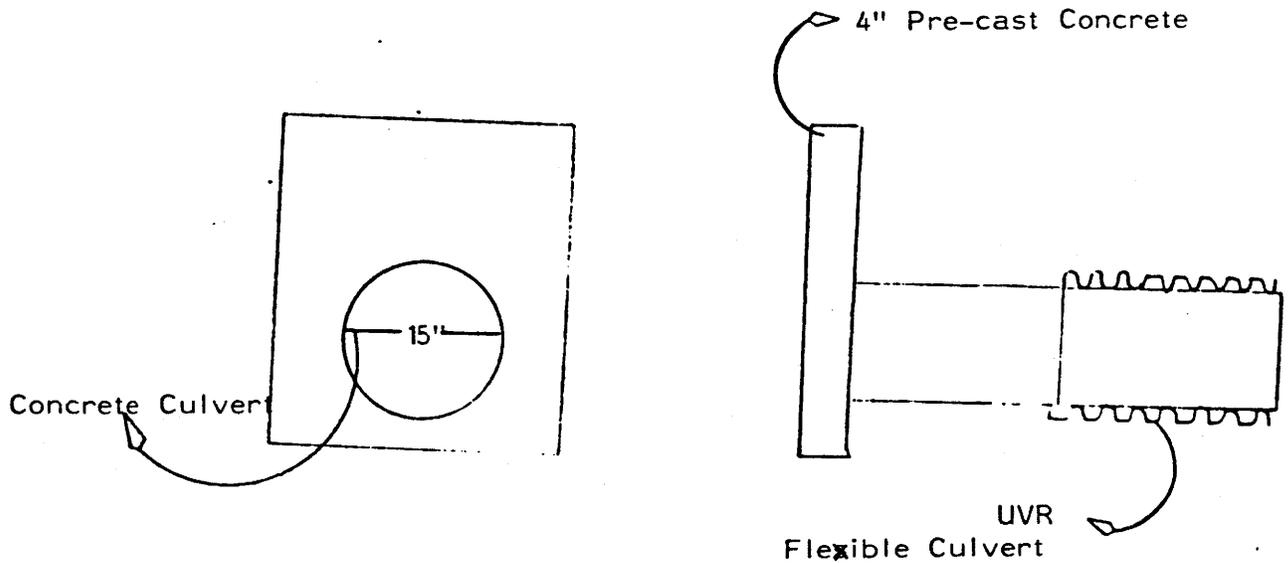
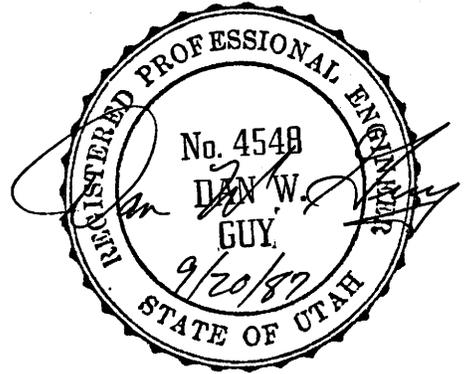
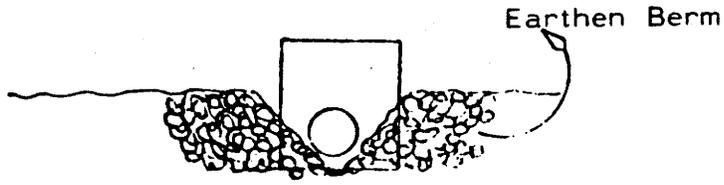
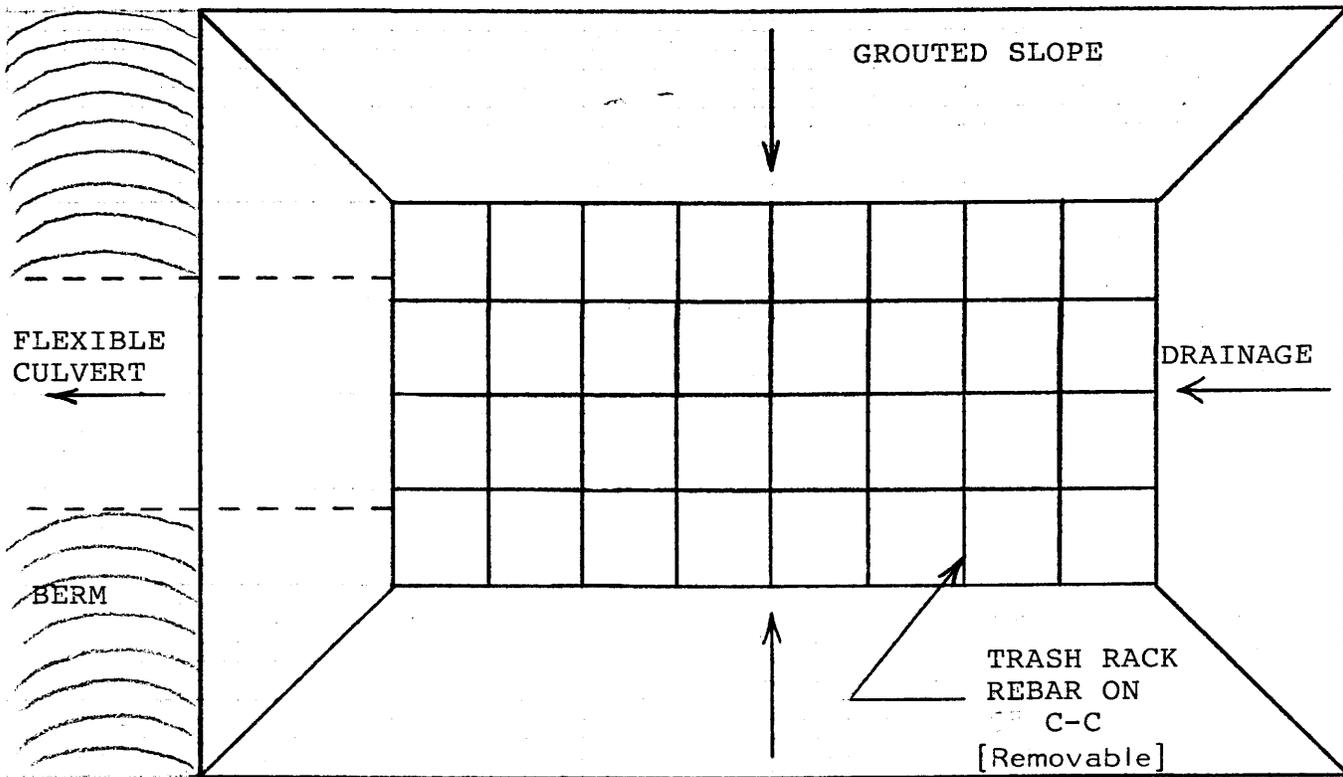
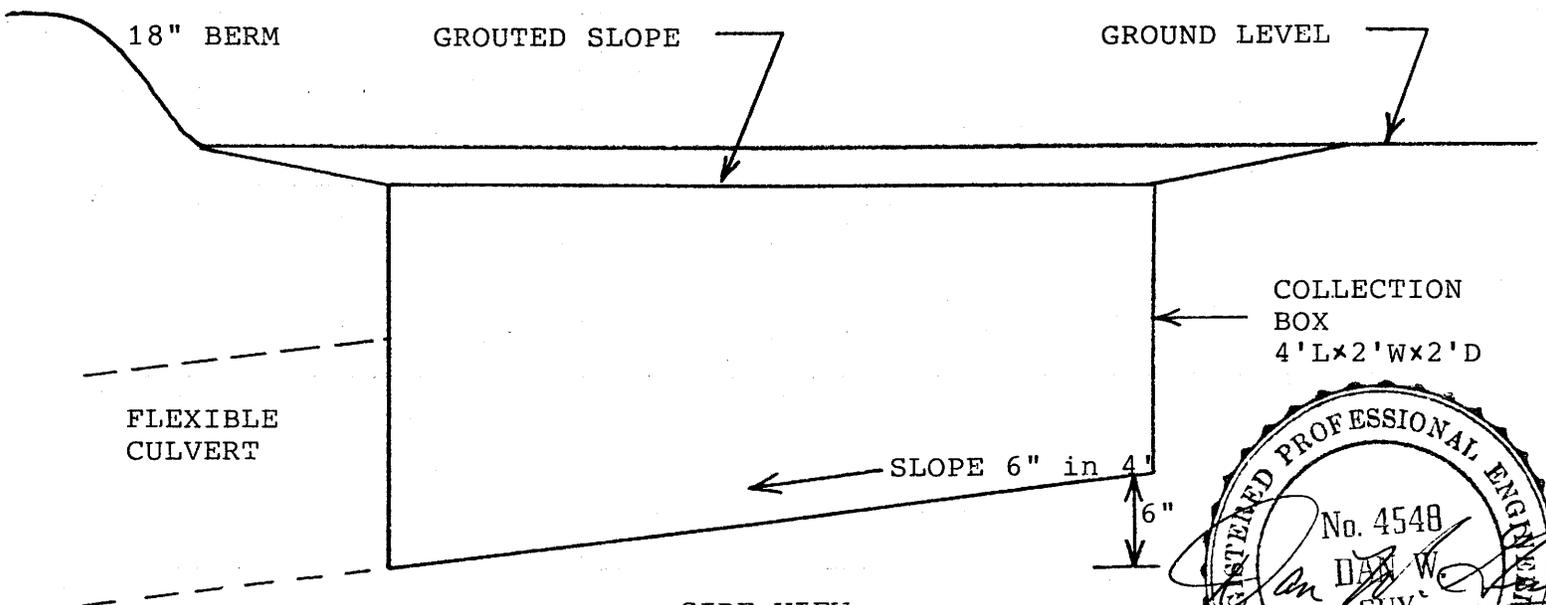


FIGURE 7.2-1 Downspout Structure

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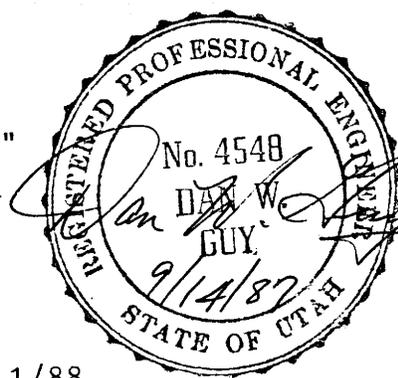


TOP VIEW



SIDE VIEW

FIGURE 7.2-2 Collection Box



BY D. GUY DATE 9/14/87

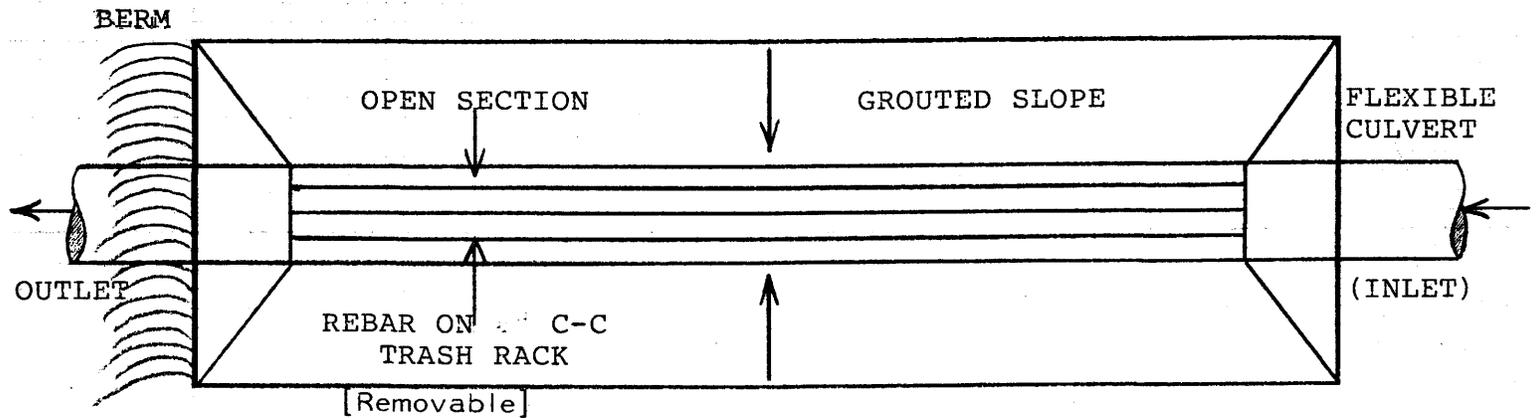
SUBJECT OPEN CULVERT TYPICAL SEC.

SHEET NO. .... OF.....

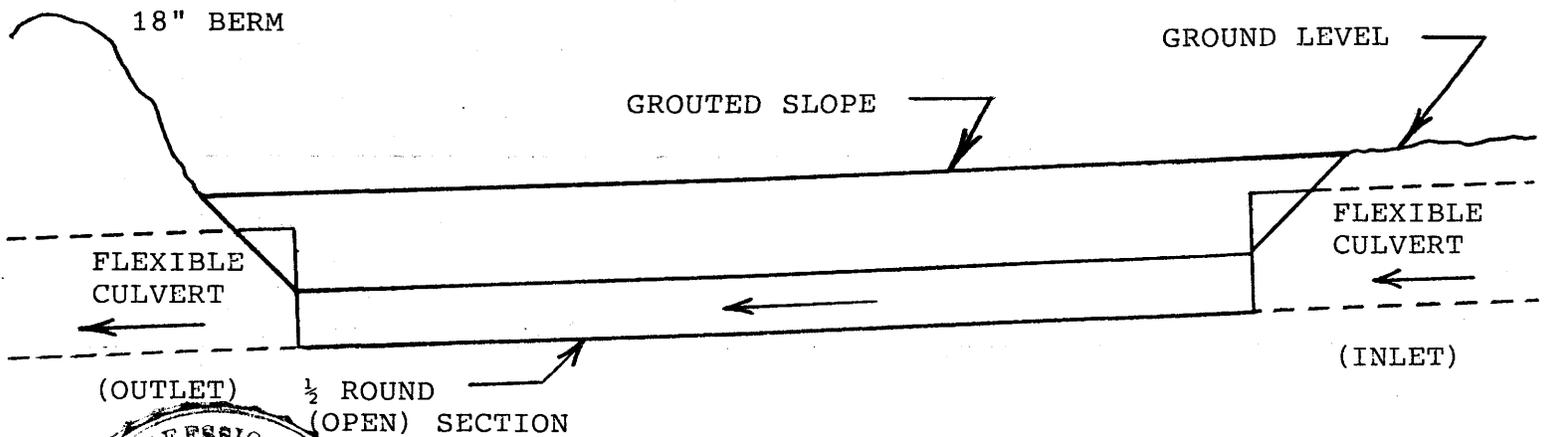
CHKD. BY ..... DATE .....

JOB NO. ....

SCALE: 1"=2'



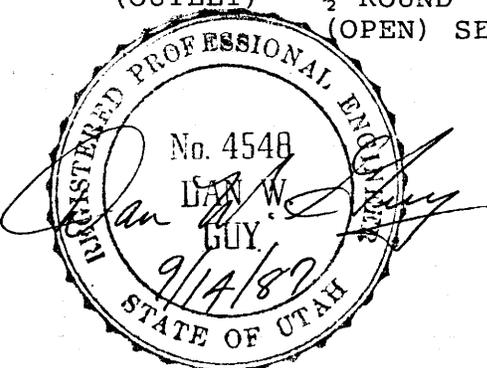
TOP VIEW



SIDE VIEW

FIGURE 7.2-3 Open Culvert Typical Section

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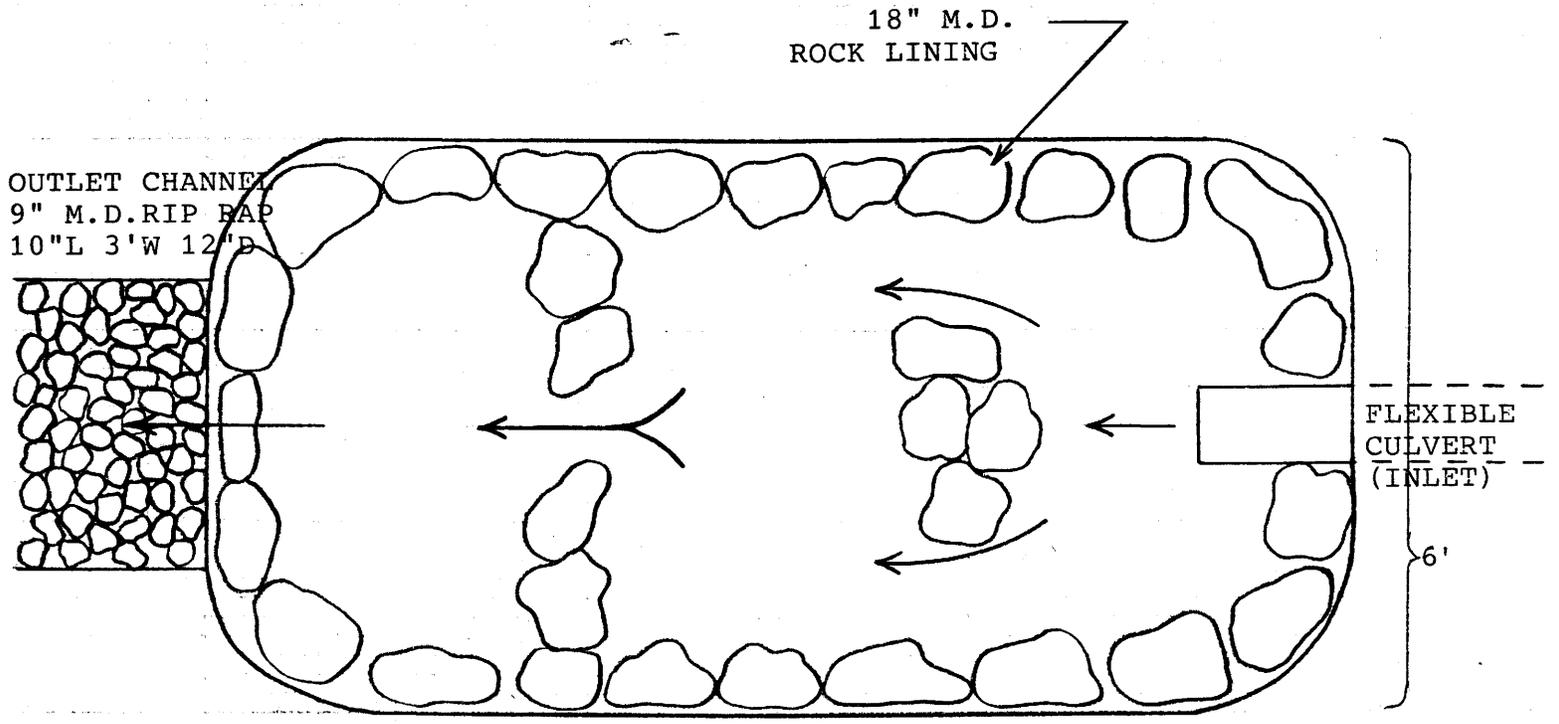


BY D. GUY DATE 9/14/87  
CHKD. BY DATE

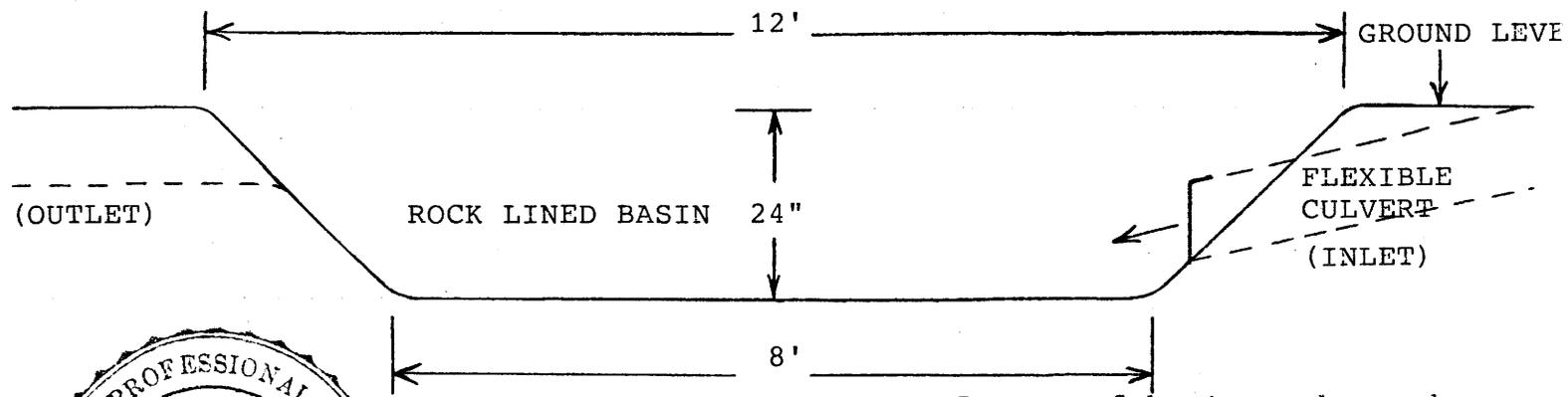
SUBJECT CATCH BASIN ENERGY DISSIPATOR  
SCALE: 1"=2'

SHEET NO. OF  
JOB NO.

\*Revised 8/28/88



TOP VIEW



SIDE VIEW

Bottom of basin to be rock lined (18 in. M.D.) if bed-rock is not found during installation.

FIGURE 7.2-6 Catch Basin



11/11/88