



May 31, 2012

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DIVISION OF  
RECLAMATION MINING & SAFETY

Mr. G. Russell Means  
Environmental Protection Specialist  
Division of Reclamation, Mining and Safety  
101 South 3<sup>rd</sup> Street, Suite 301  
Grand Junction, CO 81501

and via email to Russ.Means@state.co.us

**RE: Nuvemco, LLC's Last Chance Mine, File No. M-2008-012  
Technical Revision No. 1**

Dear Mr. Means,

As we previously discussed enclosed are three copies of Technical Revision No. 1 for Nuvemco's above referenced Last Chance Mine permit. Nuvemco has provided a check for the filing fee of \$1006. Also enclosed is a copy of the Federal Express address label to the Montrose County Clerk and Records office in Nucla, requesting that they file this Technical Revision in the library with the rest of the permit. We will send you the receipt as soon as we get it back from them.

Please advise if you need any further information or documentation.

Very truly yours,

**AMEC Environment and Infrastructure**

E. Thomas Cavanaugh, CPG, PG  
Senior Geologist Energy Resources

From: (303) 292-5365  
Tom Cavanaugh

Origin ID: WHHA



1819 Denver West Drive  
Bldg 26, Suite 100  
Golden, CO 80401



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SHIP TO: (970) 241-1117

BILL SENDER

Montrose County Clerk and Recorder

300 Main Street

Nucla, CO 81424

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CAD: 101080566/NET3250

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Dept #

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- 2 Fold the printed page along the horizontal line
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**Last Chance Mine  
Permit No. M-2008-012  
112d (1)**

**Technical Revision No. 1**

**Amendment of Exhibit T, Designated Mining Operation  
Environmental Protection Plan:**

***Sec. 10 - Surface Water Control and Containment Facilities  
Information,***

***Appendix I - Storm Water Management Plan, March 2010***

***Sec. 15 - Construction Schedule Information, and***

***Sec. 18 - Wildlife Protection***

**Submitted to:  
Division of Reclamation, Mining and Safety**

**Prepared for:  
Nuvemco, LLC  
125 Continental View Drive  
Boulder, CO 80303**

**Prepared by:  
AMEC Environment & Infrastructure  
1819 Denver West Drive, Ste 100  
Golden, CO 80401**

**May 2012**

The Colorado Division of Reclamation, Mining and Safety ("DRMS") is herein presented Technical Revision No. 1 for the Last Chance Mine, Permit No. M-2008-012, a 112d (1) Designated Mining Operation ("Last Chance Mine DMO") issued to Nuvemco, LLC ("Nuvemco").

By way of background, DRMS requested that Nuvemco review the Storm Water Management Plan (SWMP) and related structures to ensure that they meet the design criteria of the Rules Exhibit U (formerly Exhibit T), Sections 10 and 15, and Rule 7.3, which were issued by DRMS subsequent to the approval of the Last Chance Mine DMO. Based upon review, this Technical Revision No. 1 was prepared, which includes minor modifications to the following DMO Environmental Protection Plan (EPP) sections:

- Sec. 10 - Surface Water Control and Containment Facilities Information
  - and by reference, the SWMP which was included as Appendix I of the permit application.
- Sec. 15 - Construction Schedule Information
- Sec. 18 - Wildlife Protection

Section 10 is amended to now read in entirety as follows, with discussion, background and calculations supporting these modifications included as exhibits.

**"10. Surface Water Control and Containment.**

Surface water runoff from the Last Chance mine drainage area will flow to two detention ponds as illustrated on Figure 1, Storm Water Controls. Ditches and berms will be constructed on the southwestern to northwestern sides of the Waste Rock Area (WRA) to prevent run-on from the rising slope to the south and to direct runoff from the WRA to Ponds No. 1 and No. 2 as shown. Most surface flows from the south will be diverted by ditches on both sides of Montrose County Road DD16. Location and construction of the berms and ditches adjacent to the WRA will be phased based upon the expanding size of the WRA during actual mining operations. WRA runoff to the south and east will be directed to the east for detention in Pond No. 2. The CDPHE Stormwater Discharge Permit No. COR-040230 and the Last Chance Mine Stormwater Management Plan are included in Appendix I, Other Agency Permits.

A ditch and/or slight berm will be constructed on the up-gradient side of the ore haulage road from the portal to the temporary ore stock pile site for drainage control. This will direct all flows from the ore stockpile back into the mine for total containment."

The management of storm water controls will be completed in phases as the WRA expands with continued mining. Three drainage areas are described on page 2 of the above referenced Storm Water Management Plan (SWMP). The mine is currently in maintenance and standby pending development drilling and improved economic conditions. As shown on Figure 1, the current waste rock area is smaller than the permitted size. Consequently, the drainage areas are configured differently and the detention ponds, for sediment control, are modified. Paragraphs 2, 3 and 4 of page 2 in the SWMP are revised by this TR to read as follows:

"Detention Pond No. 1

Runoff areas 1 and 3 have controls directing flow to Pond No. 1 as shown on Figures 1 and 2. Areas 1 and 3 combine to form the largest area, approximately 0.50 acres in size (21,798 ft<sup>2</sup>), including the northwestern and southwestern parts of the WRA. An earthen berm and ditch will be constructed on the southwest and northwest sides of the area to prevent run-on to the disturbed area and to direct runoff flows into Detention Pond No. 1 (sediment trap). All of the storm water generated from this area will flow to Pond No. 1, located in the north end of the study area. A schematic pond design is shown as Figure 3. When mining operations expand the WRA, the runoff controlling berms and ditches will be modified to contain all storm water and Pond No. 1 enlarged as needed. All of areas 1 and 3 will be considered disturbed in the run-off calculations.

Detention Pond No. 2

The study area is about 0.44 acres (18,944 ft<sup>2</sup>) including Pond No. 2 which is located and designed to detain runoff from the central part of the WRA and the mine entrance area as shown on Figure 1. A berm constructed across the southern part of the waste rock area will direct runoff to Pond No. 2. The eastern part of Area 2 is separated from the ore haulage road and temporary ore stockpile areas by a constructed berm. A topographic high separates this area from Area 3. Some run-on occurs from the small hill to the southwest which is vegetated with sage brush, juniper and native grasses. The remainder of the area is bare earth. All of the storm water generated from this area will flow into Pond 2.

The total area for all four runoff areas described above is 1.38 acres. Continued mining may result in the WRA expanding to the south and west with storm water controls expanding to encompass the entire mining area disturbance boundary."

This currently described configuration of the SWMP will be considered Phase I. Although areas, distances, time of concentration, etc., are reduced for this phase, to be conservative, the methodologies of the March 2010 SWMP will not be changed. The worst case cumulative precipitation from the 100-year, and 10-year, 24-hour events remains 0.413 feet of precipitation. The calculations of maximum runoff volume and required detention pond sizes for Phase I will be added to the SWMP on page 7, after the descriptions Maximum

Runoff Volumes for Pond No. 2 and before the last paragraph titled SEDIMENT YIELD, and shall read:

**“PHASE I MAXIMUM RUNOFF AND DETENTION POND VOLUME CALCULATIONS**

The maximum cumulative storm events will result in 0.413 feet of precipitation on the receiving disturbed areas generating the following quantities of storm water to be detained in ponds.

<u>Runoff Areas</u>	<u>Events Volume</u>	<u>Receiving Pond</u>
Areas 1 and 3	$21,798 \text{ ft}^2 \times 0.413 \text{ ft} = 9003 \text{ ft}^3$	Pond 1
Area 2	$18,944 \text{ ft}^2 \times 0.413 \text{ ft} = 7823 \text{ ft}^3$	Pond 2

Figure No. 3, Last Chance Pond No. 1 Design illustrates an idealized detention pond construction with 2:1, H:V interior walls constructed to a depth of 8 ft with a total volume of  $10,966 \text{ ft}^3$ , more than adequate to contain the maximum runoff. An alternate shape that fits the area and ground conditions may be constructed if it has a volume equal to  $9003 \text{ ft}^3$  or more and two sides with slopes no steeper than 2:1.

Pond No. 2, 55 ft long by 35 ft wide by 6 ft deep, with the interior ends sloping at 2:1, H:V will have a volume of  $9030 \text{ ft}^3$ , more than adequate to contain the maximum runoff. An alternate shape that fits the area and ground conditions may be constructed if it has a volume equal of  $7823 \text{ ft}^3$  or more and two sides with slopes no steeper than 2:1.”

Sections 15 and 18 are amended to now read in entirety as follows, with discussion, background and calculations supporting these modifications included as exhibits.

**“15. Construction Schedule Information.**

Nuvmco’s personnel, or contracted persons, will construct the ditches, berms, and ponds described in the Storm Water Management Plan, included as part of Section 10, as amended by this Technical Revision and the attached Figures 1 and 3. Construction will commence as soon as practicable, and within 60 days of DRMS approval of changes to assure sufficient time to comply with Rule 7.3.2. Nuvmco will provide an independent, certified verification that the facilities were constructed in accordance with the approved plan, and completed before October 1, 2012, for DRMS acceptance.”

**“18. Wildlife Protection**

The unlined water detention ponds at the Last Chance Mine area rarely contain any water. The ponds’ surface capacities are less than 1/2 acre each and mining activity is expected to deter wildlife from using the water on a frequent basis. The berm end slopes will be at least 2:1, horizontal:vertical, to facilitate egress should wildlife enter either pond.

Prepared by AMEC Environment & Infrastructure, this 31st day of May, 2012.



E. Thomas Cavanaugh, CPG, PG  
Senior Geologist Energy Resources

**Exhibits**

- Exhibit 1 – Explanation of Modifications

**Attachments**

- Figure No. 1. Last Chance Storm Water Controls; modified from Figure T-1, Storm Water Controls, of SWMP submitted March 2010, and Map C-5 of Permit Application.
- Figure No. 2. Last Chance Aerial Photo; modified from NAIP Imagery 2011, showing current extent of Mine Waste Rock Area with runoff areas.
- Figure No. 3. Last Chance Pond #1 Design.

## **Exhibit 1 – Explanation of Modifications**

Technical Revision No. 1 is proposed to meet DRMS requirements for this permit.

Figure No. 1 is modified from the Map C-5 – Mine Plan Map with Topography which is in Exhibit C of the Last Chance 112(d) Permit Application. Figure No. 2 is aerial imagery from the NATIONAL AGRICULTURE IMAGERY PROGRAM (NAIP) from August 2011 which shows the current extent of the Waste Rock Area (WRA) and was utilized to locate the existing WRA on Figure 1. The locations and configurations of the ditches, berms and ponds which control storm water runoff from the WRA will be determined and constructed in phases based upon mining activities. The Last Chance Mine is not currently being mined underground pending development drilling results and improved economic considerations. The WRA size and configuration is stable and smaller than the area used for calculations in the 2010 SWMP which provides latitude for alternative pond shapes to be constructed if they have equivalent volume. Nuvermco will revise the SWMP utilizing different sized, but volumetrically adequate detention ponds for sediment control. This modification will maximize the effectiveness of natural features. Figure No. 1 shows a smaller Pond No. 1 on the north and areas 1 and 3 on the west side of the WRA, dividing the area of precipitation runoff accordingly. Pond No. 2 is enlarged to manage a larger area including the central part of the WRA with berm controls. The northern temporary ore stockpile area as presented in the 2010 SWMP remains the same, as do the other inputs and calculations of the plan. The north and west parts of the Last Chance Permit have significant area to expand detention ponds for properly authorized expansion of mining operations in the future.

Modifications of the SWMP include managing the southwestern runoff from the Area 3 of the WRA and the northern runoff by Pond No. 1 with their respective berms and ditches. The berms prevent run-on from the undisturbed areas and the ditches direct WRA runoff to the respective ponds. Two detention ponds will be constructed to control runoff from precipitation falling on the WRA and other disturbed ground, minimizing additional disturbance until mining resumes. As shown corresponding to Phase 1, the current area drained to Pond No. 2 is 21,798 sq ft, or 0.50 acres and Pond No. 2 receives runoff from 18,944 sq ft, or about 0.43 acres. The Maximum Runoff Volume calculations on page 5 of the SWMP were modified accordingly.

Figure No. 3 is a schematic showing the design of Pond No. 1 with 2:1, horizontal to vertical slopes on compacted earthen berms on the north and west sides of the pond. The south side of the pond will be constructed after moving the trailer, to approximate the illustrated confining slopes. As shown and calculated from GIS measurements, the design will have a constructed volume of approximately 10,966 cu ft, greater than the 9003 cu ft required for the current phase of mining operations.

Pond No. 2 will be rectilinear, about 55 ft long by 35 ft wide and 6 ft deep with ends sloping at 2:1. This configuration creates a detention pond with a volume of 9030 cu ft, more than sufficient to hold the maximum runoff volume.



All pond, ditch, and berm construction will be completed by late summer. Before October 1, 2012, an inspection and certification by a professional engineer or other appropriately qualified professional will confirm that the facility was constructed in accordance with the approved design plan as required by Section 7.3.2 of the Rules.



NUVEMCO

125 Continental View Drive  
Boulder, Colorado 80303



2000 S. Colorado Blvd, Ste 2-1000  
Denver, Colorado 80222

## LAST CHANCE POND #1 DESIGN

Montrose County, Colorado

0 10 20 30 Feet  
1 inch = 30 feet

### Explanation of Features

- Ditch
- Outfall
- Pond
- Berm Area
- Runoff Area

Date: 5/31/2012

Checked By: Tom Cavanaugh

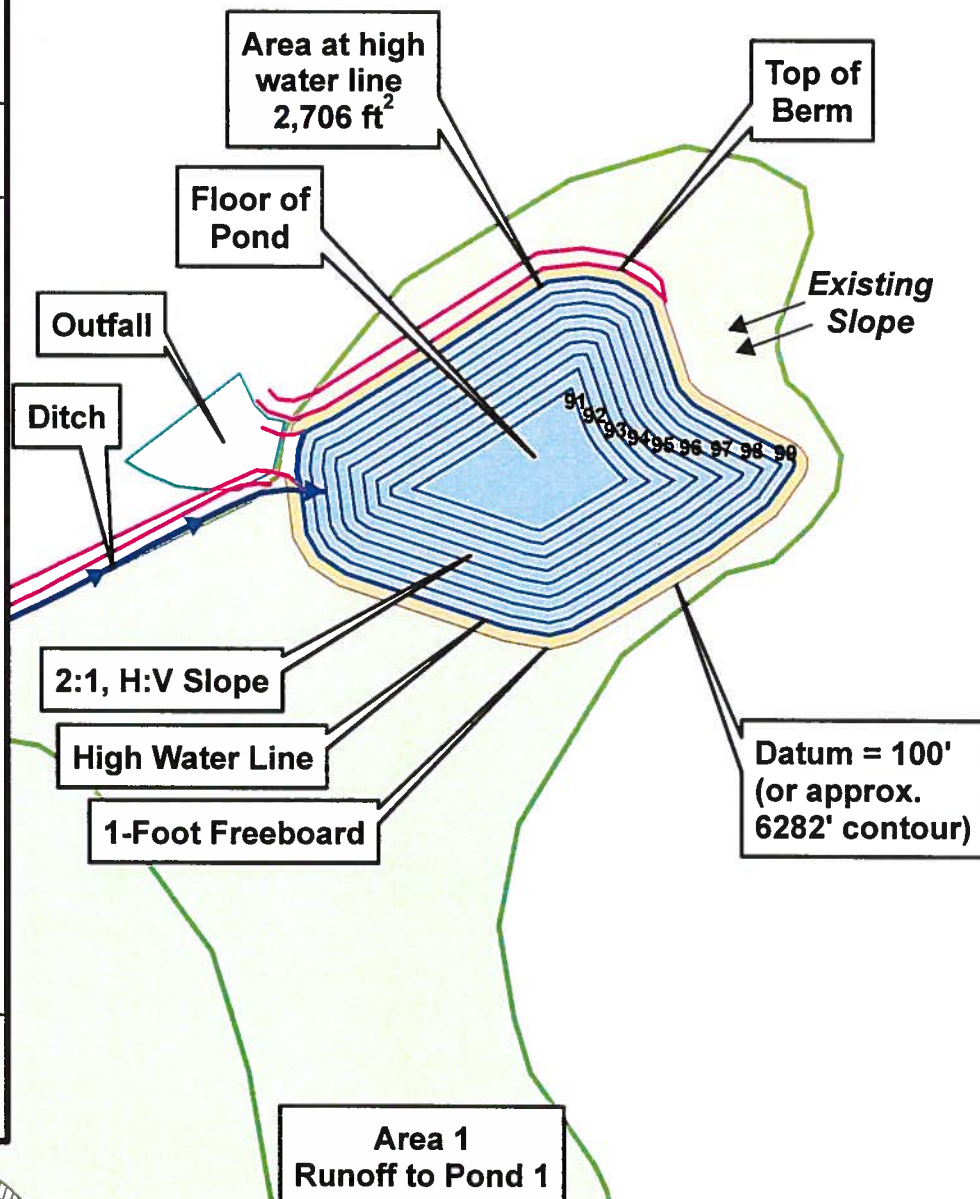
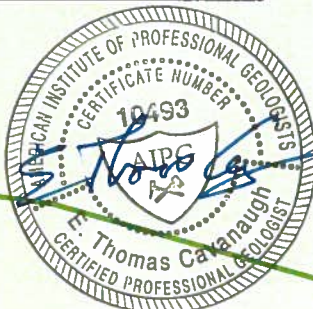
Drawn By: AJG

### Notes:

- 1- AMEC Project No.: 18480.4
- 2- Data Source: US BLM;  
Shaaf Engineering; Client.
- 3- This map is intended to be  
used for planning purposes  
only. It is not a survey.



**FIGURE  
NO. 3**



Last Chance Mine - M-2008-12  
Technical Revision No.1, May 2012





NUVEMCO

125 Continental View Drive  
Boulder, Colorado 80303



2000 S. Colorado Blvd, Ste 2-1000  
Denver, Colorado 80222

## LAST CHANCE STORM WATER CONTROLS

Montrose County, Colorado

0 10 20 30 40 50 Feet  
1 inch = 50 feet

### Storm Water Controls to be Constructed

- Ditch
- Outfall
- Berm Area
- Pond
- Runoff Area
- Current Waste Rock Area

Date: 5/31/2012

Checked By: Tom Cavanaugh

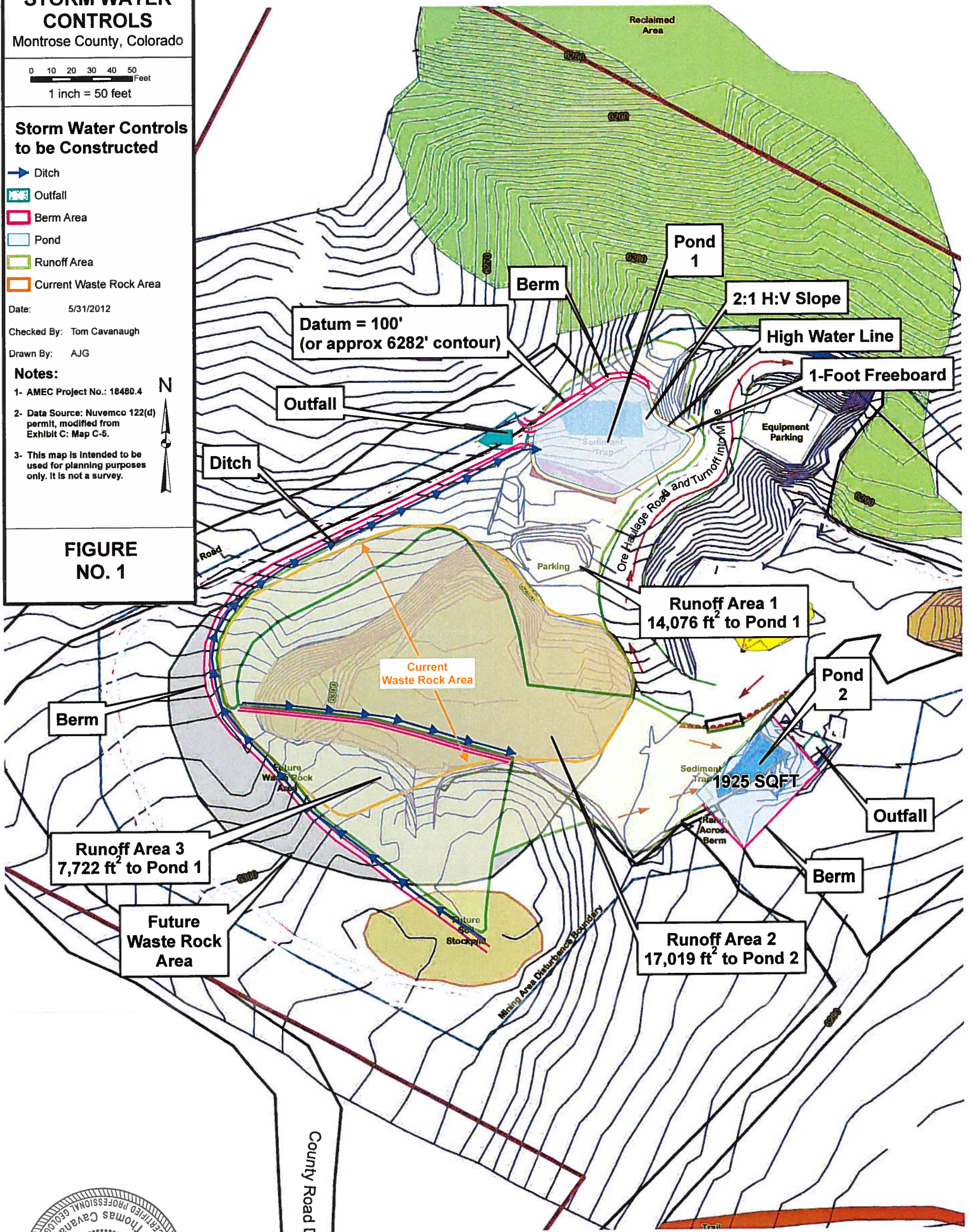
Drawn By: AJG

#### Notes:

- AMEC Project No.: 18480.4
- Data Source: Nuvemco 122(d) permit, modified from Exhibit C: Map C-5.
- This map is intended to be used for planning purposes only. It is not a survey.



FIGURE  
NO. 1







125 Continental View Drive  
Boulder, Colorado 80303



2000 S. Colorado Blvd, Ste 2-1000  
Denver, Colorado 80222

# LAST CHANCE AERIAL PHOTO

Montrose County, Colorado

0 25 50 75 100 Feet  
1 inch = 100 feet

## Explanation of Features

- Ditch
- Berm
- Pond
- Runoff Area

Date: 5/31/2012  
Checked By: Tom Cavanaugh  
Drawn By: AJG

### Notes:

- AMEC Project No.: 18480.4
- Data Source: NAIP Imagery 2011
- This map is intended to be used for planning purposes only. It is not a survey.



FIGURE  
NO. 2

