

STATE OF COLORADO

DIVISION OF RECLAMATION, MINING AND SAFETY

Department of Natural Resources

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MEMORANDUM

John W. Hickenlooper
Governor

Mike King
Executive Director

Loretta Piñeda
Director

To: Travis Marshall

From: Tim Cazier, P.E. 

Date: November 26, 2013

**Re: JD-9 Mine Drainage Design Plan – Second General Stormwater Comments,
Permit No. M-1977-306 / AM-01**

The Division of Reclamation, Mining and Safety (DRMS) engineering staff has reviewed the August 1, 2013 "Response to General Stormwater Comments, dated February 22, 2013 for the JD-9 Mine prepared by O'Connor Design Group, Inc. The following comments are posed to ensure adequate engineering analyses and design practices are implemented to eliminate or reduce to the extent practical the disturbance to the hydrologic balance expected by the mining operation with respect to water quality and quantity in accordance with Rules 3.1.6(1), 6.4.21(10) and 7.3.1. Please note, as this site is a designated mining operation (DMO), compliance with Rule 7.3.1 is applicable, thus requiring certified designs and specifications for engineered elements associated with the environmental protection plan (EPP). The original comment numbers have been retained for the purpose of tracking responses.

1. *Page ESWMP-1 reponse - settling ponds on Monogram Mesa ...*
 - a. The August 1, 2013 clarification response is adequate.
 - b. *How is water managed in the lowermost pond?* The response that "ponds will be designed at a later date" is inadequate. As these ponds are part of the required EPP, designs are required prior to approval of the EPP.
 - c. *Is "several inches of freeboard" in the lowermost pond sufficient ...* The response is inadequate. As these ponds are part of the required EPP, designs are required prior to approval of the EPP.
2. *Page ESWMP-5, section 7.2.... state the specific design storm depths ...* August 1, 2013 response is adequate.
3. *Page ESWMP-6, last paragraph, DDP Drawing 3 of 7, and FlowMaster output pages.*
 - a. The August 1, 2013 rationale for the selected roughness coefficients response is adequate. However, the DRMS has revised the February 22, 2013 Attachment A and disagrees with the use of Manning's n values of 0.035 (stability) for earth-

- lined channels. Referencing TABLE 802A, items b.4 and b.5, Manning's n for unarmored channels should be: $0.025 < n < 0.028$. Please revise the calculations, or justify using the same roughness value for earth-lined and riprap-lined channels.
- b. *Please design... ditches with appropriate freeboard/channel design depths ...* The August 1, 2013 response is partially adequate. Please review the revised **Attachment A** for additional channel segments identified by the DRMS that are not included in the analyses provided, and submit analyses for these segments.
 - c. *Please review Attachment A...* The August 1, 2013 response is partially adequate. Please review the revised **Attachment A** for additional channel segments identified by the DRMS that are not included in the analyses provided, and submit analyses for these segments.
 - d. *Please note channels expecting erosive channel velocities...* The August 1, 2013 response is partially adequate. Please review the revised **Attachment A** for missing armoring calculations.
4. *Page ESWMP-7, section 7.4 paragraph and Retention Pond...* The August 1, 2013 response is partially adequate. The following items need to be addressed:
 - a. There is a discrepancy between the “Worksheet for Weir Throat Sect 1.0% Trap. Channel” and the grades depicted on Sheet 4 of 10. The drawing appears to have a relatively constant ~10% slope through the throat section and the chute. Please explain the 1% throat used in the analysis.
 - b. The response does not address the “DWR’s requirement to release retained stormwater within 72 hours”. The DRMS previously suggested the Operator consider a low level outlet be designed into the pond in case a call is put on the Dolores River, the Operator can comply with the DOWR requirements. Please provide a response to this comment.
 5. *Please address the reclamation/post mining plan for the retention pond.* The August 1, 2013 response is partially adequate. Sheet 5 of 10 shows a nearly five foot drop at 3H:1V at the toe of the embankment with no defined channel. This steep section will erode with successive runoff events and lead to sediment problems. The DRMS suggests cutting the outfall to the original grade or designing a defined armored channel. Please revise the design.
 6. *Page ESWMP-25, 72” CMP analysis; DDP Drawing 3 of 7; and Figure C2.*
 - a. *...photo #8 is the 72” CMP.* The August 1, 2013 clarification response is adequate.
 - b. *Please review the last two rows of Attachment A.* The August 1, 2013 clarification response is adequate.
 - c. *Provide outlet protection design for the culvert...* The August 1, 2013 response indicates the subject culvert will be removed. The DRMS is concerned about potential scour and sediment problems related to the removal of the culvert and embankment. Please provide the DRMS with the following:
 - i. A drawing profile through the embankment showing the existing grade and embankment and the proposed grade after removal.

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- ii. A cross section showing cut slopes similar to those shown in Drawings on Sheets 6 through 8.
 - iii. Analyses demonstrating the resulting cut slopes will be stable during the 100-year, 24-hour design peak flow.
 - d. *The embankment through which this culvert conveys stormwater...* Please see Comment 6.c.i –iii above.
7. *Pages ESWMP-48 and 49, NOAA Atlas Charts.* The August 1, 2013 response is adequate.

DDP Drawings:

8. *Sheet ~~3 of 7~~, now 3 of 10.* The August 1, 2013 response is partially adequate. The proposed sections 20.-A and 10A-1A are not where the DRMS intended analyses to be performed. Please see Figures I and II on page 3 of **Attachment A** for clarification and revise Sheet 3 accordingly.
9. *Sheet ~~4 of 7~~, now 4 of 10.* The August 1, 2013 response is adequate, but may require revisions based on the response to Comment 4a above, regarding the throat section.
10. *Sheets ~~5 and 6 of 7~~, now 6 and 7 of 10.*
- a. *Please provide water surface (W.S.) elevations...* The August 1, 2013 response is adequate.
 - b. *Please provide flow velocities for each section...* The August 1, 2013 response is adequate, but may require revisions based on the response to Comments 3a through d above.
 - c. *Please revise slopes...* The August 1, 2013 response is adequate.
11. *Sheet ~~7 of 7~~, now 10 of 10.* Cross sections and details:
- a. *Section 20-2.* Moved to Sheet 8 of 10 and increased depth to 12 inches. The August 1, 2013 response is adequate.
 - b. *Section 30-2.* Section 30-2 on Sheet 3 of 10 appears to have moved from the previous location on Sheet 3 of 7 (9/12/2012 submittal) to what was previously Section 30-3 on Sheet 3 of 7. The one-foot design depth does however meet the minimum freeboard requirements. Please see the revised **Attachment A** for comments related to the Manning's n used.
 - c. *Section 20-3.* The one-foot design berm height appears to meet the minimum freeboard requirements. However, please see the revised **Attachment A** for comments related to the Manning's n used.
 - d. Please provide details or sections and analyses identified as missing or inadequate in the revised **Attachment A**.

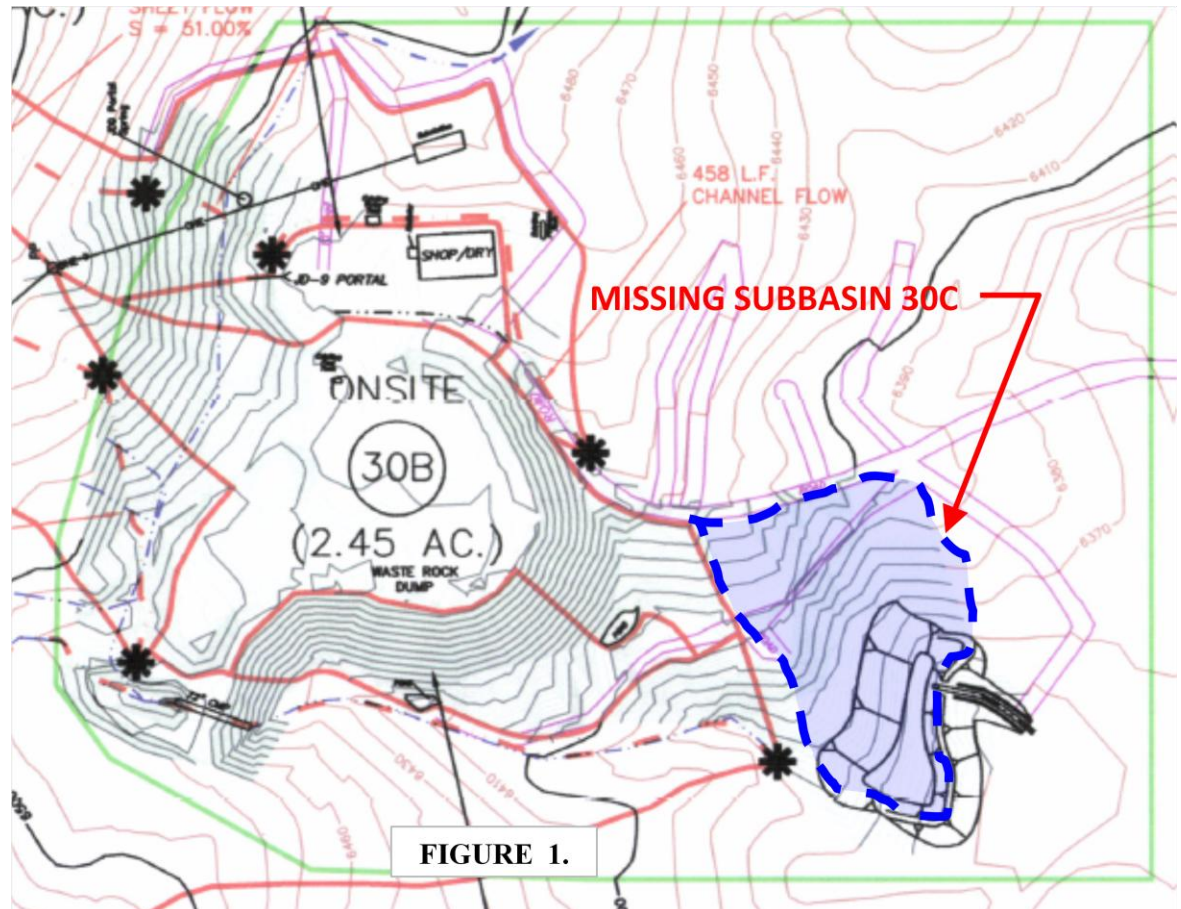
New Comments

12. *Sheet 2 of 10.* Some subbasin delineations have been revised since the 9/12/2012 submittal. There are also additional existing and proposed channels that were not previously identified. Finally, the previously submitted subbasin Offsite 20 has been reduced in size and no longer adequately addresses the predicted runoff to the existing

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road ditch ④ (reference Sheet 3). The following items must be addressed to ensure the drainage plan is adequate:

- a. The missing subbasin (labeled 30C) contributing to the proposed retention pond 30, see Figure 1 below must be added to account for runoff from this area to the pond. Adjustments will need to be made to spillway and chute design analyses.



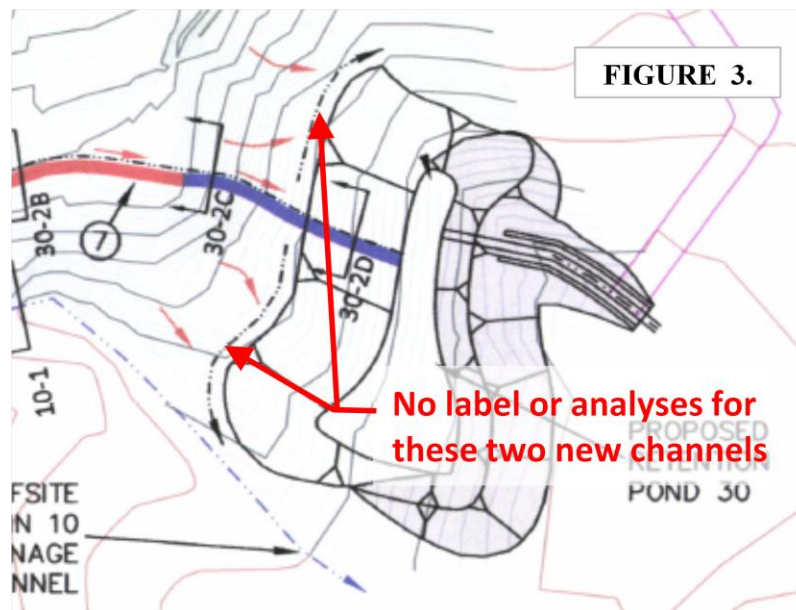
- b. The subbasin area contributing to the existing road ditch ④ (ref. Sheet 3 label) has been reduced. Please reference Figure 2 (attached) to see the area (highlighted in light blue) DRMS deems necessary to address contributing runoff to existing road ditch ④ and ensure adequate design capacity and stability. Please revise the hydrology estimates and make the necessary adjustments to the channel analyses for capacity and stability. Section 20-1 may need a flatter slope to be considered for the capacity analysis. (Note this area was included in the 9/12/2012 submittal).
- c. The new “existing” diversion ditch east of Offsite 20B is not analyzed for stability or capacity nor is the contributing subbasin drawn to consider it. Please reference Figure 2 (attached) to see the area (highlighted in magenta) DRMS deems necessary to address contributing runoff to this existing diversion ditch and ensure adequate design capacity and stability. Please revise the hydrology estimates and make the necessary adjustments to the channel analyses for capacity and stability.
- d. Subbasin 10A is not drawn to consider the proposed diversion channel ① (ref. Sheet 3 label). Please reference Figure 2 (attached) to see the area (highlighted in

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green) DRMS deems necessary to address contributing runoff to this existing diversion ditch and ensure adequate design capacity and stability.

13. *Sheet 3 of 10.* New and modified features:

- a. There are two diversion channels upgradient of proposed retention pond that have not labeled or analyzed. Please see Figure 3 below and either provide the requisite analyses or remove them from Sheet 3 of 10.

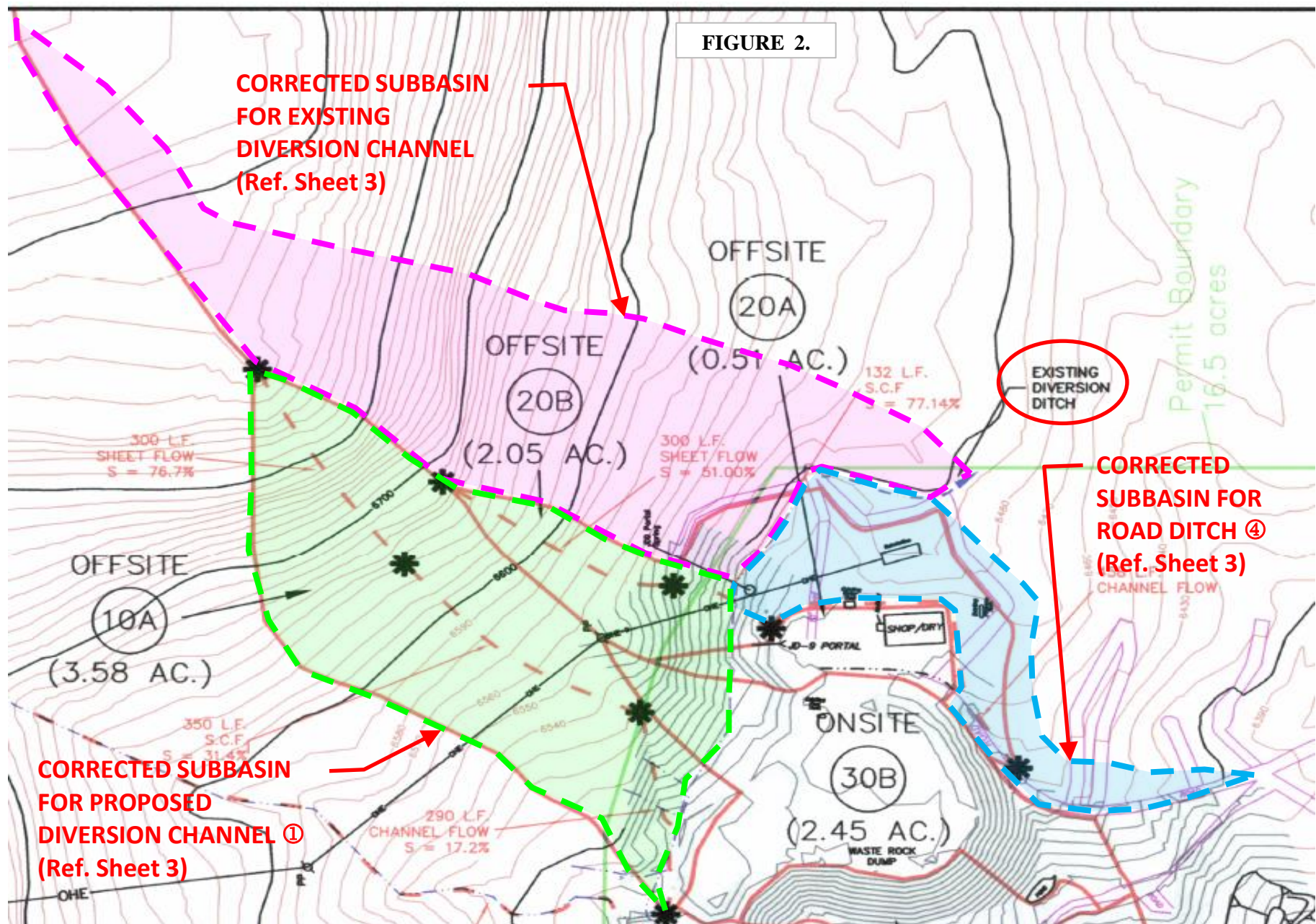


- b. What happened to the 9/12/2012 Section 30-2 (reference Sheet 3 of 7)? Is this previously proposed channel no longer being considered?

14. *Sheet 5 of 10.* Retention Pond 30: Post-Reclamation. There is no defined channel or armoring specified for the “chute” section at a 3H:1V slope from elevation 6354 to the toe of the embankment. Please redesign with a defined and armored channel, or remove the embankment to the original grade and armor if necessary.

If either you or the applicants have any questions regarding the comments above, please call me at (303) 866-3567, extension 8169.

Enclosures: Attachment A, Figure 2



ATTACHMENT A

Revised (8/1/2013) Proposed Drainage Improvements Sheet 3 of 10 - Parameter/Status Check for M-77-306 / JD-9

Channel#	Location	Slope on Sht 4, 5, 6, 7, 8 or 9 of 10 (ft/ft)	Analysis Max. / Min. Design Slope (ft/ft)	Worksheet Max. / Min. Manning's n	Status per Sht 3 of 10	Detail or Cross-Section Provided	Channel Natural or Engineered?	If Engineered, Riprap Required?	Riprap Calc. in Attach. #4?	8/1/2013 submittal adequate?	Comments
10-1	As shown on Sheet 3 of 10	0.0222 0.1946	only 0.200 only 0.1946	only 0.045 0.045 / 0.060	Existing	Sht 6 of 10	Natural	NR	NR	Yes	
10-2	As shown on Sheet 3 of 10	0.0222 0.1069	only 0.1053 only 0.1069	only 0.045 0.045 / 0.060	Existing	Sht 6 of 10	Natural	NR	NR	Yes	
10-3	As shown on Sheet 3 of 10	0.0222 0.2000	only 0.200	only 0.045 0.045 / 0.060	Existing	Sht 6 of 10	Natural	NR	NR	Yes	
10A-1	As shown on Sheet 3 of 10	not shown 0.0105	only 0.011 only 0.0105	only 0.040 0.035 / 0.045	Proposed	Missing Sht 7 of 10	Engineered	No	NR	Yes	
10A-1A	drop into pond above 72" CMP	Missing - natural instead of engineered section analyzed	only 0.07680, should be ~0.53	0.045 / 0.060, should be 0.035 / 0.045	Proposed	Missing - section needs to be perpendicular to that shown	Engineered	Probably	Missing	NO	Cross-section shown in natural channel above culvert, should be steep drop from engineered diversion channel 10A-1. See Figure I for location.
20-1	As shown on Sheet 3 of 10	0.0222 0.1430	only 0.141 only 0.1430 (NOTE: the current 20-3A [S=0.17] could be addressed in 20-1 by including the MAX & min. slope as previously suggested by DRMS)	only 0.035 0.035 / 0.045	Existing	Sht 8 of 10	Engineered	Yes	Missing	NO	Need riprap calc. in Attachment #4
20-2	As shown on Sheet 3 of 10	not shown	Missing only 0.03330	Missing 0.035 / 0.045	Proposed	Sht 8 of 10	Engineered	No	NR	Yes	
20-3A	downgradient of 20-3	Missing - shows roadside channel above 20-1 instead of diversion berm steep drop from shop/dry bldg.	Missing - wrong location & flow	Missing - wrong location & flow	Proposed	Missing - section needs to be ID No. 2 (Sht 3) steep portion of diversion berm	Engineered	Probably	Missing - wrong location & flow	NO	See Figure II for location.

ATTACHMENT A

Revised (8/1/2013) Proposed Drainage Improvements Sheet 3 of 10 - Parameter/Status Check for M-77-306 / JD-9

Channel#	Location	Slope on Sht 4, 5, 6, 7, 8 or 9 of 10 (ft/ft)	Analysis Max. / Min. Design Slope (ft/ft)	Worksheet Max. / Min. Manning's n	Status per Sht 3 of 10	Detail or Cross-Section Provided	Channel Natural or Engineered?	If Engineered, Riprap Required?	Riprap Calc. in Attach. #4?	8/1/2013 submittal adequate?	Comments
20-3	As shown on Sheet 3 of 10	not shown on either Sht 3 or Sht 10	Missing 0.100 / 0.010	Missing <i>0.035 / 0.045 should be: 0.025<n<0.028 for earth channels</i>	Proposed	Sht 10 of 10	Engineered	<i>Probably Not</i>	NR	Yes	<i>Manning's n for unarmored channels should be: 0.025<n<0.028 according to TABLE 802A, items b.4 and b.5</i>
30-1 (irreg.)	As shown on Sheet 3 of 10	0.0222 0.143	only 0.141 only 0.1430	only 0.035 0.035 / 0.045	Existing	Sht 9 of 10	Engineered	Yes	Yes	Yes	Section 30-1, Sht 9 of 10 references Section 30P, Can't find Section 30P
30-1 (triangular)	As shown on Sheet 3 of 10	0.143	0.170 / 0.143	0.035 / 0.045	Existing	Irregular sect. on Sht 9 of 10	Engineered	Yes	Yes	Yes	
30-1A (irreg.)	As shown on Sheet 3 of 10	not shown 0.2974	Missing only 0.2974	Missing 0.035 / 0.045	Existing	Missing Sht 9 of 10	Engineered	Yes	Yes	Yes	Section 30-1A, Sht 9 of 10 notes "ARMORING REQUIRED", but no detail referenced
30-1A (triangular)	As shown on Sheet 3 of 10	0.2974	0.250 / 0.200	0.035 / 0.045	Existing	Irregular sect. on Sht 9 of 10	Engineered	Yes	Yes	Yes	
30-2	As shown on Sheet 3 of 10	0.05 not shown on either Sht 3 or Sht 10	0.080 / 0.010 0.250 / 0.020	only 0.035 <i>0.035 / 0.045 should be: 0.025<n<0.028 for earth channels</i>	Proposed	Shts 9 & 10 of 10	Engineered	<i>Possibly</i>	NR	NO	<i>Manning's n for unarmored channels should be: 0.025<n<0.028 according to TABLE 802A, items b.4 and b.5</i>
30-2A	As shown on Sheet 3 of 10	Min. S = 0.010, no Max. of Sht 9 of 10	0.175 / 0.025	0.035 / 0.045	Proposed	<i>Section 30-2A on Sht 9 of 10 is NOT ARMORED</i>	Engineered	Yes	Yes	NO	<i>Drawing reference Section 30-2A on Sht 9 of 10 is INCORRECT</i>
30-2B	As shown on Sheet 3 of 10	Min. S = 0.010, no Max. of Sht 9 of 10	0.020 / 0.010	0.035 / 0.045	Proposed	Section 30-2A on Sht 9 of 10	Engineered	<i>Probably Not</i>	No	NO	<i>Manning's n for unarmored channels should be: 0.025<n<0.028 according to TABLE 802A, items b.4 and b.5</i>
30-2C	As shown on Sheet 3 of 10	Min. S = 0.010, no Max. of Sht 9 of 10	only 0.4222 (constant)	0.035 / 0.045	Proposed	<i>Section 30-2C on Sht 9 of 10 is NOT ARMORED</i>	Engineered	Yes	Yes	NO	<i>Drawing reference Section 30-2C on Sht 9 of 10 is INCORRECT</i>
30-2D	As shown on Sheet 3 of 10	not shown	only 0.330 (constant)	0.035 / 0.045	Proposed	<i>Missing</i>	Engineered	Yes	Yes	NO	<i>Slope and detail section NOT PROVIDED</i>
30-3	As shown on Sheet 3 of 7 - relabeled	Now labeled 30-2 on Sht 3 of 10									
30-3A	<i>drop into proposed retention pond</i>	Now labeled 30-2D on Sht 3 of 10									
72" CMP	As shown on Sheet 2 of 2, Figure C2	N/A	0.098	0.024	Existing	N/A				Yes	

ATTACHMENT A

Revised (8/1/2013) Proposed Drainage Improvements Sheet 3 of 10 - Parameter/Status Check for M-77-306 / JD-9

Channel‡	Location	Slope on Sht 4, 5, 6, 7, 8 or 9 of 10 (ft/ft)	Analysis Max. / Min. Design Slope (ft/ft)	Worksheet Max. / Min. Manning's n	Status per Sht 3 of 10	Detail or Cross-Section Provided	Channel Natural or Engineered?	If Engineered, Riprap Required?	Riprap Calc. in Attach. #4?	8/1/2013 submittal adequate?	Comments
	As shown on Sheet 3 of 10	N/A									
Broad Crested Weir JD-9	As shown on Sheet 4 of 10	--	--	--	Proposed	Section C-C, Sht 10	Engineered	Yes	--	Yes	<i>Note Sheet 10 is labeled SR-13A, instead of JD-9</i>
Weir Throat Section	Section C-C as shown on Sheet 4 of 10	0.111	0.010 / 0.100	0.035 / 0.045	Proposed	Section C-C, Sht 10	Engineered	Yes	<i>Missing</i>	<i>No</i>	<i>Needs riprap sizing analysis</i>
Weir Chute Section	Section D-D as shown on Sheet 4 of 10	0.100	0.010 / 0.100	0.035 / 0.045	Proposed	Section D-D, Sht 10	Engineered	Yes	<i>Missing</i>	<i>NO</i>	<i>Note: analysis indicates riprap not needed, section D-D, Sht 10 has 6" riprap.</i>
Post-Reclam. Chute Section	Sheet 5 of 10	0.333	Missing	Missing	Proposed	Missing	Engineered	<i>Probably</i>	<i>Missing</i>	<i>NO</i>	<i>There is no defined post-reclamation channel. Discharges will head cut through the spillway section and cause erosion problems</i>

‡ Channels in *red italics* are segments identified by DRMS that should be evaluated.

* N/A = Not Available - should be provided

NR - Not Required

