Change Order
Number 3

Date: December 22, 2022
To: ESCO Construction Co.
From: City of Grand Junction, Department of Public Works and Utilities
Project: **Hogchute (AKA Carson) Reservoir Dam Rehabilitation**
P.O.: **2021-00000729**

It is agreed to modify the Contract for the Project as follows:

Contract time is adjusted 12 Calendar Days to account for weather and material supply delays.

This change order removes installation of the hydraulic control equipment for the slide gate from the contract, to be completed by others. The removal of this item includes removal from the contract of the final installation of the trash rack, to be completed by others. Initial startup of hydraulic controls is also removed from this contract to be completed by others.

(Continued on Page 2.)

Summary of Contract price adjustments - itemized on the attached sheet(s):

Original Contract Amount	$2,893,500.00
Approved Change Orders	1,374,752.64
This Change Order	74,605.35
Revised Contract Amount	$4,342,857.99

Summary of Contract time adjustments:

Original Contract Time	151.	Cal. Days
Approved Change Orders	160.	
Winterization*	180.	*Not included in contract time
This Change Order	12.	
Revised Contract Time	323.	Cal. Days

Construction Start Date:	June 3, 2021
Contract Completion Date:	October 19, 2022

This modification constitutes compensation in full for all costs and mark-ups directly and/or indirectly attributable to the changes ordered herein, for all delays, impacts and disruptions related thereto and for performance of the changes within the Contract Time.

Owner: **City of Grand Junction**

Prepared by: DocuSigned by: John Eklund CA8094AB864A42F... Date: 12/30/2022
John Eklund, Project Engineer

Reviewed by: DocuSigned by: Randi Kim - Utilities Director F3B7E9047688412... Date: 1/4/2023
Randi Kim, Utilities Director

Approved by: DocuSigned by: Greg Caton - City Manager - City of Grand Junction 2F1EE1D55758492... Date: 1/4/2023
Greg Caton, City Manager

Contractor: **ESCO Construction Co.**

Signature: DocuSigned by: Eric Clark - President, ESCO Construction Co. 9BD108E3B071499... Date: 12/30/2022

Name and Title: Eric Clark - President, ESCO Construction Co. President

Change Order Number 3

(Continued)

Project: **Hogchute (AKA Carson) Reservoir Dam Rehabilitation**
To: ESCO Construction Co.
From: City of Grand Junction
Date: December 22, 2022

Description of and justifications for change (continued)

Contract quantities are adjusted according to final as-built quantities. Final Quantities are listed in detail below. Costs for two items have exceeded contract total cost per Change Order No 2. These items are COR2A.02 Stockpile Management and COR2B.05 Import Embankment Material.

This Change Order authorizes COR2A.02 Stockpile Management overrun of original contract amount per Change Order No 2. Final total days agreed upon are 23 per negotiations related to Requests for Adjustment 007 and 008 (RFA007 and RFA008) (see attached for detail). The additional days result in a total cost to the City of $55,500.00.

The City Authorized Import of Embankment Material per item COR2B.05 during the 2022 construction season to expedite reconstruction of the dam. Import Material and unit price was defined in Change Order No 1. Total maximum quantity authorized for 2022 was 2700 CY per email from 15 August 2022 and WCR 2 (see attached). Unit pricing for COR2B.05 is $45.50/ton. Conversion factor is 1.85 ton/CY. Thus, final authorized quantity is 6603 tons of Import Embankment Material. Actual embankment material imported in 2022 was 3,498 tons. This final quantity is reflected as part of this Change Order for a total cost to the City of $159,158.94.

The net change in the Contract Amount based on final as-built quantities is $74,605.35. The total contract cost to the City of $4,342.857.99.

Attachments:
- Import Embankment Material Authorizations
- Request for Adjustment 007 – Embankment Material Moisture
- Request for Adjustment 008 – Stockpile Management Days (supplemental data not attached)
- RFA007 & RFA008 Stockpile Management Response

Hogchute (AKA Carson) Reservoir Dam Rehabilitation -- City P.O. No. 2021-00000729

December 22, 2022

Change Order No. 3

Item No.	CDOT, City Ref.	Description	Current Contract [1, 2] Quantity	Units	Unit Price	Extended Price	Revised Quantity	Units	Unit Price	Extended Price	Change
---	---	Construction Period [1, 2]	311	Cal. Days	---	---	323	Cal. Days	---	---	12
1	626 01 22 50	Mobilization	1.	LS	$ 137,295.00	$ 137,295.00	1	LS	$ 137,295.00	$ 137,295.00	
2	208 01 57 19	Erosion Control	1.	LS	$ 60,000.00	$ 60,000.00	1	LS	$ 60,000.00	$ 60,000.00	
3	01 57 60	Construction Dewatering	1.	LS	$ 168,000.00	$ 168,000.00	1	LS	$ 168,000.00	$ 168,000.00	
4	02 41 00	Demolition (intake, outfall, piping, controls, spillway grouted riprap, etc.)	1.	LS	$ 180,000.00	$ 180,000.00	1	LS	$ 180,000.00	$ 180,000.00	
5	03 30 00 31 20 00 31 37 00	Concrete Overflow Spillway (excavation, form, concrete placement, backfill, and riprap, etc.)	1.	LS	$ 300,000.00	$ 300,000.00	1	LS	$ 300,000.00	$ 300,000.00	
6	31 24 00 31 20 00	Embankment Excavation	1.	LS	$ 210,000.00	$ 210,000.00	1	LS	$ 210,000.00	$ 210,000.00	
7	33 41 66	Type I Filter Material	1,000.	CY	$ 145.00	$ 145,000.00	1000	CY	$ 145.00	$ 145,000.00	
8	33 41 66	Type II Filter Material	120.	CY	$ 211.00	$ 25,320.00	97	CY	$ 211.00	$ 20,467.00	$ (4,853.00)
9	33 41 66 33 42 15	HDPE Perforated Drain Pipe	270.	LF	$ 184.00	$ 49,680.00	262	LF	$ 184.00	$ 48,208.00	$ (1,472.00)
10	33 41 66 33 42 15	HDPE Solid Drain Pipe	375.	LF	$ 62.00	$ 23,250.00	375	LF	$ 62.00	$ 23,250.00	
11	31 24 00 31 20 00 31 23 33	Embankment Backfill (embankment fill, rock shell, restore stockpile areas, etc.)	1.	LS	$ 180,000.00	$ 180,000.00	1	LS	$ 180,000.00	$ 180,000.00	
12	35 22 28 33 42 15	Stainless Steel Slide Gate	1.	LS	$ 16,000.00	$ 16,000.00	0.9	LS	$ 16,000.00	$ 14,400.00	$ (1,600.00)
13	03 30 00 33 42 15 05 50 00	Concrete Buttress Intake Structure (Concrete buttress, conduit encasement, air vent and hydraulics conduit, steel elbow, etc.)	1.	LS	$ 150,000.00	$ 150,000.00	1	LS	$ 150,000.00	$ 150,000.00	
14	26 05 43 33 42 15	Locking Valve Box	1.	LS	$ 10,000.00	$ 10,000.00	1	LS	$ 10,000.00	$ 10,000.00	
15	05 50 00	Trash Rack	1.	LS	$ 12,000.00	$ 12,000.00	1	LS	$ 12,000.00	$ 12,000.00	
16 [1, 2]	32 92 26	Wetland Soil Stockpiling	4,100.	SY	$ 4.00	$ 16,400.00	4100	SY	$ 4.00	$ 16,400.00	

[x] - See Change Order No. "x"
** - Items to be paid using Minor Contract Revisions

Hogchute (AKA Carson) Reservoir Dam Rehabilitation -- City P.O. No. 2021-00000729

December 22, 2022

Change Order No. 3

Item No.	CDOT, City Ref.	Description	Current Contract [1, 2] Quantity	Units	Unit Price	Extended Price	Revised Quantity	Units	Unit Price	Extended Price	Change
---	---	Construction Period [1, 2]	311	Cal. Days	---	---	323	Cal. Days	---	---	12
17 [1, 2]	31 20 00	Auxiliary Spillway Grading	3,000.	SY	$ 21.00	$ 63,000.00	3000	SY	$ 21.00	$ 63,000.00	
18 [1, 2]	31 37 00	Auxiliary Spillway Rock Berms	656.12	LF	$ 291.00	$ 190,932.08	1105	LF	$ 291.00	$ 321,555.00	$ 130,622.92
19 [2]	33 42 15 03 30 00	30-Inch Steel Pipe	97.	LF	$ 1,375.00	$ 133,375.00	97	LF	$ 1,375.00	$ 133,375.00	
20	33 01 36	CIPP Pipe Lining	300.	LF	$ 495.00	$ 148,500.00	317	LF	$ 495.00	$ 156,915.00	$ 8,415.00
21	03 30 00 31 20 00 31 37 00 05 52 04	Impact Basin (excavation, backfill, formwork, concrete, riprap, steel railing, etc.)	1.	LS	$ 120,000.00	$ 120,000.00	1	LS	$ 120,000.00	$ 120,000.00	
22 [1, 2]	32 92 26 32 99 10	Site Restoration (placing topsoil, seeding, sodding, planting, mulching, etc.)	1.	LS	$ 45,000.00	$ 45,000.00	1	LS	$ 45,000.00	$ 45,000.00	
23 [1]	40 70 10	Early Warning System					0.43726	LS	$ 100,000.00	$ 43,726.00	$ 43,726.00
24	625	Construction Surveying	1.	LS	$ 65,000.00	$ 65,000.00	1	LS	$ 65,000.00	$ 65,000.00	
		Change Order No. 1									
	RFA 002A	**Onsite Borrow**									
COR2A.01 [2]		Staging Area Stripping	1.	Ac	$ 1,500.00	$ 1,500.00	1	Ac	$ 1,500.00	$ 1,500.00	
COR2A.02 [2]		Stockpile Management	8.	Day	$ 3,700.00	$ 29,600.00	23	Day	$ 3,700.00	$ 85,100.00	$ 55,500.00
COR2A.03 [2]		Excavate Borrow Area	4,066.	CY	$ 18.50	$ 75,221.00	4066	CY	$ 18.50	$ 75,221.00	
COR2A.04 [2]		Embankment Material Haul	4,066.	CY	$ 12.20	$ 49,605.20	4066	CY	$ 12.20	$ 49,605.20	
COR2A.05 [2]		Existing Unsuitable Embankment to Waste	4,066.	CY	$ 10.50	$ 42,693.00	3968.13	CY	$ 10.50	$ 41,665.37	$ (1,027.63)
COR2A.06		Restore Staging Area						Ac	$ 6,366.00		
	RFA 002B	**Embankment Import**									
COR2B.01 [1]		Mobilization	1.	LS	$ 10,500.00	$ 10,500.00	1	LS	$ 10,500.00	$ 10,500.00	
COR2B.02 [1]		Staging Area Stripping (if Authorized before	2.	AC	$ 1,500.00	$ 3,000.00	2	AC	$ 1,500.00	$ 3,000.00	
COR2B.03 [1,	**	Access Road Maintenance	10.	Day	$ 5,675.00	$ 56,750.00	10	Day	$ 5,675.00	$ 56,750.00	
COR2B.04 [1,		Stockpile Management	8.	Day	$ 3,700.00	$ 29,600.00	8	Day	$ 3,700.00	$ 29,600.00	
COR2B.05 [1,		Import Embankment Material	3,104.72	Ton	$ 45.50	$ 141,264.76	6602.7186	Ton	$ 45.50	$ 300,423.70	$ 159,158.94
COR2B.06 [1,		Embankment Material Haul	1,774.13	CY	$ 12.20	$ 21,644.39	1774.13	CY	$ 12.20	$ 21,644.39	
COR2B.07 [1,		Existing Unsuitable Embankment to Waste	1,774.13	CY	$ 10.50	$ 18,628.36		CY	$ 10.50		$ (18,628.36)
COR2B.08 [1]		Restore Staging Area (If Authorized Before	2.		$ 6,366.00	$ 12,732.00	2		$ 6,366.00	$ 12,732.00	
CO-101 [1]		Auxiliary Spillway Rock Riprap Fabrication.	1.	LS	$ 130,622.80	$ 130,622.80		LS	$ 130,622.80		$ (130,622.80)
CO-102 [1]		Early Warning System Purchase	1.	LS	$ 43,726.00	$ 43,726.00		LS	$ 43,726.00		$ (43,726.00)

[x] - See Change Order No. "x"

** - Items to be paid using Minor Contract Revisions

Hogchute (AKA Carson) Reservoir Dam Rehabilitation -- City P.O. No. 2021-00000729

December 22, 2022

Change Order No. 3

Item No.	CDOT, City Ref.	Description	Current Contract [1, 2] Quantity	Units	Unit Price	Extended Price	Revised Quantity	Units	Unit Price	Extended Price	Change
---	---	Construction Period [1, 2]	311	Cal. Days	---	---	323	Cal. Days	---	---	12
		Change Order No. 2									
	RFA004	**Remobilization & Winterization Removal (2022)**									
CO4A.01 [2]		Remobilization	1.	LS	$ 144,830.00	$ 144,830.00	1	LS	$ 144,830.00	$ 144,830.00	
CO4A.02 [2]		Reinstall/Maintain Erosion Control BMP's	1.	LS	$ 57,340.00	$ 57,340.00	1	LS	$ 57,340.00	$ 57,340.00	
CO4A.03 [2]		Construction Survey	1.	LS	$ 33,480.00	$ 33,480.00	1	LS	$ 33,480.00	$ 33,480.00	
CO4A.04 [2]		Winterization Downstream Cobble Removal	1.	LS	$ 100,303.00	$ 100,303.00	1	LS	$ 100,303.00	$ 100,303.00	
CO4A.05 [2]		Reestablish Downstream Subgrade	1.	LS	$ 33,997.00	$ 33,997.00	1	LS	$ 33,997.00	$ 33,997.00	
CO4A.06 [2]		Winterization Crest Buildup Removal	1.	LS	$ 42,476.00	$ 42,476.00	1	LS	$ 42,476.00	$ 42,476.00	
CO4A.07 [2]		Replace Cobble Upstream	1.	LS	$ 22,290.00	$ 22,290.00	1	LS	$ 22,290.00	$ 22,290.00	
CO4A.08 [2]		Expose Filter Diaphragm	1.	LS	$ 33,200.00	$ 33,200.00	1	LS	$ 33,200.00	$ 33,200.00	
CO4A.09 [2]		Dewater 2021 Filter Diaphragm	1.	LS	$ 30,510.00	$ 30,510.00	1	LS	$ 30,510.00	$ 30,510.00	
CO4A.10 [2]		Remove Cobble Above Buttress	1.	LS	$ 17,160.00	$ 17,160.00	1	LS	$ 17,160.00	$ 17,160.00	
CO4A.11 [2]		Install Bypass Pumping System	1.	LS	$ 37,500.00	$ 37,500.00	1	LS	$ 37,500.00	$ 37,500.00	
CO4A.12 [2]		Install Cofferdam	1.	LS	$ 12,150.00	$ 12,150.00	1	LS	$ 12,150.00	$ 12,150.00	
CO4A.13 [2]		Rent Bypass Pumping System	1.	Week	$ 5,230.00	$ 5,230.00	2	Week	$ 5,230.00	$ 10,460.00	$ 5,230.00
CO4A.14 [2]		Operate/Maintain Bypass Pumping System	1.	Week	$ 8,040.00	$ 8,040.00	2	Week	$ 8,040.00	$ 16,080.00	$ 8,040.00
CO4A.15 [2]		Remove Cofferdam	1.	LS	$ 17,160.00	$ 17,160.00	1	LS	$ 17,160.00	$ 17,160.00	
CO4A.16 [2]		Remove Bypass Pumping System	1.	LS	$ 16,320.00	$ 16,320.00	1	LS	$ 16,320.00	$ 16,320.00	
CO4A.17 [2]		Remove/Reinstall Trash Rack	1.	LS	$ 18,010.00	$ 18,010.00	0.95	LS	$ 18,010.00	$ 17,109.50	$ (900.50)
CO4A.18 [2]		Type I Filter Escalations	1,000.	CY	$ 9.75	$ 9,750.00	1000	CY	$ 9.75	$ 9,750.00	
CO4A.19 [2]		Type II Filter Escalations	120.	CY	$ 2.46	$ 295.20	97	CY	$ 2.46	$ 238.62	$ (56.58)
CO4A.20 [2]		2022 Onsite Project Management	16.	Week	$ 9,572.50	$ 153,160.00	16	Week	$ 9,572.50	$ 153,160.00	
C04A.21 [2]		Original Contract Project Management - Credit	1.	LS	$ (37,622.15)	$ (37,622.15)	1	LS	$ (37,622.15)	$ (37,622.15)	
CO-201 [2]		Early Warning System Installation	1.	LS	$ 56,274.00	$ 56,274.00	1	LS	$ 56,274.00	$ 56,274.00	
		Change Order No. 2 Force Account									
CO4A.21 [2]	FA	Install Secondary Bypass System	1.	LS	$ 34,200.00	$ 34,200.00		LS	$ 34,200.00		$ (34,200.00)
CO4A.22 [2]	FA	Rent Secondary Bypass System	1.	Week	$ 2,870.00	$ 2,870.00		Week	$ 2,870.00		$ (2,870.00)
CO4A.23 [2]	FA	Remove Secondary Bypass System	1.	LS	$ 16,320.00	$ 16,320.00		LS	$ 16,320.00		$ (16,320.00)
CO4A.24 [2]	FA	Impact Basin Remove/Replace Backfill	1.	LS	$ 40,920.00	$ 40,920.00		LS	$ 40,920.00		$ (40,920.00)
CO4A.25 [2]	FA	Concrete Buttress Remove/Replace Backfill	1.	LS	$ 36,250.00	$ 36,250.00		LS	$ 36,250.00		$ (36,250.00)
MCR		Minor Contract Revisions	---	---	$ 210,000.00	$ 210,000.00	---	---	$ 207,359.36	$ 207,359.36	$ (2,640.64)
		Total Change to Original Contract:								$ 174,838.92	
		Total Change as part of this Change Order:								$ 195,002.95	
		TOTALS:				$ 4,268,252.64				$ 4,342,857.99	$ 74,605.35

See Change Order No. "x"

[x] - See Change Order No. "x"
** - Items to be paid using Minor Contract Revisions

John Eklund

From: John Eklund
Sent: Monday, August 15, 2022 3:59 PM
To: Joe Zink
Subject: RE: Letter No. ESCO-CGJ-C-0454A-006 Embankment Material Moisture

Joe - Thanks for your additional info as requested. I apologize for my slow response: I have been having computer issues.

I appreciate ESCO's efforts to work with the City to complete this project according to the contract. I am confident we can all continue to find solutions together to complete this project successfully this October. As noted in the meeting, ESCO was authorized for import. Considering pricing of $52.37/CY, ESCO is authorized for import of 960 CY (1000 CY total with the previous 40 CY import). Overages will be the responsibility of ESCO. This import was authorized in the hopes that it would allow your crew time to bring the borrow materials within spec. Please update on the status of the borrow material. I am please that since that meeting, you have been able to bring borrow into spec and

As you probably know, Ayres staff has received approval from the SEO to change the proctor specifications for embankment material. Hopefully this helps your efforts on the embankment work. Thank you to Ayres and Dam Safety Staff for their efforts on this.

At this time, I have acknowledged 3-4 working days that in which conditions prevented a full day of work. As noted, these have been recorded and time can be finalized toward the end of the project. This is simply a way to prevent the need for many CO's throughout the project.

I have reviewed the info you have provided. Unfortunately, the information provided does not constitute a changed condition. ESCO was onsite all last summer and had firsthand experience and knowledge about both weather and borrow material conditions. As you recall, your crews assisted Ayres in digging test pits and taking samples in the borrow area last summer. These conditions were known at the time ESCO proposed RFA 003 & 004. ESCO proposed both cost and schedule that were incorporated into CO-02. The City and Ayres have striven to work alongside ESCO to find solutions that would improve drying efficiency such as approving additional stockpile working areas, as well as those items noted above. Ultimately, the methods used to bring the borrow into specification is the responsibility of ESCO. Please continue to dry the borrow material so that it can be used to complete the project.

Finally, a couple weeks ago I asked for an updated project schedule. With all the computer issued I have recently had, it's possible I have missed that. If you haven't sent it, would you prepare that for me by the our weekly meeting on Wednesday.

Thank you,

John Eklund, PE, CFM

From: Joe Zink <jzink@escomailbox.com>
Sent: Wednesday, August 3, 2022 12:50 PM
To: John Eklund <johne@gjcity.org>
Cc: Eric Taylor <etaylor@escomailbox.com>; Jon Samole <jsamole@escomailbox.com>; Grant Burmeister <gburmeister@escomailbox.com>; Randi Kim <randik@gjcity.org>; Kenneth Haley <kennethh@gjcity.org>; Mark Ritterbush <markri@gjcity.org>; Goodwin, Chris <goodwinc@ayresassociates.com>; Mathison, Dale

CITY OF Grand Junction COLORADO

PUBLIC WORKS

WORK CHANGE REQUEST No. 2

The Engineer may desire to make a change in the Work described in the Contract Documents. This form shall be used to inform the Contractor of desired changes, and to direct the Contractor to submit a Request for Adjustment. If the time required for preparation and execution of a formal Change Order would result in delay or stoppage of the Work, or would allow a hazardous condition to exist, the Engineer may authorize and direct the Contractor to proceed with the changes described.

Project: **Hogchute (AKA Carson) Reservoir Dam Rehabilitation**
To: ESCO Construction Co.
From: City of Grand Junction
Date: August 30, 2022

Description of and justifications for change (attach supporting documents if necessary)

ESCO estimates of 1500-2000 CY embankment material is needed to complete the embankment improvements. ESCO has stated 300 CY borrow material are dry and available. ESCO is directed to use the 300 CY prepared borrow material immediately. Due to critical importance of completing the Project during the 2022 construction season, the City hereby authorizes ESCO to import the remaining embankment material, not to exceed the quantity of 1700 CY per Bid Schedule Line Item COR2 B.05 to begin immediately.

(Continued on page 2)

Recommended method of payment (Reference is made to Section VIII of the General Conditions):

_X__ Unit Price(s) in Bid Schedule
___ Unit Price(s) to be agreed upon and set forth in a Change Order or included under the Minor Contract Revision Item
___ Actual cost plus overhead and profit (aka Time & Materials)
___ Lump Sum to be agreed upon and set forth in a Change Order or included under the Force Account Item
___ _____

Recommended adjustment in Contract Time: No change_____

___ Contractor is directed to submit a Request for Adjustment for but not proceed with the proposed changes described above.
_X__ Contractor is directed to submit a Request for Adjustment and is authorized to proceed with the changes described above.

_____ _____
John Eklund, Project Engineer Date

The Contractor acknowledges:
- that this is not a formal Change Order;
- that recommended methods of Contract Price and Contract Time adjustment are not binding;
- that a formal Change Order shall follow if changes are to be made;
- that any additional work performed by the Contractor unless directed otherwise above shall be at his expense, for which compensation is not due and will not be paid; and
- that a Request for Adjustment for the above changed work must be submitted within five Working Days.

_____ _____
Contractor's representative Title Date

WORK CHANGE REQUEST No. 2

(Continued)

Project: **Hogchute (AKA Carson) Reservoir Dam Rehabilitation** 30-Aug-22

To: ESCO Construction Co.

From: City of Grand Junction

Description of and justifications for change (continued)

Any overages in delivered quantities shall be the responsibility of ESCO. It shall be the responsibility of ESCO to remove any excess import material from the project site that remains following completion of the Embankment Improvements at no cost to the City. ESCO and its representative shall not use imported embankment materials for purposes other than the embankment reconstruction unless approved in writing by the Project Engineer, AE or other City Representative.

This WCA will require a Change Order to finalize quantities and payment. See Recommended Method of Payment.

Edit per email from Jon Samole:

1) Line Item COR2 B.05 unit should be paid per ton as established in 2021.

2) Line Item COR2 B.06 is included in this Work Change Request No. 2 per line item established in 2021.

ESCO Conditions for Acceptance of Work Change Request No. 2:

1. Import to be paid utilizing bid item COR2B.05 based upon a calculated tons per cubic yard at 1.85 tns/cy.
2. Additional compensation required for handling/onsite hauling imported material under bid item COR2B.06. Material to be imported to stockpile location, loaded into onsite haul trucks, and hauled to embankment location.

ESCO CONSTRUCTION CO.
32045 Castle Court, Suite 200
Evergreen, CO 80439
Phone: 303.674.3385 Fax: 303.496-9673

LETTER NO. ESCO-CGJ-C-0454A-007

July 29, 2022

John Eklund, Project Engineer
City of Grand Junction
333 West Ave., Building C
Grand Junction, CO 81501

Reference: Project IFB-4839-21-DH
Hogchute (aka Carson) Reservoir Dam Modifications Project

Subject: Embankment Moisture Content Impact

Dear Mr. Eklund,

On May 11, 2022, Change Order Number 2 was signed and executed by the City and ESCO. Part of that change order covered pricing for the excavation of the embankment borrow area as well as, stockpile management. This was per RFA-003 which was submitted to the City on September 28, 2021. Qualification number 1 in RFA-003, stated "that all quantities are estimated, and final contract price will be based on actual quantities installed."

ESCO started excavation of the borrow area, and stockpiling embankment material on June 21, 2022. In-Situ moisture contents ranged from 21.5% to 25.7%. Optimum moisture content of the material ranges from 11.9% to 13.3%. Since the excavation of the borrow area began, ESCO has spent time managing the stockpile every workday to dry-out the material and achieve an acceptable moisture content for use. During this period, we have received several rain events that have set back the progress we had made in drying the embankment material.

Currently ESCO is attempting to use the driest embankment material available from the stockpile. However, given the materials high initial moisture content, recurring afternoon rain cycles, ESCO has not been able to achieve an acceptable moisture content to meet the specifications for placing the embankment. Per Change Order Number 2 there were 8 days of stockpile management included for this work. To date ESCO has spent 19 days managing the stockpile. In addition to the additional days ESCO has also procured disking equipment, which was not included in the original pricing, to accelerate that material drying time. Despite ESCO's stockpile management efforts there is no useable embankment material on-site.

Pursuant to the weekly coordination meeting held on July 27, 2022, ESCO is taking additional steps to expand the stockpile area to increase the surface area for drying the materials. ESCO is also procuring additional equipment to help with this process. These efforts are a result of the overly saturated material procured from the lakebed borrow source and continual rain events this season. At this time ESCO has experienced 14 days with rain events totaling close to 3 inches of moisture. Historical records for the Grand Mesa region show that the rainiest month of the year is August which provides additional concerns moving forward.

At this time the city has authorized up to 40 cubic yards of material for two purposes. One, to perform a test mixing the onsite saturated materials with imported dry material to get a blend of material acceptable for use. Two, to bring the embankment around the filter diaphragm up to minimize rain ponding in the area.

ESCO requests that the City of Grand Junction authorize the continued import of the offsite material and the associated costs. It is imperative that we continue embankment construction immediately as ESCO is very concerned with achieving the project milestones.

ESCO
Established 1944

ESCO CONSTRUCTION CO.

32045 Castle Court, Suite 200
Evergreen, CO 80439
Phone: 303.674.3385 Fax: 303.496-9673

Per the Grand Junction Standard specifications, consider this correspondence a notice of changed site conditions. As the impacts of this condition are not known at this time, ESCO reserves its rights for the associated costs including but not limited to additional equipment, purchase of offsite material and acceleration efforts.

Your immediate attention to this matter is requested. We can certainly meet via Teams as necessary to discuss further.

Respectfully,

Joe Zink
Project Manager
ESCO Construction Co

Attachments:

Cc:

Jon Samole, Project Sponsor, ESCO Construction
Randi Kim, Utilities Director, City of Grand Junction

ESCO Construction Company
32045 Castle Court Suite 200
Evergreen, CO 80439
303-674-3385
www.escoconstructioncompany.com

LETTER NO. ESCO-CGJ-C-0454A-008

September 20, 2022

John Eklund, Project Engineer
City of Grand Junction
333 West Ave., Building C
Grand Junction, CO 81501

Reference: Project IFB-4839-21-DH
Hogchute (aka Carson) Reservoir Dam Modifications Project

Subject: Stockpile Management Days

Dear Mr. Eklund,

As a follow up to our discussions from the weekly meeting of August 30th, 2022, ESCO is providing the following documentation that supports our request for additional stockpile management days.

- Summary Sheet of Stockpile management Days (June 8th thru August 30th)
- Associated Daily Reports

As we have previously explained, the "super saturated" material excavated from the lakebed has always been a concern of ESCO. Nonetheless, despite rainy conditions and cool temperatures ESCO has provided the manpower and equipment to produce useable embankment from the site.

It is our intention to resolve this matter as quickly as possible. As per the agreed change order ESCO requests payment for 37 days of stockpile management.

Regards,

Joe Zink
Project Manager

CC: Eric Taylor Business Executive
Jon Samole, Project Sponsor

CITY OF Grand Junction COLORADO
PUBLIC WORKS

21 November 2022

Joe Zink, Project Manager
ESCO Construction, CO.
32045 Castle Ct, Suite 200
Evergreen, CO 80439

Reference: Project IFB-4839-21-DH
Hogchute (aka Carson) Reservoir Dam Modifications

Subject: Embankment Borrow Stockpile Management RFA006 and RFA008

Mr. Zink,

Following our previous meeting to discuss the above, I, with Ayres inspection staff, have reviewed the information contained within RFA006 Embankment Material Moisture and subsequent RFA008 Stockpile Management Days. As a result, the City acknowledges that the ESCO underestimated in their proposal the days needed to prepare the borrow material for placement, but put considerable effort into drying the stockpile. However, due to a combination of methods and weather conditions, ESCO was not able to dry out the borrow material such that it was entirely useable in a time that that would allow the project to be completed this season. In the interest of completing the project before winter 2022, the City was forced to accept the use of import material at significant cost to the project ($140,025.75).

The City acknowledges that ESCO used the borrow material when possible, to minimize cost due to importing embankment materials. ESCO excavated the full borrow quantity of 4066 CY per Item COR2A.03; the quantity required to complete the embankment reconstruction. ESCO stated during the weekly progress meeting on 28 September 2022 that between 1000-1500 CY of borrow material remain stockpiled at the close of construction (also confirmed in RFI 61). This number was confirmed at the final progress meeting and construction inspection on 19 October. Thus, a portion for of the borrow material was used for embankment reconstruction. As such the City proposes to pay a prorated amount of the effort recorded in Item COR2.A02 Stockpile Management (days) based on the percent of usable material produced and placed in the dam embankment. See Table 1 below for detail.

The amount owed to ESCO shown in Table 1 will be included in a change order since the final amount is above the current contract total.

Respectfully,

John Eklund, PE, CFM
Project Engineer
City of Grand Junction

CITY OF Grand Junction COLORADO
PUBLIC WORKS

Table 1:

RFA002A Borrow items and Quantities		QTY	Unit	Extended
Stockpile managemenet claimmed	Days	37	$ 3,700.00	$ 136,900.00
Original Stockpile Management Quantity	Days	8	$ 3,700.00	$ 29,600.00
Stockpile management Qty paid to date	Days	8	$ 3,700.00	$ 29,600.00
Remaining		29	$ 3,700.00	$ 107,300.00
Original Borrow Excavation Excavation	CY	4066		
Borrow Unuseable at close of 2022	CY	1500		
Borrow Excavation Placed in embankment	CY	2566		
Percent of Borrow used at close of 2022	CY	63.1%		
City Responsibility for effective stockpile management	Days	23	$ 3,700.00	$ 85,100.00
Amount due to ESCO	**Days**	**15**		**$ 55,500.00**

CITY OF Grand Junction COLORADO

NOTICE TO PROCEED
for Change Order #2

Date: May 25, 2022

Contractor: ESCO Construction Co.

Project: Hogchute (aka Carson) Reservoir Dam Modifications Project
IFB-4839-21-DH (Change Order #2)

In accordance with the Change Order #2 dated May 3, 2022 the Contractor is hereby notified to begin work on the Project on or before May 31, 2022.

The date of final completion as determined is October 7, 2022.

CITY OF GRAND JUNCTION, COLORADO

DocuSigned by:
Duane Hoff Jr., Contract Administrator – City of Grand Junction
9F789E7D50F14BC...
Duane Hoff Jr., Contract Administrator

Receipt of this Notice to Proceed is hereby acknowledged:

Contractor: ESCO Construction Co

By: DocuSigned by:
Eric Clark – President, ESCO Construction Co.
9BD108E3B071499...

Print Name: Eric Clark - President, ESCO Construction Co.

Title: President

Date: 6/2/2022

Change Order
Number 2

Date: May 3, 2022
To: ESCO Construction Co.
From: City of Grand Junction, Department of Public Works and Utilities
Project: **Hogchute (AKA Carson) Reservoir Dam Rehabilitation**
P.O.: **2021-00000729**

It is agreed to modify the Contract for the Project as follows:

Contract is changed to Calendar Days. Winterization was required by Colorado Division of water Resources – Dam Safety and extends from 7 November 2021 to date of Notice to Proceed for 2022 construction (anticipated 31 May 2022). Contractor shall have 130 Calendar Days from the date of the 2022 Notice to Proceed to achieve Final Acceptance.

Substantial completion of the dam shall be achieved by the contractor not less than two (2) weeks prior to Final Acceptance and includes all work to be approved for filling by the State (Continued on Page 2.)

Summary of Contract price adjustments - itemized on the attached sheet(s):

Original Contract Amount	$2,893,500.00
Approved Change Orders	(9,565.20)
This Change Order	1,384,317.84
Revised Contract Amount	$4,268,252.64

Summary of Contract time adjustments:

Original Contract Time	151.	Cal. Days
Approved Change Orders	30.	
Winterization*	180.	*Not included in contract time
This Change Order	130.	
Revised Contract Time	311.	Cal. Days

Construction Start Date:	June 3, 2021
Contract Completion Date:	October 7, 2022

This modification constitutes compensation in full for all costs and mark-ups directly and/or indirectly attributable to the changes ordered herein, for all delays, impacts and disruptions related thereto and for performance of the changes within the Contract Time.

Owner: **City of Grand Junction**

Prepared by: DocuSigned by: John Eklund — Date: 5/11/2022
John Eklund, Project Engineer

Reviewed by: DocuSigned by: Randi Kim – Public Works – Utilities Director, City of Grand Junction — Date: 5/11/2022
Randi Kim, Utilities Director

Approved by: DocuSigned by: Greg Caton – City Manager – City of Grand Junction — Date: 5/11/2022
Greg Caton, City Manager

Contractor: **ESCO Construction Co.**

Signature: DocuSigned by: Eric Clark – President, ESCO Construction Co. — Date: 5/11/2022

Name and Title: Eric Clark - President, ESCO Construction Co. President

Change Order Number 2

(Continued)

Project: **Hogchute (AKA Carson) Reservoir Dam Rehabilitation**
To: ESCO Construction Co.
From: City of Grand Junction
Date: May 3, 2022

Description of and justifications for change (continued)

Dam Safety Office and excludes only demobilization and any identified Punch List Items. Substantial completion of Auxiliary Spillway shall be all work including grading, rock berms, seeding, etc., except harvest and planting of willow stakes.

The process of obtaining acceptable embankment material delayed the project which was subsequently required by the State Dam Safety Office to be shut down through the winter season. This change order incorporates costs to remobilize the contractor and de-winterize the dam so that the modifications can be completed. The additional costs to remobilize and de-winterize total $755,579.05

Due to the additional work scope associated with the embankment and impending weather constraints for working on the Grand Mesa, the installation of the Early Warning System and auxiliary spillway work was not completed in 2021. The contract Line Items for these efforts were thus removed from the Contract in a previous change order. These items are reestablished in this Change Order at their original pricing for the total cost to the City of $371,606.08.

Suitable embankment material is available on site. The pricing for excavating, preparing, and using this material was established, but not included in a previous change order. These items are included in this change order for a total cost to the City of $198,619.20.

Several items that are completed in 2021 did not use the total estimated material quantity. The remaining quantities are removed from the contract for a credit to the City in the amount of ($72,046.49).

A force account item has been established as part of this change order for the backfill around the upstream pipe inlet. This material must be tested to confirm compaction meets project specifications. If compaction is determined to be out of specification, the material will need to be excavated and replaced with proper compaction. Total cost to the City, if needed, is $130,560.00.

The combined additional costs to the City as part of the change order is $1,384,317.84.

Attachments:
Request for Adjustment 004 - Remobilization and Winterization Removal (RFA04) (Revision 2)
Hogchute RFA04 - Additional Narrative
Hogchute RFA04 - 2022 Schedule

Hogchute (AKA Carson) Reservoir Dam Rehabilitation -- City P.O. No. 2021-00000729

May 3, 2022

Change Order No. 2

Item No.	CDOT, City Ref.	Description	Current Contract [1] Quantity	Units	Unit Price	Extended Price	Revised Quantity	Units	Unit Price	Extended Price	Change
---	---	Construction Period [1]	181	Cal. Days	---	---	311	Cal. Days	---	---	130
1	626 01 22 50	Mobilization	1.	LS	$ 137,295.00	$ 137,295.00	1	LS	$ 137,295.00	$ 137,295.00	
2	208 01 57 19	Erosion Control	1.	LS	$ 60,000.00	$ 60,000.00	1	LS	$ 60,000.00	$ 60,000.00	
3	01 57 60	Construction Dewatering	1.	LS	$ 168,000.00	$ 168,000.00	1	LS	$ 168,000.00	$ 168,000.00	
4	02 41 00	Demolition (intake, outfall, piping, controls, spillway grouted riprap, etc.)	1.	LS	$ 180,000.00	$ 180,000.00	1	LS	$ 180,000.00	$ 180,000.00	
5	03 30 00 31 20 00 31 37 00	Concrete Overflow Spillway (excavation, form, concrete placement, backfill, and riprap, etc.)	1.	LS	$ 300,000.00	$ 300,000.00	1	LS	$ 300,000.00	$ 300,000.00	
6	31 24 00 31 20 00	Embankment Excavation	1.	LS	$ 210,000.00	$ 210,000.00	1	LS	$ 210,000.00	$ 210,000.00	
7	33 41 66	Type I Filter Material	1,000.	CY	$ 145.00	$ 145,000.00	1000	CY	$ 145.00	$ 145,000.00	
8	33 41 66	Type II Filter Material	120.	CY	$ 211.00	$ 25,320.00	120	CY	$ 211.00	$ 25,320.00	
9	33 41 66 33 42 15	HDPE Perforated Drain Pipe	270.	LF	$ 184.00	$ 49,680.00	270	LF	$ 184.00	$ 49,680.00	
10	33 41 66 33 42 15	HDPE Solid Drain Pipe	375.	LF	$ 62.00	$ 23,250.00	375	LF	$ 62.00	$ 23,250.00	
11	31 24 00 31 20 00 31 23 33	Embankment Backfill (embankment fill, rock shell, restore stockpile areas, etc.)	1.	LS	$ 180,000.00	$ 180,000.00	1	LS	$ 180,000.00	$ 180,000.00	
12	35 22 28 33 42 15	Stainless Steel Slide Gate	1.	LS	$ 16,000.00	$ 16,000.00	1	LS	$ 16,000.00	$ 16,000.00	
13	03 30 00 33 42 15 05 50 00	Concrete Buttress Intake Structure (Concrete buttress, conduit encasement, air vent and hydraulics conduit, steel elbow, etc.)	1.	LS	$ 150,000.00	$ 150,000.00	1	LS	$ 150,000.00	$ 150,000.00	
14	26 05 43 33 42 15	Locking Valve Box	1.	LS	$ 10,000.00	$ 10,000.00	1	LS	$ 10,000.00	$ 10,000.00	
15	05 50 00	Trash Rack	1.	LS	$ 12,000.00	$ 12,000.00	1	LS	$ 12,000.00	$ 12,000.00	

[x] - See Change Order No. "x"
** - Items to be paid using Minor Contract Revisions

Hogchute (AKA Carson) Reservoir Dam Rehabilitation -- City P.O. No. 2021-00000729

May 3, 2022

Change Order No. 2

Item No.	CDOT, City Ref.	Description	Current Contract [1] Quantity	Units	Unit Price	Extended Price	Revised Quantity	Units	Unit Price	Extended Price	Change
---	---	Construction Period [1]	181	Cal. Days	---	---	311	Cal. Days	---	---	130
16 [1]	32 92 26	Wetland Soil Stockpiling					4100	SY	$ 4.00	$ 16,400.00	$ 16,400.00
17 [1]	31 20 00	Auxiliary Spillway Grading					3000	SY	$ 21.00	$ 63,000.00	$ 63,000.00
18 [1]	31 37 00	Auxiliary Spillway Rock Berms					656.124	LF	$ 291.00	$ 190,932.08	$ 190,932.08
19	33 42 15 03 30 00	30-Inch Steel Pipe	100.	LF	$ 1,375.00	$ 137,500.00	97	LF	$ 1,375.00	$ 133,375.00	$ (4,125.00)
20	33 01 36	CIPP Pipe Lining	300.	LF	$ 495.00	$ 148,500.00	300	LF	$ 495.00	$ 148,500.00	
21	03 30 00 31 20 00 31 37 00 05 52 04	Impact Basin (excavation, backfill, formwork, concrete, riprap, steel railing, etc.)	1.	LS	$ 120,000.00	$ 120,000.00	1	LS	$ 120,000.00	$ 120,000.00	
22 [1]	32 92 26 32 99 10	Site Restoration (placing topsoil, seeding, sodding, planting, mulching, etc.)					1	LS	$ 45,000.00	$ 45,000.00	$ 45,000.00
23 [1]	40 70 10	Early Warning System						LS	$ 100,000.00		
24	625	Construction Surveying	1.	LS	$ 65,000.00	$ 65,000.00	1	LS	$ 65,000.00	$ 65,000.00	
		Change Order No. 1									
	RFA 002A	**Onsite Borrow**									
COR2A.01		Staging Area Stripping					1	Ac	$ 1,500.00	$ 1,500.00	$ 1,500.00
COR2A.02		Stockpile Management					8	Day	$ 3,700.00	$ 29,600.00	$ 29,600.00
COR2A.03		Excavate Borrow Area					4066	CY	$ 18.50	$ 75,221.00	$ 75,221.00
COR2A.04		Embankment Material Haul					4066	CY	$ 12.20	$ 49,605.20	$ 49,605.20
COR2A.05		Existing Unsuitable Embankment to Waste					4066	CY	$ 10.50	$ 42,693.00	$ 42,693.00
COR2A.06		Restore Staging Area						Ac	$ 6,366.00		
	RFA 002B	**Embankment Import**									
COR2B.01		Mobilization	1.	LS	$ 10,500.00	$ 10,500.00	1	LS	$ 10,500.00	$ 10,500.00	
COR2B.02		Staging Area Stripping (if Authorized before	2.	AC	$ 1,500.00	$ 3,000.00	2	AC	$ 1,500.00	$ 3,000.00	
COR2B.03	**	Access Road Maintenance	14.	Day	$ 5,675.00	$ 79,450.00	10	Day	$ 5,675.00	$ 56,750.00	$ (22,700.00)
COR2B.04		Stockpile Management	14.	Day	$ 3,700.00	$ 51,800.00	8	Day	$ 3,700.00	$ 29,600.00	$ (22,200.00)
COR2B.05		Import Embankment Material	3,498.	Ton	$ 45.50	$ 159,159.00	3104.72	Ton	$ 45.50	$ 141,264.76	$ (17,894.24)
COR2B.06		Embankment Material Haul	2,000.	CY	$ 12.20	$ 24,400.00	1774.13	CY	$ 12.20	$ 21,644.39	$ (2,755.61)
COR2B.07		Existing Unsuitable Embankment to Waste	2,000.	CY	$ 10.50	$ 21,000.00	1774.1299	CY	$ 10.50	$ 18,628.36	$ (2,371.64)
COR2B.08		Restore Staging Area (If Authorized Before 2A)	2.		$ 6,366.00	$ 12,732.00	2		$ 6,366.00	$ 12,732.00	

[x] - See Change Order No. "x"

** - Items to be paid using Minor Contract Revisions

Hogchute (AKA Carson) Reservoir Dam Rehabilitation -- City P.O. No. 2021-00000729

May 3, 2022

Change Order No. 2

Item No.	CDOT, City Ref.	Description	Current Contract [1] Quantity	Units	Unit Price	Extended Price	Revised Quantity	Units	Unit Price	Extended Price	Change
---	---	Construction Period [1]	181	Cal. Days	---	---	311	Cal. Days	---	---	130
CO-101 [1]		Auxiliary Spillway Rock Riprap Fabrication.	1.	LS	$ 130,622.80	$ 130,622.80	1	LS	$ 130,622.80	$ 130,622.80	
CO-102 [1]		Early Warning System Purchase	1.	LS	$ 43,726.00	$ 43,726.00	1	LS	$ 43,726.00	$ 43,726.00	
		Change Order No. 2									
	RFA004	**Remobilization & Winterization Removal (2022)**									
CO4A.01		Remobilization					1	LS	$ 144,830.00	$ 144,830.00	$ 144,830.00
CO4A.02		Reinstall/Maintain Erosion Control BMP's					1	LS	$ 57,340.00	$ 57,340.00	$ 57,340.00
CO4A.03		Construction Survey					1	LS	$ 33,480.00	$ 33,480.00	$ 33,480.00
CO4A.04		Winterization Downstream Cobble Removal					1	LS	$ 100,303.00	$ 100,303.00	$ 100,303.00
CO4A.05		Reestablish Downstream Subgrade					1	LS	$ 33,997.00	$ 33,997.00	$ 33,997.00
CO4A.06		Winterization Crest Buildup Removal					1	LS	$ 42,476.00	$ 42,476.00	$ 42,476.00
CO4A.07		Replace Cobble Upstream					1	LS	$ 22,290.00	$ 22,290.00	$ 22,290.00
CO4A.08		Expose Filter Diaphragm					1	LS	$ 33,200.00	$ 33,200.00	$ 33,200.00
CO4A.09		Dewater 2021 Filter Diaphragm					1	LS	$ 30,510.00	$ 30,510.00	$ 30,510.00
CO4A.10		Remove Cobble Above Buttress					1	LS	$ 17,160.00	$ 17,160.00	$ 17,160.00
CO4A.11		Install Bypass Pumping System					1	LS	$ 37,500.00	$ 37,500.00	$ 37,500.00
CO4A.12		Install Cofferdam					1	LS	$ 12,150.00	$ 12,150.00	$ 12,150.00
CO4A.13		Rent Bypass Pumping System					1	Week	$ 5,230.00	$ 5,230.00	$ 5,230.00
CO4A.14		Operate/Maintain Bypass Pumping System					1	Week	$ 8,040.00	$ 8,040.00	$ 8,040.00
CO4A.15		Remove Cofferdam					1	LS	$ 17,160.00	$ 17,160.00	$ 17,160.00
CO4A.16		Remove Bypass Pumping System					1	LS	$ 16,320.00	$ 16,320.00	$ 16,320.00
CO4A.17		Remove/Reinstall Trash Rack					1	LS	$ 18,010.00	$ 18,010.00	$ 18,010.00
CO4A.18		Type I Filter Escalations					1000	CY	$ 9.75	$ 9,750.00	$ 9,750.00
CO4A.19		Type II Filter Escalations					120	CY	$ 2.46	$ 295.20	$ 295.20
CO4A.20		2022 Onsite Project Management					16	Week	$ 9,572.50	$ 153,160.00	$ 153,160.00
C04A.21		Original Contract Project Management - Credit					1	LS	$ (37,622.15)	$ (37,622.15)	$ (37,622.15)
CO-201		Early Warning System Installation					1	LS	$ 56,274.00	$ 56,274.00	$ 56,274.00
		Change Order No. 2 Force Account									
CO4A.21	FA	Install Secondary Bypass System					1	LS	$ 34,200.00	$ 34,200.00	$ 34,200.00
CO4A.22	FA	Rent Secondary Bypass System					1	Week	$ 2,870.00	$ 2,870.00	$ 2,870.00
CO4A.23	FA	Remove Secondary Bypass System					1	LS	$ 16,320.00	$ 16,320.00	$ 16,320.00
CO4A.24	FA	Impact Basin Remove/Replace Backfill					1	LS	$ 40,920.00	$ 40,920.00	$ 40,920.00
CO4A.25	FA	Concrete Buttress Remove/Replace Backfill					1	LS	$ 36,250.00	$ 36,250.00	$ 36,250.00
MCR		Minor Contract Revisions	---	---	$ 210,000.00	$ 210,000.00	---	---	$ 210,000.00	$ 210,000.00	$ 0.00
		Total Change to Original Contract:								$ 311,207.08	
		Total Change as part of this Change Order:								$ 130,697.71	

[x] - See Change Order No. "x"

** - Items to be paid using Minor Contract Revisions

Hogchute (AKA Carson) Reservoir Dam Rehabilitation -- City P.O. No. 2021-00000729

May 3, 2022

Change Order No. 2

Item No.	CDOT, City Ref.	Description	Current Contract [1] Quantity	Units	Unit Price	Extended Price	Revised Quantity	Units	Unit Price	Extended Price	Change
---	---	Construction Period [1]	181	Cal. Days	---	---	311	Cal. Days	---	---	130
		TOTALS:				$ 2,883,934.80				$ 4,268,252.64	$ 1,384,317.84

[x] - See Change Order No. "x"

[x] - See Change Order No. "x"

** - Items to be paid using Minor Contract Revisions

ESCO CONSTRUCTION CO.
32045 Castle Court, Suite 200
Evergreen, CO 80439
Phone: 303.674.3385 Fax: 303.496-9673

LETTER NO. ESCO-CGJ-C-0454A-006

March 30, 2022

John Eklund, Project Engineer
City of Grand Junction
333 West Ave., Building C
Grand Junction, CO 81501

Reference: Project IFB-4839-21-DH
Hogchute (aka Carson) Reservoir Dam Modifications Project

Subject: Request for Adjustment 004 – Remobilization & Winterization Removal

Dear Mr. Eklund,

As a result of varying site conditions and plan changes on the Hogchute Dam Rehabilitation project, reference Letter No. ESCO CGJ-C-045A-004, ESCO was unable to complete the contract work in the 2021 construction season. This combined with winter conditions required ESCO to winterize the project in accordance with Dam Safety and Ayres winterization requirements, see Attachment 2. The winterization of the project was completed in November 2021, at which time, ESCO demobilized all crews, equipment, and materials for the winter.

ESCO has prepared the following costs to remobilize and complete the dam rehabilitation work in 2022 following spring runoff. Pricing includes original contract items that were removed from the scope to pay for embankment material import, previously agreed to pricing for embankment borrow sourcing, credits for items that will not be complete and/or underruns, and remobilization & winter removal costs for 2022 work.

Original Contract Items					
Item No.	**Description**	**Unit Price**	**Quantity**	**Units**	**Total**
16	Wetland Soil Stockpiling	$4.00	4100	SY	$16,400.00
17	Auxiliary Spillway Grading	$21.00	3000	SY	$63,000.00
22	Site Restoration	$45,000.00	1	LS	$45,000.00
18	Auxiliary Spillway Rock Berms	$291.00	656.124	LF	$190,932.08
23	Early Warning System	$56,274.00	1	LS	$56,274.00
			Original Contract Items Subtotal:		**$371,606.08**

Embankment Processing Items					
Item No.	**Description**	**Unit Price**	**Quantity**	**Units**	**Total**
COR2A.01	Borrow Area Striping	$1,500.00	1	AC	$1,500.00
COR2A.02	Stockpile Management	$3,700.00	8	DY	$29,600.00
COR2A.03	Excavate Borrow Area	$18.50	4066	CY	$75,221.00
COR2A.04	Embankment Material Haul	$12.20	4066	CY	$49,605.20
COR2A.05	Existing Unsuitable to Waste	$10.50	4066	CY	$42,693.00
			Embankment Processing Items Subtotal:		**$198,619.20**

ESCO CONSTRUCTION CO.
32045 Castle Court, Suite 200
Evergreen, CO 80439
Phone: 303.674.3385 Fax: 303.496-9673

Current Contract Deduct Items					
Item No.	**Description**	**Unit Price**	**Quantity**	**Units**	**Total**
COR2B.03	Import Access Rd. Maintenance - Deduct	$5,675.00	-4	DY	-$22,700.00
COR2B.04	Import Stockpile Management - Deduct	$3,700.00	-6	DY	-$22,200.00
COR2B.05	Import Embankment Material - Deduct	$45.50	-393.28	TN	-$17,894.24
COR2B.06	Import Emb. Material Haul - Deduct	$12.20	-225.87	CY	-$2,755.61
COR2B.07	Unsuitable Emb. to Waste - Deduct	$10.50	-225.87	CY	-$2,371.64
19	30-Inch Steel Pipe - Deduct	$1,375.00	-3	LF	-$4,125.00
				Current Contract Deduct Items Subtotal:	**-$72,046.49**

2022 Remobilization Items					
Item No.	**Description**	**Unit Price**	**Quantity**	**Units**	**Total**
COR4A.01	Remobilization	$144,830.00	1	LS	$144,830.00
COR4A.02	Reinstall/Maintain Erosion Control BMPs	$57,340.00	1	LS	$57,340.00
COR4A.03	Construction Survey	$33,480.00	1	LS	$33,480.00
COR4A.04	Winterization Downstream Cobble Removal	$100,303.00	1	LS	$100,303.00
COR4A.05	Re-Establish Downstream Subgrade	$33,997.00	1	LS	$33,997.00
COR4A.06	Winterization Crest Buildup Removal	$42,476.00	1	LS	$42,476.00
COR4A.07	Replace Cobble Upstream	$22,290.00	1	LS	$22,290.00
COR4A.08	Expose Filter Diaphragm	$33,200.00	1	LS	$33,200.00
COR4A.09	Dewater 2021 Filter Diaphragm	$30,510.00	1	LS	$30,510.00
COR4A.10	Remove Cobble Above Buttress	$17,160.00	1	LS	$17,160.00
COR4A.11	Install Remove Bypass Pumping System	$32,770.00	1	LS	$37,500.00
COR4A.12	Install Cofferdam	$12,150.00	1	LS	$12,150.00
COR4A.13	Rent Bypass Pumping System	$5,230.00	1	WK	$5,230.00
COR4A.14	Operate/Maintain Bypass Pumping System	$8,040.00	1	WK	$8,040.00
COR4A.15	Remove Cofferdam	$17,160.00	1	LS	$17,160.00
COR4A.16	Remove Bypass Pumping System	$16,320.00	1	LS	$16,320.00
COR4A.17	Remove/Reinstall Trash Rack	$18,010.00	1	LS	$18,010.00
COR4A.18	Type I Filter Escalations	$9.75	1000	CY	$9,750.00
COR4A.19	Type II Filter Escalations	$2.46	120	CY	$295.20
COR4A.20	2022 Onsite Project Management	$9,572.50	16	WK	$153,160.00
COR4A.21	Original Contract Project Management - Credit	-$37,622.15	1	LS	-$37,622.15
				2022 Remobilization Items Subtotal:	**$755,579.05**
				Total Contract Adjustment Request:	**$1,253,757.85**

ESCO CONSTRUCTION CO.
32045 Castle Court, Suite 200
Evergreen, CO 80439
Phone: 303.674.3385 Fax: 303.496-9673

In addition to the remobilization and winterization removal costs ESCO has prepared the following rough order of magnitude (ROM) pricing for additional work that may be requested once the site can be evaluated after spring runoff. The following ROM pricing is for reference only. It is ESCO's understanding from prior meetings with the City that this work would be performed on a Time & Materials basis once the full scope of the work has been identified. Please note that the ROM pricing would require additional primary bypass pumping in addition to the secondary bypass system shown below. Primary bypass pumping time that would be billed at the weekly rates provided above.

2022 ROM Items					
Item No.	**Description**	**Unit Price**	**Quantity**	**Units**	**Total**
	Install Secondary Bypass System (O)	$36,280.00	1	LS	$34,200.00
	Rent Secondary Bypass System (O)	$2,870.00	1	WK	$2,870.00
	Remove Secondary Bypass System (O)	$27,010.00	1	LS	$16,320.00
	ROM - Impact Basin Remove/Replace Backfill	$40,920.00	1	LS	$40,920.00
	ROM - Concrete Buttress Remove/Replace Backfill	$36,250.00	1	LS	$36,250.00
			2022 ROM Items Subtotal:		**$130,560.00**

Qualifications:

1) Mobilization of all crew, equipment, and materials to complete the remaining work.
2) Completion of original contract scope, previously removed from contract un Change Order No. 1.
3) Balance of embankment material processing in accordance with RFA-003.
4) Re-establishment and maintenance of construction BMPs for the 2022 season.
5) Removal of winterization activities, required to complete contract work.
6) Additional dewatering and tie into the filter diaphragm.
7) Cofferdam and bypass pumping of reservoir inflows to facilitate the installation of the slide gate and trash rack.
8) Construction Survey: Revised construction models based on the revised drawings, confirm subgrade upon completion of winterization removals, and re-establishment of survey controls.
9) Escalations for filter materials.
10) Rental & Operation will be billed by the number of weeks run rounded up to the nearest week.
11) This proposal assumes diesel fuel cost at $3.00/Gallon. Due to ongoing current events, the price of diesel fuel has become extremely volatile over the past month. ESCO reserves the right to seek additional compensation shall fuel prices exceed $3.30/Gallon.

We look forward to working closely with the City of Grand Junction for a safe and successful completion of this project. If you have any questions, please do not hesitate to contact me at (480) 296-3485

Respectfully,

Justin Cooper
Project Sponsor
ESCO Construction Co

ESCO CONSTRUCTION CO.
32045 Castle Court, Suite 200
Evergreen, CO 80439
Phone: 303.674.3385 Fax: 303.496-9673

Attachments:

Attachment 1 – Schedule of Value Narrative
Attachment 2 – Letter No. ESCO-CGJ-C-0454A-004 – Notice of Change – Plan/Design Revision No. 1
Attachment 3 – WCR-01 – Winterization Order
Attachment 4 – Letter No. ESCO-CGJ-C045A-003 – Request for Adjustment 002R1

Cc:

Joe Zink, Project Manager, ESCO Construction
Mark Ritterbush, Water Control Supervisor, City of Grand Junction

HOGCHUTE DAM REHABLIITATION 2022 REMOBILIZATION NARRATIVE

Item No.	Description	Narrative
COR4A.01	Remobilization	Item includes all costs to remobilize/demobilize equipment, crew, and construction materials in order to complete the remaining work in the 2022 construction season.
COR4A.02	Reinstall/Maintain Erosion Control BMPs	Item includes reinstallation of silt fence that was damaged during the winter season and spring runoff. Line item includes costs to reinstall BMP measures and maintain BMPs through the 2022 construction season.
COR4A.03	Construction Survey	Line item includes costs to develop new construction models based on the revised drawings received on 9/22/2021, re-establish control points, and verify grades once the winterization measures have been removed.
COR4A.04	Winterization Downstream Cobble Removal	Line item includes all costs associated with removing, hauling, and stockpiling the winterization cobble from the dam crest to the downstream toe of slope. Cobble will be removed down to the embankment subgrade. **Per Ayers' model, the downstream cobble quantity is 4,947 CY.**
COR4A.05	Re-Establish Downstream Subgrade	ESCO anticipates that the embankment subgrade below the cobble will have some amount of damage from the placement/removal of the winterization cobble, as well as from snow melt and other weather related conditions. This line item includes costs to repair/re-establish one-half of the embankment subgrade area to receive filter drain material. **Quantity assumed to be 2,090 SY.**
COR4A.06	Winterization Crest Buildup Removal	ESCO used unsuitable embankment material removed from the downstream face of the dam to build the crest of the embankment back up to its original elevation, during winterization. This line item includes costs to remove the material from this area prior to replacing the upstream cobble. **ESCO will be removing 1,570 CY.**
COR4A.07	Replace Cobble Upstream	In order to complete the embankment crest build per the winterization plan ESCO had to pull some of the upstream cobble shell down to make access for hauling activities and to create a suitable base to facilitate the build up. Line item includes costs to replace this cobble back to its original grades.
COR4A.08	Expose Filter Diaphragm	Due to winter weather conditions ESCO was unable to bring the filter diaphragm up above the 30" pipe encasement. The filter had to be buried with embankment fill so that cobble could be placed above. This line item includes costs to excavate down to the filter material, stockpile the embankment material for reuse, remove/replace any contaminated filter material prior to continuing the filter diaphragm.
COR4A.09	Dewater 2021 Filter Diaphragm	The location of the filter diaphragm is extremely saturated. With embankment material now placed between the filter and the impact basin ESCO will no longer be able to let the water gravity flow out of the area. ESCO will install sumps to control ground water on either side of the 30" pipe encasement in order to facilitate the continuation of the filter diaphragm. Line item includes costs to install, operate/maintain, and remove sumps/pumps.

HOGCHUTE DAM REHABLIITATION 2022 REMOBILIZATION NARRATIVE

Item No.	Description	Narrative
COR4A.10	Remove Cobble Above Buttress	Due to lack of useable embankment material ESCO was unable to complete the backfill of the Concrete buttress. Approximately 2 feet of embankment was placed over top of the 30" pipe encasement before cobble was placed in the area to secure it for the winter. Line item includes costs to remove and stockpile the material above the buttress. **Quantity of cobble to be removed is 560 CY.**
COR4A.11	Install Remove Bypass Pumping System	During the 2021 season the City elected not to install the slide gate but required that the trash rack be installed. In order to remove the trash rack, install the slide gate and reinstall the trash rack the reservoir inflows will need to be bypass pumped around the dam. Line item includes mobilization and setup of the bypass pumping system.
COR4A.12	Install Cofferdam	In order to effectively bypass pump the reservoir inflow the temporary cofferdam will need to be reinstalled. Line item includes installation of the cofferdam to facilitate bypass pumping operations.
COR4A.13	Rent Bypass Pumping System	Line item includes the costs associated with renting pumps, pipe, fittings, etc. for the bypass system.
COR4A.14	Operate/Maintain Bypass Pumping System	Line item includes costs for fuel, labor, and equipment to keep the bypass system running.
COR4A.15	Remove Cofferdam	Line item includes cost to dig out the cofferdam and load into trucks. Haul off of the cofferdam material is included in the original dewatering contract item.
COR4A.16	Remove Bypass Pumping System	Line item includes labor, equipment and demobilization costs to dismantle and haul off the bypass pumping system.
COR4A.17	Remove/Reinstall Trash Rack	Line item includes labor and equipment costs to remove and reinstall the trash rack at the concrete buttress structure. Bypass pumping of the reservoir inflows are included in the line items above. Costs to install the slide gate are included in the original contract items.
COR4A.18	Type I Filter Escalations	Line item covers material escalation costs for the Type I filter sand.
COR4A.19	Type II Filter Escalations	Line item covers material escalation costs for the Type II filter sand.
COR4A.20	2022 Onsite Project Management	Line item covers additional onsite project management, project management per diem, and onsite office costs. Onsite office costs include office trailer rental, generator power for the trailers, internet, and sanitation facilities. The original contract work was scheduled for a 4 month duration, but due to changes in conditions and plan revisions, ESCO was unable to complete the work and was directed to winterize the site and return in 2022 to complete the project. ESCO performed all winterization work on T&M. The T&M tickets covered direct cost, but did not cover extended overhead cost for the extra work performed to winterize the project. ESCO is therefore requesting a total of 3 additional months for the 2022 construction season.

ESCO
Established 1944

1) **Your winterization work cost the City $128,153. Your proposed de-winterization total is $276,147. This is higher than your original embankment excavation amount. Please revise these costs so that they are more reflective of the winterization effort. $130K – 150K seems more reasonable for the effort.**
    a. It is ESCO's understanding that the city is comparing the following de-winterization items to the original contract Embankment Excavation item:
        i. Items total:

COR4A.04	Winterization Downstream Cobble Removal	$100,303.00	1	LS	$100,303.00
COR4A.05	Re-Establish Downstream Subgrade	$33,997.00	1	LS	$33,997.00
COR4A.06	Winterization Crest Buildup Removal	$42,476.00	1	LS	$42,476.00
COR4A.07	Replace Cobble Upstream	$22,290.00	1	LS	$22,290.00
COR4A.08	Expose Filter Diaphragm	$33,200.00	1	LS	$33,200.00
COR4A.10	Remove Cobble Above Buttress	$17,160.00	1	LS	$17,160.00

Items total: $249,426.00

b. According to Specification 01 22 50 paragraph 3.06 Embankment Excavation is defined as, *excavating and stockpiling the downstream rock shell and embankment fill as shown on the Drawings and as defined in Section 31 24 00 and Section 31 20 00*. Based upon this definition, it would not be accurate to compare the price for the six items listed above to the original contract amount for Embankment Excavation.

ESCO believes the closest comparison to the original contract Embankment Excavation item is to compare items COR4A.04 Winterization Cobble Removal and item COR4A.05 Re-Establish Downstream subgrade. When comparing these two items together the cost comparison is $134,400.00 for de-winterization versus the original Embankment Excavation item of $210,000.00.

c. There is not an accurate comparison to any original contract work for the Line COR4A.06 & COR4A.07 as this work was done solely for winterization of the project. This work comprised of removing cobble from the upstream side of the reservoir to create a stable base and to build the crest up to secure the dam over the winter. For de-winterization of this area ESCO must remove the crest build up material from the area and replace the cobble that was stripped down. Due to the location and limited access to the location of the crest build up the material will have to be removed by backing haul trucks into the area one at a time to be loaded so the material can be hauled off. We anticipate the operation to be a very slow process due to the location and access of the work. ESCO has reviewed any double handle of material since unsuitable embankment material was

used for this and the material will need to be disposed of. After our review of this and during the second submission of this proposal ESCO included a $15,014.00 credit for double handling of the material.

d. There is no accurate comparison to the original contract work for line item COR4A.08 Expose Filter Diaphragm. In order to winterize the project and place cobble on the downstream side embankment material had to be placed over top of the filter diaphragm (see figure below).

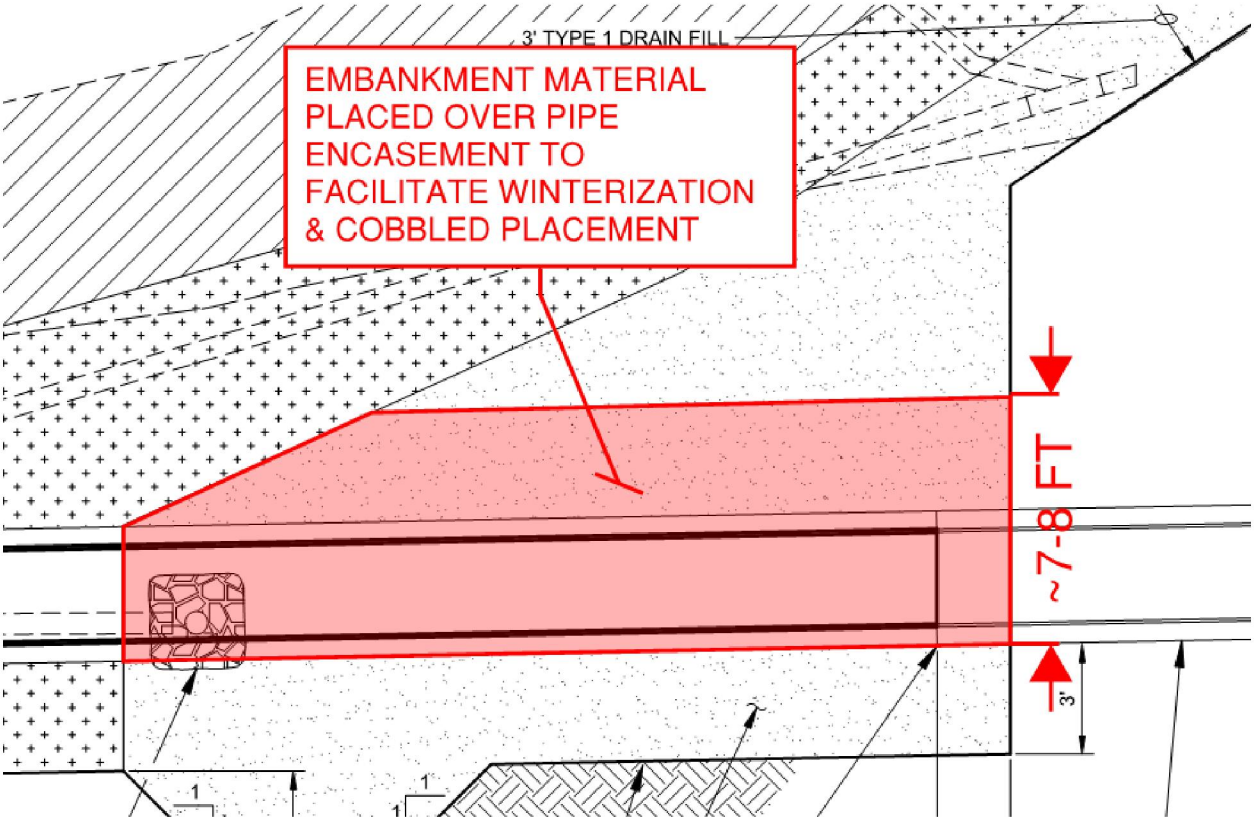


Figure 1

To complete the filter diaphragm work in 2022 the embankment material placed for winterization will need to be removed. Due to the location of the work and since the pipe encasement has been installed this work will be slow and need to be done very carefully to prevent damage to the encasement. It is also anticipated that the top layer of the drain sand will need to be removed and replaced due to contamination of the filter sand before the diaphragm can be brought up to its final grades.

e. There is no accurate comparison to the original contract work for line item COR4A.10 Remove Cobble Above Buttress. The nearest original contract comparison would be to line item 130 Concrete Buttress Intake Structure (Ex/Form/Concrete/Backfill/Rip) since

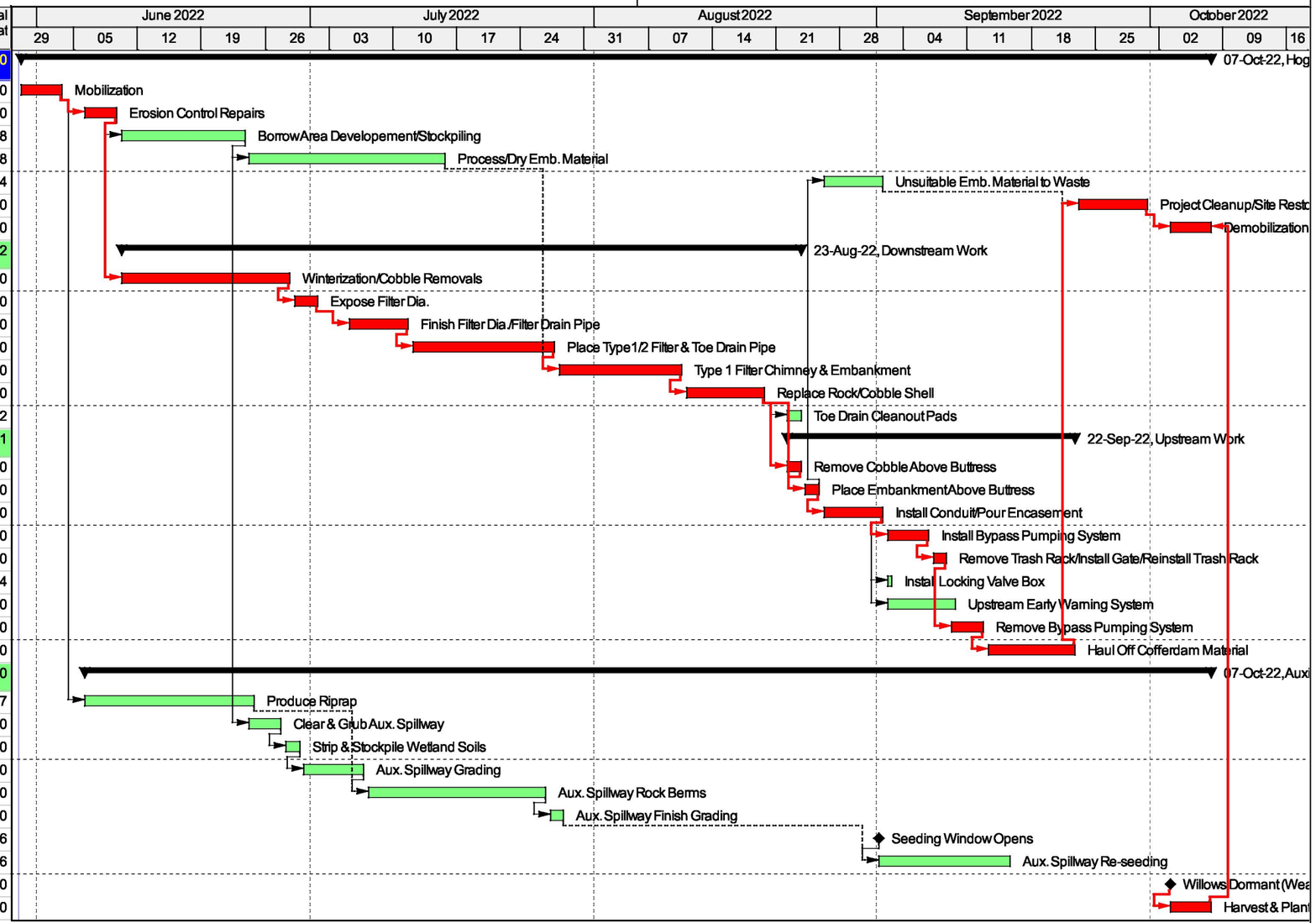
this item had the original excavation for that structure. During Winterization ESCO ran out of usable embankment material and was not able to complete the backfill of the Concrete Buttress in its entirety. Due to this reason cobble was placed above the buttress to secure it for the winter. This cobble will need to be removed so that the remaining embankment material can be placed.

f. The City also compared the de-winterization costs to the T&M tickets provided during the Winterization work. We again feel that this is not an accurate comparison. The work required to remove the winterization measures and re-establish the site will be much more time consuming work to prevent damage to installed work.

2) **You have not acknowledged the credit for project management remaining in those original line items to be completed this year. Please either quantify and provide that credit or I will plan on striking the project management line item from the change order.**
   a. As discussed during the meeting on 3/28/22 ESCO believes that the 2022 work to complete the project will take between 4 and 5 months. We also feel that during the winterization work in 2021, which took approximately 1 month, ESCO was not compensated for on-site management during that time.
   b. As part of the remobilization change order ESCO has requested compensation for 3 of the 5 to 6 months of additional work.
   c. In order to accurately show the request, the city has requested that ESCO pull out a management costs that are included in the remaining original contract items and increase the project management item in the change order. We have reviewed the original contract and are pulling out the management costs from these items.
      i. Remaining Original Contract Value: $543.959.30
      ii. Project Management Percentage: 7%
      iii. Project Management Value: $37,622.15
   d. ESCO is now showing a credit for $37,622.15 for project management from the original contract and will change Item COR4A.20 2022 Onsite Project Management from 12 weeks to 16 weeks to show costs for the duration of the 2022 construction season.

HOGCHUTE RESERVOIR DAM REHABILITATION

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
Hogchute Reservoir 2022 Season		93	30-May-22	07-Oct-22	0
G1000	Mobilization	5	30-May-22	03-Jun-22	0
G1002	Erosion Control Repairs	4	06-Jun-22	09-Jun-22	0
G1010	BorrowArea Developement/Stockpiling	10	10-Jun-22	23-Jun-22	8
G1015	Process/Dry Emb. Material	15	24-Jun-22	15-Jul-22	8
G1020	Unsuitable Emb. Material to Waste	5	26-Aug-22	01-Sep-22	14
G1030	Project Cleanup/Site Restoration	6	23-Sep-22	30-Sep-22	0
G1040	Demobilization	5	03-Oct-22	07-Oct-22	0
Downstream Work		52	10-Jun-22	23-Aug-22	32
DS1000	Winterization/Cobble Removals	13	10-Jun-22	28-Jun-22	0
DS1010	Expose Filter Dia.	3	29-Jun-22	01-Jul-22	0
DS1020	Finish Filter Dia./Filter Drain Pipe	5	05-Jul-22	11-Jul-22	0
DS1030	Place Type1/2 Filter & Toe Drain Pipe	12	12-Jul-22	27-Jul-22	0
DS1040	Type 1 Filter Chimney & Embankment	10	28-Jul-22	10-Aug-22	0
DS1050	Replace Rock/Cobble Shell	7	11-Aug-22	19-Aug-22	0
DS1060	Toe Drain Cleanout Pads	2	22-Aug-22	23-Aug-22	32
Upstream Work		23	22-Aug-22	22-Sep-22	11
US1000	Remove Cobble Above Buttress	2	22-Aug-22	23-Aug-22	0
US1010	Place EmbankmentAbove Buttress	2	24-Aug-22	25-Aug-22	0
US1020	Install Conduit/Pour Encasement	5	26-Aug-22	01-Sep-22	0
US1030	Install Bypass Pumping System	2	02-Sep-22	06-Sep-22	0
US1040	Remove Trash Rack/Install Gate/Reinstall	2	07-Sep-22	08-Sep-22	0
US1050	Install Locking Valve Box	1	02-Sep-22	02-Sep-22	24
US1070	Upstream Early Warning System	5	02-Sep-22	09-Sep-22	20
US1080	Remove Bypass Pumping System	2	09-Sep-22	12-Sep-22	0
US1090	Haul Off Cofferdam Material	8	13-Sep-22	22-Sep-22	0
Auxillary Spillway		88	06-Jun-22	07-Oct-22	0
AS1000	Produce Riprap	15	06-Jun-22	24-Jun-22	47
AS1010	Clear & Grub Aux. Spillway	2	24-Jun-22	27-Jun-22	40
AS1020	Strip & Stockpile Wetland Soils	2	28-Jun-22	29-Jun-22	40
AS1030	Aux. Spillway Grading	4	30-Jun-22	06-Jul-22	40
AS1040	Aux. Spillway Rock Berms	14	07-Jul-22	26-Jul-22	40
AS1050	Aux. Spillway Finish Grading	2	27-Jul-22	28-Jul-22	40
AS1055	Seeding Window Opens	0	01-Sep-22*		16
AS1060	Aux. Spillway Re-seeding	10	01-Sep-22	15-Sep-22	16
AS1070	Willows Dormant (Weather Dependent)	0	03-Oct-22*		0
AS1080	Harvest & Plant Willows	5	03-Oct-22	07-Oct-22	0



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

06/28/2021

Change Order
Number 1

Date: October 11, 2021
To: ESCO Construction Co.
From: City of Grand Junction, Department of Public Works and Utilities
Project: **Hogchute (AKA Carson) Reservoir Dam Rehabilitation**
P.O.: **2021-00000729**

It is agreed to modify the Contract for the Project as follows:

Items COR2B.01 through .08 of Request for Adjustment – Embankment Fill – Revision 1 (RFA 002R1), are approved to begin importing embankment material retroactively to 5 October 2021. Cost increase approved per RFA 002R1 up to 2,000 cubic yards as needed $362,041.00. Importing fill in excess of 2,000 CY will require authorization through a subsequent change order.

Contract Bid Schedule Line Items 16 – Wetland Soil Stockpiling ($16,400), 17 – Auxiliary Spillway Grading ($63,000) and 22 – Site Restoration ($45,000) are removed from the
(Continued on page 2.)

Summary of Contract price adjustments - itemized on the attached sheet(s):

Original Contract Amount	$2,893,500.00
Approved Change Orders	0.00
This Change Order	(9,565.20)
Revised Contract Amount	$2,883,934.80

Summary of Contract time adjustments:

Original Contract Time	151.	Cal. Days
Approved Change Orders	0.	
This Change Order	30.	
Revised Contract Time	181.	Cal. Days

Construction Start Date: June 3, 2021
Contract Completion Date: November 30, 2021

This modification constitutes compensation in full for all costs and mark-ups directly and/or indirectly attributable to the changes ordered herein, for all delays, impacts and disruptions related thereto and for performance of the changes within the Contract Time.

Owner: **City of Grand Junction**

Prepared by: DocuSigned by: John Eklund CA8094AB864A42F... Date: 10/12/2021
John Eklund, Project Engineer

Approved by: DocuSigned by: Randi Kim – Utilities Director, City of Grand Junction F3B7E9047888412... Date: 10/12/2021
Randi Kim, Utilities Director

Contractor: **ESCO Construction Co.**

Signature: DocuSigned by: Eric Clark – President, ESCO Construction Co. Date: 10/12/2021

Name and Title: Eric Clark - President, ESCO Construction Co. President

Change Order Number 1

(Continued)

Project: **Hogchute (AKA Carson) Reservoir Dam Rehabilitation**
To: ESCO Construction Co.
From: City of Grand Junction
Date: October 8, 2021

Description of and justifications for change (continued)

Contract. These items shall be completed following spring runoff in 2022 and will necessitate a change for additional mobilization.

Contract Bid Schedule Item 18 – Auxiliary Spillway Rock Berms ($321,555) is removed from the Contract. However, production of rock riprap shall be completed in 2021. The production of rock riprap is approved as part of this Change Order Item CO-1, 01 to be paid as Time and Materials up to the amount of $130,622.80 per Time and Materials Rates for said production (see attachments for detail). These adjustments reduce the Contract amount $190,932.20. Installation of the Auxiliary Spillway Rock Berms shall be completed following spring runoff in 2022. Pricing for installation of Auxiliary Spillway Rock Berms in 2022 shall be $172.79/LF (total plan length is 1,105 LF) to maintain pricing established in Bid Item 18.

Contract Bid Schedule Item 23 – Early Warning System ($100,000) is removed from the Contract. However, ESCO has procured materials for Bid Item 23. Early Warning System Material is authorized in Change Order Item CO-1, 02 to be paid as Lump Sum in the amount of $43,726.00. These adjustments reduce the Contract amount $56,274.00. Installation of the Early Warning System shall be completed following spring runoff in 2022. Pricing for installation of Early Warning System in 2022 shall be $56,274.00 to maintain pricing established in Bid Item 23.

The City of Grand Junction and ESCO understand the quantities presented in RFA 002R1 are estimates and agree to the proposed unit pricing. ESCO agrees to prioritize the use and placement of Items COR2A.03-05 to maximize efficiency of embankment reconstruction. Use of imported fill will only be authorized and utilized when the City and its representatives agree that the source of suitable borrow material from the footprint of Hogchute Reservoir has been reasonably exhausted. Available borrow material may be more or less than estimated in this change order. Stockpiling excavated borrow may be required when materials need additional treatment (further mixing, drying, etc.) to meet the above specifications or for storage to protect against winter and spring conditions. Hauling and placing borrow directly from source may be possible when excavated materials properties (e.g. moisture content, PI, etc.) are within specifications or when the mixing inherent to excavation, hauling and placing would be sufficient to bring borrow within specifications as determined by the Design Engineer and Approved by State Dam Safety in Design Change Order No 1 - Embankment.

The net change reduces the Contract amount by $9,565.20.

Change Order 1 authorizes ESCO to continue working on Hogchute Dam until 20 November 2021 if weather conditions permit. The City and ESCO understand the purpose of working past 31 October 2021 is to prepare for winter shutdown by creating safe site conditions as agreed upon by Colorado Dam Safety Engineer, ESCO, the City of Grand Junction and the Design Engineer, Ayres Associates.

Change Order Number 1

(Continued)

Project: **Hogchute (AKA Carson) Reservoir Dam Rehabilitation**
To: ESCO Construction Co.
From: City of Grand Junction
Date: October 8, 2021

Description of and justifications for change (continued)

Conditions and Clarifications:

1.) Liquidated Damages shall be suspended during the 2021/2022 winter shutdown period. City and ESCO shall negotiate a new completion schedule for 2022, based upon remaining scope of work not completed in 2021. Upon successful negotiation of said schedule, a change order shall be executed, and Liquidated Damage terms and conditions shall be reinstated once the project resumes.

2.) This change order states the pricing for Bid Items 18 and 23 will be maintained in 2022. ESCO shall confirm with subcontractors any pricing escalation for 2022 for consideration by the City during negotiation of change order for work to be completed in 2022.

3.) If imported embankment material is required to complete the Work in 2022, material may be subject to escalated material and trucking costs. Additional mobilization will also need to be agreed upon by the City and ESCO.

Attachments:
Request for Adjustment 002 – Embankment Fill -Revision 1 (RFA 002R1)
Hogchute ESCO Riprap Productions Time and Materials Rates
Early Warning System Materials OneRain Invoice
Hogchute Reservoir Test Pit Sample Results
Design Change Order Approval No 1 (State Dam Safety)

REQUEST FOR ADJUSTMENT

This form shall be used by the Contractor to submit in writing a request for an adjustment of Contract Time or Contract Price. Basis for proposed adjustments may be Extra Work in conjunction with an emergency, changed conditions, Engineer's interpretations, a Work Change Request, or some other condition. Requests for adjustment shall not be valid unless they are submitted to the Engineer:
1) within two Working Days of the Emergency or discovery of changed conditions which resulted or may result in Additional Work; or
2) within five Working Days after the effective date of a Field Order or Work Change Request, or other events that the Contractor believes merits an adjustment.

Project: **Hogchute (Aka Carson) Reservoir Dam Rehabilitation (Construction No. C-0454A)**

To: City of Grand Junction
Project Manager

From: **ESCO Construction Company**
Description of: ___ Completed Work _X_ Directed Work ___ Proposed Work for which a claim is being made
(attach additional documents as required):

The City of Grand Junction issued a letter from the Ayers Associates that summarizes design changes to Project IFB-4839-21-DH Hogchute (aka Carson) Reservoir Dam Modifications project. The letter issued a revision to Drawing No. C13 and to Specification Section 31 20 00 Earth Moving and Embankments. As a result to these plan changes, ESCO will have to either process onsite material to make suitable embankment or import suitable embankment fill. ESCO is hereby proposing to excavate as much on site material as possible approved by Ayres that does not require processing and import the remaining suitable embankment fill needed to complet the project.

Proposed method of payment (Reference is made to Article VIII of the General Contract Conditions regarding changes in work or contract price):
___ Unit Price(s) in Bid Schedule
_X_ Unit Prices to be agreed upon and set forth in a Change Order
___ Cost plus 15%
___ Lump Sum to be agreed upon and set forth in a Change Order

Total price of adjustment: $ 544,750.00
(Attach additional sheets for price justification based on proposed method of payment.)

Proposed Adjustment in Contract Time: 30 Calendar Days

The Contractor acknowledges that the proposed method of Contract Price change and Contract Time adjustment are proposed only and are not binding.

	Project Manager	09/28/2021
Contractor's representative	Title	Date

ESCO CONSTRUCTION CO.
32045 Castle Court, Suite 200
Evergreen, CO 80439
Phone: 303.674.3385 Fax: 303.496-9673

LETTER NO. ESCO-CGJ-C-0454A-003R1

September 28, 2021

John Eklund, Project Engineer
City of Grand Junction
333 West Ave., Building C
Grand Junction, CO 81501

Reference: Project IFB-4839-21-DH
Hogchute (aka Carson) Reservoir Dam Modifications Project

Subject: Request for Adjustment – Embankment Fill – Revision 1

Dear Mr. Eklund,

Per the meeting between The City of Grand Junction (City), Ayers Associates (Engineer) and ESCO Construction (ESCO) on September 27, 2021, the City has asked ESCO to break the Request for Adjustment associated with the Embankment Fill change in conditions in to two phases. Phase 1 (RFA 002A) consists of mining 2,800 CY of onsite borrow from the reservoir and Phase 2 (RFA 002B) consists of importing 4,148 TN of embankment as needed to complete the remaining dam improvements. Note that all pricing summarized below is unit price and ESCO will bill for actual quantities installed and agreed to in the field. Please reference Letter No. ESCO-CGJ-C-045A-003 for complete details relating this change in conditions

In accordance with the City of Grand Junction Standard Contract Documents for Capital Improvements Construction Section VIII, Changes In Work or Contract Price, Subpart 71, Paragraph IV, ESCO is hereby submitting a Request for Adjustment for Contract Price and Contract Time related to the change in conditions associated with the embankment fill requirements. Please reference the Request for Adjustment attached to this letter as Attachment 3. ESCO is requesting an increase in Contract Time totaling 30 Calendar Days. Additionally, ESCO submits the following unit price increase to the Contract Price.

RFA 002A - Onsite Borrow					
Bid Item	**Description**	**Quantity**	**Unit of Measure**	**Unit Price**	**Total Price**
COR2A.01	Staging Area Stripping	3	AC	$1,500.00	$4,500.00
COR2A.02	Stockpile Management	5	DAY	$3,700.00	$18,500.00
COR2A.03	Excavate Borrow Area	2,800	CY	$18.50	$51,800.00
COR2A.04	Embankment Material Haul	2,800	CY	$12.20	$34,160.00
COR2A.05	Existing Unsuitable Emb. To Waste	2,800	CY	$10.50	$29,400.00
COR2A.06	Restore Staging Area	2	AC	$6,366.00	$12,732.00
Request for Adjustment 002A – Embankment Fill Contract Price Adjustment:					$151,092.00

ESCO CONSTRUCTION CO.
32045 Castle Court, Suite 200
Evergreen, CO 80439
Phone: 303.674.3385 Fax: 303.496-9673

RFA 002B - Embankment Import					
Bid Item	**Description**	**Quantity**	**Unit of Measure**	**Unit Price**	**Total Price**
COR2B.01	Mobilization	1	LS	$10,500.00	$10,500.00
COR2B.02	Staging Area Stripping (If Authorized Before 2A)	0	AC	$1,500.00	$0.00
COR2B.03	Access Road Maintenance	15	DAY	$5,675.00	$85,125.00
COR2B.04	Stockpile Management	15	DAY	$3,700.00	$55,500.00
COR2B.05	Import Embankment Material	4,148	TN	$45.50	$188,734.00
COR2B.06	Embankment Material Haul	2,370	CY	$12.20	$28,914.00
COR2B.07	Existing Unsuitable Emb. To Waste	2,370	CY	$10.50	$24,885.00
COR2B.08	Restore Staging Area (If Authorized Before 2A)	0	AC	$6,366.00	$0.00
Request for Adjustment 002B – Embankment Fill Contract Price Adjustment:					$393,658.00

Total Contract Time Adjustment: 30 Calendar Days

Qualifications:

1) All quantities are estimated for pricing purposes, final Contract Price Adjustment will be based on actual quantities installed.
2) Bid Item COR2B.05 Import Embankment Material, payment shall be based on load tickets provided by material supplier.
3) Bid Items COR2A.04/COR2B.06 Embankment Material Haul, assumes additional staging area for embankment fill stockpile will be provided/approved within 1,000 feet of dam footprint.
4) Bid Item COR2A.05/COR2B.07 Existing Unsuitable Emb. To Waste assumes all waste/unsuitable embankment will be stockpiled within the construction limits or at the quarry site. Stockpiled material will not meet compaction specifications.
5) Bid Item COR2A.03/COR2A.02 assumes that all excavated and stockpiled material will be paid for by the cubic yard, regardless of acceptance for use as suitable embankment.
6) Bid Item COR2A.03 assumes that identified borrow area has been reviewed and accepted by Engineer and all additional testing will be paid for on a Time and Material basis.
7) Pricing for RFA 002B is contingent upon approval of proposed import material from Parkersons Construction, by Engineer and State (See Letter No. ESCO-CGJ-C-045A-003).

We look forward to working closely with the City of Grand Junction for a safe and successful completion of this project. If you have any questions, please do not hesitate to contact me at (480) 296-3485

Respectfully,

Justin Cooper
Project Sponsor
ESCO Construction Co

Attachments:

Attachment 1 – Request for Adjustment – Change Conditions – Embankment Fill – Revision 1

ESCO CONSTRUCTION CO.
32045 Castle Court, Suite 200
Evergreen, CO 80439
Phone: 303.674.3385 Fax: 303.496-9673

Cc:

Joe Zink, Project Manager, ESCO Construction
Mark Ritterbush, Water Control Supervisor, City of Grand Junction

Notes:

HOGCHUTE RESERVOIR

Time and Material Rates

ESCO Construction Co.

ESCO Construction Company

32045 Castle Ct. Suite104

Evergreen, CO 80439

O 303-674-3385 Fax 303-674-9967

EQUIPMENT (NO OPERATOR)				LABOR			
DESCRIPTION	HOURS	HR RATE	TOTAL	DESCRIPTION	HOURS	HR RATE	TOTAL
CAT 349F Excavator		$ 268.14	$ -	Superintendent w/ Truck	62.5	$ 126.79	$ 7,924.22
CAT 335F Excavator	250	$ 220.45	$ 55,112.50	Foreman w/Truck & Tools		$ 101.43	$ -
CAT 980 Loader		$ 134.04	$ -	Foreman Truck (if Foreman operates eqp)		$ 32.96	$ -
CAT 938 Loader	125	$ 82.62	$ 10,327.50	Leadman w/Truck & Tools		$ 95.09	$ -
Cat 289 Skid Steer		$ 54.77	$ -	Pipelayer		$ 56.98	$ -
Bell B35D Haul Truck		$ 234.55	$ -	Operator - if not w/machine	375	$ 57.37	$ 21,513.28
			$ -	Laborer (skilled)		$ 55.72	
Add for Hammer	250	$ 87.00	$ 21,750.00	Laborer (unskilled)		$ 43.04	
			$ -	Grade Checker (GPS)		$ 106.43	$ -
			$ -	Concrete Finisher/Formsetter		$ 66.64	$ -
			$ -	Concrete Form Carpenter		$ 60.42	$ -
			$ -	Project Manager w/ Truck		$ 131.67	$ -
			$ -				$ -
			$ -				$ -
			$ -				$ -
			$ -				$ -
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			$ -				$ -
			$ -				$ -
			$ -				
			$ -				$ -
			$ -				$ -
				EQUIPMENT & LABOR SUBTOTAL			$ 116,627.50

ADD $10.00/HOUR TO ABOVE IF WORK PERFORMED ON AN OVERTIME BASIS

MATERIAL							
DESCRIPTION	QTY	UNIT PRICE	TOTAL	DESCRIPTION	QTY	UNIT PRICE	TOTAL
			$ -				$ -
			$ -				$ -
			$ -				$ -
				MATERIAL SUBTOTAL			$ -

SUBCONTRACTOR							
DESCRIPTION	QTY	HRLY RATE	TOTAL	DESCRIPTION	QTY	UNIT PRICE	TOTAL
			$ -				$ -
			$ -				$ -
			$ -				$ -
				SUBCONTRACTOR SUBTOTAL			$ -

	EQUIPMENT & LABOR SUBTOTAL		$ 116,627.50
	MATERIAL SUBTOTAL		$ -
ESCO Represenative Date:	EQUIPMENT/LABOR/MATERIAL SUBTOTAL		$ 116,627.50
	EQUIPMENT/LABOR/MATERIAL MARKUP	12%	$ 13,995.30
	SUBCONTRACTOR SUBTOTAL		$ -
	SUBCONTRACTOR MARKUP	3%	$ -
	TOTAL DIRECT COSTS		$ 116,627.50
Owners Representative Authorization Date:	TOTAL MARKUP		$ 13,995.30
	TOTAL		$ 130,622.80

John Eklund

From: Felix Zamora <felix.zamora@onerain.com>
Sent: Monday, October 4, 2021 9:06 PM
To: Joe Zink
Subject: Hogchute EWS Material Costs

Joe,

Here are the material costs for the EWS station. These numbers are lifted directly from the proposal.

Items	Line Item	Price	QTY	Total	
StormLink Monitoring Station - Master. Includes: bullet resistant enclosure, pressure transducer (qty. 2), rain gauge, datalogger, electronics enclosure with intrusion sensor, solar panel, batteries (qty. 2), voltage regulator, satellite antenna, spread-spectrum radio, mounting infrastructure, shipping	3	$ 27,322.00	1	$ 27,322.00	$ 27,322.00
StormLink Monitoring Station - Remote. Includes: bullet resistant enclosure, float switches (qty. 2), datalogger, electronics enclosure with intrusion sensor, solar panel, batteries (qty. 2), voltage regulator, spread spectrum radio, mounting infrastructure, shipping	4	$ 16,404.00	1	$ 16,404.00	$ 16,404.00
				Subtotal:	**$ 43,726.00**

Let me know if you have any questions.

Felix Zamora
Field Engineer

OneRain
The Rainfall Company

1531 Skyway Drive | Unit D | Longmont | Colorado 80504
Toll Free 1-800-758-RAIN (7246)
Phone +1-303-774-2033
Fax +1-303-774-2037
E-mail felix.zamora@onerain.com
www.onerain.com

AYRES
Ingenuity, Integrity, and Intelligence.

August 11, 2021

Mr. Korey Kadrmas
Ms. Jackie Blumberg
Design Review Engineers
Colorado Division of Water Resources

Re: HOGCHUTE DAM, DAMID 420127
Water Division 4, Water District 42
Construction File No. C-0454A

Dear Mr. Kadrmas and Ms. Blumberg,

The purpose of this letter is to request a design change order for the embankment fill to be used at the Hogchute Dam. The embankment fill specification was developed based on previous geotechnical investigations. Our design of the filter drain system and embankment stability was based on two borings installed along the embankment crest in 2018. Embankment samples are typically described as sandy clays with a Plasticity Index (PI) of 11 to 12 (three samples had a PI of 11) and a % passing the No. 200 sieve between 43% and 54%. The specified embankment fill was intended to "match" the characteristics of the existing embankment fill.

Salvageable embankment fill from the embankment can be used to restore the embankment, however field investigations during the removal of the rock and cobble shell indicated that the embankment core material may contain significantly more rocks and boulders than anticipated. Additional embankment fill is also required downstream of the Type I filter.

The Contractor has collected 15 samples within the impoundment from areas of potential embankment fill. Samples collected in July from the north area of the reservoir bed did not meet the embankment fill specifications. An additional six test pits from the south side of the reservoir bed were excavated with samples collected on August 3rd. One of these samples did meet the embankment specification. Two other samples collected on August 3rd, had a PI greater than 10, but did not meet the gradation for percent passing a no. 200. The attached Tables summarizes the borrow area embankment samples collected and tested by Ground Engineering. Also included are the Huddleston Berry QA samples and the 2018 embankment fill samples we based filter and embankment designed on. Location of the borrow pits is shown on the two figures in Attachment 1.

The available on-site embankment fill has a PI between zero and nine and on average the gradation is more fine-grained than what was specified. The sampled material modified proctor results were similar or better than the designed parameters in the approved SLOPE/W modeling. SLOPE/W analysis in this embankment is performed as a worst-case scenario of consolidated drained material with no cohesion. All input values for modeling remain the same as no borrow area samples were worse than design parameters for unit weight, and friction angle values were determined by the principles provided in Static Stability Analysis (*Design Standards No. 13*, Chapter 4, Reclamation, 2011). Inputs such as slope, surcharge and layering composition remain the same as the approved SLOPE/W model. The only parameters that are affected by the difference of sampled material are gradation size and Atterberg Limits in the phreatic analysis that is performed in the parent modeling analysis of SEEP/W. We revised the SEEP/W models to include the recent embankment material sample parameters from the borrow area that has a lower PI and different gradation. Values from the borrow material parameters in the revised model are an average of the results of the nine borrow area samples (samples collected on August 3rd are not included). The difference of model results with the revised borrow fill properties are negligible and therefore did not change the phreatic surface or seepage rate of the embankment. Therefore, the

SLOPE/W child analysis was not impacted either. Output files from the model are included in Attachment 2 and the input parameters are included in Attachment 3.

The Type I filter is design following the USBR Design Standard 13, Embankment Dams. The design was based on gradations and hydrometers from two samples collected from the embankment in the previous geotechnical investigation. Samples recently collected from the reservoir did not have hydrometers run on any of the samples. To check compatibility of the embankment fill from the reservoir with the C33 concrete sand, we input the average gradation to the No. 200 sieve into our design spreadsheet and then we adjusted the D_{15} particle size to determine at what point the D_{15} particle size would modify the required filter gradation. The original design used a D_{15} of 0.001 mm, which was approximated from the design plot. A D_{15} of 0.035 mm is required to change the Type 1 filter design such that a C33 concrete sand is no longer appropriate. To simulate a gradation that would yield a D15 of 0.035 mm, the percentage of the particles passing a No. 200 sieve would nearly be 90% silt or fine sand, with no clay faction. The design spreadsheet is included in Attachment 4. The Atterberg Limits results from the reservoir samples indicate a clay content in the material, implying the assumption of 90% silt particles is not correct. Also, the embankment was constructed from local material, and it is unlikely that the reservoirs borrow material will be significantly different than the embankment fill. Based on this evaluation we are confident the C33 sand is appropriate for the material to be used for embankment fill, however we do recommend additional samples be collected from the stockpiled embankment fill as it is created to confirm this assumption.

The soil stratigraphy of the borrow area is inconsistent, with layers of higher PI soil and layers of more sandy material. To use this material the Contractor will need to excavate and blend the material together, however the Contractor will be instructed to separate out the identifiable higher PI material based on the sampling already conducted and field classification of the material. Two stockpiles of material will be created, one of the more plastic soils and one of the blended remaining materials.

When the embankment is restored, the more plastic soils will be placed in the embankment, upstream of the Type 1 filter and the upper portion of the embankment. The lower plasticity index material will be placed in the lower ½ of the embankment and downstream of the Type I filter. A cross section showing the location of the differing embankment fill material property location and revised Specification 31 20 00 Article 2.02, which modifies the embankment specification to allow the borrow material identified in this change order to be used on site for embankment fill is included in Attachment 5. We will also revise the allowable gradation to include 100% less than 3" sieve designation to allow larger rocks within the embankment fill.

If this change order is approved by the SEO, a change order will be generated revising the specification for embankment fill.

Please contact us if you have any questions. Thanks.

Sincerely,

Ayres Associates Inc

Chris Goodwin
Manager – Water Resources
Direct: 715.831.7682
Cell: 715.829.6941
Goodwinc@AyresAssociates.com

Todd Rudolph, PE
Water Resources Engineer
Direct: 715.831.7679
RudolphT@AyresAssociates.com

Enclosure

cc: John Eklund, City of Grand Junction

Attachment 1
Borrow Area
Sampling

Ground Engineering Sample Results

	Sample ID																
Location	Borrow Pit 1 Bottom of Carson Lake	Embankment Sample	Borrow Pit 2 (Sample A 4' BG)	Borrow Pit 2 (Sample B 2' BG)	Borrow Pit 2 (Blend Sample A and B)	Borrow Pit 3 (Sample A, 4' BG)	Borrow Pit 3 (Sample B, 2' BG)	Borrow Pit 3 (Sample A and B Blend)	Borrow Pit 2 and 3 (Pit 2 and 3, Blend)	Borrow Pit 4 (4 A - 4' BG)	Borrow Pit 4 (4 B - 4' BG)	Borrow Pit 4 (4 C - 6' BG)	Borrow Pit 4 (4 D - 6' BG)	Borrow Pit 4 (4 E - 6' BG)	Borrow Pit 4 (4 F - 6' BG)	Average	Specification
Liquid Limit	29	26	23	0	0	25	24	32	29	26	34	33	25	31	24	24	NA
Plastic Limit	20	19	20	0	0	17	19	25	24	26	20	19	18	20	19	18	NA
Plasticity Index	9	7	3	0	0	8	5	7	5	0	14	14	7	11	5	6	10
% Passing 3/4"	97	76	100	100	100	84	100	100	100	96	100	97	88	100	100	96	95 - 100%
% Passing 3/8"	93	68	96	100	96	78	98	100	100	83	100	96	87	98	92	92	85 - 90%
% Passing No. 4	87	64	87	100	90	75	96	96	90	76	96	91	86	96	83	88	75 - 80%
% Passing No. 10	63	47	76	99	79	71	93	92	86	51	90	85	84	92	72	79	NA
% Passing No. 40	43	37	56	98	67	66	89	84	79	48	65	64	80	77	57	67	50 - 60%
% Passing No. 100	37	37	47	97	60	64	86	80	74	29	44	47	75	60	50	59	45 - 55%
% Passing No. 200	31	27	37	81	48	61	80	71	65		34	37	67	46	44	52	40 - 50%
Date Collected	7/13/2021	7/19/2021	7/21/2021	7/21/2021	7/21/2021	7/21/2021	7/21/2021	7/21/2021	7/21/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021	8/3/2021		

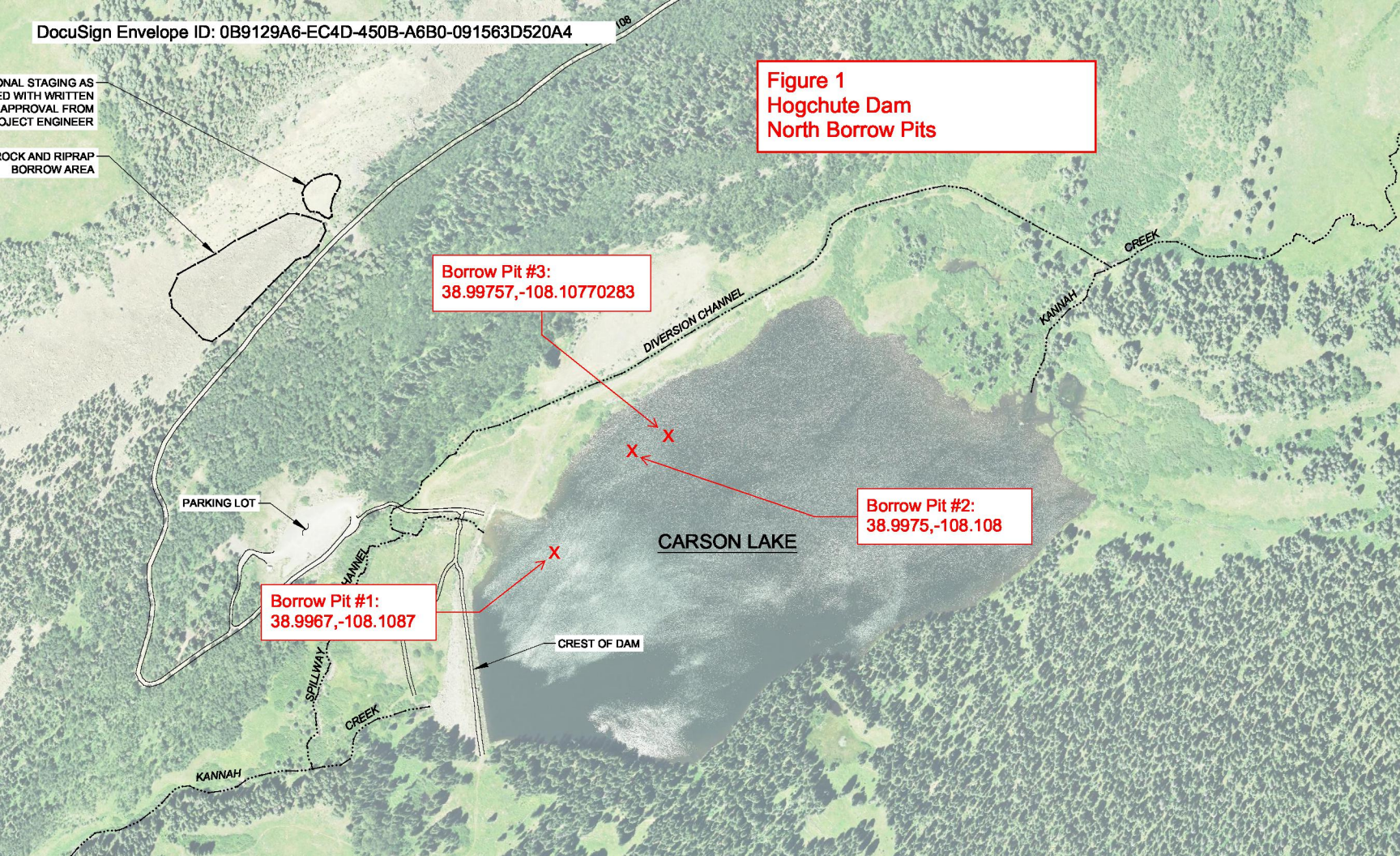
Huddleston-Berry Sample Results

	Sample ID										
Location	21-0549 Borrow-Lake	21-0563 Native 24"	21-0567 2A Red	21-0568 2B Black	21-0569 2 Blend	21-0570 3A Red	21-0571 3B Brown	21-0572 3 Blend	21-0573 2 and 3 Blend	Average	Specification
Liquid Limit	27	26	24	23	29	28	26	21	30	26	NA
Plastic Limit	21	18	18	21	20	20	18	19	22	20	NA
Plasticity Index	6	8	6	2	9	8	8	2	8	6	10
% Passing 3/4"	-	69	-	-	-	-	-	-	-		95 - 100 %
% Passing 3/8"	-	59	-	-	-	-	-	-	-		85 - 90%
% Passing No. 4	-	53	-	-	-	-	-	-	-		75 - 80%
% Passing No. 40	-	39	-	-	-	-	-	-	-		50 - 60%
% Passing No. 100	-	34	-	-	-	-	-	-	-		45 - 55%
% Passing No. 200	-	28									40 - 50%
Date Collected	7/16/2021	7/16/2021	7/21/2021	7/21/2021	7/21/2021	7/21/2021	7/21/2021	7/21/2021	7/21/2021		

Design Samples

	Sample ID			
Location	B-101 Bu-13 25' - 40' BG	B-101 Bu-20 51' - 65' BG	B-102 BU-10 18' - 41.5' BG	B-103 Bu-11 10' - 17.5'BG
Liquid Limit	28	27	28	27
Plastic Limit	17	15	17	
Plasticity Index	11	12	11	11
% Passing 3/4"	95.6	97.3	95.2	95.7
% Passing 3/8"	88.1	88.8	86.2	87
% Passing No. 4	74.5	80.2	75.7	76.1
% Passing No. 40	57.7	65.9	58	53.7
% Passing No. 100	52.2	60.5	52.47	48.6
% Passing No. 200	45.9	54	46.6	43
% Passing 0.045 mm (1)	44.9	44.9	-	38.3
% Passing 0.032 mm	43.5	43.5	-	36.4
% Passing 0.024 mm	38.7	38.7	-	31.8
% Passing 0.013 mm	32.5	32.5	-	25.3
% Passing 0.009 mm	28.4	28.4	-	22.1
% Passing 0.006 mm	25.7	25.7	-	18.9
% Passing 0.003 mm	20.2	20.2	-	14.5
% Passing 0.001 mm	15.8	15.8	-	11.7
Date Collected	7/28/2018	7/28/2018	7/26/2018	7/24/2018

(1) See lab report in RJH 2019 report for specific particle diameters

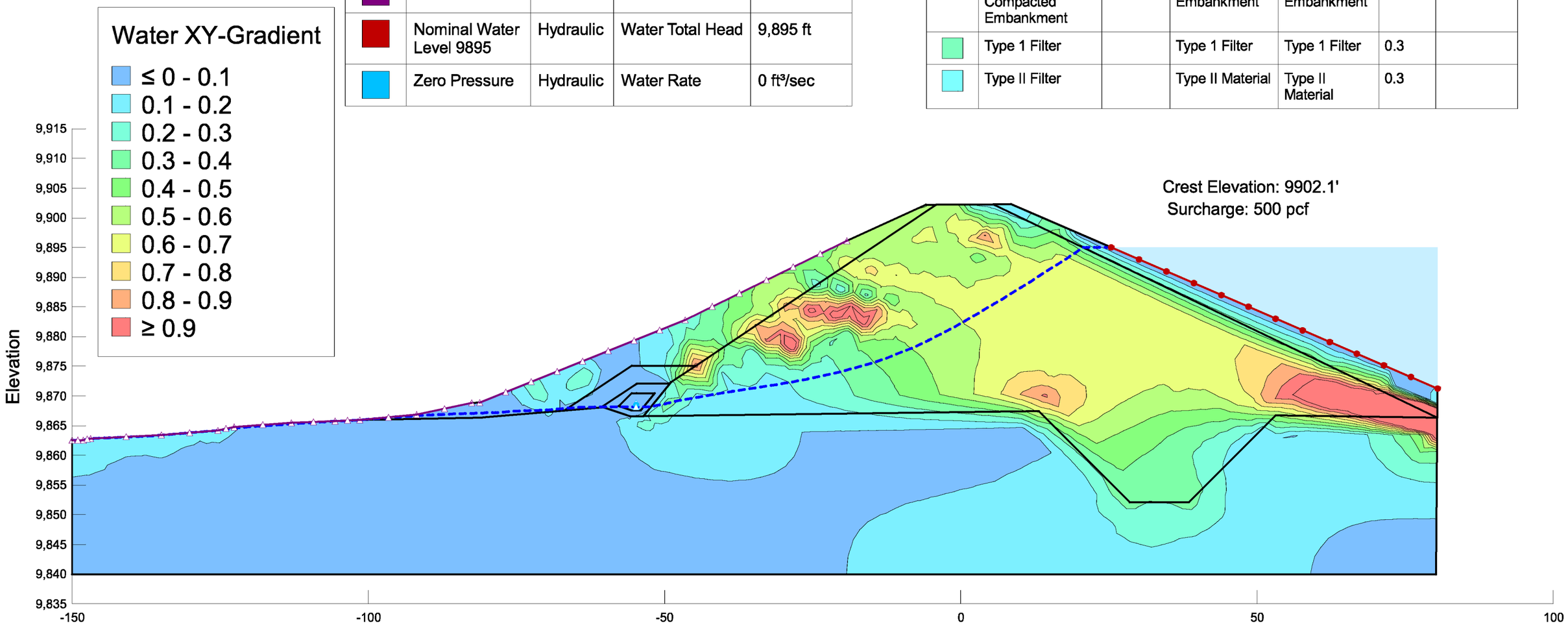


Attachment 2
SEEP/W and SLOPE/W Model Output

Project: DSB - Carson Dam, Station 22+50
Seepage Stability
8/5/21 Proposed Conditions
Seepage Analysis, Normal Head Water Pool EL. 9895.0'

Color	Name	Category	Kind	Parameters
	Drainage	Hydraulic	Water Rate	0 ft³/sec
	Nominal Water Level 9895	Hydraulic	Water Total Head	9,895 ft
	Zero Pressure	Hydraulic	Water Rate	0 ft³/sec

Color	Name	Sat Kx (cm/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Volumetric Water Content
	Cobble and Rock Fill		Rock Fill	Rock fill	1	
	Colluvium	0.0031			0.52	25.2
	Embankment Fill		Embankment	Embankment	0.3	
	Onsite Borrow Compacted Embankment		On-site Borrow Embankment	Onsite-Borrow Embankment	0.3	
	Type 1 Filter		Type 1 Filter	Type 1 Filter	0.3	
	Type II Filter		Type II Material	Type II Material	0.3	



Kind: Slope/W
Method: Morgenstern-Price

AYRES ASSOCIATES
August 5, 2021

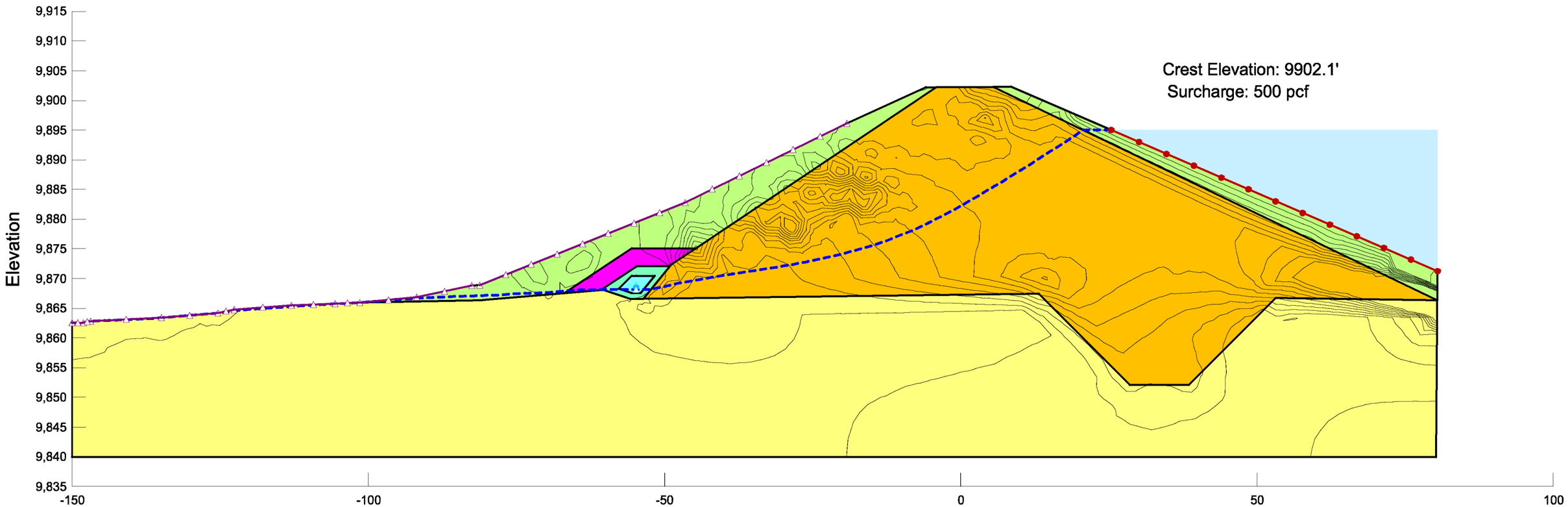
Colorado Dam Safety Branch
Hogchute Dam Embankment

I:\26\Grand Junction CO\Geostudio

Project: DSB - Carson Dam, Station 22+50
Seepage Stability
8/5/21 Proposed Conditions
Seepage Material, Normal Head Water Pool EL. 9895.0'

Color	Name	Category	Kind	Parameters
	Drainage	Hydraulic	Water Rate	0 ft³/sec
	Nominal Water Level 9895	Hydraulic	Water Total Head	9,895 ft
	Zero Pressure	Hydraulic	Water Rate	0 ft³/sec

Color	Name	Sat Kx (cm/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Volumetric Water Content
	Cobble and Rock Fill		Rock Fill	Rock fill	1	
	Colluvium	0.0031			0.52	25.2
	Embankment Fill		Embankment	Embankment	0.3	
	Onsite Borrow Compacted Embankment		On-site Borrow Embankment	Onsite-Borrow Embankment	0.3	
	Type 1 Filter		Type 1 Filter	Type 1 Filter	0.3	
	Type II Filter		Type II Material	Type II Material	0.3	



Kind: Slope/W
Method: Morgenstern-Price

AYRES ASSOCIATES
August 5, 2021

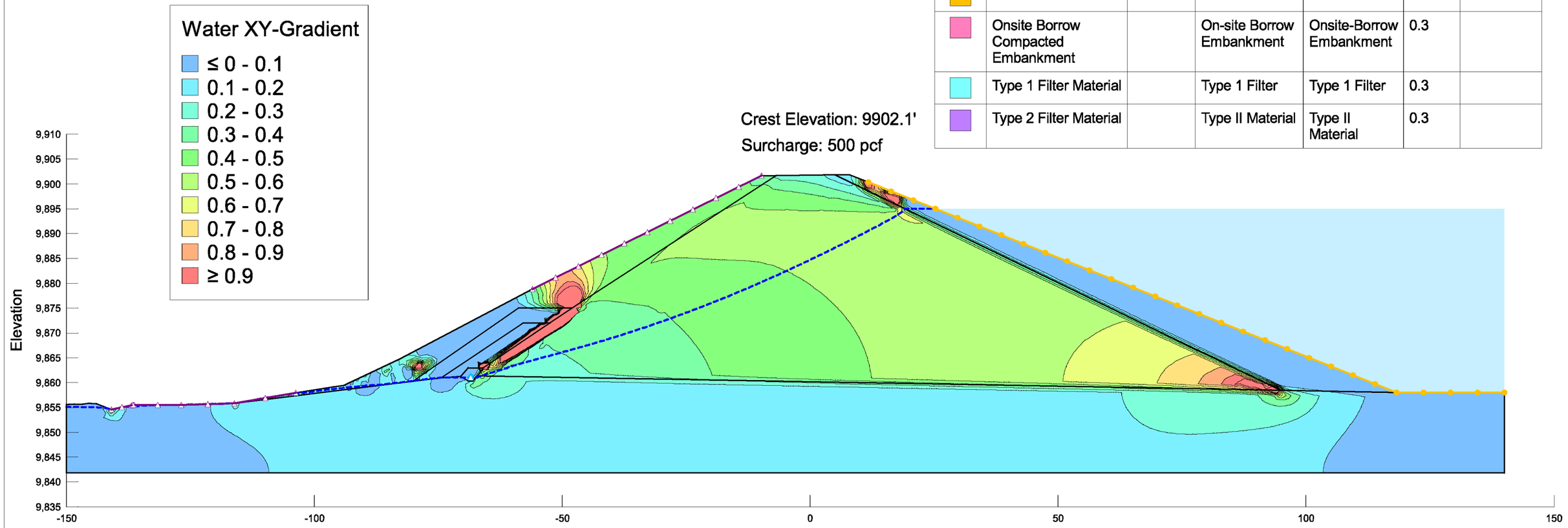
Colorado Dam Safety Branch
Hogchute Dam Embankment

I:\26\Grand Junction CO\Geostudio

Project: DSB - Carson Dam, Station 20+60
Seepage Stability
8/5/21 Proposed Conditions
Seepage Analysis, Normal Head Water Pool EL. 9895.0'

Color	Name	Category	Kind	Parameters
	9895.0 Nominal Reservoir Level Pressure	Hydraulic	Water Total Head	9,895 ft
	Drainage	Hydraulic	Water Rate	0 ft³/sec
	Zero pressure Head	Hydraulic	Water Rate	0 ft³/sec

Color	Name	Sat Kx (cm/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Volumetric Water Content
	Cobble and Rock Fill		Rock Fill	Rock fill	1	
	Colluvium	0.0031			0.52	25.2
	Embankment Fill		Embankment	Embankment	0.3	
	Onsite Borrow Compacted Embankment		On-site Borrow Embankment	Onsite-Borrow Embankment	0.3	
	Type 1 Filter Material		Type 1 Filter	Type 1 Filter	0.3	
	Type 2 Filter Material		Type II Material	Type II Material	0.3	



Kind: Slope/W
Method: Morgenstern-Price

AYRES ASSOCIATES
August 5, 2021

Colorado Dam Safety Branch
Hogchute Dam Embankment

I:\26\Grand Junction CO\Geostudio

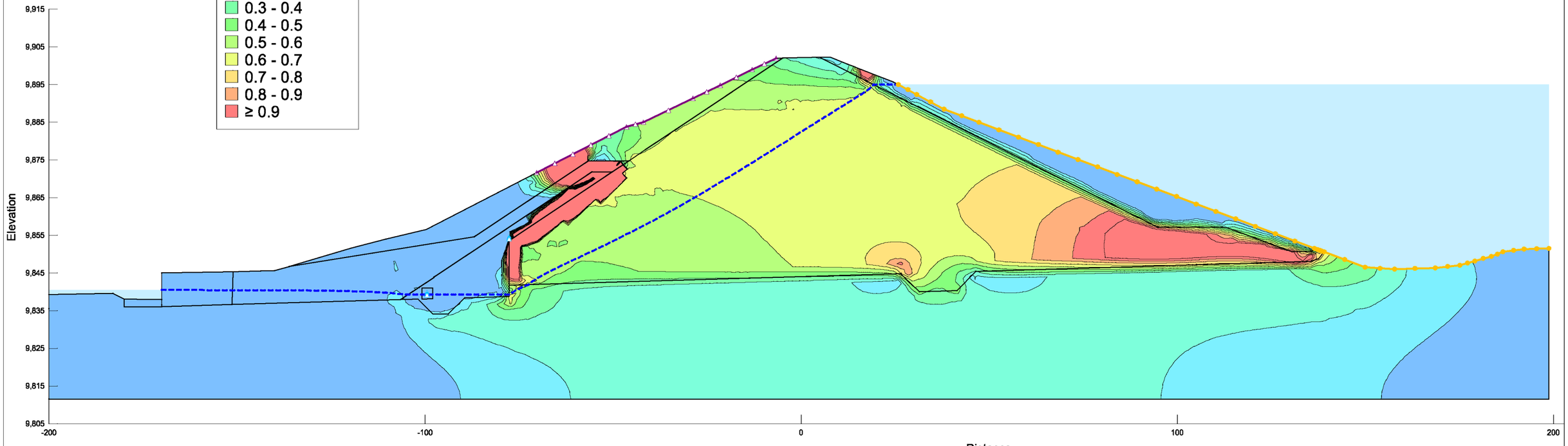
Project: DSB - Carson Dam, Station 21+50
Seepage Stability
8/5/21 Proposed Conditions
Seepage Analysis, Normal Head Water Pool EL. 9895.0'

Color	Name	Category	Kind	Parameters
	9895.0 Nominal Reservoir Level Pressure	Hydraulic	Water Total Head	9,895 ft
	Drainage	Hydraulic	Water Rate	0 ft³/sec
	Zero pressure Head	Hydraulic	Water Rate	0 ft³/sec

Color	Name	Sat Kx (cm/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Volumetric Water Content
	Cobble and Rock Fill		Rock Fill	Rock fill	1	
	Colluvium	0.0031			0.52	25.2
	Concrete		Concrete	Concrete	0.3	
	Embankment Fill		Embankment	Embankment	0.3	
	Onsite Borrow Compacted Embankment Fill		On-site Borrow Embankment	Onsite-Borrow Embankment	0.3	
	Type 1 Filter Material		Type 1 Filter	Type 1 Filter	0.3	
	Type 2 Filter Material		Type II Material	Type II Material	0.3	

Water XY-Gradient
- ≤ 0 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- ≥ 0.9

Crest Elevation: 9902.1'
Surcharge: 500 pcf



Kind: Slope/W
Method: Morgenstern-Price

AYRES ASSOCIATES
August 5, 2021

Colorado Dam Safety Branch
Hogchute Dam Embankment

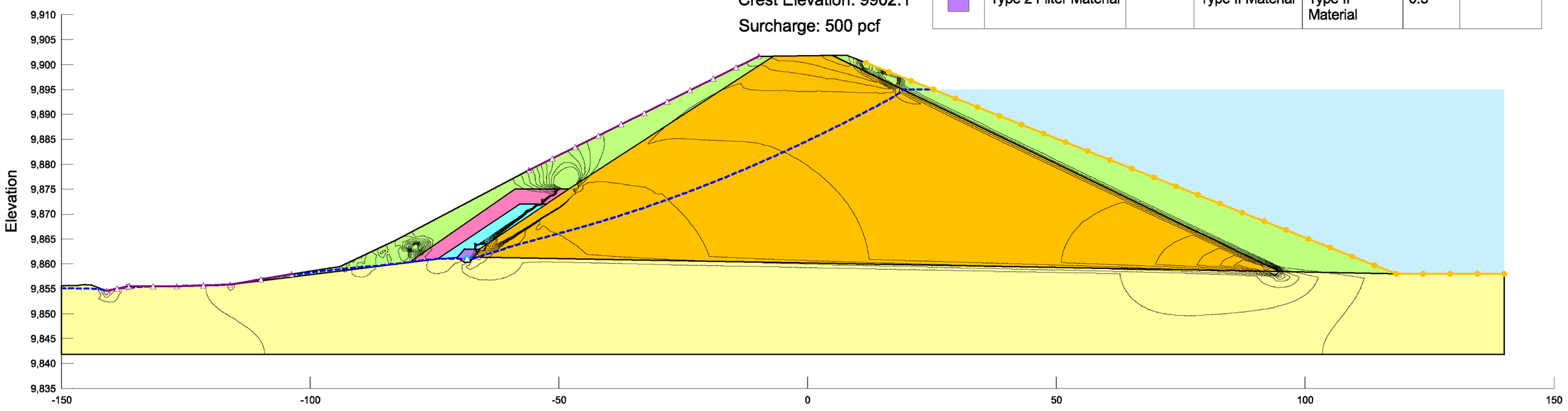
I:\26\Grand Junction CO\Geostudio

Project: DSB - Carson Dam, Station 20+60
Seepage Stability
8/5/21 Proposed Conditions
Seepage Material, Normal Head Water Pool EL. 9895.0'

Color	Name	Category	Kind	Parameters
	9895.0 Nominal Reservoir Level Pressure	Hydraulic	Water Total Head	9,895 ft
	Drainage	Hydraulic	Water Rate	0 ft³/sec
	Zero pressure Head	Hydraulic	Water Rate	0 ft³/sec

Color	Name	Sat Kx (cm/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Volumetric Water Content
	Cobble and Rock Fill		Rock Fill	Rock fill	1	
	Colluvium	0.0031			0.52	25.2
	Embankment Fill		Embankment	Embankment	0.3	
	Onsite Borrow Compacted Embankment		On-site Borrow Embankment	Onsite-Borrow Embankment	0.3	
	Type 1 Filter Material		Type 1 Filter	Type 1 Filter	0.3	
	Type 2 Filter Material		Type II Material	Type II Material	0.3	

Crest Elevation: 9902.1'
Surcharge: 500 pcf



Kind: Slope/W
Method: Morgenstern-Price

AYRES ASSOCIATES
August 5, 2021

Colorado Dam Safety Branch
Hogchute Dam Embankment

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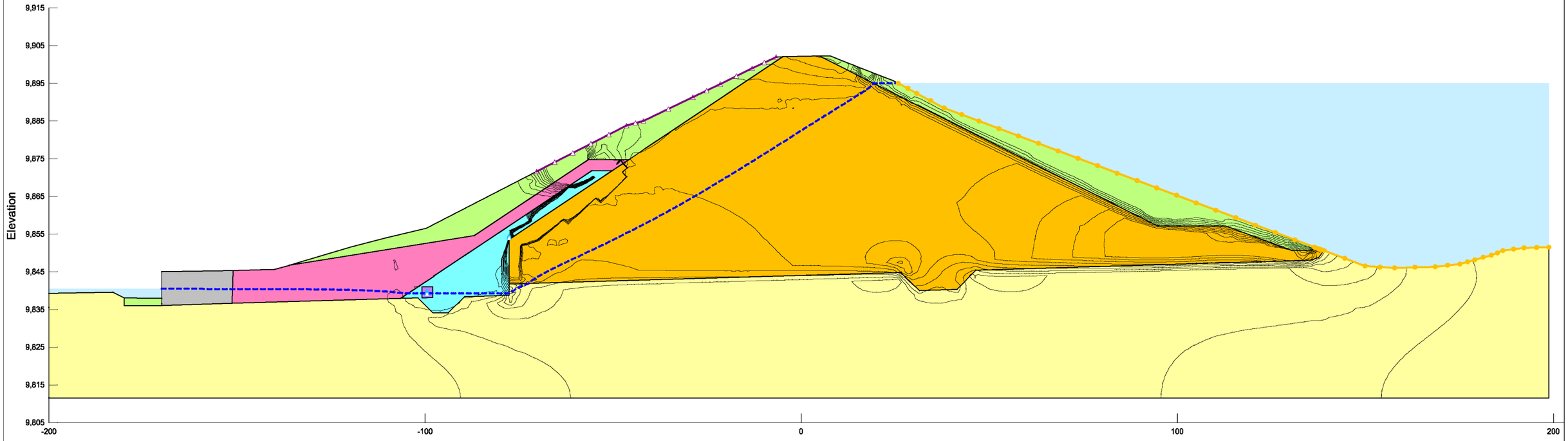
Project: DSB - Carson Dam, Station 21+50
Seepage Stability
8/5/21 Proposed Conditions
Seepage Material, Normal Head Water Pool EL. 9895.0'

Color	Name	Category	Kind	Parameters
	9895.0 Nominal Reservoir Level Pressure	Hydraulic	Water Total Head	9,895 ft
	Drainage	Hydraulic	Water Rate	0 ft³/sec
	Zero pressure Head	Hydraulic	Water Rate	0 ft³/sec

Color	Name	Sat Kx (cm/sec)	Vol. WC. Function	K-Function	Ky'/Kx' Ratio	Volumetric Water Content
	Cobble and Rock Fill		Rock Fill	Rock fill	1	
	Colluvium	0.0031			0.52	25.2
	Concrete		Concrete	Concrete	0.3	
	Embankment Fill		Embankment	Embankment	0.3	
	Onsite Borrow Compacted Embankment Fill		On-site Borrow Embankment	Onsite-Borrow Embankment	0.3	
	Type 1 Filter Material		Type 1 Filter	Type 1 Filter	0.3	
	Type 2 Filter Material		Type II Material	Type II Material	0.3	

Crest Elevation: 9902.1'
Surcharge: 500 pcf



Kind: Slope/W
Method: Morgenstern-Price

AYRES ASSOCIATES
August 5, 2021

Colorado Dam Safety Branch
Hogchute Dam Embankment

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Attachment 3
SEEP/W and SLOPE W Input Parameters

Steady-State Seepage

1. Ignore all soil classifications in output, auto generated by model

2. Filter materials used a classification sample function for their respective hydraulic conductivity values

3. Liquid limit readings are used instead of entered values

File Information

File Version: 10.01
Title: Carson Dam Main Embankment
Created By: Leopold, Michael
Last Edited By: Leopold, Michael
Revision Number: 275
Date: 08/05/2021
Time: 11:02:20 AM
Tool Version: 10.1.1.18972
File Name: Carson Dam Main Embankment Proposed station 20+60.gsz
Directory: I:\26\Grand Junction CO 26-1144.00\Geostudio\
Last Solved Date: 08/05/2021
Last Solved Time: 11:02:35 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

Steady-State Seepage

Kind: SEEP/W
Method: Steady-State
Physics
- Water Transfer
  - Free convection: thermal effects: No
  - Free convection: solute effects: No
  - Vapor transfer: isothermal: No
  - Vapor transfer: thermal: No

Water Settings
- Maximum Number of Iterations: 500
- Maximum Difference: 0.005
- Significant Digits: 2
- Max # of Reviews: 10
- Under-Relaxation Criteria
  - Initial Rate: 1
  - Minimum Rate: 0.1
  - Rate Reduction Factor: 0.65
  - Reduction Frequency (iterations): 10
- Unit Weight of Water: 62.430189 pcf
- Bulk Modulus of Pore-Fluid: 43,511,321 psf

Time
- Starting Time: 0 d
- Duration: 0 d
- Ending Time: 0 d

Materials

Embankment Fill

Hydraulic

- Model: Saturated / Unsaturated
- Vol. WC. Function: Embankment
- K-Function: Embankment
- Ky'/Kx' Ratio: 0.3
- Rotation: 0 °

Cobble and Rock Fill

Hydraulic

- Model: Saturated / Unsaturated
- Vol. WC. Function: Rock Fill
- K-Function: Rock fill
- Ky'/Kx' Ratio: 1
- Rotation: 0 °

Colluvium

Hydraulic

- Model: Saturated Only
- Sat Kx: 0.0031 cm/sec
- Ky'/Kx' Ratio: 0.52
- Rotation: 0 °
- Volumetric Water Content: 25.2
- Compressibility: 6,000 /psf

Type 1 Filter Material

Hydraulic

- Model: Saturated / Unsaturated
- Vol. WC. Function: Type 1 Filter
- K-Function: Type 1 Filter
- Ky'/Kx' Ratio: 0.3
- Rotation: 0 °

Type 2 Filter Material

Hydraulic

- Model: Saturated / Unsaturated
- Vol. WC. Function: Type II Material
- K-Function: Type II Material
- Ky'/Kx' Ratio: 0.3
- Rotation: 0 °

Onsite Borrow Compacted Embankment

Hydraulic

- Model: Saturated / Unsaturated
- Vol. WC. Function: On-site Borrow Embankment
- K-Function: Onsite-Borrow Embankment
- Ky'/Kx' Ratio: 0.3
- Rotation: 0 °

Boundary Conditions

Drainage

Category: Hydraulic
Kind: Water Rate 0 ft³/sec
Review: Yes

9895.0 Nominal Reservoir Level Pressure

Category: Hydraulic
Kind: Water Total Head 9,895 ft
Review: No

Zero pressure Head

Category: Hydraulic
Kind: Water Rate 0 ft³/sec
Review: Yes

Water K Functions

Rock fill

Model: Hyd K Data Point Function
Function: Water X-Conductivity vs. Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Saturated Kx: 0.025 cm/sec
Data Points: Matric Suction (psf), Water X-Conductivity (cm/sec)
Data Point: (0.20885434, 0.025)
Data Point: (0.38282598, 0.025000077)
Data Point: (0.70171264, 0.025000466)
Data Point: (1.2862257, 0.024997196)
Data Point: (2.357627, 0.024952361)
Data Point: (4.3214847, 0.024902153)
Data Point: (7.9211981, 0.024329365)
Data Point: (14.519403, 5.2852311e-05)
Data Point: (26.613786, 6.3382191e-11)
Data Point: (48.782557, 7.148871e-17)
Data Point: (89.417486, 8.1695229e-23)
Data Point: (163.90053, 4.5040477e-29)
Data Point: (300.42651, 8.9407567e-30)
Data Point: (550.67599, 7.4721685e-30)
Data Point: (1,009.3785, 7.4782604e-30)
Data Point: (1,850.1713, 7.4984883e-30)
Data Point: (3,391.3282, 7.5000623e-30)
Data Point: (6,216.2392, 7.4998947e-30)
Data Point: (11,394.247, 7.4998597e-30)
Data Point: (20,885.434, 7.499859e-30)
Estimation Properties
Hyd. K-Function Estimation Method: Van Genuchten Function
Volume Water Content Function: Rock Fill
Saturated Kx: 0.025 cm/sec
Residual Water Content: 0.099
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Embankment

Model: Hyd K Data Point Function
Function: Water X-Conductivity vs. Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Saturated Kx: 2.7e-06 cm/sec
Data Points: Matric Suction (psf), Water X-Conductivity (cm/sec)
Data Point: (0.20885434, 2.7e-06)
Data Point: (0.38282598, 2.7e-06)
Data Point: (0.70171264, 2.7e-06)
Data Point: (1.2862257, 2.7e-06)
Data Point: (2.357627, 2.6999998e-06)
Data Point: (4.3214847, 2.6999992e-06)
Data Point: (7.9211981, 2.6999983e-06)
Data Point: (14.519403, 2.6998803e-06)
Data Point: (26.613786, 2.6961401e-06)
Data Point: (48.782557, 2.6275852e-06)
Data Point: (89.417486, 1.6729567e-06)
Data Point: (163.90053, 2.4277653e-08)
Data Point: (300.42651, 7.5773533e-12)
Data Point: (550.67599, 1.6236186e-15)
Data Point: (1,009.3785, 3.4294199e-19)
Data Point: (1,850.1713, 7.2407799e-23)
Data Point: (3,391.3282, 1.5289888e-26)
Data Point: (6,216.2392, 3.2320209e-30)
Data Point: (11,394.247, 6.8189711e-34)
Data Point: (20,885.434, 9.642262e-36)
Estimation Properties
Hyd. K-Function Estimation Method: Van Genuchten Function
Volume Water Content Function: Embankment
Saturated Kx: 2.7e-06 cm/sec
Residual Water Content: 0.254
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Type 1 Filter

Model: Hyd K Data Point Function
Function: Water X-Conductivity vs. Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Saturated Kx: 3.0474253 cm/sec
Data Points: Matric Suction (psf), Water X-Conductivity (cm/sec)
Data Point: (0.1, 3.0474253)
Data Point: (0.16237767, 3.0467819)
Data Point: (0.26366509, 3.0454069)
Data Point: (0.42813324, 3.0424914)
Data Point: (0.6951928, 3.0362931)
Data Point: (1.1288379, 3.02313)
Data Point: (1.8329807, 2.995181)
Data Point: (2.9763514, 2.9359549)
Data Point: (4.8329302, 2.8114505)
Data Point: (7.8475997, 2.5558962)
Data Point: (12.74275, 2.0647125)

Data Point: (20.691381, 1.2775678)
Data Point: (33.598183, 0.46362369)
Data Point: (54.555948, 0.079063996)
Data Point: (88.586679, 0.0072304852)
Data Point: (143.84499, 0.0004873838)
Data Point: (233.57215, 2.9486861e-05)
Data Point: (379.26902, 1.7253948e-06)
Data Point: (615.84821, 9.9968233e-08)
Data Point: (1,000, 5.7753828e-09)

Estimation Properties
Hyd. K-Function Estimation Method: Van Genuchten Function
Volume Water Content Function: Type 1 Filter
Saturated Kx: 3.048 cm/sec
Residual Water Content: 0.05
Maximum Suction: 1,000 psf
Minimum Suction: 0.1 psf
Num. Points: 20

Type II Material

Model: Hyd K Data Point Function
Function: Water X-Conductivity vs. Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Saturated Kx: 36.575999 cm/sec
Data Points: Matric Suction (psf), Water X-Conductivity (cm/sec)
Data Point: (0.20885434, 36.575999)
Data Point: (0.32623906, 36.575994)
Data Point: (0.50959881, 36.575971)
Data Point: (0.79601426, 36.57574)
Data Point: (1.243407, 36.574616)
Data Point: (1.9422527, 36.566162)
Data Point: (3.0338785, 36.512157)
Data Point: (4.7390429, 36.183943)
Data Point: (7.4025796, 33.882224)
Data Point: (11.563133, 22.57072)
Data Point: (18.062089, 2.7461178)
Data Point: (28.213725, 0.028697176)
Data Point: (44.070997, 0.00012722338)
Data Point: (68.840706, 5.0396794e-07)
Data Point: (107.53201, 1.9740531e-09)
Data Point: (167.96942, 7.7227503e-12)
Data Point: (262.37513, 3.0209959e-14)
Data Point: (409.84072, 1.1818534e-16)
Data Point: (640.18804, 4.6186421e-19)
Data Point: (1,000, 1.8161695e-21)

Estimation Properties
Hyd. K-Function Estimation Method: Van Genuchten Function
Volume Water Content Function: Type II Material
Saturated Kx: 36.576 cm/sec
Residual Water Content: 0.05
Maximum Suction: 1,000 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Onsite-Borrow Embankment

Model: Hyd K Data Point Function
Function: Water X-Conductivity vs. Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Saturated Kx: 2.7e-06 cm/sec
Data Points: Matric Suction (psf), Water X-Conductivity (cm/sec)
Data Point: (0.20885434, 2.7e-06)
Data Point: (0.38282598, 2.7e-06)
Data Point: (0.70171264, 2.7e-06)
Data Point: (1.2862257, 2.7e-06)
Data Point: (2.357627, 2.7e-06)
Data Point: (4.3214847, 2.7e-06)
Data Point: (7.9211981, 2.7e-06)
Data Point: (14.519403, 2.7e-06)
Data Point: (26.613786, 2.7e-06)
Data Point: (48.782557, 2.7e-06)
Data Point: (89.417486, 2.6999998e-06)
Data Point: (163.90053, 2.6999933e-06)
Data Point: (300.42651, 2.6999076e-06)
Data Point: (550.67599, 2.69889e-06)
Data Point: (1,009.3785, 2.6838124e-06)
Data Point: (1,850.1713, 2.4376061e-06)
Data Point: (3,391.3282, 5.8689517e-07)
Data Point: (6,216.2392, 1.2958021e-09)
Data Point: (11,394.247, 4.6338287e-13)
Data Point: (20,885.434, 1.5025321e-16)
Estimation Properties
Hyd. K-Function Estimation Method: Van Genuchten Function
Volume Water Content Function: On-site Borrow Embankment
Saturated Kx: 2.7e-06 cm/sec
Residual Water Content: 0.254
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Vol. Water Content Functions

Rock Fill

Model: Vol WC Data Point Function
Function: Volumetric Water Content vs. Water Pressure
Compressibility: 0 /psf
Saturated Water Content: 0.11385603
Residual Water Content: 0.011385603
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Porosity: 0.11385603
Data Points: Matric Suction (psf), Volumetric Water Content
Data Point: (0.20885434, 0.11399993)
Data Point: (0.38282598, 0.11399988)
Data Point: (0.70171264, 0.11399978)
Data Point: (1.2862257, 0.11399951)

Data Point: (2.357627, 0.1139972)
Data Point: (4.3214847, 0.1139505)
Data Point: (7.9211981, 0.11288938)
Data Point: (14.519403, 0.094641232)
Data Point: (26.613786, 0.042138191)
Data Point: (48.782557, 0.021825158)
Data Point: (89.417486, 0.014680428)
Data Point: (163.90053, 0.011119769)
Data Point: (300.42651, 0.0089785293)
Data Point: (550.67599, 0.0075430023)
Data Point: (1,009.3785, 0.0065089982)
Data Point: (1,850.1713, 0.0057237261)
Data Point: (3,391.3282, 0.0051005523)
Data Point: (6,216.2392, 0.0045848334)
Data Point: (11,394.247, 0.0041382958)
Data Point: (20,885.434, 0.0037317466)

Estimation Properties
Vol. WC Estimation Method: Sample functions
Saturated Water Content: 0.114
Sample Material: Gravel
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Embankment

Model: Vol WC Data Point Function
Function: Volumetric Water Content vs. Water Pressure
Compressibility: 0 /psf
Saturated Water Content: 0.2902959
Residual Water Content: 0.02902959
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Porosity: 0.2902959
Data Points: Matric Suction (psf), Volumetric Water Content
Data Point: (0.20885434, 0.2897096)
Data Point: (0.38282598, 0.2897096)
Data Point: (0.70171264, 0.2897096)
Data Point: (1.2862257, 0.2897096)
Data Point: (2.357627, 0.2897096)
Data Point: (4.3214847, 0.2897096)
Data Point: (7.9211981, 0.2897096)
Data Point: (14.519403, 0.2897096)
Data Point: (26.613786, 0.2897096)
Data Point: (48.782557, 0.2897096)
Data Point: (89.417486, 0.2897096)
Data Point: (163.90053, 0.2897096)
Data Point: (300.42651, 0.2897096)
Data Point: (550.67599, 0.2897096)
Data Point: (1,009.3785, 0.2897096)
Data Point: (1,850.1713, 0.2897096)
Data Point: (3,391.3282, 0.2897096)

Data Point: (6,216.2392, 0.2897096)
Data Point: (11,394.247, 0.27759469)
Data Point: (20,885.434, 0.24483719)

Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Saturated Water Content: 0.29
Sample Material: Clay
Liquid Limit: 21 %
Diameter at 10% passing: 0.001
Diameter at 60% passing: 0.10833
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Type 1 Filter

Model: Vol WC Data Point Function
Function: Volumetric Water Content vs. Water Pressure
Compressibility: 5e-07 /psf
Saturated Water Content: 0.19999999
Residual Water Content: 0.019999999
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Porosity: 0.19999999
Data Points: Matric Suction (psf), Volumetric Water Content
Data Point: (0.01, 0.19999999)
Data Point: (0.018329807, 0.19999997)
Data Point: (0.033598183, 0.1999999)
Data Point: (0.061584821, 0.19999971)
Data Point: (0.11288379, 0.19999911)
Data Point: (0.20691381, 0.19999718)
Data Point: (0.37926902, 0.19999093)
Data Point: (0.6951928, 0.19997055)
Data Point: (1.274275, 0.19990402)
Data Point: (2.3357215, 0.19968668)
Data Point: (4.2813324, 0.19897883)
Data Point: (7.8475997, 0.19670167)
Data Point: (14.384499, 0.18966661)
Data Point: (26.366509, 0.17040155)
Data Point: (48.329302, 0.13128038)
Data Point: (88.586679, 0.083993776)
Data Point: (162.37767, 0.050440759)
Data Point: (297.63514, 0.032219908)
Data Point: (545.55948, 0.022430781)
Data Point: (1,000, 0.01672195)

Estimation Properties
Vol. WC Estimation Method: Sample functions
Saturated Water Content: 0.2
Sample Material: Sand
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum Suction: 1,000 psf
Minimum Suction: 0.01 psf
Num. Points: 20

filter materials used a classification sample function for their respective hydraulic conductivity values and liquid limit readings instead of entered values

Ignore classification

Type II Material

Model: Vol WC Data Point Function
Function: Volumetric Water Content vs. Water Pressure
Compressibility: 5e-07 /psf
Saturated Water Content: 0.14002115
Residual Water Content: 0.014002115
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Porosity: 0.14002115
Data Points: Matric Suction (psf), Volumetric Water Content
Data Point: (0.20885434, 0.13999992)
Data Point: (0.32623906, 0.13999987)
Data Point: (0.50959881, 0.1399998)
Data Point: (0.79601426, 0.13999969)
Data Point: (1.243407, 0.13999943)
Data Point: (1.9422527, 0.13999833)
Data Point: (3.0338785, 0.13998943)
Data Point: (4.7390429, 0.13990269)
Data Point: (7.4025796, 0.13903582)
Data Point: (11.563133, 0.13109924)
Data Point: (18.062089, 0.091925323)
Data Point: (28.213725, 0.047737033)
Data Point: (44.070997, 0.029213604)
Data Point: (68.840706, 0.020971948)
Data Point: (107.53201, 0.016416999)
Data Point: (167.96942, 0.013524389)
Data Point: (262.37513, 0.011519386)
Data Point: (409.84072, 0.010044319)
Data Point: (640.18804, 0.0089109551)
Data Point: (1,000, 0.0080104047)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Saturated Water Content: 0.14
Sample Material: Gravel
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum Suction: 1,000 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

On-site Borrow Embankment

Model: Vol WC Data Point Function
Function: Volumetric Water Content vs. Water Pressure
Compressibility: 0 /psf
Saturated Water Content: 0.2902959
Residual Water Content: 0.02902959
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Porosity: 0.2902959
Data Points: Matric Suction (psf), Volumetric Water Content
Data Point: (0.20885434, 0.2897096)
Data Point: (0.38282598, 0.2897096)
Data Point: (0.70171264, 0.2897096)

Data Point: (1.2862257, 0.2897096)
Data Point: (2.357627, 0.2897096)
Data Point: (4.3214847, 0.2897096)
Data Point: (7.9211981, 0.2897096)
Data Point: (14.519403, 0.2897096)
Data Point: (26.613786, 0.2897096)
Data Point: (48.782557, 0.2897096)
Data Point: (89.417486, 0.2897096)
Data Point: (163.90053, 0.2897096)
Data Point: (300.42651, 0.2897096)
Data Point: (550.67599, 0.2897096)
Data Point: (1,009.3785, 0.2897096)
Data Point: (1,850.1713, 0.2897096)
Data Point: (3,391.3282, 0.2897096)
Data Point: (6,216.2392, 0.2897096)
Data Point: (11,394.247, 0.27759469)
Data Point: (20,885.434, 0.24483719)

Estimation Properties

Vol. WC Estimation Method: Grain Size Function
Saturated Water Content: 0.29
Sample Material: Clay
Liquid Limit: 21 %
Diameter at 10% passing: 0.001
Diameter at 60% passing: 0.10833
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Geometry

Name: 2D Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	26.49172 ft	9,859.6686 ft
Point 2	25.25 ft	9,895 ft
Point 3	11.67 ft	9,900.4 ft
Point 4	-103.76227 ft	9,857.9136 ft
Point 5	-96.04148 ft	9,859.1983 ft
Point 6	-94.14438 ft	9,859.4035 ft
Point 7	-82.73309 ft	9,864.7803 ft
Point 8	-56.02084 ft	9,878.8624 ft
Point 9	-9.86544 ft	9,901.6632 ft
Point 10	-6.84641 ft	9,901.6714 ft
Point 11	-47.99151 ft	9,875 ft
Point 12	-58.81549 ft	9,875 ft
Point 13	-80.08295 ft	9,860.2885 ft
Point 14	-74.47575 ft	9,860.9558 ft
Point 15	-52.49485 ft	9,872 ft

Point 16	-47.99153 ft	9,875 ft
Point 17	7.9346 ft	9,901.8865 ft
Point 18	-149.5792 ft	9,855.5559 ft
Point 19	-148.43064 ft	9,855.6985 ft
Point 20	-146.64327 ft	9,855.6808 ft
Point 21	-145.51693 ft	9,855.8323 ft
Point 22	-143.94654 ft	9,855.7225 ft
Point 23	-140.9649 ft	9,854.5632 ft
Point 24	-136.89898 ft	9,855.4607 ft
Point 25	-136.31374 ft	9,855.5188 ft
Point 26	-126.84903 ft	9,855.5164 ft
Point 27	-116.1511 ft	9,855.8363 ft
Point 28	-57.90928 ft	9,872 ft
Point 29	118.20412 ft	9,858.0338 ft
Point 30	94.80561 ft	9,858.451 ft
Point 31	-68.46389 ft	9,862 ft
Point 32	-66 ft	9,863 ft
Point 33	-69 ft	9,863 ft
Point 34	-70.5 ft	9,861.22 ft
Point 35	-69 ft	9,860.3 ft
Point 36	-68 ft	9,860.3 ft
Point 37	-67.10825 ft	9,861.3376 ft
Point 38	-66.00478 ft	9,863 ft
Point 39	-70.49616 ft	9,861.2246 ft
Point 40	-68.46389 ft	9,861.75 ft
Point 41	-68.46389 ft	9,861.25 ft
Point 42	-68.46389 ft	9,861.5 ft
Point 43	140 ft	9,858.0338 ft
Point 44	140 ft	9,841.8034 ft
Point 45	-150 ft	9,841.8034 ft
Point 46	-150 ft	9,855.5724 ft
Point 47	4.9346 ft	9,901.8465 ft

Lines

	Start Point	End Point	Length	Angle	Hydraulic Boundary
Line 1	13	12	25.86 ft	34.7 °	
Line 2	12	16	10.824 ft	0 °	
Line 3	16	10	49.034 ft	33 °	
Line 4	10	9	3.019 ft	0.156 °	
Line 5	9	8	51.48 ft	26.3 °	Drainage
Line 6	8	7	30.197 ft	27.8 °	
Line 7	7	6	12.615 ft	25.2 °	
Line 8	6	5	1.9082 ft	6.17 °	
Line 9	5	4	7.8269 ft	9.45 °	
Line 10	4	27	12.562 ft	9.52 °	Drainage
Line 11	27	26	10.703 ft	1.71 °	Drainage
Line 12	26	25	9.4647 ft	-0.0145 °	Drainage
Line 13	25	24	0.58812 ft	5.67 °	Drainage
Line 14	24	23	4.1638 ft	12.4 °	Drainage
Line 15	23	22	3.1991 ft	-21.2 °	
Line 16	22	21	1.5742 ft	-4 °	

Line 17	21	20	1.1365 ft	7.66 °	
Line 18	20	19	1.7875 ft	-0.567 °	
Line 19	19	18	1.1574 ft	7.08 °	
Line 20	16	15	5.4111 ft	33.7 °	
Line 21	14	13	5.6468 ft	6.79 °	
Line 22	15	28	5.4144 ft	0 °	
Line 23	28	14	19.91 ft	33.7 °	
Line 24	30	29	23.402 ft	-1.02 °	
Line 25	1	30	68.325 ft	-1.02 °	
Line 26	37	1	93.615 ft	-1.02 °	
Line 27	15	38	16.233 ft	33.7 °	
Line 28	39	14	3.9887 ft	3.86 °	
Line 29	38	32	0.00478 ft	0 °	
Line 30	32	37	1.9979 ft	56.3 °	
Line 31	39	33	2.3218 ft	49.9 °	
Line 32	33	38	2.9952 ft	0 °	
Line 33	37	36	1.3681 ft	49.3 °	
Line 34	36	35	1 ft	0 °	
Line 35	35	34	1.7597 ft	-31.5 °	
Line 36	34	39	0.0059921 ft	50.1 °	
Line 37	41	42	1.5708 ft	0 °	Zero pressure Head
Line 38	29	2	100.03 ft	-21.7 °	9895.0 Nominal Reservoir Level Pressure
Line 39	2	3	14.614 ft	-21.7 °	9895.0 Nominal Reservoir Level Pressure
Line 40	3	17	4.0203 ft	-21.7 °	
Line 41	43	29	21.796 ft	0 °	9895.0 Nominal Reservoir Level Pressure
Line 42	43	44	16.23 ft	90 °	
Line 43	45	44	290 ft	0 °	
Line 44	18	46	0.42112 ft	-2.25 °	
Line 45	45	46	13.769 ft	90 °	
Line 46	27	13	36.342 ft	7.04 °	
Line 47	47	10	11.782 ft	0.852 °	
Line 48	30	47	99.8 ft	-25.8 °	
Line 49	17	47	3.0003 ft	0.764 °	

Regions

	Material	Points	Area
Region 1	Cobble and Rock Fill	4,27,13,12,16,10,9,8,7,6,5	390.12 ft²
Region 2	Embankment Fill	1,30,47,10,16,15,38,32,37	3,650.3 ft²
Region 3	Onsite Borrow Compacted Embankment	13,14,28,15,16,12	88.361 ft²
Region 4	Type 1 Filter Material	14,39,33,38,15,28	54.48 ft²
Region 5	Cobble and Rock Fill	17,47,30,29,2,3	556.9 ft²
Region 6	Colluvium	27,26,25,24,23,22,21,20,19,18,46,45,44,43,29,30,1,37,36,35,34,39,14,13	4,963.9 ft²
Region 7	Type 2 Filter Material	34,35,36,37,32,38,33,39	7.5913 ft²
Region 8		41,42	0.19635 ft²

Mesh Properties

Global Element Size: 1 ft

Steady-State Seepage

File Information

File Version: 10.01
Title: Carson Dam Main Embankment
Created By: Leopold, Michael
Last Edited By: Leopold, Michael
Revision Number: 253
Date: 08/05/2021
Time: 11:07:50 AM
Tool Version: 10.1.1.18972
File Name: Carson Dam Main Embankment Proposed station 21+50 On-site Borrow.gsz
Directory: I:\26\Grand Junction CO 26-1144.00\Geostudio\
Last Solved Date: 08/05/2021
Last Solved Time: 11:08:19 AM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

Steady-State Seepage

Kind: SEEP/W
Method: Steady-State
Physics
- Water Transfer
  - Free convection: thermal effects: No
  - Free convection: solute effects: No
  - Vapor transfer: isothermal: No
  - Vapor transfer: thermal: No

Water Settings
- Maximum Number of Iterations: 500
- Maximum Difference: 0.005
- Significant Digits: 2
- Max # of Reviews: 10
- Under-Relaxation Criteria
  - Initial Rate: 1
  - Minimum Rate: 0.1
  - Rate Reduction Factor: 0.65
  - Reduction Frequency (iterations): 10
- Unit Weight of Water: 62.430189 pcf
- Bulk Modulus of Pore-Fluid: 43,511,321 psf

Time
- Starting Time: 0 d
- Duration: 0 d
- Ending Time: 0 d

Materials

Embankment Fill

Hydraulic
- Model: Saturated / Unsaturated
- Vol. WC. Function: Embankment
- K-Function: Embankment
- Ky'/Kx' Ratio: 0.3

Rotation: 0 °

Cobble and Rock Fill

Hydraulic

Model: Saturated / Unsaturated
Vol. WC. Function: Rock Fill
K-Function: Rock fill
Ky'/Kx' Ratio: 1
Rotation: 0 °

Colluvium

Hydraulic

Model: Saturated Only
Sat Kx: 0.0031 cm/sec
Ky'/Kx' Ratio: 0.52
Rotation: 0 °
Volumetric Water Content: 25.2
Compressibility: 6,000 /psf

Type 1 Filter Material

Hydraulic

Model: Saturated / Unsaturated
Vol. WC. Function: Type 1 Filter
K-Function: Type 1 Filter
Ky'/Kx' Ratio: 0.3
Rotation: 0 °

Type 2 Filter Material

Hydraulic

Model: Saturated / Unsaturated
Vol. WC. Function: Type II Material
K-Function: Type II Material
Ky'/Kx' Ratio: 0.3
Rotation: 0 °

Concrete

Hydraulic

Model: Saturated / Unsaturated
Vol. WC. Function: Concrete
K-Function: Concrete
Ky'/Kx' Ratio: 0.3
Rotation: 0 °

Onsite Borrow Compacted Embankment Fill

Hydraulic

Model: Saturated / Unsaturated
Vol. WC. Function: On-site Borrow Embankment
K-Function: Onsite-Borrow Embankment
Ky'/Kx' Ratio: 0.3
Rotation: 0 °

Boundary Conditions

Drainage

Category: Hydraulic
Kind: Water Rate 0 ft^3/sec
Review: Yes

9895.0 Nominal Reservoir Level Pressure

Category: Hydraulic
Kind: Water Total Head 9,895 ft
Review: No

Zero pressure Head

Category: Hydraulic
Kind: Water Rate 0 ft³/sec
Review: Yes

Water K Functions

Rock fill

Model: Hyd K Data Point Function
Function: Water X-Conductivity vs. Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Saturated Kx: 0.025 cm/sec
Data Points: Matric Suction (psf), Water X-Conductivity (cm/sec)
Data Point: (0.20885434, 0.025)
Data Point: (0.38282598, 0.025000077)
Data Point: (0.70171264, 0.025000466)
Data Point: (1.2862257, 0.024997196)
Data Point: (2.357627, 0.024952361)
Data Point: (4.3214847, 0.024902153)
Data Point: (7.9211981, 0.024329365)
Data Point: (14.519403, 5.2852311e-05)
Data Point: (26.613786, 6.3382191e-11)
Data Point: (48.782557, 7.148871e-17)
Data Point: (89.417486, 8.1695229e-23)
Data Point: (163.90053, 4.5040477e-29)
Data Point: (300.42651, 8.9407567e-30)
Data Point: (550.67599, 7.4721685e-30)
Data Point: (1,009.3785, 7.4782604e-30)
Data Point: (1,850.1713, 7.4984883e-30)
Data Point: (3,391.3282, 7.5000623e-30)
Data Point: (6,216.2392, 7.4998947e-30)
Data Point: (11,394.247, 7.4998597e-30)
Data Point: (20,885.434, 7.499859e-30)
Estimation Properties
Hyd. K-Function Estimation Method: Van Genuchten Function
Volume Water Content Function: Rock Fill
Saturated Kx: 0.025 cm/sec
Residual Water Content: 0.099
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Embankment

Model: Hyd K Data Point Function
Function: Water X-Conductivity vs. Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Saturated Kx: 2.7e-06 cm/sec
Data Points: Matric Suction (psf), Water X-Conductivity (cm/sec)
Data Point: (0.20885434, 2.7e-06)
Data Point: (0.38282598, 2.7e-06)
Data Point: (0.70171264, 2.7e-06)
Data Point: (1.2862257, 2.7e-06)
Data Point: (2.357627, 2.6999998e-06)
Data Point: (4.3214847, 2.6999992e-06)
Data Point: (7.9211981, 2.6999983e-06)
Data Point: (14.519403, 2.6998803e-06)
Data Point: (26.613786, 2.6961401e-06)
Data Point: (48.782557, 2.6275852e-06)
Data Point: (89.417486, 1.6729567e-06)

Data Point: (163.90053, 2.4277653e-08)
Data Point: (300.42651, 7.5773533e-12)
Data Point: (550.67599, 1.6236186e-15)
Data Point: (1,009.3785, 3.4294199e-19)
Data Point: (1,850.1713, 7.2407799e-23)
Data Point: (3,391.3282, 1.5289888e-26)
Data Point: (6,216.2392, 3.2320209e-30)
Data Point: (11,394.247, 6.8189711e-34)
Data Point: (20,885.434, 9.642262e-36)

Estimation Properties
Hyd. K-Function Estimation Method: Van Genuchten Function
Volume Water Content Function: Embankment
Saturated Kx: 2.7e-06 cm/sec
Residual Water Content: 0.254
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Type 1 Filter

Model: Hyd K Data Point Function
Function: Water X-Conductivity vs. Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Saturated Kx: 3.0474253 cm/sec
Data Points: Matric Suction (psf), Water X-Conductivity (cm/sec)
Data Point: (0.1, 3.0474253)
Data Point: (0.16237767, 3.0467819)
Data Point: (0.26366509, 3.0454069)
Data Point: (0.42813324, 3.0424914)
Data Point: (0.6951928, 3.0362931)
Data Point: (1.1288379, 3.02313)
Data Point: (1.8329807, 2.995181)
Data Point: (2.9763514, 2.9359549)
Data Point: (4.8329302, 2.8114505)
Data Point: (7.8475997, 2.5558962)
Data Point: (12.74275, 2.0647125)
Data Point: (20.691381, 1.2775678)
Data Point: (33.598183, 0.46362369)
Data Point: (54.555948, 0.079063996)
Data Point: (88.586679, 0.0072304852)
Data Point: (143.84499, 0.0004873838)
Data Point: (233.57215, 2.9486861e-05)
Data Point: (379.26902, 1.7253948e-06)
Data Point: (615.84821, 9.9968233e-08)
Data Point: (1,000, 5.7753828e-09)

Estimation Properties
Hyd. K-Function Estimation Method: Van Genuchten Function
Volume Water Content Function: Type 1 Filter
Saturated Kx: 3.048 cm/sec
Residual Water Content: 0.05
Maximum Suction: 1,000 psf
Minimum Suction: 0.1 psf
Num. Points: 20

filter materials used a classification sample function for their respective hydraulic conductivity values and liquid limit readings instead of entered values

Type II Material

Model: Hyd K Data Point Function
Function: Water X-Conductivity vs. Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Saturated Kx: 36.575999 cm/sec
Data Points: Matric Suction (psf), Water X-Conductivity (cm/sec)
Data Point: (0.20885434, 36.575999)
Data Point: (0.32623906, 36.575994)

Data Point: (0.50959881, 36.575971)
Data Point: (0.79601426, 36.57574)
Data Point: (1.243407, 36.574616)
Data Point: (1.9422527, 36.566162)
Data Point: (3.0338785, 36.512157)
Data Point: (4.7390429, 36.183943)
Data Point: (7.4025796, 33.882224)
Data Point: (11.563133, 22.57072)
Data Point: (18.062089, 2.7461178)
Data Point: (28.213725, 0.028697176)
Data Point: (44.070997, 0.00012722338)
Data Point: (68.840706, 5.0396794e-07)
Data Point: (107.53201, 1.9740531e-09)
Data Point: (167.96942, 7.7227503e-12)
Data Point: (262.37513, 3.0209959e-14)
Data Point: (409.84072, 1.1818534e-16)
Data Point: (640.18804, 4.6186421e-19)
Data Point: (1,000, 1.8161695e-21)

Estimation Properties
Hyd. K-Function Estimation Method: Van Genuchten Function
Volume Water Content Function: Type II Material
Saturated Kx: 36.576 cm/sec
Residual Water Content: 0.05
Maximum Suction: 1,000 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Concrete

Model: Hyd K Data Point Function
Function: Water X-Conductivity vs. Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Saturated Kx: 9.9933964e-10 cm/sec
Data Points: Matric Suction (psf), Water X-Conductivity (cm/sec)
Data Point: (0.20885434, 9.9933964e-10)
Data Point: (0.38282598, 9.988444e-10)
Data Point: (0.70171264, 9.9797511e-10)
Data Point: (1.2862257, 9.9645459e-10)
Data Point: (2.357627, 9.9379427e-10)
Data Point: (4.3214847, 9.8914162e-10)
Data Point: (7.9211981, 9.8101583e-10)
Data Point: (14.519403, 9.6685231e-10)
Data Point: (26.613786, 9.4225818e-10)
Data Point: (48.782557, 8.9987516e-10)
Data Point: (89.417486, 8.2790116e-10)
Data Point: (163.90053, 7.09637e-10)
Data Point: (300.42651, 5.296029e-10)
Data Point: (550.67599, 3.0111033e-10)
Data Point: (1,009.3785, 1.0566827e-10)
Data Point: (1,850.1713, 1.970211e-11)
Data Point: (3,391.3282, 2.1911564e-12)
Data Point: (6,216.2392, 1.8687488e-13)
Data Point: (11,394.247, 1.4399444e-14)
Data Point: (20,885.434, 1.0725388e-15)

Estimation Properties
Hyd. K-Function Estimation Method: Van Genuchten Function
Volume Water Content Function: Concrete
Saturated Kx: 1e-09 cm/sec
Residual Water Content: 0.1
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Onsite-Borrow Embankment

Model: Hyd K Data Point Function
Function: Water X-Conductivity vs. Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Saturated Kx: 2.7e-06 cm/sec
Data Points: Matric Suction (psf), Water X-Conductivity (cm/sec)
Data Point: (0.20885434, 2.7e-06)
Data Point: (0.38282598, 2.7e-06)
Data Point: (0.70171264, 2.7e-06)
Data Point: (1.2862257, 2.7e-06)
Data Point: (2.357627, 2.6999998e-06)
Data Point: (4.3214847, 2.6999986e-06)
Data Point: (7.9211981, 2.6999898e-06)
Data Point: (14.519403, 2.6997702e-06)
Data Point: (26.613786, 2.6948148e-06)
Data Point: (48.782557, 2.6136521e-06)
Data Point: (89.417486, 1.6092867e-06)
Data Point: (163.90053, 2.5865325e-08)
Data Point: (300.42651, 1.095681e-11)
Data Point: (550.67599, 3.1625226e-15)
Data Point: (1,009.3785, 8.983733e-19)
Data Point: (1,850.1713, 2.5509097e-22)
Data Point: (3,391.3282, 7.2337054e-26)
Data Point: (6,216.2392, 2.0259208e-29)
Data Point: (11,394.247, 5.8061392e-33)
Data Point: (20,885.434, 1.0200616e-35)
Estimation Properties
Hyd. K-Function Estimation Method: Van Genuchten Function
Volume Water Content Function: On-site Borrow Embankment
Saturated Kx: 2.7e-06 cm/sec
Residual Water Content: 0.254
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Vol. Water Content Functions

Rock Fill

Model: Vol WC Data Point Function
Function: Volumetric Water Content vs. Water Pressure
Compressibility: 0 /psf
Saturated Water Content: 0.11385603
Residual Water Content: 0.011385603
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Porosity: 0.11385603
Data Points: Matric Suction (psf), Volumetric Water Content
Data Point: (0.20885434, 0.11399993)
Data Point: (0.38282598, 0.11399988)
Data Point: (0.70171264, 0.11399978)
Data Point: (1.2862257, 0.11399951)
Data Point: (2.357627, 0.1139972)
Data Point: (4.3214847, 0.1139505)
Data Point: (7.9211981, 0.11288938)
Data Point: (14.519403, 0.094641232)
Data Point: (26.613786, 0.042138191)
Data Point: (48.782557, 0.021825158)
Data Point: (89.417486, 0.014680428)
Data Point: (163.90053, 0.011119769)
Data Point: (300.42651, 0.0089785293)

Data Point: (550.67599, 0.0075430023)
Data Point: (1,009.3785, 0.0065089982)
Data Point: (1,850.1713, 0.0057237261)
Data Point: (3,391.3282, 0.0051005523)
Data Point: (6,216.2392, 0.0045848334)
Data Point: (11,394.247, 0.0041382958)
Data Point: (20,885.434, 0.0037317466)

Estimation Properties
Vol. WC Estimation Method: Sample functions
Saturated Water Content: 0.114
Sample Material: Gravel
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Embankment

Model: Vol WC Data Point Function
Function: Volumetric Water Content vs. Water Pressure
Compressibility: 0 /psf
Saturated Water Content: 0.2902959
Residual Water Content: 0.02902959
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Porosity: 0.2902959
Data Points: Matric Suction (psf), Volumetric Water Content
Data Point: (0.20885434, 0.2897096)
Data Point: (0.38282598, 0.2897096)
Data Point: (0.70171264, 0.2897096)
Data Point: (1.2862257, 0.2897096)
Data Point: (2.357627, 0.2897096)
Data Point: (4.3214847, 0.2897096)
Data Point: (7.9211981, 0.2897096)
Data Point: (14.519403, 0.2897096)
Data Point: (26.613786, 0.2897096)
Data Point: (48.782557, 0.2897096)
Data Point: (89.417486, 0.2897096)
Data Point: (163.90053, 0.2897096)
Data Point: (300.42651, 0.2897096)
Data Point: (550.67599, 0.2897096)
Data Point: (1,009.3785, 0.2897096)
Data Point: (1,850.1713, 0.2897096)
Data Point: (3,391.3282, 0.2897096)
Data Point: (6,216.2392, 0.2897096)
Data Point: (11,394.247, 0.27759469)
Data Point: (20,885.434, 0.24483719)

Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Saturated Water Content: 0.29
Sample Material: Clay
Liquid Limit: 21 %
Diameter at 10% passing: 0.001
Diameter at 60% passing: 0.10833
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Type 1 Filter

Model: Vol WC Data Point Function
Function: Volumetric Water Content vs. Water Pressure
Compressibility: 5e-07 /psf

Saturated Water Content: 0.19999999
Residual Water Content: 0.019999999
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Porosity: 0.19999999
Data Points: Matric Suction (psf), Volumetric Water Content
Data Point: (0.01, 0.19999999)
Data Point: (0.018329807, 0.19999997)
Data Point: (0.033598183, 0.1999999)
Data Point: (0.061584821, 0.19999971)
Data Point: (0.11288379, 0.19999911)
Data Point: (0.20691381, 0.19999718)
Data Point: (0.37926902, 0.19999093)
Data Point: (0.6951928, 0.19997055)
Data Point: (1.274275, 0.19990402)
Data Point: (2.3357215, 0.19968668)
Data Point: (4.2813324, 0.19897883)
Data Point: (7.8475997, 0.19670167)
Data Point: (14.384499, 0.18966661)
Data Point: (26.366509, 0.17040155)
Data Point: (48.329302, 0.13128038)
Data Point: (88.586679, 0.083993776)
Data Point: (162.37767, 0.050440759)
Data Point: (297.63514, 0.032219908)
Data Point: (545.55948, 0.022430781)
Data Point: (1,000, 0.01672195)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Saturated Water Content: 0.2
Sample Material: Sand
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum Suction: 1,000 psf
Minimum Suction: 0.01 psf
Num. Points: 20

Type II Material

Model: Vol WC Data Point Function
Function: Volumetric Water Content vs. Water Pressure
Compressibility: 5e-07 /psf
Saturated Water Content: 0.14002115
Residual Water Content: 0.014002115
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Porosity: 0.14002115
Data Points: Matric Suction (psf), Volumetric Water Content
Data Point: (0.20885434, 0.13999992)
Data Point: (0.32623906, 0.13999987)
Data Point: (0.50959881, 0.1399998)
Data Point: (0.79601426, 0.13999969)
Data Point: (1.243407, 0.13999943)
Data Point: (1.9422527, 0.13999833)
Data Point: (3.0338785, 0.13998943)
Data Point: (4.7390429, 0.13990269)
Data Point: (7.4025796, 0.13903582)
Data Point: (11.563133, 0.13109924)
Data Point: (18.062089, 0.091925323)
Data Point: (28.213725, 0.047737033)
Data Point: (44.070997, 0.029213604)
Data Point: (68.840706, 0.020971948)
Data Point: (107.53201, 0.016416999)
Data Point: (167.96942, 0.013524389)

Data Point: (262.37513, 0.011519386)
Data Point: (409.84072, 0.010044319)
Data Point: (640.18804, 0.0089109551)
Data Point: (1,000, 0.0080104047)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Saturated Water Content: 0.14
Sample Material: Gravel
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum Suction: 1,000 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Concrete

Model: Vol WC Data Point Function
Function: Volumetric Water Content vs. Water Pressure
Compressibility: 0 /psf
Saturated Water Content: 0.29999961
Residual Water Content: 0.029999961
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Porosity: 0.29999961
Data Points: Matric Suction (psf), Volumetric Water Content
Data Point: (0.20885434, 0.29999961)
Data Point: (0.38282598, 0.29999916)
Data Point: (0.70171264, 0.29999812)
Data Point: (1.2862257, 0.29999573)
Data Point: (2.357627, 0.29999014)
Data Point: (4.3214847, 0.2999769)
Data Point: (7.9211981, 0.29994529)
Data Point: (14.519403, 0.29986923)
Data Point: (26.613786, 0.29968531)
Data Point: (48.782557, 0.2992395)
Data Point: (89.417486, 0.29816048)
Data Point: (163.90053, 0.29557379)
Data Point: (300.42651, 0.28953871)
Data Point: (550.67599, 0.27634231)
Data Point: (1,009.3785, 0.25115239)
Data Point: (1,850.1713, 0.21310733)
Data Point: (3,391.3282, 0.17060408)
Data Point: (6,216.2392, 0.13415717)
Data Point: (11,394.247, 0.10701196)
Data Point: (20,885.434, 0.087233461)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Saturated Water Content: 0.3
Sample Material: Clay
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

On-site Borrow Embankment

Model: Vol WC Data Point Function
Function: Volumetric Water Content vs. Water Pressure
Compressibility: 0 /psf
Saturated Water Content: 0.2902959
Residual Water Content: 0.02902959
Curve Fit to Data: 100 %

Segment Curvature: 100 %
Porosity: 0.2902959
Data Points: Matric Suction (psf), Volumetric Water Content
Data Point: (0.20885434, 0.2897096)
Data Point: (0.38282598, 0.2897096)
Data Point: (0.70171264, 0.2897096)
Data Point: (1.2862257, 0.2897096)
Data Point: (2.357627, 0.2897096)
Data Point: (4.3214847, 0.2897096)
Data Point: (7.9211981, 0.2897096)
Data Point: (14.519403, 0.2897096)
Data Point: (26.613786, 0.2897096)
Data Point: (48.782557, 0.2897096)
Data Point: (89.417486, 0.2897096)
Data Point: (163.90053, 0.2897096)
Data Point: (300.42651, 0.2897096)
Data Point: (550.67599, 0.2897096)
Data Point: (1,009.3785, 0.2897096)
Data Point: (1,850.1713, 0.2897096)
Data Point: (3,391.3282, 0.2897096)
Data Point: (6,216.2392, 0.2897096)
Data Point: (11,394.247, 0.27759469)
Data Point: (20,885.434, 0.24483719)
Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Saturated Water Content: 0.29
Sample Material: Clay
Liquid Limit: 21 %
Diameter at 10% passing: 0.001
Diameter at 60% passing: 0.10833
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Geometry

Name: 2D Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	-150 ft	9,847 ft
Point 2	-77.59799 ft	9,853.5554 ft
Point 3	-55.58912 ft	9,871.8108 ft
Point 4	-97.62856 ft	9,843.8108 ft
Point 5	-56.49598 ft	9,874.8108 ft
Point 6	-93.84355 ft	9,849.9391 ft
Point 7	-100.17609 ft	9,848.8551 ft
Point 8	-102.84132 ft	9,848.5922 ft
Point 9	-128.03655 ft	9,845.9409 ft
Point 10	-4.83112 ft	9,902 ft
Point 11	-6.63289 ft	9,901.9711 ft
Point 12	-13.07828 ft	9,898.9325 ft
Point 13	-41.87221 ft	9,884.9595 ft
Point 14	-46.41696 ft	9,883.7411 ft
Point 15	-70.26278 ft	9,871.6533 ft
Point 16	-99.66774 ft	9,856.5376 ft
Point 17	-110.39429 ft	9,853.9709 ft
Point 18	-119.58711 ft	9,851.5871 ft

Point 19	-136.23794 ft	9,846.6346 ft
Point 20	-140.00685 ft	9,845.5875 ft
Point 21	-183.77745 ft	9,835.7873 ft
Point 22	-177.77658 ft	9,832.7911 ft
Point 23	-158.0191 ft	9,832.7883 ft
Point 24	-152.35812 ft	9,835.6132 ft
Point 25	-151.30909 ft	9,836.5845 ft
Point 26	-151.30671 ft	9,839.5859 ft
Point 27	-182.89277 ft	9,839.5408 ft
Point 28	112.8872 ft	9,857.1846 ft
Point 29	94.80146 ft	9,857.1846 ft
Point 30	4.80146 ft	9,902.1846 ft
Point 31	-45.67103 ft	9,874.8108 ft
Point 32	-50.17722 ft	9,871.8108 ft
Point 33	135.40843 ft	9,848.0547 ft
Point 34	137.56466 ft	9,848.7686 ft
Point 35	138.9502 ft	9,850.6107 ft
Point 36	136.45315 ft	9,851.5466 ft
Point 37	136.01335 ft	9,850.9376 ft
Point 38	135.40843 ft	9,850.7214 ft
Point 39	-77.59799 ft	9,844.4288 ft
Point 40	-97.58681 ft	9,843.8386 ft
Point 41	-106.49156 ft	9,837.9077 ft
Point 42	-101.77146 ft	9,841.0515 ft
Point 43	-77.59799 ft	9,838.7608 ft
Point 44	-88.24396 ft	9,841.4477 ft
Point 45	26.49172 ft	9,844.8336 ft
Point 46	31.48735 ft	9,839.9814 ft
Point 47	41.48299 ft	9,840.2767 ft
Point 48	46.47863 ft	9,845.4243 ft
Point 49	7.80146 ft	9,902.1846 ft
Point 50	13.96439 ft	9,899.7596 ft
Point 51	24.4745 ft	9,895.7069 ft
Point 52	38.01491 ft	9,888.4581 ft
Point 53	130.50593 ft	9,850.5766 ft
Point 54	149.96396 ft	9,846.4828 ft
Point 55	157.72405 ft	9,846.0461 ft
Point 56	168.63276 ft	9,846.3675 ft
Point 57	175.06846 ft	9,847.0566 ft
Point 58	179.09078 ft	9,848.205 ft
Point 59	183.45786 ft	9,849.3534 ft
Point 60	186.56079 ft	9,850.6167 ft
Point 61	192.19203 ft	9,851.3058 ft
Point 62	198.76847 ft	9,851.5184 ft
Point 63	198.76847 ft	9,811.5184 ft
Point 64	25.8 ft	9,895 ft
Point 65	47.24 ft	9,885 ft
Point 66	-77.59799 ft	9,854.25 ft
Point 67	-77.59799 ft	9,854.5 ft
Point 68	12.34 ft	9,900.4 ft
Point 69	-101.77143 ft	9,841.0515 ft
Point 70	-77.59799 ft	9,841.7622 ft
Point 71	-101.80951 ft	9,838.0459 ft
Point 72	-97.80951 ft	9,834.0459 ft
Point 73	-93.80951 ft	9,834.0459 ft
Point 74	-89.80951 ft	9,838.0459 ft
Point 75	-89.47218 ft	9,838.4102 ft
Point 76	-100.80951 ft	9,838.0459 ft
Point 77	-97.94114 ft	9,838.1601 ft
Point 78	-97.94114 ft	9,841 ft

Point 79	-100.80951 ft	9,841 ft
Point 80	-100.80951 ft	9,838.0754 ft
Point 81	-99.5 ft	9,839.5 ft
Point 82	-99.5 ft	9,839.75 ft
Point 83	-24.59799 ft	9,895.7608 ft
Point 84	-74.72849 ft	9,841.8469 ft
Point 85	-72.17889 ft	9,844.5889 ft
Point 86	-41.48902 ft	9,877.595 ft
Point 87	-28.69585 ft	9,891.3537 ft
Point 88	137.91 ft	9,851 ft
Point 89	-20.59799 ft	9,895.7608 ft
Point 90	-74.5053 ft	9,841.8535 ft
Point 91	-71.75744 ft	9,844.6014 ft
Point 92	-33.33575 ft	9,883.023 ft
Point 93	-21.52551 ft	9,894.8333 ft
Point 94	-74.02296 ft	9,841.8677 ft
Point 95	-70.84647 ft	9,844.6283 ft
Point 96	-96.31034 ft	9,843.8763 ft
Point 97	43.59799 ft	9,898.7608 ft
Point 98	-71.15109 ft	9,841.9524 ft
Point 99	-65.42236 ft	9,844.7885 ft
Point 100	27.54431 ft	9,890.8132 ft
Point 101	30.70027 ft	9,892.3756 ft
Point 102	28.59799 ft	9,908.3756 ft
Point 103	-72.32801 ft	9,841.9177 ft
Point 104	-67.64519 ft	9,844.7228 ft
Point 105	17.59808 ft	9,895.7863 ft
Point 106	20.21037 ft	9,897.3511 ft
Point 107	-72.8036 ft	9,841.9037 ft
Point 108	-68.54353 ft	9,844.6963 ft
Point 109	12.9435 ft	9,898.1136 ft
Point 110	14.90258 ft	9,899.3978 ft
Point 111	-77.59799 ft	9,856.07 ft
Point 112	-151.30783 ft	9,844.2526 ft
Point 113	-143.653 ft	9,845.4798 ft
Point 114	-135.98957 ft	9,846.7085 ft
Point 115	-86.86935 ft	9,854.5836 ft
Point 116	-79.73749 ft	9,855.727 ft
Point 117	-151.21048 ft	9,839.5884 ft
Point 118	-151.12284 ft	9,842.2581 ft
Point 119	-151.02422 ft	9,845.2622 ft
Point 120	-200 ft	9,811.5184 ft
Point 121	-200 ft	9,835.5045 ft
Point 122	-200 ft	9,839.2494 ft
Point 123	-170 ft	9,836 ft
Point 124	-170 ft	9,836.5409 ft
Point 125	-170 ft	9,845 ft
Point 126	-180 ft	9,836 ft
Point 127	-179.96223 ft	9,838.0755 ft
Point 128	-170 ft	9,838 ft

Lines

	Start Point	End Point	Length	Angle	Hydraulic Boundary
Line 1	2	32	32.942 ft	33.7 °	
Line 2	32	3	5.4119 ft	0 °	
Line 3	39	2	9.1266 ft	90 °	
Line 4	6	7	6.4246 ft	9.71 °	
Line 5	7	9	28.012 ft	5.97 °	
Line 6	9	20	11.976 ft	1.69 °	
Line 7	32	31	5.4135 ft	33.7 °	

Line 8	31	5	10.825 ft	0 °	
Line 9	11	12	7.1257 ft	25.2 °	Drainage
Line 10	13	14	4.7052 ft	15 °	Drainage
Line 11	14	15	26.735 ft	26.9 °	Drainage
Line 12	15	16	33.063 ft	27.2 °	
Line 13	16	17	11.029 ft	13.5 °	
Line 14	17	18	9.4969 ft	14.5 °	
Line 15	19	20	3.9117 ft	15.5 °	
Line 16	10	11	1.802 ft	0.919 °	
Line 17	21	22	6.7073 ft	-26.5 °	
Line 18	22	23	19.757 ft	-0.00812 °	
Line 19	23	24	6.3267 ft	26.5 °	
Line 20	24	25	1.4296 ft	42.8 °	
Line 21	33	34	2.2713 ft	18.3 °	
Line 22	34	35	2.305 ft	53.1 °	
Line 23	36	37	0.7512 ft	54.2 °	
Line 24	37	38	0.64239 ft	19.7 °	
Line 25	38	53	4.9046 ft	1.69 °	
Line 26	45	46	6.9642 ft	-44.2 °	
Line 27	46	47	10 ft	1.69 °	
Line 28	47	48	7.1732 ft	45.9 °	
Line 29	48	45	19.996 ft	1.69 °	
Line 30	29	28	18.086 ft	0 °	
Line 31	28	53	18.817 ft	-20.6 °	
Line 32	49	30	3 ft	0 °	
Line 33	63	62	40 ft	90 °	
Line 34	62	61	6.5799 ft	1.85 °	9895.0 Nominal Reservoir Level Pressure
Line 35	61	60	5.6732 ft	6.98 °	9895.0 Nominal Reservoir Level Pressure
Line 36	60	59	3.3502 ft	22.2 °	9895.0 Nominal Reservoir Level Pressure
Line 37	59	58	4.5156 ft	14.7 °	9895.0 Nominal Reservoir Level Pressure
Line 38	58	57	4.183 ft	15.9 °	9895.0 Nominal Reservoir Level Pressure
Line 39	57	56	6.4725 ft	6.11 °	9895.0 Nominal Reservoir Level Pressure
Line 40	56	55	10.913 ft	1.69 °	9895.0 Nominal Reservoir Level Pressure
Line 41	55	54	7.7724 ft	-3.22 °	9895.0 Nominal Reservoir Level Pressure
Line 42	54	35	11.762 ft	-20.5 °	9895.0 Nominal Reservoir Level Pressure
Line 43	33	48	88.969 ft	1.69 °	
Line 44	41	25	44.837 ft	1.69 °	
Line 45	30	10	9.6343 ft	1.1 °	
Line 46	41	42	5.6712 ft	33.7 °	
Line 47	36	65	95.279 ft	-20.6 °	9895.0 Nominal Reservoir Level Pressure
Line 48	65	52	9.8519 ft	-20.5 °	9895.0 Nominal Reservoir Level Pressure
Line 49	64	51	1.5022 ft	-28.1 °	
Line 50	66	67	1.5708 ft	0 °	Zero pressure Head
Line 51	50	68	1.7461 ft	-21.5 °	
Line 52	68	49	4.8768 ft	-21.5 °	
Line 53	42	69	3e-05 ft	0 °	
Line 54	69	44	13.533 ft	1.68 °	
Line 55	69	4	4.9777 ft	33.7 °	
Line 56	4	40	0.050159 ft	33.7 °	
Line 57	44	70	10.651 ft	1.69 °	
Line 58	70	39	2.6666 ft	90 °	
Line 59	71	41	4.6841 ft	1.69 °	
Line 60	43	75	11.879 ft	1.69 °	
Line 61	71	72	5.6569 ft	-45 °	
Line 62	72	73	4 ft	0 °	
Line 63	73	75	6.153 ft	45.2 °	
Line 64	75	77	8.4727 ft	1.69 °	
Line 65	80	71	1.0004 ft	1.69 °	
Line 66	80	79	2.9246 ft	90 °	
Line 67	79	78	2.8684 ft	0 °	

Line 68	78	77	2.8399 ft	90 °	
Line 69	77	76	2.8706 ft	2.28 °	
Line 70	76	80	0.0295 ft	90 °	
Line 71	81	82	1.5708 ft	0 °	Zero pressure Head
Line 72	43	70	3.0014 ft	90 °	
Line 73	84	70	2.8707 ft	1.69 °	
Line 74	85	39	5.4215 ft	1.69 °	
Line 75	31	86	5.024 ft	33.7 °	
Line 76	87	13	14.646 ft	25.9 °	Drainage
Line 77	88	35	1.1107 ft	-20.5 °	9895.0 Nominal Reservoir Level Pressure
Line 78	88	36	1.556 ft	-20.6 °	9895.0 Nominal Reservoir Level Pressure
Line 79	90	84	0.22329 ft	1.69 °	
Line 80	91	85	0.42164 ft	1.7 °	
Line 81	86	92	9.7948 ft	33.7 °	
Line 82	92	10	34.244 ft	33.7 °	
Line 83	91	92	54.336 ft	45 °	
Line 84	12	93	9.3893 ft	25.9 °	Drainage
Line 85	93	87	7.97 ft	25.9 °	Drainage
Line 86	92	93	16.702 ft	45 °	
Line 87	94	90	0.48255 ft	1.69 °	
Line 88	95	91	0.91137 ft	1.69 °	
Line 89	95	10	87.462 ft	41 °	
Line 90	40	96	1.277 ft	1.69 °	
Line 91	96	39	18.721 ft	1.69 °	
Line 92	45	98	97.685 ft	1.69 °	
Line 93	43	98	7.1937 ft	26.3 °	
Line 94	53	99	196.01 ft	1.69 °	
Line 95	98	99	6.3923 ft	26.3 °	
Line 96	100	29	75.196 ft	-26.6 °	
Line 97	99	100	103.74 ft	26.3 °	
Line 98	52	101	8.2976 ft	-28.2 °	9895.0 Nominal Reservoir Level Pressure
Line 99	101	64	5.5588 ft	-28.2 °	9895.0 Nominal Reservoir Level Pressure
Line 100	100	101	3.5215 ft	26.3 °	
Line 101	98	103	1.1774 ft	1.69 °	
Line 102	99	104	2.2238 ft	1.69 °	
Line 103	105	100	11.12 ft	-26.6 °	
Line 104	51	106	4.5701 ft	-21.1 °	
Line 105	103	107	0.4758 ft	1.69 °	
Line 106	107	94	1.2199 ft	1.69 °	
Line 107	43	107	5.7327 ft	33.2 °	
Line 108	104	108	0.89873 ft	1.69 °	
Line 109	108	95	2.3039 ft	1.69 °	
Line 110	107	108	5.0938 ft	33.2 °	
Line 111	30	109	9.1031 ft	-26.6 °	
Line 112	109	105	5.204 ft	-26.6 °	
Line 113	108	109	97.435 ft	33.2 °	
Line 114	106	110	5.6887 ft	-21.1 °	
Line 115	110	50	1.0055 ft	-21.1 °	
Line 116	109	110	2.3425 ft	33.2 °	
Line 117	20	113	3.6477 ft	1.69 °	
Line 118	18	114	17.113 ft	16.6 °	
Line 119	114	19	0.25913 ft	16.6 °	
Line 120	5	115	36.492 ft	33.7 °	
Line 121	115	6	8.3792 ft	33.7 °	
Line 122	114	115	49.747 ft	9.11 °	
Line 123	3	116	29.014 ft	33.7 °	
Line 124	116	40	21.446 ft	33.7 °	
Line 125	115	116	7.2229 ft	9.11 °	
Line 126	117	42	49.461 ft	1.7 °	
Line 127	25	117	3.0055 ft	88.1 °	

Line 128	118	40	53.559 ft	1.69 °	
Line 129	117	118	2.6711 ft	88.1 °	
Line 130	113	119	7.3744 ft	1.69 °	
Line 131	118	119	3.0057 ft	88.1 °	
Line 132	120	63	398.77 ft	0 °	
Line 133	121	21	16.225 ft	0.999 °	
Line 134	120	121	23.986 ft	90 °	
Line 135	27	122	17.11 ft	0.976 °	
Line 136	121	122	3.7449 ft	90 °	
Line 137	25	123	18.7 ft	1.79 °	
Line 138	123	124	0.5409 ft	90 °	
Line 139	125	119	18.978 ft	0.792 °	
Line 140	123	126	10 ft	0 °	
Line 141	127	27	3.2765 ft	-26.6 °	
Line 142	126	127	2.0758 ft	89 °	
Line 143	124	128	1.4591 ft	90 °	
Line 144	128	125	7 ft	90 °	
Line 145	127	128	9.9625 ft	-0.434 °	

Regions

	Material	Points	Area
Region 1	Onsite Borrow Compacted Embankment Fill	40,116,115,6,7,9,20,113,119,118	250.54 ft²
Region 2	Cobble and Rock Fill	11,12,93,92,10	62.854 ft²
Region 3	Embankment Fill	45,46,47,48	74.955 ft²
Region 4	Colluvium	75,73,72,71,41,25,24,23,22,21,121,120,63,62,61,60,59,58,57,56,55,54,35,34,33,48,47,46,45,98,43	12,350 ft²
Region 5		66,67	0.19635 ft²
Region 6	Onsite Borrow Compacted Embankment Fill	42,69,4,40,118,117	137.23 ft²
Region 7	Type 1 Filter Material	80,79,78,77,75,43,70,44,69,42,41,71	71.397 ft²
Region 8	Type 1 Filter Material	73,75,77,76,80,71,72	34.089 ft²
Region 9	Type 2 Filter Material	79,80,76,77,78	8.3097 ft²
Region 10		81,82	0.19635 ft²
Region 11	Embankment Fill	31,32,2,39,85,91,92,86	310.87 ft²
Region 12	Cobble and Rock Fill	13,14,15,16,17,18,114,115,5,31,86,92,93,87	547.58 ft²
Region 13	Embankment Fill	92,91,95,10	208.28 ft²
Region 14	Type 1 Filter Material	32,3,116,40,96,39,2	216.14 ft²
Region 15	Type 1 Filter Material	40,4,69,44,70,39,96	58.869 ft²
Region 16	Embankment Fill	45,48,33,34,35,88,36,37,38,53,99,98	551.18 ft²
Region 17	Embankment Fill	53,28,29,100,99	3,921.3 ft²
Region 18	Cobble and Rock Fill	29,28,53,38,37,36,65,52,101,100	579.31 ft²
Region	Colluvium	98,103,107,43	2.4801

19			ft²
Region 20	Embankment Fill	98,99,104,108,107,103	6.3655 ft²
Region 21	Embankment Fill	99,100,105,109,108,104	754.95 ft²
Region 22	Cobble and Rock Fill	100,101,64,51,106,110,109,105	44.41 ft²
Region 23	Colluvium	94,90,84,70,43,107	7.195 ft²
Region 24	Embankment Fill	95,91,85,39,70,84,90,94,107,108	18.465 ft²
Region 25	Embankment Fill	30,10,95,108,109	717.26 ft²
Region 26	Cobble and Rock Fill	50,68,49,30,109,110	13.377 ft²
Region 27	Onsite Borrow Compacted Embankment Fill	19,20,9,7,6,115,114	127.49 ft²
Region 28	Onsite Borrow Compacted Embankment Fill	3,32,31,5,115,116	122.64 ft²
Region 29	Onsite Borrow Compacted Embankment Fill	41,42,117,25	141.51 ft²
Region 30	Colluvium	21,22,23,24,25,123,126,127,27,122,121	161.25 ft²
Region 31	Concrete	119,118,117,25,123,124,128,125	166.4 ft²
Region 32	Cobble and Rock Fill	126,127,128,124,123	20.34 ft²

Mesh Properties

Global Element Size: 2 ft

Steady-State Seepage

File Information

File Version: 10.01
Title: Carson Dam Groin Embankment Station
Created By: Leopold, Michael
Last Edited By: Leopold, Michael
Revision Number: 143
Date: 08/05/2021
Time: 12:22:53 PM
Tool Version: 10.1.1.18972
File Name: Carson Dam Main Embankment Groin Drainage 22.50 Proposed On-site Borrow.gsz
Directory: I:\26\Grand Junction CO 26-1144.00\Geostudio\
Last Solved Date: 08/05/2021
Last Solved Time: 12:23:01 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

Steady-State Seepage

Kind: SEEP/W
Method: Steady-State
Physics
- Water Transfer
  - Free convection: thermal effects: No
  - Free convection: solute effects: No
  - Vapor transfer: isothermal: No
  - Vapor transfer: thermal: No

Water Settings
- Maximum Number of Iterations: 500
- Maximum Difference: 0.005
- Significant Digits: 2
- Max # of Reviews: 10
- Under-Relaxation Criteria
  - Initial Rate: 1
  - Minimum Rate: 0.1
  - Rate Reduction Factor: 0.65
  - Reduction Frequency (iterations): 10
- Unit Weight of Water: 62.430189 pcf
- Bulk Modulus of Pore-Fluid: 43,511,321 psf

Time
- Starting Time: 0 d
- Duration: 0 d
- Ending Time: 0 d

Materials

Colluvium

Hydraulic

- Model: Saturated Only
- Sat Kx: 0.0031 cm/sec
- Ky'/Kx' Ratio: 0.52
- Rotation: 0 °
- Volumetric Water Content: 25.2
- Compressibility: 6,000 /psf

Cobble and Rock Fill

Hydraulic

- Model: Saturated / Unsaturated
- Vol. WC. Function: Rock Fill
- K-Function: Rock fill
- Ky'/Kx' Ratio: 1
- Rotation: 0 °

Embankment Fill

Hydraulic

- Model: Saturated / Unsaturated
- Vol. WC. Function: Embankment
- K-Function: Embankment
- Ky'/Kx' Ratio: 0.3
- Rotation: 0 °

Type 1 Filter

Hydraulic

- Model: Saturated / Unsaturated
- Vol. WC. Function: Type 1 Filter
- K-Function: Type 1 Filter
- Ky'/Kx' Ratio: 0.3
- Rotation: 0 °

Type II Filter

Hydraulic

- Model: Saturated / Unsaturated
- Vol. WC. Function: Type II Material
- K-Function: Type II Material
- Ky'/Kx' Ratio: 0.3
- Rotation: 0 °

Onsite Borrow Compacted Embankment

Hydraulic

- Model: Saturated / Unsaturated
- Vol. WC. Function: On-site Borrow Embankment
- K-Function: Onsite-Borrow Embankment
- Ky'/Kx' Ratio: 0.3
- Rotation: 0 °

Boundary Conditions

Drainage

Category: Hydraulic
Kind: Water Rate 0 ft³/sec
Review: Yes

Zero Pressure

Category: Hydraulic
Kind: Water Rate 0 ft³/sec
Review: Yes

Nominal Water Level 9895

Category: Hydraulic
Kind: Water Total Head 9,895 ft
Review: No

Water K Functions

Type 1 Filter

Model: Hyd K Data Point Function
Function: Water X-Conductivity vs. Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Saturated Kx: 3.0474253 cm/sec
Data Points: Matric Suction (psf), Water X-Conductivity (cm/sec)
Data Point: (0.1, 3.0474253)
Data Point: (0.16237767, 3.0467819)
Data Point: (0.26366509, 3.0454069)
Data Point: (0.42813324, 3.0424914)
Data Point: (0.6951928, 3.0362931)
Data Point: (1.1288379, 3.02313)
Data Point: (1.8329807, 2.995181)
Data Point: (2.9763514, 2.9359549)
Data Point: (4.8329302, 2.8114505)
Data Point: (7.8475997, 2.5558962)
Data Point: (12.74275, 2.0647125)
Data Point: (20.691381, 1.2775678)
Data Point: (33.598183, 0.46362369)
Data Point: (54.555948, 0.079063996)
Data Point: (88.586679, 0.0072304852)
Data Point: (143.84499, 0.0004873838)
Data Point: (233.57215, 2.9486861e-05)
Data Point: (379.26902, 1.7253948e-06)
Data Point: (615.84821, 9.9968233e-08)
Data Point: (1,000, 5.7753828e-09)
Estimation Properties
Hyd. K-Function Estimation Method: Van Genuchten Function
Volume Water Content Function: Type 1 Filter
Saturated Kx: 3.048 cm/sec
Residual Water Content: 0.05
Maximum Suction: 1,000 psf
Minimum Suction: 0.1 psf
Num. Points: 20

filter materials used a classification sample function for their respective hydraulic conductivity values and liquid limit readings instead of entered values

Type II Material

Model: Hyd K Data Point Function
Function: Water X-Conductivity vs. Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Saturated Kx: 36.575999 cm/sec
Data Points: Matric Suction (psf), Water X-Conductivity (cm/sec)
Data Point: (0.20885434, 36.575999)
Data Point: (0.32623906, 36.575994)
Data Point: (0.50959881, 36.575971)
Data Point: (0.79601426, 36.57574)
Data Point: (1.243407, 36.574616)
Data Point: (1.9422527, 36.566162)
Data Point: (3.0338785, 36.512157)
Data Point: (4.7390429, 36.183943)
Data Point: (7.4025796, 33.882224)
Data Point: (11.563133, 22.57072)
Data Point: (18.062089, 2.7461178)
Data Point: (28.213725, 0.028697176)
Data Point: (44.070997, 0.00012722338)
Data Point: (68.840706, 5.0396794e-07)
Data Point: (107.53201, 1.9740531e-09)
Data Point: (167.96942, 7.7227503e-12)
Data Point: (262.37513, 3.0209959e-14)
Data Point: (409.84072, 1.1818534e-16)
Data Point: (640.18804, 4.6186421e-19)
Data Point: (1,000, 1.8161695e-21)
Estimation Properties
Hyd. K-Function Estimation Method: Van Genuchten Function
Volume Water Content Function: Type II Material
Saturated Kx: 36.576 cm/sec
Residual Water Content: 0.05
Maximum Suction: 1,000 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Rock fill

Model: Hyd K Data Point Function
Function: Water X-Conductivity vs. Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Saturated Kx: 0.025 cm/sec
Data Points: Matric Suction (psf), Water X-Conductivity (cm/sec)
Data Point: (0.20885434, 0.025)
Data Point: (0.38282598, 0.025000077)
Data Point: (0.70171264, 0.025000466)
Data Point: (1.2862257, 0.024997196)
Data Point: (2.357627, 0.024952361)
Data Point: (4.3214847, 0.024902153)
Data Point: (7.9211981, 0.024329365)
Data Point: (14.519403, 5.2852307e-05)
Data Point: (26.613786, 6.3382176e-11)
Data Point: (48.782557, 7.1488745e-17)
Data Point: (89.417486, 8.1695416e-23)

Data Point: (163.90053, 4.5035982e-29)
Data Point: (300.42651, 8.9408942e-30)
Data Point: (550.67599, 7.472166e-30)
Data Point: (1,009.3785, 7.4782585e-30)
Data Point: (1,850.1713, 7.4984882e-30)
Data Point: (3,391.3282, 7.5000623e-30)
Data Point: (6,216.2392, 7.4998947e-30)
Data Point: (11,394.247, 7.4998597e-30)
Data Point: (20,885.434, 7.499859e-30)

Estimation Properties
Hyd. K-Function Estimation Method: Van Genuchten Function
Volume Water Content Function: Rock Fill
Saturated Kx: 0.025 cm/sec
Residual Water Content: 0.099
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Embankment

Model: Hyd K Data Point Function
Function: Water X-Conductivity vs. Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Saturated Kx: 2.7e-06 cm/sec
Data Points: Matric Suction (psf), Water X-Conductivity (cm/sec)
Data Point: (0.20885434, 2.7e-06)
Data Point: (0.38282598, 2.7e-06)
Data Point: (0.70171264, 2.7e-06)
Data Point: (1.2862257, 2.7e-06)
Data Point: (2.357627, 2.6999998e-06)
Data Point: (4.3214847, 2.6999992e-06)
Data Point: (7.9211981, 2.6999983e-06)
Data Point: (14.519403, 2.6998803e-06)
Data Point: (26.613786, 2.6961401e-06)
Data Point: (48.782557, 2.6275851e-06)
Data Point: (89.417486, 1.6729563e-06)
Data Point: (163.90053, 2.4277661e-08)
Data Point: (300.42651, 7.5773686e-12)
Data Point: (550.67599, 1.6236245e-15)
Data Point: (1,009.3785, 3.429438e-19)
Data Point: (1,850.1713, 7.2408305e-23)
Data Point: (3,391.3282, 1.5289999e-26)
Data Point: (6,216.2392, 3.2320047e-30)
Data Point: (11,394.247, 6.8189483e-34)
Data Point: (20,885.434, 9.6353955e-36)

Estimation Properties
Hyd. K-Function Estimation Method: Van Genuchten Function
Volume Water Content Function: Embankment
Saturated Kx: 2.7e-06 cm/sec
Residual Water Content: 0.254
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Onsite-Borrow Embankment

Model: Hyd K Data Point Function
Function: Water X-Conductivity vs. Water Pressure
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Saturated Kx: 2.7e-06 cm/sec
Data Points: Matric Suction (psf), Water X-Conductivity (cm/sec)
Data Point: (0.20885434, 2.7e-06)
Data Point: (0.38282598, 2.7e-06)
Data Point: (0.70171264, 2.7e-06)
Data Point: (1.2862257, 2.7e-06)
Data Point: (2.357627, 2.6999998e-06)
Data Point: (4.3214847, 2.6999986e-06)
Data Point: (7.9211981, 2.6999898e-06)
Data Point: (14.519403, 2.6997702e-06)
Data Point: (26.613786, 2.6948148e-06)
Data Point: (48.782557, 2.6136522e-06)
Data Point: (89.417486, 1.6092872e-06)
Data Point: (163.90053, 2.5865312e-08)
Data Point: (300.42651, 1.0956778e-11)
Data Point: (550.67599, 3.1625055e-15)
Data Point: (1,009.3785, 8.9836629e-19)
Data Point: (1,850.1713, 2.5508836e-22)
Data Point: (3,391.3282, 7.2336159e-26)
Data Point: (6,216.2392, 2.0259014e-29)
Data Point: (11,394.247, 5.8059696e-33)
Data Point: (20,885.434, 1.0200627e-35)
Estimation Properties
Hyd. K-Function Estimation Method: Van Genuchten Function
Volume Water Content Function: On-site Borrow Embankment
Saturated Kx: 2.7e-06 cm/sec
Residual Water Content: 0.254
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

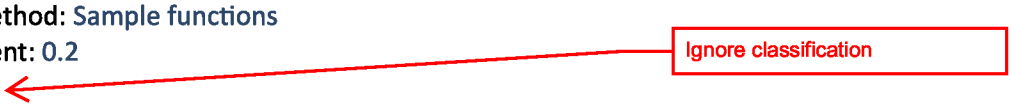
Vol. Water Content Functions

Type 1 Filter

Model: Vol WC Data Point Function
Function: Volumetric Water Content vs. Water Pressure
Compressibility: 5e-07 /psf
Saturated Water Content: 0.19999999
Residual Water Content: 0.019999999
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Porosity: 0.19999999
Data Points: Matric Suction (psf), Volumetric Water Content
Data Point: (0.01, 0.19999999)
Data Point: (0.018329807, 0.19999997)
Data Point: (0.033598183, 0.1999999)
Data Point: (0.061584821, 0.19999971)

Data Point: (0.11288379, 0.19999911)
Data Point: (0.20691381, 0.19999718)
Data Point: (0.37926902, 0.19999093)
Data Point: (0.6951928, 0.19997055)
Data Point: (1.274275, 0.19990402)
Data Point: (2.3357215, 0.19968668)
Data Point: (4.2813324, 0.19897883)
Data Point: (7.8475997, 0.19670167)
Data Point: (14.384499, 0.18966661)
Data Point: (26.366509, 0.17040155)
Data Point: (48.329302, 0.13128038)
Data Point: (88.586679, 0.083993776)
Data Point: (162.37767, 0.050440759)
Data Point: (297.63514, 0.032219908)
Data Point: (545.55948, 0.022430781)
Data Point: (1,000, 0.01672195)

Estimation Properties
Vol. WC Estimation Method: Sample functions
Saturated Water Content: 0.2
Sample Material: Sand
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum Suction: 1,000 psf
Minimum Suction: 0.01 psf
Num. Points: 20



Type II Material

Model: Vol WC Data Point Function
Function: Volumetric Water Content vs. Water Pressure
Compressibility: 5e-07 /psf
Saturated Water Content: 0.14002115
Residual Water Content: 0.014002115
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Porosity: 0.14002115
Data Points: Matric Suction (psf), Volumetric Water Content
Data Point: (0.20885434, 0.13999992)
Data Point: (0.32623906, 0.13999987)
Data Point: (0.50959881, 0.1399998)
Data Point: (0.79601426, 0.13999969)
Data Point: (1.243407, 0.13999943)
Data Point: (1.9422527, 0.13999833)
Data Point: (3.0338785, 0.13998943)
Data Point: (4.7390429, 0.13990269)
Data Point: (7.4025796, 0.13903582)
Data Point: (11.563133, 0.13109924)
Data Point: (18.062089, 0.091925323)
Data Point: (28.213725, 0.047737033)
Data Point: (44.070997, 0.029213604)
Data Point: (68.840706, 0.020971948)
Data Point: (107.53201, 0.016416999)
Data Point: (167.96942, 0.013524389)
Data Point: (262.37513, 0.011519386)

Data Point: (409.84072, 0.010044319)
Data Point: (640.18804, 0.0089109551)
Data Point: (1,000, 0.0080104047)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Saturated Water Content: 0.14
Sample Material: Gravel
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum Suction: 1,000 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Rock Fill

Model: Vol WC Data Point Function
Function: Volumetric Water Content vs. Water Pressure
Compressibility: 0 /psf
Saturated Water Content: 0.11385603
Residual Water Content: 0.011385603
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Porosity: 0.11385603
Data Points: Matric Suction (psf), Volumetric Water Content
Data Point: (0.20885434, 0.11399993)
Data Point: (0.38282598, 0.11399988)
Data Point: (0.70171264, 0.11399978)
Data Point: (1.2862257, 0.11399951)
Data Point: (2.357627, 0.1139972)
Data Point: (4.3214847, 0.1139505)
Data Point: (7.9211981, 0.11288938)
Data Point: (14.519403, 0.094641232)
Data Point: (26.613786, 0.042138191)
Data Point: (48.782557, 0.021825158)
Data Point: (89.417486, 0.014680428)
Data Point: (163.90053, 0.011119769)
Data Point: (300.42651, 0.0089785293)
Data Point: (550.67599, 0.0075430023)
Data Point: (1,009.3785, 0.0065089982)
Data Point: (1,850.1713, 0.0057237261)
Data Point: (3,391.3282, 0.0051005523)
Data Point: (6,216.2392, 0.0045848334)
Data Point: (11,394.247, 0.0041382958)
Data Point: (20,885.434, 0.0037317466)
Estimation Properties
Vol. WC Estimation Method: Sample functions
Saturated Water Content: 0.114
Sample Material: Gravel
Liquid Limit: 0 %
Diameter at 10% passing: 0
Diameter at 60% passing: 0
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Embankment

Model: Vol WC Data Point Function
Function: Volumetric Water Content vs. Water Pressure
Compressibility: 0 /psf
Saturated Water Content: 0.2902959
Residual Water Content: 0.02902959
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Porosity: 0.2902959
Data Points: Matric Suction (psf), Volumetric Water Content
Data Point: (0.20885434, 0.2897096)
Data Point: (0.38282598, 0.2897096)
Data Point: (0.70171264, 0.2897096)
Data Point: (1.2862257, 0.2897096)
Data Point: (2.357627, 0.2897096)
Data Point: (4.3214847, 0.2897096)
Data Point: (7.9211981, 0.2897096)
Data Point: (14.519403, 0.2897096)
Data Point: (26.613786, 0.2897096)
Data Point: (48.782557, 0.2897096)
Data Point: (89.417486, 0.2897096)
Data Point: (163.90053, 0.2897096)
Data Point: (300.42651, 0.2897096)
Data Point: (550.67599, 0.2897096)
Data Point: (1,009.3785, 0.2897096)
Data Point: (1,850.1713, 0.2897096)
Data Point: (3,391.3282, 0.2897096)
Data Point: (6,216.2392, 0.2897096)
Data Point: (11,394.247, 0.27759469)
Data Point: (20,885.434, 0.24483719)
Estimation Properties
Vol. WC Estimation Method: Grain Size Function
Saturated Water Content: 0.29
Sample Material: Clay
Liquid Limit: 21 %
Diameter at 10% passing: 0.001
Diameter at 60% passing: 0.10833
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

On-site Borrow Embankment

Model: Vol WC Data Point Function
Function: Volumetric Water Content vs. Water Pressure
Compressibility: 0 /psf
Saturated Water Content: 0.2902959
Residual Water Content: 0.02902959
Curve Fit to Data: 100 %
Segment Curvature: 100 %
Porosity: 0.2902959
Data Points: Matric Suction (psf), Volumetric Water Content
Data Point: (0.20885434, 0.2897096)
Data Point: (0.38282598, 0.2897096)
Data Point: (0.70171264, 0.2897096)

Data Point: (1.2862257, 0.2897096)
Data Point: (2.357627, 0.2897096)
Data Point: (4.3214847, 0.2897096)
Data Point: (7.9211981, 0.2897096)
Data Point: (14.519403, 0.2897096)
Data Point: (26.613786, 0.2897096)
Data Point: (48.782557, 0.2897096)
Data Point: (89.417486, 0.2897096)
Data Point: (163.90053, 0.2897096)
Data Point: (300.42651, 0.2897096)
Data Point: (550.67599, 0.2897096)
Data Point: (1,009.3785, 0.2897096)
Data Point: (1,850.1713, 0.2897096)
Data Point: (3,391.3282, 0.2897096)
Data Point: (6,216.2392, 0.2897096)
Data Point: (11,394.247, 0.27759469)
Data Point: (20,885.434, 0.24483719)

Estimation Properties

Vol. WC Estimation Method: Grain Size Function
Saturated Water Content: 0.29
Sample Material: Clay
Liquid Limit: 21 %
Diameter at 10% passing: 0.001
Diameter at 60% passing: 0.10833
Maximum Suction: 20,885.434 psf
Minimum Suction: 0.20885434 psf
Num. Points: 20

Geometry

Name: 2D Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	-80.86084 ft	9,866.3566 ft
Point 2	-57.57788 ft	9,865.5454 ft
Point 3	-60.57788 ft	9,865.5454 ft
Point 4	-54.779 ft	9,868.5 ft
Point 5	-54.779 ft	9,868.83 ft
Point 6	8.44236 ft	9,902.3144 ft
Point 7	53.16449 ft	9,866.7651 ft
Point 8	38.48959 ft	9,852.0902 ft
Point 9	28.48959 ft	9,852.0902 ft
Point 10	-66.95674 ft	9,867.5086 ft
Point 11	80.44236 ft	9,871.2438 ft
Point 12	13.15357 ft	9,867.4262 ft
Point 13	48.561 ft	9,885 ft
Point 14	-80.86084 ft	9,866.3565 ft
Point 15	-55.53759 ft	9,875.1218 ft

Point 16	-44.71342 ft	9,875.1215 ft
Point 17	-4.12514 ft	9,902.18 ft
Point 18	-5.9252 ft	9,902.1611 ft
Point 19	-19.19519 ft	9,896.0901 ft
Point 20	-46.5423 ft	9,882.796 ft
Point 21	-81.15254 ft	9,868.8837 ft
Point 22	-82.55072 ft	9,868.8158 ft
Point 23	-91.79888 ft	9,866.8455 ft
Point 24	-101.40779 ft	9,865.9335 ft
Point 25	-60.19631 ft	9,868.0748 ft
Point 26	-55.84161 ft	9,866.5738 ft
Point 27	-53.55638 ft	9,866.5738 ft
Point 28	-51.19843 ft	9,869.4722 ft
Point 29	-49.11104 ft	9,872.0381 ft
Point 30	-48.84026 ft	9,872.3703 ft
Point 31	-60.77033 ft	9,868.0271 ft
Point 32	-54.62819 ft	9,872.1218 ft
Point 33	-49.21377 ft	9,872.1218 ft
Point 34	-54.03197 ft	9,867.5738 ft
Point 35	-51.65969 ft	9,870.4899 ft
Point 36	-55.52263 ft	9,870.4899 ft
Point 37	-57.72798 ft	9,868.2819 ft
Point 38	-55.67407 ft	9,867.5738 ft
Point 39	-54.7348 ft	9,866.5738 ft
Point 40	-54.7348 ft	9,870.4899 ft
Point 41	-54.7348 ft	9,867.5738 ft
Point 42	-54.7348 ft	9,872.0507 ft
Point 43	-80.50067 ft	9,866.3864 ft
Point 44	25.391 ft	9,895 ft
Point 45	-189.279 ft	9,845 ft
Point 46	-105.58954 ft	9,865.7818 ft
Point 47	-330.70767 ft	9,867.5086 ft
Point 48	-134.93043 ft	9,863.3798 ft
Point 49	-125.37079 ft	9,864.2158 ft
Point 50	-122.65949 ft	9,864.7472 ft
Point 51	-112.9751 ft	9,865.5138 ft
Point 52	-148.1317 ft	9,862.5895 ft
Point 53	-146.83875 ft	9,862.7911 ft
Point 54	5.44236 ft	9,902.28 ft
Point 55	80.40542 ft	9,866.315 ft
Point 56	-150 ft	9,862.5366 ft
Point 57	-150 ft	9,840 ft
Point 58	80.20822 ft	9,840 ft

Lines

	Start Point	End Point	Hydraulic Boundary	Length	Angle
Line 1	4	5	Zero Pressure	2.0735 ft	0 °
Line 2	12	9		21.688 ft	-45 °
Line 3	9	8		10 ft	0 °
Line 4	8	7		20.753 ft	45 °
Line 5	11	13	Nominal Water Level 9895	34.723 ft	-23.3 °

Line 6	15	16		10.824 ft	-0.00159 °
Line 7	16	17		48.781 ft	33.7 °
Line 8	17	18		1.8002 ft	0.602 °
Line 9	18	19		14.593 ft	24.6 °
Line 10	19	20	Drainage	30.407 ft	25.9 °
Line 11	20	21	Drainage	37.302 ft	21.9 °
Line 12	21	22		1.3998 ft	2.78 °
Line 13	22	23	Drainage	9.4557 ft	12 °
Line 14	23	24	Drainage	9.6521 ft	5.42 °
Line 15	16	30		4.9598 ft	33.7 °
Line 16	30	27		7.4727 ft	50.9 °
Line 17	27	39		1.1784 ft	0 °
Line 18	39	26		1.1068 ft	0 °
Line 19	26	25		4.6061 ft	-19 °
Line 20	34	35		3.7592 ft	50.9 °
Line 21	35	40		3.0751 ft	0 °
Line 22	40	36		0.78783 ft	0 °
Line 23	36	37		3.1207 ft	45 °
Line 24	37	38		2.1725 ft	-19 °
Line 25	38	41		0.93927 ft	0 °
Line 26	41	34		0.70283 ft	0 °
Line 27	31	25		0.576 ft	4.75 °
Line 28	39	41		1 ft	90 °
Line 29	40	42		1.5608 ft	90 °
Line 30	42	31		7.2538 ft	33.7 °
Line 31	30	33		0.44862 ft	33.6 °
Line 32	33	32		5.4144 ft	0 °
Line 33	32	42		0.12814 ft	33.7 °
Line 34	12	27		66.715 ft	0.732 °
Line 35	10	43		13.59 ft	4.74 °
Line 36	43	1		0.3614 ft	4.73 °
Line 37	10	31		6.2081 ft	4.79 °
Line 38	24	14		20.551 ft	1.18 °
Line 39	14	1		0.0001 ft	90 °
Line 40	44	6		18.46 ft	-23.3 °
Line 41	13	44	Nominal Water Level 9895	25.236 ft	-23.3 °
Line 42	53	52	Drainage	1.3086 ft	8.86 °
Line 43	46	51	Drainage	7.3904 ft	2.08 °
Line 44	51	50	Drainage	9.7147 ft	4.53 °
Line 45	50	49	Drainage	2.7629 ft	11.1 °
Line 46	49	48	Drainage	9.5961 ft	5 °
Line 47	48	53	Drainage	11.923 ft	2.83 °
Line 48	24	46	Drainage	4.1845 ft	2.08 °
Line 49	15	10		13.724 ft	33.7 °
Line 50	54	17		9.568 ft	0.599 °
Line 51	6	54		3.0002 ft	0.657 °
Line 52	7	55		27.245 ft	-0.947 °
Line 53	54	55		83.144 ft	-25.6 °
Line 54	55	11		4.9289 ft	89.6 °
Line 55	52	56	Drainage	1.869 ft	1.62 °
Line 56	56	57		22.537 ft	90 °

Line 57	55	58		26.316 ft	89.6 °
Line 58	57	58		230.21 ft	0 °

Regions

	Points	Area	Material
Region 1	4,5	0.34212 ft²	
Region 2	44,6,54,55,11,13	233.19 ft²	Cobble and Rock Fill
Region 3	14,1,43,10,15,16,17,18,19,20,21,22,23,24	416.27 ft²	Cobble and Rock Fill
Region 4	12,9,8,7,55,54,17,16,30,27	2,935.8 ft²	Embankment Fill
Region 5	34,35,40,36,37,38,41	11.075 ft²	Type II Filter
Region 6	31,25,26,39,41,38,37,36,40,42	11.231 ft²	Type 1 Filter
Region 7	27,30,33,32,42,40,35,34,41,39	13.569 ft²	Type 1 Filter
Region 8	10,31,42,32,33,30,16,15	56.022 ft²	Onsite Borrow Compacted Embankment
Region 9	53,52,56,57,58,55,7,8,9,12,27,39,26,25,31,10,43,1,14,24,46,51,50,49,48	5,691 ft²	Colluvium

Mesh Properties

Global Element Size: 3 ft

Attachment 4
Type I Filter
Sizing Check

AYRES

Type I Filter Gradation

Hogchute Dam, Mesa County, CO

References

1) Design Standards No. 13 - Embankment Dams, U.S. Department of the Interior, Bureau of Reclamation, Chapter 5: Protective Filters, November 2011.
2) Grain Size Analysis with Hydrometer (ASTM D6913 and ASTM D7928), ATT, 11/8/2018

Analysis for Type I Filter Material

Average of borrow area sample results'

Design Gradation			
Sieve Size	Opening (mm)	Percent Passing	Regraded Percent Passing
1 in.	25.00	100.0	
3/4 in.	19.00	96.0	
3/8 in.	9.510	92.0	
#4	4.750	88.0	100.0
#10	2.000	79.0	89.8
#40	0.425	67.0	76.1
#100	0.150	59.0	67.0
#200	0.075	52.0	59.1
hydrometer	0.045	50.0	56.8
hydrometer	0.032	5.0	5.7
hydrometer	0.024	3.0	3.4
hydrometer	0.013	2.0	2.3
hydrometer	0.0090	1.0	1.1
hydrometer	0.0060	1.0	1.1
hydrometer	0.0030	0.0	0.0
hydrometer	0.0010	0.0	0.0

Regrade to omit gravels. Only consider particles passing the #4 sieve.

Base Soil Category	Percent Finer than #200 Sieve	(Ref. 1, Table 5.4.3-1)
1	>85	
2	40-85	
3	15-39	
4	<15	

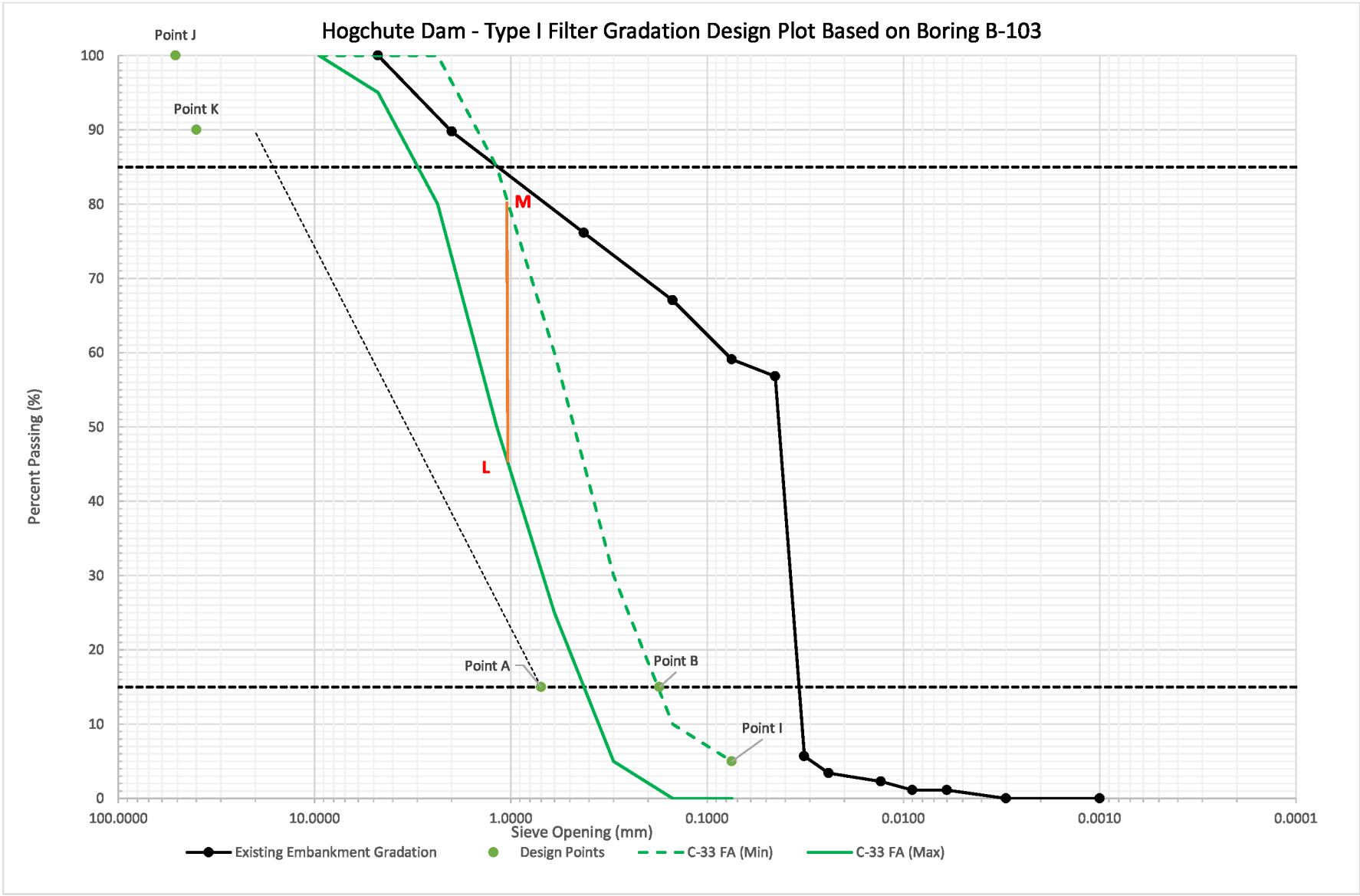
AYRES

--> Complete following based on above information:			
Finest Sample Percent Passing #200:	59.1	%	
Finest Sample D_{15}:	0.035	mm	Worst Case
Finest Sample D_{85}:	1.2	mm	
Soil Category:	2		

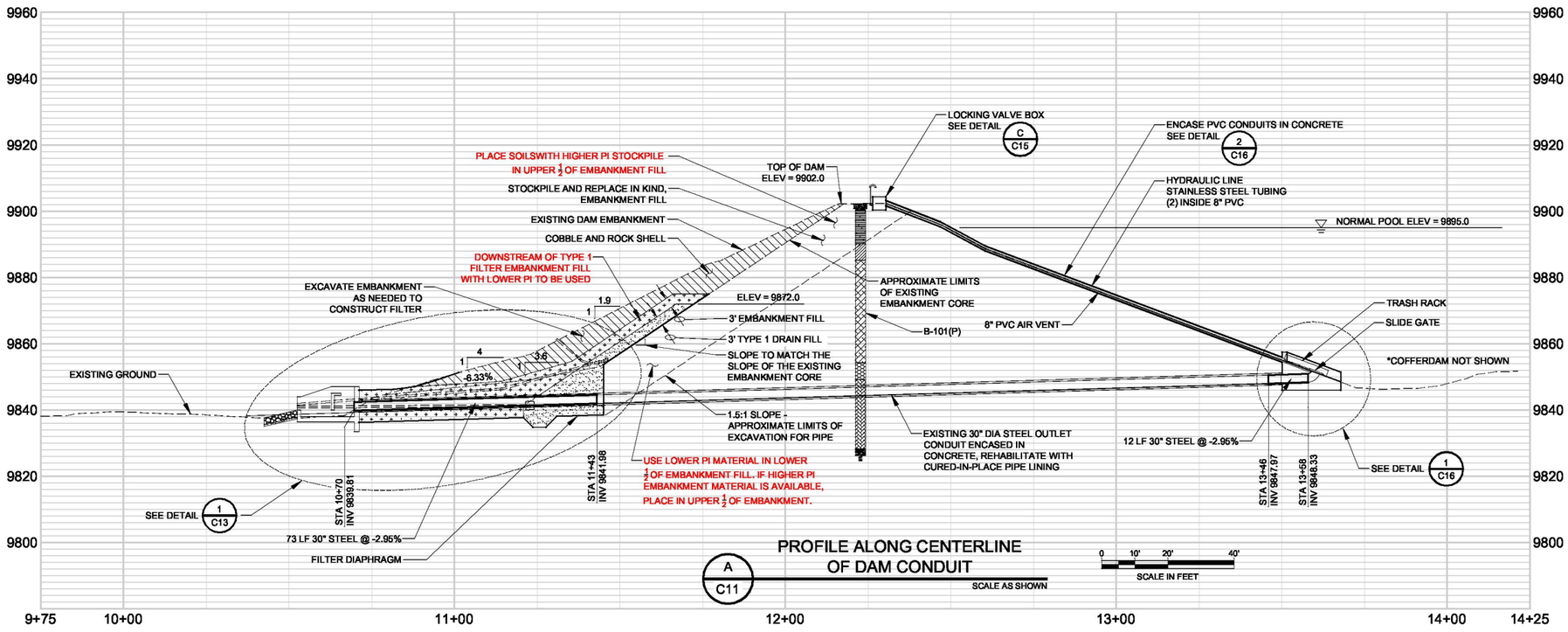
	Opening (mm)	% Passing			
Point A	0.7	15		(Ref. 1, Table 5.4.4-1)	MAX D15F
Point B	0.175	15		(Ref. 1, Section 5.4.5)	MIN D15F
Point J	51	100		(Ref. 1, Table 5.4.6-1)	same for all
Point I	0.075	5		(Ref. 1, Table 5.4.6-1)	same for all
Point K	40	90	<<-Manually input	(Ref. 1, Table 5.4.6-2)	

Type 1 Filter Gradation			
Sieve Size	Opening (mm)	Modified C-33 FA Percent Passing	
1/2 in.	12.5		
3/8 in.	9.51	100	100
#4	4.75	95	100
#8	2.36	80	100
#16	1.18	50	85
#30	0.60	25	60
#50	0.30	5	30
#100	0.15	0	10
#200	0.075	0	5

C-33 Fine Aggregate is acceptable.



Attachment 5
Revised Drawing and Embankment Specification

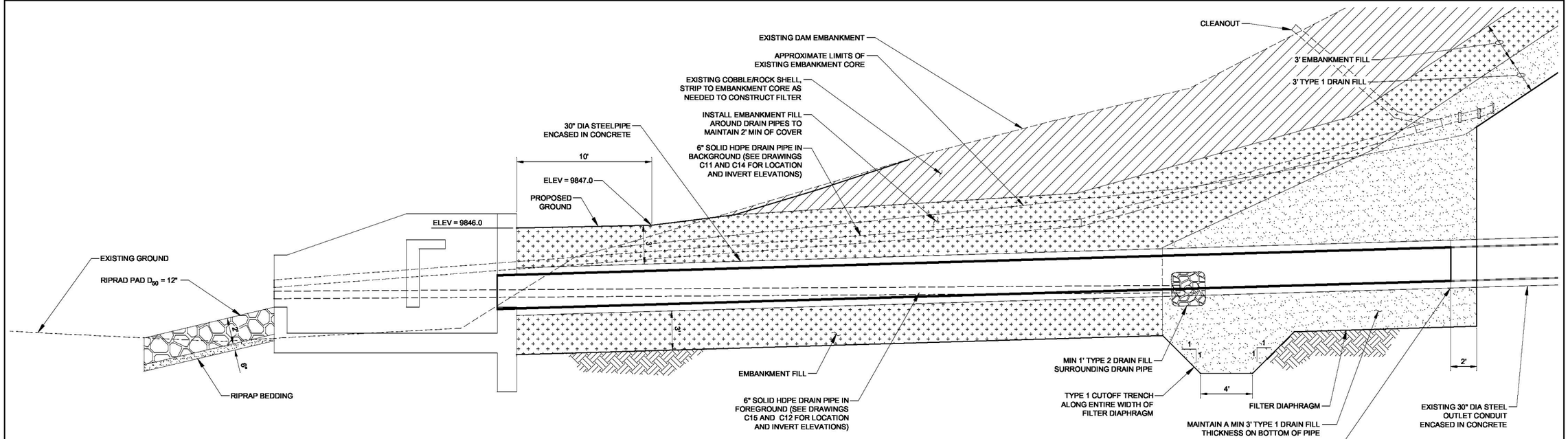


A C11 PROFILE ALONG CENTERLINE OF DAM CONDUIT

SCALE AS SHOWN

0 10' 20' 40'

SCALE IN FEET



COLORADO LICENSED TODD M. RUDOLPH 58436 PROFESSIONAL ENGINEER 8/11/2021

1 C13 DIAPHRAGM FILTER AND OUTLET DETAIL

SCALE AS SHOWN

0 2' 4' 8'

SCALE IN FEET

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
Fort Collins, CO 80525
(970) 223-5556

DAM PROFILE AND DETAIL

HOGCHUTE (AKA CARSON) RESERVOIR DAM REHABILITATION
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Revisions	Date

Project Mgr.	CTG
Designed By:	AJS
Drawn By:	RBR
Approved By:	TMR
Date:	05/10/21

PROJECT NO. 26-1144.00

DRAWING NO. C13

SHEET 20 OF 44

Drawing Name: I:\36\26-114400 GRAND JUNCTION HOGCHUTE DAM\MAINDWGS 2020\SHEETS\26-1144.00 DAM PROFILE AND DETAILDWG Wednesday, August 11, 2021 2:37 PM By: WAYNE, ROBERT

PART 2 PRODUCTS

2.01 SOIL MATERIALS, GENERAL

A. Soil materials shall be free of organic matter, debris, frozen soils, ice, and other objectionable materials. Rock particles larger than maximum size specified shall be removed prior to placement of soil. If not otherwise specified, rock particles shall be no larger than 1/2 the specified lift (layer) thickness.

B. Select existing material from required excavations may be used for fill or backfill if it meets the specified product requirements. If necessary, furnish additional approved material from suitable off-site sources.

2.02 EMBANKMENT FILL

A. Where identified as requiring higher Plastic Index (PI) on the drawings, select, natural, free draining soils complying with ASTM D2487 soil classification groups CL or SC, or combinations thereof, and suitable for compaction. Plasticity Index for material shall be greater than 10.

B. Where identified as requiring lower Plastic Index (PI) on the drawings, select, natural, free draining soils complying with ASTM D2487 soil classification groups CL or SC, or combinations thereof, and suitable for compaction. Plasticity Index for material shall be greater than 4.

B. Embankment fill shall comply with the following gradation by weight

	Percent Passing
Sieve Designation	Range
3"	100
3/4"	95-100
3/8"	85-90
No. 4	75-80
No. 40	50-60
No. 100	45-55
No. 200	40-50

2.03 COBBLE AND ROCK SHELL

A. This material is existing on site and consists of well graded riprap from sand size material to 24-inch diameter riprap. If importing of additional Cobble Rock Shell material is needed, it needs to match a similar gradation to existing material.

B. Imported cobble and rock shell shall comply with requirements of Colorado DOT Std. Spec., Section 506, Table 506-2 for d50 = 12" riprap with the following gradation by weight:

GROUND ENGINEERING

Client: Shelly McCarron
ESCO Construction Company
32045 Castle Court
Suite 200
Evergreen, CO 80439

Hogchute Reservoir Dam Rehabilitation

Report Date:	Sep 23, 2021	*Work Order No.:*	21-6553.SoilSampling.0013; ver: 1
Work Order Date:	Sep 8, 2021	*Reviewed by:*	Chris Hutto

Soil/Aggregate Laboratory Summary

General Location:	Carson Lake - samples for gradation with hydrometer and Att limits. Sampled by Client.	*Logged-in by:*	Cody Peacock

On-Site Notifications

Name	Company
Jake Dryden	ESCO Construction Company

Photos

GROUND ENGINEERING

Client: Shelly McCarron
ESCO Construction Company
32045 Castle Court
Suite 200
Evergreen, CO 80439

Hogchute Reservoir Dam Rehabilitation

Report Date: Sep 23, 2021
Work Order Date: Sep 8, 2021
Work Order No.: 21-6553.SoilSampling.0013; ver: 1
Reviewed by: Chris Hutto

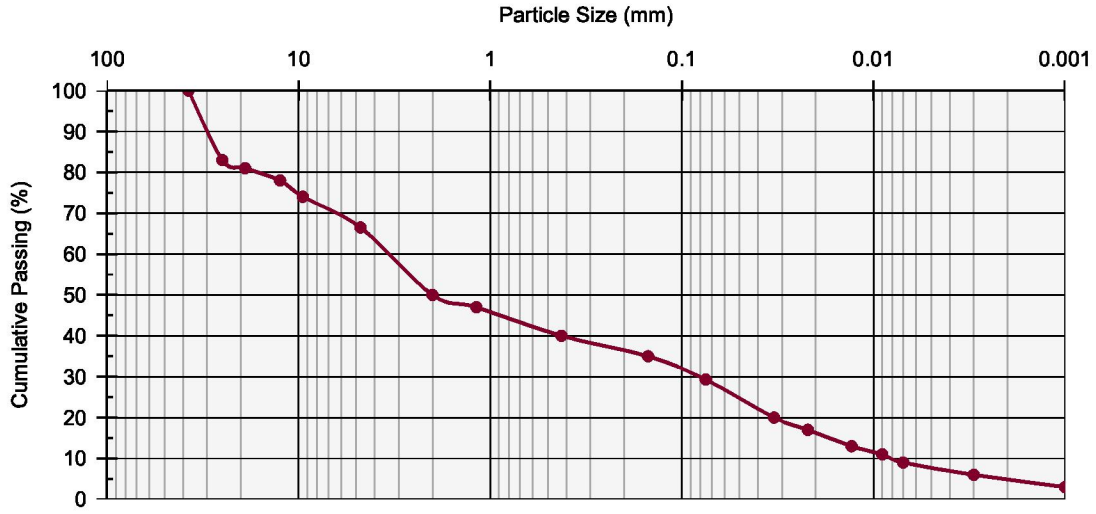
Soil/Aggregate Laboratory Summary

Specification Title: Embankment
Sampling Method: ASTM D75 / AASHTO T2 / CDOT CP30
Sample Location: Sample 1 East 3' BG
Lab ID: Soil138

Atterberg Limits (ASTM D4318) and Classification (ASTM D2487 & AASHTO M145)

Method	Liquid Limit		Plastic Limit		Plasticity Index		Classification	
	Value	Spec.	Value	Spec.	Value	Spec.	USCS	AASHTO
Single Point	25	-	18	-	7	-	(SC-SM)g	A-2-4 (0)

Soil Gradation and Hydrometer (ASTM D422-63[2007])



Coarse Gradation				Fine Gradation				Hydrometer		
Sieve Size	Particle Size (mm)	Cumulative Passing (%)	Specified (%)	Sieve Size	Particle Size (mm)	Cumulative Passing (%)	Specified (%)	Particle Size (mm)	Cumulative Passing (%)	Specified (%)
6 in	150	-	-	No. 4	4.75	66.5	-	0.033	20	-
5 in	125	-	-	No. 8	2.36	-	-	0.022	17	-
4 in	100	-	-	No. 10	2.00	50	-	0.013	13	-
3 in	75	-	-	No. 16	1.18	47	-	0.0091	11	-
2.5 in	63	-	-	No. 20	0.85	-	-	0.0066	9	-
2 in	50	-	-	No. 30	0.60	-	-	0.0033	6	-
1.5 in	37.5	100	-	No. 40	0.425	40	-	0.0014	3	-
1 in	25.0	83	-	No. 50	0.300	38	-	-	-	-
3/4 in	19.0	81	-	No. 60	0.250	-	-	-	-	-
1/2 in	12.5	78	-	No. 100	0.150	35	-	-	-	-
3/8 in	9.5	74	-	No. 140	0.090	-	-	-	-	-
No. 4	4.75	66.5	-	No. 200	0.075	29.3	-	0.002	4	-

Note: Composite temperature and miniscus corrections were applied to each reading.

GROUND ENGINEERING

Client: Shelly McCarron
ESCO Construction Company
32045 Castle Court
Suite 200
Evergreen, CO 80439

Hogchute Reservoir Dam Rehabilitation

Report Date: Sep 23, 2021
Work Order No.: 21-6553.SoilSampling.0013; ver: 1
Work Order Date: Sep 8, 2021
Reviewed by: Chris Hutto

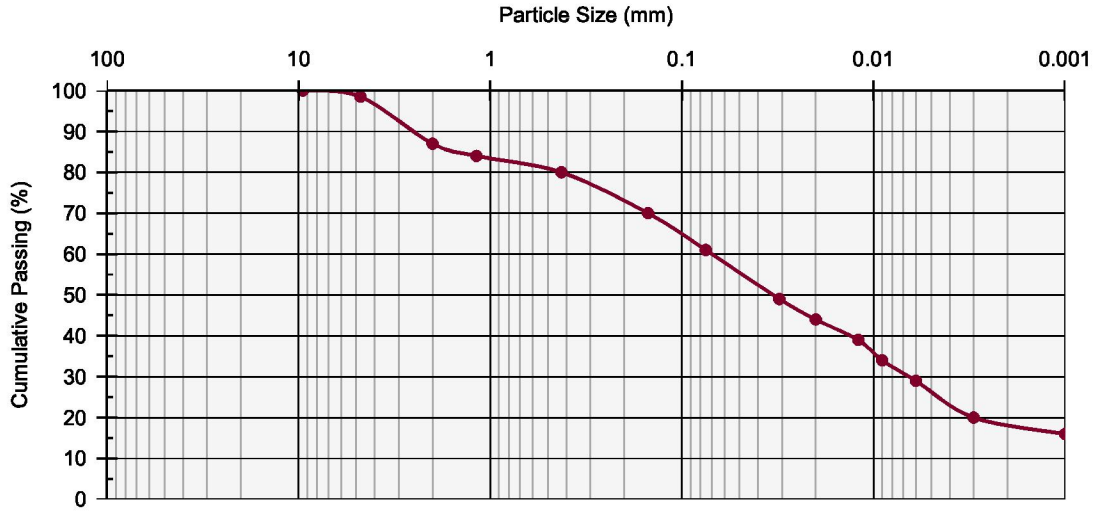
Soil/Aggregate Laboratory Summary

Specification Title: Embankment
Sampling Method: ASTM D75 / AASHTO T2 / CDOT CP30
Sample Location: Sample 2 East 5' BG
Lab ID: Soil139

Atterberg Limits (ASTM D4318) and Classification (ASTM D2487 & AASHTO M145)

Method	Liquid Limit		Plastic Limit		Plasticity Index		Classification	
	Value	Spec.	Value	Spec.	Value	Spec.	USCS	AASHTO
Single Point	40	-	26	-	14	-	s(ML)	A-6 (7)

Soil Gradation and Hydrometer (ASTM D422-63[2007])



Coarse Gradation				Fine Gradation				Hydrometer		
Sieve Size	Particle Size (mm)	Cumulative Passing (%)	Specified (%)	Sieve Size	Particle Size (mm)	Cumulative Passing (%)	Specified (%)	Particle Size (mm)	Cumulative Passing (%)	Specified (%)
6 in	150	-	-	No. 4	4.75	98.5	-	0.031	49	-
5 in	125	-	-	No. 8	2.36	-	-	0.020	44	-
4 in	100	-	-	No. 10	2.00	87	-	0.012	39	-
3 in	75	-	-	No. 16	1.18	84	-	0.0085	34	-
2.5 in	63	-	-	No. 20	0.85	-	-	0.0062	29	-
2 in	50	-	-	No. 30	0.60	-	-	0.0031	20	-
1.5 in	37.5	-	-	No. 40	0.425	80	-	0.0013	16	-
1 in	25.0	-	-	No. 50	0.300	78	-	-	-	-
3/4 in	19.0	-	-	No. 60	0.250	-	-	-	-	-
1/2 in	12.5	-	-	No. 100	0.150	70	-	-	-	-
3/8 in	9.5	100	-	No. 140	0.090	-	-	-	-	-
No. 4	4.75	98.5	-	No. 200	0.075	61.0	-	0.002	18	-

Note: Composite temperature and miniscus corrections were applied to each reading.

GROUND ENGINEERING

Client: Shelly McCarron
ESCO Construction Company
32045 Castle Court
Suite 200
Evergreen, CO 80439

Hogchute Reservoir Dam Rehabilitation

Report Date: Sep 23, 2021
Work Order Date: Sep 8, 2021
Work Order No.: 21-6553.SoilSampling.0013; ver: 1
Reviewed by: Chris Hutto

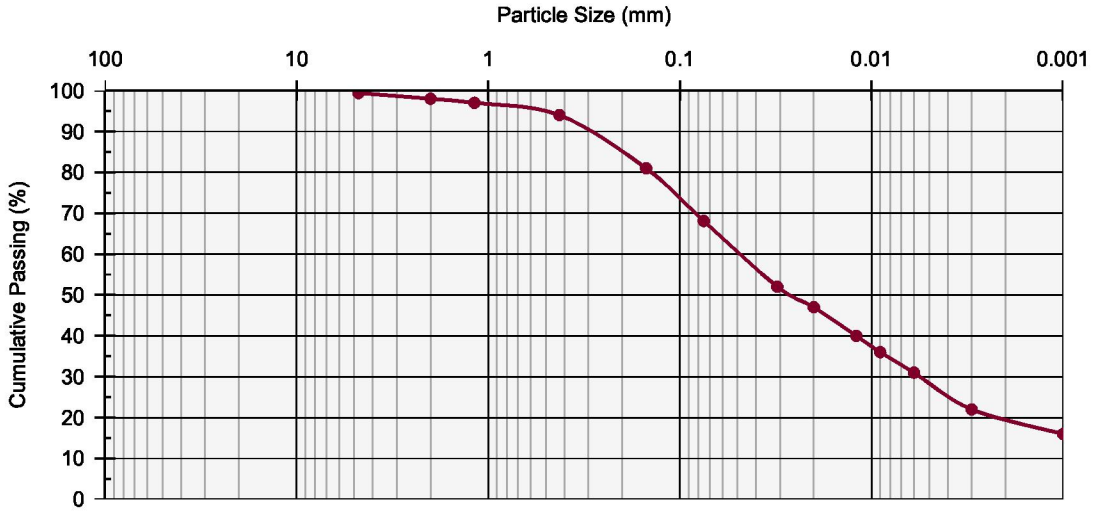
Soil/Aggregate Laboratory Summary

Specification Title: Embankment
Sampling Method: ASTM D75 / AASHTO T2 / CDOT CP30
Sample Location: Sample 3 East 3' BG
Lab ID: Soil140

Atterberg Limits (ASTM D4318) and Classification (ASTM D2487 & AASHTO M145)

Method	Liquid Limit		Plastic Limit		Plasticity Index		Classification	
	Value	Spec.	Value	Spec.	Value	Spec.	USCS	AASHTO
Single Point	34	-	23	-	11	-	s(CL)	A-6 (6)

Soil Gradation and Hydrometer (ASTM D422-63[2007])



Coarse Gradation				Fine Gradation				Hydrometer		
Sieve Size	Particle Size (mm)	Cumulative Passing (%)	Specified (%)	Sieve Size	Particle Size (mm)	Cumulative Passing (%)	Specified (%)	Particle Size (mm)	Cumulative Passing (%)	Specified (%)
6 in	150	-	-	No. 4	4.75	99.4	-	0.031	52	-
5 in	125	-	-	No. 8	2.36	-	-	0.020	47	-
4 in	100	-	-	No. 10	2.00	98	-	0.012	40	-
3 in	75	-	-	No. 16	1.18	97	-	0.0086	36	-
2.5 in	63	-	-	No. 20	0.85	-	-	0.0062	31	-
2 in	50	-	-	No. 30	0.60	-	-	0.0031	22	-
1.5 in	37.5	-	-	No. 40	0.425	94	-	0.0013	16	-
1 in	25.0	-	-	No. 50	0.300	93	-	-	-	-
3/4 in	19.0	-	-	No. 60	0.250	-	-	-	-	-
1/2 in	12.5	-	-	No. 100	0.150	81	-	-	-	-
3/8 in	9.5	-	-	No. 140	0.090	-	-	-	-	-
No. 4	4.75	99.4	-	No. 200	0.075	68.1	-	0.002	19	-

Note: Composite temperature and miniscus corrections were applied to each reading.

AYRES

Type I Filter Gradation

Hogchute Dam, Mesa County, CO

References

1) Design Standards No. 13 - Embankment Dams, U.S. Department of the Interior, Bureau of Reclamation, Chapter 5: Protective Filters, November 2011.
2) Grain Size Analysis with Hydrometer (ASTM D6913 and ASTM D7928), ATT, 11/8/2018

Analysis for Type I Filter Material

Reservoir Sample 1 East 3 Feet BG'

Design Gradation			
Sieve Size	Opening (mm)	Percent Passing	Regraded Percent Passing
1 in.	25.00	83.0	
3/4 in.	19.00	81.0	
3/8 in.	9.510	74.0	
#4	4.750	66.5	100.0
#10	2.000	50.0	75.2
#40	0.425	40.0	60.2
#100	0.150	35.0	52.6
#200	0.075	29.3	44.1
hydrometer	0.033	20.0	30.1
hydrometer	0.022	17.0	25.6
hydrometer	0.013	13.0	19.5
hydrometer	0.009	11.0	16.5
hydrometer	0.0066	9.0	13.5
hydrometer	0.0033	6.0	9.0
hydrometer	0.0014	3.0	4.5
hydrometer	0.0020	2.0	3.0

Regrade to omit gravels. Only consider particles passing the #4 sieve.

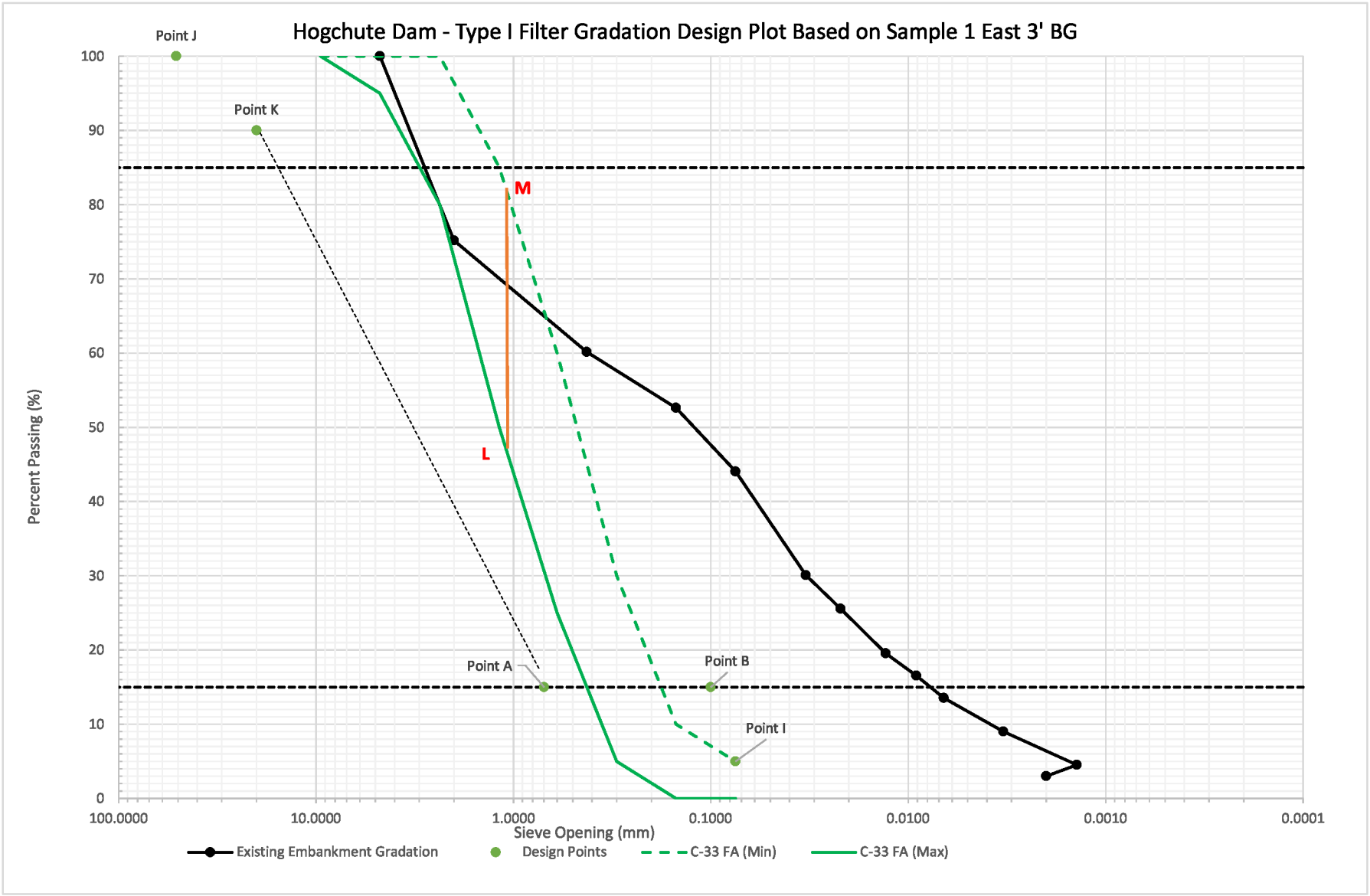
Base Soil Category	Percent Finer than #200 Sieve	(Ref. 1, Table 5.4.3-1)
1	>85	
2	40-85	
3	15-39	
4	<15	

--> Complete following based on above information:			
Finest Sample Percent Passing #200:	44.1	%	
Finest Sample D_{15}:	0.0075	mm	approximated.
Finest Sample D_{85}:	2.9	mm	
Soil Category:	2		

	Opening (mm)	% Passing			
Point A	0.7	15		(Ref. 1, Table 5.4.4-1)	MAX D15F
Point B	0.1	15		(Ref. 1, Section 5.4.5)	MIN D15F
Point J	51	100		(Ref. 1, Table 5.4.6-1)	same for all
Point I	0.075	5		(Ref. 1, Table 5.4.6-1)	same for all
Point K	20	90	<<-Manually input	(Ref. 1, Table 5.4.6-2)	

Type 1 Filter Gradation			
Sieve Size	Opening (mm)	Modified C-33 FA Percent Passing	
1/2 in.	12.5		
3/8 in.	9.51	100	100
#4	4.75	95	100
#8	2.36	80	100
#16	1.18	50	85
#30	0.60	25	60
#50	0.30	5	30
#100	0.15	0	10
#200	0.075	0	5

C-33 Fine Aggregate is acceptable.



AYRES

Type I Filter Gradation

Hogchute Dam, Mesa County, CO

References

1) Design Standards No. 13 - Embankment Dams, U.S. Department of the Interior, Bureau of Reclamation, Chapter 5: Protective Filters, November 2011.
2) Grain Size Analysis with Hydrometer (ASTM D6913 and ASTM D7928), ATT, 11/8/2018

Analysis for Type I Filter Material

Reservoir Sample 2 East 5 Feet BG'

Design Gradation			
Sieve Size	Opening (mm)	Percent Passing	Regraded Percent Passing
1 in.	25.00	100.0	
3/4 in.	19.00	100.0	
3/8 in.	9.510	100.0	
#4	4.750	98.5	100.0
#10	2.000	87.0	88.3
#40	0.425	80.0	81.2
#100	0.150	70.0	71.1
#200	0.075	61.0	61.9
hydrometer	0.031	49.0	49.7
hydrometer	0.020	44.0	44.7
hydrometer	0.012	39.0	39.6
hydrometer	0.009	34.0	34.5
hydrometer	0.0062	29.0	29.4
hydrometer	0.0031	20.0	20.3
hydrometer	0.0013	16.0	16.2
hydrometer	0.0020	18.0	18.3

Regrade to omit gravels. Only consider particles passing the #4 sieve.

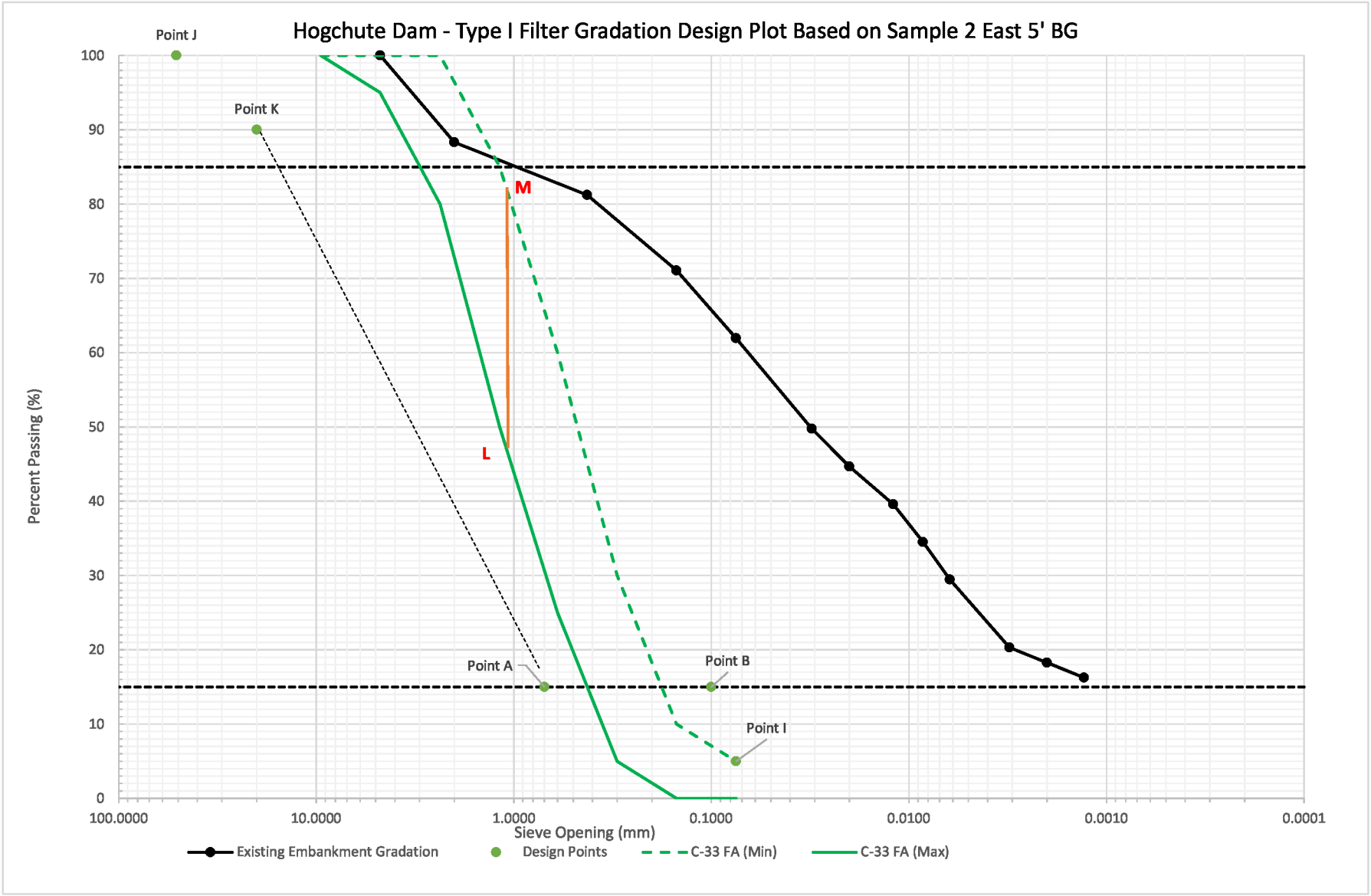
Base Soil Category	Percent Finer than #200 Sieve	(Ref. 1, Table 5.4.3-1)
1	>85	
2	40-85	
3	15-39	
4	<15	

--> Complete following based on above information:			
Finest Sample Percent Passing #200:	61.9	%	
Finest Sample D_{15}:	0.001	mm	approximated.
Finest Sample D_{85}:	1	mm	
Soil Category:	2		

	Opening (mm)	% Passing			
Point A	0.7	15		(Ref. 1, Table 5.4.4-1)	MAX D15F
Point B	0.1	15		(Ref. 1, Section 5.4.5)	MIN D15F
Point J	51	100		(Ref. 1, Table 5.4.6-1)	same for all
Point I	0.075	5		(Ref. 1, Table 5.4.6-1)	same for all
Point K	20	90	<<-Manually input	(Ref. 1, Table 5.4.6-2)	

Type 1 Filter Gradation			
Sieve Size	Opening (mm)	Modified C-33 FA Percent Passing	
1/2 in.	12.5		
3/8 in.	9.51	100	100
#4	4.75	95	100
#8	2.36	80	100
#16	1.18	50	85
#30	0.60	25	60
#50	0.30	5	30
#100	0.15	0	10
#200	0.075	0	5

C-33 Fine Aggregate is acceptable.



AYRES

Type I Filter Gradation

Hogchute Dam, Mesa County, CO

References

1) Design Standards No. 13 - Embankment Dams, U.S. Department of the Interior, Bureau of Reclamation, Chapter 5: Protective Filters, November 2011.
2) Grain Size Analysis with Hydrometer (ASTM D6913 and ASTM D7928), ATT, 11/8/2018

Analysis for Type I Filter Material

Reservoir Sample 3 East 3 Feet BG'

Design Gradation			
Sieve Size	Opening (mm)	Percent Passing	Regraded Percent Passing
1 in.	25.00	100.0	
3/4 in.	19.00	100.0	
3/8 in.	9.510	100.0	
#4	4.750	99.4	100.0
#10	2.000	98.0	98.6
#40	0.425	94.0	94.6
#100	0.150	81.0	81.5
#200	0.075	68.1	68.5
hydrometer	0.031	52.0	52.3
hydrometer	0.020	47.0	47.3
hydrometer	0.012	40.0	40.2
hydrometer	0.0086	36.0	36.2
hydrometer	0.0062	31.0	31.2
hydrometer	0.0031	22.0	22.1
hydrometer	0.0013	16.0	16.1
hydrometer	0.0020	19.0	19.1

Regrade to omit gravels. Only consider particles passing the #4 sieve.

Base Soil Category	Percent Finer than #200 Sieve	(Ref. 1, Table 5.4.3-1)
1	>85	
2	40-85	
3	15-39	
4	<15	

--> Complete following based on above information:			
Finest Sample Percent Passing #200:	68.5	%	
Finest Sample D_{15}:	0.001	mm	approximated.
Finest Sample D_{85}:	0.2	mm	
Soil Category:	2		

	Opening (mm)	% Passing			
Point A	0.7	15		(Ref. 1, Table 5.4.4-1)	MAX D15F
Point B	0.1	15		(Ref. 1, Section 5.4.5)	MIN D15F
Point J	51	100		(Ref. 1, Table 5.4.6-1)	same for all
Point I	0.075	5		(Ref. 1, Table 5.4.6-1)	same for all
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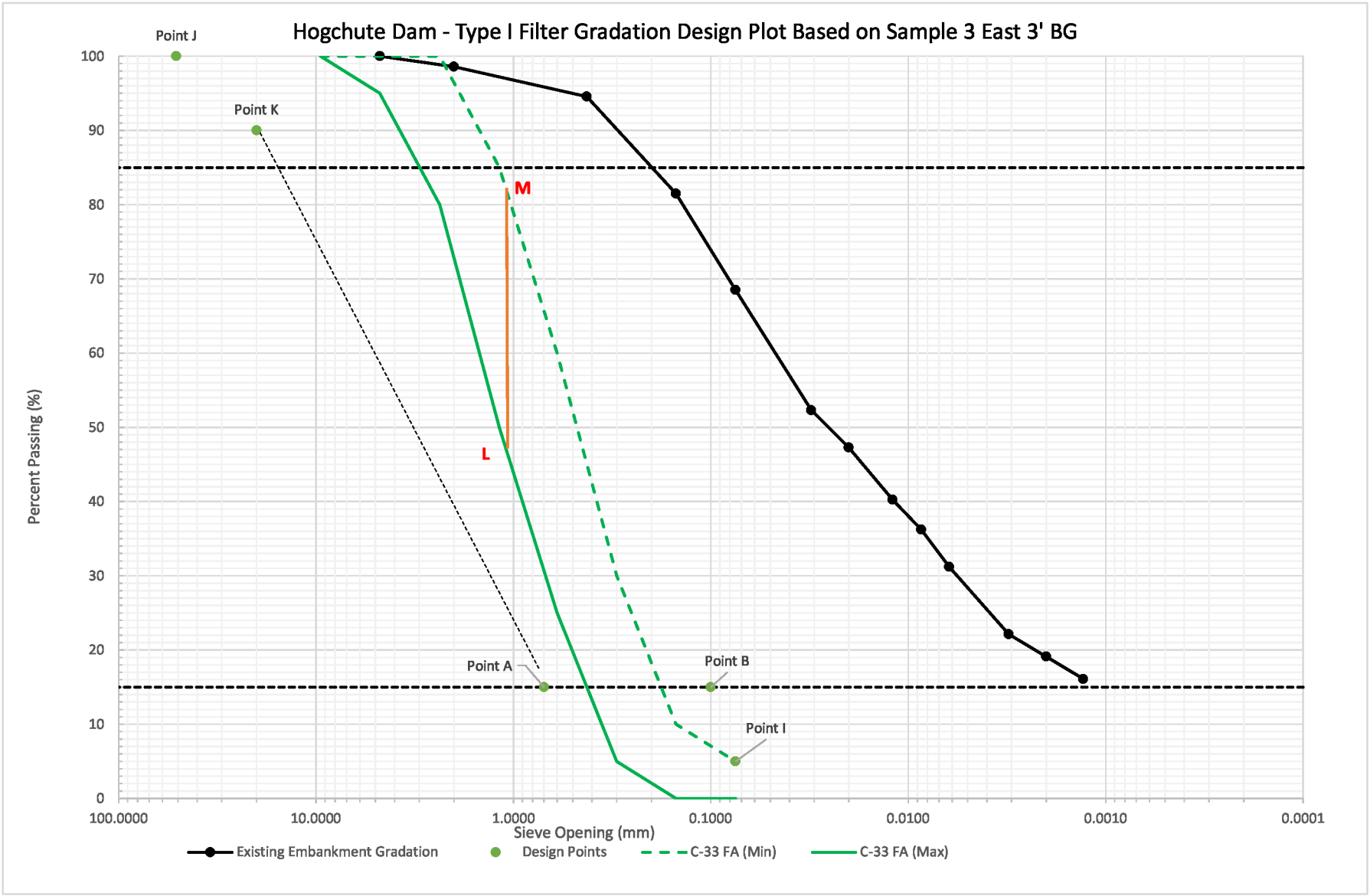
#200	0.075	0	5

C-33 Fine Aggregate is acceptable.



CITY OF Grand Junction COLORADO

NOTICE TO PROCEED

Date: June 24, 2021

Contractor: ESCO Construction Co.

Project: Hogchute (aka Carson) Reservoir Dam Modifications Project
IFB-4839-21-DH

In accordance with the contract dated June 3, 2021 the Contractor is hereby notified to begin work on the Project on or before June 28, 2021.

The date of final completion as determined is October 31, 2021.

CITY OF GRAND JUNCTION, COLORADO

DocuSigned by:
Duane Hoff Jr., Senior Buyer- City of Grand Junction
9F789E7D58F14DC...
Duane Hoff Jr., Senior Buyer

Receipt of this Notice to Proceed is hereby acknowledged:

Contractor: ESCO Construction Co

By: DocuSigned by:
Eric Clark - President, ESCO Construction Co.
9BD108E3B071499...

Print Name: Eric Clark - President, ESCO Construction Co.

Title: President

Date: 6/25/2021 | 07:51 MDT

CITY OF GRAND JUNCTION, COLORADO

****

CONTRACT

This CONTRACT made and entered into this 3rd day of June, 2021 by and between the **City of Grand Junction, Colorado,** a government entity in the County of Mesa, State of Colorado, hereinafter in the Contract Documents referred to as the "Owner" and **ESCO Construction Co.** hereinafter in the Contract Documents referred to as the "Contractor."

WITNESSETH:

WHEREAS, the Owner advertised that sealed Bids would be received for furnishing all labor, tools, supplies, equipment, materials, and everything necessary and required for the Project described by the Contract Documents and known as **Hogchute (aka Carson) Reservoir Dam Modifications Project IFB-4839-21-DH**.

WHEREAS, the Contract has been awarded to the above named Contractor by the Owner, and said Contractor is now ready, willing and able to perform the Work specified in the Notice of Award, in accordance with the Contract Documents;

NOW, THEREFORE, in consideration of the compensation to be paid the Contractor, the mutual covenants hereinafter set forth and subject to the terms hereinafter stated, it is mutually covenanted and agreed as follows:

ARTICLE 1

Contract Documents: It is agreed by the parties hereto that the following list of instruments, drawings, and documents which are attached hereto, bound herewith, or incorporated herein by reference constitute and shall be referred to either as the "Contract Documents" or the "Contract", and all of said instruments, drawings, and documents taken together as a whole constitute the Contract between the parties hereto, and they are fully a part of this agreement as if they were set out verbatim and in full herein:

The order of contract document governance shall be as follows:

a. The body of this contract agreement;
b. Solicitation Documents for the Project; **Hogchute (aka Carson) Reservoir Dam Modifications Project (Note: Section 2.54 Non-Appropriation of Funds, "…Colorado Statues…" shall be replaced with "…Colorado law…");**

c. Notice of Award
d. Contractors Response to the Solicitation
e. Work Change Requests (directing that changed work be performed);
f. Field Orders
g. Change Orders.

ARTICLE 2

Definitions: The clauses provided in the Solicitation apply to the terms used in the Contract and all the Contract Documents.

ARTICLE 3

Contract Work: The Contractor agrees to furnish all labor, tools, supplies, equipment, materials, and all that is necessary and required to complete the tasks associated with the Work described, set forth, shown, and included in the Contract Documents as indicated in the Solicitation Document.

ARTICLE 4

Contract Time and Liquidated Damages: Time is of the essence with respect to this Contract. The Contractor hereby agrees to commence Work under the Contract on or before the date specified in the Solicitation from the Owner, and to achieve Substantial Completion and Final Completion of the Work within the time or times specified in the Solicitation. In the event the Work is not completed in the times set forth and as agreed upon, the Contractor further agrees to pay Liquidated Damages to the Owner as set forth in the Solicitation. The Contractor acknowledges and recognizes the delays, expenses and difficulties involved in proving in a legal proceeding the actual losses suffered by the Owner if the work is not completed on time. Accordingly, instead of requiring any such proof, the Owner and the Contractor agree that as Liquidated Damages for delay, but not as a penalty, the Contractor shall pay to the Owner the amounts specified in the Solicitation.

ARTICLE 5

Contract Price and Payment Procedures: The Contractor shall accept as full and complete compensation for the performance and completion of all of the Work specified in the Contract Documents, the sum of **Two Million Eight Hundred Ninety-Three Thousand Five Hundred and 00/100 Dollars ($2,893,500.00).** If this Contract contains unit price pay items, the Contract Price shall be adjusted in accordance with the actual quantities of items completed and accepted by the Owner at the unit prices quoted in the Solicitation Response. The amount of the Contract Price is and has heretofore been appropriated by the Grand Junction City Council for the use and benefit of this Project. The Contract Price shall not be modified except by Change Order or other written directive of the Owner. The Owner shall not issue a Change Order or other written directive which requires additional work to be performed, which work causes the aggregate amount payable under this Contract to exceed the amount appropriated for this Project, unless and until the Owner provides Contractor written assurance that lawful appropriations to cover the costs of the additional work have been made.

Unless otherwise provided in the Solicitation, monthly partial payments shall be made as the Work progresses. Applications for partial and Final Payment shall be prepared by the Contractor and approved by the Owner in accordance with the Solicitation.

Upon Final Completion of the Work under the Contract and before the Contractor shall receive final payment, the Owner shall publish at least twice in a newspaper of general circulation published in the County a notice that: 1. the Owner has accepted such Work as completed according to the Contract Documents; 2. the Contractor is entitled to final payment therefore; 3. thirty days after the first publication, specifying the exact date, the Owner shall pay the full balance due under the Contract; and 4. persons having claims for labor, materials, team hire, sustenance, provisions, provender, or other supplies used or consumed by the Contractor or a subcontractor shall file a verified statement of the amount due and unpaid on account of such claim prior to the date specified for such payment. Nothing herein shall be construed as relieving the Contractor and the Sureties on the Contractor's Bonds from any claim or claims for work or labor done or materials or supplies furnished in the execution of the Contract.

ARTICLE 6

Bonds: The Contractor shall furnish currently herewith the Bonds required by the Contract Documents, such Bonds being attached hereto. The Performance Bond shall be in an amount not less than one hundred percent (100%) of the Contract Price set forth in Article 5. The Payment Bond shall be in an amount not less than one hundred (100%) of the Contract Price set forth in Article 5.

ARTICLE 7

Contract Binding: The Owner and the Contractor each binds itself, its partners, successors, assigns and legal representatives to the other party hereto in respect to all covenants, agreements and obligations contained in the Contract Documents. The Contract Documents constitute the entire agreement between the Owner and Contractor and may only be altered, amended or repealed by a duly executed written instrument. Neither the Owner nor the Contractor shall, without the prior written consent of the other, assign or sublet in whole or in part its interest under any of the Contract Documents and specifically, the Contractor shall not assign any moneys due or to become due without the prior written consent of the Owner.

ARTICLE 8

Severability: If any part, portion or provision of the Contract shall be found or declared null, void or unenforceable for any reason whatsoever by any court of competent jurisdiction or any governmental agency having the authority thereover, only such part, portion or provision shall be effected thereby and all other parts, portions and provisions of the Contract shall remain in full force and effect.

IN WITNESS WHEREOF, City of Grand Junction, Colorado, has caused this Contract to be subscribed and sealed and attested in its behalf; and the Contractor has signed this Contract the day and the year first mentioned herein.

The Contract is executed in two counterparts.

CITY OF GRAND JUNCTION, COLORADO

DocuSigned by:

By: Duane Hoff Jr., Senior Buyer- City of Grand Junction 6/23/2021 | 11:01 MDT
9F789E7D50F74BC...

Duane Hoff Jr., Senior Buyer Date

ESCO Construction Co.

DocuSigned by:

By: Eric Clark - President, ESCO Construction Co. 6/23/2021 | 10:52 MDT
9BD108E3B071499...

Eric Clark - President, ESCO Construction Co. President Date

CITY OF Grand Junction COLORADO

NOTICE OF AWARD

Date: June 3, 2021

Company: ESCO Construction Co.

Project: Hogchute (aka Carson) Reservoir Dam Modifications Project IFB-4839-21-DH

You have been awarded the City of Grand Junction Hogchute (aka Carson) Reservoir Dam Modifications Project IFB-4839-21-DH for a total price of **$2,893,500.00**.

Please notify John Eklund, City of Grand Junction Project Engineer 970-244-1558 for project scheduling and return to the City Purchasing Division an acknowledged copy of this Notice of Award, signed Contract, Payment & Performance Bonds, and Insurance Certificate, as per the contract doucments.

CITY OF GRAND JUNCTION, COLORADO

DocuSigned by:
Duane Hoff Jr., Senior Buyer- City of Grand Junction
9F709E7D58F44BC...

Duane Hoff Jr., Senior Buyer

SUPPLIER ACKNOWLEDGEMENT

Receipt of this Notice to Award is hereby acknowledged:

Company: ESCO Construction Co

By: DocuSigned by:
Eric Clark - President, ESCO Construction Co
9BB186E3B074499...
Eric Clark - President, ESCO Construction Co

Title: President

Date: 6/23/2021 | 10:52 MDT

Purchasing Division

Invitation for Bid

IFB-4839-21-DH

Hogchute (aka Carson) Reservoir Dam Modifications Project

Responses Due:

Responses will be due in March/April, 2021 (TBD)
(Exact date to be determined)

Accepting Electronic Responses Only
Responses Only Submitted Through the Rocky Mountain E-Purchasing System (RMEPS)
https://www.rockymountainbidsystem.com/default.asp
(Purchasing Representative does not have access or control of the vendor side of RMEPS. If website or other problems arise during response submission, vendor MUST contact RMEPS to resolve issue prior to the response deadline. 800-835-4603)

Purchasing Representative:
Duane Hoff, Senior Buyer
duaneh@gjcity.org
970-244-1545

This document has been developed specifically to solicit competitive responses for this solicitation, and may not be the same as previous City of Grand Junction solicitations. All vendors are urged to thoroughly review this solicitation prior to responding. Submittal by **FAX, EMAIL or HARD COPY IS NOT ACCEPTABLE** for this solicitation.

Invitation for Bids

Table of Contents

1. Instructions to Bidders

1.1. **Purpose:** The City of Grand Junction is soliciting competitive bids from qualified and interested companies for all labor, equipment, and materials required for the **Carson Reservoir Dam Modifications Project**. The Project generally consists of demolition, clearing and grubbing, structure removal, pipe removal, excavation and embankment, spillway reconstruction, riprap removal and placement, installation of a new seepage sand chimney filter and perforated pipe toe-drain system on the downstream face of the dam embankment, UV Cured-in-Place Pipe for the existing 30-inch steel outlet pipe, outlet valve installation, construction of trash rack structure, and construction of outlet pipe structure. All dimensions and scope of work should be verified by Contractors prior to submission of bids.

IFB Questions:
Duane Hoff, Senior Buyer
duaneh@gjcity.org

The City would like to remind all Contractors, Sub-Contractors, Vendors, Suppliers, Manufacturers, Service Providers, etc. that (with the exception of Pre-Bid or Site Visit Meetings) all questions, inquiries, comments, or communication pertaining to any formal solicitation (whether process, specifications, scope, etc.) must be directed (in writing) to the Purchasing Agent assigned to the project, or Purchasing Division. Direct communication with the City assigned Project Managers/Engineers is not appropriate for public procurement, and may result in disqualification.

1.2. **Mandatory Pre-Bid Meeting:** **Prospective bidders are required to attend a mandatory on-site pre-bid meeting on October 22, 2020 at 10:30 am**. Meeting location shall be at Carson Reservoir on the Grand Mesa on Forest Service Road 108. From US Hwy 50, go east on Kannah Creek Road for 3 miles, veer left onto Land's End Road (Forest Service Road 100) and continue 26 miles to Forest Service Road 108 on the Right. From I-70, take Exit 49 onto CO Hwy 65 and continue approximately 30 miles. Turn Right onto Forest Service Road 100, and after 3 miles Forest Service Road 108 will be on the left. The purpose of this visit will for Bidders to become familiar with the proposed project site before the snow comes and access to Carson Reservoir is closed, and to inspect and to clarify the contents of this Invitation for Bids (IFB).

1.3. **The Owner:** The Owner is the City of Grand Junction, Colorado and is referred to throughout this Solicitation. The term Owner means the Owner or his authorized representative.

1.4. **Submission:** ***Each bid shall be submitted in electronic format only, and only through the Rocky Mountain E-Purchasing website (https://www.rockymountainbidsystem.com/default.asp).*** *This site offers both "free" and "paying" registration options that allow for full access of the Owner's documents and for electronic submission of proposals. (Note: "free" registration may take up to 24 hours to process. Please Plan accordingly.)* Please view our "**Electronic Vendor Registration Guide"** at http://www.gjcity.org/business-and-economic-development/bids/ for details. (Purchasing Representative does not have access or control of the vendor side of

RMEPS. If website or other problems arise during response submission, vendor **MUST** contact RMEPS to resolve issue prior to the response deadline. **800-835-4603**)

1.5. **Modification and Withdrawal of Bids Before Opening.** Bids may be modified or withdrawn by an appropriate document stating such, duly executed and submitted to the place where Bids are to be submitted at any time prior to Bid Opening.

1.6. **Printed Form for Price Bid:** All Price Bids must be made upon the Price Bid Schedule attached, and should give the amounts both in words and in figures, and must be signed and acknowledged by the bidder.

The Offeror shall specify a unit price in figures for each pay item for which a quantity is given and shall provide the products (in numbers) of the respective unit prices and quantities in the Extended Amount column. The total Bid price shall be equal to the sum of all extended amount prices. When an item in the Price Bid Schedule provides a choice to be made by the Offeror, Offeror's choice shall be indicated in accordance with the specifications for that particular item and thereafter no further choice shall be permitted.

Where the unit of a pay item is lump sum, the lump sum amount shall be shown in the "extended amount" column and included in the summation of the total Bid.

All blank spaces in the Price Bid Schedule must be properly filled out.

Bids by corporations must be executed in the corporate name by the president or vice president or other corporate office accompanied by evidence of authority to sign. The corporate address and state of incorporation shall be shown below the signature.

Bids by partnerships must be executed in the partnership name and signed by a partner whose title must appear under the signature and the official address of the partnership must be shown below the signature.

All names must be typed or printed below the signature.

The Offeror's Bid shall contain an acknowledgement of receipt of all Addenda, the numbers of which shall be filled in on the Contractor's Bid Form.

The contact information to which communications regarding the Bid are to be directed must be shown.

1.7. **Exclusions:** No oral, telephonic, emailed, or facsimile bid will be considered

1.8. **Contract Documents:** The complete IFB and bidder's response compose the Contract Documents. Copies of bid documents can be obtained from the City Purchasing website, http://www.gjcity.org/business-and-economic-development/bids/ .

1.9. **Additional Documents:** The July 2010 edition of the "City Standard Contract Documents for Capital Improvements Construction", Plans, Specifications and other Bid Documents are available for review or download on the Public Works &

Planning/Engineering page at www.gjcity.org. Electronic copies may be obtained on a CD format at the Department of Public Works and Planning at City Hall.

1.10. Definitions and Terms: See Article I, Section 3 of the General Contract Conditions in the *Standard Contract Documents for Capital Improvements Construction*.

1.11. Examination of Specifications: Bidders shall thoroughly examine and be familiar with the project Statement of Work. The failure or omission of any Offeror to receive or examine any form, addendum, or other document shall in no way relieve any Offeror from any obligation with respect to his bid. The submission of a bid shall be taken as evidence of compliance with this section. Prior to submitting a bid, each Offeror shall, at a minimum:

a. Examine the *Contract Documents* thoroughly;

b. Visit the site to familiarize themselves with local conditions that may in any manner affect cost, progress, or performance of the Work;

c. Become familiar with federal, state, and local laws, ordinances, rules, and regulations that may in any manner affect cost, progress or performance of the Work;

d. Study and carefully correlate Bidder's observations with the *Contract Documents*, and;

e. Notify the Purchasing Agent of all conflicts, errors, ambiguities or discrepancies in or among the *Contract Documents* within the designated inquiry period.

On request, the Owner will provide each Offeror access to the site to conduct such investigations and tests as each Bidder deems necessary for submission of a Bid. It shall be the Offeror's responsibility to make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data which pertain to the physical conditions (including without limitation, surface, subsurface and underground utilities) at or contiguous to the site or otherwise which may affect cost, progress or performance of the work and which the Offeror deems necessary to determine its Bid for performing the work in accordance with the time, price and other terms and conditions of the Contract Documents. Location of any excavation or boring made by Offeror shall be subject to prior approval of Owner and applicable agencies. Offeror shall fill all holes, restore all pavements to match the existing structural section and shall clean up and restore the site to its former condition upon completion of such exploration. The Owner reserves the right to require the Offeror to execute an access agreement with the Owner prior to accessing the site.

The lands upon which the Work is to be performed, rights of way, and access thereto, and other lands designated for use by Contractor in performing the Work, are identified on the Drawings.

Information and data reflected in the *Contract Documents* with respect to underground utilities at or contiguous to the site are based upon information and data furnished to

the Owner and the Engineer by the owners of such underground utilities or others, and the Owner does not assume responsibility for the accuracy or completeness thereof, unless it is expressly provided otherwise in the *Contract Documents*.

By submission of a Bid, the Offeror shall be conclusively presumed to represent that the Offeror has complied with every requirement of these Instructions to Bidders, that the *Contract Documents* are not ambiguous and are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work.

1.12. Questions Regarding Statement of Work: Any information relative to interpretation of Scope of Work or specifications shall be requested of the Purchasing Representative, in writing, in ample time, prior to the inquiry deadline.

1.13. Addenda & Interpretations: If it becomes necessary to revise any part of this solicitation, a written addendum will be posted electronically on the City's website at http://www.gjcity.org/business-and-economic-development/bids/ . The Owner is not bound by any oral representations, clarifications, or changes made in the written specifications by Owner, unless such clarification or change is provided in written addendum form from the City Purchasing Representative.

1.14. Taxes: The Owner is exempt from State retail and Federal tax. The bid price must be net, exclusive of taxes.

1.15. Sales and Use Taxes: The Contractor and all Subcontractors are required to obtain exemption certificates from the Colorado Department of Revenue for sales and use taxes in accordance with the provisions of the General Contract Conditions. Bids shall reflect this method of accounting for sales and use taxes on materials, fixtures and equipment.

1.16. Offers Binding 60 Days: Unless additional time is required by the Owner, or otherwise specified, all formal offers submitted shall be binding for sixty (60) calendar days following opening date, unless the Bidder, upon request of the Purchasing Representative, agrees to an extension.

1.17. Exceptions and Substitutions: Bidders taking exception to the specifications and/or scope of work shall do so at their own risk. The Owner reserves the right to accept or reject any or all substitutions or alternatives. When offering substitutions and/or alternatives, Bidder must state these exceptions in the section pertaining to that area. Exception/substitution, if accepted, must meet or exceed the stated intent and/or specifications and/or scope of work. The absence of such a list shall indicate that the Bidder has not taken exceptions, and if awarded a contract, shall hold the Bidder responsible to perform in strict accordance with the specifications and/or scope of work contained herein.

1.18. Collusion Clause: Each bidder by submitting a bid certifies that it is not party to any collusive action or any action that may be in violation of the Sherman Antitrust Act. Any and all bids shall be rejected if there is evidence or reason for believing that collusion exists among bidders. The Owner may, or may not, accept future bids for the same services or commodities from participants in such collusion.

1.19. Disqualification of Bidders: A Bid will not be accepted from, nor shall a Contract be awarded to, any person, firm, or corporation that is in arrears to the Owner, upon debt or contract, or that has defaulted, as surety or otherwise, upon any obligation to the Owner, or that is deemed irresponsible or unreliable.

Bidders may be required to submit satisfactory evidence that they are responsible, have a practical knowledge of the project bid upon and that they have the necessary financial and other resources to complete the proposed Work.

Either of the following reasons, without limitation, shall be considered sufficient to disqualify a Bidder and Bid:

a. More than one Bid is submitted for the same Work from an individual, firm, or corporation under the same or different name; and

b. Evidence of collusion among Bidders. Any participant in such collusion shall not receive recognition as a Bidder for any future work of the Owner until such participant has been reinstated as a qualified bidder.

1.20. Public Disclosure Record: If the bidder has knowledge of their employee(s) or sub-contractors having an immediate family relationship with a City employee or elected official, the bidder must provide the Purchasing Representative with the name(s) of these individuals. These individuals are required to file an acceptable "Public Disclosure Record", a statement of financial interest, before conducting business with the City.

2. General Contract Conditions for Construction Projects

2.1. The Contract: This Invitation for Bid, submitted documents, and any negotiations, when properly accepted by the City, shall constitute a contract equally binding between the City and Contractor. The contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral. The contract may be amended or modified with Change Orders, Field Orders, or Addendums.

2.2. The Work: The term Work includes all labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in such construction.

2.3. Execution, Correlation, Intent, and Interpretations: The Contract Documents shall be signed by the Owner (City) and Contractor. City will provide the contract. By executing the contract, the Contractor represents that he/she has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents. The Contract Documents are complementary, and what is required by any one, shall be as binding as if required by all. The intention of the documents is to include all labor, materials, equipment and other items necessary for the proper execution and completion of the scope of work as defined in the technical specifications and drawings contained

herein. All drawings, specifications and copies furnished by the City are, and shall remain, City property. They are not to be used on any other project, and with the exception of one contract set for each party to the contract, are to be returned to the owner on request at the completion of the work.

2.4. The Owner: The Owner is the City of Grand Junction, Colorado and is referred to throughout the Contract Documents. The term Owner means the Owner or his authorized representative. The Owner shall, at all times, have access to the work wherever it is in preparation and progress. The Contractor shall provide facilities for such access. The Owner will make periodic visits to the site to familiarize himself generally with the progress and quality of work and to determine, in general, if the work is proceeding in accordance with the contract documents. Based on such observations and the Contractor's Application for Payment, the Owner will determine the amounts owing to the Contractor and will issue Certificates for Payment in such amounts, as provided in the contract. The Owner will have authority to reject work which does not conform to the Contract documents. Whenever, in his reasonable opinion, he considers it necessary or advisable to insure the proper implementation of the intent of the Contract Documents, he will have authority to require the Contractor to stop the work or any portion, or to require special inspection or testing of the work, whether or not such work can be then be fabricated, installed, or completed. The Owner will not be responsible for the acts or omissions of the Contractor, and sub-Contractor, or any of their agents or employees, or any other persons performing any of the work.

2.5. Contractor: The Contractor is the person or organization identified as such in the Agreement and is referred to throughout the Contract Documents. The term Contractor means the Contractor or his authorized representative. The Contractor shall carefully study and compare the General Contract Conditions of the Contract, Specification and Drawings, Scope of Work, Addenda and Modifications and shall at once report to the Owner any error, inconsistency or omission he may discover. Contractor shall not be liable to the Owner for any damage resulting from such errors, inconsistencies or omissions. The Contractor shall not commence work without clarifying Drawings, Specifications, or Interpretations.

2.6. Sub-Contractors: A sub-contractor is a person or organization who has a direct contract with the Contractor to perform any of the work at the site. The term sub-contractor is referred to throughout the contract documents and means a sub-contractor or his authorized representative.

2.7. Award of Sub-Contractors & Other Contracts for Portions of the Work: Contractor shall submit with their bid response to the Owner, in writing for acceptance, a list of the names of the sub-contractors or other persons or organizations proposed for such portions of the work as may be designated in the proposal requirements, or, if none is so designated, the names of the sub-contractors proposed for the principal portions of the work. Prior to the award of the contract, the Owner shall notify the successful Contractor in writing if, after due investigation, has reasonable objection to any person or organization on such list. If, prior to the award of the contract, the Owner has a reasonable and substantial objection to any person or organization on such list, and refuses in writing to accept such person or organization, the successful Contractor may, prior to the award, withdraw their proposal without forfeiture of proposal security. If the

successful Contractor submits an acceptable substitute with an increase in the proposed price to cover the difference in cost occasioned by the substitution, the Owner may, at their discretion, accept the increased proposal or may disqualify the Contractor. If, after the award, the Owner refuses to accept any person or organization on such list, the Contractor shall submit an acceptable substitute and the contract sum shall be increased or decreased by the difference in cost occasioned by such substitution and an appropriate Change Order shall be issued. However, no increase in the contract sum shall be allowed for any such substitution unless the Contractor has acted promptly and responsively in submitting a name with respect thereto prior to the award.

2.8. Quantities of Work and Unit Price: Materials or quantities stated as unit price items in the Bid are supplied only to give an indication of the general scope of the Work, and are as such, estimates only. The Owner does not expressly or by implication agree that the actual amount of Work or material will correspond therewith, and reserves the right after award to increase or decrease the quantity of any unit item of the Work without a change in the unit price except as set forth in Article VIII, Section 70 of the *General Contract Conditions*. The City also reserves the right to make changes in the Work (including the right to delete any bid item in its entirety or add additional bid items) as set forth in Article VIII, Sections 69 through 71 of the *General Contract Conditions*.

2.9. Substitutions: The materials, products and equipment described in the *Solicitation Documents* shall be regarded as establishing a standard of required performance, function, dimension, appearance, or quality to be met by any proposed substitution. No substitution will be considered prior to receipt of Bids unless the Offeror submits a written request for approval to the City Purchasing Division at least ten (10) days prior to the date for receipt of Bids. Such requests for approval shall include the name of the material or equipment for which substitution is sought and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for evaluation, including samples if requested. The Offeror shall set forth changes in other materials, equipment, or other portions of the Work including changes of the work of other contracts, which incorporation of the proposed substitution would require to be included. The Owner's decision of approval or disapproval of a proposed substitution shall be final. If the Owner approves a proposed substitution before receipt of Bids, such approval will be set forth in an Addendum. Offeors shall not rely upon approvals made in any other manner.

2.10. Supervision and Construction Procedures: The Contractor shall supervise and direct the work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the work under the contract.

2.11. Warranty: The Contractor warrants to the Owner that all materials and equipment furnished under this contract will be new unless otherwise specified, and that all work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All work not so conforming to these standards may be considered defective. If required by Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. If within ten (10) days after written notice to the Contractor requesting such repairs or replacement, the Contractor should neglect to make or undertake with due diligence to the same, the City may make such repairs or

replacements. All indirect and direct costs of such correction or removal or replacement shall be at the Contractor's expense. The Contractor will also bear the expenses of making good all work of others destroyed or damaged by the correction, removal or replacement of his defective work.

2.12. Permits, Fees, & Notices: The Contractor shall secure and pay for all permits, governmental fees and licenses necessary for the proper execution and completion of the work. The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and orders of any public authority bearing on the performance of the work. If the Contractor observes that any of the Contract Documents are at variance in any respect, he shall promptly notify the Owner in writing, and any necessary changes shall be adjusted by approximate modification. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Owner, he shall assume full responsibility and shall bear all costs attributable.

2.13. Responsibility for Those Performing the Work: The Contractor shall be responsible to the Owner for the acts and omissions of all his employees and all sub-contractors, their agents and employees, and all other persons performing any of the work under a contract with the Contractor.

2.14. Use of the Site: The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents, and shall not unreasonably encumber the site with any materials or equipment.

2.15. Cleanup: The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of work he shall remove all his waste materials and rubbish from and about the project, as well as all his tools, construction equipment, machinery and surplus materials.

2.16. Insurance: The Contractor shall secure and maintain such insurance policies as will provide the coverage and contain other provisions specified in the General Contract Conditions, or as modified in the Special Contract Conditions.

The Contractor shall file a copy of the policies or Certificates of Insurance acceptable to the City with the Engineer within ten (10) Calendar Days after issuance of the Notice of Award. These Certificates of Insurance shall contain a provision that coverage afforded under the policies shall not be canceled unless at least thirty (30) Calendar Days prior written notice has been given to the City.

2.17. Indemnification: The Contractor shall defend, indemnify and save harmless the Owner, and all its officers, employees, insurers, and self-insurance pool, from and against all liability, suits, actions, or other claims of any character, name and description brought for or on account of any injuries or damages received or sustained by any person, persons, or property on account of any negligent act or fault of the Contractor, or of any Contractor's agent, employee, sub-contractor or supplier in the execution of, or performance under, any contract which may result from proposal award. Contractor shall pay any judgment with cost which may be obtained against the Owner growing out of such injury or damages.

2.18. Miscellaneous Conditions: Material Availability: Contractors must accept responsibility for verification of material availability, production schedules, and other pertinent data prior to submission of bid. It is the responsibility of the bidder to notify the Owner immediately if materials specified are discontinued, replaced, or not available for an extended period of time. **OSHA Standards:** All bidders agree and warrant that services performed in response to this invitation shall conform to the standards declared by the US Department of Labor under the Occupational Safety and Health Act of 1970 (OSHA). In the event the services do not conform to OSHA standards, the Owner may require the services to be redone at no additional expense to the Owner.

2.19. Time: Time is of the essence with respect to the time of completion of the Project and any other milestones or deadline which are part of the Contract. It will be necessary for each Bidder to satisfy the City of its ability to complete the Work within the Contract Time set forth in the Contract Documents. The Contract Time is the period of time allotted in the Contract Documents for completion of the work. The date of commencement of the work is the date established in a Notice to Proceed. If there is no Notice to Proceed, it shall be the date of the Contract or such other date as may be established therein, or as established as entered on the Bid Form. The Date of Final Completion of the work is the date certified by the Owner when all construction, and all other work associated to include, but not be limited to: testing, QA/QC, receipt of required reports and/or forms, grant requirements (if applicable), punch list items, clean-up, receipt of drawings and/or as-builts, etc., is fully complete, and in accordance with the Contract Documents.

2.20. Progress & Completion: The Contractor shall begin work on the date of commencement as defined in the Contract, and shall carry the work forward expeditiously with adequate forces and shall complete it within the contract time.

2.21. Payment & Completion: The Contract Sum is stated in the Contract and is the total amount payable by the Owner to the Contractor for the performance of the work under the Contract Documents. Upon receipt of written notice that the work is ready for final inspection and acceptance and upon receipt of application for payment, the Owner's Project Manager will promptly make such inspection and, when he finds the work acceptable under the Contract Documents and the Contract fully performed, the Owner shall make payment in the manner provided in the Contract Documents.

2.22. Bid Bond: Each Bid shall as a guaranty of good faith on the part of the Bidder be accompanied by a Bid Guaranty consisting of: a certified or cashier's check drawn on an approved national bank or trust company in the state of Colorado, and made payable without condition to the City; or a **Bid Bond** written by an approved corporate surety in favor of the City. The amount of the Bid Guaranty shall not be less than 5% of the total Bid amount. Once a Bid is accepted and a Contact is awarded, the apparent successful bidder has ten calendar days to enter into a contractor in the form prescribed and to furnish the bonds with a legally responsible and approved surety. Failure to do so will result I forfeiture of the Bid Guaranty to the City as Liquidated Damages.

Each bidder shall guaranty its total bid price for a period of sixty (60) Calendar Days from the date of the bid opening.

2.23. Performance & Payment Bonds: Contractor shall furnish a Performance and a Payment Bond, each in an amount at least equal to that specified for the contract amount as security for the faithful performance and payment of all Contractor's obligations under the Contract Documents. These bonds shall remain in effect for the duration of the Warranty Period (as specified in the Special Conditions). Contractor shall also furnish other bonds that may be required by the Special Conditions. All bonds shall be in the forms prescribed by the Contract Documents and be executed by such sureties as (1) are licensed to conduct business in the State of Colorado and (2) are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Accounts, U.S. Treasury Department. All bonds singed by an agent must be accompanied by a certified copy of the Authority Act. If the surety on any bond furnished by the Contractor is declared bankrupt, or becomes insolvent, or its rights to do business in Colorado are terminated, or it ceases to meet the requirements of clauses (1) and (2) of this section, Contractor shall within five (5) days thereafter substitute another bond and surety, both of which shall be acceptable to the City.

2.24. Retention: The Owner will deduct money from the partial payments in amounts considered necessary to protect the interest of the Owner and will retain this money until after completion of the entire contract. The amount to be retained from partial payments will be five (5) percent of the value of the completed work, and not greater than five (5) percent of the amount of the Contract. When the retainage has reached five (5) percent of the amount of the Contract no further retainage will be made and this amount will be retained until such time as final payment is made.

2.25. Liquidated Damages for Failure to Enter Into Contract: CITY ONLY Should the Successful Bidder fail or refuse to enter into the Contract within ten Calendar Days from the issuance of the Notice of Award, the City shall be entitled to collect the amount of such Bidder's Bid Guaranty as Liquidated Damages, not as a penalty but in consideration of the mutual release by the City and the Successful Bidder of all claims arising from the City's issuance of the Notice of Award and the Successful Bidder's failure to enter into the Contract and the costs to award the Contract to any other Bidder, to re-advertise, or otherwise dispose of the Work as the City may determine best serves its interest.

2.26. Liquidated Damages for Failure to Meet Project Completion Schedule: CITY ONLY If the Contractor does not achieve Final Completion by the required date, whether by neglect, refusal or any other reason, the parties agree and stipulate that the Contractor shall pay liquidated damages to the City for each such day that final completion is late. As provided elsewhere, this provision does not apply for delays caused by the City. The date for Final Completion may be extended in writing by the Owner.

The Contractor agrees that as a part of the consideration for the City's awarding of this Contract liquidated damages in the daily amount of **$1,200.00** is reasonable and necessary to pay for the actual damages resulting from such delay. The parties agree that the real costs and injury to the City for such delay include hard to quantify items such as: additional engineering, inspection and oversight by the City and its agents; additional contract administration; inability to apply the efforts of those employees to the other work of the City; perceived inefficiency of the City; citizens having to deal with the

construction and the Work, rather than having the benefit of a completed Work, on time; inconvenience to the public; loss of reputation and community standing for the City during times when such things are very important and very difficult to maintain.

The Contractor must complete the Work and achieve final completion included under the Bid Schedule in the number of consecutive calendar days after the City gives is written Notice to Proceed. When the Contractor considers the entire Work ready for its intended use, Contractor shall certify in writing that the Work is fully complete. Final Completion date is the date by which the Contractor shall have fully completed all clean-up, and all items that were identified by the City in the inspection for final completion. Unless otherwise stated in the Special Conditions, for purposes of this liquidated damages clause, the Work shall not be finished and the Contract time shall continue to accrue until the City gives its written Final Acceptance.

If the Contractor shall fail to pay said liquidated damages promptly upon demand thereof after having failed to achieve Final Completion on time, the City shall first look to any retainage or other funds from which to pay said liquidated damages; if retainage or other liquid funds are not available to pay said liquidated damages amounts, the Surety on the Contractor's Performance Bond and Payment Bond shall pay such liquidated damages. In addition, the City may withhold all, or any part of, such liquidated damages from any payment otherwise due the Contractor.
Liquidated damages as provided do not include any sums to reimburse the City for extra costs which the City may become obligated to pay on other contracts which were delayed or extended because of the Contractor's failure to complete the Work within the Contract Time. Should the City incur additional costs because of delays or extensions to other contracts resulting from the Contractor's failure of timely performance, the Contractor agrees to pay these costs that the City incurs because of the Contractor's delay, and these payments are separate from and in addition to any liquidated damages.

The Contractor agrees that the City may use its own forces or hire other parties to obtain Final Completion of the work if the time of completion has elapsed and the Contractor is not diligently pursuing completion. In addition to the Liquidated Damages provided for, the Contractor agrees to reimburse the City for all expenses thus incurred.

2.27. Contingency/Force Account: Contingency/Force Account work will be authorized by the Owner's Project Manager and is defined as minor expenses to cover miscellaneous or unforeseen expenses related to the project. The expenses are not included in the Drawings, Specifications, or Scope of Work and are necessary to accomplish the scope of this contract. Contingency/Force Account Authorization will be directed by the Owner through an approved form. Contingency/Force Account funds are the property of the Owner and any Contingency/Force Account funds, not required for project completion, shall remain the property of the Owner. Contractor is not entitled to any Contingency/Force Account funds, that are not authorized by Owner or Owner's Project Manager.

2.28. Protection of Persons & Property: The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. Contractor shall erect and maintain, as required by existing safeguards for safety and

protection, and all reasonable precautions, including posting danger signs or other warnings against hazards promulgating safety regulations and notifying owners and users of adjacent utilities. When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct by the Contractor in the execution of the work, or in consequence of the non-execution thereof by the Contractor, he shall restore, at his own expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, rebuilding, or otherwise restoring as may be directed, or it shall make good such damage or injury in an acceptable manner.

2.29. Changes in the Work: The Owner, without invalidating the contract, may order changes in the work within the general scope of the contract consisting of additions, deletions or other revisions, the contract sum and the contract time being adjusted accordingly. All such changes in the work shall be authorized by Change Order and shall be executed under the applicable conditions of the contract documents. A Change Order is a written order to the Contractor signed by the Owner issued after the execution of the contract, authorizing a change in the work or an adjustment in the contract sum or the contract time. The contract sum and the contract time may be changed only by Change Order.

2.30. Claims for Additional Cost or Time: If the Contractor wishes to make a claim for an increase in the contract sum or an extension in the contract time, he shall give the Owner written notice thereof within a reasonable time after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the work, except in an emergency endangering life or property in which case the Contractor shall precede in accordance with the regulations on safety. No such claim shall be valid unless so made. Any change in the contract sum or contract time resulting from such claim shall be authorized by Change Order.

2.31. Minor Changes in the Work: The Owner shall have authority to order minor changes in the work not involving an adjustment in the contract sum or an extension of the contract time and not inconsistent with the intent of the contract documents.

2.32. Field Orders: The Owner may issue written Field Orders which interpret the Contract Documents in accordance with the specifications, or which order minor changes in the work in accordance with the agreement, without change in the contract sum or time. The Contractor shall carry out such Field Orders promptly.

2.33. Uncovering & Correction of Work: The Contractor shall promptly correct all work rejected by the Owner as defective or as failing to conform to the contract documents whether observed before or after substantial completion and whether or not fabricated installed or competed. The Contractor shall bear all costs of correcting such rejected work, including the cost of the Owner's additional services thereby made necessary. If within one (1) year after the date of completion or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the contract documents, any of the work found to be defective or not in accordance with the contract documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discover of condition. All such defective or non-conforming work under

the above paragraphs shall be removed from the site where necessary and the work shall be corrected to comply with the contract documents without cost to the Owner. The Contractor shall bear the cost of making good all work of separate Contractors destroyed or damaged by such removal or correction. If the Owner prefers to accept defective or non-conforming work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect an appropriate reduction in the payment or contract sum, or, if the amount is determined after final payment, it shall be paid by the Contractor.

2.30. Amendment: No oral statement of any person shall modify or otherwise change, or affect the terms, conditions or specifications stated in the resulting contract. All amendments to the contract shall be made in writing by the Owner.

2.31. Assignment: The Contractor shall not sell, assign, transfer or convey any contract resulting from this IFB, in whole or in part, without the prior written approval from the Owner.

2.32. Compliance with Laws: Bids must comply with all Federal, State, County and local laws governing or covering this type of service and the fulfillment of all ADA (Americans with Disabilities Act) requirements.

2.33. Confidentiality: All information disclosed by the Owner to the Contractor for the purpose of the work to be done or information that comes to the attention of the Contractor during the course of performing such work is to be kept strictly confidential.

2.34. Conflict of Interest: No public official and/or City/County employee shall have interest in any contract resulting from this IFB.

2.35. Contract Termination: This contract shall remain in effect until any of the following occurs: (1) contract expires; (2) completion of services; (3) acceptance of services or, (4) for convenience terminated by either party with a written *Notice of Cancellation* stating therein the reasons for such cancellation and the effective date of cancellation.

2.36. Employment Discrimination: During the performance of any services per agreement with the Owner, the Contractor, by submitting a Bid, agrees to the following conditions:

2.36.1. The Contractor shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age, handicap, or national origin except when such condition is a legitimate occupational qualification reasonably necessary for the normal operations of the Contractor. The Contractor agrees to post in conspicuous places, visible to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

2.36.2. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, shall state that such Contractor is an Equal Opportunity Employer.

2.36.3. Notices, advertisements, and solicitations placed in accordance with federal law, rule, or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

2.37. Affirmative Action: In executing a Contract with the City, the Contractor agrees to comply with Affirmative Action and Equal Employment Opportunity regulations presented in the General Contract Conditions.

2.38. Immigration Reform and Control Act of 1986 and Immigration Compliance: The Offeror certifies that it does not and will not during the performance of the contract employ illegal alien workers or otherwise violate the provisions of the Federal Immigration Reform and Control Act of 1986 and/or the immigration compliance requirements of State of Colorado C.R.S. § 8-17.5-101, *et.seq.* (House Bill 06-1343).

2.39. Ethics: The Contractor shall not accept or offer gifts or anything of value nor enter into any business arrangement with any employee, official, or agent of the Owner.

2.40. Failure to Deliver: In the event of failure of the Contractor to deliver services in accordance with the contract terms and conditions, the Owner, after due oral or written notice, may procure the services from other sources and hold the Contractor responsible for any costs resulting in additional purchase and administrative services. This remedy shall be in addition to any other remedies that the Owner may have.

2.41. Failure to Enforce: Failure by the Owner at any time to enforce the provisions of the contract shall not be construed as a waiver of any such provisions. Such failure to enforce shall not affect the validity of the contract or any part thereof or the right of the Owner to enforce any provision at any time in accordance with its terms.

2.42. Force Majeure: The Contractor shall not be held responsible for failure to perform the duties and responsibilities imposed by the contract due to legal strikes, fires, riots, rebellions, and acts of God beyond the control of the Contractor, unless otherwise specified in the contract.

2.43. Independent Contractor: The Contractor shall be legally considered an Independent Contractor and neither the Contractor nor its employees shall, under any circumstances, be considered servants or agents of the Owner. The Owner shall be at no time legally responsible for any negligence or other wrongdoing by the Contractor, its servants, or agents. The Owner shall not withhold from the contract payments to the Contractor any federal or state unemployment taxes, federal or state income taxes, Social Security Tax or any other amounts for benefits to the Contractor. Further, the Owner shall not provide to the Contractor any insurance coverage or other benefits, including Workers' Compensation, normally provided by the Owner for its employees.

2.44. Nonconforming Terms and Conditions: A bid that includes terms and conditions that do not conform to the terms and conditions of this Invitation for Bid is subject to rejection as non-responsive. The Owner reserves the right to permit the Contractor to withdraw nonconforming terms and conditions from its bid prior to a determination by the Owner of non-responsiveness based on the submission of nonconforming terms and conditions.

Items for non-responsiveness may include, but not be limited to:

a. Submission of the Bid on forms other than those supplied by the City;

b. Alteration, interlineation, erasure, or partial detachment of any part of the forms which are supplied herein;

c. Inclusion of unauthorized additions conditional or alternate Bids or irregularities of any kind which may tend to make the Bid incomplete, indefinite, or ambiguous as to its meaning;

d. Failure to acknowledge receipt of any or all issued Addenda;

e. Failure to provide a unit price or a lump sum price, as appropriate, for each pay item listed except in the case of authorized alternative pay items;

f. Failure to list the names of Subcontractors used in the Bid preparation as may be required in the Solicitation Documents;

g. Submission of a Bid that, in the opinion of the Owner, is unbalanced so that each item does not reasonably carry its own proportion of cost or which contains inadequate or unreasonable prices for any item;

h. Tying of the Bid with any other bid or contract; and

i. Failure to calculate Bid prices as described herein.

2.45. Evaluation of Bids and Offerors: The Owner reserves the right to:

- reject any and all Bids,
- waive any and all informalities,
- negotiate final terms with the Successful Bidder, and
- disregard any and all nonconforming, nonresponsive or conditional Bids.

Discrepancies between words and figures will be resolved in favor of words. Discrepancies between Unit Prices and Extended Prices will be resolved in favor of the Unit Prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. The corrected extensions and totals will be shown in the tabulation of Bids.

The Owner may consider the qualifications and experience of Subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for those portions of the work as to which the identity of Subcontractors and other persons and organizations must be submitted. Operating costs, maintenance considerations performance data, and guarantees of materials and equipment may also be considered by the Owner.

The Owner will conduct such investigations as deemed necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of the Offeror, proposed Subcontractors and other persons and organizations to do the Work in accordance with the *Contract Documents* to the City's satisfaction within the Contract Time.

The Offeror shall furnish the Owner all information and data requested by the Owner to determine the ability of the Offeror to perform the Work. The Owner reserves the right to reject the Bid if the evidence submitted by, or investigation of such Offeror fails to satisfy the Owner that such Offeror is properly qualified to carry out the obligations of the Contract and to complete the Work contemplated therein.

By submitting a Bid, each Offeror authorizes the Owner to perform such investigation of the Offeror as the Owner deems necessary to establish the responsibility, qualifications and financial ability of the Offeror and, by its signature thereon, authorizes the Owner to obtain reference information concerning the Offeror and releases the party providing such information and the Owner from any and all liability to the Offeror as a result of such reference information so provided.

The Owner reserves the right to reject the Bid of any Offeror who does not pass any evaluation to the Owner's satisfaction.

If the Contract is to be awarded, it will be awarded to the Offeror who, by evaluation, the Owner determines will best meet the Owner's interests.

The Owner reserves the right to accept or reject the Work contained in any of the Price Bid Schedules or alternates, either in whole or in part.

2.46. Award of Contract: Unless otherwise indicated, a single award will be made for all the bid items in an individual bid schedule. In the event that the Work is contained in more than one Bid Schedule, the City may award Schedules individually or in combination. In the case of two Bid Schedules which are alternative to each other, only one of such alternative Schedules will be awarded. Within forty-five (45) Calendar Days of Bid Opening, the City will issue a Notice of Award to the Successful Bidder which will be accompanied by four (4) unsigned copies of the Contract and the Performance and Payment Bond forms. Within ten (10) Calendar Days thereafter, the Successful Bidder shall sign and deliver four (4) copies of the Contract, Performance Bond, Payment Bond and Certificates of Insurance to the City. Within ten (10) Calendar Days thereafter, the City will deliver two (2) fully executed counterparts of the Contract to the Contractor. No contract shall exist between the Successful Bidder and the City and the Successful Bidder shall have no rights at law or in equity until the Contract has been duly executed by the City.

The Successful Bidder's failure to sign and submit a Contract and other documents set forth in this Paragraph within the prescribed time shall be just cause of annulment of the award, and forfeiture of the Bid Guaranty. The award of Contract may then be made to the next qualified Bidder in the same manner as previously prescribed.

2.47. Ownership: All plans, prints, designs, concepts, etc., shall become the property of the Owner.

2.48. Oral Statements: No oral statement of any person shall modify or otherwise affect the terms, conditions, or specifications stated in this document and/or resulting agreement. All modifications to this request and any agreement must be made in writing by the Owner.

2.49. Patents/Copyrights: The Contractor agrees to protect the Owner from any claims involving infringements of patents and/or copyrights. In no event shall the Owner be liable to the Contractor for any/all suits arising on the grounds of patent(s)/copyright(s) infringement. Patent/copyright infringement shall null and void any agreement resulting from response to this IFB.

2.50. Remedies: The Contractor and Owner agree that both parties have all rights, duties, and remedies available as stated in the Uniform Commercial Code.

2.51. Venue: Any agreement as a result of responding to this IFB shall be deemed to have been made in, and shall be construed and interpreted in accordance with, the laws of the City of Grand Junction, Mesa County, Colorado.

2.52. Expenses: Expenses incurred in preparation, submission and presentation of this IFB are the responsibility of the company and cannot be charged to the Owner.

2.53. Sovereign Immunity: The Owner specifically reserves its right to sovereign immunity pursuant to Colorado State Law as a defense to any action arising in conjunction to this agreement.

2.54. Non-Appropriation of Funds: The contractual obligation of the Owner under this contract is contingent upon the availability of appropriated funds from this fiscal year budget as approved by the City Council or Board of County Commissioners from this fiscal year only. State of Colorado Statutes prohibit obligation of public funds beyond the fiscal year for which the budget was approved. Anticipated expenditures/obligations beyond the end of the current Owner's fiscal year budget shall be subject to budget approval. Any contract will be subject to and must contain a governmental non-appropriation of funds clause.

2.55. Cooperative Purchasing: Purchases as a result of this solicitation are primarily for the City/County. Other governmental entities may be extended the opportunity to utilize the resultant contract award with the agreement of the successful provider and the participating agencies. All participating entities will be required to abide by the specifications, terms, conditions and pricings established in this Bid. The quantities furnished in this bid document are for only the City/County. It does not include quantities for any other jurisdiction. The City or County will be responsible only for the award for its jurisdiction. Other participating entities will place their own awards on their respective Purchase Orders through their purchasing office or use their purchasing card for purchase/payment as authorized or agreed upon between the provider and the individual entity. The City/County accepts no liability for payment of orders placed by other participating jurisdictions that choose to piggy-back on our solicitation. Orders placed by

participating jurisdictions under the terms of this solicitation will indicate their specific delivery and invoicing instructions.

2.56. Keep Jobs in Colorado Act: Contractor shall be responsible for ensuring compliance with Article 17 of Title 8, Colorado Revised Statutes requiring 80% Colorado labor to be employed on public works. Contractor shall, upon reasonable notice provided by the Owner, permit the Owner to inspect documentation of identification and residency required by C.R.S. §8-17-101(2)(a). If Contractor claims it is entitled to a waiver pursuant to C.R.S. §8-17-101(1), Contractor shall state that there is insufficient Colorado labor to perform the work such that compliance with Article 17 would create an undue burden that would substantially prevent a project from proceeding to completion, and shall include evidence demonstrating the insufficiency and undue burden in its response.

Unless expressly granted a waiver by the Owner pursuant to C.R.S. §8-17-101(1), Contractor shall be responsible for ensuring compliance with Article 17 of Title 8, Colorado Revised Statutes requiring 80% Colorado labor to be employed on public works. Contractor shall, upon reasonable notice provided by the Owner, permit the Owner to inspect documentation of identification and residency required by C.R.S. §8-17-101(2)(a).

2.56.1. "Public project" is defined as:

(a) any construction, alteration, repair, demolition, or improvement of any land, building, structure, facility, road, highway, bridge, or other public improvement suitable for and intended for use in the promotion of the public health, welfare, or safety and any maintenance programs for the upkeep of such projects

(b) for which appropriate or expenditure of moneys may be reasonably expected to be $500,000.00 or more in the aggregate for any fiscal year

(c) except any project that receives federal moneys.

3. Statement of Work

3.1. GENERAL: The City of Grand Junction is soliciting competitive bids from qualified and interested companies for all labor, equipment, and materials required for the **Carson Reservoir Dam Modifications Project**. The Project generally consists of demolition, clearing and grubbing, structure removal, pipe removal, excavation and embankment, spillway reconstruction, riprap removal and placement, installation of a new seepage sand chimney filter and perforated pipe toe-drain system on the downstream face of the dam embankment, UV Cured-in-Place Pipe for the existing 30-inch steel outlet pipe, outlet valve installation, construction of trash rack structure, and construction of outlet pipe structure. All dimensions and scope of work should be verified by Contractors prior to submission of bids.

NOTE: The description of the pay items listed in the Price Bid Schedule for this Project may not agree with those listed in the Standard Specifications. Payment for all Work performed, as required in the Contract Documents, will be in accordance with the items and units listed in the Price Bid Schedule.

The performance of the Work for this Project shall conform to the General Contract Conditions presented in the City of Grand Junction's Standard Contract Documents for Capital Improvements Construction, revised July 2010, except as specifically modified or supplemented herein or on the Construction Drawings.

3.2. PROJECT DESCRIPTION: The City of Grand Junction owns and operates Hogchute (aka Carson) Reservoir. Carson Reservoir is located in Mesa County, Colorado within the Grand Mesa National Forest on Kannah Creek. The reservoir was approved for construction in May of 1947 by the State Engineer with construction of the dam being completed in November 1947.

The elevation of the reservoir site is approximately 9,800 feet AMSL. The structural height of the earthen-embankment dam is 56 feet. The normal storage capacity of the reservoir is 520 acre-feet. Carson Reservoir is an in-line reservoir within the natural drainage path of Kannah Creek. The reservoir provides water storage for domestic use, downstream irrigation use, and for fishing recreation.

Carson Reservoir is typically filled from runoff in the Kannah Creek drainage, and natural spring inflows. The volume of Carson Reservoir can be maintained with several other minor reservoirs upstream on the Grand Mesa. The reservoir is usually drained to about 300 – 400 ac-ft during the winter months to accommodate the inflows from Kannah Creek, snow melt, and the natural spring inflows.

The Carson Reservoir Dam is classified as a high hazard jurisdictional dam as defined by Colorado Dam Safety Program of the Division of Water Resources, Department of Natural Resources. The rating is based on the impacts to downstream residents and infrastructure as determined by the City of Grand Junction through dam failure computer simulations and inundation mapping. The Dam Safety Department of the SEO identified key deficiencies of the Carson Dam in their February 2018 Comprehensive Dam Safety Report. These deficiencies are being addressed through this project to maintain dam safety and to avoid the need reduce the reservoir storage capacity as a safety precaution.

The Project generally consists of demolition, clearing and grubbing, structure removal, pipe removal, excavation and embankment, spillway reconstruction and channel improvements, riprap removal and placement, installation of a new seepage sand chimney filter and perforated pipe toe-drain system on the downstream face of the dam embankment, UV Cured-in-Place Pipe for the existing 30-inch steel outlet pipe, outlet valve installation, construction of trash rack structure, and construction of outlet pipe structure.

Construction is anticipated during Summer/Fall 2021 after spring runoff. See Section 3.7 for detail on schedule.

3.3. SPECIAL CONDITIONS & PROVISIONS:

3.3.1 Mandatory Pre-Bid Meeting: **Prospective bidders are required to attend a mandatory on-site pre-bid meeting on October 22, 2020 at 10:30 am**. Meeting location shall be at Carson Reservoir on the Grand Mesa on Forest Service Road

108. From US Hwy 50, go east on Kannah Creek Road for 3 miles, veer left onto Land's End Road (Forest Service Road 100) and continue 26 miles to Forest Service Road 108 on the Right. From I-70, take Exit 49 onto CO Hwy 65 and continue approximately 30 miles. Turn Right onto Forest Service Road 100, and after 3 miles Forest Service Road 108 will be on the left. The purpose of this visit will for Bidders to become familiar with the proposed project site before the snow comes and access to Carson Reservoir is closed, and to inspect and to clarify the contents of this Invitation for Bids (IFB).

3.3.2 QUESTIONS REGUARDING SOLICIATION PROCESS/SCOPE OF WORK:
Duane Hoff, Senior Buyer
City of Grand Junction
duaneh@gjcity.org

3.3.2 Project Manager: The Project Manager for the Project is John Eklund, Project Engineer, who can be reached at 970-244-1558. During Construction, all notices, letters, submittals, and other communications directed to the City shall be addressed and mailed or delivered to:

City of Grand Junction
Department of Public Works
Attn: John Eklund Project Engineer
333 West Ave., Building C
Grand Junction, CO 81501

3.3.3 Affirmative Action: The Contractor is not required to submit a written Affirmative Action Program for the Project.

3.3.4 Pricing: Pricing shall be all inclusive to include but not be limited to: all labor, equipment, supplies, materials, freight (F.O.B. Destination – Freight Pre-paid and Allowed to each site), travel, mobilization costs, fuel, set-up and take down costs, quality control testing and full-time inspection costs, and all other costs related to the successful completion of the project.

The Owner shall not pay nor be liable for any other additional costs including but not limited to: taxes, shipping charges, insurance, interest, penalties, termination payments, attorney fees, liquidated damages, etc.

3.3.5 Freight/Shipping: All freight/shipping shall be F.O.B. Destination – Freight Pre-Paid and Allowed to the project site(s), Grand Junction, CO.

Contractor must meet all federal, state, and local rules, regulations, and requirements for providing such services.

3.3.6 Contract: A binding contract shall consist of: (1) the IFB and any amendments thereto, (2) the bidder's response (bid) to the IFB, (3) clarification of the bid, if any, and (4) the City's Purchasing Department's acceptance of the bid by "Notice of Award" or by "Purchase Order". All Exhibits and Attachments included In the IFB shall be incorporated into the contract by reference.

A. The contract expresses the complete agreement of the parties and, performance shall be governed solely by the specifications and requirements contained therein.

B. Any change to the contract, whether by modification and/or supplementation, must be accomplished by a formal contract amendment signed and approved by and between the duly authorized representative of the bidder and the City Purchasing Division or by a modified Purchase Order prior to the effective date of such modification. The bidder expressly and explicitly understands and agrees that no other method and/or no other document, including acts and oral communications by or from any person, shall be used or construed as an amendment or modification to the contract.

3.3.7 Time of Completion: The scheduled time of Completion for the Project is *(To Be Provided in Addendum at a later date)*.

Completion is achieved when site cleanup and all punch list items (resulting from the final inspection) have been completed. Completion shall have the meaning set forth in Article I, Section 3 (Definitions and Terms) of the General Contract Conditions.

3.3.8 Working Days and Hours: The working days and hours shall be as stated in the General Contract Conditions or as mutually agreed upon in the preconstruction Meeting.

3.3.9 Licenses and Permits: Contractor is responsible for obtaining all necessary licenses and permits required for Construction, at Contractors expense. See Section 2.12. Contractor shall supply to Owner all copies of finalized permits.

3.3.10 Permits: The following permits are required for the Project and will be obtained by the City at no cost to the Contractor:

- *State of Colorado Division of water Resources Office of the State Engineer Dam Safety Branch Approval for the Alteration, Modification, or Repair or a Dam and Reservoir – Pending*
- *USACE Clean Water Act Sections 401 and 404 Nationwide Permits – Pending*
- *USFS Special Use Permit – Pending*
-

The following permits may be required for the Project and shall be obtained and paid for by the Contractor, with the costs included in the total bid price for the Project:

- *Mesa County building or electrical permit*
- *Stormwater Permits (CDPS and Mesa County)*
- *Dewatering permits (CDPS)*

3.3.11 City Furnished Materials: The City will furnish the following materials for the Project:

- PDF and Paper copies of Construction Drawings and Project Documents
- The City may provide Electronic AutoCAD Drawing Files for survey stake-out

Electronic File Disclaimer

The City of Grand Junction delivers these electronic copies of certain documents or data ("Electronic Files") to its client or contractor, the original recipient hereof ("Client"), in addition to printed copies ("Hard Copies") for the convenience of Client. Client and its consultants, contractors and subcontractors may only rely on Hard Copies furnished by The City of Grand Junction to Client. If there is any discrepancy between Electronic Files and the corresponding Hard Copies, the Hard Copies control. Client acknowledges that Electronic Files can be altered, modified or corrupted Without The City of Grand Junction's authorization and that errors can occur in the transmission of such Electronic Files. The City of Grand Junction does not warrant or represent that Electronic Files will be compatible with or useable or readable by systems used by Client or its consultants, contractors and subcontractors. The City of Grand Junction is not responsible for any problems in the interaction of Electronic Files with other software used by Client or its consultants, contractors and subcontractors.

3.3.12 Project Newsletters: Project newsletters, if required, will be the responsibility of the City.

3.3.13 Project Sign: Project signs, if any, will be furnished and installed by the City.

3.3.14 Authorized Representatives of the City: Those authorized to represent the City shall include Purchasing Agent, Engineers, and Inspectors employed by the City, only.

3.3.15 Stockpiling Materials and Equipment: All stockpiling/storage shall be in accordance with General Contract Condition Section 51.

3.3.16 Traffic Control: The traffic control requirements for this Project will be determined during the design phase.

3.3.17 Clean-Up: The Contractor shall clear the construction site of all trash and on-site waste daily, including scrap from construction materials.

3.3.18 Quality Control Testing: To be determined to design phase.

3.3.19 Schedule of Submittals: Contractor shall deliver these submittals at least two days prior to the pre-construction meeting:

- Traffic Control Plans
- Project Schedule

3.3.20 Uranium Mill Tailings: It is anticipated that radioactive mill tailings will not be encountered on this Project.

3.3.21 Fugitive Petroleum or Other Contamination: It is anticipated that soil contamination from fugitive petroleum or other contaminants will not be encountered with the Project.

3.3.22 Excess Material: All excess materials shall be disposed in accordance with General Contract Condition Section 50.

3.3.23 Existing Utilities and Structures: Utilities were **not** potholed during design of this project. The location of existing utilities and structures shown on the Plans is approximate with the information gathered during design. It is the responsibility of the Contractor to pothole/locate and protect all structures and utilities in accordance with General Contract Condition Section 37.

3.3.24 Incidental Items: Any item of work not specifically identified or paid for directly, but which is necessary for the satisfactory completion of any paid items of work, will be considered as incidental to those items, and will be included in the cost of those items.

3.3.25 Existing U.S. Forest Service Parking Lot at Carson Reservoir: The plan is for the existing parking lot at Carson Reservoir to be used as a Construction Staging Area for the Project. The USFS pit toilets at the parking lot will be **off limits** to the Contractor and its subcontractors. The contractor shall provide temporary portable toilets for use by its staff and subcontractors for the duration of the Project.

3.3.26 ACI Concrete and Flatwork Finisher and Technician: Hand finishing concrete will be permitted only when performed under the direct supervision of a craftsman holding the following certificate: ACI Concrete Flatwork Finisher and Technician (ACICFFT) or other Flatwork Finisher certification program approved by the City Engineering Manager.

3.3.27 Weekly Progress Meetings: The Contractor and Engineer will schedule and hold regular progress meetings at least weekly. The purpose of the meetings will be to review the progress of the work, maintain coordination efforts, discuss the schedule, and resolve issues that may develop.

3.4. SCOPE OF WORK: The Project generally consists of demolition, clearing and grubbing, structure removal, pipe removal, excavation and embankment, spillway reconstruction, riprap removal and placement, installation of a new seepage sand chimney filter and perforated pipe toe-drain system on the downstream face of the dam embankment, UV Cured-in-Place Pipe for the existing 30-inch steel outlet pipe, outlet valve installation, construction of trash rack structure, and construction of outlet pipe structure.

3.5. Attachments:
Appendix A: TBD
Appendix B: TBD
Appendix C: TBD
Appendix D: TBD

3.6. Contractor Bid Documents: For Contractor's convenience, the following is a list of forms/items to be submitted with the Contractor's bid response. However, should a

form/item not be listed in this section, but required in the solicitation documents, it is the Contractor's responsibility to ensure all forms/items are submitted.

- **Contractor's Bid Form**
- **Price Bid Schedule**
- **References**

3.7. IFB TENTATIVE TIME SCHEDULE:

The City of Grand Junction and their design Consultant, Ayres Associates, are currently working on the construction plans, specifications, and permitting for the construction of the Carson Reservoir Dam Modifications Project. The City is having the Pre-Bid meeting early to allow potential bidders the opportunity to see Carson Reservoir before the snow arrives and access would be closed as the bidding process for the Project will be finished in Spring of 2021. The City is planning to construct these dam improvements in the summer/fall season in 2021. The City currently anticipates construction starting after spring runoff in late June or early July 2021, or as soon as access to open to Carson Reservoir is possible.

City of Grand Junction has lowered the water level in Carson Reservoir for the Pre-Bid meeting. The reservoir will be partly or completely filled for the duration of the winter 2020-2021. The City will start draining Carson Reservoir in March/April 2021 and leave the outlet valves fully open during the spring runoff season so the reservoir is empty before construction starts in June/July 2021.

The City and Ayres Associates plan to provide Bidders attending the Pre-Bid meeting with either 30% construction plans, or a list of items that will describe what work is going to be required as part of the dam modifications project. **We would ask that Contractors hold their questions until such time that the 100% construction plans are released with the Addendum 1.**

In March or April 2021, the City will issue Addendum 1 for this Project that will include the 100% complete construction plans and specifications that the Bidders will use for determining their bid. Addendum 1 will also provide specific dates such as: Inquiry Deadline, Bid Opening, City Council Approval, etc. The City will provide at least 2-3 weeks for the Bidders to review the plans before the inquiry deadline. Further addenda for inquiry responses, or issuance of other information will be posted as required during the Advertisement Period.

Invitation for Bids available:	October 7, 2020
Mandatory Pre-Bid Meeting:	October 22, 2020
Inquiry deadline, no questions after this date:	TBD with Addendum
Addendum Posted:	March/April 2020 (TBD)
Submittal deadline for proposals (Bid Opening):	TBD with Addendum
City Council Approval:	TBD with Addendum
Notice of Award & Contract Execution:	TBD with Addendum
Bonding & Insurance Cert due	TBD with Addendum
Preconstruction meeting	TBD with Addendum
Work begins no later than	TBD with Addendum
Final Completion	TBD with Addendum
Holidays:	TBD with Addendum

4. Contractor's Bid Form

Bid Date: _____

Project: IFB-4839-21-DH "Hogchute (aka Carson) Reservoir Dam Modifications Project"

Bidding Company: _____

Name of Authorized Agent: _____

Email _____

Telephone_____ **Address**_____

City_____**State**_____**Zip**_____

The undersigned Bidder, in compliance with the Invitation for Bids, having examined the Instruction to Bidders, General Contract Conditions, Statement of Work, Specifications, and any and all Addenda thereto, having investigated the location of, and conditions affecting the proposed work, hereby proposes to furnish all labor, materials and supplies, and to perform all work for the Project in accordance with Contract Documents, within the time set forth and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this Contractor's Bid Form is a part.

The undersigned Contractor does hereby declare and stipulate that this offer is made in good faith without collusion or connection to any person(s) providing an offer for the same work, and that it is made in pursuance of, and subject to, all terms and conditions of the Instructions to Bidders, the Specifications, and all other Solicitation Documents, all of which have been examined by the undersigned.

The Contractor also agrees that if awarded the Contract, to provide insurance certificates within ten (10) working days of the date of Notification of Award. Submittal of this offer will be taken by the Owner as a binding covenant that the Contractor will be prepared to complete the project in its entirety.

The Owner reserves the right to make the award on the basis of the offer deemed most favorable, to waive any formalities or technicalities and to reject any or all offers. It is further agreed that this offer may not be withdrawn for a period of sixty (60) calendar days after closing time. Submission of clarifications and revised offers automatically establish a new thirty day (30) period.

Prices in the bid proposal have not knowingly been disclosed with another provider and will not be prior to award.

- Prices in this bid proposal have been arrived at independently, without consultation, communication or agreement for the purpose of restricting competition.
- No attempt has been made nor will be to induce any other person or firm to submit a bid proposal for the purpose of restricting competition.
- The individual signing this bid proposal certifies they are a legal agent of the offeror, authorized to represent the offeror and is legally responsible for the offer with regard to supporting documentation and prices provided.
- Direct purchases by the City of Grand Junction are tax exempt from Colorado Sales or Use Tax. Tax exempt No. 98-903544. The undersigned certifies that no Federal, State, County or Municipal tax will be added to the above quoted prices.
- City of Grand Junction payment terms shall be Net 30 days.
- Prompt payment discount of _____ percent of the net dollar will be offered to the Owner if the invoice is paid within _____ days after the receipt of the invoice.

RECEIPT OF ADDENDA: the undersigned Contractor acknowledges receipt of Addenda to the Solicitation, Specifications, and other Contract Documents.

State number of Addenda received: _____.

It is the responsibility of the Bidder to ensure all Addenda have been received and acknowledged.

By signing below, the Undersigned agree to comply with all terms and conditions contained herein.

Company: _____

Authorized Signature: _____

Title: _____

The undersigned Bidder proposes to subcontract the following portion of Work:

Name & address of Sub-Contractor	Description of work to be performed	% of Contract

The undersigned Bidder acknowledges the right of the City to reject any and all Bids submitted and to waive informalities and irregularities therein in the City's sole discretion.

By submission of the Bid, each Bidder certifies, and in the case of a joint Bid each party thereto certifies as to his own organization, that this Bid has been arrived at independently, without collusion, consultation, communication, or agreement as to any matter relating to this Bid with any other Bidder or with any competitor.

BID FORM

PROJECT: Hogchute Dam Repairs
DAMID 420127
Mesa County, CO

BID DEADLINE: TBD
TBD

To: City of Grand Junction _____

We _____(Name of Bidder) acknowledge that we have received the Contract Documents, prepared by Ayres and dated _____, that are listed in the Project Manual Table of Contents and Drawing Sheet Index. We hereby agree to provide all labor, materials, equipment, and services required to complete the work in strict accordance with the Contract Documents for the following stated amount(s).

BID SCHEDULE

Item No.	Description	Unit	Approx. Quantity	Unit Price	Total Price
1-1	Mobilization	L.S.	1	_____	_____
1-2	Erosion Control	L.S.	1	_____	_____
1-3	Construction Dewatering	L.S.	1	_____	_____
1-4	Demolition	L.S.	1	_____	_____
1-5	Concrete Overflow Spillway	L.S.	1	_____	_____
1-6	Rock Shell Removal	L.S.	1	_____	_____
1-7	Type 1 Filter Material	C.Y.		_____	_____
1-8	Filter Drain Pipe	L.F.		_____	_____
1-9	Filter Embankment Cap	C.Y.		_____	_____
1-10	Rock Shell Replacement	L.S.	1	_____	_____
1-11	Hydraulic Sluice Gate	L.S.	1	_____	_____
1-12	Intake Structure	L.S.	1	_____	_____
1-13	Auxiliary Spillway Grading	L.S.	1	_____	_____
1-14	Auxiliary Spillway Rock Berms	S.Y.		_____	_____
1-15	Pipe Filter Diaphragm	C.Y.		_____	_____
1-16	Outfall Pipe	L.F.		_____	_____
1-17	CIPP Pipe Lining	L.F.		_____	_____
1-18	Site Restoration	L.S.	1	_____	_____

Total Bid Amount, Items 1-1 thru 1-18, shall be _____

_____ Dollars ($ _____)

BID SECURITY

Accompanying this bid is bid security payable to Owner in the form stipulated in the Instructions to Bidders, which is at least 5% of the maximum bid amount, and will be retained by Owner as liquidated damages if the undersigned fails to execute agreements and furnish bonds (if specified) within 10 days after Notice of Award.

WITHDRAWAL OF BID

It is agreed that this bid and any required bid security may not be withdrawn for a period of 45 days after the Bid Deadline.

TIME OF COMPLETION

The undersigned agrees, if awarded the contract, to start work within 10 calendar days after "Notice to Proceed" and to substantially complete the work within _____ calendar days thereafter.

Failure to substantially complete the work within the stated time will result in liquidated damages of _____ per calendar day thereafter until substantial completion.

The undersigned agrees, if awarded the contract, to start work after "Notice to Proceed" and to substantially complete the work on or before _____.

Failure to substantially complete the work within the stated time will result in liquidated damages of _____ per calendar day thereafter until substantial completion.

The undersigned agrees, if awarded the contract, to start work within 10 calendar days after "Notice to Proceed" and to substantially complete the work within _____ calendar days thereafter. The successful Contractor will be allowed to select the Notice to Proceed date provided the calculated substantial completion date is no later than _____.

Failure to substantially complete the work within the stated time will result in liquidated damages of _____ per calendar day thereafter until substantial completion.

The undersigned agrees, if awarded the contract, to start work within 10 calendar days after "Notice to Proceed" and to substantially complete the work within _____ calendar days after the contract time commences; and to have all work completed and ready for final payment within _____ calendar days after the contract time commences.

Failure to substantially complete the work within the stated time will result in liquidated damages of _____ per calendar day thereafter until substantial completion. Failure to have the work completed and ready for final payment within the stated time will result in liquidated damages of _____ per calendar day thereafter until the work is completed and ready for final payment.

The undersigned agrees, if awarded the contract, to start work after "Notice to Proceed" and to substantially complete the work on or before _____; and to have all work completed and ready for final payment on or before _____.

Failure to substantially complete the work within the stated time will result in liquidated damages of _____ per calendar day thereafter until substantial completion. Failure to have the work completed and ready for final payment within the stated time will result in liquidated damages of _____ per calendar day thereafter until the work is completed and ready for final payment.

The undersigned agrees, if awarded the contract, to start work within 10 calendar days after "Notice to Proceed" and to substantially complete _____ within _____ calendar days after the contract time commences; and to substantially complete all remaining work within _____ calendar days after the contract time commences.

Failure to substantially complete the work of either deadline within the stated time will result in liquidated damages of _____ per calendar day thereafter until substantial completion of the applicable work.

BIDDER'S WARRANTY

By the act of submitting a bid for the proposed work, the bidder warrants that:

1. Bidder and its subcontractors have carefully and thoroughly reviewed the Contract Documents and have found them complete, free of ambiguities, and sufficient for the purpose intended; further that,

2. Bidder and all workers, employees, and subcontractors are skilled and experienced in the type of work represented by the Contract Documents; further that,

3. Bid is based solely upon the Contract Documents and properly issued written addenda and not upon any other representation; further that,

4. Bidder has carefully examined the site of the work and from its investigations is satisfied as to the nature and location of work, the character, quality, quantities of materials, and difficulties to be encountered, the kind and extent of equipment and other facilities needed for performance of the work, the general and local conditions, and other items which may, in any way, affect the work or its performance; and further that,

5. Neither the bidder nor its employees, agents, prospective suppliers, or subcontractors have relied upon any verbal representations allegedly authorized or unauthorized from the Owner, its employees or agents, including architects, engineers, and consultants, in assembling the bid.

LIST OF SUBCONTRACTORS

The following is a list of subcontractors whose bids were used in this bid. It is agreed that after submission of this list, no change may be made in subcontractors as listed without submitting change for Owner review in accordance with the conditions of the contract. If there are no subcontractors, state "None."

Subcontract:	Subcontractor:

ADDENDA

The undersigned acknowledges receipt of addenda _____ to _____ inclusive.

ORGANIZATION AND AUTHORITY

The undersigned hereby certifies that the bidder is organized as indicated below and that all statements herein are made on behalf of such bidder.

Business Name _____

Business Address _____

_____

Telephone Number _____

Fax Number _____

E-Mail Address _____

State Contractor Registration/License No. (if applicable) _____

(Complete applicable paragraph 1, 2, 3, or 4.)

1. Corporation. Bidder is a corporation organized under the laws of the state of _____. Its corporate president is _____ and its corporate secretary is _____. The _____ is authorized to submit bids and sign construction contracts for the bidder by action of the board of directors.

2. Limited Liability Corporation. Bidder is a limited liability corporation organized under the laws of the state of _____. Its members are _____ _____. The _____ is authorized to submit bids and sign construction contracts for the bidder.

3. Partnership. Bidder is a partnership consisting of partners _____ _____ and _____.

4. Sole Trader. Bidder is an individual doing business as _____ _____.

SWORN STATEMENT

I, being duly sworn, hereby certify that I have examined and carefully prepared this bid from the Contract Documents and have checked the same in detail before submitting this bid; that I have full authority to make such statements and submit this bid on behalf of the above bidder; and that said statements are true and correct.

Signature _____

Name and Title _____

(Seal, if bid is by a corporation)

Subscribed and sworn to before me this _____

day of _____, 20 _____

_____ Notary Public

_____ County, _____

My Commission expires _____

SECTION 01 01 00

GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 PROJECT DESCRIPTION

A. In general, the project consists of:

1. Mobilization.
2. Drawdown, diversion, and dewatering.
3. Erosion and sediment controls.
4. Clearing and grubbing.
5. Stripping and stockpiling.
6. Developing borrow area.
7. Construction of new auxiliary spillway weir and improved spillway chute.
8. Excavation of embankment.
9. Demolition of existing outlet works intake structure.
10. Construction of new outlet works intake structure.
11. Replacement and rehabilitation of existing outlet works conduit.
12. Construction of embankment filter, filter diaphragm around conduit, and toe drain.
13. Backfill and site restoration.

1.02 WORK BY OTHERS

A. Owner will draw down the reservoir and bypass flows prior to and during construction.

1.03 WORK SEQUENCE

A. The work shall be performed in accordance with general sequence or phasing included on the Drawings.

1.04 PROJECT MEETINGS

A. A preconstruction conference will be scheduled after award of contract and prior to beginning work. This meeting shall be attended by A/E, Owner, and an authorized representative of Contractor.

B. Periodic progress meetings will be held at project site at times designated by Owner or A/E. A responsible representative of Contractor who can bind Contractor to decisions shall attend.

1.05 WORK HOURS

A. Work shall be conducted between the hours of 7:00 a.m. to 6:00 p.m. on normal work days, unless approved for unusual circumstances.

B. Give written notice to A/E whenever it is desired to perform work at night, or on a Saturday, Sunday, or holiday, or to vary period of hours during which work is carried on each day. If approved, such work shall be subject to requirements furnished in writing by A/E, and no extra compensation will be allowed.

1.06 SUBMITTAL PROCEDURES

A. See Section 01 33 00.

1.07 PERMITS AND CODES

A. Owner will obtain permits, licenses, and approvals, which may include the following:

1. State of Colorado Division of Water Resources Office of the State Engineer Dam Safety Branch Approval for the Alteration, Modification, or Repair of a Dam and Reservoir.
2. US Army Corps of Engineers (USACE) Clean Water Act Section 404 Nationwide Permit and Clean Water Act Section 401 Water Quality Certification Authorization.
3. Colorado State Historic Preservation Office (SHPO) Section 106 review.
4. US Forest Service (USFS) Special Use Permit.
5. Colorado Discharge Permit System (CDPS) General Permit for Stormwater Discharges Associated with Construction Activities, COR400000.

B. Contractor shall comply with the requirements of the above permits, licenses, and approvals. If a copy of a permit, license, or approval is not available for review prior to the Bid Deadline, and if it contains a requirement not covered by the Contract Documents, such a requirement will be considered extra work if Contractor makes a claim under the terms of the General Conditions. Work shall not begin on items applicable to the above until the required permit, license, or approval is received.

C. Contractor shall provide all other necessary permits and licenses and pay all fees, taxes, and royalties, unless otherwise indicated.

D. Comply with local and municipal ordinances and applicable state and national codes.

1.08 TEMPORARY UTILITIES

A. Contractor shall be responsible for providing temporary electric power as required for construction purposes. Provide portable power supply or make arrangements with local utility company.

B. Contractor shall be responsible for obtaining water for its needs. Pay cost of water used and meter rental, if applicable.

C. Contractor shall provide temporary outside toilets sufficient for construction workers. Toilets shall be self-contained chemical type and shall comply with applicable Codes. Maintain sanitary facilities in a clean and sanitary condition; supply toilet paper until completion of project.

1.09 PROTECTION

A. Furnish and maintain proper barricades, fences, signal lights, warning signs, and personnel as required to properly protect and safeguard the work, persons, animals, and property against injury.

1.10 ENVIRONMENTAL CONTROLS

A. See Section 01 57 19.

1.11 TRAFFIC CONTROL

A. Conduct operations to ensure minimum interference with streets, walks, and adjacent facilities not part of construction project.

B. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

1.12 PRODUCT REQUIREMENTS

A. General: Provide new products manufactured and conditioned for the particular application as recommended by manufacturer, unless otherwise noted. Transport, handle, store, and protect products as specified and in accordance with manufacturer's recommendations.

B. Acceptable Manufacturers: Products, materials, and equipment identified by reference to a manufacturer's name, catalog number, or model are identified for the purpose of establishing a standard of type, function, appearance, and quality. Unless otherwise noted, any other product, material, or equipment which will perform adequately the duties imposed by the general design will be considered for substitution in accordance with the provisions below.

C. Bid Phase Substitutions: Substitutions and "or equal" items proposed prior to the Bid Deadline shall be submitted in accordance with the Instructions to Bidders.

D. Construction Phase Substitutions: Substitutions and "or equal" items proposed after Contract has been awarded shall be submitted for approval prior to their use. Consideration will be given only to proposed substitutions and "or equal" items where:

1. The products named in the Contract Documents are no longer available or cannot be provided within the Contract Time.
2. The manufacturers' standard products are no longer in conformance with the specified requirements.
3. Owner's interests may be adversely affected.

E. Substitution Procedures: Requests for substitution of alternate products or use of "or equal" items shall be submitted with complete references to manufacturer's product identification and product data indicating composition, guarantee, availability, applicable standards or agency approvals met or exceeded, restrictions imposed on product, and manufacturer's recommended method of application or installation. A substitution or an "or equal" item will be considered acceptable if the product will perform adequately the duties imposed by the general design and, in opinion of A/E, is of equal substance, quality, appearance, and function, unless the named item is necessary for interchangeability or if the named product has been demonstrated to be most cost-effective.

1.13 SURVEYS, STAKING, LINE AND GRADE

A. Owner will provide baseline reference points and benchmarks as indicated on Drawings. Contractor shall provide all other survey staking and layout as required to complete the Work.

1.14 FIELD MEASUREMENTS AND INSPECTION OF SURFACES

A. Contractor shall layout its Work based on reference points furnished by Owner and shall be solely responsible for the accuracy of its measurements. Verify grades, lines, levels, locations, and dimensions as shown on Drawings, and inspect surfaces that are to receive work before proceeding with fabricating, assembling, fitting, or erecting. Notify A/E in writing in case of unsuitable conditions, defective substrates, or discrepancies in Contract Documents. Starting of work shall imply acceptance of conditions.

B. Correct any errors or defects due to faulty measurements, improper layout, or failure to report discrepancies.

1.15 CUTTING AND PATCHING

A. Cut new openings in existing construction as required. Employ skilled workers.

B. Restore surfaces to match adjacent finish. Waterproof and insulate holes in exterior walls. Backfill and properly compact earthwork needed to perform cutting and patching.

1.16 CONSTRUCTION CLEANING

A. Keep work area free of accumulations of surplus materials, rubbish, and debris.

1.17 PUNCH LIST

A. A "punch list" will be prepared and distributed to Contractor at Substantial Completion. Items on punch list shall be completed within 30 days. Required submittals (see below) shall be completed prior to or when requesting final payment.

1.18 CLOSEOUT SUBMITTALS

A. Submit the following items to A/E prior to or with final Application for Payment:

1. Project record drawings marked to show all changes made during construction. Dimension underground and concealed work and utilities from permanent reference points; record vertical distances. Make and record measurements to the nearest 0.5 ft on a clean drawing set.
2. Evidence of continuing insurance coverage complying with insurance requirements (see Conditions of the Contract).
3. Contractor's affidavit, along with final releases and waivers of liens as required by Owner, indicating that all debts and claims against project (less amounts withheld by Owner) have been paid in full or otherwise satisfied.
4. Consent of surety company to final payment.

1.19 DEFINITIONS

A. Dimensions on drawings and details are subject to field measurements.

B. The term "working days" shall exclude weekends (Saturday and Sunday) and holidays.

C. References to "Division 00" shall mean the Bidding Requirements and Contracting Requirements.

D. References to "DSB" shall mean State of Colorado Division of Water Resources Office of the State Engineer Dam Safety Branch.

E. References to "USACE" shall mean US Army Corps of Engineers.

F. References to "Colorado DOT Std. Spec." shall mean Colorado Department of Transportation, Standard Specifications for Road and Bridge Construction, latest edition.

G. References to "USFS" shall mean US Forest Service.

H. References to "CDPS" shall mean Colorado Discharge Permit System.

I. References to "A/E", "Architect", or "Engineer" shall mean Ayres.

J. References to "Owner" shall mean City of Grand Junction.

PART 2 (NOT USED)

PART 3 (NOT USED)

END OF SECTION

SECTION 01 22 50

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. Payment for all work done in compliance with the Contract Documents, including all labor, equipment, materials, and performance of operations relative to construction of this project, will be made under the Bid Items listed below. Work required by the Contract Documents for which there is not a Bid Item will be considered incidental to the Contract and no additional compensation will be allowed.

B. Owner reserves the right to alter Drawings, modify incidental work as may be necessary, and increase or decrease quantities of work to be performed, including deduction or cancellation of any one or more Bid Items. Changes in the Work shall not be considered as a waiver of any conditions of the Contract nor invalidate any provisions thereof. When changes result in revised quantities of work to be performed, Contractor shall accept payment according to contract unit prices appearing in the original Contract. A supplemental agreement between Contractor and Owner may be requested by either party when cumulative changes involve a net increase or decrease of more than 20 percent in total contract amount.

C. Final measured quantities determined in field by A/E at time of construction shall govern over approximate quantities shown on the Bid Schedule, unless otherwise noted. Contractor shall take no advantage of any apparent error or omission in Drawings or Specifications, and A/E shall be permitted to make corrections and interpretations as may be deemed necessary for fulfillment of the intent of the Contract Documents.

PART 2 (NOT USED)

PART 3 EXECUTION

3.01 MOBILIZATION

A. This work consists of work and operations necessary for movement of personnel, equipment, supplies, and incidentals to project site and for establishment of Contractor's offices and other temporary facilities necessary for work on project; and of all other work and operations which must be performed, or for which costs must be incurred before beginning work on various items on project site; and demobilization at completion of work.

B. Measurement for payment will be as a complete unit of work acceptably performed.

C. Payment will be made at the contract lump sum price for MOBILIZATION, payable to Contractor in accordance with the following schedule:

1. When 5 percent or more of original contract amount is earned, 40 percent of amount bid for mobilization will be paid.
2. When 25 percent or more of original contract amount is earned, 80 percent of amount bid for mobilization will be paid.
3. When 90 percent or more of original contract amount is earned, 100 percent of amount bid for mobilization will be paid.

3.02 EROSION CONTROL

A. This work consists of furnishing, installing, and maintaining erosion and other environmental control measures in accordance with Section 01 57 19.

B. Measurement for payment will be as a complete unit of work acceptably completed.

C. Payment will be made at the contract lump sum price for EROSION CONTROL, payable to Contractor in accordance with the following schedule:

1. When erosion control measures are installed, 75 percent of amount bid for erosion control will be paid.
2. When erosion control measures have been removed, 100 percent of amount bid for erosion control will be paid.

3.03 CONSTRUCTION DEWATERING

A. This work consists of diverting surface water, constructing cofferdams, and dewatering construction site in accordance with Section 01 57 60 as required to complete the work.

B. Measurement for payment will be as a complete unit of work acceptably performed.

C. Payment will be made at the contract lump sum price for CONSTRUCTION DEWATERING, payable to Contractor in accordance with the following schedule:

1. When site is dewatered for construction, 75 percent of amount bid for dewatering will be paid.
2. When all dewatering measures are removed, 100 percent of amount bid for dewatering will be paid.

3.04 DEMOLITION

A. This work consists of removing intake structure and controls, Outfall structure and piping as shown on drawings, and grouted riprap and concrete outfall structure accordance with Section 02 41 00.

B. Measurement for payment will be as a complete unit of work acceptably performed.

C. Payment will be made at the contract lump sum price for DEMOLITION.

3.05 CONCRETE OVERFLOW SPILLWAY

A. This work consists of constructing the Concrete Overflow Spillway as designated in the Drawings and in accordance with Section 03 30 00.

B. Measurement for payment will be as a complete unit of work acceptably performed.

C. Payment will be made at the contract lump sum price for CONCRRETE OVERFLOW SPILLWAY.

3.06 ROCK SHELL REMOVAL

A. This work consists of excavating and stockpiling the downstream rock shell defined in Section 31 24 00.

B. Measurement for payment will be as a complete unit of work acceptably performed.

C. Payment will be made at the contract unit price per cubic yard for Rock SHELL REMOVAL.

3.07 TYPE I FILTER MATERIAL

A. This work consists of furnishing and placing Type I filter material in accordance with Sections 31 24 00 and 33 46 72 and as shown on the Drawings.

B. Measurement for payment will be the number of cubic yards of Type I filter material acceptably placed within the specified pay limits.

1. Type I Filter Material required to fill voids resulting from over excavation outside specified lines and grades will not be measured for payment, unless such over excavation is authorized to remove unsuitable material where unsuitable condition is not a result of Contractor's operations.
2. Pay limits shall be the measured surface of foundation when approved for placement of fill and designated neat lines of fill surface. Quantities will be based upon project plan drawings.

C. Payment will be made at the contract unit price per cubic yard for TYPE I FILTER MATERIAL.

3.08 FILTER DRAIN PIPE

A. This work consists of furnishing and installing drainage pipe including granular filter blanket in accordance with Section 33 46 72.

B. Measurement for payment will be the number of linear feet of drainage pipe in place and the number of cubic yards of granular filter blanket materials, not to exceed limits shown on Drawings.

C. Payment for drainage pipe will be made at the contract unit price per linear foot for DRAINAGE PIPE.

D. Payment for granular filter blanket will be made at the contract unit price per cubic yard for FILTER DRAIN PIPE.

3.09 FILTER EMBANKMENT CAP

A. This work consists of excavating materials from embankment, stockpiling, placing, and compacting materials as specified, restoring stockpile areas, and other items necessary and incidental for construction of embankments in accordance with Section 31 20 00.

B. Measurement for payment will be the volume of earth fill within specified zones and pay limits measured and computed to nearest cubic yard by method of average cross-sectional end areas. Unless otherwise indicated, no deduction in volume will be made for embedded conduits and appurtenances.

C. Earth fill required to fill voids resulting from over excavation outside specified lines and grades will not be measured for payment, unless such over excavation is authorized to remove unsuitable material where unsuitable condition is not a result of Contractor's operations.

D. Pay limits shall be the measured surface of foundation when approved for placement of fill and designated neat lines of fill surface.

E. Payment for each type of earth fill will be made at the respective contract unit price per cubic yard for FILTER EMBANKMENT CAPEARTH.

3.10 ROCK SHELL REPLACEMENT

A. This work consists of restoring downstream rock shell defined in Section 31 24 00.

B. Measurement for payment will be as a complete unit of work acceptably performed.

C. Payment will be made at the contract unit price per cubic yard for ROCK SHELL REPLACEMENT .

3.11 HYDRAULIC SLUICE GATE

A. This work consists of furnishing and installing sluice gate, operators, hoses, casement pipes, portable operator, and anchorages in accordance with Section 35 20 40.

B. Measurement for payment will be the number of units acceptably installed.

C. Payment will be made at the contract unit price each for HYDRAULIC SLUICE GATE

3.12 INTAKE STRUCTURE

A. This work consists of constructing the intake structure as designated in the Drawings and in accordance with Section 03 30 00.

B. Measurement for payment will be as a complete unit of work acceptably performed.

C. Payment will be made at the contract lump sum price for CONCRRETE OVERFLOW SPILLWAY.

3.13 AUXILIARY SPILLWAY GRADING

A. This work consists of constructing the intake structure as designated in the Drawings and in accordance with Section 31 20 00.

B. Measurement for payment for auxiliary spillway grading will be the square yards of spillway grading not to exceed limits shown on Drawings will be made at the contract unit price per square yard

C. Payment for auxiliary spillway grading will be made at the contract unit price per square yard for AUXILIARY SPILLWAY GRADING.

3.14 AUXILIARY SPILLWAY ROCK BERMS

A. This work consists of furnishing and placing riprap in accordance with Section 31 37 00.

B. Measurement for payment will be the number of cubic yards of riprap in place.

C. Payment for riprap will be made at the contract unit price per cubic yard for AUXILIARY SPILLWAY ROCK BERMS.

3.15 PIPE FILTER DIAPHRAGM

A. This work consists of furnishing and placing Type I filter material for pipe diaphragm in accordance with Sections 31 24 00 and 33 46 72 and as shown on the Drawings.

B. Measurement for payment will be the number of cubic yards of Type I filter material acceptably placed within the specified pay limits.

1. Type I Filter Material required to fill voids resulting from over excavation outside specified lines and grades will not be measured for payment, unless such over excavation is authorized to remove unsuitable material where unsuitable condition is not a result of Contractor's operations.
2. Pay limits shall be the measured surface of foundation when approved for placement of fill and designated neat lines of fill surface. Quantities will be based upon project plan drawings

C. Measurement for payment will be the number of cubic yards of Type I filter material acceptably placed within the specified pay limits

D. Payment will be made at the contract unit price per cubic yard for PIPE FILTER DIAPHRAGM.

3.16 OUTFALL PIPE

A. This work consists of constructing the outfall pipe as designated in the Drawings and in accordance with Section 32 42 15.

B. Measurement for payment will be the linear feet of pipe placed.

C. Payment will be made at the contract lump sum price for OUTFALL PIPE.

3.17 CIPP PIPE LINING

A. This work consists of lining of the steel penstock pipe in accordance with Section 33 01 36 and as shown on the Drawings. Any special equipment, personnel, or materials required for this work shall be incidental to this item.

B. Measurement for payment will be the number of linear feet of pipe acceptable lined.

C. Payment for fence will be made at the contract unit price per linear foot for CIPP PIPE LINING FENCE.

3.18 SITE RESTORATION

A. This work consists of placing topsoil, fertilizing, seeding, and mulching in accordance with Section 32 99 10.

B. Measurement for payment will be as a complete unit of work acceptably performed.

C. Payment will be made at the contract lump sum price for SITE RESTORATION.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Submit items to A/E for review as required by the various Contract Documents. Refer to individual specification sections, General Conditions, Supplementary Conditions, and sections of Division 01 - General Requirements for submittal requirements.

1.02 GENERAL PROCEDURES

A. Follow the requirements for each submittal type as specified below.

B. Submittals shall be identified with project name, numbered consecutively, and bear the stamp of approval of Contractor as evidence of accuracy, compatibility, and conformance with contract requirements. Submittals not so stamped will be returned without being examined.

C. Give specific written notice of each variation that submittals may have from requirements of the Contract Documents.

D. Partial submittals will not be considered. Submit each portion of work complete in one submittal.

E. Products subject to submittal review shall not be used in the work until submittals have been reviewed and bear the stamp and signature of A/E. Submittals will only be reviewed for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Contractor shall be responsible for confirming and correlating all quantities and dimensions, selecting fabrication processes and the means and methods of construction, coordinating its work with that of all other trades, and performing all work in a safe and satisfactory manner. Corrections or comments made on submittals shall not relieve Contractor from compliance with requirements of Drawings and Specifications and shall not be considered an order for extra work.

F. If information on previously reviewed shop drawings is altered, submit changes for review.

G. Maintain complete copies of all final submittals at the project site.

1.03 SHOP DRAWINGS

A. Required shop drawings are designated in the various specification sections. Submit shop drawings for review prior to fabrication, delivery, or installation in one of the following formats:

1. PDF electronic file. An annotated PDF electronic file will be returned to Contractor.

B. Each brochure of shop drawings shall contain an index of contents and shall consist of layout details, schedules, setting instructions, manufacturer's literature, and other data specifically prepared for the work. Reproductions of contract drawings may not be used without prior approval.

1.04 PRODUCT DATA

A. Required product data are designated in the various specification sections. Submit product data for review prior to delivery or installation in one of the following formats:

1. PDF electronic file. An annotated PDF electronic file will be returned to Contractor.

B. Product data shall consist of manufacturer's literature, illustrations, and brochures of catalog cuts; instructions for handling, storage, and installation; and specifications and design data. Where manufacturer's standard literature includes multiple products or options, identify the specific products and options as required for this project.

1.05 SAMPLES

A. Prior to fabrication, delivery, or installation, submit samples as designated in the various specification sections. Allow reasonable time for review and testing.

1. Submit samples in sufficient quantity and of adequate size to show quality, type, and extremes of color range, finish, and texture. Submit a minimum of two sets of appearance and color samples.

B. Label each sample stating material, description, project name, and Contractor's name. Expedite submittal of appearance and color samples following Notice to Proceed.

C. Submit samples with transmittal letter requesting review; prepay transportation charges. Samples shall become Owner's property, unless otherwise designated.

D. Samples will be reviewed for acceptability or selection of color, pattern, and texture only. Compliance with specifications is the responsibility of Contractor.

E. Order no materials subject to sample review until receipt of written notice of completion of review. Installed materials shall match reviewed samples. No review of samples shall be taken in itself to change contract requirements.

1.06 CERTIFICATES OF COMPLIANCE

A. Submit certificates of compliance as designated in the various specification sections in one of the following formats:

1. PDF electronic file.

B. Certificates shall be furnished by manufacturer, producer, or supplier of material or product and shall indicate that material or product conforms to or exceeds specified requirements. Include supporting reference data as appropriate. Certificates may be recent or previous test results on material or product, but must be acceptable to A/E.

1.07 PERMITS AND APPROVALS

A. Submit permits, code inspections, and agency approval documents as designated in the various specification sections in one of the following formats:

1. PDF electronic file.

1.08 TEST REPORTS

A. Submit test reports as designated in the various technical specifications in one of the following formats:

1. PDF electronic file.

1.09 OPERATION AND MAINTENANCE (O/M) MANUALS

A. Submit operation and maintenance manuals covering each item of equipment furnished or installed under the Contract. Submit individual preliminary O/M brochures in PDF electronic format within 30 days after completion of shop drawing or product data review. Submit final O/M manuals prior to substantial completion in the following formats:

1. PDF electronic file of entire manual, and
2. Two bound paper sets (unless otherwise specified in the various specification sections).

B. For each item of equipment, include the following information:

1. A/E-reviewed shop drawings and product data.
2. Installation and operating instructions.
3. Maintenance instructions and address of authorized service center.
4. Wiring diagrams and parts lists.
5. Test data and certifications.
6. Manufacturer's warranty information.

C. Designate correct model number where literature covers more than one model.

D. Write and furnish duplicate operation and maintenance instructions for items fabricated or assembled by Contractor.

E. Electronic Manual:

1. Submit manual in the form of a single PDF file for entire project.
2. Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
3. Group data according to specification section and organize with bookmarks. Bookmark both specification sections and individual products so that resulting bookmarks reflect a readily navigated document tree.
4. Include an overall table of contents of the O/M manuals furnished.

F. Paper Manuals:

1. Furnish data in 8-1/2 in. x 11 in. or 11 in. x 17 in. size; photographically reduce information if required. Place data into D-style, 3-ring hard cover binders; fold 11 in. x 17 in. sheets as required. Group data according to specification section and organize with tabbed index dividers on which the product name is typed.
2. Label binders as follows:

[Systems or Equipment Designation]
OPERATION AND MAINTENANCE MANUAL
[Project Name]
[Project Location]

3. Integrate general, mechanical, and electrical construction into same binder(s) when practicable. Individual subcontract O/M manuals will be acceptable provided they are placed in binder(s) as specified above.
4. Include an overall table of contents of the O/M manuals furnished.

1.10 PROJECT RECORD DOCUMENTS

A. Keep a current set of paper documents at project site that are marked to show all changes made during construction. Dimension underground and concealed work and utilities from permanent reference points; record vertical distances. Make and record measurements to the nearest 0.1 ft. Submit project record documents upon completion of Work.

PART 2 (NOT USED)

PART 3 (NOT USED)

END OF SECTION

SECTION 01 57 19

TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.01 SUMMARY

A. Provide temporary environmental controls as shown and as specified. Comply with applicable provisions of Divisions 00 and 01.

1.02 DEFINITIONS

A. References to "Colorado DOT Std. Spec." shall mean Colorado Department of Transportation Standard Specifications for Road and Bridge Construction (available at https://www.codot.gov/business/designsupport/cdot-construction-specifications/2019-construction-specifications/2019-specs-book/2019-standard-specifications).

1.03 SUBMITTALS

A. Submit in accordance with Section 01 33 00: Submittals.

B. Inspection Reports: Submit one copy of weekly inspection reports for erosion and sediment controls.

C. Technical product literature for all commercial products to be used for sedimentation and erosion control.

D. Contractor's Sedimentation and Erosion Control Plan: A plan describing Best Management Practices (BMPs) in accordance with local, state, and federal regulations and permits and this Section and Drawings stamped and sealed by a professional engineer as required.

1.04 PERMITS

A. Owner will:

1. Submit a Colorado Discharge Permit System (CDPS) General Permit for Stormwater Discharges Associated with Construction Activities, COR400000 Permit Application at least 10 working days prior to the start of construction.
2. Provide Contractor with a copy of the notice of General Permit coverage.
3. File Notice of Termination after construction site has undergone final stabilization.

B. Contractor shall:

1. Comply with the requirements of the General Permit and the Sedimentation and Erosion Control Plan and keep a copy of these documents at project site during construction.
2. Post a copy of the Certificate of Permit Coverage in a conspicuous place on the construction site.

PART 2 PRODUCTS

2.01 SILT FENCE

A. Posts: 2-inch by 2-inch; 4 feet 6-inch long, wood stakes, suitably durable for driving without cracking, as approved by the A/E.

B. Fabric: Woven, polypropylene, ultraviolet resistant material. Mirafi, Inc. Mirafi 100X, or approved equal.

C. Prefabricated commercial silt fence, if substituted for built-in-field fence: Mirafi Inc. "Envirofence" or approved equal.

2.02 EROSION BALES

A. Certified weed hay or straw certified under the North American Weed Free Forage Certification Program and the New Mexico State University Seed Certification (NMSUSC) Program. Each certified weed free erosion bale shall be identified with purple and yellow twine, and regional Forage Certification Program tag indicating the Regional Forage Certification Program Number unless otherwise specified by the program.

B. Erosion bales shall be inspected for and Regionally Certified as weed free based on the Regionally Designated Noxious Weed and Undesirable Plant List. Do not unload certified weed free erosion bales or remove their identifying twine, wire or tags until the A/E has inspected and accepted them. Provide a certificate of compliance showing the transit certificate number or a copy of the transit certificate as supplied from the forage producer.

2.03 EROSION LOGS

A. Curled aspen wood excelsior with a consistent width of fibers evenly distributed throughout the log and a seamless casing comprised of a photodegradable tube netting. Fungus free, resin free and free of growth or germination inhibiting substances. Furnish logs with the minimum diameter and length shown on approved erosion and sediment control plans.

2.04 VEHICLE TRACKING PAD

A. Constructed tracking pad complying with Colorado DOT Std. Spec.

B. Use crushed natural aggregate with at least two fractured faces that meets the Colorado DOT Std. Spec. gradation requirements for vehicle tracking pads.

C. Geotextile fabric for tracking pads shall be Colorado DOT Std. Spec., Subsection 712.08, Class 2 fabric.

2.05 PERMANENT SEED

A. See Section 32 92 36 and Section 32 99 10.

PART 3 EXECUTION

3.01 EROSION CONTROL

A. General: Maintain erosion control measures to protect the project site and prevent sediment pollution of adjacent water courses and properties. At a minimum, provide erosion control measures as indicated on the Drawings.

B. Applicable Standards: Unless otherwise shown or specified, erosion control measures shall comply with:

1. CDPS General Permit for Stormwater Discharges Associated with Construction Activities, COR400000.
2. Colorado DOT Std. Spec.

C. Time Period: Install erosion control measures prior to start of construction and maintain them until final completion of work. Unless otherwise instructed, remove temporary erosion control measures prior to final application for payment.

D. Stripping: Strive to limit stripping of sod and vegetation to a period that will expose bare soil to the least possibility of erosion that construction requirements will allow.

E. Diversions: Construct and maintain dams, channels, flumes, sumps, surface roughening, and other temporary diversion and protective works to divert streamflow and other surface water through or around construction site and away from work while construction is in progress. Unless otherwise specified, a diversion must discharge into the same natural drainageway in which its head waters are located.

F. Sediment Barriers: Construct and maintain one or more sediment barriers to receive runoff leaving site.

1. Affix silt fence to ground and maintain in suitable structural condition to last until vegetation establishes.
2. Affix erosion logs to ground, either by wood stakes (recommended method) or by equivalent anchorage if frozen winter subgrade prevents driving stakes. Equivalent anchorages include using steel posts (removed after vegetation establishes) or erosion bales spaced at same intervals as planned stakes or other approved equivalent method.

H. Trackout Control: Prevent tracking of soils and sediments onto public and private streets by constructing and maintaining stabilized work surfaces and trackout controls in accordance with Colorado DOT Std. Spec. Check dual tire vehicles for picked up tracking pad materials prior to leaving site. Refresh and loosen tracking pad as needed to allow stones to contact full tire tread (at least up to start of sidewall) of exiting vehicles. If a vehicle or tire washing station is established, water from washing shall drain into a suitable sediment trap or settling device. Remove at the end of each workday soils and sediment reaching public and private streets not part of the construction site.

I. Re-establishment of Vegetation: Re-establish temporary or permanent vegetation on disturbed areas within the time limits allowed by applicable standards.

J. Sediment Deposits: Remove and dispose of sediment deposits when deposits reach one-half the volume capacity of sediment barrier, unless otherwise indicated.

3.03 EROSION CONTROL MONITORING AND REPORTING

A. Contractor shall conduct the following inspections:

1. Weekly inspections of implemented erosion and sediment controls.
2. Inspections of erosion and sediment controls within 24 hours after a precipitation event that produces 0.5 in. of rain or more during a 24 hour period.

B. Contractor shall prepare weekly written reports of all inspections that include:

1. Date, time, and exact place of inspection.
2. Name of individual who performed inspection.
3. An assessment of condition of erosion and sediment controls.
4. A description of any erosion and sediment control implementation and maintenance performed.
5. A description of the present phase of construction at site.

3.04 DUST CONTROL

A. Minimize dispersion of dust from construction operations by application of water or other dust control materials. Controls shall confine dust and dirt within the immediate area of project. Masonry and debris shall be thoroughly soaked during demolition and loading operations.

3.05 NOISE CONTROL

A. Provide noise control measures to limit the amount of noise and prevent nuisance. Properly equip all equipment with mufflers. Limit construction activities generating significant noise to normal working hours.

3.06 MATERIAL HANDLING AND SPILL PREVENTION

A. Hazardous materials shall be handled and stored in accordance with the recommendations of the manufacturer and Material Safety Data Sheets (MSDS). Containers or equipment leaking any contaminants shall be repaired, removed from the site, or utilize drip pans for containment purposes.

B. Spills of any contaminants shall be immediately reported to the Colorado Water Quality Control Division Hotline at 877.518.5608. Contractor shall maintain an emergency spill kit at the project site containing contaminant containment products and absorbent materials (inlet socks, dry absorbent materials, and similar products).

3.07 HAZARDOUS ENVIRONMENTAL CONDITIONS

A. If underground petroleum storage tanks, petroleum contaminated soils, or other hazardous environmental conditions are encountered, and are not identified to be part of the work, Contractor shall immediately stop all work in connection with the hazardous condition and shall notify Owner and A/E. (See the General Conditions of the Contract for specific procedures that may apply.)

END OF SECTION

CONSTRUCTION DRAWINGS FOR

HOGCHUTE DAM REPAIRS

DAM ID NO. 420127 CONSTRUCTION NO. XXX

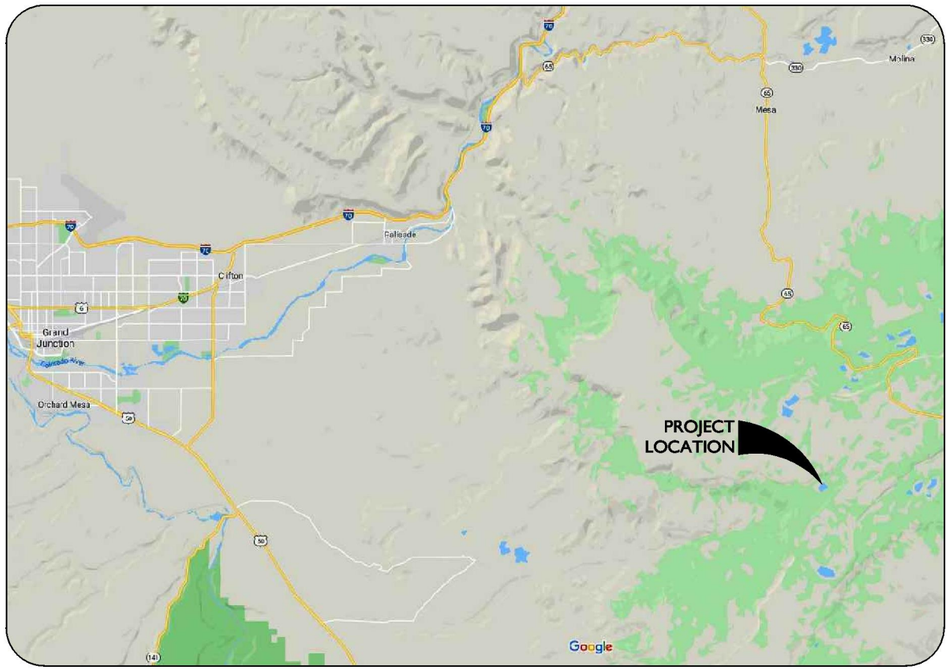
PREPARED FOR THE

CITY OF GRAND JUNCTION, MESA COUNTY, COLORADO
WATER DIVISION 4, WATER DISTRICT 42

SEPTEMBER 2020

VICINITY MAP

NOT TO SCALE



CONTACT INFORMATION

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CIVIL ENGINEER
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Dale Mathison, P.E.
3665 JFK Parkway, Building 2, Suite 100
Fort Collins, Colorado 80525
(970) 223-5556

COLORADO 811 KNOW WHAT'S BELOW. CALL BEFORE YOU DIG.

THESE PLANS HAVE BEEN PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.

DALE MATHISON
COLORADO P.E. NO. 0050522

APPROVED ON THE _____ DAY OF _____ 2020

STATE ENGINEER

BILL McCORMICK, CHIEF, COLORADO DAM SAFETY
COLORADO P.E. NO. 0029127

THESE PLANS REPRESENT THE AS-CONSTRUCTED CONDITIONS OF HOGCHUTE DAM REPAIRS TO THE BEST OF MY KNOWLEDGE AND JUDGMENT, BASED IN PART ON INFORMATION FURNISHED BY OTHERS, AS OF THE _____ DAY OF _____ 2020

DALE MATHISON
COLORADO P.E. NO. 0050522

60% SUBMITTAL
NOT FOR CONSTRUCTION
09/29/20

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
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(970) 223-5556

TITLE SHEET

HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Date	Revisions

Project Mgr.	CTG
Designed By:	AJS
Drawn By:	RBR
Approved By:	DAM
Date:	09/29/20

PROJECT NO.
26-1144.00

DRAWING NO.
G01

SHEET INDEX

SHEET	DRAWING	DESCRIPTION
1	G01	TITLE SHEET
2	G02	INDEX TO DRAWINGS, SURVEY NOTES, AND GENERAL NOTES
3	G03	SITE ACCESS AND BORROW AREAS PLAN
4	G04	EXISTING SITE, STAGING, AND STOCKPILE AREAS PLAN
5	C01	DAM EXISTING CONDITIONS AND DEMOLITION PLAN
6	C02	DAM PLAN
7	C03	DAM PROFILE AND DETAIL
8	C04	DAM DETAILS
9	C05	DAM SECTIONS
10	C06	SPILLWAY PLAN 1 OF 2
11	C07	SPILLWAY PLAN 2 OF 2
12	C08	SPILLWAY DETAILS AND SECTIONS
13	C09	SPILLWAY OVERFLOW WIER PLAN AND DETAILS

GENERAL NOTES:

1. xxx

SURVEY NOTES:

BENCHMARK:

THE HORIZONTAL AND VERTICAL CONTROL SHOWN IS BASED ON UNADJUSTED GPS STATIC OBSERVATIONS TIED TO THE GRAND MESA AREA (GMA) GEOID ESTABLISHED BY MESA COUNTY. THE NORTHERLY CONTROL POINT (POINT 2) IS A PK NAIL AND WASHER EMBEDDED IN ROCK AND IS THE BENCHMARK FOR THIS PROJECT. THE SOUTH POINT (POINT 3) IS A ROUND HEAD BOLT EMBEDDED IN ROCK.

SURVEY CONTROL POINT TABLE

POINT NUMBER	DESCRIPTION	ELEVATION	NORTHING	EASTING
1	CP /PK-W/	9902.462	15722.80	45752.48
2	CP /PK-W/	9903.882	16393.64	45673.48
3	CP /BOLT/	9905.415	15477.14	45781.19
10	CP /BOLT/	9901.937	16157.18	45763.76
11	CP /BOLT/	9902.010	15831.42	45734.61
12	CP /BOLT/	9902.091	15606.47	45772.61

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
Building 2, Suite 100
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INDEX TO DRAWINGS, SURVEY NOTES, AND GENERAL NOTES

HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Revisions	Date

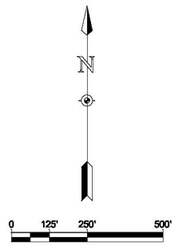
Project Mgr. CTC
Designed By: AJS
Drawn By: RBR
Approved By: DAM
Date: 09/29/20

PROJECT NO.
26-1144.00

DRAWING NO.
G02

SHEET 2 OF 13

INSET MAP
NOT TO SCALE



NOTES:

xx

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SITE ACCESS AND BORROW AREAS PLAN

HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Date	Revisions

Project Mgr. CTG
Designed By: AJS
Drawn By: RBR
Approved By: DAM
Date: 09/29/20

PROJECT NO.
26-1144.00

DRAWING NO.
G03

SHEET 3 OF 13

60% SUBMITTAL
NOT FOR CONSTRUCTION
09/29/20

ONE INCH - IF NOT, SCALE ACCORDINGLY

Drawing Name: I:\36\26-114400 GRAND JUNCTION HOGCHUTE DAM\MAINDWGS 2020\SHEETS\26-1144.00 SITE ACCESS.DWG Tuesday, September 29, 2020 4:41 PM By: RICKS, RONALD

N

0 25' 50' 100'

SCALE IN FEET

NOTES:

xx

60% SUBMITTAL
NOT FOR CONSTRUCTION
09/29/20

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
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EXISTING SITE, STAGING, AND STOCKPILE AREAS PLAN

HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Date	Revisions

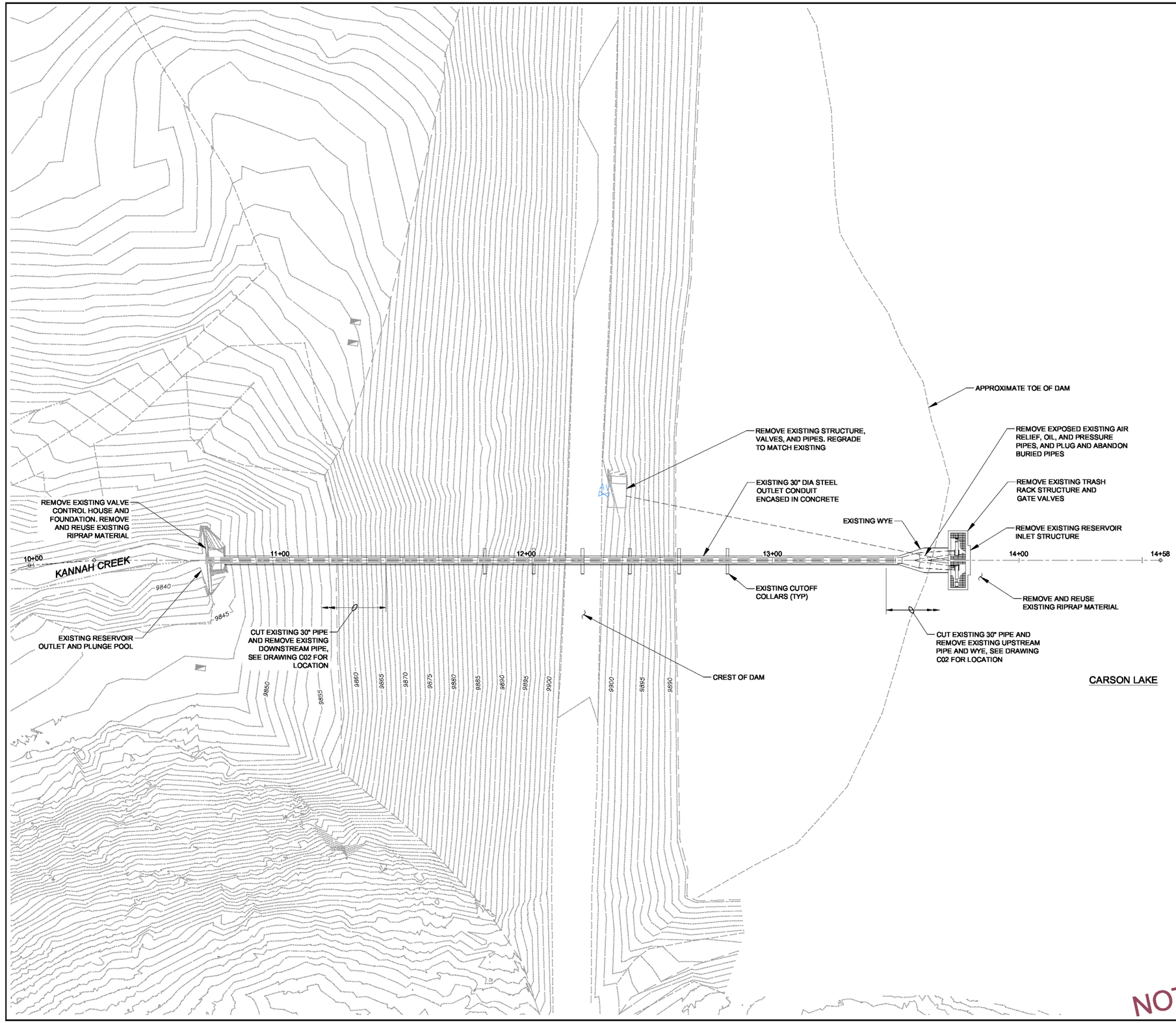
Project Mgr. CTG
Designed By: AJS
Drawn By: RBR
Approved By: DAM
Date: 09/29/20

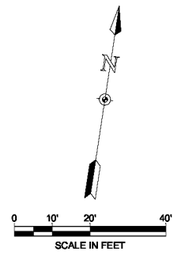
PROJECT NO.
26-1144.00

DRAWING NO.
G04

SHEET 4 OF 13

Drawing Name: I:\36\26-1144.00 GRAND JUNCTION HOGCHUTE DAM\MAINDWGS 2020\SHEETS\26-1144.00 STAGING AND BORROW AREAS.DWG Tuesday, September 29, 2020 4:41 PM By: RICKS, RONALD





NOTES:

xx

ONE INCH - IF NOT, SCALE ACCORDINGLY

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DAM EXISTING CONDITIONS AND DEMOLITION PLAN

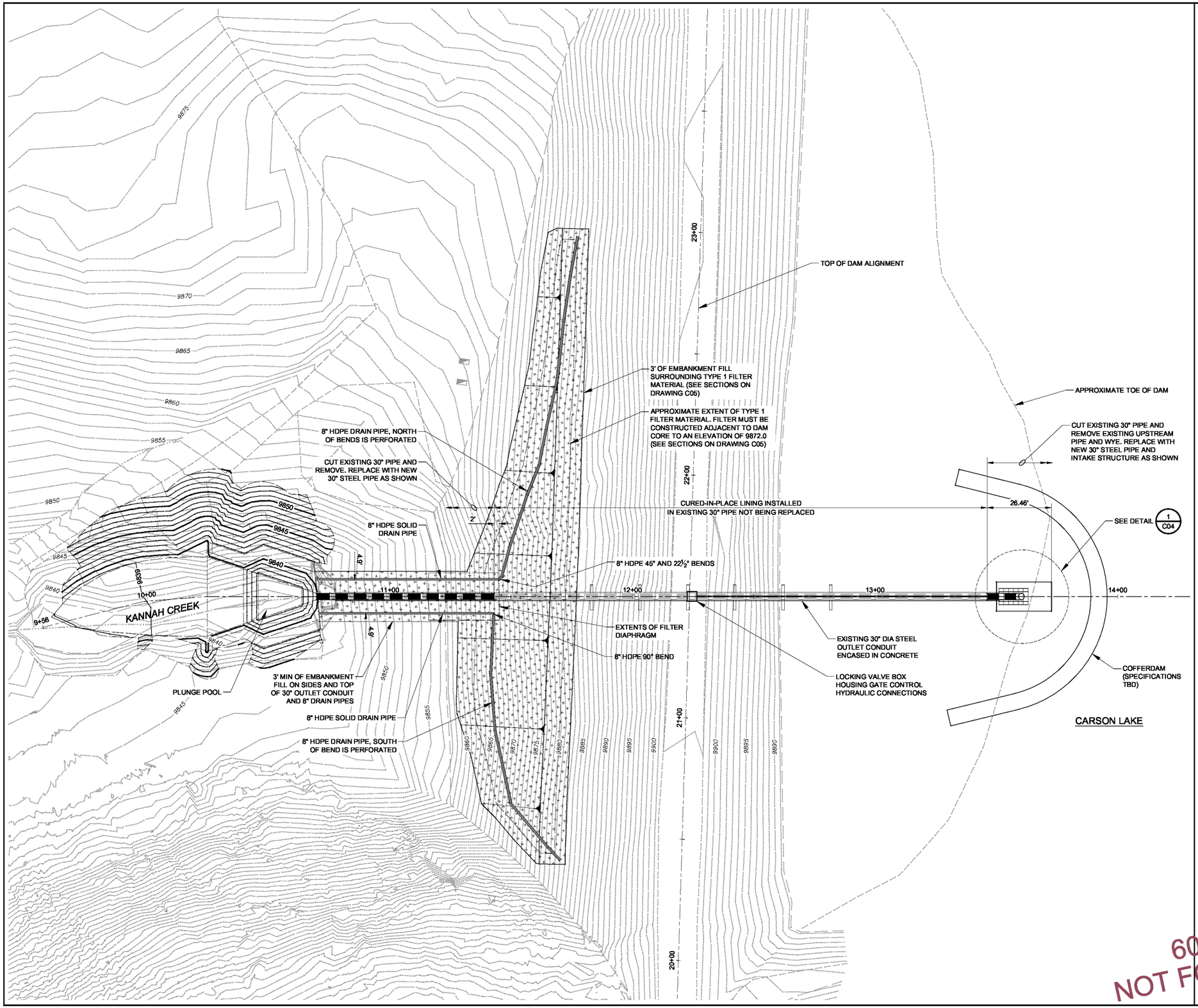
HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Revisions	Date

Project Mgr.	CTC
Designed By:	AJS
Drawn By:	RBR
Approved By:	DAM
Date:	09/29/20

PROJECT NO.
26-1144.00

DRAWING NO.
C01



N

0 10' 20' 40'

SCALE IN FEET

NOTES:

XX

60% SUBMITTAL
NOT FOR CONSTRUCTION
09/29/20

ONE INCH - IF NOT, SCALE ACCORDINGLY

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DAM PLAN

HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Revisions	Date

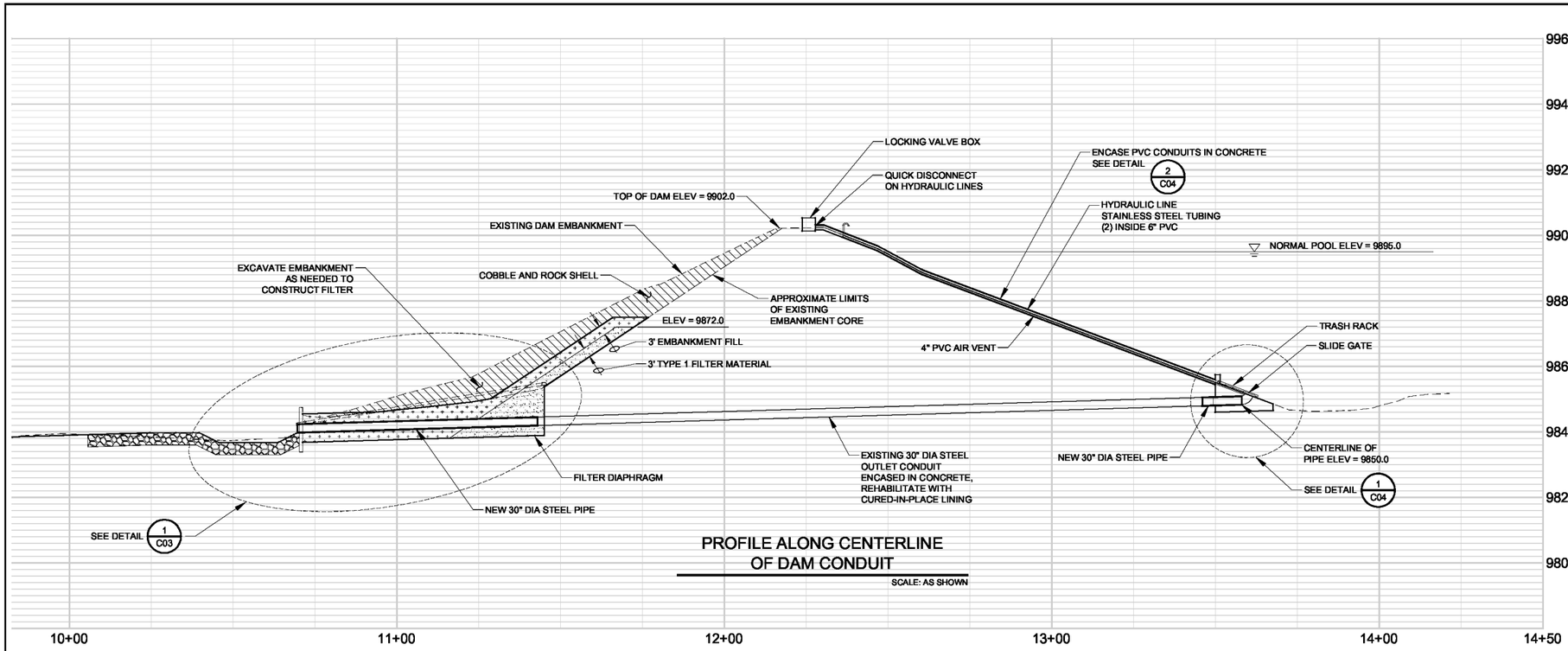
Project Mgr.	CTG
Designed By:	AJS
Drawn By:	RBR
Approved By:	DAM
Date:	09/29/20

PROJECT NO.
26-1144.00

DRAWING NO.
C02

SHEET 6 OF 13

Drawing Name: I:\36\26-114400 GRAND JUNCTION HOGCHUTE DAM\MAINDWGS 2020\SHEETS\26-1144.00 PLAN AND PROFILE.DWG Tuesday, September 29, 2020 5:29 PM By: RICKS, RONALD



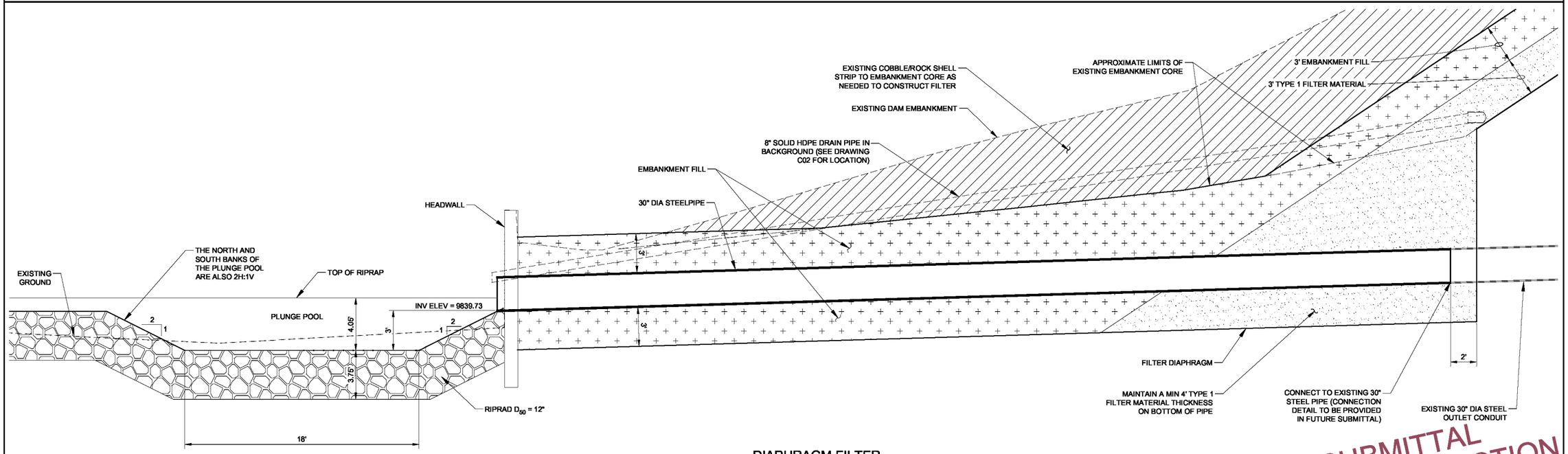
PROFILE ALONG CENTERLINE OF DAM CONDUIT

SCALE: AS SHOWN

0 10' 20' 40'
SCALE IN FEET

NOTES:

XX



DIAPHRAGM FILTER AND OUTLET DETAIL

1 C03

SCALE AS SHOWN

0 2' 4' 8'
SCALE IN FEET

ONE INCH - IF NOT, SCALE ACCORDINGLY

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09/29/20

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DAM PROFILE AND DETAIL

HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Revisions	Date

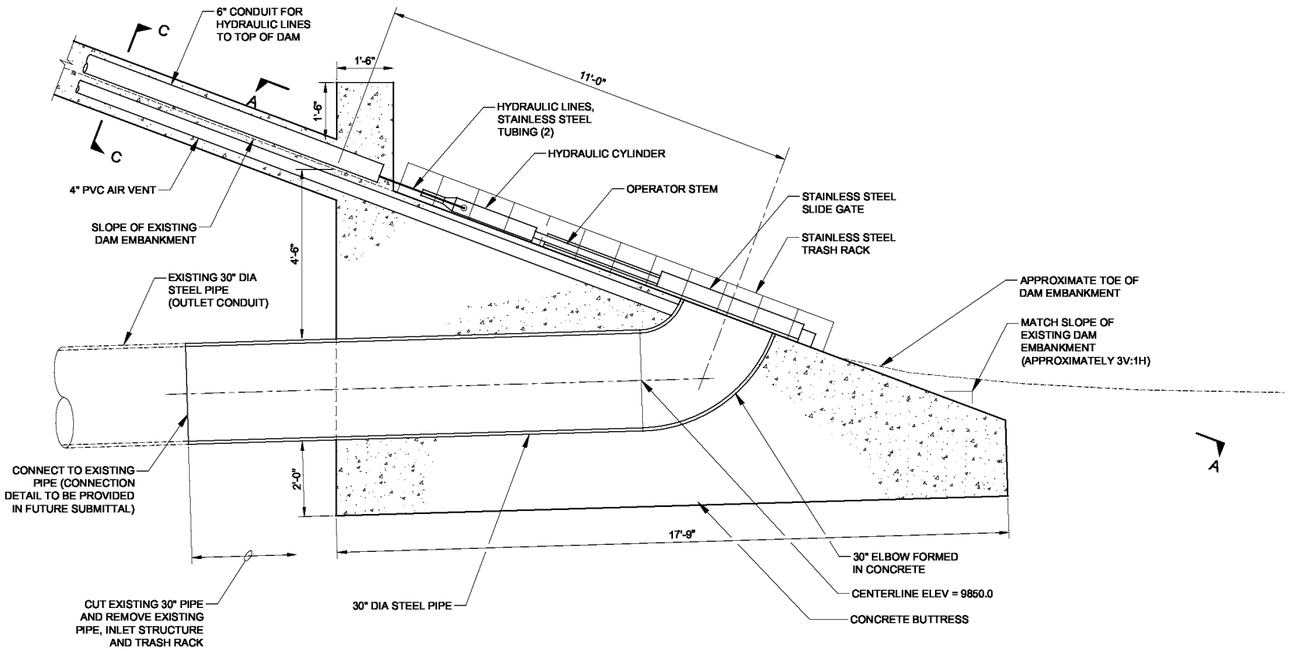
Project Mgr.	CTC	Designed By:	AJS
Drawn By:	RBR	Approved By:	DAM
Date:	09/29/20		

PROJECT NO.
26-1144.00

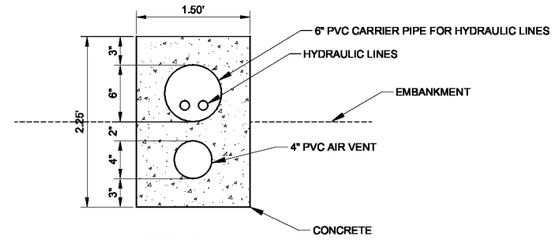
DRAWING NO.
C03

SHEET 7 OF 13

Drawing Name: I:\36\26-1144\00 GRAND JUNCTION HOGCHUTE DAM\MAINDWGS 2020\SHEETS\26-1144.00 PLAN AND PROFILE.DWG Tuesday, September 29, 2020 5:29 PM By: RICKS, RONALD



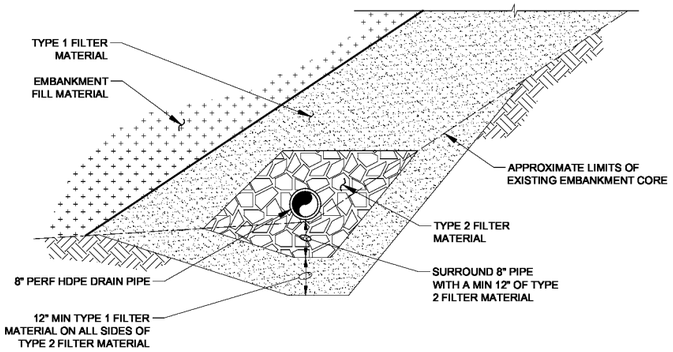
SECTION B-B



SECTION C-C

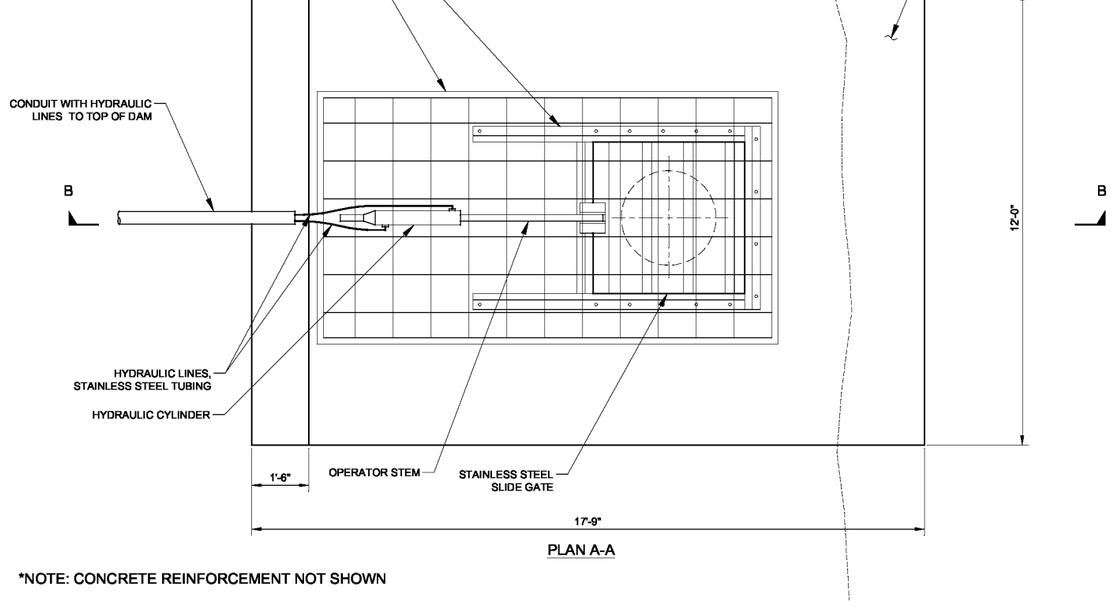
2 / C04 CONCRETE SECTION

N.T.S.



3 / C04 PERFORATED DRAIN PIPE TRENCH DETAIL

SCALE: 1"=2'



PLAN A-A

*NOTE: CONCRETE REINFORCEMENT NOT SHOWN

1 / C04 CONCRETE BUTTRESS DETAIL

SCALE: 1/2"=1'-0"

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NOT FOR CONSTRUCTION
09/29/20

ONE INCH - IF NOT, SCALE ACCORDINGLY

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(970) 223-5556

DAM DETAILS

HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

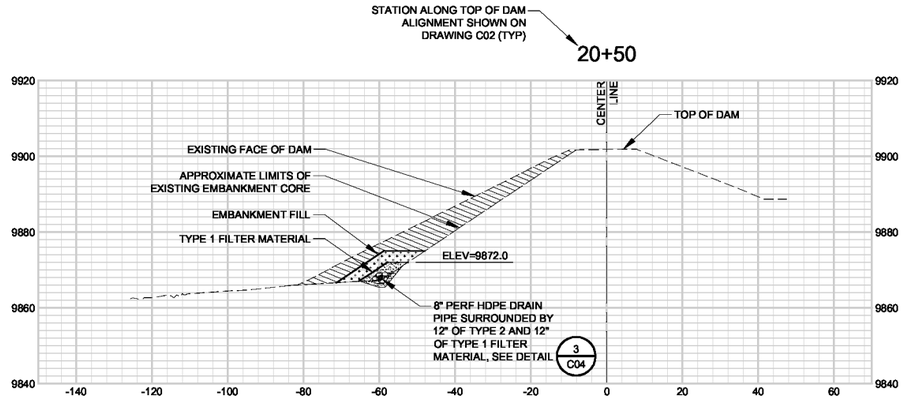
Date
Revisions

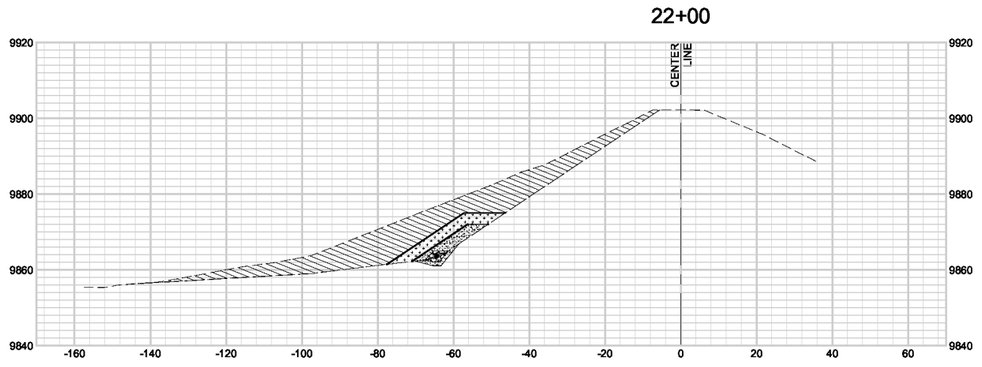
Project Mgr. CTG
Designed By: AJS
Drawn By: RBR
Approved By: DAM
Date: 09/29/20

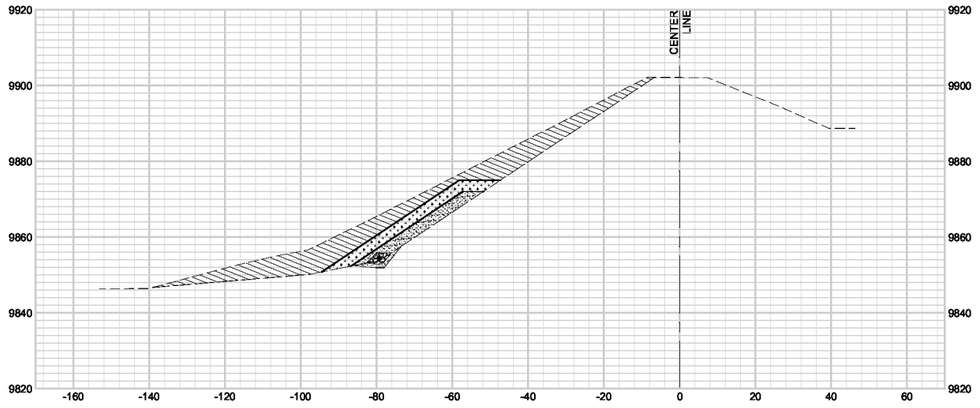
PROJECT NO.
26-1144.00

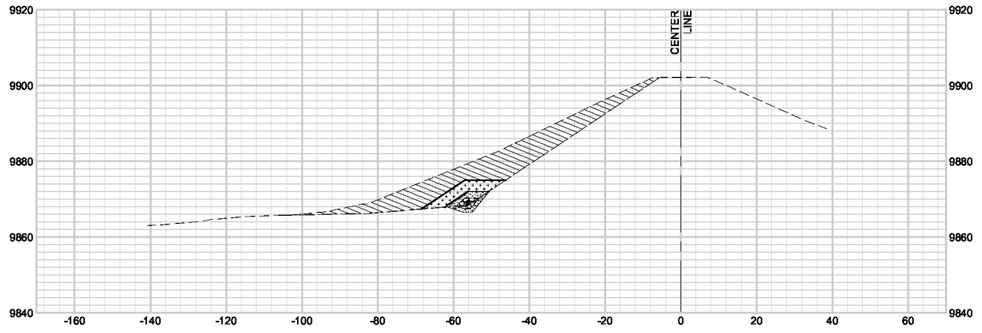
DRAWING NO.
C04

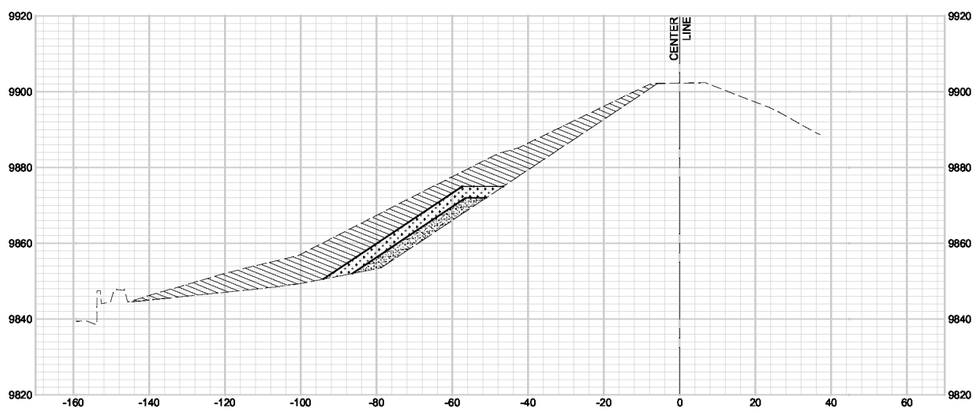
SHEET 8 OF 13

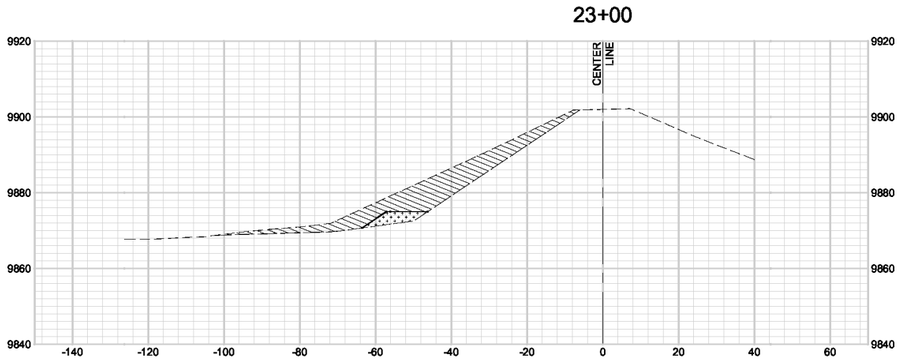












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DAM SECTIONS

HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Revisions	Date

Project Mgr: CTC
Designed By: AJS
Drawn By: RBR
Approved By: DAM
Date: 09/29/20

PROJECT NO.
26-1144.00

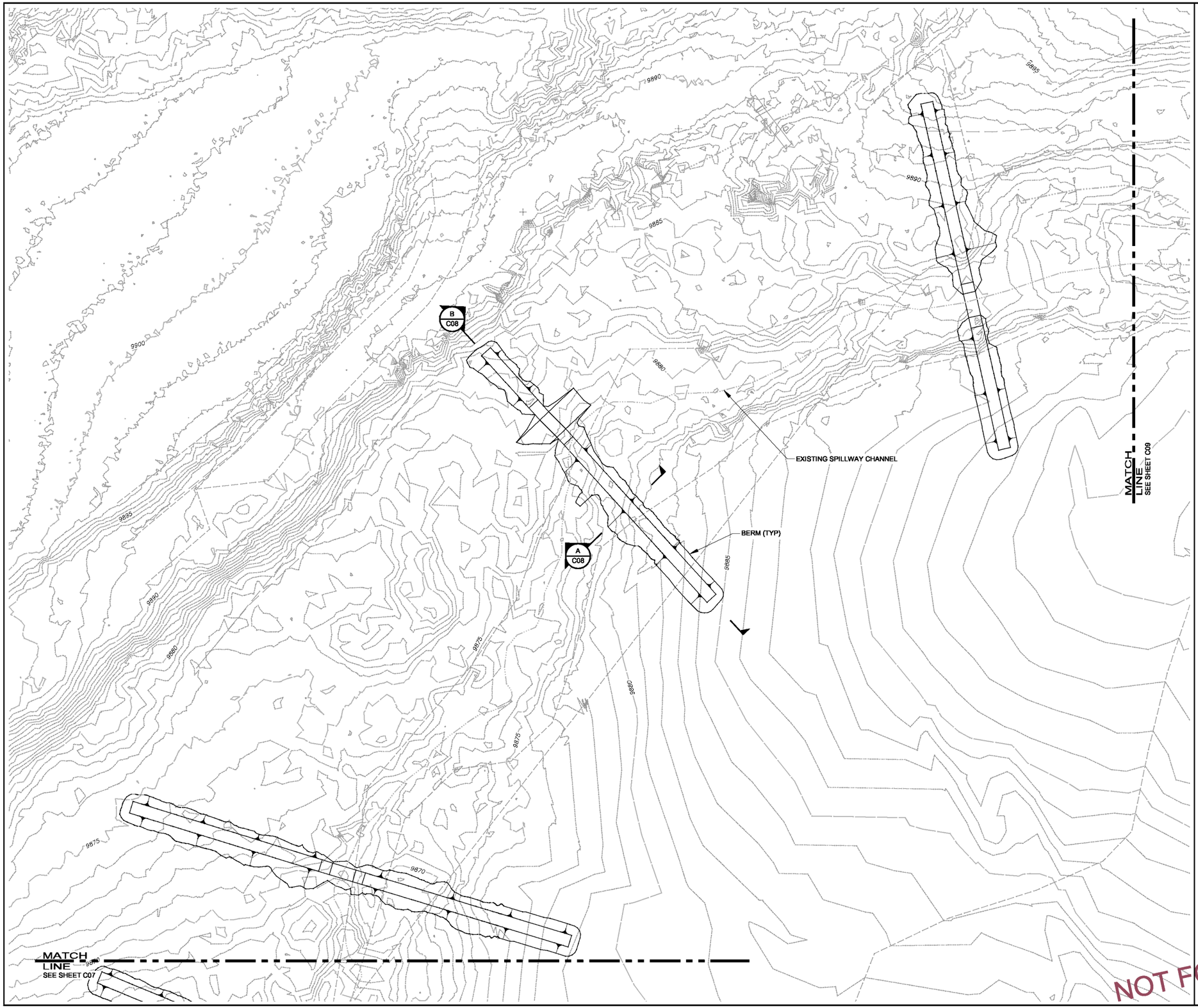
DRAWING NO.
C05

SHEET 9 OF 13

60% SUBMITTAL
NOT FOR CONSTRUCTION
09/29/20

ONE INCH - IF NOT, SCALE ACCORDINGLY

Drawing Name: I:\36\26-114400 GRAND JUNCTION HOGCHUTE DAM\MAINDWGS 2020\SHEETS\26-1144.00 DAM SECTIONS.DWG Tuesday, September 29, 2020 4:49 PM By: RICKS, RONALD



N

0 10' 20' 40'
SCALE IN FEET

NOTES:

xx

NOT FOR CONSTRUCTION
09/29/20

ONE INCH - IF NOT, SCALE ACCORDINGLY

AYRES
3665 JFK Parkway
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SPILLWAY PLAN 1 OF 2

HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Revisions	Date

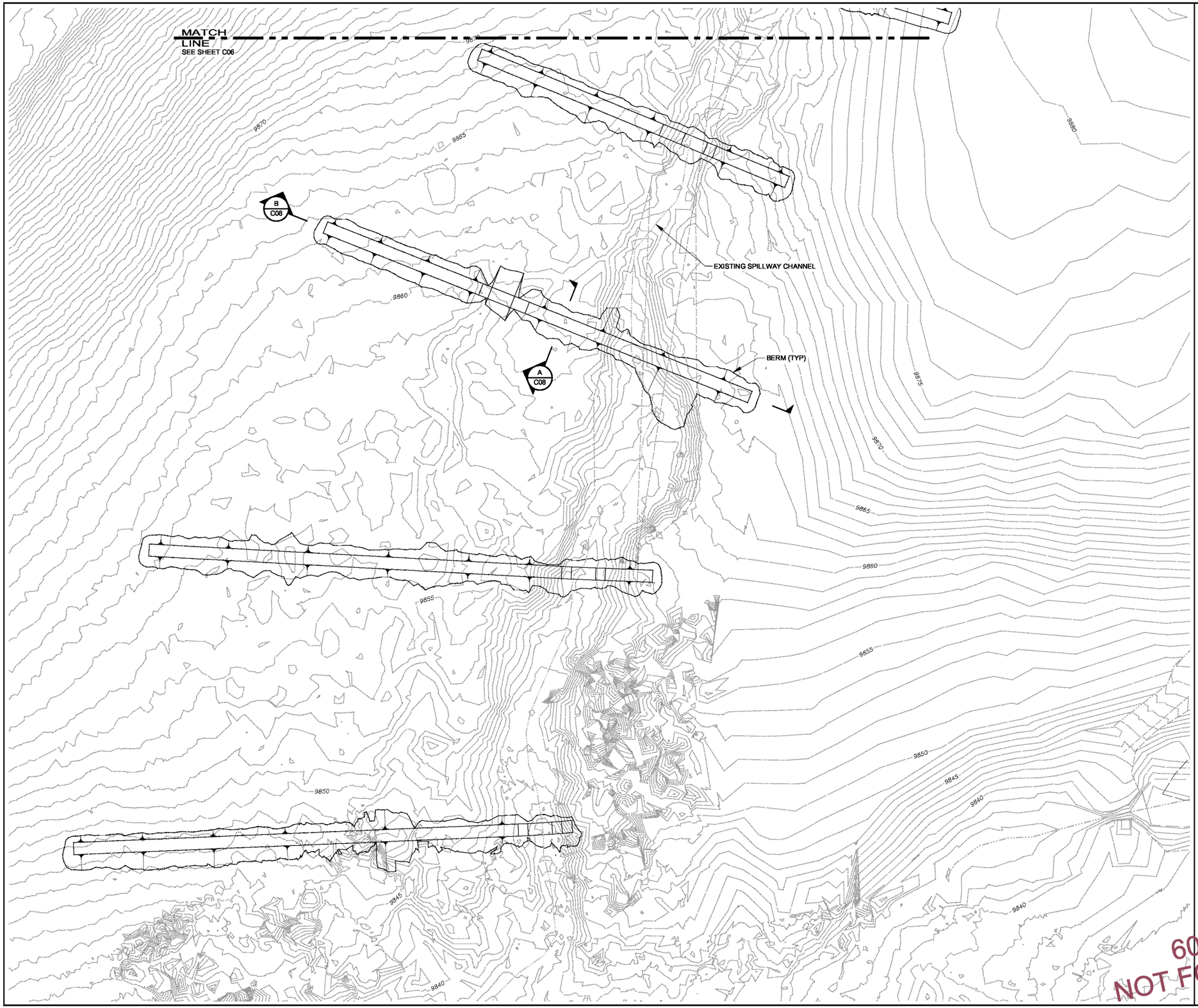
Project Mgr: CTG
Designed By: AJS
Drawn By: RBR
Approved By: DAM
Date: 09/29/20

PROJECT NO.
26-1144.00

DRAWING NO.
C06

SHEET 10 OF 13

Drawing Name: I:\26\26-1144.00 GRAND JUNCTION HOGCHUTE DAM\MAIN\DWGS 2020\SHEETS\26-1144.00 SPILLWAY PLAN.DWG Tuesday, September 29, 2020 5:07 PM By: RICKS, RONALD



NOTES:

xx

60% SUBMITTAL
NOT FOR CONSTRUCTION
09/29/20

ONE INCH - IF NOT, SCALE ACCORDINGLY

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SPILLWAY PLAN 2 OF 2

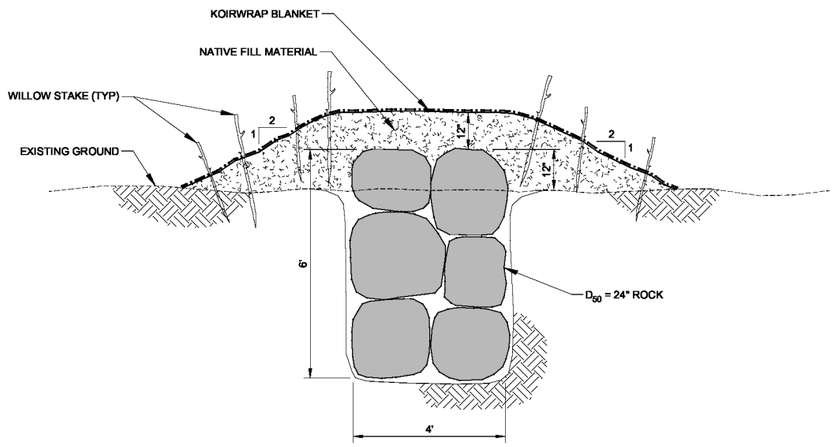
HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Revisions	Date

Project Mgr.	CTC
Designed By:	AJS
Drawn By:	RBR
Approved By:	DAM
Date:	09/29/20

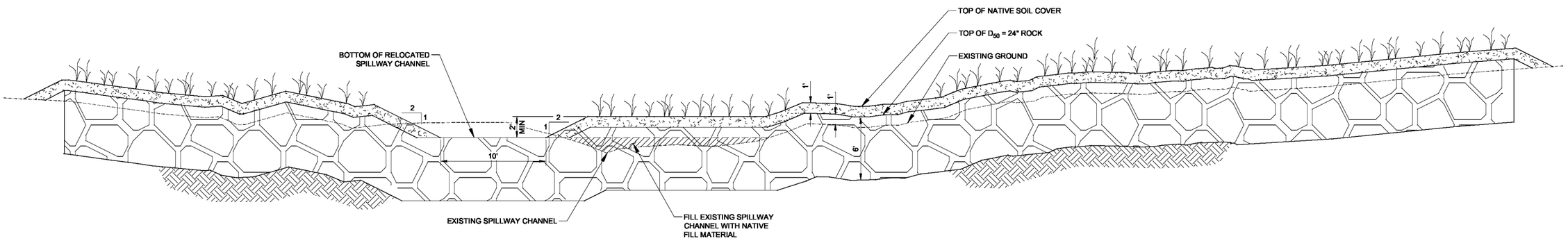
PROJECT NO.
26-1144.00

DRAWING NO.
C07



A / C08 TYPICAL BERM SECTION

NOT TO SCALE



B / C08 TYPICAL BERM PROFILE

SCALE: 1"=5'

60% SUBMITTAL
NOT FOR CONSTRUCTION
09/29/20

ONE INCH - IF NOT, SCALE ACCORDINGLY

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SPILLWAY DETAILS AND SECTIONS

HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Revisions	Date

Project Mgr.	CTG
Designed By:	AJS
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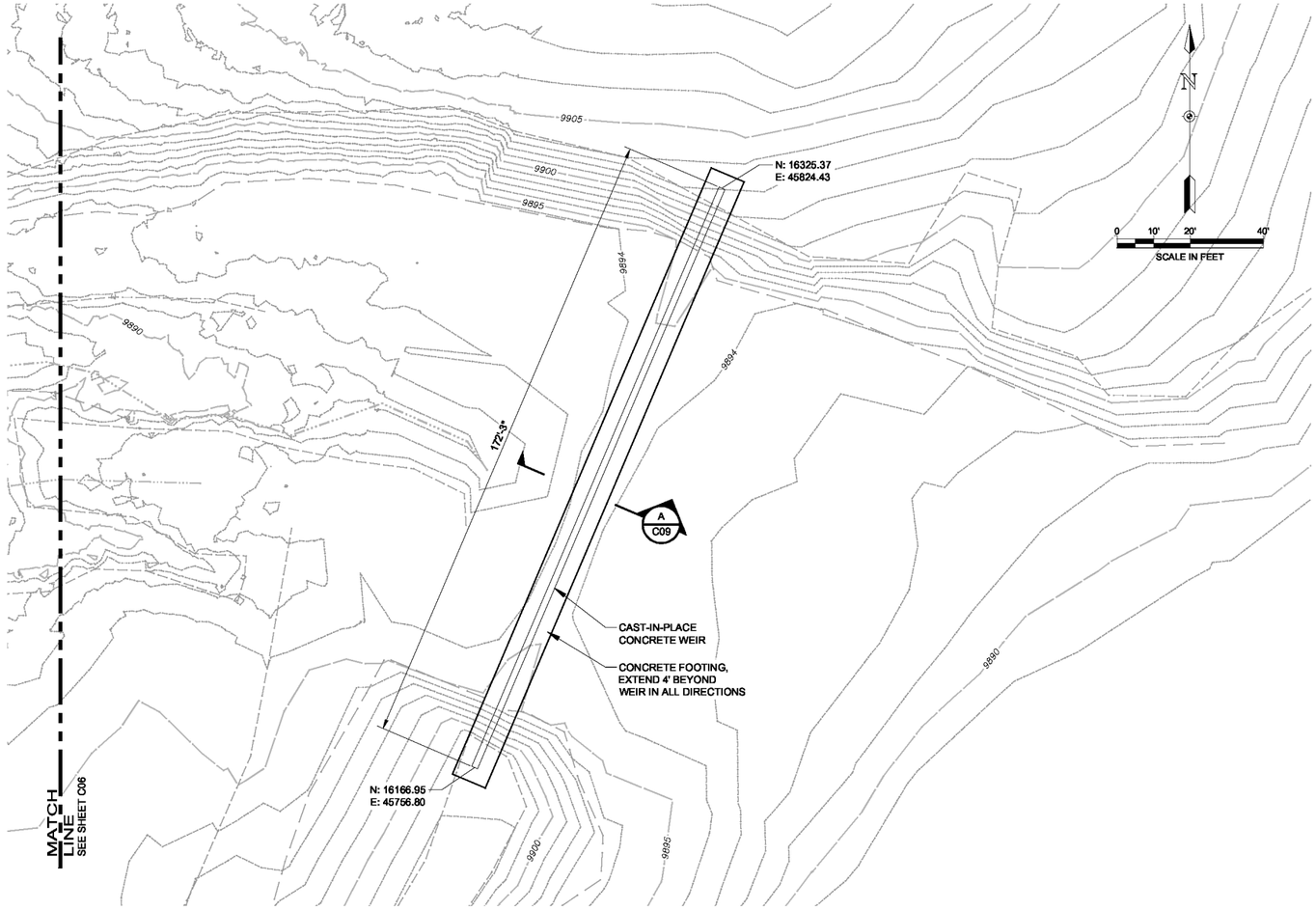
Approved By:	DAM
Date:	09/29/20

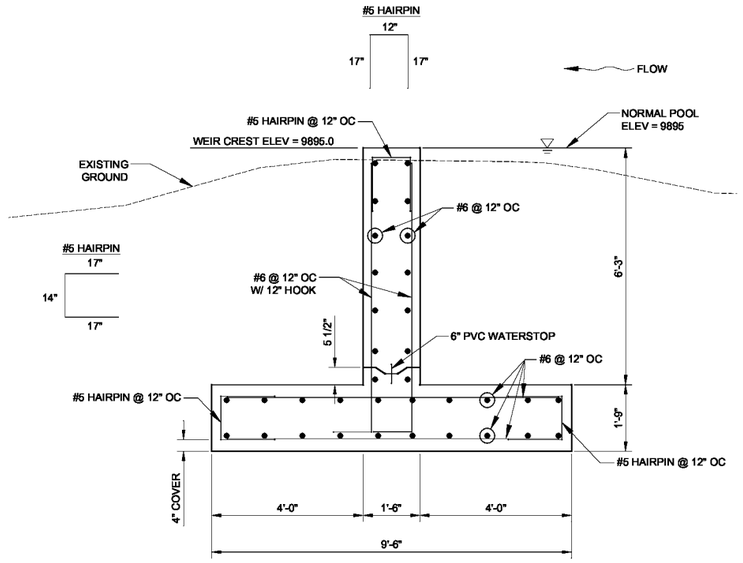
PROJECT NO.
26-1144.00

DRAWING NO.
C08



OVERFLOW WEIR PLAN

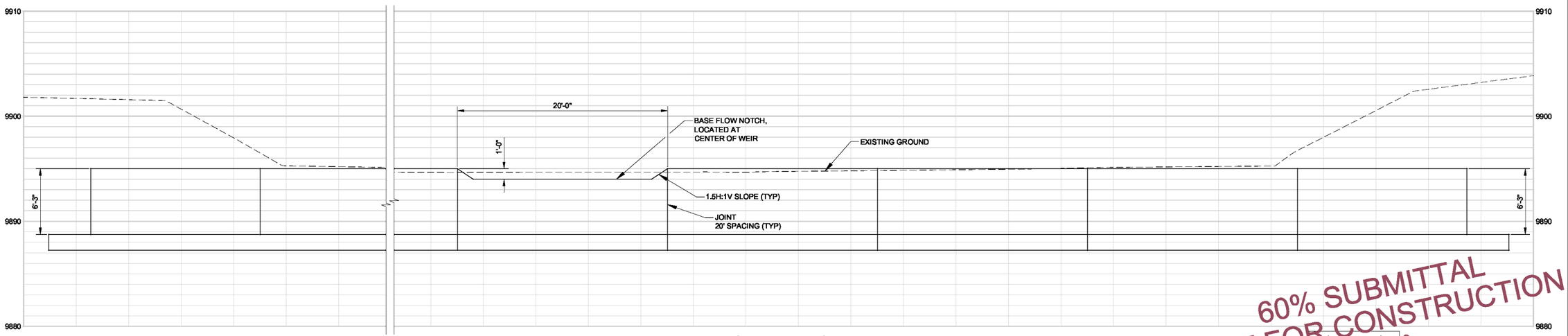
SCALE: AS SHOWN



A
C09

SECTION

SCALE: 1"=2'



FRONT ELEVATION

SCALE: 1"=5'

60% SUBMITTAL
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09/29/20

ONE INCH IF NOT,
SCALE ACCORDINGLY

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SPILLWAY OVERFLOW WIER
PLAN AND DETAILS

HOGCHUTE DAM REPAIRS
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

Date	Revisions

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Drawn By:	RBR
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Date:	09/29/20

PROJECT NO.
26-1144.00

DRAWING NO.
C09

SHEET 13 OF 13

Drawing Name: I:\26\26-114400 GRAND JUNCTION HOGCHUTE DAM\MAINDWGS 2020\SHEETS\26-1144.00 OVERFLOW WEIR.DWG Tuesday, September 29, 2020 4:42 PM By: RICKS, RONALD

CITY OF Grand Junction COLORADO

Purchasing Division

ADDENDUM NO. 1

DATE: **October 16, 2020**
FROM: **City of Grand Junction Purchasing Division**
TO: **All Offerors**
RE: **Hogchute (aka) Carson) Reservoir Dam Modifications Project IFB-4839-21-DH**

Offerors responding to the above referenced solicitation are hereby instructed that the requirements have been clarified, modified, superseded and supplemented as to this date as hereinafter described.

Please make note of the following clarifications:

1. Q. What is the engineers estimate for the project or ball park price range for the work to be completed?

A. The engineer's 30% design plans estimate for the project is $2.9 million.

2. Q. Will there be prerequisites that the bidding contractors need to meet in order to be allowed to bid the project.

A. Contractors interested in participating in this solicitation process must attend the Mandatory Pre-Bid Meeting (see Section 3.3.1), and must also provide references with their bid submittal (at least 3 references of similar projects in size, scope, complexity, and cost).

The original solicitation for the project noted above is amended as noted.

All other conditions of subject remain the same.

Respectfully,

Duane Hoff Jr., Senior Buyer
City of Grand Junction, Colorado

CITY OF Grand Junction COLORADO

Purchasing Division

ADDENDUM NO. 2

DATE: **November 30, 2020**
FROM: **City of Grand Junction Purchasing Division**
TO: **All Offerors**
RE: **Hogchute (aka) Carson) Reservoir Dam Modifications Project IFB-4839-21-DH**

Offerors responding to the above referenced solicitation are hereby instructed that the requirements have been clarified, modified, superseded and supplemented as to this date as hereinafter described.

Please make note of the following clarifications:

1. Q. Where are staging and stocking areas?

   A. Staging is available in the parking area and some stockpiling areas are shown on the plans.

2. Q. Are there borrow areas available on site for fill and riprap materials?

   A. The City and its consultant is working to identify on-site borrow areas for necessary materials. The city is also working with the USFS to allow using riprap from the old quarry adjacent to FS Rd 108.

3. Q. What is the project budget?

   A. Approximately $3M?

4. Q. Is the Hogchute (Carson) Dam Jurisdictional?

   A. Yes, Hogchute has a 640 ac-ft capacity and is rated High Hazard by Colorado Division of Water Resources Dam Safety Program.

5. Q. What will the standards be for the size and shape of riprap on the dam face? Will rounded basalt be allowable (similar to what exists on the dam face today)?

   A. The City will need to determine if it is willing to accept a non-standard riprap material for the dam face with the DWR Dam Safety Program.

6. Q. Will the contractor need to correct any damage caused by equipment to FS 108 before Final Completion?

   A. Yes.

7. Q. Will the Contractor be required to obtain permits such as 404 Wetland and NEPA permits?

A. As specified in Section ### of the IFB, the City is working to obtain the above permits as well as agreements with USFS and DWR Dam Safety. The Contractor will be responsible for Stormwater and Dewatering Permits.

8. Q. Would the City be willing to share the outlet pipe inspection video footage in an addendum?

A. The City will consider issuing the video in an addendum.

9. Q. How will the bypass channel be diverted during the downstream channel improvements?

A. The City and its consultant are considering options for this challenge.

10. To clarify the References item under Section 3.6 Contractor Bid Documents, Contractor shall submit the following with their bid submittal:

The City of Grand Junction does not currently have a "pre-qualification" process in service. However, the City would like to take this opportunity to emphasize that contractor experience with a project of this scope and size is important to the success of this project.

Due to the general complexities and critical aspects of the project, the Contractor shall submit a minimum of 3 references, with their bid submittal, of projects of similar scope and size in which the contractor was the General Contractor for those projects.

Please include:
-Project Title and a brief description of the project:
-Company Name;
-Point of Contact information;
-Project Location;
-and Dollar Amount.

These references shall be taken into consideration for selecting the awarded bidder.

11. Q. With the reconstruction work at Hogchute dam, have you determined if you need to have a debris barrier in front of the spillway?

A. This type of debris barrier/boon is not currently in the design. If it is determined that something like this is needed, it will be added to the scope/specifications.

12. Q. I'm hearing that there is going to be another pre-bid meeting for this project. Just checking to see if this is the case?

A. No. There are no other pre-bid meetings for this solicitation process.

The original solicitation for the project noted above is amended as noted.

All other conditions of subject remain the same.

Respectfully,

Duane Hoff Jr., Senior Buyer
City of Grand Junction, Colorado

CITY OF Grand Junction COLORADO

Purchasing Division

ADDENDUM NO. 3

DATE: **March 26, 2021**
FROM: **City of Grand Junction Purchasing Division**
TO: **All Offerors**
RE: **Hogchute (aka) Carson) Reservoir Dam Modifications Project IFB-4839-21-DH**

Offerors responding to the above referenced solicitation are hereby instructed that the requirements have been clarified, modified, superseded and supplemented as to this date as hereinafter described.

Please make note of the following clarifications:

1. The Responses Due Date and Time have been modified/update follows:
   Responses Due: April 30, 2021 prior to 3:00pm

   NOTE: All City solicitation openings will continue to be held virtually.

   Please join Solicitation Opening, IFB-4839-21-DH, Hogchute aka Carson Reservoir Dam Modifications Project on GoToConnect from your computer using the Chrome browser.
   https://my.jive.com/meet/392816469
   You can also dial in using your phone.
   US: (571) 317-3116

   Access Code: 392-816-469

2. Section 3.7 IFB Tentative Time Schedule has been modified/updated as follows:

Invitation for Bids available:	October 7, 2020
Mandatory Pre-Bid Meeting:	October 22, 2020
Pre-Qualification Application Deadline	April 9, 2021
Inquiry deadline, no questions after this date:	April 9, 2021
Addendum Posted:	April 19, 2021
Submittal deadline for proposals (Bid Opening):	April 30, 2021
City Council Approval:	May 19, 2021
Notice of Award & Contract Execution:	May 20, 2021
Bonding & Insurance Cert due	May 26, 2021
Preconstruction meeting	May 26, 2021
Work begins no later than	Upon Receipt of Notice to Proceed
Final Completion	October 31, 2021
Holidays:	July 5, 2021
	September, 6, 2021

3. **General Contractor/Bidder Pre-Qualification:** Due to the complexity, size, and scope of this project, the City has determined that a pre-qualification process is prudent to ensuring that the awarded bidder is both qualified and capable of successfully performing and completing the project. Therefore, in an effort to be respectful of the time and cost of General Contractors/Bidders putting together a bid packages for which they may not be qualified to perform, we are requiring that all General Contractors/Bidders intending to submit a bid response to this solicitation process, complete and submit the attached Pre-Qualification Application and all required documents to the City's Purchasing Agent (via e-mail duaneh@gjcity.org) **no later than April 9, 2021** Each individual General Contractor/Bidder shall be notified of their pre-qualification status **no later than April 19, 2021**. Pre-Qualification Application (Link).

4. See Hogchute Dam Design Report (Link), containing 100% drawings, Geotech report, specifications, hydraulic studies, project manual, etc. NOTE: File is 74MB in size.

5. See Price Bid Schedule (Link)

6. **3.3.28 Construction Surveying & "As-Built" Drawings:** In addition to Items I and II in the General Contract Conditions, Section 54, As-Built record information will be provided to, and approved by City staff prior to Final Acceptance of the Project. Information to be provided must be in electronic format (e.g. AutoCAD and/or survey files) along with a PDF set of As-Built drawings. As-Built electronic files must contain information suitable for the City to maintain Utility records to the standards set forth in the new Colorado 811 One Call/Subsurface Utility Law (effective August 8, 2018) and standards as described in the American Society of Civil Engineers (ASCE) Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data (ASCE 38-02).

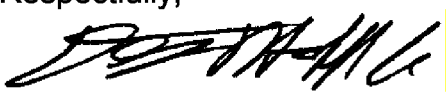
Electronic information for As-Built records shall include, but is not limited to, verification of all horizontal and vertical changes in pipe alignments, elbows, tees, manholes, valves, control structures, service taps, service pipe (horizontal and vertical deflections to ROW line, meter pits, or clean-outs, whichever is closer), beginning and ending of slip-lined segments, tie-in or connection to existing infrastructure, etc. Distance between As-Built data points along pipe alignment is dependent on the amount of deflection used to install the pipe in the field. There must be sufficient point data to create a plan and profile of all infrastructure accurate to within eighteen inches (18") of the physical structures anywhere along the project.

The cost for surveying all fittings, both sewer and water, shall be incidental to the project cost and will not be paid for separately.

The original solicitation for the project noted above is amended as noted.

All other conditions of subject remain the same.

Respectfully,



Duane Hoff Jr., Senior Buyer
City of Grand Junction, Colorado

CITY OF Grand Junction COLORADO

Purchasing Division

ADDENDUM NO. 4

DATE: **March 26, 2021**
FROM: **City of Grand Junction Purchasing Division**
TO: **All Offerors**
RE: **Hogchute (aka) Carson) Reservoir Dam Modifications Project IFB-4839-21-DH**

Offerors responding to the above referenced solicitation are hereby instructed that the requirements have been clarified, modified, superseded and supplemented as to this date as hereinafter described.

Please make note of the following clarifications:

1. Could you please Clarify that the contractor will purchase pipe and fittings and also do the installation on the Purdy Mesa Flowline?

A. That is correct. The Contractor shall be responsible to provide all materials, parts, supplies, equipment, labor, etc. to complete the project, as per the solicitation documents.

2. Can you please clarify if the Purdy Mesa Flowline job that the city just released is an install only, owner furnished pipe/fittings?

A. That is not correct. The Contractor shall be responsible to provide all materials, parts, supplies, equipment, labor, etc. to complete the project, as per the solicitation documents.

3. Will there be another site visit allowed for additional Contractors to able to bid this project.

A. No.

The original solicitation for the project noted above is amended as noted.

All other conditions of subject remain the same.

Respectfully,

Duane Hoff Jr., Senior Buyer
City of Grand Junction, Colorado

CITY OF Grand Junction COLORADO

Purchasing Division

ADDENDUM NO. 5

DATE: **March 26, 2021**
FROM: **City of Grand Junction Purchasing Division**
TO: **All Offerors**
RE: **Hogchute (aka) Carson) Reservoir Dam Modifications Project IFB-4839-21-DH**

Offerors responding to the above referenced solicitation are hereby instructed that the requirements have been clarified, modified, superseded and supplemented as to this date as hereinafter described.

Please make note of the following clarifications:

1. Please disregard the addendum 4 posted as it was posted in error.

The original solicitation for the project noted above is amended as noted.

All other conditions of subject remain the same.

Respectfully,

Duane Hoff Jr., Senior Buyer
City of Grand Junction, Colorado

CITY OF Grand Junction COLORADO

Purchasing Division

ADDENDUM NO. 6

DATE: **March 30, 2021**
FROM: **City of Grand Junction Purchasing Division**
TO: **All Offerors**
RE: **Hogchute (aka) Carson) Reservoir Dam Modifications Project IFB-4839-21-DH**

Offerors responding to the above referenced solicitation are hereby instructed that the requirements have been clarified, modified, superseded and supplemented as to this date as hereinafter described.

Please make note of the following clarifications:

1. Will there be another site visit allowed for additional Contractors to able to bid this project.

   A. No. No other site visits will be made.

The original solicitation for the project noted above is amended as noted.

All other conditions of subject remain the same.

Respectfully,

Duane Hoff Jr., Senior Buyer
City of Grand Junction, Colorado

CITY OF Grand Junction COLORADO

Purchasing Division

ADDENDUM NO. 7

DATE: **April 21, 2021**
FROM: **City of Grand Junction Purchasing Division**
TO: **All Offerors**
RE: **Hogchute (aka) Carson) Reservoir Dam Modifications Project IFB-4839-21-DH**

Offerors responding to the above referenced solicitation are hereby instructed that the requirements have been clarified, modified, superseded and supplemented as to this date as hereinafter described.

Please make note of the following clarifications:

1. Q. The Responses Due Date and Time have been modified/update follows:
   Responses Due: May 17, 2021 prior to 3:00pm

   Please join Solicitation Opening, IFB-4839-21-DH, Hogchute aka Carson Reservoir Dam Modifications Project on GoToConnect from your computer using the Chrome browser.
   https://my.jive.com/meet/392816469
   You can also dial in using your phone.
   US: (571) 317-3116

   Access Code: 392-816-469

2. Section 3.7 IFB Tentative Time Schedule has been modified/updated as follows:

Invitation for Bids available:	October 7, 2020
Mandatory Pre-Bid Meeting:	October 22, 2020
Pre-Qualification Application Deadline	April 9, 2021
Inquiry deadline, no questions after this date:	May 5, 2021
Addendum Posted:	May 10, 2021
Submittal deadline for proposals (Bid Opening):	May 17, 2021
City Council Approval:	June 2, 2021
Notice of Award & Contract Execution:	June 3, 2021
Bonding & Insurance Cert due	June 8, 2021
Preconstruction meeting	June 8, 2021
Work begins no later than	Upon Receipt of Notice to Proceed
Final Completion	October 31, 2021
Holidays:	July 5, 2021
	September, 6, 2021

3. Q. If the prequalification process doesn't notify contractors until 4/19 can the bid date be extended?

   A. See item 2 of this addendum above.

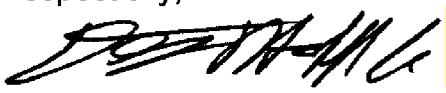
4. Q. Can the question deadline be extended a week after the qualification process is complete to allow those qualified to ask questions regarding the project?

A. See item 2 of this addendum above.

The original solicitation for the project noted above is amended as noted.

All other conditions of subject remain the same.

Respectfully,



Duane Hoff Jr., Senior Buyer
City of Grand Junction, Colorado

CITY OF Grand Junction COLORADO

Purchasing Division

ADDENDUM NO. 8

DATE: April 29, 2021
FROM: City of Grand Junction Purchasing Division
TO: All Offerors
RE: Hogchute (aka) Carson) Reservoir Dam Modifications Project IFB-4839-21-DH

Offerors responding to the above referenced solicitation are hereby instructed that the requirements have been clarified, modified, superseded and supplemented as to this date as hereinafter described.

Please make note of the following clarifications:

1. The following companies have been approved for this project.

Company Name	Location	Name	Phone	E-Mail	Construction - Pre-Qualification Approved/Not
Zak Dirt, Inc.	Longmont, CO	Pete Sewczak	970-535-4657	pjsewczak@zakdirt.com	Approved
CON-SY, Inc.	Grand Junction, CO	Thomas Lee	970-549-1270	consyinc@aol.com	Approved
Dietzler Construction Corp.	Berthoud, CO	John Dietzler	303-532-8865	jdietzler@dietzlerco.com	Approved
Kissner G.C., Inc.	Cedaredge, CO	Bryan Kissner	970-835-7910	bkissner@kissnergen.com	Approved
American West Construction, LLC	Denver, CO	Brian Schrameyer	303-455-0838	bschrameyer@trustawc.com	Approved
ESCO Construction Co.	Evergreen, CO	Eric Clark	303-674-3385	estimating@escomailbox.com	Approved

2. Q. Will DR17 HDPE be accepted due to the lack of availability/lead time of DR32.5 HDPE pipe?

A. DR17 pipe will be acceptable.

3. Q. City and State standards for delivery time of concrete is 90 minutes from batch plant to site. It may not be possible for trucks to deliver concrete in that window. How should this be handled?

A. The Cast in Place Concrete Spec requires placement within one hour of adding water in mix. Admixture can be allowed to increase this time and contractors would have to provide us this in their concrete mix design submittal.

4. Q. There's also some confusion on the HDPE drain pipe spec- everything points to FUSION HDPE but in the spec it says "integral bell and spigot" which FUSION HDPE is not. Please clarify pipe type needed.

A. Either bell and spigot or fusion welded HDPE joints are acceptable.

5. Q. Are there CAD files available for the City of Grand Junction - Hogchute (aka Carson) Reservoir Dam Modifications Project? They would be helpful to our estimating team.

A. CAD files are not available during the bidding process but will be provided to the selected contractor.

6. Q. Line item 10 on the bid schedule (HDPE Solid Drain Pipe) does not have a quantity.

A. Quantity for Item 10 – HDPE Solid Drain Pipe = 300 LF. See updated Price Bid Schedule (Link). Contractor shall utilize this Addendum 8 Price Bid Schedule when submitting their bid response.

7. Q. Does this project have Buy American requirements? I'm wondering about domestic materials, particularly in regard to steel pipe and the SS slide gate.

A. There is no Buy America requirement on this project.

8. Q. Would it be possible to change the embankment excavation and embankment fill bid items from LS to CY?

A. The unit remains unchanged; please provide lump sum costs for these bid items.

9. Q. Is there a spec in the project manual for the type 1 and type 2 filter materials?

A. Yes, see the Drain Fill specification (33 41 66) for type 1 and type 2 filter materials.

10. Q. Will a sacrificial test on the sand be required and if so who will approve the procedure?

A. We assume this question pertains to two stage filter construction and sacrificial testing of two stage filter material is not required.

11. Q. I have been in contact with Onerain regarding the early warning system, and they have asked if you have an exact location for the StormLink Monitoring Station below the dam structure?

A. See Sheet 35 (Drawing #C29) for specific proposed location for the Monitoring Station below the dam structure.

12. Q. As we all know, weather on the Grand Mesa is unpredictable. In the even winter comes early (which it has in the past), and work on this project becomes impossible to safely continue, can it be finished the following summer?

A. Reference Section 2.42 Force Majeure in the solicitation document.

13. Q. Bid Item No. 10 HDPE Solid Drain Pipe has a bid unit of "LF", but no quantity. What is the bid quantity for this item?

A. See answer to Q6 above.

14. Q. Can you verify that the City is supplying the SS Slide Gate?

A. The City will supply the SS slide gate and the hydraulic control cylinder. It is the responsibility of the Contractor to supply remaining parts such as hydraulic conduit, etc.

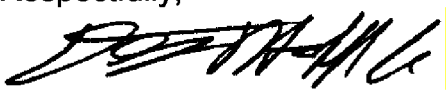
15. Q. The specifications state that sheet piling cannot be used within 10 of any permanent structure to protect against damage from vibration. Is the embankment dam considered a "permanent structure" meaning that sheet pile cannot be used within 10 of the footprint?

A. Section 01 57 60 limits sheet piling to within 10 feet of permanent Structure. For construction dewatering purposes, the embankment is not considered a permanent structure.

The original solicitation for the project noted above is amended as noted.

All other conditions of subject remain the same.

Respectfully,



Duane Hoff Jr., Senior Buyer
City of Grand Junction, Colorado

CITY OF Grand Junction COLORADO

Purchasing Division

ADDENDUM NO. 9

DATE: **May 10, 2021**
FROM: **City of Grand Junction Purchasing Division**
TO: **All Offerors**
RE: **Hogchute (aka) Carson) Reservoir Dam Modifications Project IFB-4839-21-DH**

Offerors responding to the above referenced solicitation are hereby instructed that the requirements have been clarified, modified, superseded and supplemented as to this date as hereinafter described.

Please make note of the following clarifications:

1. Q. How much riprap will the contractor have to import?

A. Riprap should generally be stockpiled and replaced. The quarry shown on Sheet G03 will supplement any remaining need. This quarry may also be used for riprap in other locations and rocks for berms.

2. Q. Just wanted to check if Waterman and Orbinox gates can be approved as equals on this project?

A. As stated in the Specifications, the City will procure the gate. Contractor is responsible for installation only. Approved equals are not applicable.

3. Q. I did not see any proposed access locations into the coffer dam location. Can you show an access point for construction purposes?

A. Access is the responsibility of the Contractor. The Contractor will create, maintain and remove temporary access as part of their work in the Reservoir.

4. Q. Can you explain how the 30 inch relief pipe is to be kept in service while the CIPP process is going on?

A. It is intended that the 30-inch pipe will not be in service during improvements to the pipe and associated outlet components (e.g. slide gate, baffle structure, etc.). Dewatering is a part of this project.

5. Please make note of the following Bidding Requirements:

CHANGES TO SPECIFICATIONS

Item 1-1. Section 01 01 00 - General Requirements. 1.04 Project Meetings. Delete paragraph A and replace with following:

A. A preconstruction conference will be scheduled after award of contract and prior to beginning work. This meeting shall be attended by A/E, Owner, SEO Representative, and an authorized representative of Contractor.

Item 1-2 Section 01 33 00 - Submittal Procedures. 1.01 Summary. Insert the following paragraph after A:

B. At the preconstruction meeting the SEO will identify submittals requiring SEO approval.

Item 1-3 Section 01 57 60 Construction Dewatering.

1.02 Submittals. Delete A.3 and replace with the following:

3. Cofferdams less than 10 feet in height do not need to bear Professional Engineer's Stamp. If cofferdam height is greater than 10 feet, submit cofferdam drawing bearing Professional Engineer's Stamp. Drawing(s) shall include height and depth of cofferdam, width of cofferdam materials (sheet size or base width), and minimum grade elevations near cofferdam. A/E approval of Contractor cofferdam drawing shall be considered only as review in conformance with dewatering intent and not considered as a full structural review or confirmation that cofferdam is suitable for intended purpose.

1.03 Permits. Delete A, and replace with the following:

A. General: Rehabilitation of the dam, including cofferdams and diversions, shall be in accordance with Colorado Division of Water Resources Office of the State Engineer Rule 8.1.1 Water Diversion Plan, DWR Rules and Regulations for Dam Safety and Dam Construction, U.S. Army Corps of Engineers (COE), Mesa County, and US Forest Service permits issued for project. The work is subject to inspection, review, and approval by these agencies.

Item 1-4 Section 03 30 30 Cast-In-Place Concrete.

1.05 Testing, delete D.1 and E.1, replace with the following:

D. Slump, Air Content, and Temperature Tests:

1. Perform slump, air content, and temperature tests prior to concrete placement each load, whenever there is a change in consistency of concrete, and when concrete cylinders are prepared.

E. Compressive Strength Tests

1. During progress of work, prepare two sets of test cylinders per 50 cu yd or fraction thereof for each class of concrete placed each day.

2.13 Concrete Mixtures. Insert after C:

D. Add fiber reinforcement for usages indicated on the Drawings and at rate indicated in Part 4 Schedules.

3.18 Concrete Surface Repairs. Delete A.2 and A.3, replace as as follows:

2. For patching within 7 days of concrete pour, use dry-pack mortar consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve and only enough water as required for handling and placing. Cut out honeycomb, rock pockets, voids over 1/4 in. diameter, and holes left by tie rods and bolts. Remove defects down to solid concrete but, in no case, to a depth of less than 1 in. Make edges of cuts perpendicular to concrete surface or slightly undercut to provide a key at edge of cut. Thoroughly clean, dampen with water, and brush-coat area to be patched with bonding agent. Place patching mortar before bonding agent has dried. Compact mortar in place and strike off slightly higher than surrounding surface. For exposed-to-view surfaces, patch shall match color of surrounding concrete.
3. Beyond 7 days from pour concrete repairs need to be completed using an epoxy patching mortar.

4.02 Usage Schedule. Insert after A:

B. Where fiber-reinforced concrete is indicated on Drawings, use synthetic fiber reinforcement at a minimum rate of 1.5 lb fiber per batch yard of concrete.

Part 2 PRODUCTS insert following after 2.13

2.14 BONDING AGENT

A. Water-based epoxy resin/portland cement bonding agent; Sika "Armatec 110 EpoCem", or approved equal.

2.15 PATCHING MORTAR

A. Horizontal Surfaces: Polymer-modified, portland-cement, trowel grade patching mortar; Sika "SikaTop 122 Plus", or approved equal.

B. Vertical and Overhead Surfaces: Polymer-modified, portland-cement, fast-setting, non-sag patching mortar; Sika "SikaTop 123 Plus", or approved equal.

2.16 SYNTHETIC FIBER REINFORCEMENT

A. Fibrillated polypropylene fibers designed for secondary reinforcement of concrete slabs, complying with ASTM C1116, Type III, not less than 3/4 in. long.

Item 1-5 Section 31 20 00 Earth Moving and Section 31 24 00 Embankments. Delete Section 31 20 00 and Section 31 24 00 and replace with Section 31 20 00 Earth Moving and Embankments (attached).

Item 1-6. Section 31 37 00 Riprap. Insert gradation table following 2.01.B

Riprap Size Designation	Percent of Material Smaller Than Typical Stone	Typical Stone Dimension (inches)	Typical Stone Weight (pounds)
D50 = 12 inch	70-100 50-70 35-50 2-10	21 18 12 4	440 275 85 3
D50 = 24 inch	100 50-70 35-50 2-10	42 33 24 9	3500 1700 650 35

Section 31 37 00 Riprap. Insert the following at the end of 2.01 RIPRAP:

C. Riprap shall be washed to removed silts, clays, debris or organic matter if needed.

Item 1-7 Section 33 42 15 Piping and Accessories. Part 1 General. Insert the paragraph 1.03 following 1.02, Delete 2.01 E and replace with:

E. Hole Spacing: 8 holes equally spaced around pipe circumference, every 1" of pipe.

1.03 QUALITY ASSURANCE

A. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel" and AWS D1.3 "Structural Welding Code--Sheet Steel." Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

Item 1-8. Section 35 22 28 Stainless Steel Slide Gates. 1.03 submittals. Replace A, B, and C with following

A. O/M Manuals: Submit installation instructions and operation and maintenance manuals for slide gate and operators.

B. Design Computations: Submit fabricators design computations of gate.

C. Certifications: Submit certifications from fabricator that gate meets applicable ASTM and AWWA standards.

D. Make submittals in accordance with Section 01 33 00.

Item 1-9. Section 33 41 66 Drain Fill. Revised Section 33 41 66 attached. Replace entire previous version.

Please make note of the following Changes to Drawings:

Item 1-10. Drawing Set. Replace entire drawing set with revised drawings, attached. Revisions have been made throughout as noted on the drawings and as summarized below

1. Sheet 1. No changes.
2. Sheet 2. Changes to General Notes.
3. Sheet 3. No changes.
4. Sheet 4. Added note that Stock Pile Area shown on Drawings can be used for imported and salvaged materials.
5. Sheet 5. Additional borings added to cross section.
6. Sheet 6. Updated spillway rating curves and tables.
7. Sheet 7. Added excavation limits to drawing and added piezometers and survey monument locations with notes to not disturb or notify Engineer if item will be disturbed.
8. Sheet 8. Added excavation limits to drawing and added piezometers and survey monument locations with notes to not disturb or notify Engineer if item will be disturbed.
9. Sheet 9: Change cofferdam top elevation to EL 9860.
10. Sheet 10 through 16. No changes.
11. Sheet 17. Change verbiage for drain fill to consistently label Type 1 and Type 2 “Filter Material” as “Drain Fill” instead. Added Northings and Eastings for drain pipes.
12. Sheet 18. Change layout of diaphragm drain and added drain outlet on north side of outfall pipe. Added rodent screens to drain pipe outfalls.
13. Sheet 19. Show riprap bedding at outfall of energy dissipator. Revised drawing to better show filter diaphragm. Corrected sheet references. Revised location of filter diaphragm drain pipes.
14. Sheet 20. No changes
15. Sheet 21. Revised Detail C15.
16. Sheet 22. Revised waterstop. Fixed erroneous note referring to a 30 degree elbow formed in concrete. The elbow is actually fabricated steel with a bend angle of 68 degrees.
17. Sheet 23 through 30. No changes

18. Sheet 31. Change notes to indicate that the berm rock is Colorado DOT Std. Spec. D50=24" riprap.

19. Sheet 32. On Detail C26 change fill immediately downstream of overflow weir from Native Fill to Structural Fill.

20. Sheet 33 and 34. No changes

21. Sheet 35. Add note that locations and installation details for the pressure transducer and air bubbler must be approved by Engineer and SEO prior to installation

22. Sheet 36. Add note that concrete shown on Detail C28 is fiber reinforced concrete

23. Sheet 37. No changes

24. Sheet 38. Added note that reinforcing detailing tables apply to all reinforcing steel shown on the drawings.

25. Sheet 39. Added note on detail 3/C33 that dowels drilled into existing encasement are secured with epoxy adhesive. Edited note on detail 1/C33 to indicate that CIPP is terminated downstream of the steel elbow in straight pipe.

26. Sheet 40 to Sheet 42. No changes

27. Sheet 43. Added note that 22.5 degree HDPE bends are to be long-radius bends.

6. Contractor shall utilize the attach updated/modified Addendum 9 Price Bid Schedule when submitting their bid response.

ATTACHMENTS (Click Links)

- Section 31 20 00 Earth Moving and Embankments (10 pages)
- Section 33 01 36 Cured-in Place Lining (5 pages)
- Section 33 41 66 Drain Fill (4 pages)
- Drawings Sheets 1 through 43

The original solicitation for the project noted above is amended as noted.

All other conditions of subject remain the same.

Respectfully,

Duane Hoff Jr., Senior Buyer
City of Grand Junction, Colorado

Bid Schedule (Revised per Addendum No. 9):
Hogchute (AKA Carson) Reservoir Dam Rehabilitation

&project

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
1	626 01 22 50	Mobilization	Lump Sum		- - -	$ _____
2	208 01 57 19	Erosion Control	Lump Sum		- - -	$ _____
3	01 57 60	Construction Dewatering	Lump Sum		- - -	$ _____
4	02 41 00	Demolition (intake, outfall, piping, controls, spillway grouted riprap, etc.)	Lump Sum		- - -	$ _____
5	03 30 00 31 20 00 31 37 00	Concrete Overflow Spillway (excavation, form, concrete placement, backfill, and riprap, etc.)	Lump Sum		- - -	$ _____
6	31 24 00 31 20 00	Embankment Excavation	Lump Sum		- - -	$ _____
7	33 41 66	Type I Filter Material	1,000.	CY	$ _____	$ _____
8	33 41 66	Type II Filter Material	120.	CY	$ _____	$ _____
9	33 41 66 33 42 15	HDPE Perforated Drain Pipe	270.	LF	$ _____	$ _____
10	33 41 66 33 42 15	HDPE Solid Drain Pipe	375.	LF	$ _____	$ _____
11	31 24 00 31 20 00 31 23 33	Embankment Backfill (embankment fill, rock shell, restore stockpile areas, etc.)	Lump Sum		- - -	$ _____
12	35 22 28 33 42 15	Stainless Steel Slide Gate	Lump Sum		- - -	$ _____
13	03 30 00 33 42 15 05 50 00	Concrete Buttress Intake Structure (Concrete buttress, conduit encasement, air vent and hydraulics conduit, steel elbow, etc.)	Lump Sum		- - -	$ _____
14	26 05 43 33 42 15	Locking Valve Box	Lump Sum		- - -	$ _____
15	05 50 00	Trash Rack	Lump Sum		- - -	$ _____
16	32 92 26	Wetland Soil Stockpiling	4,100.	SY	$ _____	$ _____
17	31 20 00	Auxiliary Spillway Grading	3,000.	SY	$ _____	$ _____
18	31 37 00	Auxiliary Spillway Rock Berms	1,105.	LF	$ _____	$ _____

Bid Schedule (Revised per Addendum No. 9):
Hogchute (AKA Carson) Reservoir Dam Rehabilitation

&project

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
19	33 42 15 03 30 00	30-Inch Steel Pipe	100.	LF	$ _____	$ _____
20	33 01 36	CIPP Pipe Lining	300.	LF	$ _____	$ _____
21	03 30 00 31 20 00 31 37 00 05 52 04	Impact Basin (excavation, backfill, formwork, concrete, riprap, steel railing, etc.)	Lump Sum		- - -	$ _____
22	32 92 26 32 99 10	Site Restoration (placing topsoil, seeding, sodding, planting, mulching, etc.)	Lump Sum		- - -	$ _____
23	40 70 10	Early Warning System	Lump Sum		- - -	$ _____
24	625	Construction Surveying	Lump Sum		- - -	$ _____
				Bid Amount:		**$** _____

Bid Amount:

_____ **dollars**

_____

Signature

_____

Name Title Date

_____

Company

4. Contractor's Bid Form

Bid Date: May 17, 2021

Project: IFB-4839-21-DH "Hogchute (aka Carson) Reservoir Dam Modifications Project"

Bidding Company: ESCO Construction Co.

Name of Authorized Agent: Eric Clark, President

Email estimating@escomailbox.com

Telephone (303) 674-3385 **Address** 32045 Castle Ct., Suite 200

City Evergreen **State** CO **Zip** 80439

The undersigned Bidder, in compliance with the Invitation for Bids, having examined the Instruction to Bidders, General Contract Conditions, Statement of Work, Specifications, and any and all Addenda thereto, having investigated the location of, and conditions affecting the proposed work, hereby proposes to furnish all labor, materials and supplies, and to perform all work for the Project in accordance with Contract Documents, within the time set forth and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this Contractor's Bid Form is a part.

The undersigned Contractor does hereby declare and stipulate that this offer is made in good faith without collusion or connection to any person(s) providing an offer for the same work, and that it is made in pursuance of, and subject to, all terms and conditions of the Instructions to Bidders, the Specifications, and all other Solicitation Documents, all of which have been examined by the undersigned.

The Contractor also agrees that if awarded the Contract, to provide insurance certificates within ten (10) working days of the date of Notification of Award. Submittal of this offer will be taken by the Owner as a binding covenant that the Contractor will be prepared to complete the project in its entirety.

The Owner reserves the right to make the award on the basis of the offer deemed most favorable, to waive any formalities or technicalities and to reject any or all offers. It is further agreed that this offer may not be withdrawn for a period of sixty (60) calendar days after closing time. Submission of clarifications and revised offers automatically establish a new thirty day (30) period.

Prices in the bid proposal have not knowingly been disclosed with another provider and will not be prior to award.

- Prices in this bid proposal have been arrived at independently, without consultation, communication or agreement for the purpose of restricting competition.
- No attempt has been made nor will be to induce any other person or firm to submit a bid proposal for the purpose of restricting competition.
- The individual signing this bid proposal certifies they are a legal agent of the offeror, authorized to represent the offeror and is legally responsible for the offer with regard to supporting documentation and prices provided.
- Direct purchases by the City of Grand Junction are tax exempt from Colorado Sales or Use Tax. Tax exempt No. 98-903544. The undersigned certifies that no Federal, State, County or Municipal tax will be added to the above quoted prices.
- City of Grand Junction payment terms shall be Net 30 days.
- Prompt payment discount of N/A percent of the net dollar will be offered to the Owner if the invoice is paid within N/A days after the receipt of the invoice.

RECEIPT OF ADDENDA: the undersigned Contractor acknowledges receipt of Addenda to the Solicitation, Specifications, and other Contract Documents.

State number of Addenda received: 1, 2, 3, 4, 5, 6, 7, 8, 9.

It is the responsibility of the Bidder to ensure all Addenda have been received and acknowledged.

By signing below, the Undersigned agree to comply with all terms and conditions contained herein.

Company: ESCO Construction Co.

Authorized Signature: Eric Clark

Title: President

The undersigned Bidder proposes to subcontract the following portion of Work:

Name & address of Sub-Contractor	Description of work to be performed	% of Contract
Insituform Technologies, LLC 9654 Titan Court Littleton, CO 80125	CIPP Lining	4.49%
Powell Restoration Inc. 7009 E. 53rd Pl. Commerce City, CO 80022	Erosion Control, Landscaping	1.50%
OneRain 1531 Skyway Dr. Unit D Longmont, CO 80504	Early Warning System	2.58%

The undersigned Bidder acknowledges the right of the City to reject any and all Bids submitted and to waive informalities and irregularities therein in the City's sole discretion.

By submission of the Bid, each Bidder certifies, and in the case of a joint Bid each party thereto certifies as to his own organization, that this Bid has been arrived at independently, without collusion, consultation, communication, or agreement as to any matter relating to this Bid with any other Bidder or with any competitor.

Bid Schedule (Revised per Addendum No. 9): Hogchute (AKA Carson) Reservoir Dam Rehabilitation

&project

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
1	626 01 22 50	Mobilization	Lump	Sum	---	$ 137,295.00
2	208 01 57 19	Erosion Control	Lump	Sum	---	$ 60,000.00
3	01 57 60	Construction Dewatering	Lump	Sum	---	$ 168,000.00
4	02 41 00	Demolition (intake, outfall, piping, controls, spillway grouted riprap, etc.)	Lump	Sum	---	$ 180,000.00
5	03 30 00 31 20 00 31 37 00	Concrete Overflow Spillway (excavation, form, concrete placement, backfill, and riprap, etc.)	Lump	Sum	---	$ 300,000.00
6	31 24 00 31 20 00	Embankment Excavation	Lump	Sum	---	$ 210,000.00
7	33 41 66	Type I Filter Material	1,000.	CY	$ 145.00	$ 145,000.00
8	33 41 66	Type II Filter Material	120.	CY	$ 211.00	$ 25,320.00
9	33 41 66 33 42 15	HDPE Perforated Drain Pipe	270.	LF	$ 184.00	$ 49,680.00
10	33 41 66 33 42 15	HDPE Solid Drain Pipe	375.	LF	$ 62.00	$ 23,250.00
11	31 24 00 31 20 00 31 23 33	Embankment Backfill (embankment fill, rock shell, restore stockpile areas, etc.)	Lump	Sum	---	$ 180,000.00
12	35 22 28 33 42 15	Stainless Steel Slide Gate	Lump	Sum	---	$ 16,000.00
13	03 30 00 33 42 15 05 50 00	Concrete Buttress Intake Structure (Concrete buttress, conduit encasement, air vent and hydraulics conduit, steel elbow, etc.)	Lump	Sum	---	$ 150,000.00
14	26 05 43 33 42 15	Locking Valve Box	Lump	Sum	---	$ 10,000.00
15	05 50 00	Trash Rack	Lump	Sum	---	$ 12,000.00
16	32 92 26	Wetland Soil Stockpiling	4,100.	SY	$ 4.00	$ 16,400.00
17	31 20 00	Auxiliary Spillway Grading	3,000.	SY	$ 21.00	$ 63,000.00
18	31 37 00	Auxiliary Spillway Rock Berms	1,105.	LF	$ 291.00	$ 321,555.00

Bid Schedule (Revised per Addendum No. 9): Hogchute (AKA Carson) Reservoir Dam Rehabilitation

&project

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
19	33 42 15 03 30 00	30-Inch Steel Pipe	100.	LF	$ 1,375.00	$ 137,500.00
20	33 01 36	CIPP Pipe Lining	300.	LF	$ 495.00	$ 148,500.00
21	03 30 00 31 20 00 31 37 00 05 52 04	Impact Basin (excavation, backfill, formwork, concrete, riprap, steel railing, etc.)	Lump Sum		---	$ 120,000.00
22	32 92 26 32 99 10	Site Restoration (placing topsoil, seeding, sodding, planting, mulching, etc.)	Lump Sum		---	$ 45,000.00
23	40 70 10	Early Warning System	Lump Sum		---	$ 100,000.00
24	625	Construction Surveying	Lump Sum		---	$ 65,000.00
				Bid Amount:		**$** 2,683,500.00

Bid Amount:

_____ **dollars**

Signature

Eric Clark	President	May 17, 2021
Name	Title	Date

ESCO Construction Co.

Company

BID SECURITY

Accompanying this bid is bid security payable to Owner in the form stipulated in the Instructions to Bidders, which is at least 5% of the maximum bid amount, and will be retained by Owner as liquidated damages if the undersigned fails to execute agreements and furnish bonds (if specified) within 10 days after Notice of Award.

WITHDRAWAL OF BID

It is agreed that this bid and any required bid security may not be withdrawn for a period of 45 days after the Bid Deadline.

TIME OF COMPLETION

The undersigned agrees, if awarded the contract, to start work within 10 calendar days after "Notice to Proceed" and to substantially complete the work within N/A calendar days thereafter.

Failure to substantially complete the work within the stated time will result in liquidated damages of $1200/day per calendar day thereafter until substantial completion.

The undersigned agrees, if awarded the contract, to start work after "Notice to Proceed" and to substantially complete the work on or before Oct 31, 2021.

Failure to substantially complete the work within the stated time will result in liquidated damages of $1200/day per calendar day thereafter until substantial completion.

The undersigned agrees, if awarded the contract, to start work within 10 calendar days after "Notice to Proceed" and to substantially complete the work within N/A calendar days thereafter. The successful Contractor will be allowed to select the Notice to Proceed date provided the calculated substantial completion date is no later than Oct 31, 2021.

Failure to substantially complete the work within the stated time will result in liquidated damages of $1200/day per calendar day thereafter until substantial completion.

The undersigned agrees, if awarded the contract, to start work within 10 calendar days after "Notice to Proceed" and to substantially complete the work within N/A calendar days after the contract time commences; and to have all work completed and ready for final payment within N/A calendar days after the contract time commences.

Failure to substantially complete the work within the stated time will result in liquidated damages of $1200/day per calendar day thereafter until substantial completion. Failure to have the work completed and ready for final payment within the stated time will result in liquidated damages of $1200/day per calendar day thereafter until the work is completed and ready for final payment.

The undersigned agrees, if awarded the contract, to start work after "Notice to Proceed" and to substantially complete the work on or before Oct 31, 2021; and to have all work completed and ready for final payment on or before Oct 31, 2021.

Failure to substantially complete the work within the stated time will result in liquidated damages of $1200/day per calendar day thereafter until substantial completion. Failure to have the work completed and ready for final payment within the stated time will result in liquidated damages of $1200/day per calendar day thereafter until the work is completed and ready for final payment.

The undersigned agrees, if awarded the contract, to start work within 10 calendar days after "Notice to Proceed" and to substantially complete N/A within N/A calendar days after the contract time commences; and to substantially complete all remaining work within N/A calendar days after the contract time commences.

Failure to substantially complete the work of either deadline within the stated time will result in liquidated damages of $1200/day per calendar day thereafter until substantial completion of the applicable work.

BIDDER'S WARRANTY

By the act of submitting a bid for the proposed work, the bidder warrants that:

1. Bidder and its subcontractors have carefully and thoroughly reviewed the Contract Documents and have found them complete, free of ambiguities, and sufficient for the purpose intended; further that,

2. Bidder and all workers, employees, and subcontractors are skilled and experienced in the type of work represented by the Contract Documents; further that,

3. Bid is based solely upon the Contract Documents and properly issued written addenda and not upon any other representation; further that,

4. Bidder has carefully examined the site of the work and from its investigations is satisfied as to the nature and location of work, the character, quality, quantities of materials, and difficulties to be encountered, the kind and extent of equipment and other facilities needed for performance of the work, the general and local conditions, and other items which may, in any way, affect the work or its performance; and further that,

5. Neither the bidder nor its employees, agents, prospective suppliers, or subcontractors have relied upon any verbal representations allegedly authorized or unauthorized from the Owner, its employees or agents, including architects, engineers, and consultants, in assembling the bid.

LIST OF SUBCONTRACTORS

The following is a list of subcontractors whose bids were used in this bid. It is agreed that after submission of this list, no change may be made in subcontractors as listed without submitting change for Owner review in accordance with the conditions of the contract. If there are no subcontractors, state "None."

Subcontract:	Subcontractor:
CIPP Lining	Insituform Technologies, LLC 9654 Titan Court Littleton, CO 80125
Erosion Control, Landscaping	Powell Restoration Inc. 7009 E. 53rd Pl. Commerce City, CO 80022
Early Warning System	OneRain 1531 Skyway Dr. Unit D Longmont, CO 80504

ADDENDA

The undersigned acknowledges receipt of addenda 1 to 9 inclusive.

ORGANIZATION AND AUTHORITY

The undersigned hereby certifies that the bidder is organized as indicated below and that all statements herein are made on behalf of such bidder.

Business Name ESCO Construction Co.
Business Address 32045 Castle Ct., Suite 200
Evergreen, CO 80439
Telephone Number (303) 674-3385
Fax Number (303) 496-9673
E-Mail Address estimating@escomailbox.com
State Contractor Registration/License No. (if applicable) N/A for CO

(Complete applicable paragraph 1, 2, 3, or 4.)

1. Corporation. Bidder is a corporation organized under the laws of the state of Colorado. Its corporate president is Eric Clark and its corporate secretary is Mike Angilello. The President is authorized to submit bids and sign construction contracts for the bidder by action of the board of directors.

2. Limited Liability Corporation. Bidder is a limited liability corporation organized under the laws of the state of N/A. Its members are N/A. The N/A is authorized to submit bids and sign construction contracts for the bidder.

3. Partnership. Bidder is a partnership consisting of partners N/A and N/A.

4. Sole Trader. Bidder is an individual doing business as N/A.

SWORN STATEMENT

I, being duly sworn, hereby certify that I have examined and carefully prepared this bid from the Contract Documents and have checked the same in detail before submitting this bid; that I have full authority to make such statements and submit this bid on behalf of the above bidder; and that said statements are true and correct.

Signature

Name and Title Eric Clark, President

(Seal, if bid is by a corporation)

SHELLY R McCARRON
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 19964013496
MY COMMISSION EXPIRES JULY 22, 2022

Subscribed and sworn to before me this 17th day of May, 20 21

Shelly R McCarron Notary Public

Colorado County, Jefferson

My Commission expires July 22, 2022

ESCO CONSTRUCTION CO.
P.O. Box 2796
Evergreen, CO 80437
Phone: 303.674.3385 Fax: 303.674.9967

Board Resolution

No. 2019-01-01 001

A special meeting was called for the election of **ESCO Construction Co.** Board of Directors and Key Officers where a proper quorum was in order. The following were agreed upon:

Whereas, the corporation voted to elect the company Board of Directors for the period 2019;

Whereas, the Board of Directors immediately after their election was formally organized by electing the company's Key Officers;

Therefore, it is hereby resolved:

That the corporation voted to elect the following Board of Directors:

a.	Eric Clark	Chairman & President
b.	Gabe Wallace	Vice President
c.	Mike Angilello	Corporate Secretary & Treasurer
d.	Pat Clark	Member
e.	Lisa Clark	Member

That the Board of Directors elected the following Key Officers of the corporation:

a.	Eric Clark	Chairman & President
b.	Gabe Wallace	Vice President
c.	Mike Angilello	Corporate Secretary & Treasurer

In acceptance and agreement to the foregoing resolutions, we have hereunto set our signatures this 1st day of January, 2019, at 3540 Evergreen Parkway, Evergreen, Co 80439.

President & Chairman

Vice President

Member

Corporate Secretary & Treasurer

Member

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)
ESCO CONSTRUCTION COMPANY
32045 Castle Court, Suite 200
Evergreen, Colorado 80439

SURETY:
(Name, legal status and principal place of business)
ATLANTIC SPECIALTY INSURANCE COMPANY
605 Highway 169 North, Suite 800
Plymouth, Minnesota 55441

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

OWNER:
(Name, legal status and address)
CITY OF GRAND JUNCTION, COLORADO
Purchasing Division, 250 North 5th Street
Grand Junction, Colorado 81501

BOND AMOUNT: Five Percent (5%) of the Total Amount of the Bid

PROJECT:
(Name, location or address, and Project number, if any)
IFB-4839-21-DH
Hogchute (aka Carson) Reservoir Dam Modifications Project
Mesa County, Colorado

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this 17th day of May, 2021

By _____
(Witness)

By _____
(Witness) Cynthia M. Burnett, Littleton, Colorado

ESCO CONSTRUCTION COMPANY
(Contractor or Principal) *(Seal)*
By _____
(Title)

ATLANTIC SPECIALTY INSURANCE COMPANY
(Surety) *(Seal)*
By _____
(Title) Douglas J. Rothey, Attorney-in-Fact

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

Init.
/

OneBeacon
INSURANCE GROUP

Power of Attorney

KNOW ALL MEN BY THESE PRESENTS, that ATLANTIC SPECIALTY INSURANCE COMPANY, a New York corporation with its principal office in Plymouth, Minnesota, does hereby constitute and appoint: **Cynthia M. Burnett, Douglas J. Rothey, Kim Payton, Wesley J. Butorac, Jason A. McMillan, Zach Rothey, Erik E. Ulibarri**, each individually if there be more than one named, its true and lawful Attorney-in-Fact, to make, execute, seal and deliver, for and on its behalf as surety, any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof; provided that no bond or undertaking executed under this authority shall exceed in amount the sum of: **unlimited** and the execution of such bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof in pursuance of these presents, shall be as binding upon said Company as if they had been fully signed by an authorized officer of the Company and sealed with the Company seal. This Power of Attorney is made and executed by authority of the following resolutions adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the President, any Senior Vice President or Vice-President (each an "Authorized Officer") may execute for and in behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and affix the seal of the Company thereto; and that the Authorized Officer may appoint and authorize an Attorney-in-Fact to execute on behalf of the Company any and all such instruments and to affix the Company seal thereto; and that the Authorized Officer may at any time remove any such Attorney-in-Fact and revoke all power and authority given to any such Attorney-in-Fact.

Resolved: That the Attorney-in-Fact may be given full power and authority to execute for and in the name and on behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and any such instrument executed by any such Attorney-in-Fact shall be as binding upon the Company as if signed and sealed by an Authorized Officer and, further, the Attorney-in-Fact is hereby authorized to verify any affidavit required to be attached to bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof.

This power of attorney is signed and sealed by facsimile under the authority of the following Resolution adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the signature of an Authorized Officer, the signature of the Secretary or the Assistant Secretary, and the Company seal may be affixed by facsimile to any power of attorney or to any certificate relating thereto appointing an Attorney-in-Fact for purposes only of executing and sealing any bond, undertaking, recognizance or other written obligation in the nature thereof, and any such signature and seal where so used, being hereby adopted by the Company as the original signature of such officer and the original seal of the Company, to be valid and binding upon the Company with the same force and effect as though manually affixed.

IN WITNESS WHEREOF, ATLANTIC SPECIALTY INSURANCE COMPANY has caused these presents to be signed by an Authorized Officer and the seal of the Company to be affixed this twenty-seventh day of April, 2020.

ATLANTIC SPECIALTY INSURANCE COMPANY CORPORATE SEAL 1986 NEW YORK

By _____
Paul J. Brehm, Senior Vice President

STATE OF MINNESOTA
HENNEPIN COUNTY

On this twenty-seventh day of April, 2020, before me personally came Paul J. Brehm, Senior Vice President of ATLANTIC SPECIALTY INSURANCE COMPANY, to me personally known to be the individual and officer described in and who executed the preceding instrument, and he acknowledged the execution of the same, and being by me duly sworn, that he is the said officer of the Company aforesaid, and that the seal affixed to the preceding instrument is the seal of said Company and that the said seal and the signature as such officer was duly affixed and subscribed to the said instrument by the authority and at the direction of the Company.

ALISON DWAN NASH-TROUT
NOTARY PUBLIC - MINNESOTA
My Commission Expires
January 31, 2025

_____
Notary Public

I, the undersigned, Secretary of ATLANTIC SPECIALTY INSURANCE COMPANY, a New York Corporation, do hereby certify that the foregoing power of attorney is in full force and has not been revoked, and the resolutions set forth above are now in force.

Signed and sealed. Dated 17th day of May, 2021.

ATLANTIC SPECIALTY INSURANCE COMPANY CORPORATE SEAL 1986 NEW YORK

This Power of Attorney expires
January 31, 2025

_____
Kara Barrow, Secretary

Attachment A

Key Personnel

ESCO Construction Co.

Key Personnel

Individuals' Name	Present Position or Office	Years of Experience	Magnitude and Type of Work	In What Capacity
Eric Clark	Chairman & President	16 years	Heavy Civil- $100 million	President, Project Manager, Superintendent, Foreman
Gabe Wallace	Vice President	16 years	Heavy Civil- $500 million	Vice President, Project Executive, Project Manager, Superintendent
Mike Angilello	Corporate Secretary & Treasurer	12 years	Heavy Civil- $100 million	Lead Estimator, Division Manager, Project Manager
Eric Taylor	Business Executive	46 years	Heavy Civil- $1.3 billion	President, Project Sponsor, Project Manager, Vice President Estimating
Justin Cooper	Project Sponsor	9 years	Heavy Civil- $100 million	Project Sponsor, Project Manager, Project Engineer

Attachment B

Similar Projects

ESCO Construction Co.
Similar Projects

Project	Year	Type of Work	Ownership Group	Contract Amount	Work Location	Contact	Phone
River Run Ranch Resort	2021	GC - RV Park - Earthwork, Utilities, Concrete, Augmentation Pond	Sun Enterprises	$71,581,126.00	Granby, CO	Nick Westfall	248-392-0905
Northwater Treatment Plant	2021	Mass Excavation	Denver Water / Kiewit	$9,175,284.00	Golden, CO	Travis Baumgartner	817-946-5168
Sylvan Lake Dam Spillway	2019	Replace Dam Spillway - 4,900cy RCC	Colorado Parks & Wildlife	$ 3,970,793.00	Eagle, CO	John Clark	720-218-7790
GK Lateral & Silt Pump Canal Pipelines	2018	48" PVC & 42" HDPE Pipelines	US Bureau of Reclamation	$4,254,456.00	Delta/Silt, CO	Mark Wernke	970-248-0643

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 6/5/2021

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Commercial Risk Solutions 6600 E Hampden Ave Ste 200 Denver CO 80224	**CONTACT NAME:** Katie Smothers **PHONE (A/C, No, Ext):** 303-996-7801 **FAX (A/C, No):** 303-757-7719 **E-MAIL ADDRESS:** ksmothers@crsdenver.com
INSURED ESCOC-1 ESCO Construction Co. P.O. Box 2796 Evergreen CO 80439	**INSURER(S) AFFORDING COVERAGE** — **NAIC #** **INSURER A :** United Specialty Insurance Co **INSURER B :** Pinnacol Assurance — 41190 **INSURER C :** Evanston Insurance Co. **INSURER D :** Selective Ins. Co. of America — 12572 **INSURER E :** Navigators Insurance Co. **INSURER F :**

COVERAGES **CERTIFICATE NUMBER:** 1176391489 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [ ] LOC [ ] OTHER:	Y		ATN2076526	7/1/2020	7/1/2021	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG $	$ 1,000,000 $ 50,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 2,000,000 $
D	AUTOMOBILE LIABILITY X ANY AUTO [ ] OWNED AUTOS ONLY [ ] SCHEDULED AUTOS X HIRED AUTOS ONLY [X] NON-OWNED AUTOS ONLY	Y		S2305385	7/1/2020	7/1/2021	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) $	$ 1,000,000 $ $ $ $
C	X UMBRELLA LIAB [X] OCCUR EXCESS LIAB [ ] CLAIMS-MADE DED [X] RETENTION $ 0			MKLV2EUL104099	7/1/2020	7/1/2021	EACH OCCURRENCE AGGREGATE $	$ 3,000,000 $ 3,000,000 $
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y/N [N] (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N/A	Y	4124549	7/1/2020	7/1/2021	X PER STATUTE [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ 1,000,000 $ 1,000,000 $ 1,000,000
D E	Leased/Rented Equipment/RC/Specia Excess Liability			S2305385 GA20EXC843680IC	7/1/2020 7/1/2020	7/1/2021 7/1/2021	Limit/ Deductible Occurrence Aggregate	550,000 / 1,000 6,000,000 6,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

RE: Project IFB-4839-21-DH - Hogchute Reservoir Dam Modifications

City of Grand Junction is included as additional insured for ongoing operations on the General Liability and included as additional insured on the Auto Liability with respect to operations of the named insured for the certificate holder as required by written contract. Workers Compensation coverage includes a waiver of subrogation.

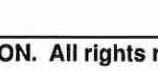
CERTIFICATE HOLDER

City of Grand Junction
333 West Avenue, Bldg C
Grand Junction CO 81501

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE



ElitePac®
Commercial Automobile Extension

COMMERCIAL AUTO
CA 78 09 11 17

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

This endorsement modifies insurance provided under the following:

BUSINESS AUTO COVERAGE FORM

With respect to coverage provided by this endorsement, the provisions of the Business Auto Coverage Form apply unless modified by the endorsement.

AMENDMENTS TO SECTION II - LIABILITY COVERAGE

A. If this policy provides Auto Liability coverage for Owned Autos, the following extensions are applicable accordingly:

NEWLY ACQUIRED OR FORMED ORGANIZATIONS

The following is added to **SECTION II, A.1. - Who Is An Insured:**

Any organization you newly acquire or form, other than a partnership, joint venture or limited liability company over which you maintain ownership or majority interest, will qualify as a Named Insured if there is no similar insurance available to that organization. However:

1. Coverage under this provision is afforded only until the 180th day after you acquire or form the organization or the end of the policy period, whichever is earlier;
2. Coverage does not apply to "bodily injury" or "property damage" resulting from an "accident" that occurred before you acquired or formed the organization.

No person or organization is an "insured" with respect to the conduct of any current or past partnership, joint venture or limited liability company that is not shown as a Named Insured in the Declarations.

EXPENSES FOR BAIL BONDS AND LOSS OF EARNINGS

Paragraphs **(2)** and **(4)** of **SECTION II, A.2.a. - Supplementary Payments** are deleted in their entirety and replaced with the following:

(2) Up to the Limit of Insurance shown on the ElitePac Schedule for the cost of bail bonds (including bonds for related traffic law violations) required because of an "accident" covered under this policy. We do not have to furnish these bonds.

(4) All reasonable expenses incurred by the "insured" at our request. This includes actual loss of earnings because of time off from work, which we will pay up to the Limit of Insurance shown on the ElitePac Schedule.

EMPLOYEE INDEMNIFICATION AND EMPLOYER'S LIABILITY AMENDMENT

The following is added to **SECTION II, B.4. - Exclusions:**

This exclusion does not apply to a "volunteer worker" who is not entitled to workers compensation, disability or unemployment compensation benefits.

FELLOW EMPLOYEE COVERAGE

The **Fellow Employee** Exclusion, **SECTION II, B.5. -** is deleted in its entirety.

CARE, CUSTODY OR CONTROL AMENDMENT

The following is added to **SECTION II, B.6. - Exclusions:**

This exclusion does not apply to property owned by anyone other than an "insured", subject to the following:

1. The most we will pay under this exception for any one "accident" is the Limit of Insurance stated in the ElitePac Schedule; and
2. A per "accident" deductible as stated in the ElitePac Schedule applies to this exception.

B. If this policy provides Auto Liability coverage for Owned Autos or Non-Owned Autos, the following extension is applicable accordingly:

LIMITED LIABILITY COMPANIES

The following is added to **SECTION II, A.1. - Who Is An Insured:**

If you are a limited liability company, your members and managers are "insureds" while using a covered "auto" you don't own, hire or borrow during the course of their duties for you.

BLANKET ADDITIONAL INSUREDS - As Required By Contract

The following is added to **SECTION II, A.1. - Who Is An Insured:**

Any person or organization whom you have agreed in a written contract, written agreement or written permit that such person or organization be added as an additional "insured" on your policy. Such person or organization is an additional "insured" only with respect to liability for "bodily injury" or "property damage" caused, in whole or in part, by your ownership, maintenance or use of a covered "auto". This coverage shall be primary and non-contributory with respect to the additional "insured". This provision only applies if:

1. It is required in the written contract, written agreement or written permit identified in this section;
2. It is permitted by law; and
3. The written contract or written agreement has been executed (executed means signed by a named insured) or written permit issued prior to the "bodily injury" or "property damage".

C. If this policy provides Auto Liability coverage for Non-Owned Autos, the following extension is applicable accordingly:

EMPLOYEES AS INSUREDS

If this policy provides Auto Liability coverage for Non-Owned Autos, the following is added to **SECTION II, A.1. - Who Is An Insured:**

Any "employee" of yours is an "insured" while using a covered "auto" you don't own, hire or borrow in your business or your personal affairs.

An "employee" of yours is an "insured" while operating an "auto" hired or rented under a contract or agreement in that "employee's" name with your permission, while performing duties related to the conduct of your business.

AMENDMENTS TO SECTION III - PHYSICAL DAMAGE COVERAGE

If this policy provides Comprehensive, Specified Causes of Loss or Collision coverage, the following extensions are applicable for those "autos" for which Comprehensive, Specified Causes of Loss or Collision coverage is purchased:

TOWING AND LABOR

SECTION III, A.2. - Towing is deleted in its entirety and replaced with the following:

We will pay all reasonable towing and labor costs up to the maximum Limit of Insurance shown on the ElitePac Schedule per tow each time a covered "Private Passenger Auto", "Social Service Van or Bus" or "Light Truck" is disabled and up to the maximum Limit of Insurance per tow each time a covered "Medium Truck", "Heavy Truck" or "Extra Heavy Truck" is disabled.

For labor charges to be eligible for reimbursement the labor must be performed at the place of disablement.

This coverage extension does not apply to Emergency Services Organizations and Governmental Entities.

GLASS BREAKAGE DEDUCTIBLE

The following is added to **SECTION III, A.3. - Glass Breakage - Hitting A Bird Or Animal - Falling Objects or Missiles:**

If damaged glass is repaired rather than replaced, no deductible will apply for such repair. This extension does not apply to Emergency Services Organizations and Governmental Entities.

ADDITIONAL TRANSPORTATION EXPENSES SECTION III, A.4.a. - Transportation Expenses is deleted in its entirety and replaced with the following:

We will pay up to the maximum Limit of Insurance shown on the ElitePac Schedule for temporary transportation expenses that you incur because of any "loss" to a covered "auto", but only if the covered "auto" carries the coverages and meets the requirements described in **1.** or **2.** below:

1. We will pay temporary transportation expenses for total theft of a covered "auto". We will only pay for such expenses incurred during the period beginning 24 hours after the theft and ending, regardless of the policy's expiration, when the covered "auto" is returned to use or we pay for its "loss".
2. For "loss" other than total theft of a covered "auto" under Comprehensive or Specified Causes of Loss Coverage, or for any "loss" under Collision Coverage to a covered "auto", we will only pay for those temporary transportation expenses incurred during the policy period beginning 24 hours after the "loss" and ending, regardless of the policy's expiration, with the lesser of the number of days reasonably required to repair or replace the covered "auto" or 30 days.

   Paragraph **2.** of this extension does not apply while there are spare or reserve "autos" available to you for your operations.

This coverage extension does not apply to Emergency Services Organizations and Governmental Entities.

HIRED AUTO PHYSICAL DAMAGE COVERAGE

The following is added to **SECTION III, A.4. - Coverage Extensions:**

Physical Damage coverage is hereby extended to apply to Physical Damage "loss" to "autos" leased, hired, rented or borrowed without a driver. We will provide coverage equal to the broadest coverage available to any covered "auto" shown in the Declarations. But, the most we will pay for "loss" to each "auto" under this coverage extension is the lesser of:

1. The Limit of Insurance stated in the ElitePac Schedule; or
2. The actual cash value of the damaged or stolen property as of the time of the "loss"; or
3. The actual cost of repairing or replacing the damaged or stolen property with other property of like kind and quality. A part is of like kind and quality when it is of equal or better condition than the pre-accident part. We will use the original equipment from the manufacturer when:
   (a) The operational safety of the vehicle might otherwise be impaired;
   (b) Reasonable and diligent efforts to locate the appropriate rebuilt, aftermarket or used part have been unsuccessful; or
   (c) A new original equipment part of like kind and quality is available and will result in the lowest overall repair cost.

For each leased, hired, rented or borrowed "auto" our obligation to pay "losses" will be reduced by a deductible equal to the highest deductible applicable to any owned "auto" for that coverage. No deductible will be applied to "losses" caused by fire or lightning.

SECTION IV, B.5. Other Insurance Condition, Paragraph **5.b.** is deleted in its entirety and replaced by the following:

For Hired Auto Physical Damage Coverage, the following are deemed to be covered "autos"' you own:

1. Any covered "auto" you lease, hire, rent, or borrow; and
2. Any covered "auto" hired or rented by your "employee" under a contract or agreement in that "employee's" name, with your permission, while performing duties related to the conduct of your business.

However, any "auto" that is leased, hired, rented or borrowed with a driver is not a covered "auto".

This coverage extension does not apply to Emergency Services Organizations and Governmental Entities.

HIRED AUTO LOSS OF USE COVERAGE

The following is added to **SECTION III, A.4. - Coverage Extensions:**

We will pay expenses for which you are legally responsible to pay up to the Limit of Insurance shown on the ElitePac Schedule per "accident" for loss of use of a leased, hired, rented or borrowed "auto" if it results from an "accident".

This coverage extension does not apply to Emergency Services Organizations, Governmental Entities, and Schools.

AUTO LOAN/LEASE GAP COVERAGE (Not Applicable in New York)

The following is added to **SECTION III, A.4. - Coverage Extensions:**

In the event of a total "loss" to a covered "auto" we will pay any unpaid amount due on the lease or loan for a covered "auto", less:

1. The amount paid under the Physical Damage Coverage Section of the policy; and
2. Any:
   a. Overdue lease/loan payments at the time of "loss";
   b. Financial penalties imposed under a lease for excessive use, abnormal wear and tear, high mileage or similar charges;
   c. Security deposits not refunded by the lessor or financial institution;
   d. Costs for extended warranties, credit life, health, accident, or disability insurance purchased with the loan or lease; and
   e. Carry-over balances from previous leases or loans.

You are responsible for the deductible applicable to the "loss" for the covered "auto".

PERSONAL EFFECTS

The following is added to **SECTION III, A.4. - Coverage Extensions:**

If this policy provides Comprehensive Coverage for a covered "auto" you own and that covered "auto" is stolen, we will pay up to the Limit of Insurance shown on the ElitePac Schedule, without application of a deductible, for lost personal effects that were in the covered "auto" at the time of theft. Personal effects do not include jewelry, tools, money, or securities. This coverage is excess over any other collectible insurance.

AIRBAG COVERAGE

The following is added to **SECTION III, B.3.a. - Exclusions:**

Mechanical breakdown does not include the accidental discharge of an airbag.

This coverage extension does not apply to Emergency Services Organizations and Governmental Entities.

EXPANDED AUDIO, VISUAL, AND DATA ELECTRONIC EQUIPMENT COVERAGE

SECTION III, B.4. - Exclusions

This exclusion does not apply to the following:

1. Global positioning systems;
2. "Telematic devices"; or
3. Electronic equipment that reproduces, receives or transmits visual or data signals and accessories used with such equipment, provided such equipment is:

a. Permanently installed in or upon the covered "auto" at the time of the "loss";

b. Removable from a housing unit that is permanently installed in the covered "auto" at the time of the "loss";

c. Designed to be solely operated by use of power from the "auto's" electrical system; or

d. Designed to be used solely in or upon the covered "auto".

For each covered "loss" to such equipment, a deductible of $50 shall apply, unless the deductible otherwise applicable to such equipment is less than $50, at which point the lower deductible, if any, will apply.

COMPREHENSIVE DEDUCTIBLE - LOCATION TRACKING DEVICE

The following is added to **SECTION III, D. - Deductible:**

Any Comprehensive Coverage Deductible shown in the Declarations will be reduced by 50% for any "loss" caused by theft if the covered "auto" is equipped with a location tracking device and that device was the sole method used to recover the "auto".

PHYSICAL DAMAGE LIMIT OF INSURANCE

SECTION III, C. - Limit Of Insurance is deleted in its entirety and replaced with the following:

The most we will pay for a "loss" in any one "accident" is the lesser of:

1. The actual cash value of the damaged or stolen property as of the time of the "loss"; or
2. The cost of repairing or replacing the damaged or stolen property with other property of like kind and quality.

This coverage extension does not apply to Emergency Services Organizations and Governmental Entities.

AMENDMENTS TO SECTION IV - BUSINESS AUTO CONDITIONS

DUTIES IN THE EVENT OF ACCIDENT, CLAIM, SUIT OR LOSS

The following is added to **SECTION IV, A.2.a. - Duties In The Event Of Accident, Claim, Suit Or Loss:**

The notice requirements for reporting "accident" claim, "suit" or "loss" information to us, including provisions related to the subsequent investigation of such "accident", claim, "suit" or "loss" do not apply until the "accident", claim, "suit" or "loss" is known to:

1. You, if you are an individual;
2. A partner, if you are a partnership;
3. An executive officer or insurance manager, if you are a corporation;
4. Your members, managers or insurance manager, if you are a limited liability company;
5. Your elected or appointed officials, trustees, board members or your insurance manager, if you are an organization other than a partnership, joint venture or limited liability company.

But, this section does not amend the provisions relating to notification of police or protection or examination of the property that was subject to the "loss".

WAIVER OF SUBROGATION

SECTION IV, A.5. - Transfer Of Rights Of Recovery Against Others To Us is deleted in its entirety and replaced with the following:

We waive any right of recovery we may have against any person or organization because of payments we make for "bodily injury" or "property damage" resulting from the ownership, maintenance or use of a covered "auto" but only when you have assumed liability for such "bodily injury" or "property damage" in an "insured contract". In all other circumstances, if a person or organization to or for whom we make payment under this Coverage Form has rights to recover damages from another, those rights are transferred to us.

MULTIPLE DEDUCTIBLES

The following is added to **SECTION IV, A. - Loss Conditions:**

If a "loss" from one event involves two or more covered "autos" and coverage under Comprehensive or Specified Causes of Loss applies, only the highest applicable deductible will be applied.

CONCEALMENT, MISREPRESENTATION OR FRAUD

The following is added to **SECTION IV, B.2. - Concealment, Misrepresentation Or Fraud:**

If you should unintentionally fail to disclose any existing hazards in your representations to us prior to the inception date of the policy or during the policy period in connection with any newly discovered hazards, we will not deny coverage under this Coverage Form based upon such failure.

POLICY PERIOD, COVERAGE TERRITORY

SECTION IV, B.7. - Policy Period, Coverage Territory is deleted in its entirety and replaced with the following:

Under this Coverage Form, we cover "accidents" and "losses" occurring:

a. During the policy period shown in the Declarations; and

b. Within the "Coverage Territory".

We also cover "loss" to or "accidents" involving a covered "auto" while being transported between any of these places.

TWO OR MORE COVERAGE FORMS OR POLICIES ISSUED BY US - DEDUCTIBLES

The following is added to **SECTION IV, B.8. - Two Or More Coverage Forms Or Policies Issued By Us:**

If a "loss" covered under this Coverage Form also involves a "loss" to other property resulting from the same "accident" that is covered under this policy or another policy issued by us or any member company of ours, only the highest applicable deductible will be applied.

AMENDMENTS TO SECTION V - DEFINITIONS

BODILY INJURY INCLUDING MENTAL ANGUISH (Not Applicable in New York)

The definition of bodily injury is deleted in its entirety and replaced by the following:

"Bodily injury" means bodily injury, sickness, or disease sustained by a person, including death resulting from any of these. "Bodily injury" includes mental anguish resulting from bodily injury, sickness or disease sustained by a person.

ADDITIONS TO SECTION V - DEFINITIONS

COVERAGE TERRITORY

"Coverage Territory" means:

1. The United States of America (including its territories and possessions), Canada and Puerto Rico; and
2. Anywhere in the world, except for any country or jurisdiction that is subject to trade or other economic sanction or embargo by the United States of America, if a covered "auto" is leased, hired, rented, or borrowed without a driver for a period of 30 days or less, and the insured's responsibility to pay "damages" is determined in a "suit" on the merits in and under the substantive law of the United States of America (including its territories and possessions), Puerto Rico, or Canada, or in a settlement we agree to.

If we are prevented by law, or otherwise, from defending the "insured" in a "suit" brought in a location described in Paragraph **2.** above, the insured will conduct a defense of that "suit". We will reimburse the "insured" for the reasonable and necessary expenses incurred for the defense of any such "suit" seeking damages to which this insurance applies, and that we would have paid had we been able to exercise our right and duty to defend.

EXTRA HEAVY TRUCK

"Extra Heavy Truck" means a truck with a gross vehicle weight rating of 45,001 pounds or more.

HEAVY TRUCK

"Heavy Truck" means a truck with a gross vehicle weight rating of 20,001 pounds to 45,000 pounds.

LIGHT TRUCK

"Light Truck" means a truck with a gross vehicle weight rating of 10,000 pounds or less.

MEDIUM TRUCK

"Medium Truck" means a truck with a gross vehicle weight rating of 10,001 pounds to 20,000 pounds.

PRIVATE PASSENGER AUTO

"Private Passenger Auto" means a four-wheel "auto" of the private passenger or station wagon type. A pickup, panel truck or van not used for business is included within the definition of a "private passenger auto".

SOCIAL SERVICE VAN OR BUS

"Social Service Van or Bus" means a van or bus used by a government entity, civic, charitable or social service organization to provide transportation to clients incidental to the social services sponsored by the organization, including special trips and outings.

TELEMATIC DEVICE

"Telematic Device" includes devices designed for the collection and dissemination of data for the purpose of monitoring vehicle and/or driver performance. This includes Global Positioning System technology, wireless safety communications and automatic driving assistance systems, all integrated with computers and mobile communications technology in automotive navigation systems.

VOLUNTEER WORKER

"Volunteer worker" means a person who performs business duties for you, for no financial or other compensation.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – SCHEDULED PERSON OR ORGANIZATION

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s)	Location(s) Of Covered Operations
As Required By Written Contract, Fully Executed Prior To The Named Insured's Work	As Required By Written Contract, Fully Executed Prior To The Named Insured's Work
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

A. **Section II – Who Is An Insured** is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf;

in the performance of your ongoing operations for the additional insured(s) at the location(s) designated above.

However:

1. The insurance afforded to such additional insured only applies to the extent permitted by law; and
2. If coverage provided to the additional insured is required by a contract or agreement, the insurance afforded to such additional insured will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to "bodily injury" or "property damage" occurring after:

1. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or
2. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

C. With respect to the insurance afforded to these additional insureds, the following is added to **Section III – Limits Of Insurance:**

If coverage provided to the additional insured is required by a contract or agreement, the most we will pay on behalf of the additional insured is the amount of insurance:

1. Required by the contract or agreement; or

2. Available under the applicable Limits of Insurance shown in the Declarations;

whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

PINNACOL
ASSURANCE

7501 E. Lowry Blvd.
Denver, CO 80230-7006
303.361.4000 / 800.873.7242
Pinnacol.com

NCCI #: WC000313B
Policy #: 4124549

Esco Construction Co
P O Box 2796
Evergreen, CO 80439

CRS, Commercial Risk Solutions, Inc
6600 E. Hampden Ave
Suite 200
Denver, CO 80224
(303) 996-7800

ENDORSEMENT: Blanket Waiver of Subrogation

We have the right to recover our payments from anyone liable for an injury covered by this policy. We will not enforce our right against the person or organization named in the Schedule. This agreement applies only to the extent that you perform work under a written contract that requires you to obtain this agreement from us.

This agreement shall not operate directly or indirectly to benefit anyone not named in the Schedule.

SCHEDULE

To any person or organization when agreed to under a written contract or agreement, as defined above and with the insured, which is in effect and executed prior to any loss.

Effective Date:July 1, 2020 Expires on: July 1, 2021
Pinnacol Assurance has issued this endorsement June 26, 2020

Bond # 800071783

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned ESCO CONSTRUCTION COMPANY, a Corporation organized under the laws of the State of Colorado, hereinafter referred to as the "Contractor" and ATLANTIC SPECIALTY INSURANCE COMPANY, a corporation organized under the laws of the State of New York, and authorized and licensed to transact business in the State of Colorado, hereinafter referred to as the "Surety," are held and firmly bound unto the City of Grand Junction, Colorado, hereinafter referred to as the "City", in the penal sum of TWO MILLION EIGHT HUNDRED NINETY THREE THOUSAND FIVE HUNDRED AND NO/100 ---------- dollars ($ 2,893,500.00), lawful money of the United States of America, for the payment of which sum the Contractor and Surety bind themselves and their heirs, executors, administrators, successors and assigns, jointly and severally by these presents.

WHEREAS, the above Contractor has on the 3rd day of June, 2021, entered into a written contract with the City for furnishing all labor, materials, equipment, tools, superintendence, and other facilities and accessories for the construction of Hogchute (aka Carson) Reservoir Dam Modifications Project IFB-4839-21-DH (the "Project") and Contract No. Not Applicable, if appropriate, in accordance with the Contract, Special Conditions, Special Provisions, General Contract Conditions, Contract Drawings, Specifications and all other Contract Documents therefor which are incorporated herein by reference and made a part hereof, and are herein referred to as the "Contract".

NOW, THEREFORE, the conditions of this performance bond are such that if the Contractor:

1. Promptly and faithfully observes, abides by and performs each and every covenant, condition and part of said Contract, including, but not limited to, its warranty provisions, in the time and manner prescribed in the Contract, and

2. Pays the City all losses, damages (liquidated or actual, including, but not limited to, damages caused by delays in performance of the Contract), expenses, costs and attorneys' fees, that the City sustains resulting from any breach or default by the Contractor under the Contract,

then this bond is void; otherwise, it shall remain in full force and effect.

IN ADDITION, if said Contractor fails to duly pay for any labor, materials, team hire, sustenance, provisions, provender, or any other supplies used or consumed by said Contractor or its subcontractors in its performance of the Work contracted to be done or fails to pay any person who supplies rental machinery, tools, or equipment, all amounts due as the result of the use of such machinery, tools or equipment in the prosecution of the work, the Surety shall pay the same in an amount not exceeding the amount of this obligation, together with interest at the rate of eight percent per annum.

PROVIDED FURTHER, that the said Surety, for value received, hereby stipulates and agrees that any and all changes in the Contract or compliance or noncompliance with the formalities in the Contract for making such changes shall not affect the Surety's obligations under this bond and the Surety hereby waives notice of any such changes. Further, Contractor and Surety acknowledge that the penal sum of this bond shall increase in accordance with approved changes to the Contract Documents without obtaining the Surety's consent up to a maximum of 20 percent of the penal sum. Any additional increases in the penal sum shall require the Surety's consent.

IN WITNESS WHEREOF, said Contractor and said Surety have executed these presents as of this 8th day of June, 2021.

CONTRACTOR: ESCO CONSTRUCTION COMPANY

By: _____ ATTEST: _____

Secretary

Title: President

SURETY: ATLANTIC SPECIALTY INSURANCE COMPANY

By: _____

Kim Payton

Title: Attorney-in-Fact

(Accompany this Bond with the attorney-in-fact's authority from the surety to execute this Bond, certified to include the date of the Bond.)

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned ESCO CONSTRUCTION COMPANY, a Corporation organized under the laws of the State of Colorado, hereinafter referred to as the "Contractor" and ATLANTIC SPECIALTY INSURANCE COMPANY, a corporation organized under the laws of the State of New York, and authorized and licensed to transact business in the State of Colorado, hereinafter referred to as the "Surety," are held and firmly bound unto the City of Grand Junction, Colorado, hereinafter referred to as the "City," in the penal sum of TWO MILLION EIGHT HUNDRED NINETY THREE THOUSAND FIVE HUNDRED AND NO/100---------- dollars ($2,893,500.00), lawful money of the United States of America, for the payment of which sum the Contractor and Surety bind themselves and their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above Contractor has on the 3rd day of June, 2021, entered into a written contract with the City for furnishing all labor, materials, equipment, tools, superintendence, and other facilities and accessories for the construction of Hogchute (aka Carson) Reservoir Dam Modifications Project IFB-4839-21-DH (the "Project") and Contract No. Not Applicable, if appropriate, in accordance with the Contract, Special Conditions, Special Provisions, General Contract Conditions, Contract Drawings, Specifications and all other Contract Documents therefor which are incorporated herein by reference and made a part hereof, and are herein referred to as the "Contract".

NOW, THEREFORE, the condition of this payment bond obligation is such that if the Contractor shall at all times promptly make payments of all amounts lawfully due to all persons supplying or furnishing it or its subcontractors with labor, materials, rental machinery, tools or equipment, used or performed in the prosecution of work provided for in the above Contract and shall indemnify and save harmless the City to the extent of any and all payments in connection with the carrying our of such Contract which the City may be required to make under the law, and for all losses, damages, expenses, costs, and attorneys' fees incurred by the City resulting from the failure of the Contractor to make the payments discussed above, then this obligation shall be null and void, otherwise, it shall remain in full force and effect.

PROVIDE FURTHER, that the said Surety, for value received, hereby stipulates and agrees that any and all changes in the Contract Documents, or compliance or noncompliance with the formalities in the Contract for making such changes shall not affect the Surety's obligations under this bond and the Surety hereby waives notice of any such changes. Further, Contractor and Surety acknowledge that the penal sum of this bond shall increase or decrease in

accordance with approved changes to the Contract Documents without obtaining the Surety's consent up to a maximum of 20 percent of the penal sum. Any additional increases in the penal sum shall require the Surety's consent.

IN WITNESS WHEREOF, said Contractor and said Surety have executed these presents as of this 8th day of June, 2021.

CONTRACTOR: ESCO CONSTRUCTION COMPANY

By: _____ ATTEST: _____

Secretary

Title: President

SURETY: ATLANTIC SPECIALTY INSURANCE COMPANY

By: _____

Kim Payton

Title: Attorney-in-Fact

(Accompany this Bond with the attorney-in-fact's authority from the surety to execute this Bond, certified to include the date of the Bond.)

OneBeacon
INSURANCE GROUP

Power of Attorney

KNOW ALL MEN BY THESE PRESENTS, that ATLANTIC SPECIALTY INSURANCE COMPANY, a New York corporation with its principal office in Plymouth, Minnesota, does hereby constitute and appoint: **Cynthia M. Burnett, Douglas J. Rothey, Kim Payton, Wesley J. Butorac, Jason A. McMillan, Zach Rothey, Erik E. Ulibarri**, each individually if there be more than one named, its true and lawful Attorney-in-Fact, to make, execute, seal and deliver, for and on its behalf as surety, any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof; provided that no bond or undertaking executed under this authority shall exceed in amount the sum of: **unlimited** and the execution of such bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof in pursuance of these presents, shall be as binding upon said Company as if they had been fully signed by an authorized officer of the Company and sealed with the Company seal. This Power of Attorney is made and executed by authority of the following resolutions adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the President, any Senior Vice President or Vice-President (each an "Authorized Officer") may execute for and in behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and affix the seal of the Company thereto; and that the Authorized Officer may appoint and authorize an Attorney-in-Fact to execute on behalf of the Company any and all such instruments and to affix the Company seal thereto; and that the Authorized Officer may at any time remove any such Attorney-in-Fact and revoke all power and authority given to any such Attorney-in-Fact.

Resolved: That the Attorney-in-Fact may be given full power and authority to execute for and in the name and on behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and any such instrument executed by any such Attorney-in-Fact shall be as binding upon the Company as if signed and sealed by an Authorized Officer and, further, the Attorney-in-Fact is hereby authorized to verify any affidavit required to be attached to bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof.

This power of attorney is signed and sealed by facsimile under the authority of the following Resolution adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the signature of an Authorized Officer, the signature of the Secretary or the Assistant Secretary, and the Company seal may be affixed by facsimile to any power of attorney or to any certificate relating thereto appointing an Attorney-in-Fact for purposes only of executing and sealing any bond, undertaking, recognizance or other written obligation in the nature thereof, and any such signature and seal where so used, being hereby adopted by the Company as the original signature of such officer and the original seal of the Company, to be valid and binding upon the Company with the same force and effect as though manually affixed.

IN WITNESS WHEREOF, ATLANTIC SPECIALTY INSURANCE COMPANY has caused these presents to be signed by an Authorized Officer and the seal of the Company to be affixed this twenty-seventh day of April, 2020.

ATLANTIC SPECIALTY INSURANCE COMPANY CORPORATE SEAL 1986 NEW YORK

By _____
Paul J. Brehm, Senior Vice President

STATE OF MINNESOTA
HENNEPIN COUNTY

On this twenty-seventh day of April, 2020, before me personally came Paul J. Brehm, Senior Vice President of ATLANTIC SPECIALTY INSURANCE COMPANY, to me personally known to be the individual and officer described in and who executed the preceding instrument, and he acknowledged the execution of the same, and being by me duly sworn, that he is the said officer of the Company aforesaid, and that the seal affixed to the preceding instrument is the seal of said Company and that the said seal and the signature as such officer was duly affixed and subscribed to the said instrument by the authority and at the direction of the Company.

ALISON DWAN NASH-TROUT
NOTARY PUBLIC - MINNESOTA
My Commission Expires
January 31, 2025

_____
Notary Public

I, the undersigned, Secretary of ATLANTIC SPECIALTY INSURANCE COMPANY, a New York Corporation, do hereby certify that the foregoing power of attorney is in full force and has not been revoked, and the resolutions set forth above are now in force.

Signed and sealed. Dated 8th day of June, 2021.

ATLANTIC SPECIALTY INSURANCE COMPANY CORPORATE SEAL 1986 NEW YORK

This Power of Attorney expires
January 31, 2025

_____
Kara Barrow, Secretary