

WARD LAKE DAM OUTLET REHABILITATION
Construction File No. C-0888A
Dam ID No. 400533

Final Construction Report
December 22, 2020

This report has been prepared for the Ward Lake Dam Outlet Rehabilitation in Delta County, Colorado per Section 8.3.1.4 of the Rules and Regulations for Dam Safety and Dam Construction, effective date January 1, 2020.

Project Description

The Ward Lake Outlet Replacement project was jointly funded by Colorado Water Conservancy Board (CWCB) and Surface Creek Ditch and Reservoir Company (SCDRC). The project was necessitated by a zero-fill decree from the State Engineer's Office (SEO) in 2017 due to continuing seepage issues from repairs made in 1958 to the outlet (Construction file C-888). The dam was breached in June 2018 and design completed by DOWL and approved by the SEO in April 2020.

8.31.1 Notification of Completion

As required by Rule 8.3.1.1, this report serves as notification that the project is complete and ready for acceptance by the State Engineer upon review and approval of the As-constructed drawings and this completion certification report.

10.2.3 Construction Report

A. Summary of significant construction milestones

- June 11, 2020 - Bids were received and opened from eight regional contractors. Con-Sy, Inc. from Grand Junction was the apparent low bidder and was awarded a contract for construction for \$332,952.00 by consensus of the SCDRC board on June 17, 2020. Notice of award was sent to Con-Sy on June 19, 2020.
- July 1, 2020 - A preconstruction conference with SEO engineers, Con-Sy staff, the SCDRC board and DOWL staff was held in the Grand Mesa Water Users Association office in Cedaredge. (See Appendix A for the meeting agenda provided by the SEO)
- July 13, 2020 - A field kickoff meeting was held on site with representatives of the SEO, DOWL, Con-Sy and SCDRC. An initial project schedule was distributed by Con-Sy staff.
- July 22, 2020 - Site meeting with Jason Ward (SEO), Keith Waibel (SCDRC), Dustin Roehm (Con-Sy) and Dan Quigley (DOWL) to discuss dewatering, excavation progress and surface preparation of the breach benches prior to embankment. (See SEO report in Appendix A for more details)

- August 5, 2020 - Site meeting of Jackie Blumberg (SEO) and Dan Quigley (DOWL) to examine the existing outlet pipe after exposure by Con-Sy staff and prior to subgrade preparation. (See SEO report in Appendix A for more details)
- August 11, 2020 - Due to reports of standing water in the outlet foundation excavation by Con-Sy staff, Jason Ward (SEO) and Dan Quigley (DOWL) met with Con-Sy staff on site to discuss dewatering options. Based on our observations, Con-SY installed three temporary dewatering wells and pumped water out of the excavation and into the 12-inch HDPE bypass pipe that was part of the dewatering plan for the outlet construction to prevent flooding of the excavation. (See SEO report in Appendix A for more details)
- August 14, 2020 - SEO, DOWL and Con-Sy met on site to observe proof-rolling of the outlet foundation and approve the foundation to start the replacement outlet pipe construction. Foundation was approved. (See SEO report in Appendix A for more details)
- August 19, 2020 - Sand diaphragm installation demonstration observation with Jackie Blumberg (SEO) and Dan Quigley (DOWL) as required by SEO construction inspection schedule. Test was repeated to determine an acceptable methodology for the contractor to use in constructing the sand diaphragm. (See SEO report in Appendix A for more details)
- August 26, 2020 - Formwork and reinforcing steel inspection of the outlet pipe encasement with Jackie Blumberg and Jason Ward (SEO) and Dan Quigley (DOWL) as required by the SEO construction inspection schedule. Formwork was approved and concrete encasement for the pipe was placed on August 28, 20-20.
- September 16, 2020 - Formwork and reinforcing steel inspection of inlet structure with Jackie Blumberg (SEO). Formwork was approved and concrete for the inlet structure was placed on September 18th.
- September 28, 2020 - An embankment methodology observation meeting was held on site with Jason Ward (SEO) and Dan Quigley (DOWL) in attendance. Con-Sy moistened the previously excavated 1-foot “benches” on the sides of the excavation to “stitch” in new soil using a D-5 dozer. That material was then compacted using a single drum sheepsfoot compactor to achieve required density of the embankment fill. Methodology was accepted as being adequate to comply with approved plans and specifications.
- November 5, 2020 - Jason Ward (SEO) conducted an inspection of the project to develop a punchlist for the contractor and because a winter storm was forecast for November 7-8 so that the site could be observed in generally dry conditions. Due to COVID-19 quarantine requirements, Dan Quigley (DOWL) could not attend the meeting.

- November 17, 2020 - Final site inspection was held with Jackie Blumberg and Jason Ward (SEO), Dan Quigley (DOWL), Keith Waibel (SCDRC) and Con-Sy staff in attendance. Approximately 12-18 inches of snow covered the site. Outstanding items were the last two anchors for the gate stem and air vent pipes and seeding the downstream face of the embankment. Dan Quigley subsequently visited the site on November and confirmed that these items had been completed.
- November 23, 2020 - Approval to temporarily fill the reservoir to a gage height of 11.0 feet was issued as requested in DOWL's letter of November 17, 2020.

B. Problems Encountered and Their Solutions

Dewatering of Foundation

Upon completion of the excavation to plan depth of 10096.0 feet, Con-Sy reported standing water on the foundation. Inspection by both SEO and the Engineer resulted in the construction of three dewatering wells on the west side of the foundation excavation. Those dewatering wells consisted of a 1/2 H.P. pump in each 12-inch diameter PVC pipe well that pumped excess water to the existing 12-inch HDPE bypass pipeline on the west side of the excavation. Con-Sy pumped intermittently for 3 days to dewater the foundation in preparation of the foundation inspection and proof-roll test on August 14th as described above. No further groundwater issues were encountered during construction of the outlet works and dam embankment.

Initial Breach Excavation and Enlargement

The initial effort by Con-Sy to excavate the existing breach and enlarge it per plans and specifications was limited since only one employee using a track hoe was on site for the first 3 weeks of the project. The first scheduled foundation inspection on August 7, 2020 was unsuccessful because Con-Sy had not excavated to the foundation limits shown on the approved plans. This was quickly corrected and the second inspection for the foundation preparation on August 14, 2020 was conducted by Engineer Dan Quigley and SEO Division 4 dam safety engineer Jason Ward and the foundation approved to begin placement of the outlet pipe and embankment material.

Winter Conditions - Western Colorado experienced unusually dry weather conditions during the summer and fall of 2020, however snowfalls on September 8-9 and November 7-8 hampered Con-Sy's productivity and the ability to complete the dam construction sooner than expected. The remaining items that were impacted included rip-rap placement on the embankment, final installation of the gate stem and final grading and re-seeding of the dam crest. These items were completed on or before November 20, 2020.

C. Summary of Construction Materials Testing.

Appendix D presents all of the Quality Control testing performed by Huddleston-Berry and Quality Assurance testing performed by DOWL for the project. Summaries of the contractor's Quality Control and the owner's Quality Assurance testing are presented in Tables 1 and 2 below.

Table 1 – Summary of Quality Control Testing

Feature	Section	Test	Required # of Tests	Actual # of Tests
Embankment	31 24 00 -C	Moisture Density (Nuclear Method)	42	68
		Gradation/Atterberg/Classification	6	3
		Moisture-Density (1 point)	6	3
Sand Filter	31 24 00 -C	Gradation	1	1
Drain Gravel	31 24 00 -C	Gradation	1	1

Table 2 - Summary of Quality Assurance Testing

Feature	Section	Test	Required # of Tests	Actual # of Tests
Embankment	31 24 00 -C	Moisture Density (Nuclear Method)	-	34
		Gradation/Atterberg/Classification	-	4
		Moisture-Density (1 point)	-	3
Sand Filter	31 24 00 -C	Gradation	-	1
Drain Gravel	31 24 00 -C	Gradation	-	1

8.3.1.2 - Schedule of First Fill

On November 23, 2020, a Temporary Approval to Fill Deep Ward Lake to a gage height of 11.0 feet was issued by the State Engineer's Office. That approval is presented in Appendix A of this report. SCDRC began filling on that date.

8.3.1.3 - As-Constructed Plans

As-constructed plans are included as a separate transmittal with this completion report.

8.3.1.5 - Permanent Monuments. There were no permanent monuments required or installed for this project.

8.3.1.6 - Long-Term Monitoring Plan

Surface Creek Ditch and Reservoir Company will be responsible for providing periodic monitoring of the dam and associated infrastructure. They will contact the SEO to determine an appropriate frequency of inspection and format for reporting their observations.

8.3.1.7 - Emergency Action Plan

SCDRC will update their Emergency Action Plan (EAP) as necessary for the new outlet works. Since the project replaced existing outlet pipe and components and the embankment height remained the same, no significant revisions to the existing EAP are anticipated.

The construction of the dam and related infrastructure is complete and is in general conformance to the construction plans and specifications approved by the State Engineer's Office for the project.

DOWL



Daniel C. Quigley, PE
Engineer



Appendices

- Appendix A - SEO Inspection Reports, Correspondences
- Appendix B - Weekly Construction Summary Reports with Progress Photos
- Appendix C - Materials Testing Results
- Appendix D - DOWL Field Observation Reports

APPENDIX A
SEO INSPECTION REPORTS
AND
CORRESPONDENCES



CONSTRUCTION INSPECTION REPORT

PROJECT INFORMATION

Dam Name:	WARD LAKE	Inspector:	Jason Ward
DAMID:	400533	Date:	July 22, 2020
C-#:	C-0888A	Time on Site:	1400 - 1500
Dam Owner:	Surface Creek Ditch & Reservoir Company (SCDRC)	Contact:	Keith Waibel, 907-201-6481
Engineer:	DOWL	Contact:	Dan Quigley 970-596-4923 (c) Russ Reed (406) 656-6399
Contractor:	Con-Sy, Inc.	Contact:	Wayne Balderston, 970-683-1604 Tanner Lee, 970-644-1678 Tom Lee, 970-379-5729 Dustin Roehm, 970-712-4890
Material QC	Huddleston-Berry	Contact:	
Approved Plans & Specifications On-site? ☒ Yes ☐ No		Engineer Following Const. Obs. Plan? ☒ Yes ☐ No	

INSPECTION PARTICIPANTS

Inspection Participants:	Jason Ward (SEO) Dan Quigley (DOWL) Keith Waibel, SCDRC Dustin Roehm (Con-Sy)
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CONDITIONS

Reservoir:	Empty; 0.8 cfs flow through existing outlet pipe
Weather:	Partly cloudy
Equipment:	Link 235x track excavator John Deere 350D articulated dump truck John Deer 225C track excavator

CONSTRUCTION STATUS

Work Completed to Date:	- Potholing adjacent to existing outlet pipe (7/16/20) - Expansion of existing breach per Sheet 8 Outlet Works Excavation Plan
Work in Progress:	- Cut of left breach slope to construction staking. - Blending of stockpile material.
Work Planned and est. Timeframe:	1-week look ahead: - Finish breach excavation plan. - Install dewatering per plan



OBSERVATIONS AND DISCUSSION

Purpose of Inspection:	The purpose of the inspection was to observe work progress on the outlet works excavation plan.
Items Inspected:	<u>Left bank of breach excavation.</u> - The left bank of the breach has been excavated to construction staking per Sheet 8 Outlet Works Excavation Plan of the approved plans. - The contractor has pre-formed benches into the side slope to meet the intent of the Drawings Sheet 11 (and others), and Specifications Section 31 24 00, Section 3.02.E. - The bench geometry appears in general conformance with the plans and specifications. - A pocket of blue clay was encountered in the lower portion of the breach left side slope. While different in color, the consistency appeared similar to the embankment fill lean clay CL material.
Items not in conformance with approved plans and specs:	None.
Problems/Concerns:	There is concern that additional surface preparation, above and beyond Specifications Section 31 24 00 Section 3.02, made be needed prior to placing embankment fill, including, but no limited to: - Removal of large particles encountered in the bench cuts that leave voids, i.e. 6-12 inch rock leaving a void in the cut (see photo). - Degradation of the subgrade after weeks of exposure. - Moisture conditioning of the exposed slope prior to backfill placement. Additional field evaluation should be conducted to determine if the blue clay encountered in the left breach sideslope is acceptable subgrade material.
Design Change Orders:	None.
Minor Changes:	None.
Conclusions:	Current work appears to be in conformance with the approved plans and specifications.
Action Items:	Breach backfill: - Prepare and submit a plan for preparation of pre-formed and exposed benches in breach cut, prior to placement of embankment fill above the elevation of the outlet works. - Determine if blue clay is acceptable subgrade material. Water Diversion Plan: - A Water Diversion Plan must be submitted in accordance with Rule 8.1.1.
Next Inspection:	

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 Wayne Balderston, Con-Sy, wayne.consy@gmail.com
 Tanner Lee, Con-Sy, tannerlcsi@gmail.com
 Tom Lee, Con-Sy, csitomlee@aol.com
 Rachel Pittinger, Colorado Water Conservation Board
 James Holiman, WD 40 Water Commissioner
 Scott Frost, WD 40 Water Commissioner
 Bill McCormick, Chief, Dam Safety Branch
 Jackie Blumberg, Dam Safety Engineer

Expansion of existing breach per
Excavation Plan.



View looking downstream along
left sideslope of breach with
pre-formed benches. Blue clay
can be seen in foreground.

Close-up of benched sideslope.



Example of oversized particle in bench that should be removed prior to fill placement. Void needs treatment prior to backfill.



CONSTRUCTION INSPECTION REPORT

PROJECT INFORMATION			
Dam Name:	Ward Lake	Inspectors:	Jackie Blumberg
DAMID:	40033	Date:	5Aug2020
C-#:	C-0888A	Time on Site:	10:00 to 10:40am
Dam Owner:	Surface Creek Ditch & Reservoir Co.	Contact:	Keith Waibel (970-856-3165)
Engineer:	DOWL	Contact:	Dan Quigley (970-497-8852) Russ Reed (406-656-6399)
Contractor:	Con-Sy	Contact:	Wayne Balderton (970-683-1604) Tanner Lee (970-644-1678) Tom Lee (970-379-5729) Dustin Roehm (on-site foreman) (970-712-4890)
Approved Plans & Specifications On-site? ☒ Yes ☐ No		Engineer Following Const. Obs. Plan? ☒ Yes ☐ No	

INSPECTION PARTICIPANTS	
Inspection Participants:	Dan Quigley (DOWL) Dustin Roehm (Con-Sy) Jackie Blumberg (SEO)

CONDITIONS	
Reservoir:	Empty; <0.5-inch of flow through bypass pipe
Weather:	Sunny and clear, mid 60s
Equipment:	CAT 350D loader - active Link Belt 235 excavator - active 350G excavator - inactive 225C excavator - inactive

CONSTRUCTION STATUS	
Work Completed to Date:	Potholing adjacent to existing outlet pipe Breach excavation (sides)
Work in Progress:	Removal of old pipe Excavate to subgrade
Work Planned and est. Timeframe:	Foundation subgrade proof roll (8/7/2020) Pipe encasement (begin 8/3/2020) Outlet structure (begin 8/11/2020)

OBSERVATIONS AND DISCUSSION	
Purpose of Inspection:	Forensic inspection of historic pipe (not an SEO defined construction milestone) Verify dewatering system installation, per Plan approved 7/31/2020
Items Inspected:	- Old pipe prior to removal - Pothole directly adjacent to old pipe - preview of subgrade - New pipe - Old and new breach material stockpiles - Dewatering system - Benching of breach side slopes



OBSERVATIONS AND DISCUSSION

Items not in compliance with approved plans/specs:	None
Problems/Concerns:	Blue clay in the left breach side slope has been verbally resolved between DOWL and the SEO. Material may have been a discrete volume from off-site during original construction and appears to generally conform with suitable embankment criteria.
Design Change Orders:	none
Minor Changes:	none
Conclusions:	Current work appears to be in conformance with approved plans and specifications
Action Items:	1. Action Item: Plan for preparation and pre-forming of exposed benches in breach cut, prior to placement of embankment materials will be resolved by field directive provided by DOWL to Con-Sy.
Next Inspection:	Foundation subgrade proof roll on 8/7/2020.

PHOTOGRAPHS



Photo 1. Exposed area beneath old pipe - note woody debris from forms left in place during concrete collar construction



Photo 2. Old pipe joint

PHOTOGRAPHS



Photo 3. Pipe is described as 1/4-inch thick, asbestos wrapped welded steel pipe with arc weld joints (reference C-0590 specifications) - photo shows outer material scraped away, revealing steel beneath



Photo 4. Close-up view of old pipe exterior - seam along side of pipe appeared discontinuous - the section of pipe upstream likely was turned over, with the seam located beneath



Photo 5. Interior view of old pipe - surprisingly good condition



Photo 6. Formwork left in place from original construction

PHOTOGRAPHS



Photo 7. Stilling basin - terminal end of pipe (area to be dewatered)



Photo 8. View of the old, exposed pipe, prior to removal



Photo 9. Flow depth of less than 0.5-inch conveyed by bypass pipe



Photo 10. Bypass pipe inlet - old trash rack is visible in center right of photo

PHOTOGRAPHS



Photo 11. Access over bypass - photo is taken upstream from Photo 10



Photo 12. Newly excavated stockpiled material - Con-Sy plans to transport a shaker/screener to the site to facilitate removal of large D-50 elements



Photo 13. Material from the old breach (completed in 2018)



Photo 14. The new pipe

PHOTOGRAPHS



Photo 15. Close-up view of pipe weld



Photo 16. View into excavation directly adjacent to outlet - generally clayey material

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Rachel Pittinger, Colorado Water Conservation Board
James Holiman, WD 40 Water Commissioner
Scott Frost, WD 40 Water Commissioner
Bill McCormick, Chief, Dam Safety Branch
Jason Ward, Dam Safety Engineer



CONSTRUCTION INSPECTION REPORT

PROJECT INFORMATION

Dam Name:	WARD LAKE	Inspector:	Jason Ward
DAMID:	400533	Date:	August 11, 2020
C-#:	C-0888A	Time on Site:	0900-1000
Dam Owner:	Surface Creek Ditch & Reservoir Company (SCDRC)	Contact:	Keith Waibel, 907-201-6481
Engineer:	DOWL	Contact:	Dan Quigley 970-596-4923 (c) Russ Reed (406) 656-6399
Contractor:	Con-Sy, Inc.	Contact:	Wayne Balderston, 970-683-1604 Tanner Lee, 970-644-1678 Tom Lee, 970-379-5729 Dustin Roehm, 970-712-4890
Material QC	Huddleston-Berry	Contact:	
Approved Plans & Specifications On-site? ☒ Yes ☐ No		Engineer Following Const. Obs. Plan? ☒ Yes ☐ No	

INSPECTION PARTICIPANTS

Inspection Participants:	Jason Ward (SEO) Dan Quigley (DOWL) Wayne Balderston (Con-Sy)
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CONDITIONS

Reservoir:	Empty
Weather:	Partly cloudy, warm
Equipment:	Link 235x track excavator John Deere 350D articulated dump truck John Deer 225C track excavator

CONSTRUCTION STATUS

Work Completed to Date:	Breach of embankment to outlet works foundation elevation.
Work in Progress:	- Dewatering - Embankment fill processing and blending.
Work Planned and est. Timeframe:	Foundation proof rolling dependent on dewatering

OBSERVATIONS AND DISCUSSION

Purpose of Inspection:	The purpose of the inspection was to observe uncontrolled water in the excavated outlet works foundation and to discuss alternatives with the engineer and contractor.
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Items Inspected:	<u>"Floor of Outlet Works" Excavation (per Sheet 8, Profile View)</u> - The outlet works foundation was reportedly excavated to elevation 10,096.0 as shown on the Excavation Plan, Sheet 8 - Saturated soils and areas of standing water 2-4 inches deep were observed along the entire length of the outlet works foundation. - The base of cut slopes on either side of the excavation were saturated with a few areas showing evidence of recent seepage flow. - No flow was observed in the foundation or along the base of the cut slopes. - Mild sloughing had occurred on both adjacent cut slopes. - Most areas probed to a firm foundation within 1-6 inches. - Access with a loader and trackhoe were reported with no problems.
Items not in conformance with approved plans and specs:	Dewatering of the outlet works foundation in accordance with Specification Section 31 24 00, 3.02.I Preparation.
Problems/Concerns:	- There is concern that a water source (reservoir, spring, etc) is continually recharging the foundation excavation such that suitable moisture conditions for proof rolling cannot be achieved. - The contractor indicated that pumping of accumulated water was successful, but only for a short period of time; less than 24 hours. - Flow and amount of water did not seem to be increasing, but no permanent drainage or pumping solution has been implemented.
Design Change Orders:	None.
Minor Changes:	None.
Conclusions:	Dewatering of the foundation to achieve suitable conditions will not be achieved without intervention.
Action Items:	Several potential dewatering solutions were discussed with the engineer and contractor including, but not limited to: - Installing well points along the edge of the foundation (both sides?) in order to promote drawdown of the water source(s) and prevent pooling at the excavation level. Ideas for well points included: - Three well points proposed by contractor; 8-12 inch diameter slotted pvc pipe buried vertically 2-4 feet at strategic locations; - Possible gravel or free-draining material placed in and around the wells; - Sump pumps installed into each well; - Pumping into the existing dewatering pipe (not preferred) or installing a new dedicated drain line for the well points (preferred). - A trench excavation for gravity draining was discussed, but is not preferred at this time. - Moving the reservoir bypass to a more upstream location further away from the excavation to reduce any influence it may have. The engineer and contractor were advised that any dewatering solution that modifies the outlet works foundation (i.e. wells, trenches, etc) will be required to be properly abandoned by a method acceptable to the Engineer and Dam Safety prior to backfilling.
Next Inspection:	Outlet works foundation proof rolling

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Rachel Pittinger, Colorado Water Conservation Board
James Holiman, WD 40 Water Commissioner
Scott Frost, WD 40 Water Commissioner
Bill McCormick, Chief, Dam Safety Branch
Jackie Blumberg, Dam Safety Engineer

Overall view of outlet works
foundation looking in downstream
direction.



View looking downstream along
outlet works foundation.

Close-up of typical area of standing water; location is near Sta 1+20 for the outlet sand diaphragm.



Upstream end of outlet works foundation; estimated Sta. 0+40.



CONSTRUCTION INSPECTION REPORT

PROJECT INFORMATION			
Dam Name:	Ward Lake	Inspectors:	Jackie Blumberg
DAMID:	40033	Date:	14Aug2020
C-#:	C-0888A	Time on Site:	11:00 - 13:30
Dam Owner:	Surface Creek Ditch & Reservoir Co.	Contact:	Keith Waibel (970-856-3165)
Engineer:	DOWL	Contact:	Dan Quigley (970-497-8852) Russ Reed (406-656-6399)
Contractor:	Con-Sy	Contact:	Wayne Balderton (970-683-1604) Tanner Lee (970-644-1678) Tom Lee (970-379-5729) Dustin Roehm (on-site foreman) (970-712-4890)
Approved Plans & Specifications On-site? ☒ Yes ☐ No		Engineer Following Const. Obs. Plan? ☒ Yes ☐ No	

INSPECTION PARTICIPANTS	
Inspection Participants:	Dan Quigley (DOWL) Tom Lee, Wayne Balderton, Dustin Roehm (Con-Sy) Jackie Blumberg (SEO)

CONDITIONS	
Reservoir:	Empty
Weather:	Sunny and clear, mid 70s
Equipment:	Kenworth Dump truck (rubber tires, used for proof rolling) CAT 350D loader - active Link Belt 235 excavator - active Sheepsfoot roller - active Other equipment moving and filtering stockpile material

CONSTRUCTION STATUS	
Work Completed to Date:	Potholing adjacent to existing outlet pipe Breach excavation (sides) Removal of old pipe Excavate to subgrade
Work in Progress:	Compacting subgrade to non-yielding surface Filtering embankment material stockpile
Work Planned and est. Timeframe:	Estimated timeframes pending look-ahead schedule update: Backfill and compact beneath pipe (early next week) Test section for filter material (end of next week) New pipe installation Formwork, reinforcement and encasement

OBSERVATIONS AND DISCUSSION	
Purpose of Inspection:	Observe dewatered subgrade and proof roll
Items Inspected:	<u>Subgrade</u> Three dewatering wells were in place and subgrade appeared generally dewatered. Con-Sy reports that elevation was approximately 10,095.5 (0.5-feet lower than shown on Sheet 80F Proof rolling was achieved commensurate with specification 31 24 00.3.02 (Preparation) using a loaded



OBSERVATIONS AND DISCUSSION

	Kenworth dump truck with rubber tires making four passes. The proof roll revealed two soft spots about 15-feet long, aligned with the center and downstream wells. Both spots were marked with paint and DOWL directed Con-Sy to excavate an additional 2-feet, backfill with filtered embankment materials and compact. Backfilling occurred by three lifts, each compacted using a sheepsfoot roller making 5 passes. A second proof roll of the subgrade yielded acceptable results. The location of the intake structure was not included within the proof roll as it will undergo additional excavation and treatment and is also the grade break/base of access road into outlet trench. Equipment entering the outlet trench has torn the ground up a bit locally. Con-Sy expects Huddleston-Berry to visit the site later in the day to test moisture content of filtered embankment material before backfilling and compaction.
Items not in compliance with approved plans/specs:	None
Problems/Concerns/ Discussion:	The SEO recommended the dewatering wells remain in place over the weekend. DOWL, SEO and Con-Sy to discuss proper abandonment of the dewatering wells next week.
Design Change Orders:	none
Minor Changes:	none
Conclusions:	Current work appears to be in conformance with approved plans and specifications. Con-Sy to begin placing and compacting lifts pending moisture testing of stockpile from Huddleston-Berry.
Action Items:	1. (resolved) Action Item: Plan for preparation and pre-forming of exposed benches in breach cut, prior to placement of embankment materials will be resolved by field directive provided by DOWL to Con-Sy.
Next Inspection:	Observe method spec for filter materials, likely end of next week (August 20 th or 21 st)

PHOTOGRAPHS



Photo 1. First proof roll, end of second pass.



Photo 2. End of third pass. Soft spots were identified in the vicinity of the center and downstream wells.

PHOTOGRAPHS



Photo 3. One of two soft spots identified during first proof roll.



Photo 4. Two spots identified as yielding during proof roll were overexcavated by two additional feet, then backfilled with embankment materials and compacted.



Photo 5. Two overexcavated spots.



Photo 6. The excavator spreads embankment material into the 2-foot overexcavated areas.

PHOTOGRAPHS



Photo 7. Backfilling: three lifts of embankment materials, each compacted by five passes with a sheepfoot roller.



Photo 8. Second proof roll. Looking downstream.



Photo 9. Kenworth loaded dump truck exits the outlet trench (looking upstream), following second proof roll.



Photo 10. Foreground is the location of dump truck in previous photo, the approximate location of the intake structure (additional excavation needed) and the grade break/base of the equipment access into the outlet trench.

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CONSTRUCTION INSPECTION REPORT

PROJECT INFORMATION			
Dam Name:	Ward Lake	Inspectors:	Jackie Blumberg
DAMID:	40033	Date:	19Aug2020
C-#:	C-0888A	Time on Site:	14:00 - 15:30
Dam Owner:	Surface Creek Ditch & Reservoir Co.	Contact:	Keith Waibel (970-856-3165)
Engineer:	DOWL	Contact:	Dan Quigley (970-497-8852) Russ Reed (406-656-6399)
Contractor:	Con-Sy	Contact:	Wayne Balderton (970-683-1604) Tanner Lee (970-644-1678) Tom Lee (970-379-5729) Dustin Roehm (on-site foreman) (970-712-4890)
Approved Plans & Specifications On-site? ☒ Yes ☐ No		Engineer Following Const. Obs. Plan? ☒ Yes ☐ No	

INSPECTION PARTICIPANTS	
Inspection Participants:	Dan Quigley (DOWL) Wayne Balderton and crew (Con-Sy) Keith Waibel (SCDR) Jackie Blumberg (SEO)

CONDITIONS	
Reservoir:	Empty
Weather:	Hazy, smoky, mid 70s
Equipment:	Kenworth Dump truck (to be used to store filter material, to minimize contamination) CAT 85C mini-excavator Wacker Packer VP 1550 vibratory compactor

CONSTRUCTION STATUS	
Work Completed to Date:	Potholing adjacent to existing outlet pipe Breach excavation (sides) Removal of old pipe Excavate to subgrade Dewatering and compacting subgrade to non-yielding surface Fill placement to bring subgrade surface up to grade
Work in Progress:	Filtering embankment material stockpile (ongoing)
Work Planned and est. Timeframe:	New pipe installation (8/19/2020) Formwork, reinforcement and encasement (8/19/2020 - 8/28/2020) Form and pour inlet & outlet (8/28/2020 - 9/9/2020)

OBSERVATIONS AND DISCUSSION	
Purpose of Inspection:	Filter material test section (per specification 31 24 00.3.02.C.10)
Items Inspected:	<u>Filter material test section</u> Specification 31 24 00.3.02.C.8 and 9 states that each thoroughly wetted 8-inch lift of material shall be compacted by two passes with a vibratory compactor for a target compaction of between



OBSERVATIONS AND DISCUSSION

65 and 75 percent relative density. Material shall also not be over-compacted, as evidenced by increased fines following compaction.

The sides of the trench appeared clean, vertical and competent. One-foot marks were painted on the sides of the trench. The elevation of the trench floor was 10,094, consistent with the approved plans.

The filter material appeared visually acceptable; did not leave a fines residual on the hand. DOWL reported that the material was tested and the distribution was within spec.

Material was scooped from the dump truck by excavator and placed into the trench in one motion, extending the bucket away from the cab while tilting it to empty. The material was spread within the trench by hand tools to a uniform elevation. The material was then moisture conditioned using a garden hose and potable water from the water truck. DOWL collected nuclear gauge measurements for the first loose lift, then for each pass (one forward, one back) with the vibratory compactor. Based on measurements below, the two-pass specification appeared acceptable to DOWL and the SEO - suitable compaction was achieved in two passes. DOWL concluded the test section by collecting a grab sample to test for particle degradation (increase in fines).

	dry dens	wet dens	% moist
loose	93.1	103.5	11.2
1st pass	100.1	109.5	9.4
2nd pass	101.8	109.9	7.9
3rd pass	102.1	110.1	7.8

The vibratory compactor was wider than the trench; turning it around for the return half of each pass was accomplished by affixing a strap and raising from the trench.

Following the test section, all sacrificial filter material was removed from the trench.

Items not in compliance with approved plans/specs:

None

Problems/Concerns/ Discussion:

At the conclusion of the test section, Con-Sy, DOWL and the SEO discussed Good Housekeeping: keeping dirt clods from entering the trench (the mini-ex was positioned on the bench above the left side of the trench) and keeping the wheels of the vibratory compactor from encountering the walls of the trench during the process of turning around with excavator assist.

Design Change Orders:

none

Minor Changes:

none

Conclusions:

Current work appears to be in conformance with approved plans and specifications.

Action Items:

1. (resolved, retained for tracking purposes) Action Item: Plan for preparation and pre-forming of exposed benches in breach cut, prior to placement of embankment materials will be resolved by field directive provided by DOWL to Con-Sy.
2. DOWL, SEO and Con-Sy to discuss proper abandonment of the dewatering well and formulate a plan.

Next Inspection:

Installed pipe, formwork and reinforcement prior to pouring concrete structures (8/19/2020 - 8/28/2020). DOWL to coordinate with the SEO.

PHOTOGRAPHS



Photo 1. The filter material.



Photo 2. Dump truck backing up to test area (actual trench location) with excavator waiting.



Photo 3. Potable water truck.



Photo 4. Moisture conditioning the filter material. Con-Sy may opt to apply water while material is in the truck.

PHOTOGRAPHS



Photo 5. Nuclear gauge testing.



Photo 6. The Wacker Packer. Following one half of the pass, a strap was affixed to the compactor, which was raised by the excavator and turned around to complete the second half of the pass. The Wacker Packer was slightly wider than the trench.



Photo 7. Grab sample collection following completion of test section, to evaluate for over-compaction and increased fines.

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Rachel Pittinger, Colorado Water Conservation Board
James Holiman, WD 40 Water Commissioner
Scott Frost, WD 40 Water Commissioner
Bill McCormick, Chief, Dam Safety Branch
Jason Ward, Dam Safety Engineer



CONSTRUCTION INSPECTION REPORT

PROJECT INFORMATION			
Dam Name:	Ward Lake	Inspectors:	Jackie Blumberg
DAMID:	40033	Date:	26Aug2020
C-#:	C-0888A	Time on Site:	
Dam Owner:	Surface Creek Ditch & Reservoir Co.	Contact:	Keith Waibel (970-856-3165)
Engineer:	DOWL	Contact:	Dan Quigley (970-497-8852) Russ Reed (406-656-6399)
Contractor:	Con-Sy	Contact:	Wayne Balderton (970-683-1604) Tanner Lee (970-644-1678) Tom Lee (970-379-5729) Dustin Roehm (on-site foreman) (970-712-4890)
Approved Plans & Specifications On-site? ☒ Yes ☐ No		Engineer Following Const. Obs. Plan? ☒ Yes ☐ No	

INSPECTION PARTICIPANTS	
Inspection Participants:	Dan Quigley (DOWL) Wayne Balderton and crew (Con-Sy) Jason Ward, Jackie Blumberg (SEO)

CONDITIONS	
Reservoir:	Empty
Weather:	Overcast, upper 60s
Equipment:	Various equipment actively stockpiling, filtering and sorting

CONSTRUCTION STATUS	
Work Completed to Date:	Potholing adjacent to existing outlet pipe Breach excavation (sides) Removal of old pipe Excavate to subgrade Dewatering and compacting subgrade to non-yielding surface Fill placement to bring subgrade surface up to grade Filter material test section and placement of filter material into trench per method specification New pipe installation
Work in Progress:	Filtering embankment material stockpile (ongoing) Formwork and steel reinforcement for outlet encasement
Work Planned and est. Timeframe:	Pipe encasement Structural steel and forms for inlet and outlet structures Form and pour inlet & outlet

OBSERVATIONS AND DISCUSSION	
Purpose of Inspection:	Formwork and steel reinforcement per sheets 10 and 11 of the approved plans for conduit structural steel (sheet 12, inlet structural steel, to be referenced at a later construction visit).
Items Inspected:	<u>Formwork and steel reinforcement</u> Steel clearance and overlap was measured and found to be generally commensurate with the approved plans. The angle of sidewall forms was measured at 7 degrees, which agrees well with the approved plans that show 5 degrees (12H:1V).



OBSERVATIONS AND DISCUSSION

	To ensure minimum clearance of structural steel above bare ground, Con-Sy has installed a workaround by suspending the structural steel cage from ties located every 6-feet. Chairs are to be installed along the forms to ensure 3-inch clearance, per the details on Sheets 10 and 11. Given the lack of available plugs for a 24-inch pipe, Con-Sy proposes to use an inflatable exercise ball to close the terminal end of the pipe, so that it may hold water and minimize buoyancy during concrete placement. DOWL discussed trimming the edge where the top of encasement meets the wall while concrete cures, to avoid a ridge that forms against the form that must be sanded off once the forms are removed. The first concrete pour is scheduled for 11:00am on Friday, 25 yards is expected to be delivered. Con-Sy to have backup generators and backup vibrators on site. Huddleston-Berry expected to be on site to collect cylinders for testing. The SEO discussed roughening of the surface, per specification 03 30 00.3.03.D.4.b, with Con-Sy. Sand-blasting will likely be used. The seven day requirement between pouring sections, per specification 03 30 00.3.03.D.3 was also discussed. Con-Sy plans to pour the intake structure and first section of pipe encasement as a monolith. The sand filter at station 1+20 was also observed. Con-Sy has protected the sand by overlying with a temporary blanket.
Items not in compliance with approved plans/specs:	None
Problems/Concerns/ Discussion:	Some flex of the HDPE pipe has occurred, due to variable temperatures on site, resulting in a slight horizontal bend to the right. Con-Sy proposes covering the pipe overnight with concrete blankets to minimize temperature impacts to the pipe and plans to pour concrete early in the day. The 4-inch blocks supporting the pipe may not offer sufficient resistance to pipe movement due to thermal expansion/contraction and a small belly was noticed by DOWL during an earlier inspection, which has since flattened out.
Design Change Orders:	none
Minor Changes:	none
Conclusions:	Current work appears to be in conformance with approved plans and specifications.
Action Items:	(revisited) Plan for preparation and pre-forming of exposed benches in breach cut, prior to placement of embankment materials will be resolved by field directive provided by DOWL to Con-Sy. Revisited due to weathered appearance pre-formed benches exhibit and the wetting-drying cycle the material has undergone since benching was conducted one month ago (see CIR from 22JUL2020). There is concern that simply moisture conditioning the exposed material may not be sufficient to promote bonding with new embankment fill. At a minimum, the SEO would like to discuss the plan with DOWL's geotechnical engineer (reference specification sections 31 24 00.3.02.A and E) (resolved) DOWL, SEO and Con-Sy to discuss proper abandonment of the dewatering well and formulate a plan. One of two plans will occur: - If access allows, apply lean concrete to well void, leaving HDPE pipe in place while curing begins, remove pipe prior to full curing; or - Follow process outlined above using Sakrete rather than lean concrete. - DOWL to coordinate with Con-Sy on removing in-place forms at station 1+60 to allow access for placing electrofusion flex restraints at 2, 6 and 10 o'clock positions, per detail C on sheet 11 of the plans. - Con-Sy to install wall chairs prior to concrete pour, to ensure 3-inch clearance between form wall and structural steel, per details shown on sheets 10 and 11 of the plans. - Con-Sy to clean pipe prior to concrete pour.

OBSERVATIONS AND DISCUSSION

- 6. Con-Sy to abandon the wells, per discussion with DOWL and the SEO.
- 7. Abandoned well locations to be surveyed for inclusion on the as-constructed plans.

Next Inspection: Structural steel and formwork for inlet and outlet structures

PHOTOGRAPHS



Photo 1. Looking downstream into the HDPE pipe, a slight bend to the right is noted. Temperatures range from mid-to-low 40s in the evening to upper 60s during the day.



Photo 2. Inlet side. Con-Sy is awaiting an appropriately sized gasket to be delivered to the site.



Photo 3. Ties every 6-feet to suspend the structural steel cage a minimum of 3-inches above the ground. Sidewall chairs to be placed to ensure 3-inch clearance from wall forms.



Photo 4. Placing steel at the terminal end of the pipe.

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Rachel Pittinger, Colorado Water Conservation Board
James Holiman, WD 40 Water Commissioner
Scott Frost, WD 40 Water Commissioner
Bill McCormick, Chief, Dam Safety Branch
Jason Ward, Dam Safety Engineer



CONSTRUCTION INSPECTION REPORT

PROJECT INFORMATION			
Dam Name:	Ward Lake	Inspectors:	Jackie Blumberg
DAMID:	40033	Date:	18Sept2020
C-#:	C-0888A	Time on Site:	10:00 – 11:00
Dam Owner:	Surface Creek Ditch & Reservoir Co.	Contact:	Keith Waibel (970-856-3165)
Engineer:	DOWL	Contact:	Dan Quigley (970-497-8852) Russ Reed (406-656-6399)
Contractor:	Con-Sy	Contact:	Wayne Balderton (970-683-1604) Tanner Lee (970-644-1678) Tom Lee (970-379-5729) Dustin Roehm (on-site foreman) (970-712-4890)
Approved Plans & Specifications On-site? ☒ Yes ☐ No		Engineer Following Const. Obs. Plan? ☒ Yes ☐ No	

INSPECTION PARTICIPANTS	
Inspection Participants:	Dan Quigley (DOWL) Dustin Roehm, Wayne Balderton and crew (Con-Sy) Keith Waibel (Surface Creek Ditch & Reservoir Co.) Jackie Blumberg (SEO)

CONDITIONS	
Reservoir:	Empty
Weather:	Hazy, low 60s
Equipment:	Wacker Nueson RTSC3 – embankment compaction Deere 85G excavator and 350D loader – excavating stilling basin area Various equipment for stockpiling, filtering and sorting - inactive

CONSTRUCTION STATUS	
Work Completed to Date:	Potholing adjacent to existing outlet pipe Breach excavation (sides) Removal of old pipe Excavate to subgrade Dewatering and compacting subgrade to non-yielding surface Fill placement to bring subgrade surface up to grade Filter material test section and placement of filter material into trench per method specification New pipe installation Formwork and steel reinforcement for outlet encasement Pipe encasement
Work in Progress:	Filtering embankment material stockpile (ongoing) Structural steel and forms - inlet structure
Work Planned and est. Timeframe:	Form and pour inlet (tentatively 9/18/2020) Begin backfill placement (start 9/21/2020)





CONSTRUCTION INSPECTION REPORT

OBSERVATIONS AND DISCUSSION	
Purpose of Inspection:	Formwork and steel reinforcement - inlet structure
Items Inspected:	<u>Formwork and steel reinforcement</u> Confirmed structural steel has been placed per detail B on Sheet 12 of the approved plans. Number and spacing appear commensurate with the plans. During inspection, several dobies were placed to ensure 2-inch spacing between bottom steel and underlying gravel. Two #5 horizontal bars on the top of the concrete structure, reservoir side of the HDPE inlet are yet to be placed. DOWL agreed to take additional photographs before the concrete pour, tentatively scheduled for September 18. <u>Embankment Placement</u> DOWL and Con-Sy each collected several material density and moisture readings using a nuclear gauge, on both sides of the outlet and generally spaced throughout the work area. Testing indicated that four to five passes with the Wacker were sufficient to attain Proctor target values. <u>Well Abandonment</u> The dewatering wells appear properly abandoned, using excess concrete material from outlet encasement pour.
Items not in compliance with approved plans/specs:	None
Concerns/ Discussion:	Detail B on sheet 14 of the approved plans shows a rectangular void to be filled with filter sand. Given the sequencing of construction, suitable compaction of the sand within the void will be difficult to achieve. Con-Sy plans to block one side and then tamp the filter sand in using a square plate hand tamper. DOWL, Con-Sy and the SEO discussed favorable strength testing outcomes for the outlet encasement concrete. Strengths up to 75 percent were noted from 3-day tests and nearing 100 percent from 5-day tests. DOWL and SEO also discussed the field directive to encourage knitting between benched/breach material and new embankment (more detail below).
Design Change Orders:	none
Minor Changes:	none
Conclusions:	Current work appears to be in conformance with approved plans and specifications.
Action Items:	1. DOWL to confirm two #5 horizontal bars on the top of the concrete structure, reservoir-side of the HDPE inlet, prior to concrete pour tentatively scheduled for Friday, September 18, at 11am. 2. (retained, discussion continues) Plan for preparation and pre-forming of exposed benches in breach cut, prior to placement of embankment materials will be resolved by field directive provided by DOWL to Con-Sy. Revisited due to brief winter conditions (week of Sept 7th) and weathered appearance pre-formed benches exhibit and the wetting-drying cycle the material has undergone since benching was conducted one month ago (see CIR from 22JUL2020). There is concern that simply moisture conditioning the exposed material may not be sufficient to promote bonding with new embankment fill. At a minimum, the SEO would like to discuss the plan with DOWL's geotechnical engineer (reference).



OBSERVATIONS AND DISCUSSION

specification sections 31 24 00.3.02.A and E). Adequate dinking, scarifying and moisture conditioning must occur at the interface to encourage proper knitting of the new and existing materials. DOWL indicated that material appeared to bond well when wetted, as was observed during the recent snowstorm event.

Next Inspection: TBD. DOWL to coordinate with the SEO.

PHOTOGRAPHS



Photo 1. Left side, floor.



Photo 2. Right side, floor.



Photo 3. Looking toward the back wall of the intake structure from the reservoir side.



Photo 4. HDPE Pipe is level and must be cut/beveled to accommodate gate as shown in profile in detail B, sheet 12. Air vent penetration is visible in the back of the pipe.

PHOTOGRAPHS



Photo 5. Overhead view of intake structure steel.



Photo 6. View into right sidewall.



Photo 7. Exterior view of formwork.



Photo 8. Rectangular void for filter sand, just upstream of outlet headwall (reference detail B on sheet 14).



Photo 9. View of the outlet terminal headwall.



Photo 10. DOWL and Con-Sy collect nuclear gauge readings of the embankment material.

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Rachel Pittinger, Colorado Water Conservation Board
James Holiman, WD 40 Water Commissioner
Scott Frost, WD 40 Water Commissioner
Bill McCormick, Chief, Dam Safety Branch
Jason Ward, Dam Safety Engineer



CONSTRUCTION INSPECTION REPORT

PROJECT INFORMATION			
Dam Name:	WARD LAKE	Inspector:	Jason Ward
DAMID:	400533	Date:	November 5, 2020
C-#:	C-0888A	Time on Site:	1100-1300
Dam Owner:	Surface Creek Ditch & Reservoir Company (SCDRC)	Contact:	Keith Waibel, 907-201-6481
Engineer:	DOWL	Contact:	Dan Quigley 970-596-4923 (c) Russ Reed (406) 656-6399
Contractor:	Con-Sy, Inc.	Contact:	Wayne Balderston, 970-683-1604 Tanner Lee, 970-644-1678 Tom Lee, 970-379-5729
Material QC	Huddleston-Berry	Contact:	
Approved Plans & Specifications On-site? ☒ Yes ☐ No		Engineer Following Const. Obs. Plan? ☒ Yes ☐ No	

INSPECTION PARTICIPANTS	
Inspection Participants:	Jason Ward (SEO) Wayne Balderston (Con-Sy)

CONDITIONS	
Reservoir:	Empty
Weather:	Sunny, Cool
Equipment:	Link 235x track excavator John Deere 350D articulated dump truck John Deere 225C track excavator Yanmar Mini-Ex

CONSTRUCTION STATUS	
Work Completed to Date:	• Breach Excavation • Foundation Prep • Outlet pipe installation and encasement • Filter Collar and Other filter construction • Upstream Intake Structure • Gate Placement • Air Vent and Gate Stem Casing • Downstream Outlet Structure • Stilling Basin • Embankment Fill • Gate Stem Support Piers •
Work in Progress:	• Upstream Slope Riprap Placement • Gate Operator Support Block • Gate Stem and Air Vent clamp installation and attachment to Support Piers



Work Planned and est. Timeframe:	• Gate Operator concrete placement – Friday Nov 6, 2020 • Remaining site work and project completion – approx. 2 week look ahead
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OBSERVATIONS AND DISCUSSION

Purpose of Inspection:	The purpose of the inspection was to observe reinforcement and formwork for the outlet gate control support structure prior to concrete placement. Due to impending weather, an overall pre-final site inspection of the site was also conducted. Action Items related to this portion of the inspection are listed below.
Items Inspected:	<u>“Gate Control Hand Wheel Support Structure” - Sheet 15</u> • Reinforcement type, geometry, offsets, etc. field verified according to Plans • Dimensions of structure (formwork) field verified according to Plans • Sleeve for gate stem provided as 2” Schedule 40 PVC. - o No material specification on Plans or Specs. - o Appears acceptable. • Field adjustment of gate stem casing was made during the inspection by running a string line along the stem casing from the intake structure to the downstream face of the support structure. Elevations were adjusted by shimming the casing above the support piers. After acceptable alignment was made, shims were added to centralize the PVC sleeve about the gate stem. • Gate support structure forms and reinforcement judged in conformance with the approved plans and acceptable for concrete placement. <u>Upstream Slope:</u> • Ongoing riprap placement during inspection appears acceptable. • The contractor asked if large boulders could line the toe of the slope (i.e “grandfather boulders”). - o Judgement and decision made to not allow large boulders and to terminate riprap at the toe of the dam uniformly with the remainder of the slope (no “grandfather rocks”). - o Large boulders acceptable to be used for access deterrents, protection around structures, etc. <u>Upstream Intake Structure / Outlet Gate:</u> • Intake structure inspection previously as acceptable. • Gate installation yet to be finalized; loosely bolted in place during inspection. <u>Air Vent / Gate Stem Casing / Support Piers:</u> • All components in place and appear in conformance with Plans and Specs. • Stem Housing Clamps (Sheet 15) yet to be installed. <u>Crest:</u> • Uniform and appears and in general conformance with Plans and Specs • Backfill and grading around Gate Support structure yet to be completed. <u>Downstream Slope:</u> • Uniformly graded; Field verified approx. 2.5H:1V slope. • Slope yet to be seeded. • Minor clean-up items listed below under Action Items. <u>Downstream Outlet Structure:</u> • Previously inspected as acceptable. • Minor clean-up items listed below under Action Items.

	<u>Stilling Basin:</u> • Appears in general conformance with the Plans and Specs • Minor clean-up and finishing items listed below under Action Items.
Items not in conformance with approved plans and specs:	None.
Problems/Concerns:	Impending weather and concern that remaining items cannot be completed prior to winter shutdown.
Design Change Orders:	None.
Minor Changes:	None.
Conclusions:	Reinforcement and formwork for the Gate Control Handwheel Support Structure appear in general conformance with the approved plans and specifications. Concrete placement should proceed as planned. An overall inspection of the project revealed only minor items that need cleanup or finishing prior to final acceptance. The Action Items listed below were reviewed with the contractor at the end of the inspection.
Action Items:	Items identified during the inspection in need of clean-up or finishing in addition to remaining work yet to be completed: <u>Downstream slope:</u> • Rough edges and ridges between the new and existing embankment should be blended for a smooth transition. <u>Downstream Outlet Structure:</u> • Termination of the HDPE outlet pipe occurs approximately 2-inches from the inside edge of the chamfer around the opening (Sheet 14, Outlet Structure Section). It appears concrete bled into this gap and created an area that was subsequently chipped out leaving a rough and uneven transition. - o Recommendation to use acceptable non-shrink grout to form a smooth transition from the end of the pipe to the opening in the structure. <u>Stilling Basin:</u> • Soil deposits at either end of the concrete apron should be removed. • Large rocks in the stilling basin protruding above the plane of the apron should be rearranged to be level with the elevation of the apron (See Plans for transition from apron to riprap). • Several riprapped areas just left and right of the outlet structure have voids with exposed filter material. Provide additional rock for full uniform coverage. • The downstream end of the stilling basin abruptly ends at the start of the narrow existing discharge channel. See Note on Sheet 9 "Grade to Blend in with Existing Channel". It is recommended to soften the transition from riprap stilling basin to discharge channel. <u>Spillway:</u> • Ensure the original grade, crest elevation, bottom width, and channel side slopes are restored to original condition.
Next Inspection:	Final Construction Inspection

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Scott Frost, WD 40 Water Commissioner
Bill McCormick, Chief, Dam Safety Branch
Jackie Blumberg, Dam Safety Engineer

Overall view of breach repair section and upstream outlet works.

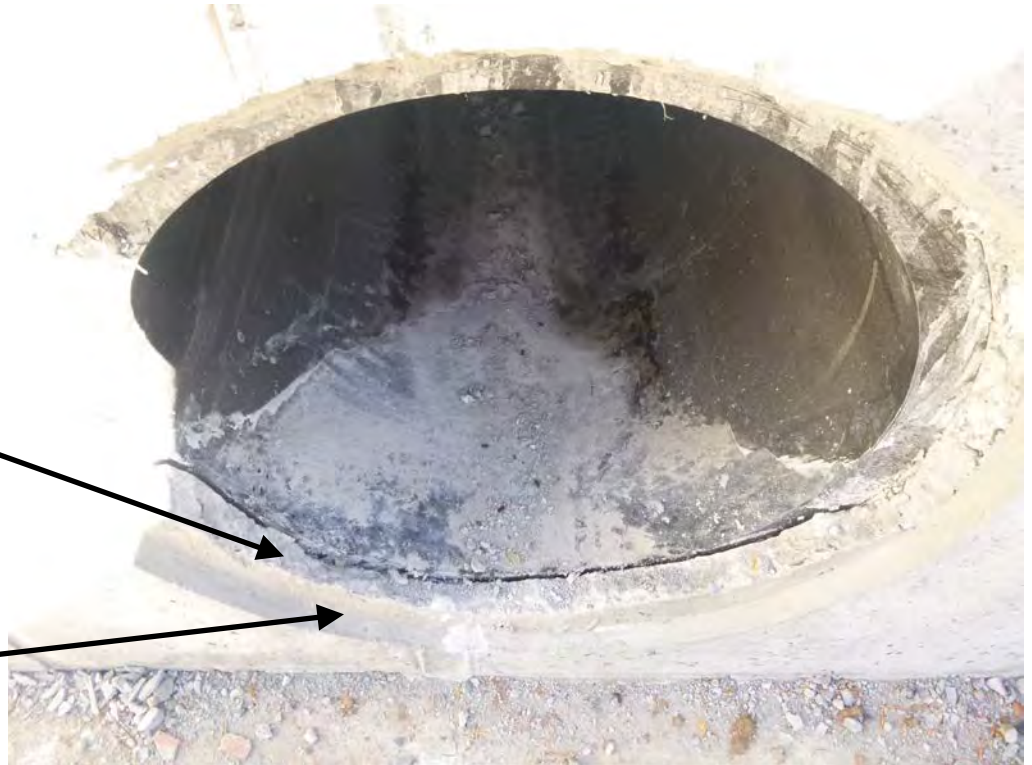


Gate Control Hand Wheel
Support Structure concrete
reinforcement and formwork.

Close-up of downstream end of
HDPE outlet pipe just inside outlet
structure opening.

Rough edge created by
concrete "bleed through"
and subsequent chipping

Chamfer per Plans Sheet 14



Rearrange rocks for smooth level
transition from apron to riprap

Grade to blend and
soften transition from
basin to channel



Overall view of outlet structure and stilling basin.
Notes included for contractor clean-up and finish items.



CONSTRUCTION INSPECTION REPORT

PROJECT INFORMATION

Dam Name:	WARD LAKE	Inspector:	Jason Ward Jackie Blumberg
DAMID:	400533	Date:	November 17, 2020
C-#:	C-0888A	Time on Site:	1100-1300
Dam Owner:	Surface Creek Ditch & Reservoir Company (SCDRC)	Contact:	Keith Waibel, 907-201-6481
Engineer:	DOWL	Contact:	Dan Quigley 970-596-4923 (c) Russ Reed (406) 656-6399
Contractor:	Con-Sy, Inc.	Contact:	Wayne Balderston, 970-683-1604 Tanner Lee, 970-644-1678 Tom Lee, 970-379-5729
Material QC	Huddleston-Berry	Contact:	
Approved Plans & Specifications On-site? ☒ Yes ☐ No		Engineer Following Const. Obs. Plan? ☒ Yes ☐ No	

INSPECTION PARTICIPANTS

Inspection Participants:	Jason Ward (Dam Safety Branch) Jackie Blumberg (Dam Safety Branch) James Holiman (Water Commissioner) Dan Quigley (DOWL) Keith Waibel (Owner) John Walker (Owner) Wayne Balderston (Con-Sy)
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CONDITIONS

Reservoir:	Empty
Weather:	Sunny, Cool, upper 40s
Equipment:	Link 235x track excavator (inactive)

CONSTRUCTION STATUS

Work Completed to Date:	Substantial completion.
Work in Progress:	Gate Stem and Air Vent clamp installation and attachment to Support Piers
Work Planned and est. Timeframe:	Final construction items and demobilization within next 2-days.



OBSERVATIONS AND DISCUSSION

Purpose of Inspection:	Dam Safety Branch project final inspection in accordance with Rule 8.2.6
Items Inspected:	All components of the project were inspected for completion and conformance with the approved Plans and Specifications. Inspection limited to conformation of remaining items from November 11, 2020 Construction Inspection Report. <u>Outlet Works – Upstream Structure and Gate</u> Complete and in general conformance with the approved Plans and Specifications. The gate was operated through the full range with no issues noted. Further, the Owner mentioned Core and Main (gate vendor) viewed the gate and provided verbal approval following installation. <u>Outlet Works – Gate stem, Air Vent, Staff Gage</u> Complete and in general conformance with the approved Plans and Specifications. Owner to cover exposed gate stem segment (see punch list below). Con-Sy mentioned the bio-oil for the gate stem has been ordered. Numbered metal plates are positioned on the staff gauge so that the center of the number equals the reservoir level. Tenth marks are scribed into the galvanized air vent pipe in accordance with the Plans. <u>Outlet Works – Gate Control Support Structure</u> Complete and in general conformance with the approved Plans and Specifications. <u>Outlet Works – Downstream Headwall</u> Complete and in general conformance with the approved Plans and Specifications. <u>Outlet Works – Stilling Basin</u> Complete and in general conformance with the approved Plans and Specifications. The team discussed blending the corners/ends of the basin to the natural channel downstream. However, it was decided that natural processes from relatively low normal operational flows (5-10 cfs max.) will likely shape the terminal end of the basin. <u>Dam Crest:</u> Complete and in general conformance with the approved Plans and Specifications. The DSB requested a small volume of acceptable fill to be placed left of the outlet operator, which appeared locally low, and graded to allow adverse drainage toward the downstream slope (see punch list below). <u>Upstream Slope:</u> Complete and in general conformance with the approved Plans and Specifications. <u>Downstream Slope:</u> Complete and in general conformance with the approved Plans and Specifications. <u>Spillway:</u> Restored to original condition.
Items not in conformance with approved plans and specs:	None.
Problems/Concerns/ Discussion:	The team discussed stage-storage information and concluded the curve based on 2016 Delta County LiDAR would be shown in the completion plan set if the Owner elects to not conduct a drone survey during near-empty conditions.

	The team also discussed allowing temporary storage within the reservoir. Subsequent to the inspection, our office received a formal request from the Engineer to allow temporary storage up to gage height of 11 ft. The Owner intends to provide a cover for the small segment of exposed gate stem just below the thrust block, to prohibit tampering. Con-Sy provided video inspection of the outlet to the DSB via thumb drive. A punch list of minor items was developed. The Engineer anticipates conducting a site visit on Friday, November 20, 2020, to confirm resolution of: 1. Installation of remaining six of seven gate stem clamps; 2. Minor grading of the crest left of the outlet thrust block, which appeared locally low during closeout inspection; 3. Removal of the cofferdam(s); 4. Application of approved seed mix; 5. Pulling stakes and wattles, general site cleanup
Design Change Orders:	None.
Minor Changes:	None.
Conclusions:	Results of the inspection show the project complete and in general conformance with the approved plans and specifications. A request for temporary approval in accordance with Rule 8.3.3 is anticipated from the Engineer on behalf of the Owner. Conversations during the inspection resulted in an agreed upon partial fill level request to gage height 11-ft. It is anticipated that the reservoir will fill to less than gage height 21 ft (normal high water line) in Spring 2021 given the current drought conditions and historic runoff from the drainage basin. Therefore, a partial fill to gage height 11 ft is in conformance with Rule 8.3.3 as well as within the reasonably expected fill elevation for the reservoir given current conditions. Based on results of the inspection, it is recommended that the request be granted upon receipt from the Engineer.
Action Items:	Completion documents by the deadline promised in the anticipated temporary approval to store water request.
Next Inspection:	2021 annual safety inspection or by request from the Owner.

ec: Dan Quigley, DOWL, dquigley@dowl.com
Loree Gutierrez, Surface Creek Ditch and Reservoir Company, Gutierrez646@hotmail.com
Grand Mesa Water Users Association, admin@gmwua.com
Wayne Balderston, Con-Sy, wayne.consy@gmail.com
Tanner Lee, Con-Sy, tannerllcsi@gmail.com
Tom Lee, Con-Sy, csitomlee@aol.com
Rachel Pittinger, Colorado Water Conservation Board
James Holiman, WD 40 Water Commissioner
Scott Frost, WD 40 Water Commissioner
Bill McCormick, Chief, Dam Safety Branch
Jackie Blumberg, Dam Safety Engineer

View looking down upstream slope
along gate stem and air vent
alignment.



Outlet gate intake structure and
trashrack.

Outlet gate in full open position
during exercise.



Close-up of typical 1-foot
interval number plates and air
vent scribes for staff gage
tenths of feet.

Typical support pier with air vent
and gate stem clamps.



Dam crest area just left gate
operator support structure in
need of minor grading to fill in
low spot and correct drainage.

APPENDIX B

WEEKLY CONSTRUCTION SUMMARY REPORTS



Weekly Construction Observation Report #1

Page 1 of 2

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 7/13-7/17
Contact:	Keith Waibel	

Inspector: D. Quigley	PE	Submitted:
Signature:		9/10/20
		Reviewed by/Date:

Summary of Weekly Activities

Monday, July 13th: 2:00 p.m. Site kickoff meeting with the following attendees:

Dan Quigley (DOWL), Jackie Blumberg and Jason Ward (CDWR), Keith Waibel and John Walker (SCDRC), Loren Paulson (USFS), Tom Lee, Dustin Roehm, Wayne Balderson (ConSy). Reviewed the proposed schedule and discussed the importance of a water control plan for the excavation. ConSy has engaged an engineer to develop the plan and will submit when ready. Excavation is expected to take 2 weeks and Dustin Roehm will be ConSy's employee on site for security.

Wednesday, July 15th: 1:45 p.m. Field meeting at the dam site with Jason Ward (CDWR) and Dustin Roehm (ConSy, Inc.). Discussed schedule for excavating the existing breach to plan limits. Dustin will be sole ConSy employee performing this work. He anticipates 2 weeks to complete excavation to subgrade elevation. Water control plan is still pending and will be required prior to beginning work on the outlet replacement. Only equipment on site was LinkBelt Trackhoe. East side of breach was being excavated by Dustin prior to our visit. Dustin excavated a small test pit on the east side of the outlet pipe at approximately STA 1+00 to observe site soils and anticipated conditions. Weather was generally clear, 75 degrees F with no precipitation.

Thursday, July 16th: 9:30 a.m. Dan Quigley on site to observe excavation progress. Dustin Roehm (ConSy) was actively excavating east side of the existing breach per plan sheet OW1. Weather was generally clear, 75 degrees F with no precipitation. LinkBelt Trackhoe was the only equipment in use during our visit.

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 7/13-7/17
Contact:	Keith Waibel	



Photo 1. View looking east at existing breach excavation on July 16, 2020.



Photo 2. View looking northeast at erosion control measures of inlet channel and HDPE pipe for the outlet.



Photo 3. View of breach and outlet prior to start of project. Photo taken on July 13, 2020.



Photo 4. View of test pit excavated on the east side of the existing steel outlet pipe to observe site soils.



Weekly Construction Observation Report #2

Page 1 of 2

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 7/20-7/24
Contact:	Keith Waibel	

Inspector: D. Quigley	PE	Submitted:
Signature:		9/10/20
		Reviewed by/Date:

Summary of Weekly Activities

Wednesday, July 22nd: 1:00 to 3:00 p.m. Field meeting at the dam site with Jason Ward (CDWR) Dustin Roehm (ConSy, Inc.) and Keith Waibel (SCDRC). East side of breach was being excavated by Dustin prior to our visit. Pocket of blue clay observed approximately 15 below the crest on the east side. Appears to be an isolated pocket of lean clay that is consistent with specified embankment fill material. Contractor has excavated the east side in 1-foot benches per Sheet OW4 of the approved project plans. Jason was concerned about surface prep and removal of obvious rocks and properly filling the voids prior to embankment fill. ConSy to develop embankment fill plan that includes dealing with rocks and surface voids. We also discussed the need for moisture conditioning prior to placing each lift of embankment to “seal” the clay of any desiccation cracks created between excavation and backfill. Weather was partially cloudy, 75 degrees F with no precipitation. Equipment in use on site was: LinkBelt 235 trackhoe, John Deere 225C trackhoe and John Deere 350D Haul truck

Friday, July 25th: 9:30 a.m. Dan Quigley on site to observe excavation progress. Dustin Roehm (ConSy) was actively excavating east side of the existing breach per plan sheet OW1. Weather was overcast, 65 degrees F with threatening precipitation. Equipment in use on site was: LinkBelt 235 trackhoe, John Deere 225C trackhoe and John Deere 350D Haul truck

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 7/20-7/24
Contact:	Keith Waibel	



Photo 1. View looking east at existing breach excavation progress on July 22, 2020.



Photo 2. Close-up of blue clay pocket on the east side of the breach excavation



Photo 3. View of Ward Lake reservoir and material stockpiling progress.



Photo 4. View of grey clay pocket on the east side of the breach excavation looking west towards campground.



Weekly Construction Observation Report #3

Page 1 of 2

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 8/3/20 to 8/7/20
Contact:	Keith Waibel	

Inspector: D. Quigley	PE	Submitted:
Signature:		9/10/20
		Reviewed by/Date:

Summary of Weekly Activities

NOTE: No report for the week of July 27 to July 31. Phone conversations with ConSy superintendent, Wayne Balderston, indicated that ConSy was still actively excavating the west side of the breach and the outlet channel in anticipation of a subgrade proof-roll test around August 7th.

Monday, August 3rd: 1:00 to 1:30 p.m. Field meeting at the dam site with Jason Ward (CDWR) and Dustin Roehm (ConSy) for excavation progress observation. Weather was sunny, 75 degrees F with no precipitation. Equipment in use on site was: LinkBelt 235 trackhoe, John Deere 225C trackhoe and John Deere 350D Haul truck.

Wednesday, August 5th: 10:00 to 10:45 a.m Field meeting at the dam site with Jackie Blumberg (CDWR) and Dustin Roehm for forensic observation of the existing outlet pipe and excavation progress. We observed the condition of the existing steel outlet pipe and the surrounding soils. Planned for subgrade proof-roll test on August 7th. Weather was sunny and 75 degrees F with threatening precipitation. Equipment on site was: LinkBelt 235 trackhoe, John Deere 225C trackhoe, Cat 350D loader and John Deere 350D Haul truck.

Friday, August 7th: 10:00 to 10:45 a.m Field meeting at the dam site with Jackie Blumberg (CDWR) and Dustin Roehm for planned subgrade proof-roll test. Contractor had not excavated down to subgrade elevation of 10,094.0 feet and was not ready for test. We observed the condition of the existing steel outlet pipe and the surrounding soils. Planned for subgrade proof-roll test on August 7th. Weather was sunny and 75 degrees F with threatening precipitation. Equipment on site was: LinkBelt 235 trackhoe, John Deere 225C trackhoe, Cat 350D loader and John Deere 350D Haul truck. ConSy plans to have subgrade exposed and ready for proof-roll test on 8/10/20.



Weekly Construction Observation Report #4

Page 1 of 2

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 8/10/20 to 8/14/20
Contact:	Keith Waibel	

Inspector: D. Quigley	PE	Submitted:
Signature:		9/10/20
		Reviewed by/Date:

Summary of Weekly Activities

Tuesday, August 11th: 19:00 to 10:00 a.m. Field meeting at the dam site with Jason Ward (CDWR) and Wayne Balderston (ConSy) to observe groundwater issue at subgrade elevation and discuss proposed dewatering plan. 3-6 inches of standing water was observed on the subgrade with sloughing of excavation sidewalls visible. Parties agreed that 3-4 vertical dewatering wells placed on the outside edges of the outlet channel would be an appropriate solution. ConSy subsequently installed three (3) vertical 12-inch perforated PVC pipes with 3/4 crushed aggregate and electric sump pumps with outlet connected to the existing bypass pipe. Weather was overcast and 75 degrees F with no precipitation. Equipment in use on site was: LinkBelt 235 trackhoe, John Deere 225C trackhoe and John Deere 350D Haul truck.

Friday, August 14th: 10:00 to 10:45 a.m Field meeting at the dam site with Jackie Blumberg (CDWR) and Tom Lee, Wayne Balderston and Dustin Roehm for subgrade proof-roll test. Subgrade had been dewatered using the wells mentioned above and passed proof-roll test after 5 passes of a loaded 3-axle Kenworth dump truck. Subgrade was approved after two soft areas were removed and recompacted using suitable embankment material and a sheepsfoot compactor. Final subgrade surface appeared to be unyielding and was approved for construction of the outlet pipe and associated outlet works. Weather was sunny and 75 degrees F with threatening precipitation. Equipment on site was: LinkBelt 235 trackhoe, John Deere 225C trackhoe, Cat 350D loader and John Deere 350D Haul truck. ConSy plans to have subgrade exposed and ready for proof-roll test on 8/10/20.

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 8/10/20 to 8/14/20
Contact:	Keith Waibel	



Photo 1. View looking north at outlet channel prior to subgrade proof-roll test on August 14, 2020.



Photo 2. Close-up one of three dewatering wells installed by ConSy. PVC and PureCore pipe connects to the outlet bypass pipe..



Photo 3. View looking north at subgrade prior to proof-roll test.



Photo 4. View looking south towards outlet of subgrade after proof-roll test.



Weekly Construction Observation Report #5

Page 1 of 2

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 8/17/20 to 8/21/20
Contact:	Keith Waibel	

Inspector: D. Quigley	PE	Submitted:
Signature:		9/10/20
		Reviewed by/Date:

Summary of Weekly Activities

Wednesday, August 19th: 9:00 to 10:00 a.m. Field meeting at the dam site with Jackie Blumberg (CDWR) and Wayne Balderston (ConSy) to observe placement of sand diaphragm test section and to establish a method control for placing and compacting the diaphragm sand per Section 31 24 00C of the approved technical specifications. Con-Sy excavated a 3-foot wide trench at STA 1+20 and approximately 6 inches of standing water was observed. Approximately 1 foot of filter sand was placed by excavator bucket into the trench and the material was moistened prior to testing. Dan Quigley performed nuclear density gauge testing for the test section placement. The first test was halted since the material was at 20.4% moisture content and was too wet to process. That material was removed and replaced with new, clean, dry sand. This was moisture conditioned using a garden hose from a water truck of potable water prior to compacting with a Wacker plate compactor. It was determined that 2 passes with the plate compactor provided adequate density without over-compacting the material. Weather was overcast and 75 degrees F with no precipitation. Equipment in use on site was: Wacker plate compactor, water truck and John Deere 225C trackhoe.

Table1. Sand Diaphragm Filter Test Results

	Wet density (pcf)	Dry Density (pcf)	% Moisture
Base Conditions	103.5	93.1	11.2
Pass #1	109.5	100.1	9.4
Pass #2	109.9	101.8	7.9
Pass #3	110.1	102.1	7.8

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 8/17/20 to 8/21/20
Contact:	Keith Waibel	



Photo 1. View looking east at sand diaphragm trench at STA 1+20 on 8/19/20. Note water truck dump truck of clean sand and excavator used to place the sand material.



Photo 2. Moisture conditioning filter sand for Test #2. Note color variation between wet and dry sand.



Photo 3. View looking east at sand diaphragm test section.



Photo 4. View looking east at initial test section which was too wet for compliant filter sand installation and which was subsequently removed prior to Test #2.



Weekly Construction Observation Report #6

Page 1 of 3

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 8/24/20 to 8/21820
Contact:	Keith Waibel	

Inspector: D. Quigley	PE	Submitted:
Signature:		9/10/20
		Reviewed by/Date:

Summary of Weekly Activities	
Wednesday, August 26th: 1:30 to 3:00 p.m. Field meeting at the dam site with Jackie Blumberg and Jason Ward (CDWR) and Wayne Balderston (ConSy) to inspect formwork and reinforcing steel for the 24-inch diameter DR-11 HDPE outlet pipe encasement. Reinforcing steel and formwork was in general conformance to the project plans and specifications with the exception that the HDPE flex restraint at STA 1+60 was missing. This was subsequently installed by fusion prior to the concrete placement on August 28th. (See 8/28/20 notes below). Formwork walls were measured to be approximately 7 degrees which is close to the design angle of 5 degrees and determined to be acceptable. ConSy plans on placing concrete for the first three sections of pipe encasement on 8/28/20. Weather was overcast and 65 degrees F with no precipitation. Equipment in use on site was: John Deere 225C trackhoe excavator. John Deer 350D dump truck and LinkBelt 235 trackhoe. Friday, August 28th: 10:00 a.m.to 12:00 p.m. DOWL staff were on site to observe placement of concrete and provide Quality Assurance testing of ready-mix concrete places in the formwork approved on August 26th. Confirmed installation of HDPE flex restraint at STA 1+60. Observed placement of approximately 27 yards of concrete provided by Whitewater Materials in Grand Junction. (See separate construction materials testing results). Concrete appeared to meet project specifications for field quality and placement. Quality Control (QC) was provided by Huddleston-Berry (H-B) on behalf of the contractor. Both DOWL and H-B molded ten 4"x8" concrete cylinders for compressive strength testing. 5 cylinders will be field cured and 5 will be laboratory cured per Specification Section 03 30 00.	

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 8/24/20 to 8/21820
Contact:	Keith Waibel	



Photo 1. View looking north at HDPE outlet pipe encasement formwork and reinforcing steel.



Photo 2. Closeup of fused HDPE flex restraint installed at STA 1+60 per plans.



Photo 3. Concrete placement of truck 2 of 3 on August 28, 2020.



Photo 4. View of typical plywood bulkhead between 20-foot segments of encasement. 2"x4" wood crossbeam at top of photo is typical of 6-foot spacing for wire ties to provide required 5-inch spacing of rebar above the pipe during concrete placement



Weekly Construction Observation Report #6

Page 3 of 3

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 8/24/20 to 8/21820
Contact:	Keith Waibel	



Weekly Construction Observation Report #7

Page 1 of 2

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 9/7 to 9/11
Contact:	Keith Waibel	

Inspector: D. Quigley	PE	Submitted:
Signature:		9/21/20
		Reviewed by/Date:

Summary of Weekly Activities	
Note: No site visit the week of August 31st to September 4th due to Labor Day holiday and snow/rain on site. ConSy performed minimal work that week including beginning to form outlet structure. Additional snow and rain fell on site on 9/9 and 9/10. Friday, September 10:30 a.m. to 12:15 p.m. Site visit to observe concrete placement at outlet structure by ConSy crew. Concrete provided by Whitewater Materials and was tested by both Huddleston-Berry (QC) and DOWL (QA) staff members. All field tests met project specifications. (See separate CMT documents for field and laboratory concrete test results) Weather was mostly sunny and 65 degrees F with no precipitation. In addition to concrete placement equipment, other equipment in use on site was: John Deere 225C trackhoe excavator. John Deer 350D dump truck and LinkBelt 235 trackhoe.	

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 9/7 to 9/11
Contact:	Keith Waibel	



Photo 1. View looking south at concrete placement for the outlet structure.



Photo 2. Closeup of fused HDPE inlet pipe prior to forming inlet structure.



Photo 3. ConSy crew grouting in the dewatering wells with concrete.



Photo 4. View of concrete blankets used to protect outlet formwork from rain and snow. Note dark areas of the embankment from precipitation events on 9/9 and 9/10.



Weekly Construction Observation Report #8

Page 1 of 3

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 9/14 to 9/18
Contact:	Keith Waibel	

Inspector: D. Quigley	PE	Submitted:
Signature:		9/21/20
		Reviewed by/Date:

Summary of Weekly Activities

Wednesday, September 16th: 10:00 to 11:00 a.m. Field meeting at the dam site with Jackie Blumberg (CDWR) and Wayne Balderston (ConSy) to inspect formwork and reinforcing steel for the inlet structure. Reinforcing steel and formwork was in general conformance to the project plans and specifications with the exception that the three #5 horizontal bars at the upstream end of the structure were missing since a ConSy crew member was still tying rebar inside the structure. This was subsequently installed prior to the concrete placement on September 18th. ConSy plans on placing concrete for the inlet structure on September 18th. Dan Quigley (DOWL) also took three density test in the backfill on both sides of the outlet pipe encasement with Huddleston-Berry staff performing QC testing in the same locations. One test did not meet project specifications for density so area was reworked by ConSy and subsequently was tested and met project specifications for moisture and density. Weather was overcast and 65 degrees F with no precipitation. Equipment in use on site was: John Deere 225C trackhoe excavator. John Deer 350D dump truck and LinkBelt 235 trackhoe

Friday, September 10:30 a.m. to 12:15 p.m. Site visit to observe concrete placement at outlet structure by ConSy crew. Concrete provided by Whitewater Materials and was tested by both Huddleston-Berry (QC) and DOWL (QA) staff members. All field tests met project specifications. (See separate CMT documents for field and laboratory concrete test results) Weather was mostly sunny and 65 degrees F with no precipitation. In addition to concrete placement equipment, other equipment in use on site was: John Deere 225C trackhoe excavator. John Deer 350D dump truck and LinkBelt 235 trackhoe.

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 9/14 to 9/18
Contact:	Keith Waibel	



Photo 1. Close-up view of inlet structure reinforcing steel. Note gap in horizontal bars above the ConSy staff member.



Photo 2. Closeup of inlet reinforcing steel placement.



Photo 3. Close-up of inlet wall reinforcement. 2-inch wall chairs were installed prior to placement on the 18th to provide required separation



Photo 4. View of remotely operated compactor used to compact the first 3-feet of embankment adjacent to the outlet pipe encasement section.

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 9/14 to 9/18
Contact:	Keith Waibel	



Photo 1. Rip-Rap placement at outlet spillway taking place concurrently with the inlet structure concrete placement on 9/18/20



Photo 2. Concrete placement at inlet structure using conveyor belt and tremie.



Photo 3. Close-up of inlet wall reinforcement during concrete placement on 9/18/20.



Photo 4. View looking south at the outlet channel on 9/18/20. Backfill is approximately at the top of the outlet pipe concrete encasement.



Weekly Construction Observation Report #9

Page 1 of 3

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 9/21 to 9/25
Contact:	Keith Waibel	

Inspector: D. Quigley	PE	Submitted:
Signature:		9/30/20
		Reviewed by/Date:

Summary of Weekly Activities	
Friday, September 25th, 11:45 a.m. to 12:15 p.m. Site visit to observe progress of dam construction. Trash rack had been installed on the inlet structure. Con-Sy crew was on lunch break and not working at the time of our visit. Embankment had been placed to approximately 3 feet above the concrete encasement of the outlet pipe. Con-Sy was planning on screening material for the remainder of the day and wait to begin placing embankment fill on the first bench until after a scheduled visit by Dan Quigley (DOWL) and Jason Ward (CDWR-Dam Safety) on Monday, September 28th. Keith Waibel (SCDRC president) also visited the site during our visit. No equipment operating during our visit, Weather was sunny, clear and 65 degrees.	

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 9/21 to 9/25
Contact:	Keith Waibel	



Photo 1. Close-up of inlet structure looking downstream.



Photo 2. View looking south (Downstream) at embankment fill above the outlet pipe encasement. Note inlet structure on the lower left of the photo.



Photo 3. Close-up of the outlet structure and stilling basin rip-rap



Photo 4. View looking west across the outlet channel embankment.



Weekly Construction Observation Report #10

Page 1 of 3

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 9/28 to 10/2
Contact:	Keith Waibel	

Inspector: D. Quigley	PE	Submitted:
Signature:		9/30/20
		Reviewed by/Date:

Summary of Weekly Activities	
Monday, September 28th, 9:30 a.m. to 10:30 a.m. Site visit to observe embankment methodology by Dan Quigley (DOWL) and Jason Ward (CDWR-Dam Safety). Observed Con-Sy crew water subgrade and first 4 feet of the benches on both sides of the outlet channel. Con-Sy placed stockpiled embankment material in approximate 8-9-inch loose lift using a Cat dump truck and Cat D5 dozer with curved blade. Operator mixed loose material at the base of the first bench with the new material. Jason and I suggested that additional water be placed on the subgrade since the windy dry conditions were wicking away the previously placed water prior to backfill material being placed on the subgrade. First lift was not complete or compacted at the time of my departure. Keith Waibel (SCDRC) was also present to observe the methodology demonstration. Keith Waibel (SCDRC president) also visited the site during our visit. Weather was sunny, clear, breezy and 36 degrees.	

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 9/28 to 10/2
Contact:	Keith Waibel	



Photo 1. View looking south (downstream) at water truck wetting subgrade prior to embankment material placement. Note previously moistened benches to the left of the water truck



Photo 2. View looking south (downstream) at water truck moisture conditioning the subgrade prior to material placement.



Photo 3. Close-up Cat D5 dozer used to mix and spread embankment material. Note curved blade.



Photo 4. View looking south (downstream) at D5 Cat dozer spreading embankment soil on the first benched lift.



Weekly Construction Observation Report #11

Page 1 of 2

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 10/5 to 10/9
Contact:	Keith Waibel	

Inspector: D. Quigley	PE	Submitted:
Signature:		9/30/20
		Reviewed by/Date:

Summary of Weekly Activities	
Wednesday, October 7th, 10:00 a.m. to 11:30 a.m. Site visit to observe embankment methodology by Dan Quigley, who also performed Quality Assurance density testing by nuclear method during his visit. Con-Sy placed stockpiled embankment material in approximate 8-9-inch loose lift using a Cat dump truck and Cat D5 dozer with curved blade. Operator mixed loose material at the base of each bench with the new material prior to compaction using an Ingersoll-Ran single drum sheepsfoot compactor to achieve required density. Weather was sunny, clear and 45 degrees.	

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 10/5 to 10/9
Contact:	Keith Waibel	



Photo 1. View looking east completed embankment lifts. Note previously moistened benches to the left of the water truck



Photo 2. View looking south (downstream) at single drum sheepsfoot compactor during lift compaction on the east side of the breach.

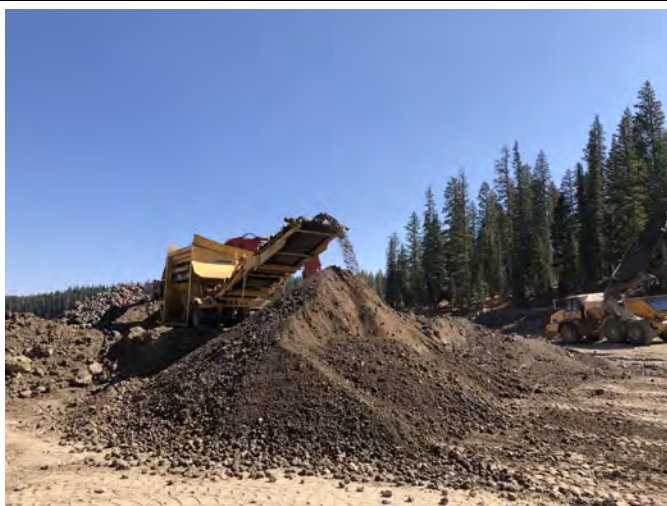


Photo 3. View of embankment material screening plant processing embankment materials prior to placement.



Photo 4. View looking west across breach at typical test location for nuclear moisture-density testing.



Weekly Construction Observation Report #12

Page 1 of 2

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 10/12 to 10/16
Contact:	Keith Waibel	

Inspector: D. Quigley	PE	Submitted:
Signature:		9/30/20
		Reviewed by/Date:

Summary of Weekly Activities

Monday, October 12th, 10:00 a.m. to 11:30 a.m. Site visit to observe embankment methodology by Dan Quigley, who also performed Quality Assurance density testing by nuclear method during his visit. Con-Sy placed stockpiled embankment material in approximate 8-9-inch loose lift using a Cat dump truck and Cat D5 dozer with curved blade. Operator mixed loose material at the base of each bench with the new material prior to compaction using an Ingersoll-Rand single drum sheepsfoot compactor to achieve required density. Weather was sunny, clear and 45 degrees. (See separate field density test results from DOWL and Huddleston-Berry in Appendix C)

Friday, October 16th, 11:00 a.m. to 12:00 p.m. Site visit by Dan Quigley (DOWL) and Jason Ward (SEO) for unofficial visit to observe embankment progress. Dan Quigley also took nuclear moisture-density tests for Quality Assurance. Tests met project specifications for moisture and density. (See separate daily density test results in Appendix C). Weather was clear, sunny and 40 degrees. Equipment in use included D5 dozer, Ingersoll-Rand sheepsfoot compactor and CAT haul truck.

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 10/12 to 10/16
Contact:	Keith Waibel	



Photo 1. View of loading operation of screened embankment material for placement of on the next embankment lift.



Photo 2. View looking south (downstream) at inlet structure with trash rack installed. Fresno gate was delivered to site that date.



Photo 3. View of embankment material being dumped prior to spreading by D5 dozer



Photo 4. View of compaction of material spread in 8-9 inch lifts. Dump truck is in the background preparing to deliver more screened embankment material



Weekly Construction Observation Report #13

Page 1 of 2

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 11/16 to 11/20
Contact:	Keith Waibel	

Inspector: D. Quigley	PE	Submitted:
Signature:		11/30/20
		Reviewed by/Date:

Summary of Weekly Activities

Tuesday, November 17th, 11:00 a.m. to 1:00 p.m. Site visit for final inspection. Attendees included Dan Quigley (DOWL), Jason Ward and Jackie Blumberg (SEO), Keith Waibel and John Walker (SCDRC), Jim Holiman (CDWR- Water Commissioner) and Wayne Balderston (Con-Sy). Approximately 12 inches of snow covered the site and we inspected and operated the Fresno outlet gate. Outstanding items to complete were:

- Final grading of dam crest to promote surface drainage back towards the reservoir
- Two (2) missing anchor brackets for gate stem piping and elevation markers for 5 and 6-foot levels
- Seeding of downstream face
- Upstream coffer dam required to be removed

Dam was approved for limited filling to the 11.0-foot elevation until completion report is approved by SEO. Inlet gate was closed during our visit.

Friday, November 20th, 11:00 to 11:30 a.m. Site visit by Dan Quigley (DOWL) to confirm outstanding items from 11/17/2020 final inspection were completed. Confirmed that anchors and elevation plates had been installed, coffer dam removed and Con-Sy staff was on site hand broadcasting seed on required revegetation areas. Weather was overcast, breezy and 30 degrees.

Client:	Surface Creek Ditch & Reservoir Company	W.O: 7122.74844.01
Project:	Ward Lake Dam Outlet Replacement	Week of: 11/16 to 11/20
Contact:	Keith Waibel	



Photo 1. View of inlet structure looking up the upstream dam face. Gate stem is visible in the upper portion of the photo



Photo 2. Detail of typical gate stem support pier at the 23-foot level marker.



Photo 3. Close-up view of outlet gate control wheel block. Photo taken on 11/20/2020.



Photo 4. View looking north at Deep Ward Lake. Note inlet structure at bottom of photo. Photo taken on 11/20/2020.

APPENDIX C

MATERIALS TESTING RESULTS

APPENDIX C.1

QUALITY CONTROL TESTS
BY
HUDDDELSTON-BERRY



Huddlestone-Berry Engineering & Testing, LLC
2789 Riverside Parkway
Grand Junction, CO 81501
970-255-8005

MOISTURE-DENSITY RELATIONSHIP

CLIENT Con-Sy, Inc.

PROJECT NAME Ward lake

PROJECT NUMBER 01594-0009

PROJECT LOCATION Mesa County, Colorado

Sample Date:

8/17/2020

Sample No :

20-0576

Source of Material:

New Stockpile screened

Description of Material

SANDY LEAN CLAY with

GRAVEL(CL)

Test Method:

ASTM D698C

TEST RESULTS

Maximum Dry Density

101.5 PCF

Optimum Water Content

19.5 %

GRADATION RESULTS (% PASSING)

#200

#4

3/4"

51

82

89

ATTERBERG LIMITS

LL
42

PL
24

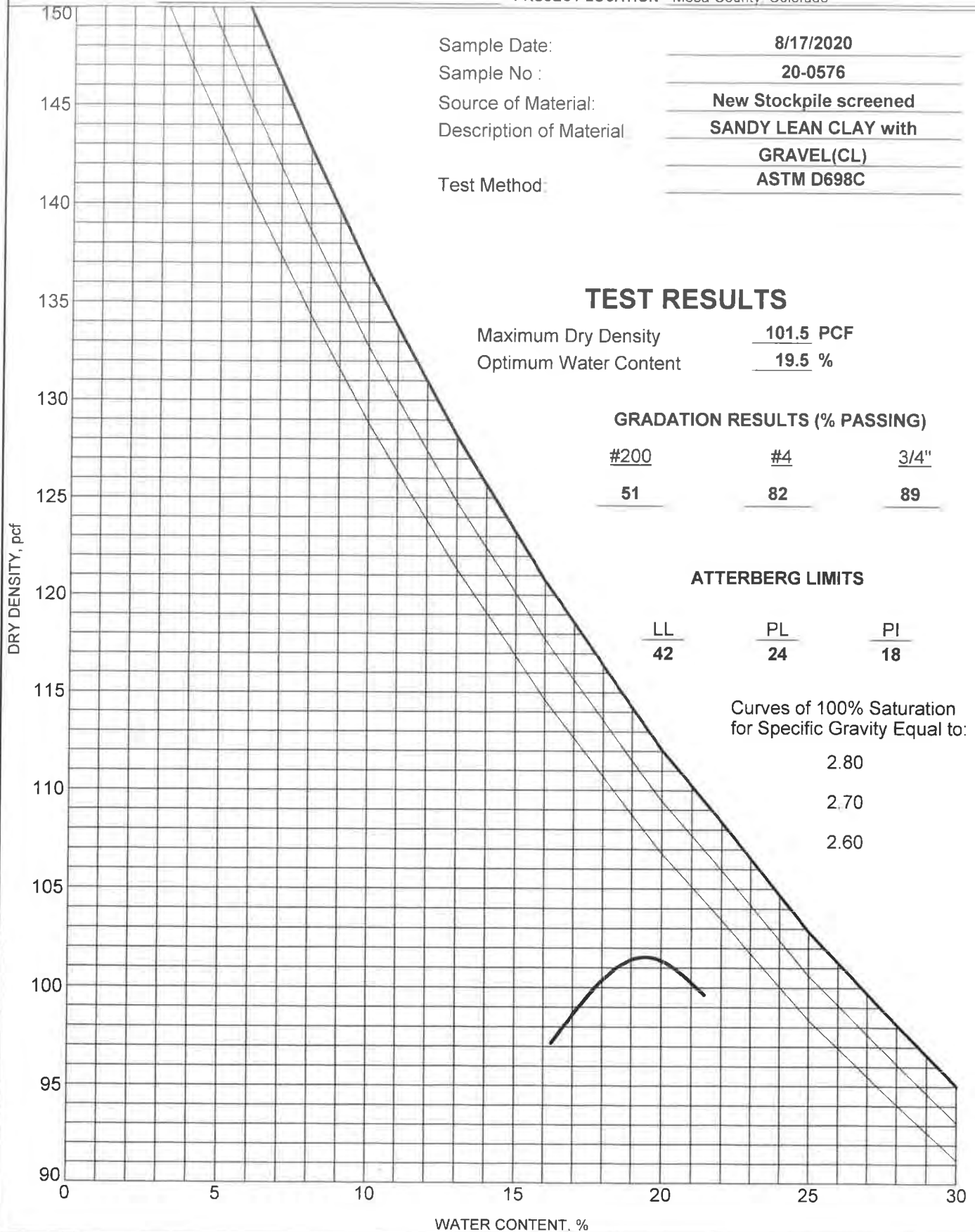
PI
18

Curves of 100% Saturation
for Specific Gravity Equal to:

2.80

2.70

2.60





Project Name: Con-Sy Ward Lake
Sample Location: New Screened Stockpile
Type of Material: Native
Comments: -

Project #: 01594-0009
Sample #: 20-0576
Washed By: LAB
Gradation Tested By: LAB
Sampled By: KC
Sample Date: 8/17/20

Sieve Size # mm	Weight Retained (g)		Cumulative Percent Passing	Specification	
				Min.	Max.
6"	150.0	0.0 Ind. Wt.	100%	-	-
3"	75.0	0.0 Ind. Wt.	100%	-	-
2"	50.0	0.0 Ind. Wt.	100%	-	-
1.5"	37.5	459.8 Ind. Wt.	97%	-	-
1"	25.0	903.9 Ind. Wt.	92%	-	-
3/4"	19.0	327.1 Ind. Wt.	89%	-	-
1/2"	12.5	15.7 Cum. Wt.	87%	-	-
3/8"	9.5	26.7 Cum. Wt.	86%	-	-
#4	4.75	53.8 Cum. Wt.	82%	-	-
#8	2.36	73.9 Cum. Wt.	79%	-	-
#10	2.00	79.7 Cum. Wt.	78%	-	-
#16	1.180	96.0 Cum. Wt.	76%	-	-
#30	0.600	123.1 Cum. Wt.	72%	-	-
#40	0.425	141.2 Cum. Wt.	70%	-	-
#50	0.300	160.5 Cum. Wt.	67%	-	-
#100	0.150	210.4 Cum. Wt.	60%	-	-
#200	0.075	277.0 Cum. Wt.	51%	-	-
Pan		291.4 Cum. Wt.			

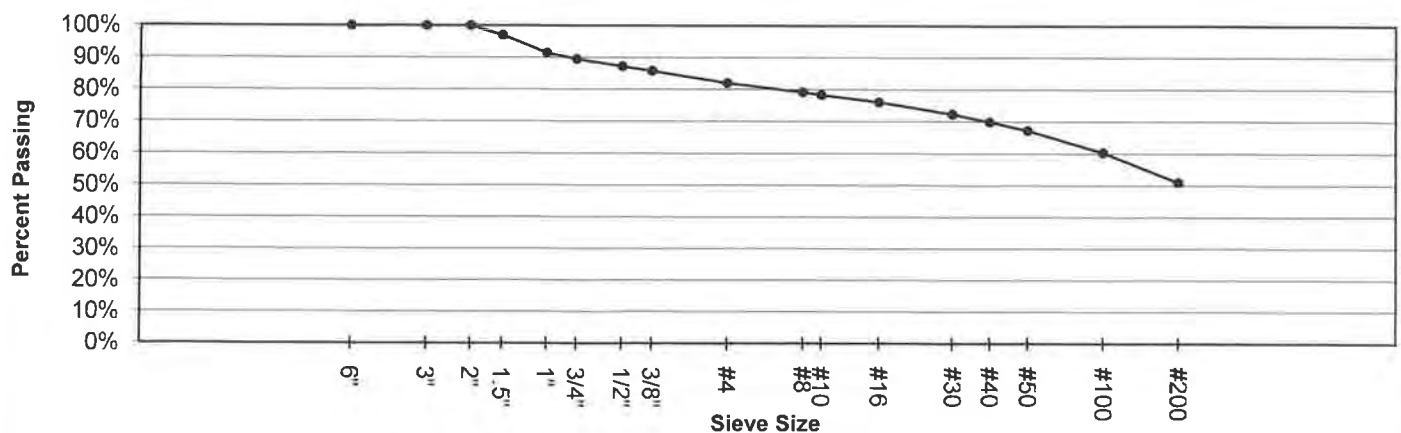
Moisture of Rock	
Tare #:	-
Tare Wt. (g)	-
Wet & Tare Wt. (g)	-
Dry & Tare Wt. (g)	-
Moisture (%):	-

Sample:	Liquid Limit:	Plasticity Index
	42	18
Specification:	-	-

Split Sieve (mm):	19.00	
	Wet	Dry
Wt. Retained (g):	1691	1691
Wt. Passing (g):	15495	14397
Total Sample Wt. (g):	17186	16087

	Wash:	Moisture:
Tare #:	-	-
Tare Wt. (g):	533.0	243.4
Wet & Tare Wt. (g):	1228.4	876.8
Dry & Tare Wt. (g):		831.9
Dry Weight (g):	646.1	588.5
Moisture (%):	7.63%	7.63%
Post Wash & Tare Wt. (g):	824.5	

Sieve Analysis



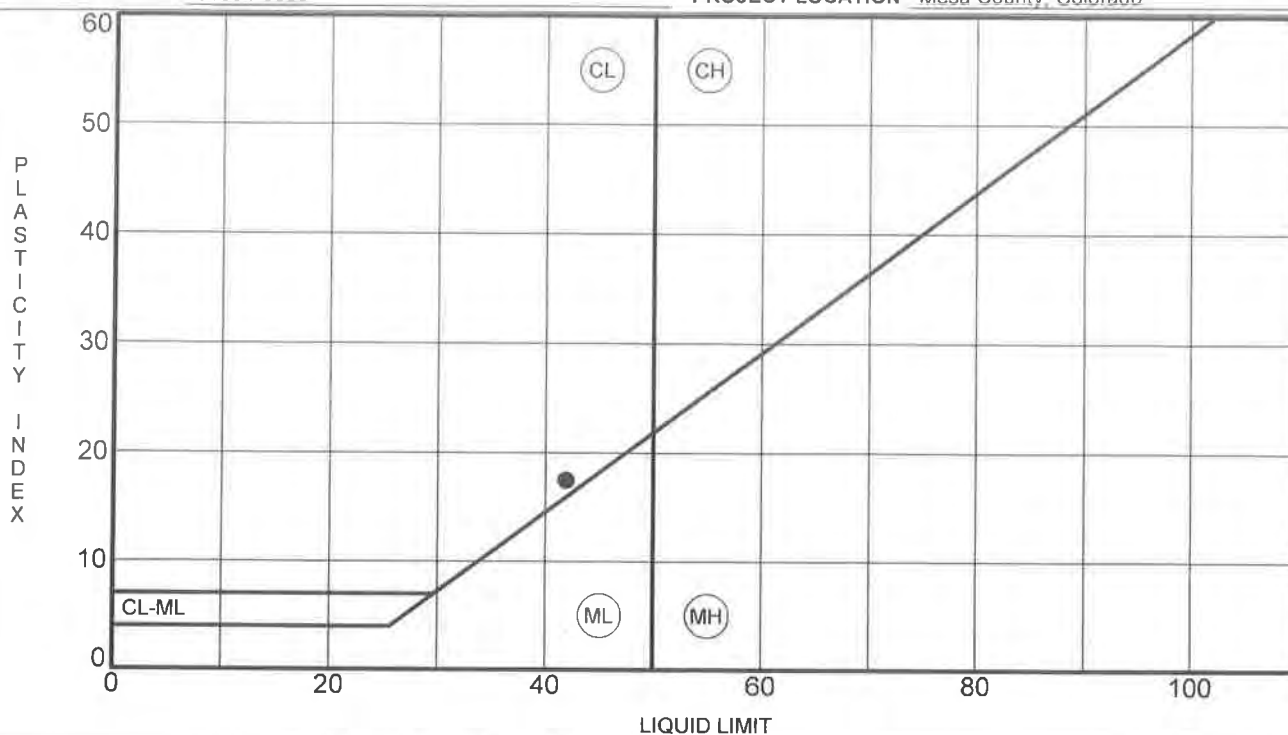


CLIENT Con-Sy, Inc

PROJECT NAME Ward lake

PROJECT NUMBER 01594-0009

PROJECT LOCATION Mesa County, Colorado

[illegible]



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Grand Junction, CO 81501
970-255-8005

MOISTURE-DENSITY RELATIONSHIP

CLIENT Con-Sy, Inc.

PROJECT NAME Ward lake

PROJECT NUMBER 01594-0009

PROJECT LOCATION Mesa County, Colorado

Sample Date:

8/6/2020

Sample No.:

20-0546

Source of Material:

New Stockpile

Description of Material:

SANDY LEAN CLAY (CL)

Test Method:

ASTM D698B

TEST RESULTS

Maximum Dry Density

107.0 PCF

Optimum Water Content

16.5 %

GRADATION RESULTS (% PASSING)

#200

#4

3/4"

56

89

100

ATTERBERG LIMITS

LL
33

PL
21

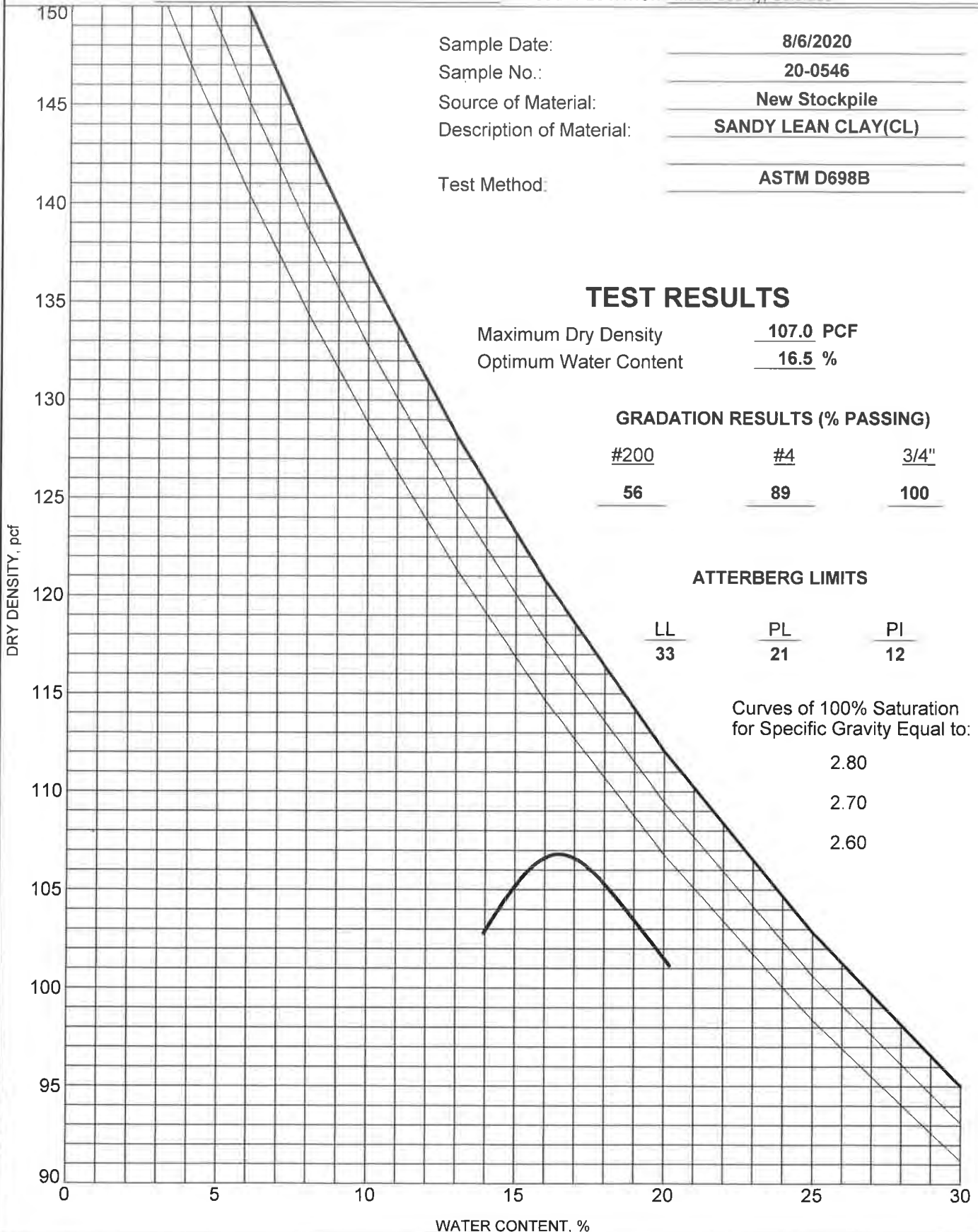
PI
12

Curves of 100% Saturation
for Specific Gravity Equal to:

2.80

2.70

2.60





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970-255-8005

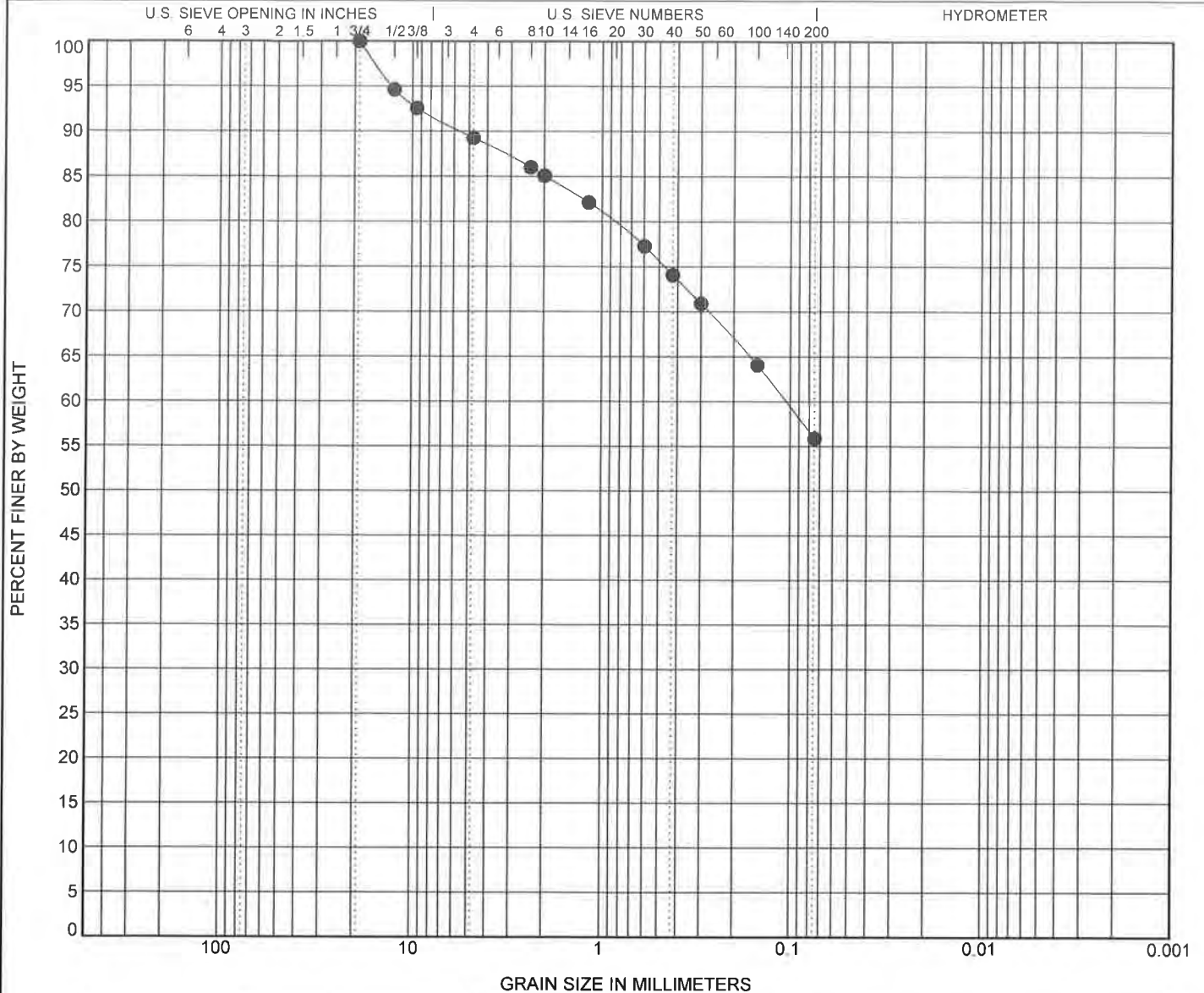
GRAIN SIZE DISTRIBUTION

CLIENT Con-Sy, Inc.

PROJECT NAME Ward lake

PROJECT NUMBER 01594-0009

PROJECT LOCATION Mesa County, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification					LL	PL	PI	Cc	Cu
● 20-0546 8/6/2020		SANDY LEAN CLAY(CL)					33	21	12		
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
● 20-0546 8/6/2020		19	0.106			10.7	33.4	55.9			

GRAIN SIZE 01594-0009 WARD LAKE GPJ GINT US LAB GDT 8/10/20



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Grand Junction, CO 81501
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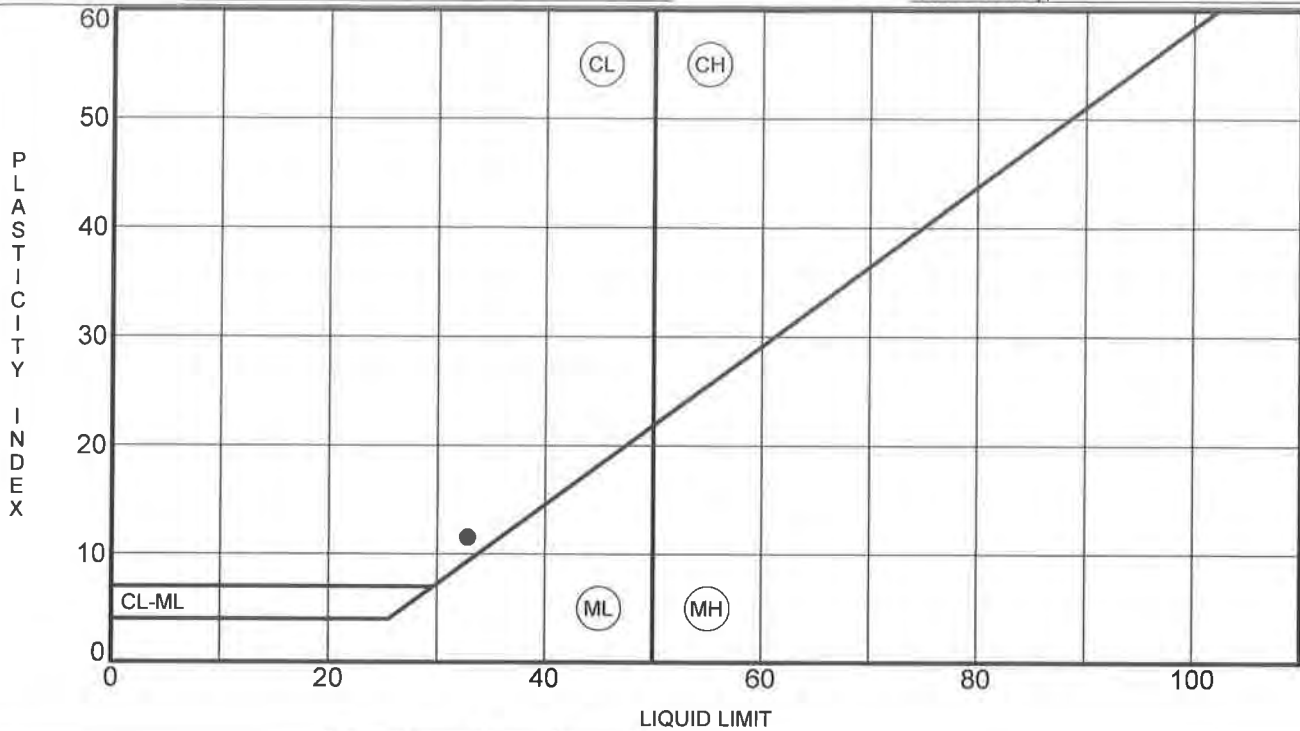
ATTERBERG LIMITS' RESULTS

CLIENT Con-Sy, Inc.

PROJECT NAME Ward lake

PROJECT NUMBER 01594-0009

PROJECT LOCATION Mesa County, Colorado





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2789 Riverside Parkway
Grand Junction, CO 81501
970-255-8005

MOISTURE-DENSITY RELATIONSHIP

CLIENT Con-Sy, Inc.

PROJECT NAME Ward lake

PROJECT NUMBER 01594-0009

PROJECT LOCATION Mesa County, Colorado

Sample Date: 8/6/2020
Sample No.: 20-0547
Source of Material: Old Stockpile
Description of Material: SANDY LEAN CLAY (CL)
Test Method: ASTM D698B

TEST RESULTS

Maximum Dry Density 104.5 PCF
Optimum Water Content 16.0 %

GRADATION RESULTS (% PASSING)

<u>#200</u>	<u>#4</u>	<u>3/4"</u>
<u>61</u>	<u>91</u>	<u>100</u>

ATTERBERG LIMITS

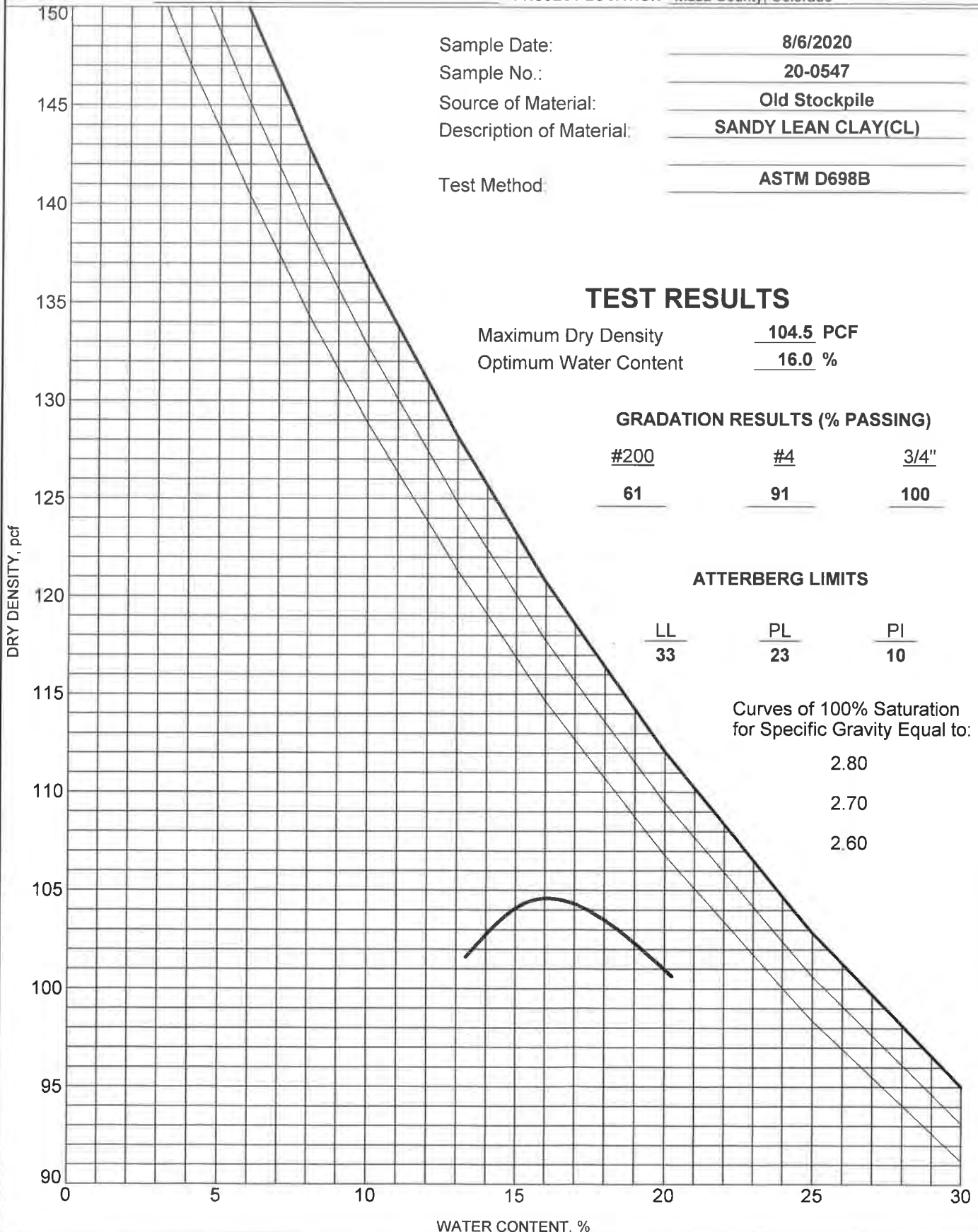
<u>LL</u>	<u>PL</u>	<u>PI</u>
<u>33</u>	<u>23</u>	<u>10</u>

Curves of 100% Saturation
for Specific Gravity Equal to:

2.80

2.70

2.60





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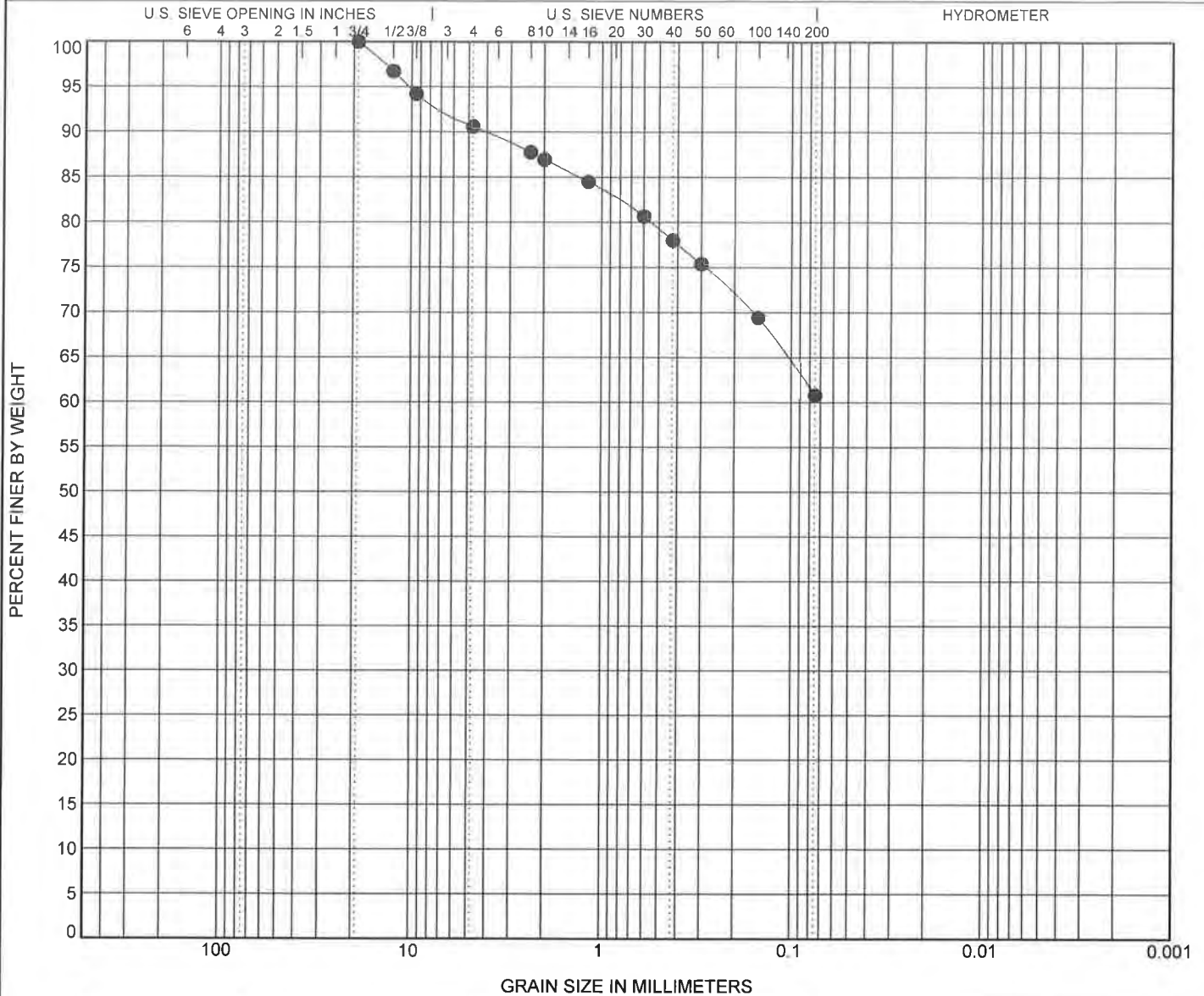
GRAIN SIZE DISTRIBUTION

CLIENT Con-Sy, Inc.

PROJECT NAME Ward lake

PROJECT NUMBER 01594-0009

PROJECT LOCATION Mesa County, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● 20-0547 8/6/2020	SANDY LEAN CLAY(CL)	33	23	10		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● 20-0547 8/6/2020	19				9.4	29.8		60.8



Task: dam backfill

Reviewed By: JAL **Date:** 10/23/20

Gauge Number: 12122	Density Counts: 1418	Moisture Counts: 522	Record No. 23	23 S
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Task: dam backfill

Reviewed By: JAL Date: 10/23/20

Gauge Number: 12122	Density Counts: 1418	Moisture Counts: 522	Record No. 22 22 S
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Task: dam backfill

Reviewed By: JAL **Date:** 10/22/20

Gauge Number: 12122	Density Counts: 1421	Moisture Counts: 524	Record No. 21	21 S
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Task: dam backfill

Project No.: 01594 - 0009

Project Name: Ward Lake Reconstruction

Client Name: Con-Sy Inc.

Placement Contractor: Con-Sy Inc

Contractor Representative: Wayne Balderston

Tested By: KC **Date:** 10/20/20

Work Order No: 69610

Authorized By: Client **Date:** 10/20/20

Reviewed By: JAL **Date:** 10/21/20

Compaction / Proof Equipment: sheeps foot **Remarks:** 10% rock correction, Locations and Elevations are approximate

Material Type:	native	Minimum Density:	97 %	Within - 2 and + 2 % of Optimum Moisture Content
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Gauge Number: 15541	Density Counts: 1770	Moisture Counts: 661	Record No. 20 20 S
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Record No. 20 **20 S**



Task: dam backfill

Reviewed By: JAL Date: 10/19/20

Gauge Number: 12122	Density Counts: 1418	Moisture Counts: 521	Record No. 19	19 S
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SOIL COMPACTION TEST REPORT

Task: dam backfill

Project No.: 01594 - 0009

Project Name: Ward Lake Reconstruction

Client Name: Con-Sy Inc.

Placement Contractor: Con-Sy Inc

Contractor Representative: Wayne Balderston

Tested By: Dm **Date:** 10/15/20

Work Order No: 69501

Authorized By: Client **Date:** 10/15/20

Reviewed By: JAL **Date:** 10/16/20

[illegible]

Compaction / Proof Equipment:	sheeps foot	Remarks: 10% rock correction, Locations and Elevations are approximate
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Material Type:	native	Minimum Density:	97 %	Within - 2 and + 2 % of Optimum Moisture Content
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Gauge Number: 12122	Density Counts: 1409	Moisture Counts: 522	Record No. 18 18 S
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Task: dam backfill

Reviewed By: JAL Date: 10/15/20

Gauge Number: 12122	Density Counts: 1405	Moisture Counts: 518	Record No. 17 17 S
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Task: dam backfill

Project No.: 01594 - 0009

Project Name: Ward Lake Reconstruction

Client Name: Con-Sy Inc.

Placement Contractor: Con-Sy Inc

Contractor Representative: Wayne Balderston

Tested By: Dm **Date:** 10/13/20

Work Order No: 69460

Authorized By: Client **Date:** 10/13/20

Reviewed By: JAL **Date:** 10/14/20

[illegible]

Compaction / Proof Equipment:	sheeps foot	Remarks:	10% rock correction, Locations and Elevations are approximate
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Material Type:	native	Minimum Density:	97 %	Within - 2 and + 2 % of Optimum Moisture Content
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Gauge Number: 12122	Density Counts: 1412	Moisture Counts: 518	Record No. 16 16 S
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Task: dam backfill

Reviewed By: JAL **Date:** 10/13/20

Gauge Number: 12122	Density Counts: 1412	Moisture Counts: 518	Record No. 15	15 S
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Task: dam backfill

Reviewed By: JAL Date: 10/9/20

Gauge Number: 12122	Density Counts: 1412	Moisture Counts: 518	Record No. 14 14 S
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Task: dam backfill

Reviewed By: JAL Date: 10/8/20

Gauge Number: 12122	Density Counts: 1416	Moisture Counts: 622	Record No. 13 13 S
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SOIL COMPACTION TEST REPORT

Task: dam backfill

Project No.: 01594 - 0009

Project Name: Ward Lake Reconstruction

Client Name: Con-Sy Inc.

Placement Contractor: Con-Sy Inc

Contractor Representative: Wayne Balderston

Tested By: JAL **Date:** 10/6/20

Work Order No: 69323

Authorized By: Client **Date:** 10/6/20

Reviewed By: JAL **Date:** 10/7/20

[illegible]

Compaction / Proof Equipment:	sheeps foot	Remarks:	10% rock correction, Locations and Elevations are approximate
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Material Type:	native	Minimum Density:	97 %	Within - 2 and + 2 % of Optimum Moisture Content
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Gauge Number: 12122	Density Counts: 1416	Moisture Counts: 622	Record No. 12 12 S
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Record No. 12 12 S



Task: dam backfill

Reviewed By: JAL **Date:** 10/6/20

Gauge Number: 12122	Density Counts: 1416	Moisture Counts: 622	Record No. 11	11 S
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Task: dam backfill

Reviewed By: JAL Date: 10/2/20

Gauge Number: 12122	Density Counts: 1416	Moisture Counts: 622	Record No. 10	S
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Task: dam backfill

Reviewed By: JAL **Date:** 9/30/20

Gauge Number: 12122	Density Counts: 1416	Moisture Counts: 622	Record No. 9 9 S
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Task: dam backfill

Reviewed By: JAL **Date:** 9/25/20

Gauge Number: 15541	Density Counts: 1766	Moisture Counts: 667	Record No. 8	8 S
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Task: Dam Backfill

Reviewed By: JAL **Date:** 9/24/20

Gauge Number: 15541	Density Counts: 1774	Moisture Counts: 667	Record No. 7 7 S
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Engineering & Testing, L.L.C.

SOIL COMPACTION TEST REPORT

Task: Dam Backfill

Project No.: 01594 - 0009

Project Name: Ward Lake Reconstruction

Client Name: Con-Sy Inc.

Placement Contractor: Con-Sy Inc

Contractor Representative: Wayne Balderston

Tested By: CDR **Date:** 9/22/20

Work Order No: 68982

Authorized By: Client **Date:** 9/22/20

Reviewed By: JAL **Date:** 9/23/20

No.	Test Location / Observation Area	Elevation (ft)*	Lab No.	Max. Dry Density (pcf)	Optimum Moisture (%)	Number of Passes / Dry Density (pcf)	Moisture Content (%)	Relative Comp. (%)	Meets Spec.	Remarks Deflection / Pumping Noted
1	Inlet Structure - South Side	-6.0	20-0576	106.2	17.8	103.0	17.1	97	Y	
2	Inlet Structure - North Side	-6.5	20-0576	106.2	17.8	103.2	17.3	97	Y	
3	South Side of Outlet Pipe Encasement - Sta: 0+90	See Remarks	20-0576	106.2	17.8	108.9	17.2	100+	Y	Plan Elevation level 10102
4	South Side of Outlet Pipe Encasement - Sta: 0+60	See Remarks	20-0576	106.2	17.8	108.3	19.0	100+	Y	Plan Elevation level 10102
5	North Side of Outlet Pipe Encasement - Sta: 1+40	See Remarks	20-0576	106.2	17.8	108.4	16.1	100+	Y	Plan Elevation level 10102
6	North Side of Outlet Pipe Encasement - Sta: 0+80	See Remarks	20-0576	106.2	17.8	104.8	18.2	99	Y	Plan Elevation level 10102

Compaction / Proof Equipment: Walk Behind Sheeps Foot / Loaded Haul Truck **Remarks:** 10% rock correction, Locations and Elevations are approximate

Material Type: native **Minimum Density:** 97 % **Within - 2 and + 2 % of Optimum Moisture Content**

Gauge Number: 17410 Density Counts: 1683 Moisture Counts: 617 **Record No.** 6 **S**



Task: dam backfill

Reviewed By: JAL **Date:** 9/18/20

Gauge Number: 12122	Density Counts: 1416	Moisture Counts: 622	Record No. 5	5 S
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Task: dam backfill

Reviewed By: BJR **Date:** 9/18/20

Gauge Number: 15541	Density Counts: 1779	Moisture Counts: 670	Record No. 4 4 S
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Task: dam backfill

Reviewed By: BJR **Date:** 9/18/20

Gauge Number: 15541	Density Counts: 1774	Moisture Counts: 664	Record No. 3 3 S
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Task: dam backfill below pipe elevation

Reviewed By: BJR **Date:** 9/18/20

Gauge Number: 15541	Density Counts: 1769	Moisture Counts: 688	Record No. 2	2 S
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SOIL COMPACTION TEST REPORT

Task: dam backfill below pipe elevation

Project No.: 01594 - 0009

Project Name: Ward Lake Reconstruction

Client Name: Con-Sy Inc.

Placement Contractor: Con-Sy Inc

Contractor Representative: Wayne Balderston

Tested By: KC **Date:** 8/17/20

Work Order No: 68320

Authorized By: Client **Date:** 8/17/20

Reviewed By: BJR **Date:** 9/18/20

No.	Test Location / Observation Area	Elevation (ft)*	Lab No.	Max. Dry Density (pcf)	Optimum Moisture (%)	Number of Passes / Dry Density (pcf)	Moisture Content (%)	Relative Comp. (%)	Meets Spec.	Remarks Deflection / Pumping Noted
1	Center Most Section of Dam Sta. ~ 0+80 to 1+20 and 2+80 and 3+20	Varies	20-0576	106.2	17.8	104.1	18.4	98	Y	first 8" lift
2	Center Most Section of Dam Sta. ~ 0+80 to 1+20 and 2+80 and 3+20	Varies	20-0576	106.2	17.8	103.4	17.2	97	Y	first 8" lift
3	Center Most Section of Dam Sta. ~ 0+80 to 1+20 and 2+80 and 3+20	Varies	20-0576	106.2	17.8	104.3	18.5	98	Y	second 8" lift
4	Center Most Section of Dam Sta. ~ 0+80 to 1+20 and 2+80 and 3+20	Varies	20-0576	106.2	17.8	104.1	18.3	98	Y	second 8" lift
5	Center Most Section of Dam Sta. ~ 0+80 to 1+20 and 2+80 and 3+20	Varies	20-0576	106.2	17.8	103.9	18.3	98	Y	third 8" lift
6	Center Most Section of Dam Sta. ~ 0+80 to 1+20 and 2+80 and 3+20	Varies	20-0576	106.2	17.8	103.9	18.5	98	Y	third 8" lift
7	Center Most Section of Dam Sta. ~ 0+80 to 1+20 and 2+80 and 3+20	Varies	20-0576	106.2	17.8	104.3	17.6	98	Y	fourth 8" lift
8	Center Most Section of Dam Sta. ~ 0+80 to 1+20 and 2+80 and 3+20	Varies	20-0576	106.2	17.8	104.0	18.3	98	Y	fourth 8" lift

Compaction / Proof Equipment: sheeps foot **Remarks:** 10% rock correction, Locations and Elevations are approximate

Material Type: native **Minimum Density:** 97 % **Within - 2 and + 2 % of Optimum Moisture Content**

Gauge Number: 15541 Density Counts: 1769 Moisture Counts: 688 **Record No.** 1 **1 S**



Huddleston-Berry
Engineering & Testing, LLC

PHYSICAL PROPERTIES AND COMPRESSIVE STRENGTH

TEST REPORT

Task / Material Tested: Inlet Structure

Project No.: 01594 - 0009

Authorized By: Client **Date:** 09/18/20

Project Name: Ward Lake Reconstruction

Sampled By: Dm **Date:** 09/18/20

Client Name: Con-Sy Inc.

Work Order No.: 68917

General Contractor: Con-Sy Inc.

Picked Up By: Dm **Date:** 09/19/20

Placement Contractor: Con-Sy Inc.

Work Order No.:

Contractor Representative: Wayne

Reviewed By: CDR **Date:** 10/19/20

Location of Placement: inlet structure east end of pipe

Sample Location: center of placement

Cylinder Storage Location: adjacent to placement

Weather Conditions: sunny **Ambient Temperature (°F):** 40s

Number of Samples Casted/Molded

Concrete: 6 ***Grout Cyl:** 0 ****Grout Prism:** 0 **Mortar Cyl:** 0 **Mortar Cube:** 0 **Soils:** 0

Mix Data	Specifications	Measured Properties
Supplier: <u>White Water</u>	Temp., C1064 (deg. F): <u>50-90</u>	Temp., C1064 (deg. F): <u>72</u>
Mix ID/Brand: <u>C18H</u>	Slump, C143 (in.): <u>4</u>	Slump, C143 (in.): <u>2 3/4</u>
Ticket No.: <u>416120</u>	Air Content, C231 (%): <u>6.5+/-1.5</u>	Air Cont., C231 (%): <u>5.5</u>
Batch Time (MIL): <u>8:54</u>	*Flow Rate: <u></u>	*Flow Rate: <u></u>
Sample Time (MIL): <u>11:10</u>	Unit Weight, C138 (pcf): <u>-</u>	Unit Weight, C138 (pcf): <u>141.6</u>
Water Added (gal.): <u>-</u>	Time in Mixer (min): <u>90max</u>	Time in Mixer (min): <u>136</u>
Load Number: <u>1 of 2</u>	Additional Water (gal.): <u></u>	Mold Dims: <u>4X8</u>
Initial W:C Ratio: <u>not supplied</u>	Max W:C Ratio: <u></u>	Final W:C Ratio: <u></u>
Batch Size: <u>7 1/2</u>	Compressive Str. (psi): <u>4500</u>	Avg. Cap Thickness, C42: <u></u>

Tare Volume (cf): 0.25

Tare Weight (lbs): 7.60

Tare & Concrete Weight (lbs): 43.00

Soil Weight (gm): - **Admixture Weight (gm):** - **Admixture Percent (%):** - **Moisture Content (%):** -

Sample No.	Break Date	Age (days)	Avg. Dia. (in.)	Avg. Hght. (in.)	Avg. Area (in.)	Weight (g)	Unit Wt. (pcf)	Break Information, C39					
								Cap*	Load (lbs)	Strength (psi)	(psi) Ratio	Break Type	Tech
20-03036	09/21/20	3	4.01	8.02	12.63	3774	142.0	U	56440	4470	99%	5	DC
20-03037	09/25/20	7				3774	142.0	U	59610	4720	105%	5	DC
20-03038	09/25/20	7				3746	140.9	U	59625	4720	105%	5	DC
20-03039	10/16/20	28				3734	140.5	U	72300	5720	127%	5	DC
20-03040	10/16/20	28				3764	141.6	U	71540	5660	126%	5	DC
20-03041	10/16/20	28				3768	141.7	U	74625	5910	131%	5	DC
20-03042	09/25/20	7				3764	141.6		56770	4500	100%	5	DC
CONCRETE FIELD CURES (if applicable), Cores, Grout Prisms, or Mortar Cubes													
20-03043	09/25/20	7	4.00	8.00	12.57	3738	141.7	U	60760	4840	108%	5	DC
20-03044	10/16/20	28	4.01	8.01	12.63	3786	142.6	U	69285	5490	122%	5	DC
20-03045	10/16/20	28	3.99	8.02	12.50	3754	142.6	U	66120	5290	118%	5	DC
20-03046	10/16/20	28	4.00	8.00	12.57	3728	141.3	U	64865	5160	115%	5	DC

Cap Type*: S=Sulfur G=Gypsum C=Neat Cement U=Unbonded Neoprene O=None

Remarks:

Field Set Number: 1 of 1 ***Flow Cone No.:** **Compression Machine:** F-502

Field Scale No.: ****Cube Mold No.:** **Lab Scale:** L129

Building Permit Number:

Record No. 7 C



TEST REPORT



Huddlestone-Berry
Engineering & Testing, LLC

REVIEW

Project No.: 01594 - 0009

Observed By: EA **Date:** 9/9/20

Project Name: Ward Lake Reconstruction

Work Order No: 68735

Client Name: Con-Sy Inc.

Authorized By: Client **Date:** 9/9/20

Installation Contractor: _____

Reviewed By: JAL **Date:** 9/9/20

Contractor Representative: _____

Physical Address: _____

Installation Equipment: _____

Datum: _____

A representative of Huddlestone Berry Engineering and Testing (HBET) arrived on site as requested to pick up field cure cylinder test samples.

General Remarks: _____

Record No. 5 C



Huddlestone-Berry
Engineering & Testing, LLC

PHYSICAL PROPERTIES AND COMPRESSIVE STRENGTH

TEST REPORT

Task / Material Tested: pipe encasement

Project No.: 01594 - 0009 **Authorized By:** Client **Date:** 09/02/20
Project Name: Ward Lake Reconstruction **Sampled By:** KC **Date:** 09/02/20
Client Name: Con-Sy Inc. **Work Order No.:** 68641
General Contractor: Con-Sy Inc. **Picked Up By:** EA **Date:** 09/04/20
Placement Contractor: Con-Sy Inc. **Work Order No.:** 68615
Contractor Representative: Wayne **Reviewed By:** CDR **Date:** 10/02/20
Location of Placement: all remaining pipe encasement sections and outfall structure base

Sample Location: center of placement of outfall structure base

Cylinder Storage Location: adjacent to placement

Weather Conditions: clear calm **Ambient Temperature (°F):** 70s

Number of Samples Casted/Molded

Concrete: 9 ***Grout Cyl:** 0 ****Grout Prism:** 0 **Mortar Cyl:** 0 **Mortar Cube:** 0 **Soils:** 0

Mix Data	Specifications	Measured Properties
Supplier: <u>White Water</u>	Temp., C1064 (deg. F): <u>50-90</u>	Temp., C1064 (deg. F): <u>79</u>
Mix ID/Brand: <u>C18H</u>	Slump, C143 (in.): <u>4</u>	Slump, C143 (in.): <u>4</u>
Ticket No.: <u>415500</u>	Air Content, C231 (%): <u>6.5+/-1.5</u>	Air Cont., C231 (%): <u>6.0</u>
Batch Time (MIL): <u>9:20</u>	*Flow Rate: <u></u>	*Flow Rate: <u></u>
Sample Time (MIL): <u>12:04</u>	Unit Weight, C138 (pcf): <u>-</u>	Unit Weight, C138 (pcf): <u>140.8</u>
Water Added (gal.): <u>3</u>	Time in Mixer (min): <u>90max</u>	Time in Mixer (min): <u>164</u>
Load Number: <u>1 of 4</u>	Additional Water (gal.): <u></u>	Mold Dims: <u>4X8</u>
Initial W:C Ratio: <u>not supplied</u>	Max W:C Ratio: <u></u>	Final W:C Ratio: <u></u>
Batch Size: <u>6</u>	Compressive Str. (psi): <u>4500</u>	Avg. Cap Thickness, C42: <u></u>

Tare Volume (cf): 0.25 **Tare Weight (lbs):** 7.60 **Tare & Concrete Weight (lbs):** 42.80

Soil Weight (gm): - **Admixture Weight (gm):** - **Admixture Percent (%):** - **Moisture Content (%):** -

Sample No.	Break Date	Age (days)	Avg. Dia. (in.)	Avg. Hght. (in.)	Avg. Area (in.)	Weight (g)	Unit Wt. (pcf)	Break Information, C39					
								Cap*	Load (lbs)	Strength (psi)	(psi) Ratio	Break Type	Tech
20-02887	09/05/20	3	3.99	8.03	12.50	3724	141.3	U	42281	3380	75%	5	KC
20-02888	09/09/20	7				3732	141.6	U	52710	4220	94%	5	DC
20-02889	09/09/20	7				3714	140.9	U	55530	4440	99%	5	DC
20-02890	09/09/20	7				3728	141.5	U	51330	4110	91%	5	DC
20-02891	09/30/20	28				3734	141.7	U	56790	4540	101%	5	DC
20-02892	09/30/20	28				3712	140.9	U	62670	5010	111%	5	DC
20-02893	09/30/20	28				3726	141.4	U	64280	5140	114%	5	DC
CONCRETE FIELD CURES (if applicable), Cores, Grout Prisms, or Mortar Cubes													
20-02925	09/09/20	7	4.00	8.03	12.57	3732	140.9	U	46820	3730	83%	5	DC
20-02926	09/09/20	7	4.00	8.07	12.57	3756	141.1	U	49670	3950	88%	5	DC

Cap Type*: S=Sulfur G=Gypsum C=Neat Cement U=Unbonded Neoprene O=None

Remarks: 5 field cures 7 lab cures (cylinders)

Field Set Number: 1 of 1 ***Flow Cone No.:** **Compression Machine:** F-502
Field Scale No.: ****Cube Mold No.:** **Lab Scale:** L129

Building Permit Number: **Record No.** 3 C



PHYSICAL PROPERTIES AND COMPRESSIVE STRENGTH TEST REPORT

Task / Material Tested: pipe encasement (field cure)

Project No.: 01594 - 0009

Authorized By: Client **Date:** 08/28/20

Project Name: Ward Lake Reconstruction

Sampled By: EA **Date:** 08/28/20

Client Name: Con-Sy Inc.

Work Order No.: 68543

General Contractor: Con-Sy Inc.

Picked Up By: EA **Date:** 08/29/20

Placement Contractor: Con-Sy Inc.

Work Order No.: 68542

Contractor Representative: Wayne

Reviewed By: CDR **Date:** 09/28/20

Location of Placement: 3 of 6 sections of entire pipe encasement: 3 staggered pieces starting from North side

Sample Location: center of placement South section

Cylinder Storage Location: adjacent to placement

Weather Conditions: partly cloudy **Ambient Temperature (°F):** 70s

Number of Samples Casted/Molded

Concrete: 5 ***Grout Cyl:** 0 ****Grout Prism:** 0 **Mortar Cyl:** 0 **Mortar Cube:** 0 **Soils:** 0

Mix Data	Specifications	Measured Properties
Supplier: <u>White Water</u>	Temp., C1064 (deg. F): <u>50-90</u>	Temp., C1064 (deg. F): <u>87</u>
Mix ID/Brand: <u>C18H</u>	Slump, C143 (in.): <u>4</u>	Slump, C143 (in.): <u>4</u>
Ticket No.: <u>415300</u>	Air Content, C231 (%): <u>6.5+/-1.5</u>	Air Cont., C231 (%): <u>5.0</u>
Batch Time (MIL): <u>9:21</u>	*Flow Rate: <u></u>	*Flow Rate: <u></u>
Sample Time (MIL): <u>12:19</u>	Unit Weight, C138 (pcf): <u>-</u>	Unit Weight, C138 (pcf): <u>-</u>
Water Added (gal.): <u>-</u>	Time in Mixer (min): <u>90max</u>	Time in Mixer (min): <u>178</u>
Load Number: <u>1 of 3</u>	Additional Water (gal.): <u></u>	Mold Dims: <u>4X8</u>
Initial W:C Ratio: <u></u>	Max W:C Ratio: <u></u>	Final W:C Ratio: <u></u>
Batch Size: <u>6</u>	Compressive Str. (psi): <u>4500</u>	Avg. Cap Thickness, C42: <u></u>

Tare Volume (cf): - **Tare Weight (lbs):** - **Tare & Concrete Weight (lbs):** 141.30

Soil Weight (gm): - **Admixture Weight (gm):** - **Admixture Percent (%):** - **Moisture Content (%):** -

Sample No.	Break Date	Age (days)	Avg. Dia. (in.)	Avg. Hght. (in.)	Avg. Area (in.)	Weight (g)	Unit Wt. (pcf)	Break Information, C39					
								Cap*	Load (lbs)	Strength (psi)	(psi) Ratio	Break Type	Tech.
20-02882	09/04/20	7	4.00	8.02	12.57	3788	143.2	U	80750	6430	143%	5	DC
20-02883	09/04/20	7				3772	142.6	U	74150	5900	131%	5	DC
20-02884	09/25/20	28				3804	143.8	U	86650	6900	153%	3	DC
20-02885	09/25/20	28				3820	144.4	U	82560	6570	146%	3	DC
20-02886	09/25/20	28				3810	144.0	U	80240	6390	142%	3	DC
CONCRETE FIELD CURES (if applicable), Cores, Grout Prisms, or Mortar Cubes													

Cap Type*: S=Sulfur G=Gypsum C=Neat Cement U=Unbonded Neoprene O=None

Remarks: 5 field cures 7 lab cures (cylinders)

Field Set Number: 1 of 1 ***Flow Cone No.:** **Compression Machine:** F-502

Field Scale No.: ****Cube Mold No.:** **Lab Scale:** L129

Building Permit Number: **Record No.** 1 C



Huddlestone-Berry
Engineering & Testing, LLC

PHYSICAL PROPERTIES AND COMPRESSIVE STRENGTH

TEST REPORT

Task / Material Tested: pipe encasement

Project No.: 01594 - 0009

Authorized By: Client **Date:** 08/28/20

Project Name: Ward Lake Reconstruction

Sampled By: EA **Date:** 08/28/20

Client Name: Con-Sy Inc.

Work Order No.: 68543

General Contractor: Con-Sy Inc.

Picked Up By: EA **Date:** 08/29/20

Placement Contractor: Con-Sy Inc.

Work Order No.: 68542

Contractor Representative: Wayne

Reviewed By: CDR **Date:** 09/28/20

Location of Placement: 3 of 6 sections of entire pipe encasement: 3 staggered pieces starting from North side

Sample Location: center of placement South section

Cylinder Storage Location: adjacent to placement

Weather Conditions: partly cloudy **Ambient Temperature (°F):** 70s

Number of Samples Casted/Molded

Concrete: 7 ***Grout Cyl:** 0 ****Grout Prism:** 0 **Mortar Cyl:** 0 **Mortar Cube:** 0 **Soils:** 0

Mix Data	Specifications	Measured Properties
Supplier: White Water	Temp., C1064 (deg. F): 50-90	Temp., C1064 (deg. F): 87
Mix ID/Brand: C18H	Slump, C143 (in.): 4	Slump, C143 (in.): 4
Ticket No.: 415300	Air Content, C231 (%): 6.5+/-1.5	Air Cont., C231 (%): 5.0
Batch Time (MIL): 9:21	*Flow Rate:	*Flow Rate:
Sample Time (MIL): 12:19	Unit Weight, C138 (pcf): -	Unit Weight, C138 (pcf): -
Water Added (gal.): -	Time in Mixer (min): 90max	Time in Mixer (min): 178
Load Number: 1 of 3	Additional Water (gal.):	Mold Dims: 4X8
Initial W:C Ratio:	Max W:C Ratio:	Final W:C Ratio:
Batch Size: 6	Compressive Str. (psi): 4500	Avg. Cap Thickness, C42:

Tare Volume (cf): - **Tare Weight (lbs):** - **Tare & Concrete Weight (lbs):** 141.30

Soil Weight (gm): - **Admixture Weight (gm):** - **Admixture Percent (%):** - **Moisture Content (%):** -

Sample No.	Break Date	Age (days)	Avg. Dia. (in.)	Avg. Hght. (in.)	Avg. Area (in.)	Weight (g)	Unit Wt. (pcf)	Break Information, C39					
								Cap*	Load (lbs)	Strength (psi)	(psi) Ratio	Break Type	Tech
20-02828	08/31/20	3	4.00	8.01	12.57	3799	143.8	U	57910	4610	102%	5	DC
20-02829	09/01/20	4				3789	143.4	U	63080	5020	112%	3	DC
20-02830	09/02/20	5				3788	143.4	U	65240	5190	115%	5	DC
20-02831	09/04/20	7				3798	143.8	U	70690	5630	125%	3	DC
20-02832	09/25/20	28				3798	143.8	U	81050	6450	143%	5	DC
20-02833	09/25/20	28				3790	143.5	U	82370	6550	146%	3	DC
20-02834	09/25/20	28				3784	143.2	U	85710	6820	152%	3	DC
CONCRETE FIELD CURES (if applicable), Cores, Grout Prisms, or Mortar Cubes													

Cap Type*: S=Sulfur G=Gypsum C=Neat Cement U=Unbonded Neoprene O=None

Remarks: 5 field cures 7 lab cures (cylinders)

Field Set Number: 1 of 1 ***Flow Cone No.:** **Compression Machine:** F-502

Field Scale No.: ****Cube Mold No.:** **Lab Scale:** L129

Building Permit Number: **Record No.** 1 C



Huddlestone-Berry
Engineering & Testing, LLC

MATERIAL PROPERTIES AND COMPRESSIVE STRENGTH

TEST REPORT

Task / Material Tested: Gate Control Structure

Project No.: 01594 - 0009 **Authorized By:** Client **Date:** 11/06/20
Project Name: Ward Lake Reconstruction **Sampled By:** CDR **Date:** 11/06/20
Client Name: Con-Sy Inc. **Work Order No.:** 69944
General Contractor: Con-Sy Inc. **Picked Up By:** AB **Date:** 11/07/20
Placement Contractor: Con-Sy Inc. **Work Order No.:** 69981
Contractor Representative: Wayne **Reviewed By:** CDR **Date:** 12/04/20
Location of Placement: Gate Control Support Structure

Sample Location: Center of Structure

Cylinder Storage Location: In Red Cooler North of Dam. Field cures are at gate control structure.

Weather Conditions: Cloudy **Ambient Temperature (°F):** 50's

Number of Samples Casted/Molded

Concrete: 7 ***Grout Cyl:** 0 ****Grout Prism:** 0 **Mortar Cyl:** 0 **Mortar Cube:** 0 **Soils:** 0

Mix Data	Specifications	Measured Properties
Supplier: White Water	Temp., C1064 (deg. F): 50-90	Temp., C1064 (deg. F): 65
Mix ID/Brand: C18H	Slump, C143 (in.): 4	Slump, C143 (in.): 4 1/2
Ticket No.: 418630	Air Content, C231 (%): 6.5+/-1.5	Air Cont., C231 (%): 5.4
Batch Time (MIL): 10:45	*Flow Rate:	*Flow Rate:
Sample Time (MIL): 13:11	Unit Weight, C138 (pcf): -	Unit Weight, C138 (pcf): 140.2
Water Added (gal.): 2	Time in Mixer (min): 90max	Time in Mixer (min): 146
Load Number: 1 of 1	Additional Water (gal.):	Mold Dims: 4X8
Initial W:C Ratio: not supplied	Max W:C Ratio:	Final W:C Ratio:
Batch Size: 2	Compressive Str. (psi): 4500	Avg. Cap Thickness, C42:

Tare Volume (cf): 0.25 **Tare Weight (lbs):** 7.46 **Tare & Concrete Weight (lbs):** 42.50

Soil Weight (gm): - **Admixture Weight (gm):** - **Admixture Percent (%):** - **Moisture Content (%):** -

Sample No.	Break Date	Age (days)	Avg. Dia. (in.)	Avg. Hght. (in.)	Avg. Area (in.)	Weight (g)	Unit Wt. (pcf)	Break Information, C39					
								Cap*	Load (lbs)	Strength (psi)	(psi) Ratio	Break Type	Tech.
20-03886	11/13/20	7	4.00	8.00	12.57	3668	139.0	U	42595	3390	75%	5	DC
20-03887	11/18/20	12				3714	140.8	U	54185	4310	96%	5	DC
20-03888	12/04/20	28				3708	140.5	U	58930	4690	104%	5	DC
20-03889	12/04/20	28				3700	140.2	U	61230	4870	108%	5	DC
CONCRETE FIELD CURES (if applicable), Cores, Grout Prisms, or Mortar Cubes													
20-03890	11/13/20	7	4.00	8.02	12.57	3694	139.7	U	44370	3530	78%	5	DC
20-03891	12/04/20	28	3.99	8.02	12.50	3690	140.2	U	59480	4760	106%	5	DC
20-03892	12/04/20	28	4.01	8.02	12.63	3678	138.4	U	60705	4810	107%	5	DC

Cap Type*: S=Sulfur G=Gypsum C=Neat Cement U=Unbonded Neoprene O=None

Remarks: Tested air on arrival. Was 2.6. Added 1/2 of air bag. Tested second time 3.1. WW then added whole bag. Test results was all composite sampled from the third round of testing.

Field Set Number: 1 of 1 ***Flow Cone No.:** **Compression Machine:** F-502
Field Scale No.: ****Cube Mold No.:** **Lab Scale:** L129

Building Permit Number: **Record No.** 8 C



Huddlestone-Berry
Engineering & Testing, LLC

PHYSICAL PROPERTIES AND COMPRESSIVE STRENGTH

TEST REPORT

Task / Material Tested: Gate Control Structure

Project No.: 01594 - 0009 **Authorized By:** Client **Date:** 11/06/20
Project Name: Ward Lake Reconstruction **Sampled By:** CDR **Date:** 11/06/20
Client Name: Con-Sy Inc. **Work Order No.:** 69944
General Contractor: Con-Sy Inc. **Picked Up By:** AB **Date:** 11/07/20
Placement Contractor: Con-Sy Inc. **Work Order No.:** 69981
Contractor Representative: Wayne **Reviewed By:** DRAFT **Date:**
Location of Placement: Gate Control Support Structure

Sample Location: Center of Structure

Cylinder Storage Location: In Red Cooler North of Dam. Field cures are at gate control structure.

Weather Conditions: Cloudy **Ambient Temperature (°F):** 50's

Number of Samples Casted/Molded

Concrete: 7 ***Grout Cyl:** 0 ****Grout Prism:** 0 **Mortar Cyl:** 0 **Mortar Cube:** 0 **Soils:** 0

Mix Data	Specifications	Measured Properties
Supplier: White Water	Temp., C1064 (deg. F): 50-90	Temp., C1064 (deg. F): 65
Mix ID/Brand: C18H	Slump, C143 (in.): 4	Slump, C143 (in.): 4 1/2
Ticket No.: 418630	Air Content, C231 (%): 6.5+/-1.5	Air Cont., C231 (%): 5.4
Batch Time (MIL): 10:45	*Flow Rate:	*Flow Rate:
Sample Time (MIL): 13:11	Unit Weight, C138 (pcf): -	Unit Weight, C138 (pcf): 140.2
Water Added (gal.): 2	Time in Mixer (min): 90max	Time in Mixer (min): 146
Load Number: 1 of 1	Additional Water (gal.):	Mold Dims: 4X8
Initial W:C Ratio: not supplied	Max W:C Ratio:	Final W:C Ratio:
Batch Size: 2	Compressive Str. (psi): 4500	Avg. Cap Thickness, C42:

Tare Volume (cf): 0.25 **Tare Weight (lbs):** 7.46 **Tare & Concrete Weight (lbs):** 42.50

Soil Weight (gm): - **Admixture Weight (gm):** - **Admixture Percent (%):** - **Moisture Content (%):** -

Sample No.	Break Date	Age (days)	Avg. Dia. (in.)	Avg. Hght. (in.)	Avg. Area (in.)	Weight (g)	Unit Wt. (pcf)	Break Information, C39					
								Cap*	Load (lbs)	Strength (psi)	(psi) Ratio	Break Type	Tech.
20-03886	11/13/20	7	4.00	8.00	12.57	3668	139.0	U	42595	3390	75%	5	DC
20-03887	11/18/20	12				3714	140.8	U	54185	4310	96%	5	DC
20-03888	12/04/20	28				3708	140.5						
20-03889	12/04/20	28				3700	140.2						
CONCRETE FIELD CURES (if applicable), Cores, Grout Prisms, or Mortar Cubes													
20-03890	11/13/20	7											
20-03891	12/04/20	28											
20-03892	12/04/20	28											

Cap Type*: S=Sulfur G=Gypsum C=Neat Cement U=Unbonded Neoprene O=None

Remarks: Tested air on arrival. Was 2.6. Added 1/2 of air bag. Tested second time 3.1. WW then added whole bag. Test results was all composite sampled from the third round of testing.

Field Set Number: 1 of 1 ***Flow Cone No.:** **Compression Machine:** F-502
Field Scale No.: ****Cube Mold No.:** **Lab Scale:** L129

Building Permit Number: **Record No.** 8 C

APPENDIX C.2

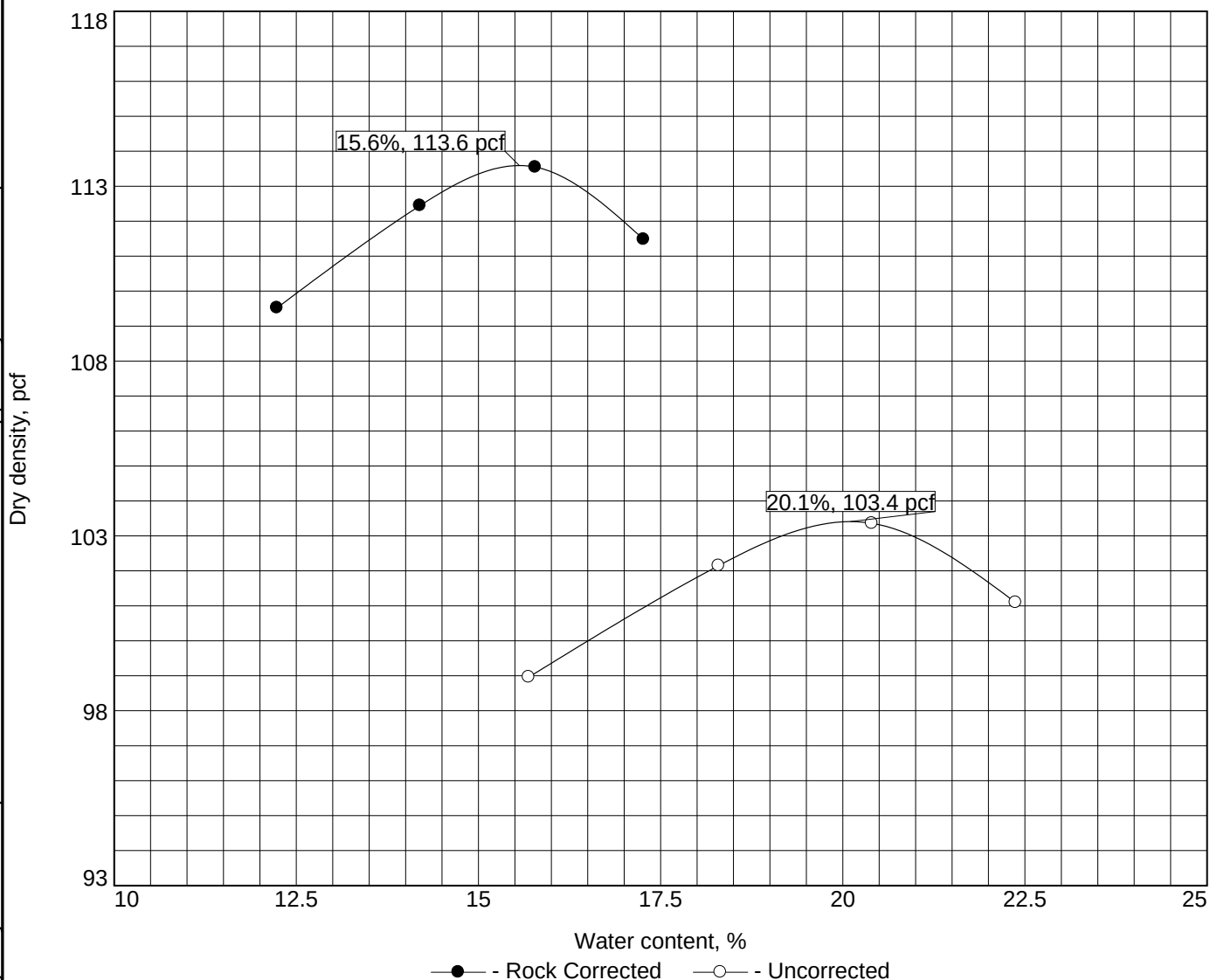
QUALITY ASSURANCE TESTS
BY
DOWL

Percent Oversize	Corrected MC	Corrected DD
0	20.1	103.4
2	19.7	104.2
4	19.4	104.9
6	19.0	105.7
8	18.6	106.5
10	18.3	107.3
12	17.9	108.1
14	17.5	108.9
16	17.2	109.8
18	16.8	110.6
20	16.4	111.5
22	16.1	112.4
24	15.7	113.3
26	15.3	114.2
28	14.9	115.1
30	14.6	116.0
32	14.2	117.0
34	13.8	118.0
36	13.5	118.9
38	13.1	119.9
40	12.7	121.0
42	12.4	122.0
44	12.0	123.0
46	11.6	124.1
48	11.3	125.2
50	10.9	126.3

Deep Ward Lake - Screened #BS9

Results are for the exclusive use of the client and apply only to the samples tested and are not indicative of apparently identical samples.

MOISTURE-DENSITY RELATIONSHIP



Test specification: ASTM D 698-12 Method A Standard
ASTM D4718-15 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
10,101'	SC	A-7-6(5)			41	19	24.7	47.4

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 113.6 pcf	103.4 pcf	brown clayey SAND with gravel
Optimum moisture = 15.6 %	20.1 %	

Project No. 7122.74844.01 Client: Surface Creek Ditch and Reservoir Company Project: Deep Ward Lake Dam Date: 9/28/2020 Location: screened Sample Number: BS9	Remarks:
	

Tested By: SJ Checked By: JLH

Results are for the exclusive use of the client and apply only to the samples tested and are not indicative of apparently identical samples.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	16.6	8.1	3.7	9.1	15.1	47.4	

Test Results (ASTM C136 & ASTM C117)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
2"	91.9		
1"	85.2		
3/4"	83.4		
1/2"	80.4		
3/8"	78.9		
#4	75.3		
#10	71.6		
#16	67.7		
#40	62.5		
#100	54.6		
#200	47.4		

* (no specification provided)

Material Description

brown clayey SAND with gravel

Atterberg Limits (ASTM D 4318)

PL= 22 LL= 41 PI= 19

Classification

USCS (D 2487)= SC AASHTO (M 145)= A-7-6(5)

Coefficients

D₉₀= 44.7306 D₈₅= 24.6253 D₆₀= 0.2834
D₅₀= 0.0955 D₃₀= D₁₅=
D₁₀= C_u= C_c=

Remarks

Date Received: 9/23/2020 Date Tested: 9/28/2020

Tested By: SJ

Checked By: JLH

Title: Laboratory Manager

Location: screened
Sample Number: BS9

Depth: 10,101'

Date Sampled: 9/23/2020



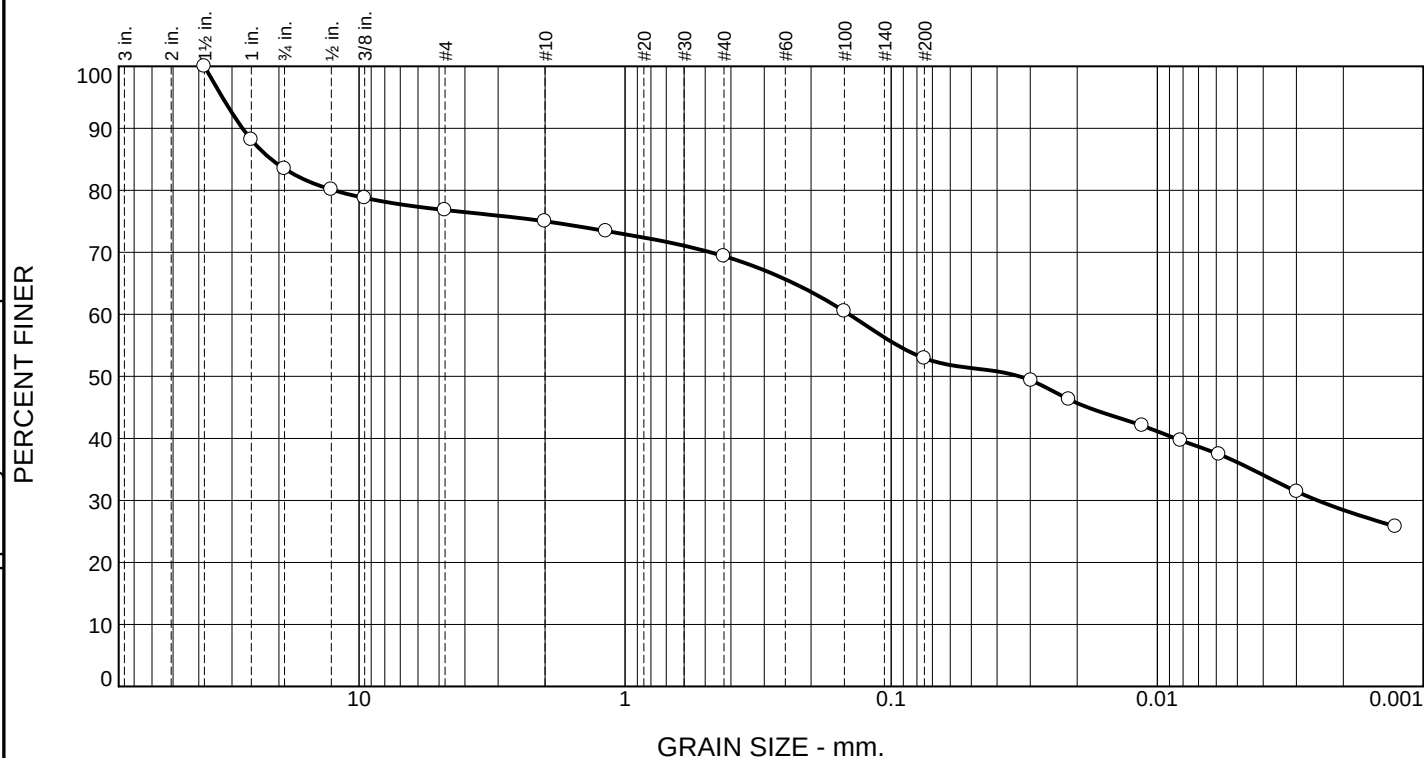
Client: Surface Creek Ditch and Reservoir Company

Project: Deep Ward Lake Dam

Project No: 7122.74844.01

Results are for the exclusive use of the client and apply only to the samples tested and are not indicative of apparently identical samples.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	16.5	6.7	1.8	5.6	16.5	16.8	36.1

Test Results (ASTM D6913 & ASTM D7928)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	88.2		
3/4"	83.5		
1/2"	80.1		
3/8"	78.8		
#4	76.8		
#10	75.0		
#16	73.4		
#40	69.4		
#100	60.5		
#200	52.9		
0.0298 mm.	49.3		
0.0215 mm.	46.3		
0.0114 mm.	42.1		
0.0082 mm.	39.7		
0.0059 mm.	37.4		
0.0030 mm.	31.4		
0.0013 mm.	25.8		

* (no specification provided)

Material Description

reddish brown sandy LEAN CLAY with gravel

Atterberg Limits (ASTM D 4318)

PL= 20 LL= 46 PI= 26

Classification

USCS (D 2487)= CL AASHTO (M 145)= A-7-6(10)

Coefficients

D₉₀= 27.4128 D₈₅= 21.3858 D₆₀= 0.1438
D₅₀= 0.0329 D₃₀= 0.0025 D₁₅=
D₁₀= C_u= C_c=

Remarks

Date Received: 10/20/2020 Date Tested: 10/21/2020

Tested By: SJ

Checked By: JLH

Title: Laboratory Manager

Sample Number: BS13

Date Sampled: 10/16/2020

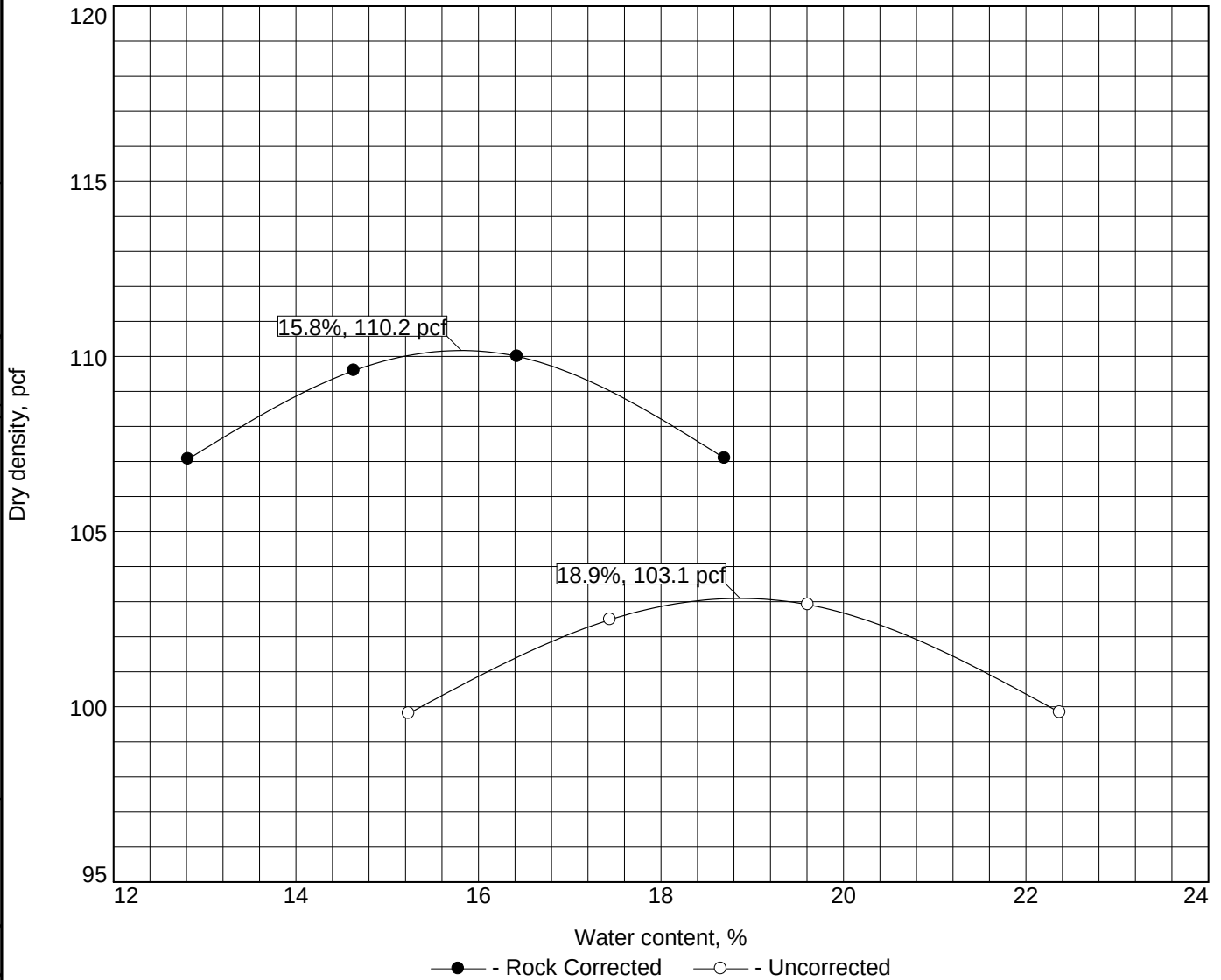


Client: Surface Creek Ditch and Reservoir Company

Project: Deep Ward Lake Dam

Project No: 7122.74844.01

MOISTURE-DENSITY RELATIONSHIP



Test specification: ASTM D 698-12 Method A Standard
ASTM D4718-15 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
stockpile	CL	A-7-6(9)			42	22	17.6	54.1

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 110.2 pcf	103.1 pcf	brown sandy LEAN CLAY with gravel
Optimum moisture = 15.8 %	18.9 %	

Project No. 7122.74844.01 Client: Surface Creek Ditch and Reservoir Company Project: Deep Ward Lake Dam Date: 8/18/2020 Location: on-site Sample Number: BS6	Remarks:
	

Results are for the exclusive use of the client and apply only to the samples tested and are not indicative of apparently identical samples.

Tested By: SJ Checked By: JLH

Results are for the exclusive use of the client and apply only to the samples tested and are not indicative of apparently identical samples.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.7	8.9	4.9	7.4	16.0	54.1	

Test Results (ASTM C136 & ASTM C117)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3"	100.0		
2"	99.4		
1.5"	97.7		
1"	94.2		
3/4"	91.3		
1/2"	87.2		
3/8"	85.6		
#4	82.4		
#10	77.5		
#16	75.5		
#40	70.1		
#100	61.7		
#200	54.1		

* (no specification provided)

Material Description

brown sandy LEAN CLAY with gravel

Atterberg Limits (ASTM D 4318)

PL= 20 LL= 42 PI= 22

Classification

USCS (D 2487)= CL AASHTO (M 145)= A-7-6(9)

Coefficients

D₉₀= 16.9574 D₈₅= 8.3305 D₆₀= 0.1267
D₅₀= D₃₀= D₁₅=
D₁₀= C_u= C_c=

Remarks

Date Received: 8/17/2020 Date Tested: 8/19/2020

Tested By: BR

Checked By: SJ

Title: Laboratory Manager

Location: on-site
Sample Number: BS6

Depth: stockpile

Date Sampled: 8/17/2020



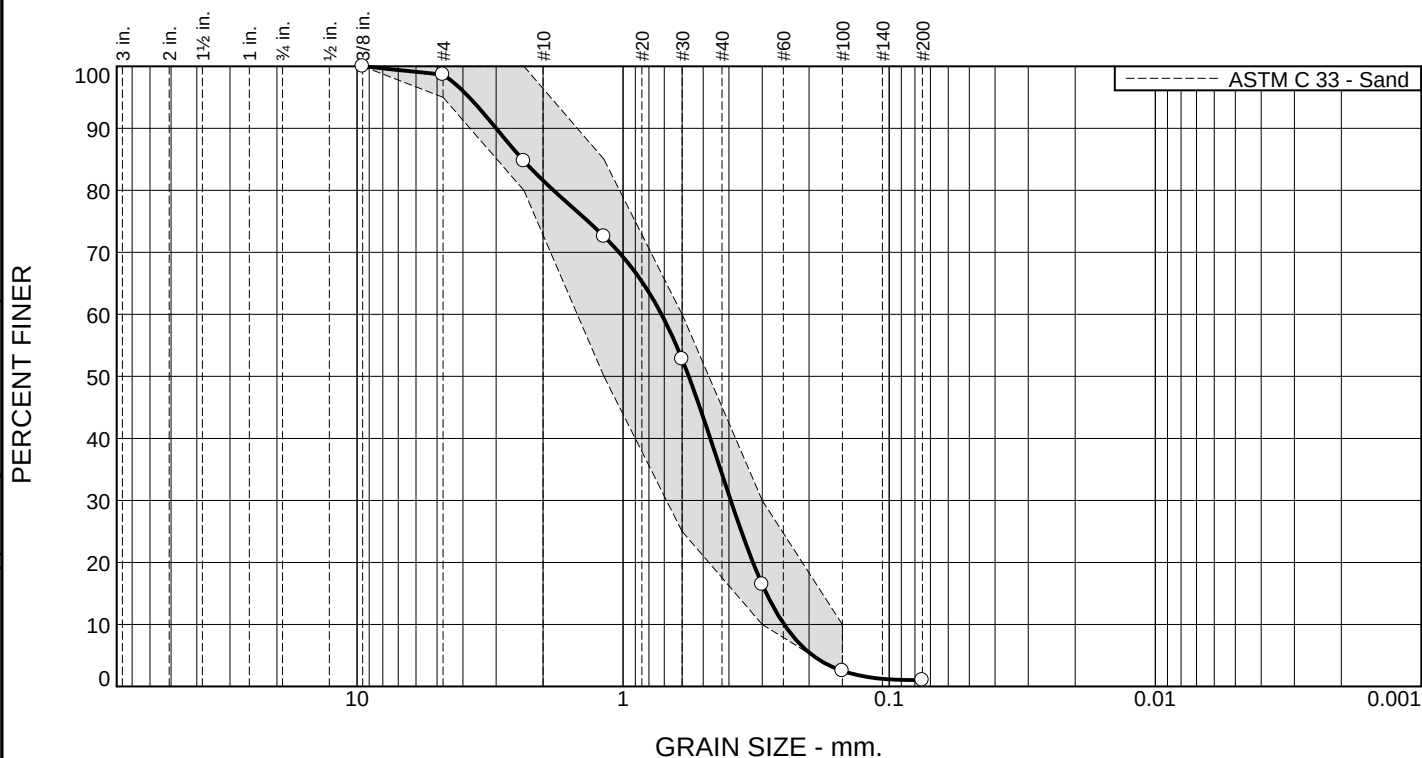
Client: Surface Creek Ditch and Reservoir Company

Project: Deep Ward Lake Dam

Project No: 7122.74844.01

Results are for the exclusive use of the client and apply only to the samples tested and are not indicative of apparently identical samples.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.3	17.1	47.3	33.3	1.0	

Test Results (ASTM C136 & ASTM C117)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0	100.0	
#4	98.7	95.0 - 100.0	
#8	84.7	80.0 - 100.0	
#16	72.6	50.0 - 85.0	
#30	52.8	25.0 - 60.0	
#50	16.4	10.0 - 30.0	
#100	2.5	2.0 - 10.0	
#200	1.0		

* ASTM C 33 - Sand

Material Description

brown poorly graded SAND

Atterberg Limits (ASTM D 4318)

PL= NP LL= NP PI= NP

Classification

USCS (D 2487)= SP AASHTO (M 145)= A-1-b

Coefficients

D₉₀= 3.0004 D₈₅= 2.3904 D₆₀= 0.7170
D₅₀= 0.5663 D₃₀= 0.3940 D₁₅= 0.2894
D₁₀= 0.2482 C_u= 2.89 C_c= 0.87

Remarks

Natural Moisture Content = 7.5%

Date Received: 8/19/2020 Date Tested: 8/20/2020

Tested By: SJ

Checked By: JLH

Title: Laboratory Manager

Sample Number: BS7

Date Sampled: 8/19/2020



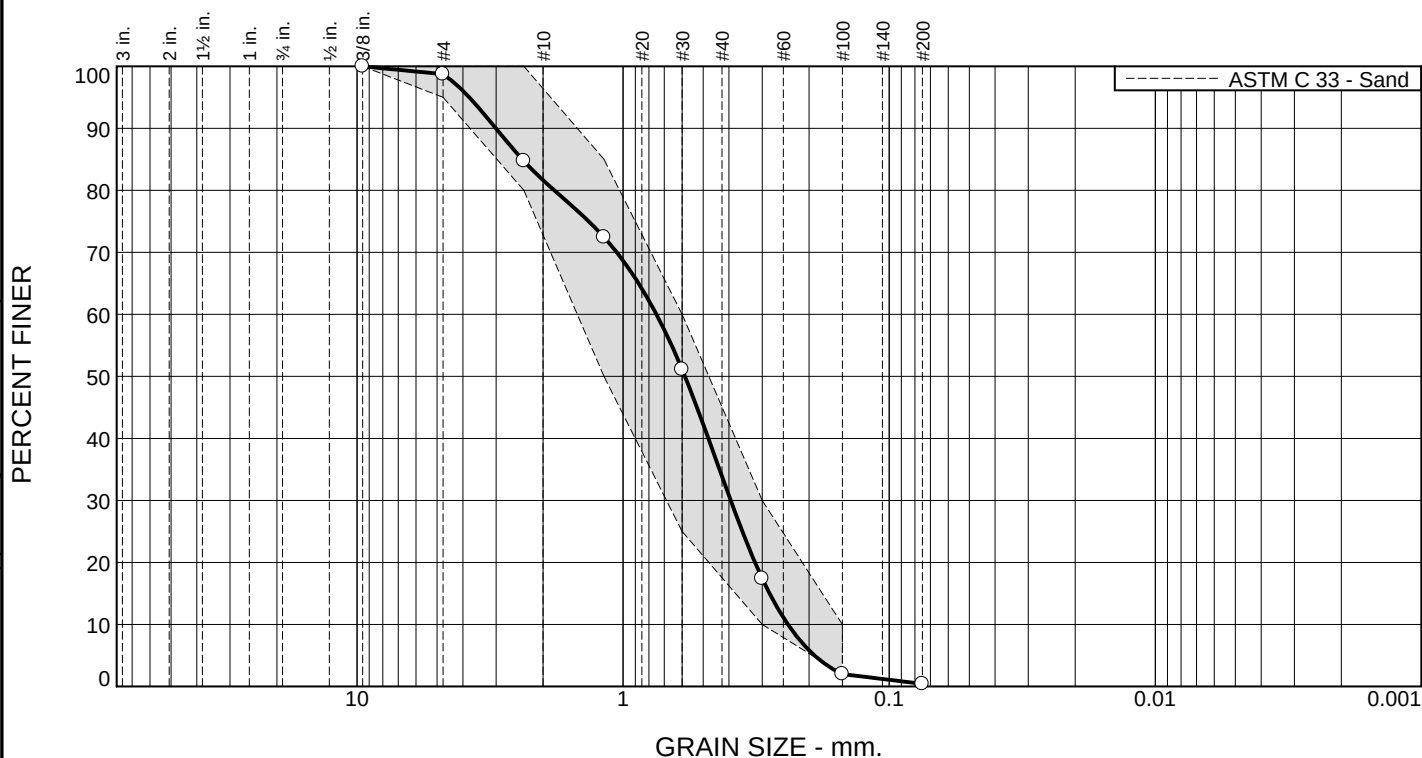
Client: Surface Creek Ditch and Reservoir Company

Project: Deep Ward Lake Dam

Project No: 7122.74844.01

Results are for the exclusive use of the client and apply only to the samples tested and are not indicative of apparently identical samples.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.3	17.1	47.7	33.5	0.4	

Test Results (ASTM C136 & ASTM C117)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8"	100.0	100.0	
#4	98.7	95.0 - 100.0	
#8	84.7	80.0 - 100.0	
#16	72.4	50.0 - 85.0	
#30	51.1	25.0 - 60.0	
#50	17.4	10.0 - 30.0	
#100	2.0	2.0 - 10.0	
#200	0.4		

* ASTM C 33 - Sand

Material Description

brown poorly graded SAND

Atterberg Limits (ASTM D 4318)

PL= NP LL= NP PI= NP

Classification

USCS (D 2487)= SP AASHTO (M 145)= A-1-b

Coefficients

D₉₀= 3.0075 D₈₅= 2.3940 D₆₀= 0.7495
D₅₀= 0.5855 D₃₀= 0.3940 D₁₅= 0.2817
D₁₀= 0.2402 C_u= 3.12 C_c= 0.86

Remarks

Date Received: 10/5/2020 Date Tested: 10/5/2020

Tested By: SJ

Checked By: JLH

Title: Laboratory Manager

Location: Sand Diaphragm @70cy - post compaction
Sample Number: BS11

Date Sampled: 10/1/2020

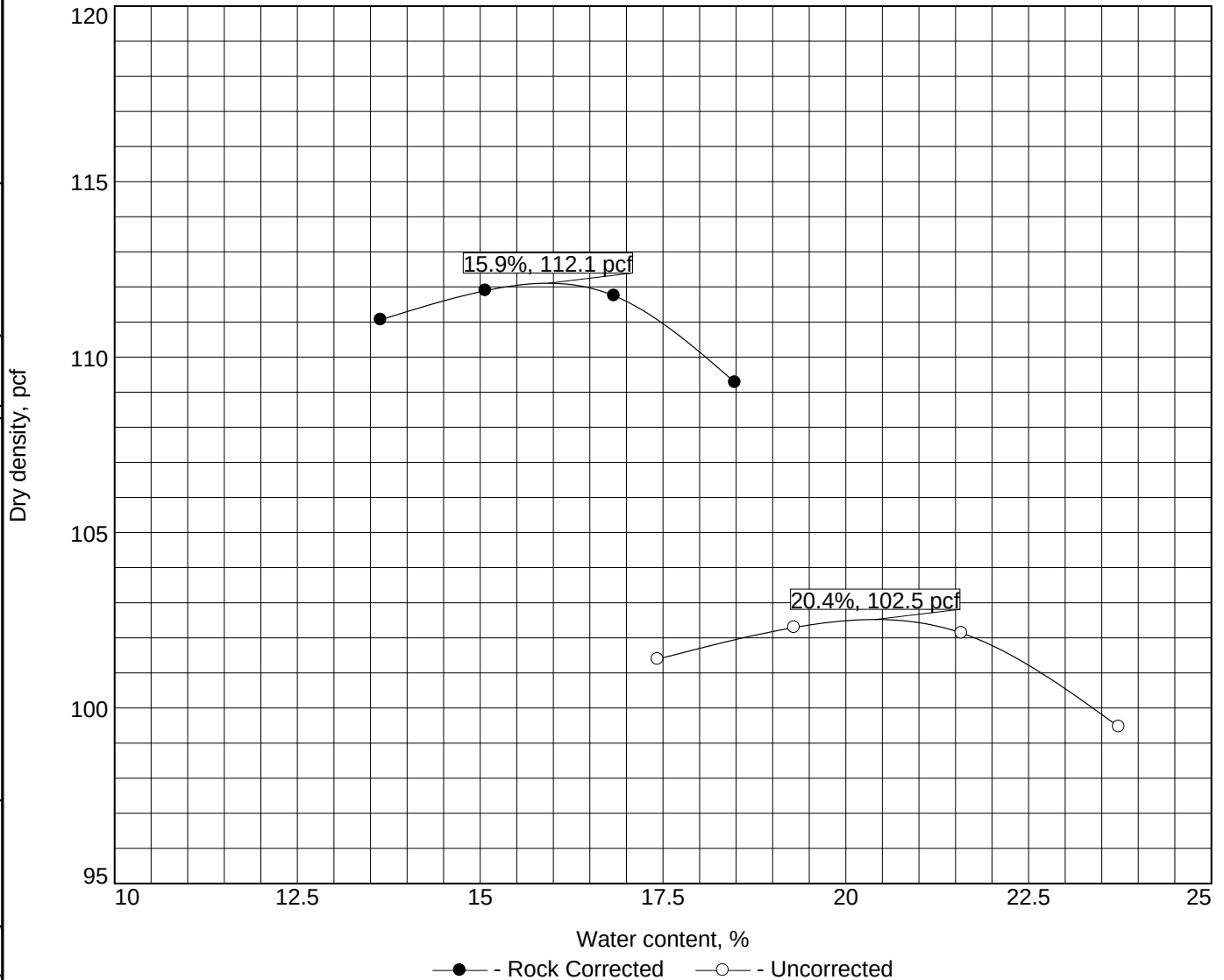


Client: Surface Creek Ditch and Reservoir Company

Project: Deep Ward Lake Dam

Project No: 7122.74844.01

MOISTURE-DENSITY RELATIONSHIP



Test specification: ASTM D 698-12 Method A Standard
ASTM D4718-15 Oversize Corr. Applied to Each Test Point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
	CL	A-7-6(10)			46	26	23.2	52.9

ROCK CORRECTED TEST RESULTS	UNCORRECTED	MATERIAL DESCRIPTION
Maximum dry density = 112.1 pcf	102.5 pcf	reddish brown sandy LEAN CLAY with gravel
Optimum moisture = 15.9 %	20.4 %	

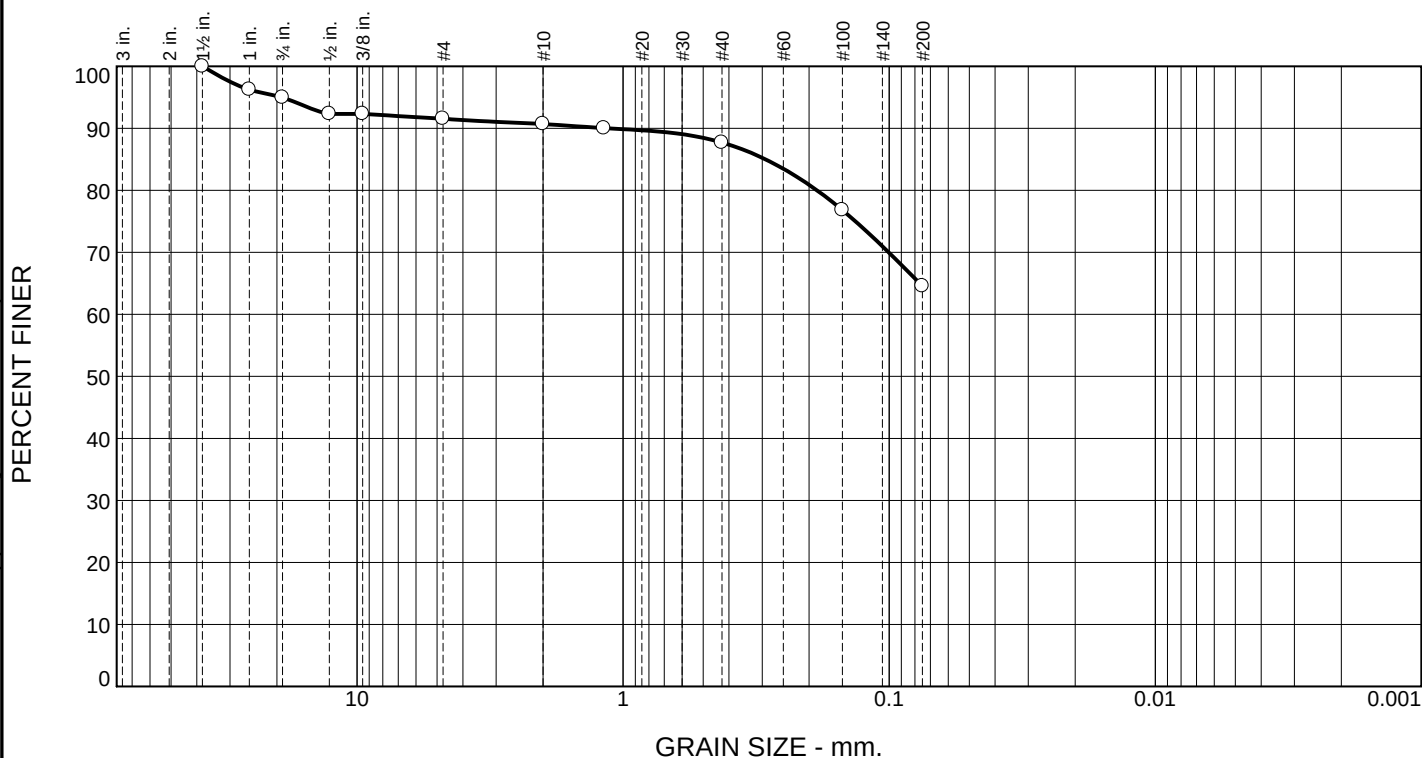
Project No. 7122.74844.01 Client: Surface Creek Ditch and Reservoir Company Project: Deep Ward Lake Dam Date: 10/24/2020 Sample Number: BS13	Remarks:
	

Results are for the exclusive use of the client and apply only to the samples tested and are not indicative of apparently identical samples.

Tested By: SJ Checked By: JLH

Results are for the exclusive use of the client and apply only to the samples tested and are not indicative of apparently identical samples.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.0	3.4	0.9	3.0	23.1	64.6	

Test Results (ASTM D6913 & ASTM D7928)			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	96.2		
3/4"	95.0		
1/2"	92.3		
3/8"	92.3		
#4	91.6		
#10	90.7		
#16	90.0		
#40	87.7		
#100	76.8		
#200	64.6		

* (no specification provided)

Material Description

mottled gray/brown sandy FAT CLAY

Atterberg Limits (ASTM D 4318)

PL= 22 LL= 56 PI= 34

Classification

USCS (D 2487)= CH AASHTO (M 145)= A-7-6(20)

Coefficients

D₉₀= 1.1441 D₈₅= 0.2919 D₆₀=
D₅₀= D₃₀= D₁₅=
D₁₀= C_u= C_c=

Remarks

Date Received: 10/12/2020 Date Tested: 10/15/2020

Tested By: SJ

Checked By: JLH

Title: Laboratory Manager

Location: alternate source
Sample Number: BS12

Date Sampled: 10/12/2020



Client: Surface Creek Ditch and Reservoir Company

Project: Deep Ward Lake Dam

Project No: 7122.74844.01



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FIELD / LAB TEST DATA - COMPRESSIVE STRENGTH ANALYSIS

☒ CONCRETE CYLINDER ☐ MASONRY GROUT CYLINDER ☐ FLOW FILL CYLINDER
☐ MASONRY GROUT CUBE ☐ CEMENT CUBE ☐ CONCRETE PRISM ☐ GROUT PRISM

Sample Date: **August 28, 2020** Technician: **J. Harshman**
Project Name: **Deep Ward Lake Outlet Repair** Project Set No. **2** Daily Set No. **2**
Project Number: **7122.74844.01** Submitted to Lab By: **J. Harshman** Date: **8/31/2020**
Client: **Surface Creek Ditch and Reservoir** Testing Requested By: **Dan Quigley**

Concrete Supplier: **Whitewater Materials Company** Truck#: **9** Ticket#: **001-415300**
Mix Identification#: **C18H Class D** Batch size: **6** cubic yards Batch Time: **921a** Sample Time: **1140a**
Time in Mixer **2** hours **21** minutes Water Added Before Sampling: **0** gallons Ambient Air Temp. (°F.): **65**
Maximum Size Aggregate: **3/4** inches Required Strength: **4000** psi at **28** days

Sample Location: **STA 0+40 to 0+65**
AREA/TYPE PLACEMENT: ☐ CURB/GUTTER ☐ FLOOR SLAB ☐ FOOTING ☐ WALL
☒ OTHER: **Pipe Casing**

SAMPLING: (Fresh Concrete) ☒ ASTM C172 ☐ AASHTO T141 (Fresh Concrete) ☐ ASTM C1019 (Grout) ☐ AASHTO T196 Sampled From: <u>truck conveyor nozzle</u>	UNIT WEIGHT: ☒ ASTM C138 ☐ AASHTO T121 Test Results <u>142.6</u> lb/ft ³ (LBF/cubic foot)	CONCRETE TEMPERATURE: OTHER ☒ ASTM C1064 ☐ Test Results <u>80</u> degrees F.
AIR-CONTENT: ☐ ASTM C153 ☐ ASTM C173 ☒ ASTM C231 ☐ AASHTO T196 Test Results <u>5.1</u> % (percent)	SLUMP: ☒ ASTM C143 ☐ AASHTO T199 ☐ ASTM C1611 ☐ Test Results <u>1.75</u> in. (inches)	Number of specimens molded: <u>10</u> Approximate size of specimen mold: Cylindrical: ☒ 4x8" ☐ 6x12" ☐ CUBE ☐ PRISM ☐ Other ☐

LABORATORY TEST DATA

Specimens cured and tested in the laboratory in accordance with: ☒ Field cured and molded: ☒ Cylinders ☐ Cubes ☐ Drilled Cores ☐ Storage Tanks
☒ ASTM C31 ☐ AASHTO T23 ☒ ASTM C39 ☐ ASTM C109 ☐ ASTM C42 ☒ ASTM C511

SPECIMEN IDENTIFICATION	DATE TESTED	AGE IN DAYS	SPECIMEN MEASUREMENTS				COMPRESSIVE STRENGTH TEST DATA				CAP TYPE			TEST BY
	YEAR: 2020						Maximum Load		FRACTURE TYPE # (See sketch below)	% of spec. achieved	C1231	C617	Other	
			Diameter 1	Diameter 2	Average Diameter	Cross Sectional Area	LBF	PSI			NEO. PADS	GYP. CAP		
9024	Sept. 4	7	4.00	4.00	4.00	12.57	64220	5110	3	100+	X			JLH
9025	Sept. 4	7	4.00	4.00	4.00	12.57	65080	5180	5	100+	X			JLH
9026	Sept. 25	28	4.00	4.01	4.01	12.60	83910	6660	3	100+	X			SJ
9027	Sept. 25	28	4.00	4.01	4.01	12.60	82110	6520	3	100+	X			SJ
9028	Sept. 25	28	4.00	4.01	4.01	12.60	79810	6340	3	100+	X			SJ

AVERAGE **5150** PSI AT **7** DAYS AVERAGE **6510** PSI AT **28** DAYS AVERAGE _____ PSI AT _____ DAYS

COMMENTS:

FRACTURE PATTERN TYPES					
Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
Note: Type 5 & 6 commonly occur with unbonded caps.					



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FIELD / LAB TEST DATA - COMPRESSIVE STRENGTH ANALYSIS

☒ CONCRETE CYLINDER ☐ MASONRY GROUT CYLINDER ☐ FLOW FILL CYLINDER
☐ MASONRY GROUT CUBE ☐ CEMENT CUBE ☐ CONCRETE PRISM ☐ GROUT PRISM

Sample Date: **August 28, 2020** Technician: **J. Harshman**
Project Name: **Deep Ward Lake Outlet Repair** Project Set No. **2** Daily Set No. **2**
Project Number: **7122.74844.01** Submitted to Lab By: **J. Harshman** Date: **8/31/2020**
Client: **Surface Creek Ditch and Reservoir** Testing Requested By: **Dan Quigley**

Concrete Supplier: **Whitewater Materials Company** Truck#: **9** Ticket#: **001-415300**
Mix Identification#: **C18H Class D** Batch size: **6** cubic yards Batch Time: **921a** Sample Time: **1140a**
Time in Mixer **2** hours **21** minutes Water Added Before Sampling: **0** gallons Ambient Air Temp. (°F.): **65**
Maximum Size Aggregate: **3/4** inches Required Strength: **4000** psi at **28** days

Sample Location: **STA 0+40 to 0+65**
AREA/TYPE PLACEMENT: ☐ CURB/GUTTER ☐ FLOOR SLAB ☐ FOOTING ☐ WALL
☒ OTHER: **Pipe Casing**

SAMPLING: (Fresh Concrete) ☒ ASTM C172 ☐ AASHTO T141 (Fresh Concrete) ☐ ASTM C1019 (Grout) ☐ AASHTO T196 Sampled From: <u>truck conveyor nozzle</u>	UNIT WEIGHT: ☒ ASTM C138 ☐ AASHTO T121 Test Results <u>142.6</u> lb/ft ³ (LBF/cubic foot)	CONCRETE TEMPERATURE: OTHER ☒ ASTM C1064 ☐ Test Results <u>80</u> degrees F.
AIR-CONTENT: ☐ ASTM C153 ☐ ASTM C173 ☒ ASTM C231 ☐ AASHTO T196 Test Results <u>5.1</u> % (percent)	SLUMP: ☒ ASTM C143 ☐ AASHTO T199 ☐ ASTM C1611 ☐ Test Results <u>1.75</u> in. (inches)	Number of specimens molded: <u>10</u> Approximate size of specimen mold: Cylindrical: ☒ 4x8" ☐ 6x12" ☐ CUBE ☐ PRISM ☐ Other ☐

LABORATORY TEST DATA

Specimens cured and tested in the laboratory in accordance with: ☒ Field cured and molded: ☒ Cylinders ☐ Cubes ☐ Drilled Cores ☐ Storage Tanks
☒ ASTM C31 ☐ AASHTO T23 ☒ ASTM C39 ☐ ASTM C109 ☐ ASTM C42 ☒ ASTM C511

SPECIMEN IDENTIFICATION	DATE TESTED	AGE IN DAYS	SPECIMEN MEASUREMENTS				COMPRESSIVE STRENGTH TEST DATA				CAP TYPE			TEST BY
	YEAR: 2020						Maximum Load		FRACTURE TYPE # (See sketch below)	% of spec. achieved	C1231 NEO. PADS	C617 GYP. CAP	Other	
			Diameter 1	Diameter 2	Average Diameter	Cross Sectional Area	LBF	PSI						
9029	Aug. 31	3	4.00	4.00	4.00	12.57	51650	4110	3	100+	X			JLH
9030	Sept. 4	7	4.01	4.00	4.01	12.60	58780	4670	2	100+	X			JLH
9031	Sept. 25	28	4.00	4.01	4.01	12.60	72570	5760	3	100+	X			SJ
9032	Sept. 25	28	4.01	4.00	4.01	12.60	71450	5670	2	100+	X			SJ
9033	Sept. 25	28	4.00	4.01	4.01	12.60	71740	5690	2	100+	X			SJ

AVERAGE **5710** PSI AT **28** DAYS AVERAGE _____ PSI AT _____ DAYS AVERAGE _____ PSI AT _____ DAYS

COMMENTS: **Field Cure Cylinders**

FRACTURE PATTERN TYPES					
Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
Note: Type 5 & 6 commonly occur with unbonded caps.					



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FIELD / LAB TEST DATA - COMPRESSIVE STRENGTH ANALYSIS

☒ CONCRETE CYLINDER ☐ MASONRY GROUT CYLINDER ☐ FLOW FILL CYLINDER
☐ MASONRY GROUT CUBE ☐ CEMENT CUBE ☐ CONCRETE PRISM ☐ GROUT PRISM

Sample Date: **September 2, 2020** Technician: **J. Harshman**
Project Name: **Deep Ward Lake Outlet Repair** Project Set No. **3** Daily Set No. **1**
Project Number: **7122.74844.01** Submitted to Lab By: **J. Harshman** Date: **9/3/2020**
Client: **Surface Creek Ditch and Reservoir** Testing Requested By: **Dan Quigley**

Concrete Supplier: **Whitewater Materials Company** Truck#: **9** Ticket#: **001-41550**
Mix Identification#: **C18H** Batch size: **6** cubic yards Batch Time: **920a** Sample Time: **1128a**
Time in Mixer **2** hours **8** minutes Water Added Before Sampling: **3** gallons Ambient Air Temp. (°F): **67**
Maximum Size Aggregate: **3/4** inches Required Strength: **4000** psi at **28** days

Sample Location: **STA 1+70 Pad and STA 1+40 to 1+30**
AREA/TYPE PLACEMENT: ☐ CURB/GUTTER ☐ FLOOR SLAB ☐ FOOTING ☐ WALL
☒ OTHER: **outlet works**

SAMPLING: (Fresh Concrete) ☒ ASTM C172 ☐ AASHTO T141 (Fresh Concrete) ☐ ASTM C1019 (Grout) ☐ AASHTO T196 Sampled From: <u>truck conveyor nozzle</u>	UNIT WEIGHT: ☒ ASTM C138 ☐ AASHTO T121 Test Results <u>140.2</u> lb/ft ³ (LBF/cubic foot)	CONCRETE TEMPERATURE: OTHER ☒ ASTM C1064 ☐ Test Results <u>80</u> degrees F.
AIR-CONTENT: ☐ ASTM C153 ☐ ASTM C173 ☒ ASTM C231 ☐ AASHTO T196 Test Results <u>6.4</u> % (percent)	SLUMP: ☒ ASTM C143 ☐ AASHTO T199 ☐ ASTM C1611 ☐ Test Results <u>4.0</u> in. (inches)	Number of specimens molded: <u>5</u> Approximate size of specimen mold: Cylindrical: ☒ 4x8" ☐ 6x12" ☐ CUBE ☐ PRISM ☐ Other ☐

LABORATORY TEST DATA

Specimens cured and tested in the laboratory in accordance with: ☒ ASTM C31 ☐ AASHTO T23 ☒ ASTM C39 ☐ ASTM C109 ☐ ASTM C42 ☒ ASTM C511
Field cured and molded: ☐ Cylinders ☐ Cubes ☐ Drilled Cores ☐ Storage Tanks

SPECIMEN IDENTIFICATION	DATE TESTED	AGE IN DAYS	SPECIMEN MEASUREMENTS				COMPRESSIVE STRENGTH TEST DATA				CAP TYPE			TEST BY
	YEAR: 2020						Maximum Load		FRACTURE TYPE # (See sketch below)	% of spec. achieved	C1231 NEO. PADS	C617 GYP. CAP	Other	
			Diameter	Diameter	Average Diameter	Cross Sectional Area	LBF	PSI						
			1	2										
9038	Sept. 9	7	4.00	4.01	4.01	12.60	55360	4390	2	100+	X			SJ
9039	Sept. 9	7	4.01	4.01	4.01	12.63	53910	4270	3	100+	X			SJ
9040	Sept. 30	28												
9041	Sept. 30	28												
9042	Sept. 30	28												

AVERAGE **4330** PSI AT **7** DAYS AVERAGE _____ PSI AT **28** DAYS AVERAGE _____ PSI AT _____ DAYS

COMMENTS: _____

FRACTURE PATTERN TYPES					
Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
Note: Type 5 & 6 commonly occur with unbonded caps.					



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FIELD / LAB TEST DATA - COMPRESSIVE STRENGTH ANALYSIS

☒ CONCRETE CYLINDER ☐ MASONRY GROUT CYLINDER ☐ FLOW FILL CYLINDER
☐ MASONRY GROUT CUBE ☐ CEMENT CUBE ☐ CONCRETE PRISM ☐ GROUT PRISM

Sample Date: **September 2, 2020** Technician: **J. Harshman**
Project Name: **Deep Ward Lake Outlet Repair** Project Set No. **3** Daily Set No. **1**
Project Number: **7122.74844.01** Submitted to Lab By: **J. Harshman** Date: **9/3/2020**
Client: **Surface Creek Ditch and Reservoir** Testing Requested By: **Dan Quigley**

Concrete Supplier: **Whitewater Materials Company** Truck#: **9** Ticket#: **001-41550**
Mix Identification#: **C18H** Batch size: **6** cubic yards Batch Time: **920a** Sample Time: **1128a**
Time in Mixer **2** hours **8** minutes Water Added Before Sampling: **3** gallons Ambient Air Temp. (°F.): **67**
Maximum Size Aggregate: **3/4** inches Required Strength: **4000** psi at **28** days

Sample Location: **STA 1+70 Pad and STA 1+40 to 1+30**
AREA/TYPE PLACEMENT: ☐ CURB/GUTTER ☐ FLOOR SLAB ☐ FOOTING ☐ WALL
☒ OTHER: **outlet works**

SAMPLING: (Fresh Concrete) ☒ ASTM C172 ☐ AASHTO T141 (Fresh Concrete) ☐ ASTM C1019 (Grout) ☐ AASHTO T196 Sampled From: truck conveyor nozzle	UNIT WEIGHT: ☒ ASTM C138 ☐ AASHTO T121 Test Results 140.2 lb/ft ³ (LBF/cubic foot)	CONCRETE TEMPERATURE: OTHER ☒ ASTM C1064 ☐ Test Results 80 degrees F.
AIR-CONTENT: ☐ ASTM C153 ☐ ASTM C173 ☒ ASTM C231 ☐ AASHTO T196 Test Results 6.4 % (percent)	SLUMP: ☒ ASTM C143 ☐ AASHTO T199 ☐ ASTM C1611 ☐ Test Results 4.0 in. (inches)	Number of specimens molded: 5 Approximate size of specimen mold: Cylindrical: ☒ 4x8" ☐ 6x12" ☐ CUBE ☐ PRISM ☐ Other ☐

LABORATORY TEST DATA

Specimens cured and tested in the laboratory in accordance with: ☒ Field cured and molded: ☒ Cylinders ☐ Cubes ☐ Drilled Cores ☐ Storage Tanks
☒ ASTM C31 ☐ AASHTO T23 ☒ ASTM C39 ☐ ASTM C109 ☐ ASTM C42 ☒ ASTM C511

SPECIMEN IDENTIFICATION	DATE TESTED	AGE IN DAYS	SPECIMEN MEASUREMENTS				COMPRESSIVE STRENGTH TEST DATA				CAP TYPE			TEST BY
	YEAR: 2020						Maximum Load		FRACTURE TYPE # (See sketch below)	% of spec. achieved	C1231 NEO. PADS	C617 GYP. CAP	Other	
			Diameter 1	Diameter 2	Average Diameter	Cross Sectional Area	LBF	PSI						
9038	Sept. 9	7	4.00	4.01	4.01	12.60	55360	4390	2	100+	X			SJ
9039	Sept. 9	7	4.01	4.01	4.01	12.63	53910	4270	3	100+	X			SJ
9040	Sept. 30	28	4.00	4.01	4.01	12.60	70810	5620	2	100+	X			SJ
9041	Sept. 30	28	4.00	4.01	4.01	12.60	70090	5560	2	100+	X			SJ
9042	Sept. 30	28	4.01	4.01	4.01	12.63	71020	5620	3	100+	X			SJ

AVERAGE **4330** PSI AT **7** DAYS AVERAGE **5600** PSI AT **28** DAYS AVERAGE _____ PSI AT _____ DAYS

COMMENTS:

FRACTURE PATTERN TYPES					
Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
Note: Type 5 & 6 commonly occur with unbonded caps.					



222 South Park Avenue
Montrose, Colorado 81401
970-249-6828

FIELD / LAB TEST DATA - COMPRESSIVE STRENGTH ANALYSIS

☒ CONCRETE CYLINDER ☐ MASONRY GROUT CYLINDER ☐ FLOW FILL CYLINDER
☐ MASONRY GROUT CUBE ☐ CEMENT CUBE ☐ CONCRETE PRISM ☐ GROUT PRISM

Sample Date: **September 2, 2020** Technician: **J. Harshman**
Project Name: **Deep Ward Lake Outlet Repair** Project Set No. **3** Daily Set No. **1**
Project Number: **7122.74844.01** Submitted to Lab By: **J. Harshman** Date: **9/3/2020**
Client: **Surface Creek Ditch and Reservoir** Testing Requested By: **Dan Quigley**

Concrete Supplier: **Whitewater Materials Company** Truck#: **9** Ticket#: **001-41550**
Mix Identification#: **C18H** Batch size: **6** cubic yards Batch Time: **920a** Sample Time: **1128a**
Time in Mixer **2** hours **8** minutes Water Added Before Sampling: **3** gallons Ambient Air Temp. (°F.): **67**
Maximum Size Aggregate: **3/4** inches Required Strength: **4000** psi at **28** days

Sample Location: **STA 1+70 Pad and STA 1+40 to 1+30**
AREA/TYPE PLACEMENT: ☐ CURB/GUTTER ☐ FLOOR SLAB ☐ FOOTING ☐ WALL
☒ OTHER: **outlet works**

SAMPLING: (Fresh Concrete) ☒ ASTM C172 ☐ AASHTO T141 (Fresh Concrete) ☐ ASTM C1019 (Grout) ☐ AASHTO T196 Sampled From: truck conveyor nozzle	UNIT WEIGHT: ☒ ASTM C138 ☐ AASHTO T121 Test Results 140.2 lb/ft ³ (LBF/cubic foot)	CONCRETE TEMPERATURE: OTHER ☒ ASTM C1064 ☐ Test Results 80 degrees F.
AIR-CONTENT: ☐ ASTM C153 ☐ ASTM C173 ☒ ASTM C231 ☐ AASHTO T196 Test Results 6.4 % (percent)	SLUMP: ☒ ASTM C143 ☐ AASHTO T199 ☐ ASTM C1611 ☐ Test Results 4.0 in. (inches)	Number of specimens molded: 5 Approximate size of specimen mold: Cylindrical: ☒ 4x8" ☐ 6x12" ☐ CUBE ☐ PRISM ☐ Other ☐

LABORATORY TEST DATA

Specimens cured and tested in the laboratory in accordance with: ☒ Field cured and molded: ☒ Cylinders ☐ Cubes ☐ Drilled Cores ☐ Storage Tanks
☒ ASTM C31 ☐ AASHTO T23 ☒ ASTM C39 ☐ ASTM C109 ☐ ASTM C42 ☒ ASTM C511

SPECIMEN IDENTIFICATION	DATE TESTED	AGE IN DAYS	SPECIMEN MEASUREMENTS				COMPRESSIVE STRENGTH TEST DATA				CAP TYPE			TEST BY
	YEAR: 2020						Maximum Load		FRACTURE TYPE # (See sketch below)	% of spec. achieved	C1231	C617	Other	
			Diameter 1	Diameter 2	Average Diameter	Cross Sectional Area	LBF	PSI			NEO. PADS	GYP. CAP		
9043	Sept. 9	7	4.00	4.01	4.01	12.60	49060	3890	2	97.3	X			SJ
9044	Sept. 9	7	4.00	4.01	4.01	12.60	45890	3640	2	91.0	X			SJ
9045	Sept. 30	28	4.01	4.01	4.01	12.63	56330	4460	2	100+	X			SJ
9046	Sept. 30	28	4.01	4.01	4.01	12.63	56260	4450	2	100+	X			SJ
9047	Sept. 30	28	4.01	4.01	4.01	12.63	53170	4210	5	100+	X			SJ

AVERAGE **3770** PSI AT **7** DAYS AVERAGE **4370** PSI AT **28** DAYS AVERAGE _____ PSI AT _____ DAYS

COMMENTS: **Field Cure Cylinders**

FRACTURE PATTERN TYPES					
Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
Note: Type 5 & 6 commonly occur with unbonded caps.					



FIELD / LAB TEST DATA - COMPRESSIVE STRENGTH ANALYSIS

☒ CONCRETE CYLINDER ☐ MASONRY GROUT CYLINDER ☐ FLOW FILL CYLINDER
☐ MASONRY GROUT CUBE ☐ CEMENT CUBE ☐ CONCRETE PRISM ☐ GROUT PRISM

Sample Date: **September 11, 2020** Technician: **J. Harshman**
Project Name: **Deep Ward Lake Outlet Repair** Project Set No. **5** Daily Set No. **1**
Project Number: **7122.74844.01** Submitted to Lab By: **J. Harshman** Date: **9/12/2020**
Client: **Surface Creek Ditch and Reservoir** Testing Requested By: **Dan Quigley**

Concrete Supplier: **Whitewater Materials Company** Truck#: **9** Ticket#: **001-415745**
Mix Identification#: **C18H** Batch size: **6** cubic yards Batch Time: **951a** Sample Time: **1227p**
Time in Mixer **2** hours **31** minutes Water Added Before Sampling: **0** gallons Ambient Air Temp. (°F): **58**
Maximum Size Aggregate: **3/4** inches Required Strength: **4000** psi at **28** days

Sample Location: **Outlet wing walls**
AREA/TYPE PLACEMENT: ☐ CURB/GUTTER ☐ FLOOR SLAB ☐ FOOTING ☐ WALL
☒ OTHER: **outlet works walls**

SAMPLING: (Fresh Concrete) ☒ ASTM C172 ☐ AASHTO T141 (Fresh Concrete) ☐ ASTM C1019 (Grout) Sampled From: <u>truck</u>	UNIT WEIGHT: ☒ ASTM C138 ☐ AASHTO T121 Test Results <u>142.4</u> lb/ft ³ (LBF/cubic foot)	CONCRETE TEMPERATURE: OTHER ☒ ASTM C1064 ☐ Test Results <u>60</u> degrees F.
AIR-CONTENT: ☐ ASTM C153 ☐ ASTM C173 ☒ ASTM C231 ☐ AASHTO T196 Test Results <u>5.8</u> % (percent)	SLUMP: ☒ ASTM C143 ☐ AASHTO T199 ☐ ASTM C1611 ☐ Test Results <u>4.75</u> in. (inches)	Number of specimens molded: <u>5</u> Approximate size of specimen mold: Cylindrical: ☒ 4x8" ☐ 6x12" ☐ CUBE PRISM Other ☐ ☐ ☐

LABORATORY TEST DATA

Specimens cured and tested in the laboratory in accordance with: ☒ Field cured and molded: ☐ Cylinders ☐ Cubes ☐ Drilled Cores ☐ Storage Tanks
☒ ASTM C31 ☐ AASHTO T23 ☒ ASTM C39 ☐ ASTM C109 ☐ ASTM C42 ☒ ASTM C511

SPECIMEN IDENTIFICATION	DATE TESTED	AGE IN DAYS	SPECIMEN MEASUREMENTS				COMPRESSIVE STRENGTH TEST DATA				CAP TYPE			TEST BY
	YEAR: 2020						Maximum Load		FRACTURE TYPE # (See sketch below)	% of spec. achieved	C1231	C617	Other	
			Diameter	Diameter	Average Diameter	Cross Sectional Area	LBF	PSI			NEO. PADS	GYP. CAP		
			1	2										
9052	Sept. 18	7	4.00	4.01	4.01	12.60	55330	4390	2	100+	X			SJ
9053	Oct. 9	28	3.99	4.00	4.00	12.54	75020	5980	3	100+	X			SJ
9054	Oct. 9	28	4.00	4.01	4.01	12.60	70720	5610	5	100+	X			SJ
9055	Oct. 9	28	4.00	4.00	4.00	12.57	74480	5930	5	100+	X			SJ
9056	H	H	Tossed											SJ

AVERAGE **5840** PSI AT **28** DAYS AVERAGE _____ PSI AT _____ DAYS AVERAGE _____ PSI AT _____ DAYS

COMMENTS:

FRACTURE PATTERN TYPES					
Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
Note: Type 5 & 6 commonly occur with unbonded caps.					



FIELD / LAB TEST DATA - COMPRESSIVE STRENGTH ANALYSIS

☒ CONCRETE CYLINDER ☐ MASONRY GROUT CYLINDER ☐ FLOW FILL CYLINDER
☐ MASONRY GROUT CUBE ☐ CEMENT CUBE ☐ CONCRETE PRISM ☐ GROUT PRISM

Sample Date: **September 11, 2020** Technician: **J. Harshman**
Project Name: **Deep Ward Lake Outlet Repair** Project Set No. **5a** Daily Set No. **2**
Project Number: **7122.74844.01** Submitted to Lab By: **J. Harshman** Date: **9/12/2020**
Client: **Surface Creek Ditch and Reservoir** Testing Requested By: **Dan Quigley**

Concrete Supplier: **Whitewater Materials Company** Truck#: **9** Ticket#: **001-415745**
Mix Identification#: **C18H** Batch size: **6** cubic yards Batch Time: **951a** Sample Time: **1227p**
Time in Mixer: **2** hours **31** minutes Water Added Before Sampling: **0** gallons Ambient Air Temp. (°F): **58**
Maximum Size Aggregate: **3/4** inches Required Strength: **4000** psi at **28** days

Sample Location: **Outlet wing walls**
AREA/TYPE PLACEMENT: ☐ CURB/GUTTER ☐ FLOOR SLAB ☐ FOOTING ☐ WALL
☒ OTHER: **outlet works walls**

SAMPLING: (Fresh Concrete) ☒ ASTM C172 (Fresh Concrete) ☐ AASHTO T141 ☐ ASTM C1019 (Grout) Sampled From: <u>truck</u>	UNIT WEIGHT: ☒ ASTM C138 ☐ AASHTO T121 Test Results <u>142.4</u> lb/ft³ (LBF/cubic foot)	CONCRETE TEMPERATURE: OTHER ☒ ASTM C1064 ☐ Test Results <u>60</u> degrees F.
AIR-CONTENT: ☐ ASTM C153 ☐ ASTM C173 ☒ ASTM C231 ☐ AASHTO T196 Test Results <u>5.8</u> % (percent)	SLUMP: ☒ ASTM C143 ☐ AASHTO T199 ☐ ASTM C1611 ☐ Test Results <u>4.75</u> in. (inches)	Number of specimens molded: <u>5</u> Approximate size of specimen mold: Cylindrical: ☒ 4x8" ☐ 6x12" ☐ CUBE PRISM Other

LABORATORY TEST DATA

Specimens cured and tested in the laboratory in accordance with: Field cured and molded: Cylinders Cubes Drilled Cores Storage Tanks
☒ ASTM C31 ☐ AASHTO T23 ☒ ASTM C39 ☐ ASTM C109 ☐ ASTM C42 ☒ ASTM C511

SPECIMEN IDENTIFICATION	DATE TESTED	AGE IN DAYS	SPECIMEN MEASUREMENTS				COMPRESSIVE STRENGTH TEST DATA				CAP TYPE			TEST BY
	YEAR: 2020						Maximum Load		FRACTURE TYPE # (See sketch below)	% of spec. achieved	C1231	C617	Other	
			Diameter	Diameter	Average Diameter	Cross Sectional Area	LBF	PSI			NEO. PADS	GYP. CAP		
			1	2										
9076	Sept. 18	7	4.01	4.01	4.01	12.63	54500	4320	2	100+	X			JLH
9077	Oct. 9	28	4.00	4.00	4.00	12.57	68750	5470	2	100+	X			SJ
9078	Oct. 9	28	4.01	3.99	4.00	12.57	68070	5420	2	100+	X			SJ
9079	Oct. 9	28	4.01	4.00	4.01	12.60	67820	5380	2	100+	X			SJ
9080	H	H	Tossed											SJ

AVERAGE **5420** PSI AT **28** DAYS AVERAGE PSI AT DAYS AVERAGE PSI AT DAYS

COMMENTS: **Field Cure Cylinders**

FRACTURE PATTERN TYPES					
Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
Note: Type 5 & 6 commonly occur with unbonded caps.					



FIELD / LAB TEST DATA - COMPRESSIVE STRENGTH ANALYSIS

☒ CONCRETE CYLINDER ☐ MASONRY GROUT CYLINDER ☐ FLOW FILL CYLINDER
☐ MASONRY GROUT CUBE ☐ CEMENT CUBE ☐ CONCRETE PRISM ☐ GROUT PRISM

Sample Date: **September 18, 2020** Technician: **J. Harshman**
Project Name: **Deep Ward Lake Outlet Repair** Project Set No. **6** Daily Set No. **1**
Project Number: **7122.74844.01** Submitted to Lab By: **J. Harshman** Date: **9/21/2020**
Client: **Surface Creek Ditch and Reservoir** Testing Requested By: **Dan Quigley**

Concrete Supplier: **Whitewater Materials Company** Truck#: **18** Ticket#: **001-416120**
Mix Identification#: Batch size: **7.5** cubic yards Batch Time: **845a** Sample Time: **1110a**
Time in Mixer **2** hours **16** minutes Water Added Before Sampling: **7** gallons Ambient Air Temp. (°F.): **58**
Maximum Size Aggregate: **3/4** inches Required Strength: **4000** psi at **28** days

Sample Location: **Inlet Structure**
AREA/TYPE PLACEMENT: ☐ CURB/GUTTER ☐ FLOOR SLAB ☐ FOOTING ☐ WALL
☐ OTHER:

SAMPLING: (Fresh Concrete) (Fresh Concrete) ☒ ASTM C172 ☐ AASHTO T141 ☐ ASTM C1019 (Grout) Sampled From: truck conveyor belt	UNIT WEIGHT: ☒ ASTM C138 ☐ AASHTO T121 Test Results 142.2 lb/ft³ (LBF/cubic foot)	CONCRETE TEMPERATURE: OTHER ☒ ASTM C1064 ☐ Test Results 66 degrees F.
AIR-CONTENT: ☐ ASTM C153 ☐ ASTM C173 ☒ ASTM C231 ☐ AASHTO T196 Test Results 6.0 % (percent)	SLUMP: ☒ ASTM C143 ☐ AASHTO T199 ☐ ASTM C1611 ☐ Test Results 2.75 in. (inches)	Number of specimens molded: 5 Approximate size of specimen mold: Cylindrical: ☒ 4x8" ☐ 6x12" ☐ CUBE PRISM Other

LABORATORY TEST DATA

Specimens cured and tested in the laboratory in accordance with: Field cured and molded: Cylinders Cubes Drilled Cores Storage Tanks
☒ ASTM C31 ☐ AASHTO T23 ☒ ASTM C39 ☐ ASTM C109 ☐ ASTM C42 ☒ ASTM C511

SPECIMEN IDENTIFICATION	DATE TESTED	AGE IN DAYS	SPECIMEN MEASUREMENTS				COMPRESSIVE STRENGTH TEST DATA				CAP TYPE			TEST BY
	YEAR: 2020						Maximum Load		FRACTURE TYPE # (See sketch below)	% of spec. achieved	C1231	C617	Other	
			Diameter	Diameter	Average Diameter	Cross Sectional Area	LBF	PSI			NEO. PADS	GYP. CAP		
			1	2										
9061	Sept. 28	10	4.00	4.00	4.00	12.57	63750	5070	2	100+	X			SJ
9062	Oct. 19	31	4.00	4.01	4.01	12.60	70230	5570	5	100+	X			SJ
9063	Oct. 19	31	4.01	4.01	4.01	12.63	72710	5760	2	100+	X			SJ
9064	Oct. 19	31	4.01	4.01	4.01	12.63	76010	6020	2	100+	X			SJ
9065	Oct. 19	H	Tossed											SJ

AVERAGE **5780** PSI AT **28** DAYS AVERAGE PSI AT DAYS AVERAGE PSI AT DAYS

COMMENTS:

FRACTURE PATTERN TYPES

Type 1

Type 2

Type 3

Type 4

Type 5

Type 6

Note: Type 5 & 6 commonly occur with unbonded caps.



FIELD / LAB TEST DATA - COMPRESSIVE STRENGTH ANALYSIS

☒ CONCRETE CYLINDER ☐ MASONRY GROUT CYLINDER ☐ FLOW FILL CYLINDER
☐ MASONRY GROUT CUBE ☐ CEMENT CUBE ☐ CONCRETE PRISM ☐ GROUT PRISM

Sample Date: **September 18, 2020** Technician: **J. Harshman**
Project Name: **Deep Ward Lake Outlet Repair** Project Set No. **7** Daily Set No. **2**
Project Number: **7122.74844.01** Submitted to Lab By: **J. Harshman** Date: **9/21/2020**
Client: **Surface Creek Ditch and Reservoir** Testing Requested By: **Dan Quigley**

Concrete Supplier: **Whitewater Materials Company** Truck#: **18** Ticket#: **001-416120**
Mix Identification#: Batch size: **7.5** cubic yards Batch Time: **845a** Sample Time: **1110a**
Time in Mixer **2** hours **16** minutes Water Added Before Sampling: **7** gallons Ambient Air Temp. (°F.): **58**
Maximum Size Aggregate: **3/4** inches Required Strength: **4000** psi at **28** days

Sample Location: **Inlet Structure**
AREA/TYPE PLACEMENT: ☐ CURB/GUTTER ☐ FLOOR SLAB ☐ FOOTING ☐ WALL
☐ OTHER:

SAMPLING: (Fresh Concrete) (Fresh Concrete) ☒ ASTM C172 ☐ AASHTO T141 ☐ ASTM C1019 (Grout) Sampled From: truck conveyor belt	UNIT WEIGHT: ☒ ASTM C138 ☐ AASHTO T121 Test Results 142.2 lb/ft³ (LBF/cubic foot)	CONCRETE TEMPERATURE: OTHER ☒ ASTM C1064 ☐ Test Results 66 degrees F.
AIR-CONTENT: ☐ ASTM C153 ☐ ASTM C173 ☒ ASTM C231 ☐ AASHTO T196 Test Results 6.0 % (percent)	SLUMP: ☒ ASTM C143 ☐ AASHTO T199 ☐ ASTM C1611 ☐ Test Results 2.75 in. (inches)	Number of specimens molded: 5 Approximate size of specimen mold: Cylindrical: ☒ 4x8" ☐ 6x12" ☐ CUBE PRISM Other

LABORATORY TEST DATA

Specimens cured and tested in the laboratory in accordance with: Field cured and molded: Cylinders Cubes Drilled Cores Storage Tanks
☒ ASTM C31 ☐ AASHTO T23 ☒ ASTM C39 ☐ ASTM C109 ☐ ASTM C42 ☒ ASTM C511

SPECIMEN IDENTIFICATION	DATE TESTED	AGE IN DAYS	SPECIMEN MEASUREMENTS				COMPRESSIVE STRENGTH TEST DATA				CAP TYPE			TEST BY
	YEAR: 2020						Maximum Load		FRACTURE TYPE # (See sketch below)	% of spec. achieved	C1231	C617	Other	
			Diameter	Diameter	Average Diameter	Cross Sectional Area	LBF	PSI			NEO. PADS	GYP. CAP		
			1	2										
9066	Sept. 28	10	4.01	4.00	4.01	12.60	61880	4910	2	100+	X			SJ
9067	Oct. 19	31	4.00	4.01	4.01	12.60	69370	5510	2	100+	X			SJ
9068	Oct. 19	31	4.01	4.01	4.01	12.63	63550	5030	2	100+	X			SJ
9069	Oct. 19	31	4.00	4.00	4.00	12.57	64790	5160	2	100+	X			SJ
9070	H	H												SJ

AVERAGE **5230** PSI AT **28** DAYS AVERAGE PSI AT DAYS AVERAGE PSI AT DAYS

COMMENTS: **Field Cure Cylinders**

FRACTURE PATTERN TYPES					
Type 1	Type 2	Type 3	Type 4	Type 5	Type 6

Note: Type 5 & 6 commonly occur with unbonded caps.

APPENDIX D

DOWL FIELD OBSERVATION REPORTS



222 South Park Avenue
Montrose, Colorado 81401
970-249-6828

FIELD OBSERVATION REPORT

DATE 08/17/20

	S	M	T	W	TH	F	S
DAY			X				

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. _____

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X			
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND	X			1	
	Dry	Moderate	Humid		
HUMIDITY	X				

CONSTRUCTION ACTIVITIES:

On-site at 8:00am. Took one density in embankment fill at 12". Left site at 8:38am.

Returned to site at 10:10am. Observed HB QC tests. Both passed moisture and density. Left site at 10:40am.

Returned to site again at 2:30pm. Took two moisture density tests at bottom of outlet. Pipe works concrete encased.

Nuclear Density indicated 9.

Page 1 of 1

BY: Jeremy Harshman

TITLE: Materials Testing Technician

Number of site visits today: _____

ARRIVAL TIME	800a	DEPARTURE TIME	830a	TRAVEL	MILEAGE
	1010a		1040a		
	230p		300p		

7122.74844.01 Deep Ward Lake Field Data .xlsx FOR8.17.20jrh#1



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222 South Park Avenue
Montrose, Colorado 81401
970-249-6828

FIELD OBSERVATION REPORT

DATE 08/24/20

	S	M	T	W	TH	F	S
DAY			X				

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. _____

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X			
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND	X			2	
	Dry	Moderate	Humid		
HUMIDITY	X				

CONSTRUCTION ACTIVITIES:

On-site at 12:45pm for observation of placement of 180N Mirafi Geo Fabric for inlet drain gravel.

Page 1 of 1

BY: Jeremy Harshman

TITLE: Materials Testing Technician

Number of site visits today: _____

ARRIVAL TIME 1245p DEPARTURE TIME 145p TRAVEL _____ MILEAGE _____



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222 South Park Avenue
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FIELD OBSERVATION REPORT

DATE 08/28/20

	S	M	T	W	TH	F	S
DAY						X	

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. _____

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER			X		
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND	X			3	
	Dry	Moderate	Humid		
HUMIDITY	X				

CONSTRUCTION ACTIVITIES:

On-site at 10:45am, as scheduled, to sample and test fresh concrete. Dan Quigley on-site to observe pour and final rebar inspection.

Took sample from end of conveyor belt at point of placement. Tested slump, unit weight, air content, concrete temperature and made two sets of five cylinders (one set for field cures).

Concrete materials tested indicated conformance to project specifications. Compressive strength conformance is pending the curing schedule.

Concrete placed in sections at STA 0+40 to 0+65.

Page 1 of 1

BY: Jeremy Harshman

TITLE: Materials Testing Technician

Number of site visits today: _____

ARRIVAL TIME 1045a

DEPARTURE TIME 1245p

TRAVEL 1

MILEAGE _____



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222 South Park Avenue
Montrose, Colorado 81401
970-249-6828

FIELD OBSERVATION REPORT

DATE 09/02/20

	S	M	T	W	TH	F	S
DAY				X			

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. _____

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X			
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND	X			4	
	Dry	Moderate	Humid		
HUMIDITY	X				

CONSTRUCTION ACTIVITIES:

On-site at 10:45am, as scheduled, to observe concrete placement for outlet works.

Contractor ordered 30 cubic yards of Class D placed at STA 0+20 to 0+40, STA 0+65 to 0+90 and STA 115 to 140.

After addition of 3 gallons water, I sampled and tested first batch on site. Concrete materials tested indicated conformance to project specifications.

Observed placement of all four trucks batched.

Contractor added water to each truck:

second truck +10 gallons - visual slump ~3"

third truck +14 gallons - visual slump ~2"

fourth truck +13 gallons - visual slump ~3"

Page 1 of 1

BY: Jeremy Harshman

TITLE: Materials Testing Technician

Number of site visits today: _____

ARRIVAL TIME 1045a

DEPARTURE TIME 130p

TRAVEL 1

MILEAGE _____



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222 South Park Avenue
Montrose, Colorado 81401
970-249-6828

FIELD OBSERVATION REPORT

DATE 09/11/20

S	M	T	W	TH	F	S
					X	

DAY

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. _____

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER					
	To 32	32-50	50-70	70-85	85 up
TEMP					
	Still	Moderate	High	Report No.	
WIND				5	
	Dry	Moderate	Humid		
HUMIDITY					

CONSTRUCTION ACTIVITIES:

On-site to sample and test concrete placed for outlet wing walls.

Sampled and tested concrete for slump, unit weight, air content, concrete temperature and made two sets of five cylinders (one set for Field Cures) for compressive strength testing.

Page 1 of 1

BY: Jeremy Harshman

TITLE: Materials Testing Technician

Number of site visits today: _____

ARRIVAL TIME 1135a DEPARTURE TIME 110p TRAVEL 3.5 MILEAGE _____



222 South Park Avenue
Montrose, Colorado 81401
970-249-6828

FIELD OBSERVATION REPORT

DATE 09/18/20

	S	M	T	W	TH	F	S
DAY						X	

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. Wayne Boulderston

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER			PC		
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND	X			6	
	Dry	Moderate	Humid		
HUMIDITY	X				

CONSTRUCTION ACTIVITIES:

On-site at 10:35am to sample and test concrete placed for inlet structure.

Tested first batch on-site for slump, unit weight, air content, concrete temperature and made two sets of five cylinders (one set for Field Cures) for compressive strength testing.

Also tested moisture density on embankment fill. One on each side of outlet works pipe concrete encasement. Both tests indicated conformance to project specifications.

Page 1 of 1

BY: Jeremy Harshman

TITLE: Materials Testing Technician

Number of site visits today: _____

ARRIVAL TIME 1035a

DEPARTURE TIME 1240p

TRAVEL _____

MILEAGE _____



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222 South Park Avenue
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970-249-6828

FIELD OBSERVATION REPORT

DATE 09/23/20

	S	M	T	W	TH	F	S
DAY				X			

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. Wayne Boulderston

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X			
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND	X			7	
	Dry	Moderate	Humid		
HUMIDITY	X				

CONSTRUCTION ACTIVITIES:

On-site at 8:00am.

Observed fill placement around inlet structure. Contractor placing ~ 8" lifts and compacting with walk behind sheepsfoot and jumping jack.

Page 1 of 1

BY: Jeremy Harshman

TITLE: Materials Testing Technician

Number of site visits today: _____

ARRIVAL TIME _____ DEPARTURE TIME _____ TRAVEL _____ MILEAGE _____



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FIELD OBSERVATION REPORT

DATE 09/24/20

	S	M	T	W	TH	F	S
DAY					X		

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. Wayne Boulderston

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X			
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND	X			8	
	Dry	Moderate	Humid		
HUMIDITY	X				

CONSTRUCTION ACTIVITIES:

Took one density test in compacted embankment.

Also observed placement of sand diaphragm placed from 10,100' to 10,105'.

Page 1 of 1

BY: Jeremy Harshman

TITLE: Materials Testing Technician

Number of site visits today: _____

ARRIVAL TIME _____ DEPARTURE TIME _____ TRAVEL _____ MILEAGE _____



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FIELD OBSERVATION REPORT

DATE 09/29/20

	S	M	T	W	TH	F	S
DAY			X				

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. Wayne Boulderston

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X			
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND	X			9	
	Dry	Moderate	Humid		
HUMIDITY	X				

CONSTRUCTION ACTIVITIES:

On-site at 9:30am.

Tested moisture density. Roller down at 12:00pm due to bolts holding sheepsfoot on are broken.

Page 1 of 1

BY: Jeramy Harshman

TITLE: Materials Testing Technician

Number of site visits today: _____

ARRIVAL TIME _____ DEPARTURE TIME _____ TRAVEL _____ MILEAGE _____



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FIELD OBSERVATION REPORT

DATE 09/30/20

	S	M	T	W	TH	F	S
DAY				X			

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. Wayne Boulderston

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X			
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND	X			10	
	Dry	Moderate	Humid		
HUMIDITY	X				

CONSTRUCTION ACTIVITIES:

Roller fixed. Previous lift was rerolled and moisture density tests passed.

Page 1 of 1

BY: Jeremy Harshman

TITLE: Materials Testing Technician

Number of site visits today: _____

ARRIVAL TIME _____ DEPARTURE TIME _____ TRAVEL _____ MILEAGE _____



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FIELD OBSERVATION REPORT

DATE 10/01/20

S	M	T	W	TH	F	S
				X		

DAY

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. Wayne Boulderston

WEATHER

TEMP

WIND

HUMIDITY

Bright Sun	Clear	Overcast	Rain	Snow
	X			
To 32	32-50	50-70	70-85	85 up
		X		
Still	Moderate	High	Report No.	
X			11	
Dry	Moderate	Humid		
X				

CONSTRUCTION ACTIVITIES:

On-site for observation of installed final 4.5' of sand diaphragm.

Previous lift of sand uncovered and cleared to ~3" below Mirafi Fabric cover. Sand is clean and ready for added filter sand.

Observed placement of sand/watering and compaction with 2 passes of v. plate.

Contractor will complete final lift on Friday.

Page 1 of 1

BY: Jeramy Harshman

TITLE: Materials Testing Technician

Number of site visits today: _____

ARRIVAL TIME 800a

DEPARTURE TIME 500p

TRAVEL _____

MILEAGE _____



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FIELD OBSERVATION REPORT

DATE 10/05/20

	S	M	T	W	TH	F	S
DAY		X					

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. Wayne Boulderston

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X			
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND	X			12	
	Dry	Moderate	Humid		
HUMIDITY	X				

CONSTRUCTION ACTIVITIES:

No fill placement today. Dozer operator not on-site. Contractor is screening native soil and stockpiling.

Page 1 of 1

BY: Jeramy Harshman

TITLE: Materials Testing Technician

Number of site visits today: _____

ARRIVAL TIME 100a DEPARTURE TIME 1020a TRAVEL 3 MILEAGE _____



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FIELD OBSERVATION REPORT

DATE 10/06/20

S	M	T	W	TH	F	S
		X				

DAY

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. Wayne Boulderston

WEATHER

TEMP

WIND

HUMIDITY

Bright Sun	Clear	Overcast	Rain	Snow
	X			
To 32	32-50	50-70	70-85	85 up
		X		
Still	Moderate	High	Report No.	
X			13	
Dry	Moderate	Humid		
X				

CONSTRUCTION ACTIVITIES:

On-site at 11:00am.

Observed contractor moisture condition slopes, placing and compacting fill and screening material.

Took density test when I arrived just after HB test.

All tests met 97% min.

Left site at 3:15pm.

Page 1 of 1

BY: Jeramy Harshman

TITLE: Materials Testing Technician

Number of site visits today: _____

ARRIVAL TIME _____ DEPARTURE TIME _____ TRAVEL _____ MILEAGE _____



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FIELD OBSERVATION REPORT

DATE 10/07/20

S	M	T	W	TH	F	S
			X			

DAY

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. Wayne Boulderston

WEATHER

TEMP

WIND

HUMIDITY

Bright Sun	Clear	Overcast	Rain	Snow
X	X			
To 32	32-50	50-70	70-85	85 up
			X	
Still	Moderate	High	Report No.	
X			14	
Dry	Moderate	Humid		
X				

CONSTRUCTION ACTIVITIES:

On-site at 12:45pm to observe and test dam embankment backfill for quality assurance. Observed Con-Sy place lifts at 10112' and 10113' Elevations. Equipment in use was, JD 350D Haul Truck, JD 350G Trackhoe, CAT D5 Dozer, CAT 950G Loader, water truck and Ingersoll-Rand Compactor with vibratory in use.

Took two density tests:

#1 at OW STA 0+90, Dam STA 2+90

#2 at OW STA , Dam STA

Both tests indicated specifications for moisture and density were being met.

Left site at .

Page 1 of 1

BY: Daniel Quigley

TITLE: Construction Engineer

Number of site visits today: 1

ARRIVAL TIME 1245p DEPARTURE TIME TRAVEL 1.25 MILEAGE



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FIELD OBSERVATION REPORT

DATE 10/12/20

S	M	T	W	TH	F	S
	X					

DAY

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. Wayne Boulderston

WEATHER

TEMP

WIND

HUMIDITY

Bright Sun	Clear	Overcast	Rain	Snow
X	X			
To 32	32-50	50-70	70-85	85 up
	X			
Still	Moderate	High	Report No.	
X			15	
Dry	Moderate	Humid		
X				

CONSTRUCTION ACTIVITIES:

Arrived on-site at 11:00am to perform Quality Assurance testing on embankment backfill. Con-Sy was completing the first lift of the day and processing additional embankment fill.

Took one compaction test on 10116' lift and results indicate material was meeting project specifications.

Sampled alternate source in reservoir basin for embankment material.

Left site at 12:00pm.

Page 1 of 1

BY: Daniel Quigley

TITLE: Construction Engineer

Number of site visits today: 1

ARRIVAL TIME 1100a DEPARTURE TIME 1200p TRAVEL 2 MILEAGE



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FIELD OBSERVATION REPORT

DATE 10/13/20

S	M	T	W	TH	F	S
		X				

DAY

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. Wayne Boulderston

WEATHER

TEMP

WIND

HUMIDITY

Bright Sun	Clear	Overcast	Rain	Snow
	X			
To 32	32-50	50-70	70-85	85 up
	X			
Still	Moderate	High	Report No.	
X			16	
Dry	Moderate	Humid		
X				

CONSTRUCTION ACTIVITIES:

Arrived on-site at 7:45am to perform Quality Assurance testing on embankment backfill. Took one density test which met project specifications.

Some frost present in top layer of fill placed and compacted yesterday approximalty 1" deep. Contractor waited untill frost had melted off prior to ripping and mixing top 2-3". Observations showed frost had melted and contractor began placing next lift at approximatly 10:00am

Dozer down at 10:30am, left site at 11:00am.

Page 1 of 1

BY: Jeramy Harshman

TITLE: Construction Engineer

Number of site visits today: 1

ARRIVAL TIME 745a DEPARTURE TIME 1100a TRAVEL 2 MILEAGE



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FIELD OBSERVATION REPORT

DATE 10/14/20

	S	M	T	W	TH	F	S
DAY				X			

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. Wayne Boulderston

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X			
	To 32	32-50	50-70	70-85	85 up
TEMP			X		
	Still	Moderate	High	Report No.	
WIND	X			17	
	Dry	Moderate	Humid		
HUMIDITY	X				

CONSTRUCTION ACTIVITIES:

Arrived on-site at 1:30pm to perform Quality Assurance testing on embankment backfill. Took one density test which met project specifications. Contractor processing fill, no more available to place today.

Left site at 1:45pm.

Page 1 of 1

BY: Jeremy Harshman

TITLE: Construction Engineer

Number of site visits today: 1

ARRIVAL TIME 130p DEPARTURE TIME 145p TRAVEL 2 MILEAGE



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FIELD OBSERVATION REPORT

DATE 10/15/20

S	M	T	W	TH	F	S
				X		

DAY

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. Wayne Boulderston

WEATHER

TEMP

WIND

HUMIDITY

Bright Sun	Clear	Overcast	Rain	Snow
	X			
To 32	32-50	50-70	70-85	85 up
	X			
Still	Moderate	High	Report No.	
X			18	
Dry	Moderate	Humid		
X				

CONSTRUCTION ACTIVITIES:

Arrived on-site at 12:00pm to perform Quality Assurance testing on embankment backfill. Took one density test which met project specifications. Contractor processing fill, no more available to place today.

Left site at 12:50pm.

Page 1 of 1

BY: Jeremy Harshman

TITLE: Construction Engineer

Number of site visits today: 1

ARRIVAL TIME 1200p DEPARTURE TIME 100p TRAVEL 2 MILEAGE



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FIELD OBSERVATION REPORT

DATE 10/21/20

	S	M	T	W	TH	F	S
DAY				X			

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. Wayne Boulderston

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X			
	To 32	32-50	50-70	70-85	85 up
TEMP		X			
	Still	Moderate	High	Report No.	
WIND	X			19	
	Dry	Moderate	Humid		
HUMIDITY	X				

CONSTRUCTION ACTIVITIES:

Arrived on-site at 3:30pm to perform Quality Assurance testing on embankment backfill. Took one density test which met project specifications. Contractor processing fill, no more available to place today.

Left site at 4:10pm.

Page 1 of 1

BY: Jeremy Harshman

TITLE: Construction Engineer

Number of site visits today: 1

ARRIVAL TIME 330p DEPARTURE TIME 410p TRAVEL 2 MILEAGE



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FIELD OBSERVATION REPORT

DATE 10/22/20

S	M	T	W	TH	F	S
				X		

DAY

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. Wayne Boulderston

WEATHER

TEMP

WIND

HUMIDITY

Bright Sun	Clear	Overcast	Rain	Snow
	X			
To 32	32-50	50-70	70-85	85 up
	X			
Still	Moderate	High	Report No.	
X			20	
Dry	Moderate	Humid		
X				

CONSTRUCTION ACTIVITIES:

Arrived on-site at 11:00am to perform Quality Assurance testing on embankment backfill. Took one density test which met project specifications. Contractors' power screen down, they hope to have fixed this afternoon, no more fill available to place today.

Left site at 12:00pm.

Page 1 of 1

BY: Jeremy Harshman

TITLE: Construction Engineer

Number of site visits today: 1

ARRIVAL TIME 1100a DEPARTURE TIME 1200p TRAVEL 2 MILEAGE



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FIELD OBSERVATION REPORT

DATE 10/22/20

	S	M	T	W	TH	F	S
DAY						X	

Project Name Deep Ward Lake Dam Seepage Repair

Project Number 7122.74844.01

Client Surface Creek Ditch and Reservoir Company

Client Rep. Keith Waibel

Contractor Con-Sy

Contractor Rep. Wayne Boulderston

	Bright Sun	Clear	Overcast	Rain	Snow
WEATHER		X			
	To 32	32-50	50-70	70-85	85 up
TEMP		X			
	Still	Moderate	High	Report No.	
WIND	X			21	
	Dry	Moderate	Humid		
HUMIDITY	X				

CONSTRUCTION ACTIVITIES:

Arrived on-site at 10:20am to perform Quality Assurance testing on embankment backfill. Took othree density tests to top of dam, elevation 11,128.5'. Final lift of topsoil material stockpiled at each end of breach will be placed after DOWL survey stakes dam crest with final elevations.

Left site at 3:15pm

Page 1 of 1

BY: Jeramy Harshman

TITLE: Construction Engineer

Number of site visits today: 1

ARRIVAL TIME 1020a DEPARTURE TIME 315p TRAVEL 2 MILEAGE