STATE OF COLORADO

Ebert - DNR, Jared <jared.ebert@state.co.us>

AFS M-2014-043 Hatchery Adequacy Response

Environment-Inc <Environment-inc@outdrs.net> Mon, Jan 7, 2019 at 3:52 PM
To: Jared Ebert <Jared.Ebert@state.co.us>
Cc: Ben Frei <BFrei@albertfreiandsons.com>

Jared,

Attached it the TR01 adequacy response for the Albert Frei and Sons, Hatchery Pit. I have mailed the originals for the file. I also asked for a 2 week extension in another e-mail so there is more review time.

Any questions give me a call.

Regards,

Steve

Steve O'Brian
Environment, Inc.
7985 Vance Dr., #205A
Arvada, CO 80003
(303) 423-7297
(303) 423-7599 Fax
Environment-inc@outdrs.net

2 attachments

M2014043-TR01-Adequacy response.pdf
6316K

M2014043-Groundwater-Plan2018.pdf
1766K

Environment, Inc.

LARRY E. O'BRIAN
FOUNDER

STEVAN L. O'BRIAN
PRESIDENT

7985 VANCE DRIVE, SUITE 205A
ARVADA, COLORADO 80003
303-423-7297
FAX 303-423-7599

January 7, 2019

Mr. Jared Ebert
Division of Reclamation, Mining & Safety
1313 Sherman St., Suite 215
Denver, CO 80215

Dear Jared;

RE: Albert Frei and Sons, Inc.
Hatchery Pit - M-2014-043
Technical Revision 01 adequacy response 01

On behalf of my client Albert Frei and Sons, Inc., I am responding to your adequacy review letter dated October 3, 2018. I have included your review points that need to be addressed in the order presented so the questions and answers will be in the same document for easy reference. Also included are copies of the revised Ground Water mitigation plan, the Design plans for the compacted liner and french drain and a copy of the most recent monitoring well data table.

Pit dewatering:

The proposed revision request to change the mining and reclamation plan for the Stage 2 area by allowing for dewatering of the site during the mining of this area and installing a clay liner as opposed to a slurry wall. Mining below the groundwater table in the Stage 2 area was not to occur until after collecting monthly water level data for one year and a quarter and prior to the installation of the slurry wall. Also, dewatering of the area was not contemplated in the original permitting process for the installation of the plant site and the first phase of mining in the Phase 2 area. According to the information in TR01, it appears dewatering has already occurred within the Phase 2 area and is occurring presently and appears to have already impacted the groundwater levels in the area. Upon a closer review of the CTL and Deere and Ault drilling data submitted with the original application, groundwater levels ranged from 5,071 feet on the west side near the plant site to 5,083 feet on the east side of the site. Based on the September 4, 2018 monitoring data the water levels on the east side (MW01, 02 and 03) were reported to be at an average level of 5,073.591 feet. This is a fairly significant drop. Please address the following:

1.) Based on the Division of Water Resources well permit data a domestic well (Permit No. 5350) is located just north of the plant site adjacent to the two monitoring wells owned by

Patrick Broda identified in the original permit application. This appears to be a fairly shallow well at 34 feet deep. This well was not identified in the original permitting process. How will this well be protected from impact?

This was a mistake on my part when I transferred the coordinates from the SEO records to my well map, I mixed them up with another well. Mr. Broda does not own the property where this well and the 2 monitoring wells are located any longer and the well can not be physically located. It appears from the SEO records that well permit # 252799 was located approximately 25 feet south of this older well. When I went out there to look for it, it appears from the location provided by the State Engineers records it is located in the middle of the access road for that parcel. We suspect it was removed when the area was mined.

2.) Page 2 of the technical revision indicates in August of 2018, the groundwater elevation in the three monitoring wells along the east and south side averaged 5,078.5 feet. This does not appear to be correct (See discussion above). Please provide the Division a date when dewatering began.

This is my mistake I used the averages for June 2016 not for August 2018 which should have been an average of 5074.21. Frei's records indicate that dewatering in Stage 2 started in mid March 2018.

3.) As the water levels of the area have now been altered due to dewatering, there now is only limited pre-mine water level data that can be used to evaluate off-site impacts. Given this, please update the groundwater monitoring and mitigation plan with the following:

a. Establish baseline high and low water levels for each of the monitoring wells. This can be done using the pre-dewatering water levels and the information provided in the CTL and Deere and Ault studies included in the original application. For each well please provide a justification for each high and low elevation.

The table in the revised Ground Water Monitoring and Mitigation Plan show the baseline elevations we propose using from this time forward.

b. Please re-evaluate the during mining and post mining water level impacts and provide a mitigation plan to address these impacts. The installation of a perimeter drain should address groundwater mounding and shadowing issues associated with the installation of the clay liner and the monitoring plan should help evaluate the effectiveness of the drain. However, adequacy issues regarding the clay liner and French drain will need to be addressed (see below).

The installation of the clay liner and the french drain in Stage 2 will regulate the ground water levels close to historic levels up on gradient areas. Please review the **Hatchery Pit Phase 2 Slope Liner** design prepared by Deere & Ault for additional information.

c. Update the trigger levels identified for mitigation. Given the already lowered groundwater levels in the Stage 2 area, the two foot trigger has already been hit. The trigger for mitigation measures needed as a result of groundwater drawdown will now be trigger by a complaint. There are several commercial, domestic and irrigation wells located outside of the 600 foot radius of the site but within about 800 feet of the operation that could potentially be impacted by dewatering.

The table in the revised Ground Water Monitoring and Mitigation Plan show the baseline elevations we propose using from this time forward. There are 6 well within 800 feet of the permit area on the up gradient side of the mine. They are along the east side from near the northeast corner to about two-thirds of the way along the south side. Five are listed as residential, 1 commercial and one general purpose. Five of the 6 wells vary from 276 to 700 feet deep and will not be affected by surface dewatering. The last is a residential well located 833 feet east of the mine and in the middle of the paved parking lot on the Mile High Flea Market east of I-76. It was drilled in 1959 and there are no records of it being moved or used since the Flea Market was built in 1986. This well was most likely abandoned but not reported as such.

Any wells located along the west and north sides will not be impacted by draw down or the shadowing once the liner is installed, because on the north another property owner filled the area immediately north of the Hatchery Pit. Along the west side is a developed Water Storage reservoir where the slurry wall liner parallels the west side of Bull Seep. Bull Seep acts as a recharge facility and has water in it year around. The shadowing along this side will be limited to just the area immediately adjacent to the Stage 1 slurry wall and Bull Seep. The ground water elevations in monitoring wells # 6 and #7 show no signs of shadowing at this time.

Clay liner and French Drain:

The top of the clay liner and the current design for the top of the slurry wall for Stage 2 is set at 5,072 feet. Based on the pre-mining water levels on the east side of the site being recorded at 5,083+/- feet, it does not appear the top elevation of the clay liner and the slurry wall will effectively block the groundwater flow to the site. Also, by placing a French drain at the top of the clay liner this could effectively dewater the groundwater levels to this elevation continually. Given these issues, please address the following:

4.) Please evaluate the effectiveness of the design of the clay liner and revise the design as necessary.

Attached is a copy of the **Hatchery Pit Phase 2 Slope Liner** design prepared by Deere & Ault. Their evaluation and design have a sloping liner so it closely matches the slope of the ground water table at the time the property was drilled in 2013. The high point is 5083.3, approximately 300 feet south of the northeast corner and slopes to 5077.3 on the northwest corner of Stage 2 and 5077.6 on the Southwest corner of Stage 2. This places the top of the slurry wall approximately 3.5 feet above the average ground water elevation. The bottom of the french drain pipe is installed at a maximum elevation of 5079.4 and slopes to 5073.2 on the northwest corner of Phase 2 and 5073.6 on the Southwest corner of Phase 2. The french drain will maintain the height of the groundwater table at 2013 elevations. The higher liner top will provide adequate height to prevent ground water from entering the filled area when reclamation is complete.

5.) Given the possible revision to the clay liner design, the location and elevation of the French drain may need to be updated, please evaluate. Please provide a design of the French drain, this should include:

a. Sizing information of the drain and a demonstration the size will be adequate.

Deere & Ault determined that a 12 inch pipe will be adequate to convey the ground water around the fill. Their plans show the typical french drain trench detail on plat page 13 of 13. Albert Frei and Sons, Inc. has decided to use 14 inch perforated pipe and 12 inch solid drain pipe as a factor of safety.

b. Please indicate how the drain will be maintained. Most French drains the Division has observed have standpipes at regular intervals along the drain to provide access for maintenance.

The plans call for installing 8 manholes along the french drain approximately every 300 feet that will provide access to the drain for inspection and clean out if necessary. Details are shown in the Deere & Ault design Plat, page 13 of 13 and the approximate locations are shown on pages 8 of 13.

c Please provide a profile for the pipe and demonstrate how it will positively drain.

This information is shown in the Deere & Ault report on Plat pages 8 of 13 thru 12 of 13. As designed the pipe will a 0.5% slope from the high point to the outlets.

Reclamation Cost Estimate

6.) Please provide an updated reclamation cost estimate for the proposed revisions to the mining and reclamation plan. This should account for pit dewatering, installation of the clay liner and French drain.

A revised Reclamation Cost Estimate is attached.

The current decision deadline for this application is January 23, 2019 and Albert Frei & Sons, Inc. would prefer to keep with this timetable if at all possible. If you have more questions or need more information please call me at (303) 423-7297.

Sincerely,

Steve

Stevan L. O'Brian
Environment, Inc.

cc Albert Frei & Sons, Inc. - Ben Frei
Jared Ebert - via e-mail
file

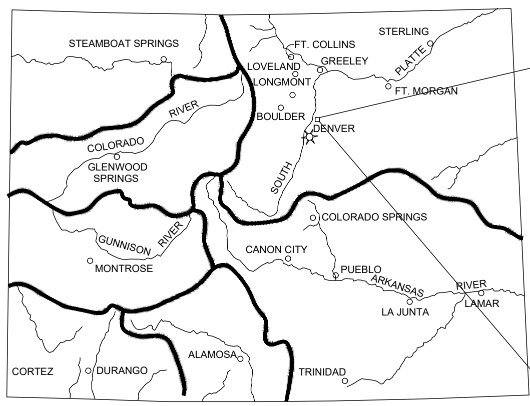
CONSTRUCTION PLANS FOR

HATCHERY PIT PHASE 2 SLOPE LINER

ADAMS, COLORADO

PREPARED FOR:

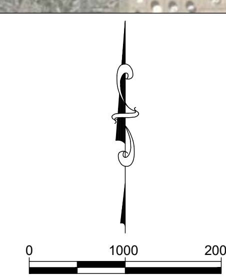
ALBERT FREI & SONS
P.O. BOX 700
HENDERSON, CO 80640



STATE OF COLORADO
PROJECT LOCATION MAP

NORTH

SCALE: NONE



SHEET INDEX:

NOTES:

DEERE AND AULT CONSULTANTS, INC. IS NOT A GUARANTOR OF THE PERFORMANCE OF THE WORK.

DEERE AND AULT CONSULTANTS, INC. IS NOT RESPONSIBLE FOR SAFETY, IN, ON, OR ABOUT THE PROJECT SITE, NOR FOR COMPLIANCE BY THE APPROPRIATE PARTY WITH ANY REGULATIONS RELATED THERETO.

DEERE AND AULT CONSULTANTS, INC. EXERCISES NO CONTROL OVER THE SAFETY OR ADEQUACY OF ANY EQUIPMENT, BUILDING COMPONENTS, FORMS, OR OTHER WORK AIDS USED IN OR ABOUT THE PROJECT, OR OVER THE SUPERINTENDING OF THE SAME.

WRITTEN SCALES ON PLAN ARE FOR FULL SIZED 22" x 34" PLANS AND DO NOT APPLY TO REDUCED PLAN SETS.

811 Know what's below. Call before you dig.

CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

DEERE & AULT CONSULTANTS, INC. ASSUMES NO RESPONSIBILITY FOR EXISTING UTILITY LOCATIONS (HORIZONTAL AND VERTICAL). THE EXISTING UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM THE BEST AVAILABLE INFORMATION. IT IS, HOWEVER, THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES.

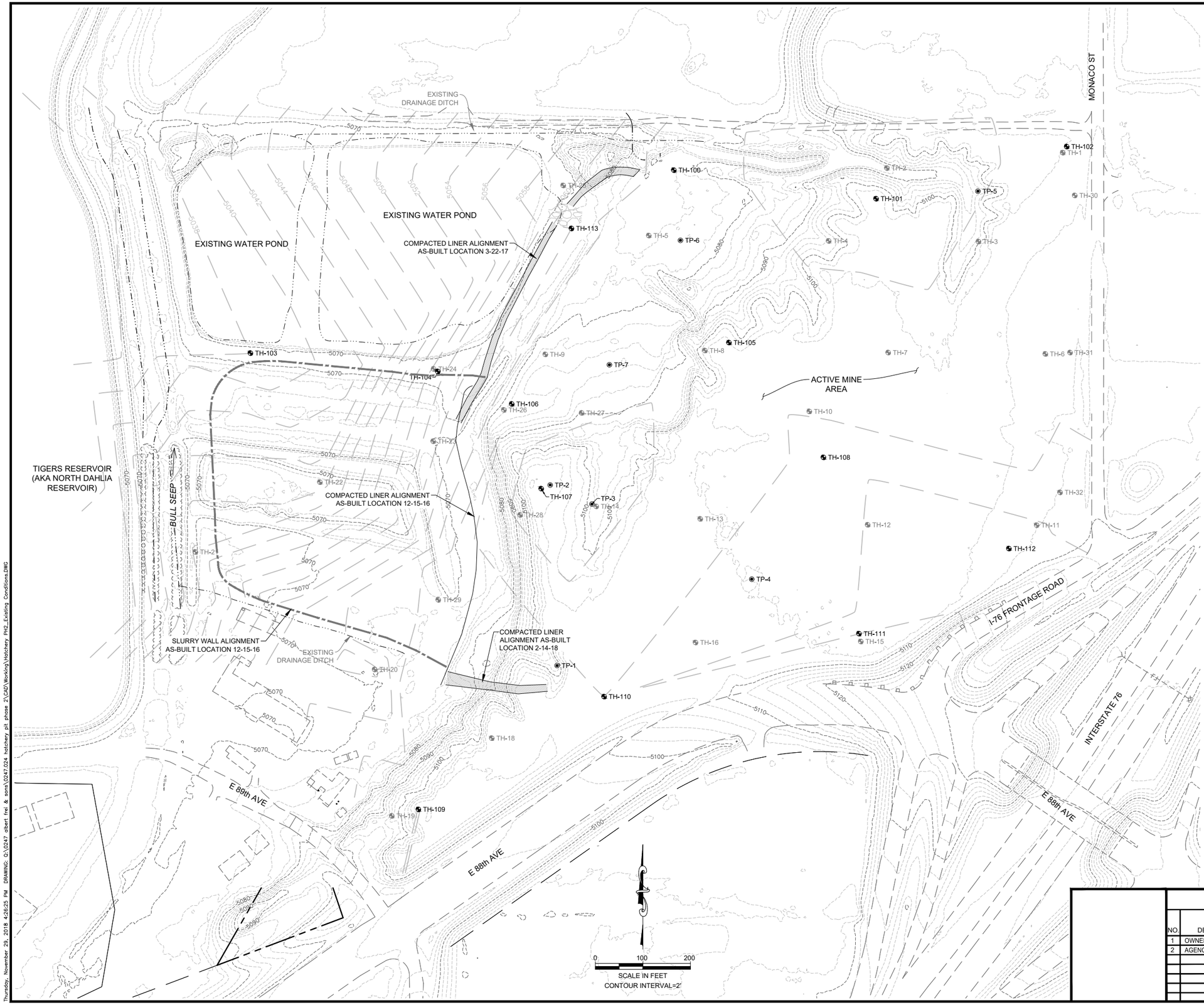
REVISIONS NO.	DESCRIPTION	DATE	BY
1	OWNER REVIEW	NOV 2018	CJH
2	AGENCY REVIEW	NOV 2018	CJH

HATCHERY PIT PHASE 2 SLOPE LINER

Cover Sheet & Vicinity Map

DEERE & AULT CONSULTANTS, INC.
600 S. AIRPORT RD., BLDG. A, SUITE 205
LONGMONT, CO 80503
TEL 303.651.1468 FAX 303.651.1469

DESIGNED BY: CJH	APPROVED BY: CJH	JOB NO.	SHEET:
DRAWN BY: ITR	DATE: NOV 2018	0247.024.00	1 of 13
CHECKED BY: CJH	SCALE: AS NOTED		



LEGEND

- EXISTING CONTOUR (2' INTERVALS)
- BEDROCK CONTOUR (2' INTERVALS)
- EXISTING PAVED ROAD
- EXISTING FENCE
- EXISTING GRAVEL ROAD
- PROPERTY BOUNDARY
- EXISTING POND AND WATER
- EXISTING OVERHEAD ELECTRIC
- TP-1 — TEST PIT LOCATION (DEERE & AULT JUNE 2013)
- TH-104 — BORING LOCATION (DEERE & AULT JUNE 2013)
- TH10 — BORING LOCATION (CTL THOMPSON DATE UNKNOWN)
- EXISTING STRUCTURE

SECTION CALLOUT:

A / - 6 - — SECTION LETTER / PAGE WHERE SECTION IS SHOWN

DETAIL CALLOUT:

1 / 11 — DETAIL NUMBER / PAGE WHERE DETAIL IS SHOWN

SURVEY NOTES:

1. EXISTING CONTOUR INFORMATION OBTAINED FROM OCTOBER 2013 FEMA LIDAR SURVEY DATA.
2. EXISTING SITE FEATURES AND PROPERTY LINES TAKEN FROM ALTA SURVEY.
3. LINER AS-BUILT LOCATIONS (3-22-17, 2-14-18) PER GILLIAN'S AS-BUILT SURVEY.

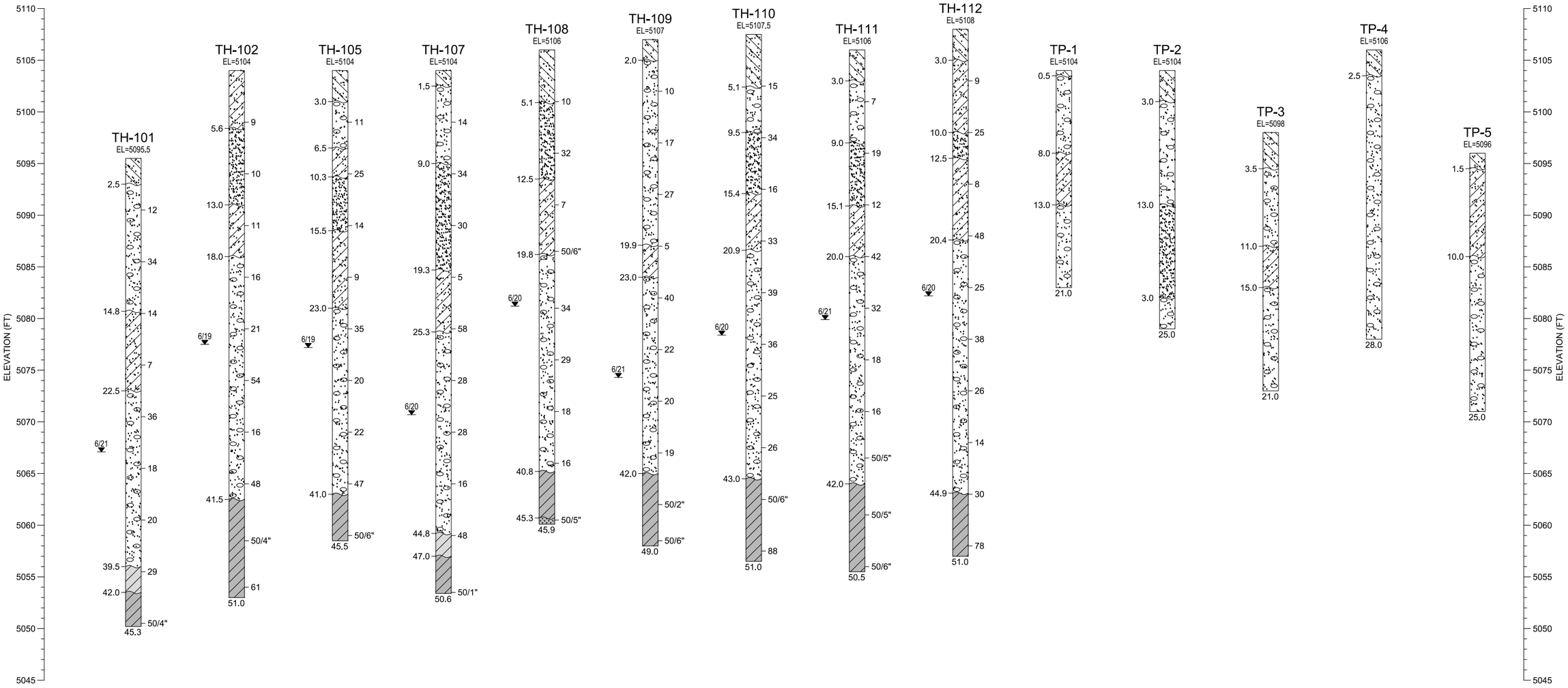
REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	OWNER REVIEW	NOV 2018	CJH
2	AGENCY REVIEW	NOV 2018	CJH

HATCHERY PIT PHASE 2 SLOPE LINER

Existing Conditions and Testhole Locations

DEERE & AULT CONSULTANTS, INC.
600 S. AIRPORT RD., BLDG. A, SUITE 205
LONGMONT, CO 80503
TEL 303.651.1468 FAX 303.651.1469

DESIGNED BY: CJH | APPROVED BY: CJH | JOB NO. 0247.024.00 | SHEET: 2 of 13
DRAWN BY: ITR | DATE: NOV 2018
CHECKED BY: CJH | SCALE: AS NOTED



LEGEND:

- SILTY SAND: VERY LOOSE TO LOOSE, SILTY, WELL GRADED, FINE TO COARSE GRAINED SAND, SCATTERED GRAVEL, DRY, LIGHT BROWN TO DARK BROWN, NON PLASTIC, LOCAL ROOTS PRESENT
- CLAYEY SAND: VERY LOOSE TO MEDIUM DENSE, SLIGHTLY CLAYEY TO CLAYEY, SILTY, SCATTERED SMALL GRAVEL, POORLY GRADED, FINE GRAINED, SLIGHTLY MOIST TO MOIST, YELLOW TAN TO BROWN TO DARK BROWN, LOCAL IRON STAINING, LOW TO LOCAL MODERATELY PLASTIC, MUD LENS
- SAND: LOOSE TO DENSE, WELL GRADED, CLEAN, FINE TO COARSE GRAINED, SCATTERED SMALL GRAVEL, DRY, TAN TO LIGHT BROWN
- SAND & GRAVEL: MEDUIM DENSE TO VERY DENSE, SANDY GRAVEL TO GRAVELLY SAND, LOCAL COBBLES, TRACE SILT AND CLAY, WELL GRADED, FINE TO COARSE GRAINED SAND, SMALL GRAVEL UP TO 10 INCH COBBLES, ROUNDED GRAVEL AND COBBLES, SLIGHTLY MOIST TO WET, TAN BROWN TO REDDISH TAN TO LIGHT BROWN
- WEATHERED CLAYSTONE , HARD (SOILS), VERY LOW STRENGTH BEDROCK, DRY TO MOIST, TANISH BROWN TO MOTTLED BROWN, LOCAL IRON STAINING, MIXTURE OF BEDROCK COLORS, MODERATELY PLASTIC, BLOCKY
- CLAYSTONE: VERY HARD TO HARD (SOILS), VERY LOW STRENGTH BEDROCK, DRY TO SLIGHTLY MOIST, GRAY TO DARK GRAY, LOW TO MODERATELY PLASTIC, BLOCKY, SLIGHTLY WEATHERED TO FRESH NEAR BEDROCK/SAND AND GRAVEL CONTACT
- SANDSTONE: VERY HARD (SOILS), VERY LOW TO LOW STRENGTH BEDROCK, CLAYEY TO VERY CLAYEY, DRY, GRAY WITH BLACK AND WHITE GRAINS, POORLY GRADED, FINE TO MEDIUM GRAINED SAND, MOSTLY BIOTITE AND QUARTZ MINERALS, NON TO LOW PLASTIC, FRESH

9.8 APPROXIMATE DEPTH OF GEOLOGIC CONTACT

6/4 WATER ENCOUNTERED DURING DRILLING AND DATE MEASURED

23 STANDARD SPLITSPOON BLOW COUNT. NUMBER ("N" VALUE) INDICATES THE NUMBER OF BLOWS OF A 140 LB. HAMMER FREE FALLING 30 INCHES REQUIRED TO DRIVE THE SAMPLER 1 FOOT OR THE INDICATED INTERVAL. "WT" INDICATES THE SAMPLER ADVANCED WITH RESTING WEIGHT OF THE HAMMER

29.9 DEPTH OF BORING (FT)

NOTES:

1. EXPLORATORY BORINGS WERE DRILLED BETWEEN 6-19-13 AND 6-21-13 USING A TRUCK-MOUNTED CME 55 DRILL RIG. BORINGS WERE DRILLED WITH 4.25-INCH I.D. HOLLOW STEM AUGERS.
2. EXPLORATORY TEST PITS WERE EXCAVATED ON 6-21-13 USING A CATERPILLAR TRACK HOE.
3. ALL EXPLORATORY BORING LOCATIONS WERE FOUND USING A HANDHELD GPS.
4. LINES BETWEEN MATERIALS REPRESENT APPROXIMATE BOUNDARIES BETWEEN TYPES AND TRANSITIONS MAY BE GRADUAL.
5. GROUNDWATER LEVELS WERE MEASURED AT THE TIME OF DRILLING. GROUNDWATER LEVELS MAY FLUCTUATE SEASONALLY AND DUE TO SITE MINING AND DEWATERING OPERATIONS.
6. ELEVATIONS WERE ESTIMATED FROM OCTOBER 2013 FEMA LIDAR SURVEY.

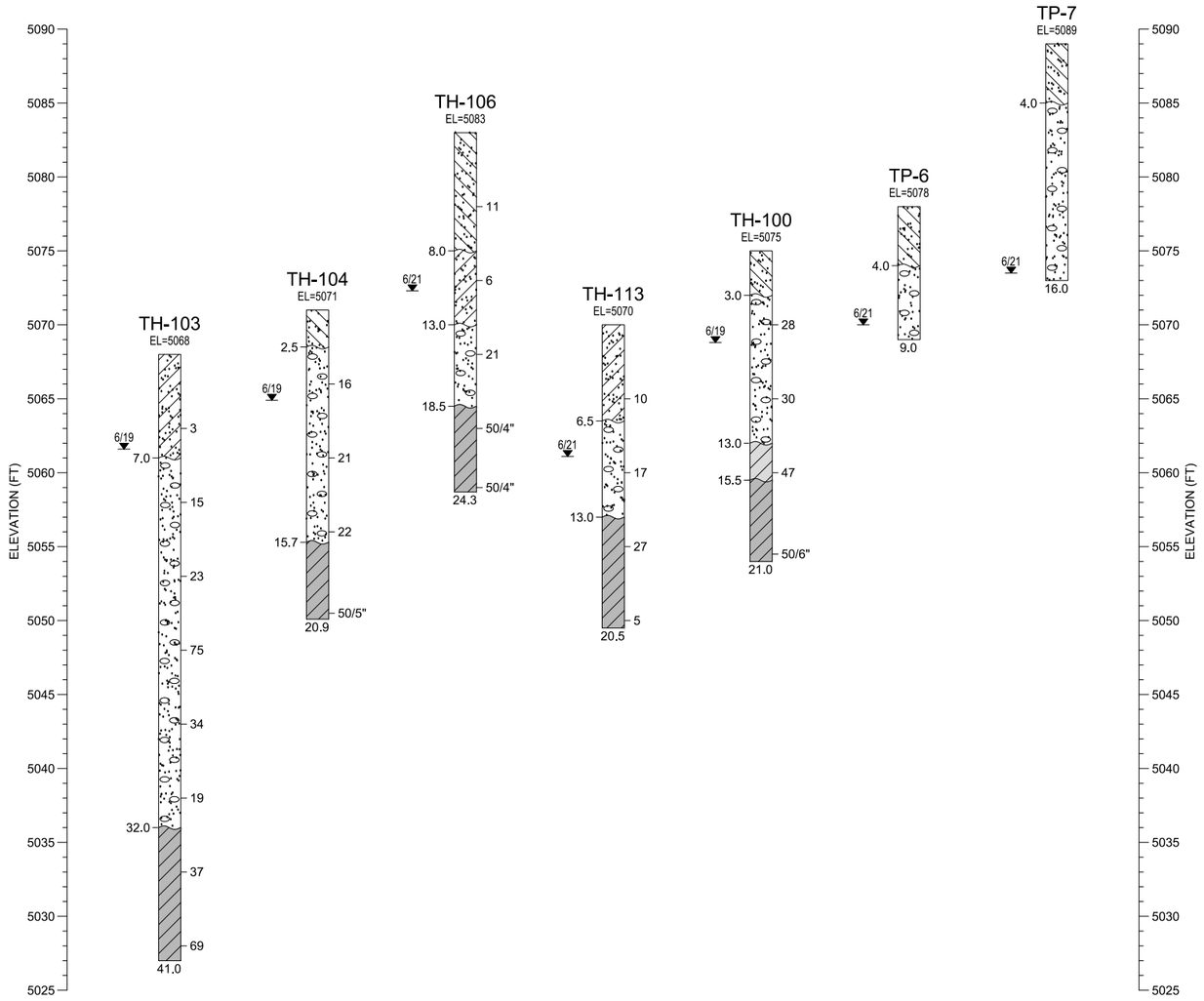
REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	OWNER REVIEW	NOV 2018	CJH
2	AGENCY REVIEW	NOV 2018	CJH

HATCHERY PIT PHASE 2 SLOPE LINER

Summary Logs and Legend

DEERE & AULT CONSULTANTS, INC.
600 S. AIRPORT RD., BLDG. A, SUITE 205
LONGMONT, CO 80503
TEL 303.651.1468 FAX 303.651.1469

DESIGNED BY: CJH | APPROVED BY: CJH | JOB NO. 0247.024.00 | SHEET: 3 of 13
DRAWN BY: ITR | DATE: NOV 2018
CHECKED BY: CJH | SCALE: AS NOTED



NOTES:

1. BORING LEGEND SHOWN ON SHEET 3.
2. EXPLORATORY BORINGS WERE DRILLED BETWEEN 6-19-13 AND 6-21-13 USING A TRUCK-MOUNTED CME 55 DRILL RIG. BORINGS WERE DRILLED WITH 4.25-INCH I.D. HOLLOW STEM AUGERS.
3. EXPLORATORY TEST PITS WERE EXCAVATED ON 6-21-13 USING A CATERPILLAR TRACK HOE.
4. ALL EXPLORATORY BORING LOCATIONS WERE FOUND USING A HANDHELD GPS.
5. LINES BETWEEN MATERIALS REPRESENT APPROXIMATE BOUNDARIES BETWEEN TYPES AND TRANSITIONS MAY BE GRADUAL.
6. GROUNDWATER LEVELS WERE MEASURED AT THE TIME OF DRILLING. GROUNDWATER LEVELS MAY FLUCTUATE SEASONALLY AND DUE TO SITE MINING AND DEWATERING OPERATIONS.
7. ELEVATIONS WERE ESTIMATED FROM OCTOBER 2013 FEMA LIDAR SURVEY.

REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	OWNER REVIEW	NOV 2018	CJH
2	AGENCY REVIEW	NOV 2018	CJH

HATCHERY PIT PHASE 2 SLOPE LINER

Summary Logs

DEERE & AULT CONSULTANTS, INC.
600 S. AIRPORT RD., BLDG. A, SUITE 205
LONGMONT, CO 80503
TEL 303.651.1468 FAX 303.651.1469

DESIGNED BY: CJH	APPROVED BY: CJH	JOB NO.	SHEET:
DRAWN BY: ITR	DATE: NOV 2018	0247.024.00	4 of 13
CHECKED BY: CJH	SCALE: AS NOTED		

EXISTING DRAINAGE DITCH

FIELD VERIFY CONNECTION TO EXISTING TRENCH LINER

MONACO ST

EXISTING WATER POND

EXISTING WATER POND

COMPACTED LINER ALIGNMENT AS-BUILT LOCATION 3-22-17

CUT OFF TRENCH

TIGERS RESERVOIR (AKA NORTH DAHLIA RESERVOIR)

BULL SEEP

COMPACTED LINER ALIGNMENT AS-BUILT LOCATION 12-15-16

CUT OFF TRENCH

SLURRY WALL ALIGNMENT AS-BUILT LOCATION 12-15-16

EXISTING DRAINAGE DITCH

COMPACTED LINER ALIGNMENT AS-BUILT LOCATION 2-14-18

CUT OFF TRENCH

I-76 FRONTAGE ROAD

INTERSTATE 76

FIELD VERIFY CONNECTION TO EXISTING TRENCH LINER

E 89th AVE

E 88th AVE

E 88th AVE

0 100 200

SCALE IN FEET
CONTOUR INTERVAL = 2'

LEGEND

- EXISTING CONTOUR (2' INTERVALS)
- PROPOSED CONTOUR
- EXISTING PAVED ROAD
- EXISTING FENCE
- EXISTING GRAVEL ROAD
- PROPERTY BOUNDARY
- EXISTING POND AND WATER
- EXISTING OVERHEAD ELECTRIC
- TP-1 TEST PIT LOCATION (DEERE & AULT JUNE 2013)
- TH-104 BORING LOCATION (DEERE & AULT JUNE 2013)
- TH10 BORING LOCATION (CTL THOMPSON DATE UNKNOWN)
- EXISTING STRUCTURE

SECTION CALLOUT:

SECTION LETTER
PAGE WHERE SECTION IS SHOWN

DETAIL CALLOUT:

DETAIL NUMBER
PAGE WHERE DETAIL IS SHOWN

SURVEY NOTES:

1. EXISTING CONTOUR INFORMATION OBTAINED FROM OCTOBER 2013 FEMA LIDAR SURVEY DATA.
2. EXISTING SITE FEATURES AND PROPERTY LINES TAKEN FROM ALTA SURVEY.

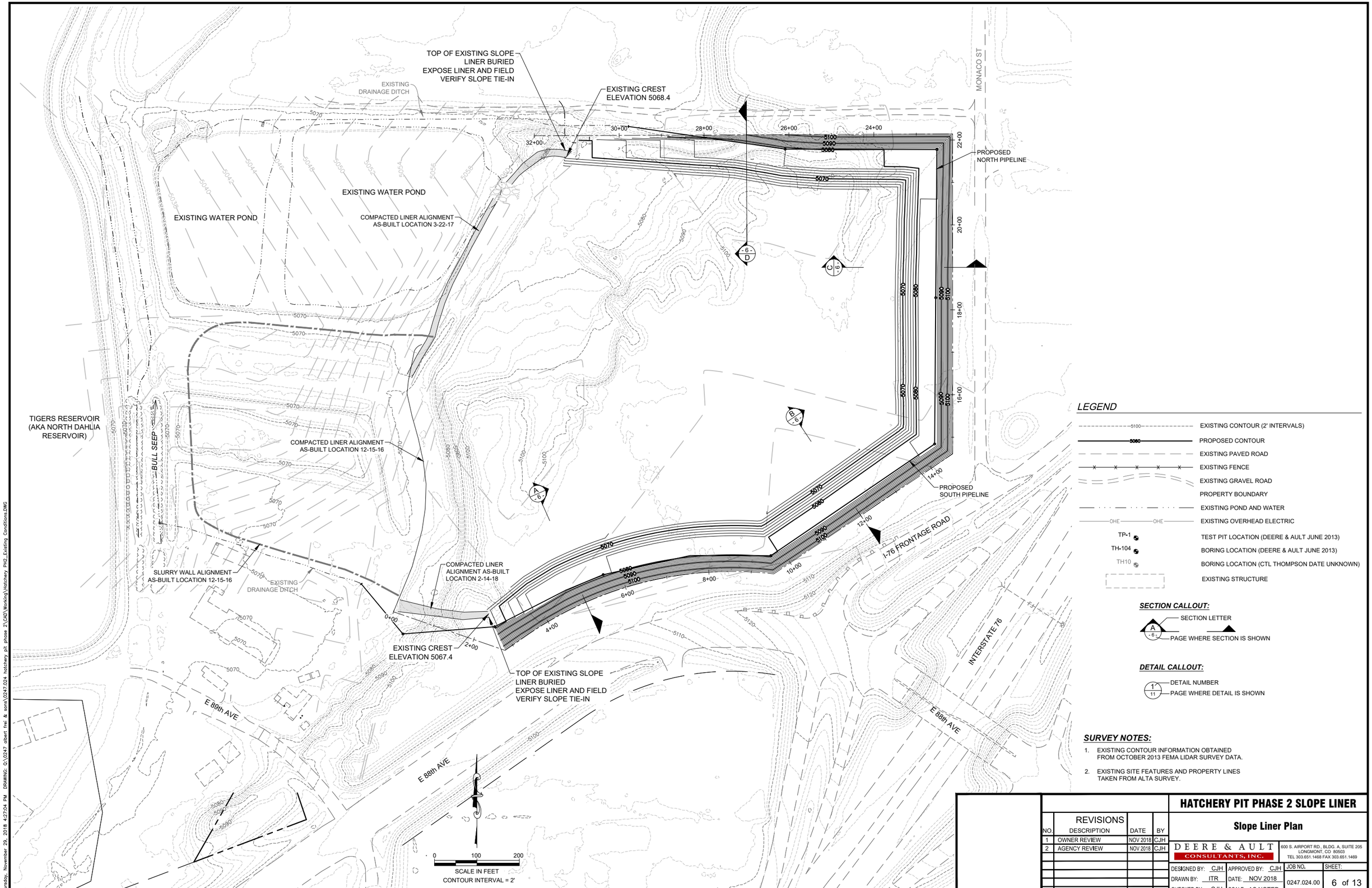
REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	OWNER REVIEW	NOV 2018	CJH
2	AGENCY REVIEW	NOV 2018	CJH

HATCHERY PIT PHASE 2 SLOPE LINER

Slope Liner Excavation Plan

DEERE & AULT CONSULTANTS, INC.
600 S. AIRPORT RD., BLDG. A, SUITE 205
LONGMONT, CO 80503
TEL 303.651.1468 FAX 303.651.1469

DESIGNED BY: CJH | APPROVED BY: CJH | JOB NO. 0247.024.00 | SHEET: 5 of 13
DRAWN BY: ITR | DATE: NOV 2018
CHECKED BY: CJH | SCALE: AS NOTED



LEGEND

- EXISTING CONTOUR (2' INTERVALS)
- PROPOSED CONTOUR
- EXISTING PAVED ROAD
- EXISTING FENCE
- EXISTING GRAVEL ROAD
- PROPERTY BOUNDARY
- EXISTING POND AND WATER
- EXISTING OVERHEAD ELECTRIC
- TP-1 TEST PIT LOCATION (DEERE & AULT JUNE 2013)
- TH-104 BORING LOCATION (DEERE & AULT JUNE 2013)
- TH10 BORING LOCATION (CTL THOMPSON DATE UNKNOWN)
- EXISTING STRUCTURE

SECTION CALLOUT:

SECTION LETTER
PAGE WHERE SECTION IS SHOWN

DETAIL CALLOUT:

DETAIL NUMBER
PAGE WHERE DETAIL IS SHOWN

SURVEY NOTES:

1. EXISTING CONTOUR INFORMATION OBTAINED FROM OCTOBER 2013 FEMA LIDAR SURVEY DATA.
2. EXISTING SITE FEATURES AND PROPERTY LINES TAKEN FROM ALTA SURVEY.

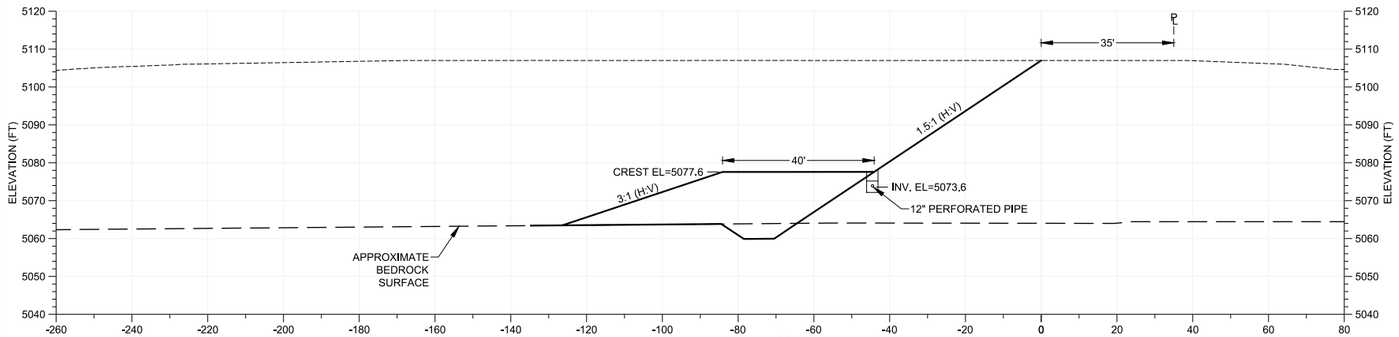
REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	OWNER REVIEW	NOV 2018	CJH
2	AGENCY REVIEW	NOV 2018	CJH

HATCHERY PIT PHASE 2 SLOPE LINER

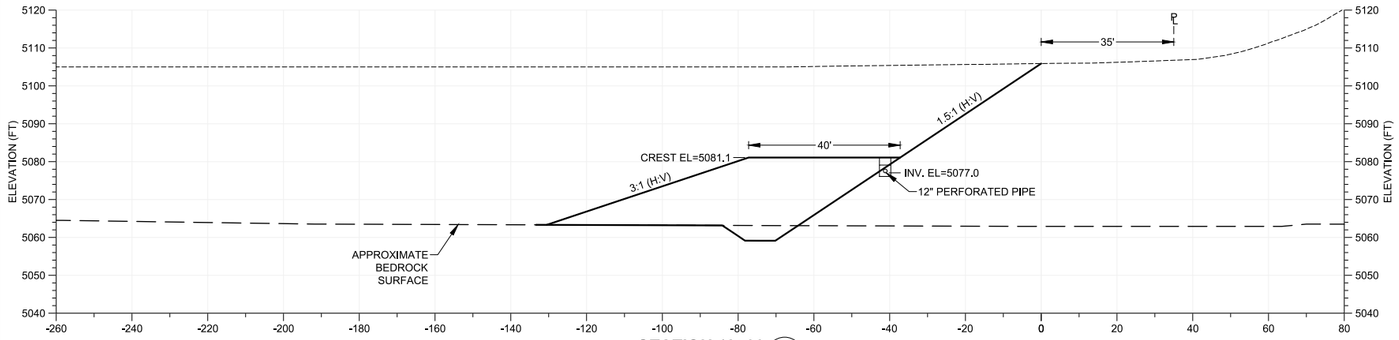
Slope Liner Plan

DEERE & AULT CONSULTANTS, INC.
600 S. AIRPORT RD., BLDG. A, SUITE 205
LONGMONT, CO 80503
TEL 303.651.1468 FAX 303.651.1469

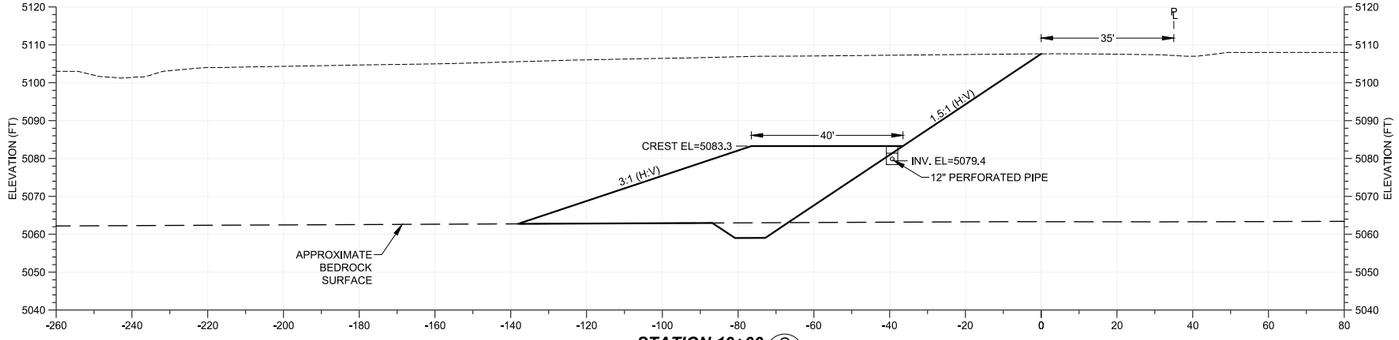
DESIGNED BY: CJH	APPROVED BY: CJH	JOB NO.	SHEET:
DRAWN BY: ITR	DATE: NOV 2018	0247.024.00	6 of 13
CHECKED BY: CJH	SCALE: AS NOTED		



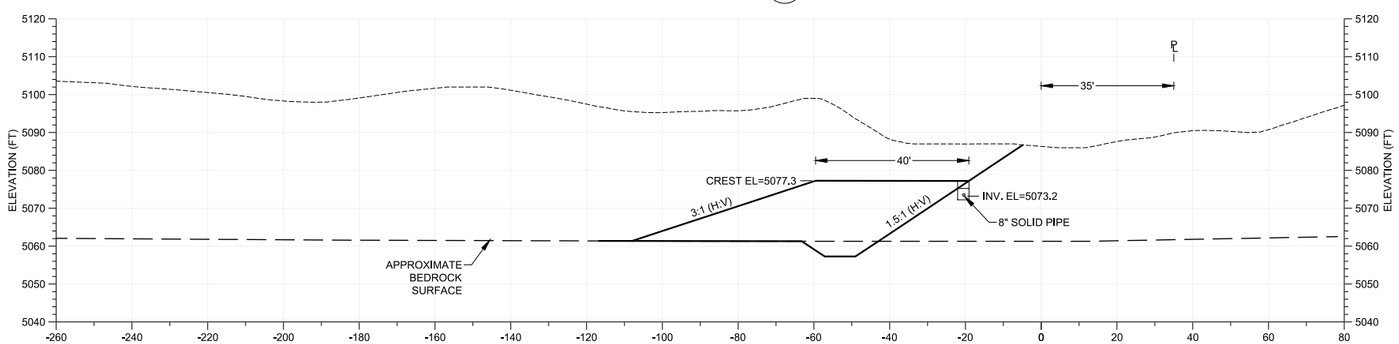
STATION 5+00 (A)



STATION 12+00 (B)

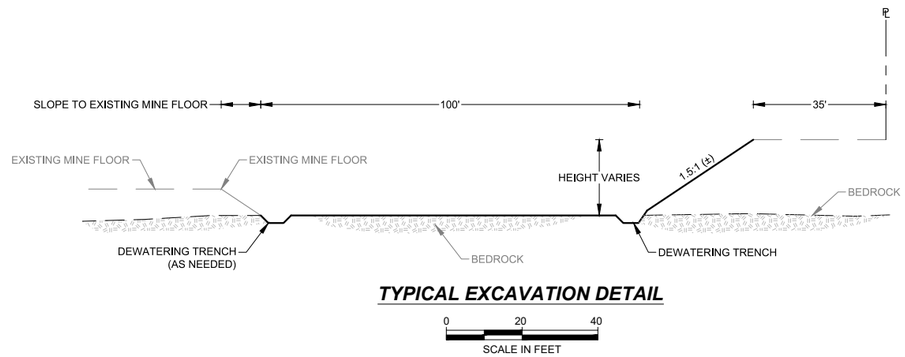


STATION 19+00 (C)



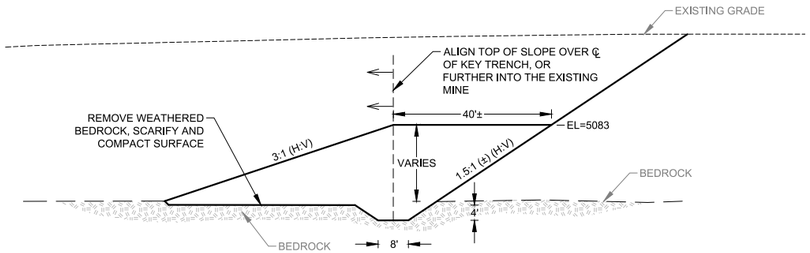
STATION 27+00 (D)

0 20 40
SCALE IN FEET



TYPICAL EXCAVATION DETAIL

0 20 40
SCALE IN FEET



TYPICAL SLOPE LINER DETAIL

0 20 40
SCALE IN FEET

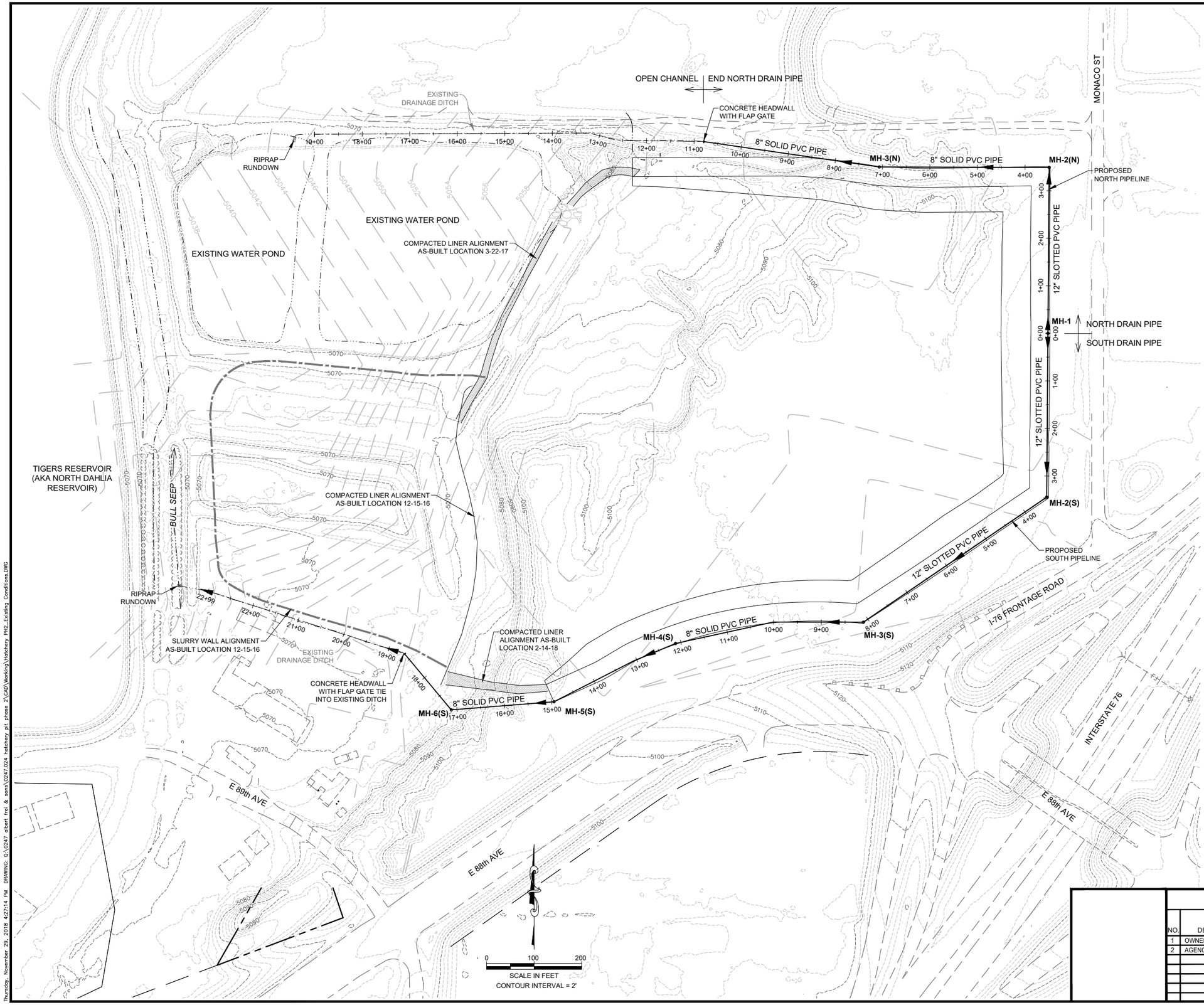
REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	OWNER REVIEW	NOV 2018	CJH
2	AGENCY REVIEW	NOV 2018	CJH

HATCHERY PIT PHASE 2 SLOPE LINER

Cross Sections

DEERE & AULT CONSULTANTS, INC.
600 S. AIRPORT RD., BLDG. A, SUITE 205
LONGMONT, CO 80503
TEL 303.651.1468 FAX 303.651.1469

DESIGNED BY: CJH	APPROVED BY: CJH	JOB NO.	SHEET:
DRAWN BY: ITR	DATE: NOV 2018	0247.024.00	7 of 13
CHECKED BY: CJH	SCALE: AS NOTED		



Thursday, November 29, 2018 4:27:14 PM DRAWING: G:\0247 albert frei & sons\0247.024 hatchery pit phase 2\CAD\Working\Hatchery PH2_Existing Conditions.DWG

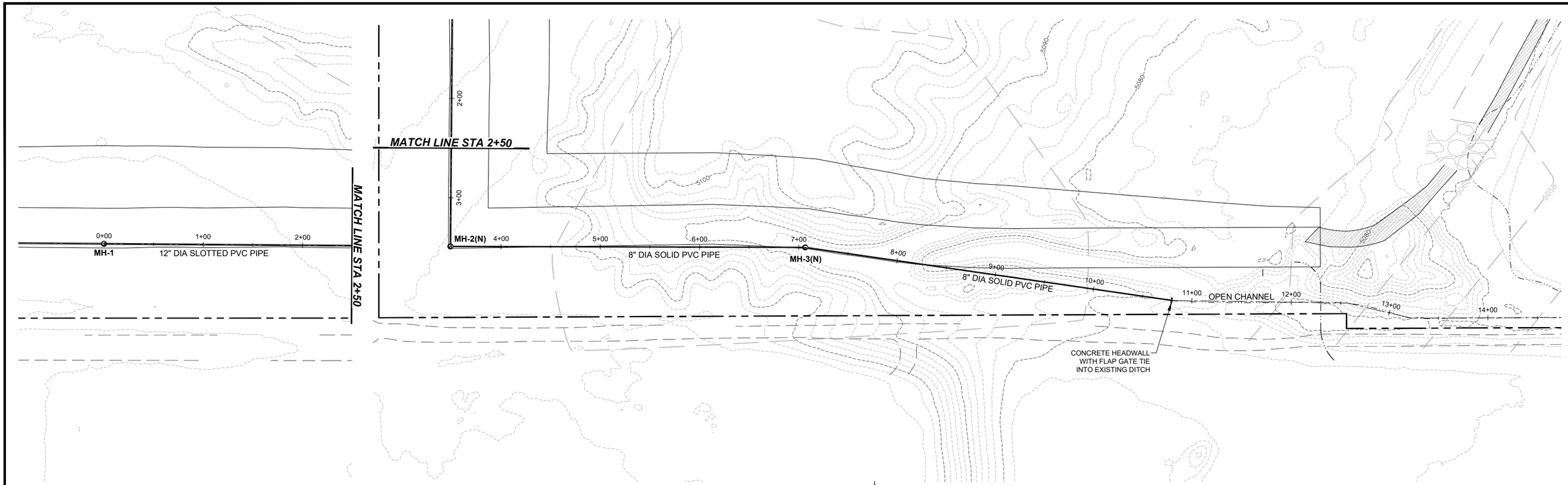
NO.	REVISIONS DESCRIPTION	DATE	BY
1	OWNER REVIEW	NOV 2018	CJH
2	AGENCY REVIEW	NOV 2018	CJH

HATCHERY PIT PHASE 2 SLOPE LINER

Pipeline Drains Overall Plan

DEERE & AULT CONSULTANTS, INC.
600 S. AIRPORT RD., BLDG. A, SUITE 205
LONGMONT, CO 80503
TEL 303.651.1468 FAX 303.651.1469

DESIGNED BY: CJH	APPROVED BY: CJH	JOB NO.	SHEET:
DRAWN BY: ITR	DATE: NOV 2018	0247.024.00	8 of 13
CHECKED BY: CJH	SCALE: AS NOTED		

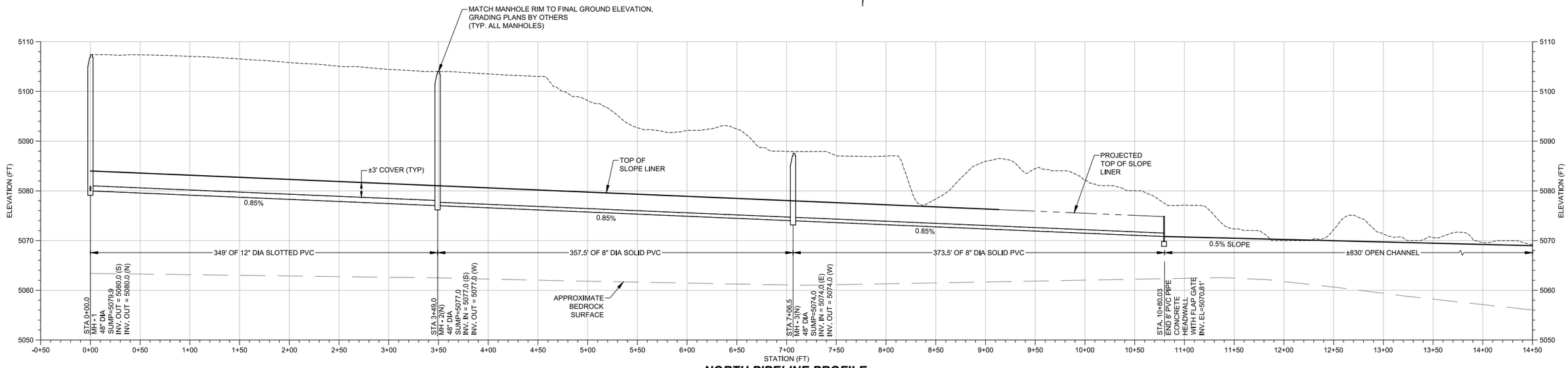


NORTH PIPELINE PLAN

0 50 100
SCALE IN FEET

NORTH PIPELINE PLAN

0 50 100
SCALE IN FEET



NORTH PIPELINE PROFILE

Vertical Scale (FT) 0 10 20
Horizontal Scale (FT) 0 50 100

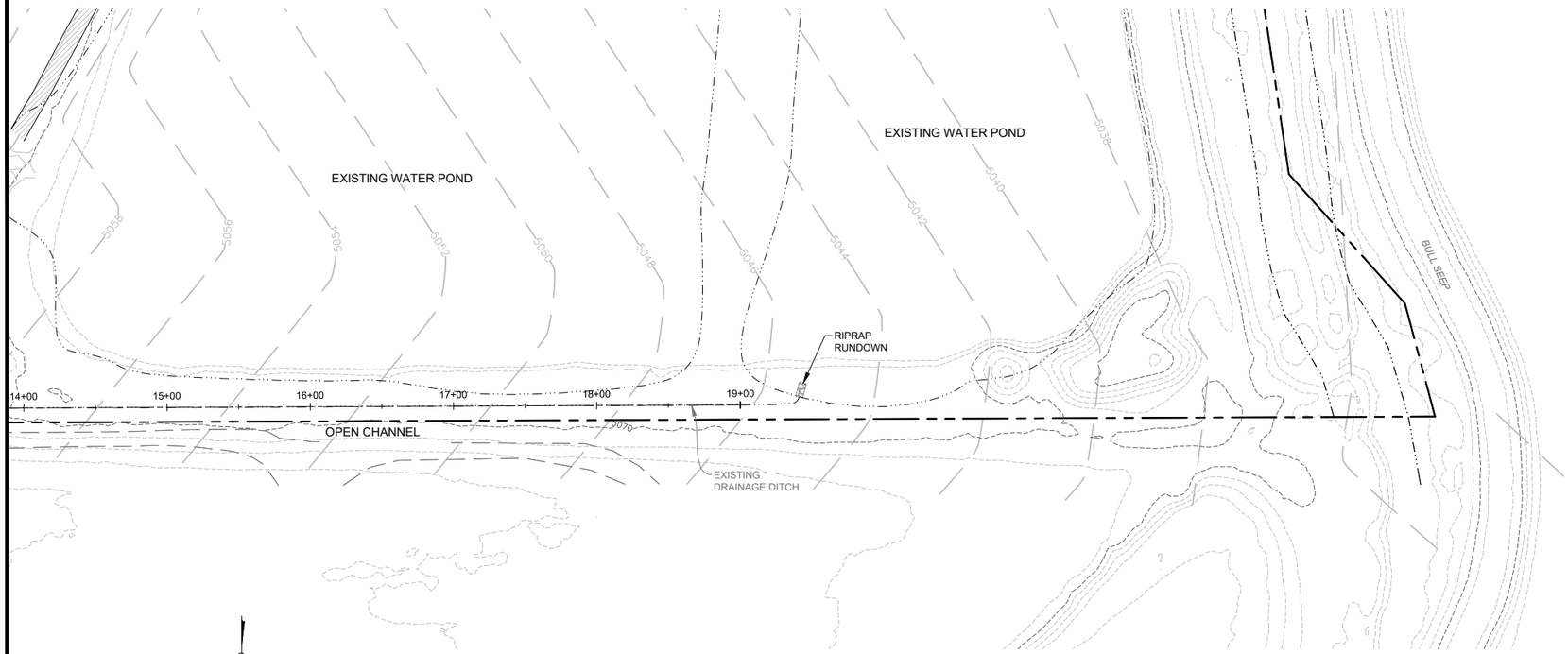
NO	REVISIONS DESCRIPTION	DATE	BY
1	OWNER REVIEW	NOV 2018	CJH
2	AGENCY REVIEW	NOV 2018	CJH

HATCHERY PIT PHASE 2 SLOPE LINER

North Pipeline Plan and Profile

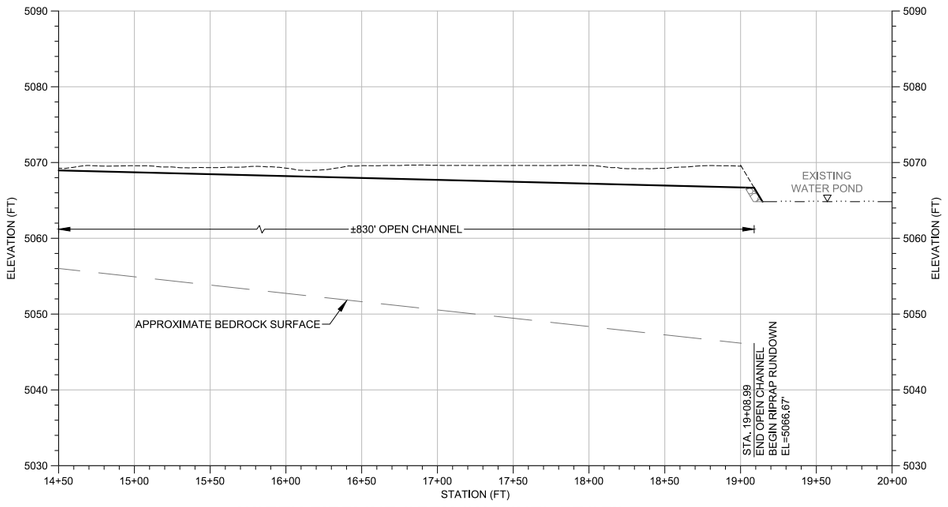
DEERE & AULT CONSULTANTS, INC.
600 S. AIRPORT RD., BLDG. A, SUITE 205
LONGMONT, CO 80503
TEL 303.651.1468 FAX 303.651.1469

DESIGNED BY: CJH | APPROVED BY: CJH | JOB NO. | SHEET:
DRAWN BY: ITR | DATE: NOV 2018 | 0247.024.00 | 9 of 13
CHECKED BY: CJH | SCALE: AS NOTED



NORTH PIPELINE OPEN CHANNEL PLAN

0 50 100
SCALE IN FEET



NORTH PIPELINE OPEN CHANNEL PROFILE

Vertical Scale (FT) 0 10 20
Horizontal Scale (FT) 0 50 100

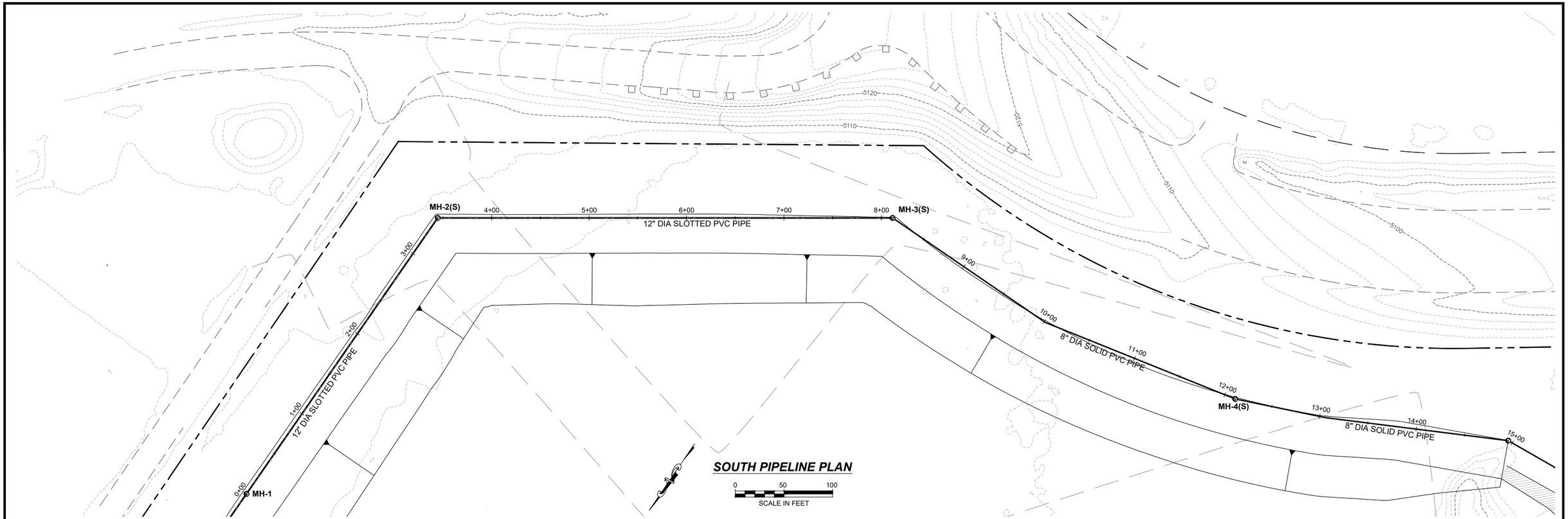
NO.	REVISIONS DESCRIPTION	DATE	BY
1	OWNER REVIEW	NOV 2018	CJH
2	AGENCY REVIEW	NOV 2018	CJH

HATCHERY PIT PHASE 2 SLOPE LINER

North Pipeline Plan and Profile (2)

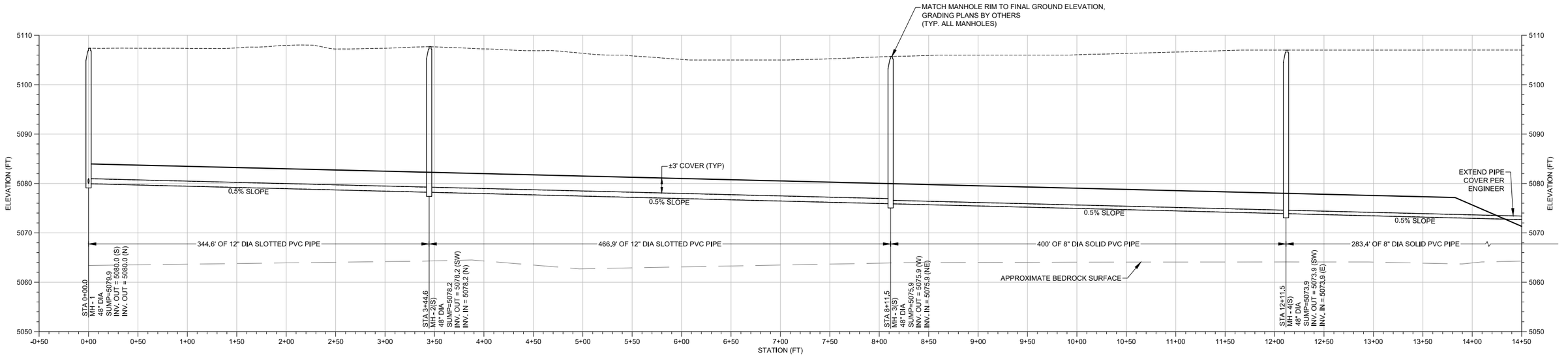
DEERE & AULT CONSULTANTS, INC.
600 S. AIRPORT RD., BLDG. A, SUITE 205
LONGMONT, CO 80503
TEL 303.651.1468 FAX 303.651.1469

DESIGNED BY: CJH | APPROVED BY: CJH | JOB NO. | SHEET:
DRAWN BY: ITR | DATE: NOV 2018 | 0247.024.00 | 10 of 13
CHECKED BY: CJH | SCALE: AS NOTED



SOUTH PIPELINE PLAN

0 50 100
SCALE IN FEET



SOUTH PIPELINE PROFILE

Vertical Scale (FT) 0 10 20
Horizontal Scale (FT) 0 50 100

NO.	REVISIONS DESCRIPTION	DATE	BY
1	OWNER REVIEW	NOV 2018	CJH
2	AGENCY REVIEW	NOV 2018	CJH

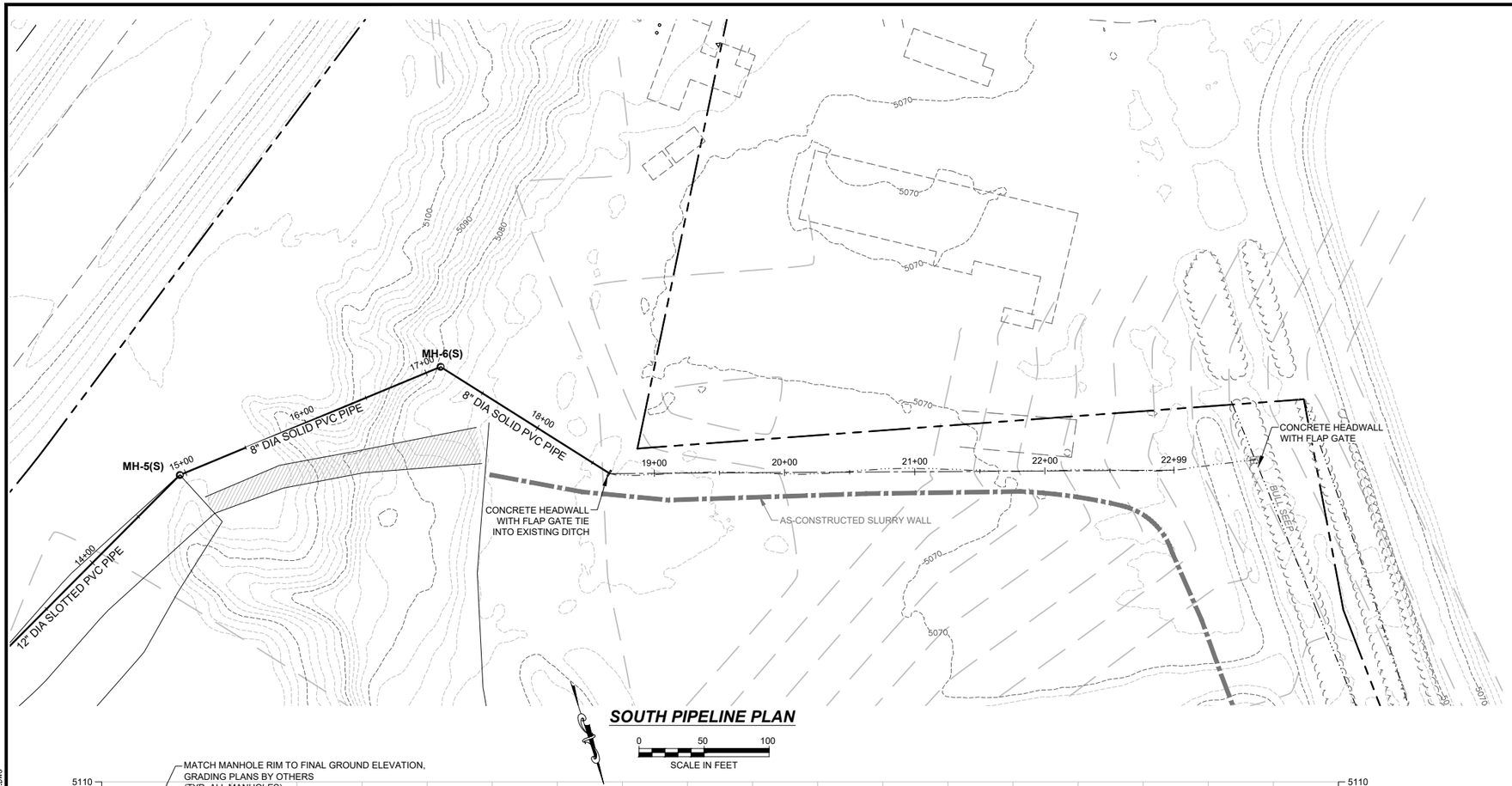
HATCHERY PIT PHASE 2 SLOPE LINER

South Pipeline Plan and Profile

DEERE & AULT CONSULTANTS, INC.
600 S. AIRPORT RD., BLDG. A, SUITE 205
LONGMONT, CO 80503
TEL 303.651.1468 FAX 303.651.1469

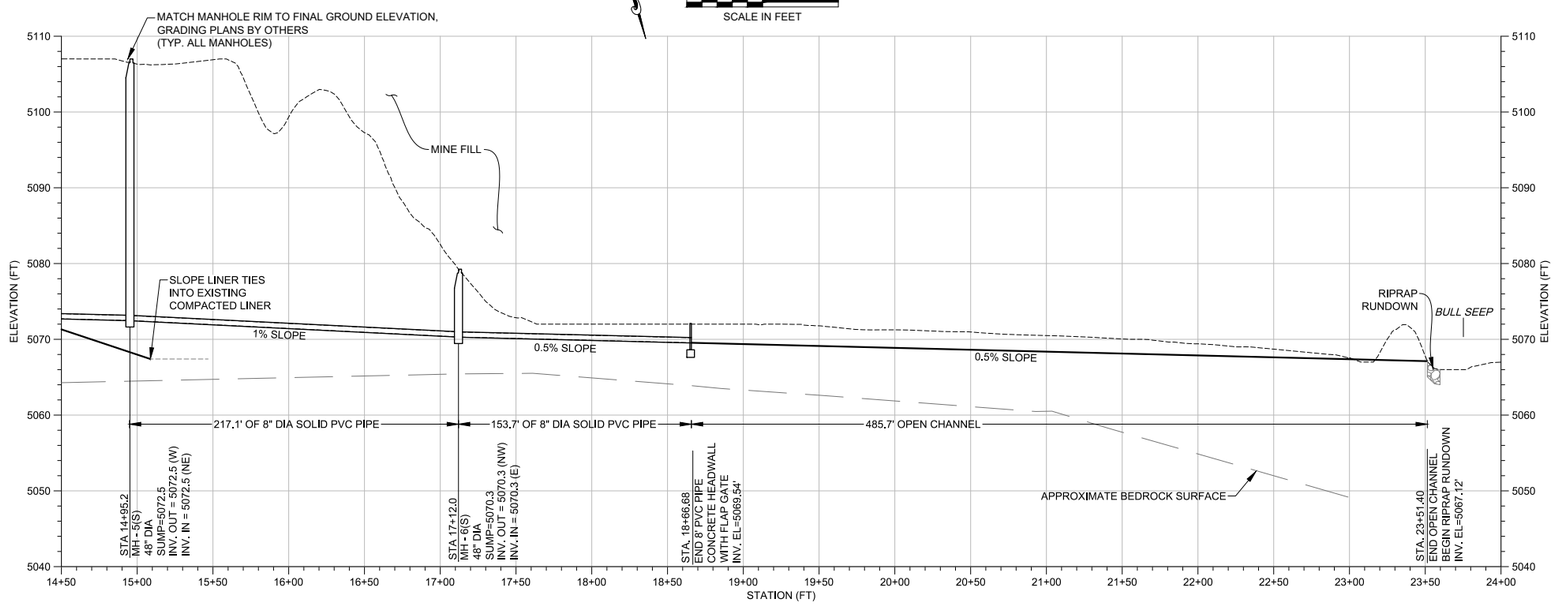
DESIGNED BY: CJH	APPROVED BY: CJH	JOB NO.	SHEET:
DRAWN BY: ITR	DATE: NOV 2018	0247.024.00	11 of 13
CHECKED BY: CJH	SCALE: AS NOTED		

Thursday, November 29, 2018 4:27:29 PM DRAWING: Q:\0247 albert frei & sons\0247.024 hatchery pit phase 2\CAD\Working\Hatchery PH2_Existing Conditions.DWG



SOUTH PIPELINE PLAN

0 50 100
SCALE IN FEET



SOUTH PIPELINE PROFILE

Vertical Scale (FT) 0 10 20
Horizontal Scale (FT) 0 50 100

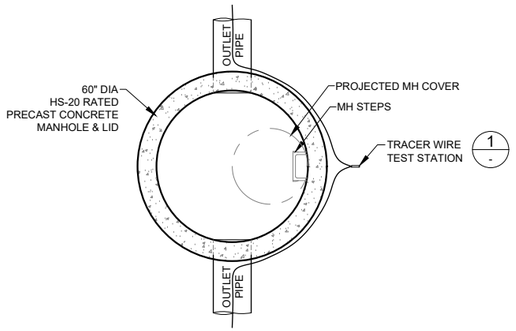
REVISIONS			
NO.	DESCRIPTION	DATE	BY
1	OWNER REVIEW	NOV 2018	CJH
2	AGENCY REVIEW	NOV 2018	CJH

HATCHERY PIT PHASE 2 SLOPE LINER

South Pipeline Plan and Profile (2)

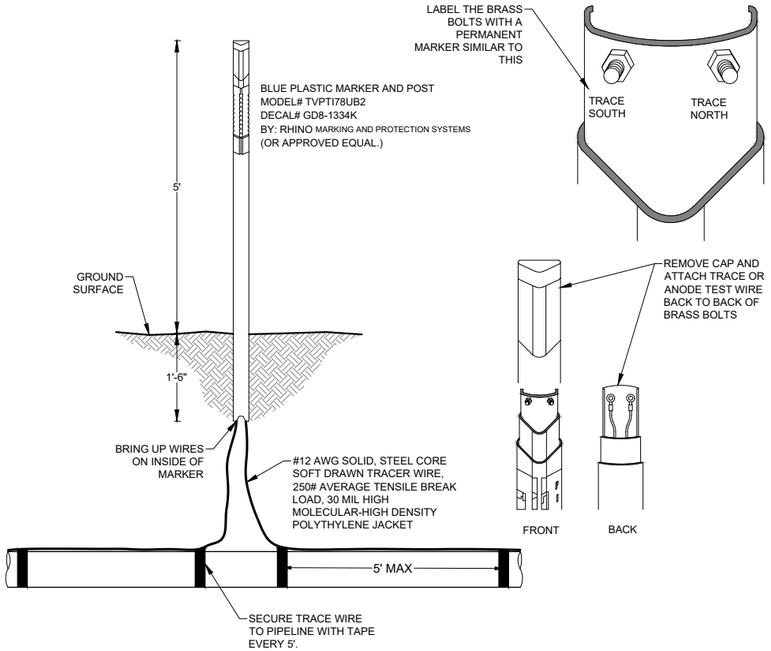
DEERE & AULT CONSULTANTS, INC.
600 S. AIRPORT RD., BLDG. A, SUITE 205
LONGMONT, CO 80503
TEL 303.651.1468 FAX 303.651.1469

DESIGNED BY: CJH | APPROVED BY: CJH | JOB NO. 0247.024.00 | SHEET: 12 of 13
DRAWN BY: ITR | DATE: NOV 2018
CHECKED BY: CJH | SCALE: AS NOTED



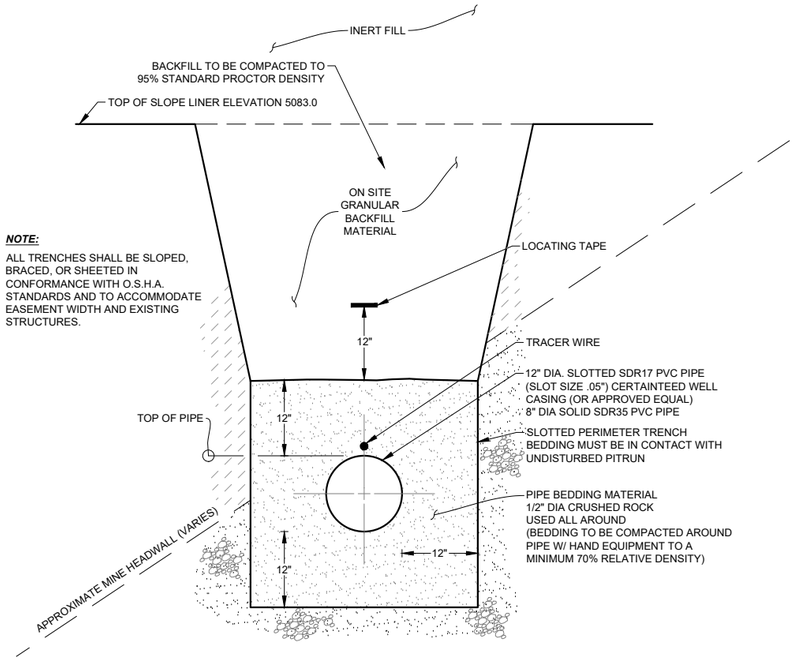
TYPICAL 48" MANHOLE PLAN VIEW

0 2' 4'
SCALE IN FEET



TRACER WIRE & MARKER DETAIL

1
-
NTS

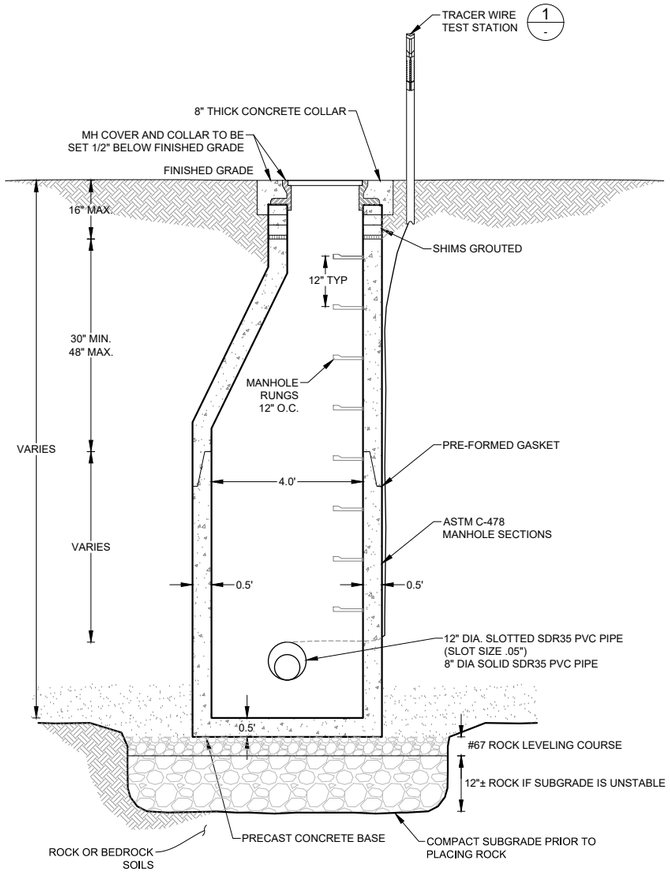


NOTE:

ALL TRENCHES SHALL BE SLOPED, BRACED, OR SHEETED IN CONFORMANCE WITH O.S.H.A. STANDARDS AND TO ACCOMMODATE EASEMENT WIDTH AND EXISTING STRUCTURES.

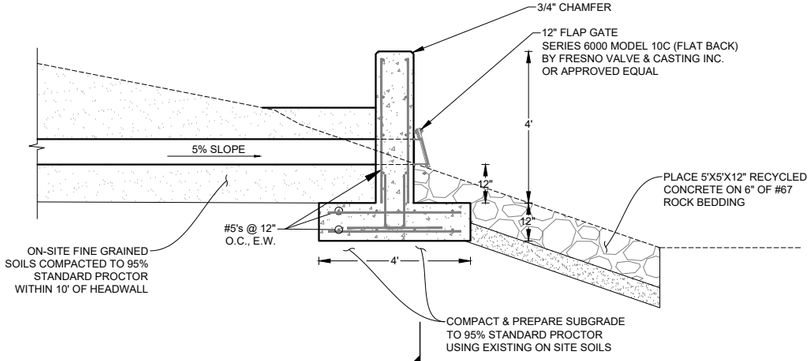
TYPICAL TRENCH DETAIL

0 1' 2'
SCALE IN FEET



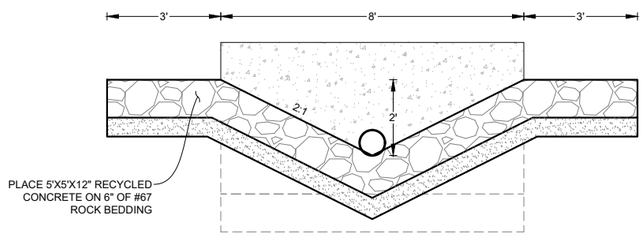
TYPICAL 48" MANHOLE SECTION

0 2' 4'
SCALE IN FEET



CONCRETE HEADWALL DETAIL

0 2' 4'
SCALE IN FEET



SECTION A-A

0 2' 4'
SCALE IN FEET

REVISIONS NO.	DESCRIPTION	DATE	BY
1	OWNER REVIEW	NOV 2018	CJH
2	AGENCY REVIEW	NOV 2018	CJH

HATCHERY PIT PHASE 2 SLOPE LINER

Details

DEERE & AULT CONSULTANTS, INC.
600 S. AIRPORT RD., BLDG. A, SUITE 205
LONGMONT, CO 80503
TEL 303.651.1468 FAX 303.651.1469

DESIGNED BY: CJH	APPROVED BY: CJH	JOB NO.	SHEET:
DRAWN BY: ITR	DATE: NOV 2018	0247.024.00	13 of 13
CHECKED BY: CJH	SCALE: AS NOTED		

RECLAMATION COST REVISION *Hatchery Pit*
M-2014-043 Revised: January 4, 2019

The following information is provided to reevaluate the current bond based on Technical Revision 01 and is based on the layout of the 2014 worksheet the Division provided during the intimal permitting process. It is not necessary to import fill material to complete reclamation on the site. The changes made to the information previously provided includes removing the Phase 2 slurry wall and replacing it with a compacted liner and french drain. We also reduced the costs associated with Phase 1 slurry wall since it is in place and that area is close to being backfilled with on-site material. We included a 5% repair cost estimate since the wall was never certified. The liner and drain system will be installed in stages but the bond is calculater as if it were left to the very end. Only grading and shaping of the upper level highwalls and seeding would be needed on the rest of the area. The french drain cost is from a quote Albert Frei and Sons, Inc. has for it's placement rounded to the number pre-sented.

The equipment used in the estimate is.
Excavator - Cat 345
Haul Trucks - Cat 730
Scarper - Cat 631G
Grader - Cat 14M
Dozer - Cat D8T
Sheeps foot compactor- Cat CP56
Dewatering Pump data 1-600M, 15", 12"suction & discharge hoses

We used the form and numbering from the ***Cost Summary Form*** prepared by the Division, making changes as appropriate.

Task Description	Direct Cost
001 - Build Phase 1 Slurry wall 190,6808*5%	$9,534.00
002 - Build Phase 2 Slurry wall Revised to install compacted liner	
002a - Excavate liner material using Shale from mine floor with trackhoe 86000*1.12=96320yds @ 71¢/yd	$67,985.94
002b - Haul liner material and place in 5 foot lifts using off road haul trucks 96320 yds @ 93.7¢/ yard	$90,225.79
002c - Compact liner material Liner construction time 38 days $210.00/day	$7,832.32
002d - French drain installation and materi-als	$100,000.00
002e - Dewatering Phase 2 area to be sur-rounded by liner - 28.25 ac @ 18 ft deep, 52 days @ $114.05/day	$120,893.00
002f - Testing	$6,000.00
003 thru 006 Backfill upper slopes in Phase 2 55558*1.15=63892yds @ $2.451/yd	$236,110.14
008- Spread Topsoil 10 inches on 37.25 ac 50,080*1.12= 56,090 yds @ 81.8¢/yd (scraper & Grader)	$45,881.29
009- Revegetation 43.54 ac. @ $1135.75/ac.	$49,450.56
Concrete demo from Plant 220 yds @$7.00/yd	$1,540.00
Weed Control per year	$5,000.00
010- Mob/demob	$7,552.00
Total Direct costs	$748,005.04
INDIRECT COSTS	
Liability insurance @ 2.02%	$15,109.70
Performance bond @ 1.05%	$11,220.08
Job Superintendent 120.00hrs @ $41.25/hr	$4,950.00
Profit @ 10%	$74,800.50
Total Indirect costs	$106,080.28
Engineering and Management	
Reclamation Management @ 5%	$37,400.25
Engineering @ 6%	$44,880.30
Total bond	$936,365.87

Albert Frei and Sons, Inc Hatchery Pit - M-2014-043
MONITOR WELL DATA FROM June 2016 to December 2018
GROUNDWATER ELEVATIONS

UPDATED: **12/10/18 - 14:50**

MONITOR WELL NO.	**MW 01**	**MW 02**	**MW 03**	**MW 04**	**MW 05**	**MW 06**	**MW 07**	NOTES
LATITUDE (WSG 84 NAVD 88)	39D51'44.2232"	39D51'34.0915"	39D51'31.0631"	39D51'27.7068"	39D51'30.9343"	39D51'32.0587"	39D51'41.8748"	
LONGITUDE (WGS 84 NAVD 88)	104D54'45.6777"	104D54'45.9139"	104D54'51.5924"	104D55'06.2682"	104D55'04.2477"	104D55'08.8602"	104D55'10.7493"	
ELEVATION (TOG), FT (NAVD 88)	5,105.30	5,108.60	5,106.40	5,075.10	5,071.00	5,068.30	5,070.80	
CASING HEIGHT, FT	2.00	2.30	2.60	2.50	2.50	2.6	2.70	
ELEVATION (TOC), FT	5,107.30	5,110.90	5,109.00	5,077.60	5,073.50	5,070.90	5,073.50	
NOTES Gillians Surveying NAVD 88 elevations - WGS 84 lat - long								
Sample date								
6/14/2016	5076.62	5079.94	5079.21	5065.94	5065.14	5064.57	5063.67	Golder sample when installed
7/19/2016	5074.90	5080.30	5079.70	5065.90	5065.00	5064.50	5063.70	Gillians sample when surveyed
11/9/2016	5075.82	5078.93	5078.25	5066.70	5066.46	5065.50	5064.18	Environment sample
1/31/2017	5075.44	5078.57	5077.96	5066.16	5066.17	5058.57	5052.67	Pre 1981 Lake part dewatered
4/10/2018	5072.87	5075.58	5073.81	5066.15	5066.01	5065.30	5064.31	pond refilled on west side
7/29/2018	5072.99	5075.78	5074.25	5065.37	5065.4	5064.92	5063.59	
8/21/2018	5072.99	5075.58	5074.05	5065.38	5065.20	5064.74	5063.80	
9/4/2018	5071.42	5075.48	5073.88	5065.69	5065.09	5064.55	5063.71	
10/31/2018	5069.70	5075.57	5074.10	5065.89	5065.99	5065.35	5063.58	
11/30/2018	5069.67	5075.50	5074.00	5065.90	5065.95	5065.16	5063.52	
12/10/2018	5069.65	5075.39	5073.50	5065.90	5065.90	5064.98	5063.38	

Groundwater Monitoring Plan.

The plans are to install slurry wall liner or compacted liner around the 2 excavated areas and then backfill them to present ground levels. To do this there are two different scenarios that have to be addressed in a different manner. They also have common issues that can be addresses in general. We use the term line as a general term to describe either the Slurry wall liner of compacted liner depending on the state being discussed

Phase 1 involved installing a Slurry Wall around the area to be mined and then mining the alluvial deposit of gravel. The slurry will be place at grade around the area to be mined and backfilling will start when all of the gravel is removed. Stage 2 is mostly a terrace deposit with the water table located approximately 30 feet below the surrounding surface at approximately 5079.8. The plan is to install a compacted liner around the bottom of the excavated area that is keyed into the bedrock. The high point of the liner is 5083.3, at a point hat is approximately 300 feet south of the northeast corner and slopes to 5077.3 on the northwest corner of Stage 2 and 5077.6 on the Southwest corner of Stage 2. This places the top of the slurry wall approximately 3.5 feet above the average ground water elevation. The bottom of the French drain pipe is installed at a maximum elevation of 5079.4 and slopes to 5073.2 on the northwest corner of Stage 2 and 5073.6 on the Southwest corner of Stage 2. The French drain will maintain the height of the groundwater table at 2013 elevations. The higher liner top will provide adequate height to prevent ground water from entering the filled area when reclamation is complete.

When the Certificate of Designation was approved by Adams County they did not include a groundwater monitoring requirement since all fill was to be isolated from the groundwater table. Seven (7) monitoring wells were installed around the mine site on June 14, 2016 (prior to mining commencing) to be used to monitor the height of the groundwater table and to determine the height of the liners. Map **Exhibit Gm-1(revised)** shows the locations of the piezometers as installed. From June 2016 to March 2018 samples were collected prior to dewatering starting on Stage 2 to establish background elevations for the water table.

The Groundwater Monitoring Data Analysis discussion explains how the data collected will be used to address the proposed mitigation measures if problems occur to the surrounding groundwater table.

This site and surrounding properties have existing groundwater and surface water features that impact groundwater elevations due to their proximity to the mine. On the north is an old gravel mine that was backfilled with inert materials similar to what is proposed at this site. Along the west side, the Bull Seep parallels the property line from the SW corner, where the property line turns back to the east, to the northwest corner where it leaves the site. The Bull Seep is a warm water slue that carries water year around. West of the Bull Seep is a slurry wall liner installed by the City of Thornton around a water storage reservoir that runs the entire length of the west side of the permit area. An old gravel lake is located in the northwest part of the mine area and previous owners installed lateral ditches and ponds along the interface of the terrace deposit and the alluvial deposit to divert water that comes to the surface, around the site and back to the Bull Seep. All of these water features have an impact on the current groundwater conditions and the flow of it across, around and thru the permit area.

The location of the Bull Seep and Thornton's slurry wall will limit the amount of ground water shadowing along the west side of the mine. The Bill Seep will recharge the groundwater and limit the mounding behind the slurry wall on the Thornton site will keep the groundwater elevations constant on this site.

The backfilling along the entire north side may have already limited water flow thru this area and is forcing the water to back up on this site. That may be why there is a constant flow of water thru the lateral drain that runs along the north side and along the base of the hill. This may also explain why the water elevation of the old gravel mine lake appears to be higher the it was prior to that area being filled. On the other hand if it has restricted flow thru that site it has not has a significant impact to the east.

Most of the existing lateral ditches and small ponds will be removed as mining progresses. They now serve to direct the seepage water and surface waters around the property and back to the western drainage. The existing ditches will be rerouted to more direct routes and new ones will be installed around the mined areas to preserve the historic flow of the water. On the north they will be directed into the existing lake so the water returns to the system. On the south a lateral ditch was built along the south side of the slurry wall so water can be diverted back to the Bull Seep drainage. This ditch also acts as a surface drain for groundwater that may backup along the slurry wall in that area and will carry the flow from the French drain to Bull Seep.

Groundwater Monitoring Data Analysis

As the data is collected, it will be recorded in a spread sheet and graphed to establish the baseline data that can be used to determine what if any impacts the slurry wall and compacted liner are having on the groundwater table. The data collected to date has allowed us to determine what the new trigger point elevations are. These elevations determine what actions are needed. Data collection will continue on a monthly basis until 13 consecutive samples have been collected and then go to a quarterly basis until 2 years after the liners are complete. From then on till reclamation is complete the monitoring will be done once a year. The data collected in the first 3 samples were used to determine the elevations of the compacted liner and French drain elevation in Stage 2 as discussed above. Future data will be used to determine if a trigger point has been reached and what actions will be needed.

Baselines and Trigger Points

The baselines for each well have been determined by taking the high and low elevations of each well from the data collected in the first 7 samples. The proposed trigger points have been determined to be elevations that are greater than two (2) foot above the highest elevations and/or less than one (1) foot above bedrock elevation in the monitoring Wells 1, 2, & 3. Based on the data collected it appears that mounding may not be a problem since there is none apparent from the filling done on the adjoining property. In addition, the natural groundwater, pre dewatering, elevations in Stage 2 averaged 5079.8 or approximately 30 feet below the surface.

The following table shows the proposed trigger elevations for each well now that site specific information is available. On Stage 1 the trigger point

elevations were based on plus or minus 2 feet of change. In Stage 2 the maximum is based on the maximum elevation measured, pre-dewatering, in each monitoring wells and added 2 feet. The minimum was picked as 1 foot above bedrock since there are no surface wells within 800 feet of the dewatering area that would be impacted. The water table is normally 30 plus feet below the surface.

Table Gm1

MONITORING WELL	MW01	MW-02	MW-03	MW-04	MW-05	MW-06	MW-07
BEDROCK ELEVATION	5065.8	5064.7	5066.4	5063.1	5063.0	5047.3	5037.67
TOP OF LINER ELEVATION		5082.0	5080.0	NA	5071.2	5068.4	NA
BOTTOM OF FRENCH DRAIN ELEVATION	5078.0	5078.0	5076.0	NA	NA	NA	NA
TRIGGER ELEVATION MAXIMUM	5080.0	5082.3	5081.7	5068.7	5068.46	5067.5	5066.3
TRIGGER ELEVATION MINIMUM	5066.8	5065.7	5067.4	5063.94	5063.14	5062.57	5061.67

The possibility of adjusting the baseline ranges if needed in the future will be discussed between the Division and the operator at that time. The baseline range changes would be documented with a Technical Revision.

If the groundwater levels in a monitoring well pass their trigger points for more than 3 months in a row, the operator will investigate to determine causes, and do mitigation as necessary. The operator will notify the Division of the trigger investigations and any subsequent mitigation.

A neighbor complaint could also be a "trigger". Examples of possible issues that may cause a trigger are: water well levels low, flooding fields, and vegetation suffering. Albert Frei & Sons would investigate to determine causes and mitigate if necessary as needed following the mitigation plan outlined below.

Mitigation Plan.

If the trigger is reached based on data collected, the following actions should be undertaken:

- An evaluation of the data to confirm that Albert Frei & Sons, Inc. (Frei) is responsible for the change shall be completed.
- Implementation of mitigation measures.

Mitigation measures that could be implemented (not necessarily in the order listed) include:

Up Gradient Mitigation

- In Stage 2 an inspection of the surface groundwater diversion drain (French Drain) on the outside the compacted liner will be done. If it is found there is a problem withe drain it will be cleaned or repaired as needed to preserve the drainage.

Down Gradient Mitigation

- Well improvements. Affected surface water wells could be deepened to bedrock or modified to increase yield. Alternatively, new alluvial wells could be constructed to provide a new water supply.

- Frei would provide temporary replacement water, if needed, while studies to determine fault are being conducted, or while mitigation measures are in the process of being implemented.

The exact mitigation measure or combination of measures would be determined based on additional investigations and consultations with the affected party. Costs for implementation and maintenance of mitigation measures needed resulting from Frei operations would be borne by Frei.

Data Collection and Submittal to the Division

The seven monitoring wells installed around the perimeter of the operation will have data collected on a monthly basis until 13 consecutive months of data has been collected then go to a quarterly basis until 2 years after the liners are complete. From then on until reclamation is complete, the monitoring will be done once a year. The data from these wells will be used to monitor for compliance to stay within baseline ranges proposed.

The operator will give the Division a groundwater monitoring well data summary report that includes, groundwater level data, times the trigger points were exceeded, investigations into cause, and any needed mitigation analysis/plans, with the annual report. The operator will also contact the Division with this information when/if a trigger point is reached and there seems to be a trend.

Map Exhibit Gm-1 Monitoring well locations

9001 MONACO STREET - MONITOR WELL EXHIBIT

LOCATED IN THE SOUTHWEST 1/4 OF SECTION 20,
TOWNSHIP 2 SOUTH, RANGE 67 WEST OF THE 6TH P.M.,
COUNTY OF ADAMS, STATE OF COLORADO
SHEET 1 OF 1

LEGEND

MONITOR WELL

SCALE: 1" = 100 US SURVEY FEET

100' 0 50' 100'

PROPERTY ADDRESS

9001 MONACO STREET, ADAMS COUNTY, COLORADO.

NOTES

1. NOTICE: ACCORDING TO COLORADO LAW, YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT, MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF CERTIFICATION SHOWN HEREON.

2. THIS ELEVATION EXHIBIT, AND THE INFORMATION HEREON, MAY NOT BE USED FOR ANY ADDITIONAL OR EXTENDED PURPOSES BEYOND THAT FOR WHICH IT WAS INTENDED AND MAY NOT BE USED BY ANY PARTIES OTHER THAN THOSE TO WHICH IT IS CERTIFIED.

3. BASIS OF ELEVATIONS: VERTICAL DATUM / BENCHMARKS: NAVD88 / ADAMS COUNTY BENCHMARK STATION NAME 95.0212, STATION NUMBER 0212, STANDARD ADAMS COUNTY 3-1/4" ALUMINUM SURVEY DISK STAMPED "95.0212 1995 2S67W S20" ELEVATION = 5103.29 FEET, ALL ELEVATIONS ARE US, SURVEY FEET.

   BASIS OF COORDINATES: WGS84

4. DATE OF FIELD WORK: JULY 19, 2016.

MONITOR WELL I.D.	GROUND ELEVATION	P.V.C. CASING RIM ELEVATION	WATER ELEVATION	LATITIUDE	LONGITUDE
MW-1	5105.3	5107.3	5072.9	N39°51'41.2232"	W104°54'45.6777"
MW-2	5108.6	5110.9	5080.3	N39°51'34.0915"	W104°54'45.9139"
MW-3	5106.4	5109.0	5079.7	N39°51'31.0631"	W104°54'51.5924"
MW-4	5075.1	5077.6	5065.9	N39°51'27.7068"	W104°55'06.2682"
MW-5	5071.0	5073.5	5065.0	N39°51'30.9343"	W104°55'04.2477"
MW-6	5068.3	5070.9	5064.5	N39°51'32.0587"	W104°55'08.8602"
MW-7	5070.8	5073.5	5063.7	N39°51'41.8748"	W104°55'10.7493"

SURVEYOR'S CERTIFICATE

I, ROBERT E. HARRIS, A PROFESSIONAL LAND SURVEYOR REGISTERED UNDER THE LAWS OF THE STATE OF COLORADO, DO HEREBY CERTIFY THAT THIS ELEVATION EXHIBIT WAS MADE BY ME AND UNDER MY SUPERVISION, AND THAT THE MAP IS ACCURATE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

ROBERT E. HARRIS
COLORADO P.L.S. 37601
FOR & ON BEHALF OF
GILLIANS LAND CONSULTANTS

COLORADO LICENSED ROBERT EMERSON HARRIS 07.19.16 37601 PROFESSIONAL LAND SURVEYOR

NO	REVISION RECORD	DATE	BY
1			

MONITOR WELL EXHIBIT
9001 MONICO STREET
ADAMS COUNTY, COLORADO

CERTIFICATION

Gillians
LAND SURVEYING
ALTA/ACSM SURVEYS
TOPOGRAPHIC MAPS
CONSULTING SERVICES
GILLIANS LAND CONSULTANTS
P.O. BOX 746358
ARVADA, CO 80006-6358
303-972-6640
www.gilliansllc.com

JOB NO.: 16058
DRAWN: JW
CHECKED: REH
FIELD: JW
ISSUE DATE: 7/19/2016
SCALE: 1=100
FILE: 16058TPO
SHEET: