GP AGGREGATES, LLC
West Farm Pit
Phase 3 & Phase 8 Slurry Walls

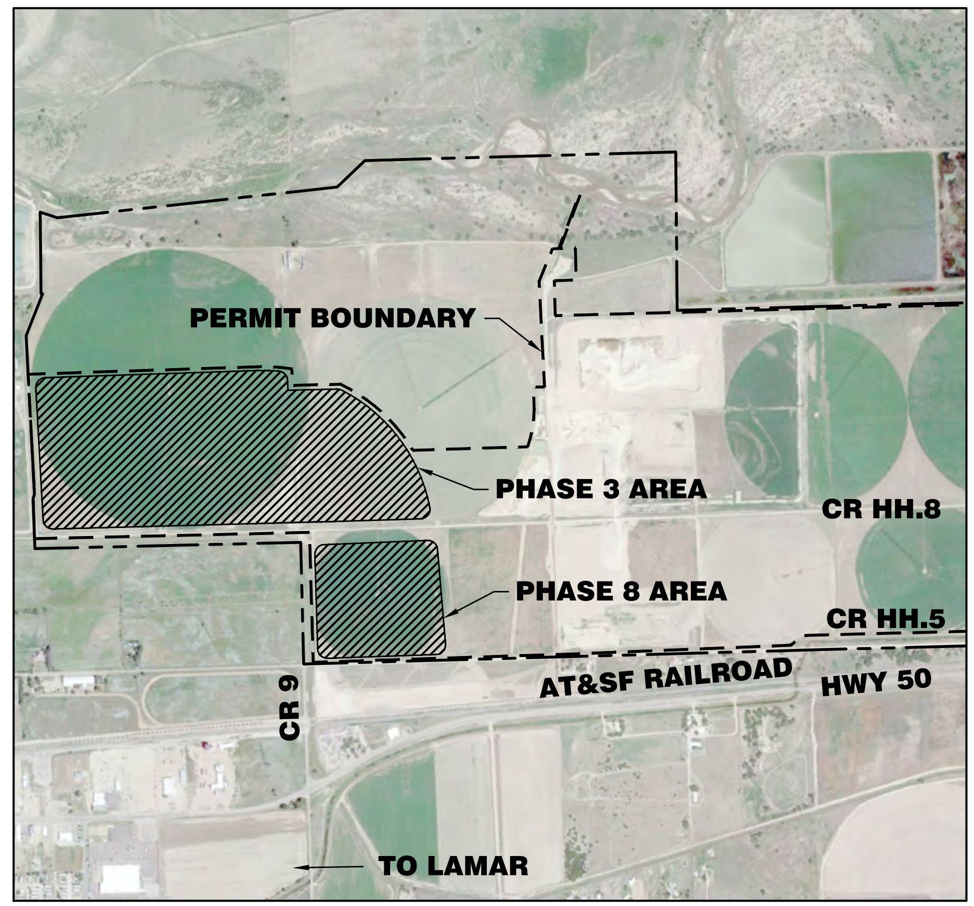
LOCATED IN
TOWNSHIP 22 SOUTH, RANGE 48 WEST, 6th P.M.
COUNTY of PROWERS, STATE of COLORADO
February, 2021

GENERAL NOTES:

1. THESE CONSTRUCTION PLANS ARE TO BE USED IN CONJUNCTION WITH THE TECHNICAL SPECIFICATIONS PREPARED BY J&T CONSULTING, INC., AND GEOTECHNICAL INVESTIGATION AND ENGINEERING DESIGN RECOMMENDATIONS PREPARED BY CESARE, INC.
2. COMPLY WITH ALL REQUIREMENTS OF OWNER OBTAINED PROJECT PERMITS: INCLUDING, BUT NOT LIMITED TO, PERMITS FROM THE U.S. ARMY CORPS OF ENGINEERS AND COLORADO DEPARTMENT OF HEALTH AND ENVIRONMENT. CONTRACTOR SHALL OBTAIN ALL OTHER PERMITS NECESSARY FOR CONSTRUCTION OF THE WORK.
3. PROTECT ALL EXISTING WETLANDS.
4. THE CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING EROSION AND SEDIMENT CONTROL MEASURES AT ALL TIMES DURING CONSTRUCTION.
5. ALL CONSTRUCTION ACTIVITIES MUST COMPLY WITH THE STATE OF COLORADO PERMITTING PROCESS FOR "STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY." FOR INFORMATION, PLEASE CONTACT THE COLORADO DEPARTMENT OF HEALTH, WATER QUALITY CONTROL DIVISION, 4300 CHERRY DRIVE SOUTH, DENVER, COLORADO 80246–1530. ATTENTION: PERMITS SECTION. PHONE 303–692–3500.
6. IF DEWATERING IS REQUIRED, A STATE CONSTRUCTION DEWATERING DISCHARGE PERMIT IS REQUIRED FOR DISCHARGES TO A STORM SEWER, CHANNEL, IRRIGATION DITCH, ANY STREET THAT IS TRIBUTARY TO THE AFOREMENTIONED FACILITIES, OR ANY WATER OF THE UNITED STATES.
7. PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION, THE CONTRACTOR SHALL CONTACT ALL UTILITIES TO COORDINATE SCHEDULES.
8. THE CONTRACTOR SHALL REGULARLY PATROL THE PUBLIC LANDS ADJACENT TO THE PROJECT, REMOVE CONSTRUCTION DEBRIS AND KEEP AREAS CLEAN AND SAFE.
9. THE CONTRACTOR IS RESPONSIBLE FOR DEVELOPING AND IMPLEMENTING A SEQUENCE AND SCHEDULE FOR COMPLETION OF THE WORK IN ACCORDANCE WITH APPLICABLE PROVISIONS OF THE CONTRACT DOCUMENTS.
10. READ THOROUGHLY AND BECOME FAMILIAR WITH THE SPECIFICATIONS AND INSTALLATION DETAILS FOR THIS RELATED WORK PRIOR TO CONSTRUCTION.
11. VERIFY SITE ELEVATIONS PRIOR TO CONSTRUCTION.
12. THE CONTRACTOR SHALL PROCURE ALL PERMITS AND LICENSES, PAY ALL CHARGES AND FEES INCLUDING, BUT NOT LIMITED TO, ALL INSPECTION CHARGES OF AGENCIES HAVING APPROPRIATE JURISDICTION.
13. CONTRACTOR SHALL PROVIDE AS–BUILT DRAWINGS OF ENTIRE PROJECT, AS SPECIFIED, UPON FINAL COMPLETION OF PROJECT.

SEDIMENT AND EROSION CONTROL:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SEDIMENT AND EROSION CONTROL AT THE SITE THROUGHOUT CONSTRUCTION.
2. BEST MANAGEMENT PRACTICES (BMP'S) SHALL BE USED AS NECESSARY TO ADDRESS SEDIMENT AND DUST FROM SITE DISTURBANCE. ADDITIONAL MEASURES MAY BE REQUIRED AT THE DIRECTION OF THE ENGINEER.
3. BMP'S MAY INCLUDE, BUT ARE NOT LIMITED TO:
   - MINIMAL DISTURBANCE FOR MINIMAL TIME PERIODS
   - GRAVEL CONSTRUCTION ENTRIES
   - SILT FENCE, STRAW BALE OR SAND BAG BARRIERS, ROCK CHECK DAMS
   - STORM SEWER INLET PROTECTION
   - SEDIMENT CAPTURE PONDS
   - SITE WATERING FOR DUST SUPPRESSION
4. BMP'S SHALL BE MAINTAINED AND KEPT IN GOOD REPAIR FOR THE DURATION OF THE PROJECT. THE CONTRACTOR SHALL INSPECT BMP'S WEEKLY AND AFTER SIGNIFICANT (GREATER THAN 0.1" PRECIPITATION) STORM EVENTS. THE MAINTENANCE AND REPAIR SHALL BE COMPLETED IN A TIMELY MANNER. SEDIMENT AND DEBRIS SHALL BE REMOVED WHEN THEY REACH HALF THE BMP HEIGHT OR IMPACT THE FUNCTION OF THE BMP.
5. SOIL STOCKPILES SHALL BE PROTECTED FROM SEDIMENT TRANSPORT BY SURFACE ROUGHENING, WATERING AND PERIMETER SILT FENCING. SOILS THAT WILL BE STOCKPILED FOR MORE THAN 30 DAYS SHALL BE MULCHED AND SEEDED WITH A GRASS COVER WITHIN 14 DAYS OF STOCKPILE CONSTRUCTION.
6. THE CONTRACTOR SHALL INSURE THAT ALL LOADS OF CUT AND FILL SOILS IMPORTED TO OR EXPORTED FROM THE SITE ARE PROPERLY LOADED AND COVERED TO PREVENT LOSS DURING TRANSPORT.
7. THE CONTRACTOR SHALL REMOVE ALL SEDIMENT, MUD, AND CONSTRUCTION DEBRIS RESULTING FROM THIS PROJECT FROM FLOWLINES AND PAVEMENT OF PUBLIC STREETS IN A TIMELY MANNER.
8. SOILS EXPOSED DURING LAND DISTURBING ACTIVITY SHALL BE KEPT IN A ROUGHENED CONDITION BY RIPPING OR DISCING ALONG LAND CONTOURS UNTIL MULCH, VEGETATION OR OTHER PERMANENT EROSION CONTROL IS IN PLACE. NO SOILS SHALL REMAIN EXPOSED BY LAND DISTURBING ACTIVITY FOR MORE THAN THIRTY (30) DAYS BEFORE REQUIRED TEMPORARY OR PERMANENT EROSION CONTROL IS INSTALLED UNLESS OTHERWISE APPROVED.
9. ALL TEMPORARY SEDIMENT CONTROLS WILL BE REMOVED WITHIN 30 DAYS AFTER THE FINAL STABILIZATION IS ACHIEVED OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, WHICHEVER OCCURS FIRST.
10. NATURAL VEGETATION SHALL BE RETAINED AND PROTECTED WHENEVER POSSIBLE. EXPOSURE OF SOIL TO EROSION BY REMOVAL OR DISTURBANCE OF VEGETATION SHALL BE LIMITED TO THE AREA REQUIRED FOR IMMEDIATE CONSTRUCTION OPERATIONS AND FOR THE SHORTEST PRACTICAL PERIOD OF TIME.



1000 500 0 1000
SCALE IN FEET

VICINITY MAP
SCALE 1" = 1000

SHEET INDEX

LEGEND:

- PROPERTY LINE
- SECTION LINE
- FENCE LINE
- OVERHEAD ELECTRIC LINES (OE)
- UNDERGROUND TELECOM LINE (T)
- UNDERGROUND GAS LINE (G)
- EXISTING SANITARY SEWER (SAN)
- DIRT ROAD
- EXISTING WATER/DITCH
- EXISTING CONTOURS (3590)
- PROPOSED CONTOURS (3590)
- FUTURE HIGHWAY REALIGNMENT PARCEL
- PERMIT BOUNDARY
- ELECTRIC RISER BOX
- GUY WIRE
- POWER POLE
- WATER PUMP
- BORING LOCATION

OWNER
GP Aggregates, LLC
Karl Nyquist
7991 Shaffer Parkway, Ste. 200
Littleton, CO 80127
303–369–5100

SURVEYOR
American West Land Surveying Co.
331 South 4th Avenue
P.O. Box 129
Brighton, CO 80601
303–659–1532

ENGINEER
J&T Consulting, Inc.
J.C. York
305 Denver Ave., Ste. D
Fort Lupton, CO 80621
303–857–6222
Fax: 303–857–6224

GEOTECHNICAL/SOIL INVESTIGATIONS
Cesare, Inc.
7108 S Alton Way, Bldg. B
Centennial, CO 80112
303–220–0300

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

Engineer's Certification

I hereby certify that these As Constructed plans for the West Farm Pit Phase 8 Slurry Wall were prepared by me or under my direct supervision for GP Aggregates, LLC.

James C. York, P.E.
Colorado Registration No. 36846

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.j-tconsulting.com

Phase 3 & Phase 8 Slurry Walls
Cover Sheet
GP Aggregates, LLC
West Farm Pit

REVISIONS

No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As constructed

COLORADO REGISTERED PROFESSIONAL ENGINEER JAMES C. YORK 36846 2.10.22

AS CONSTRUCTED

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	Cover Sheet
Scale	As Shown

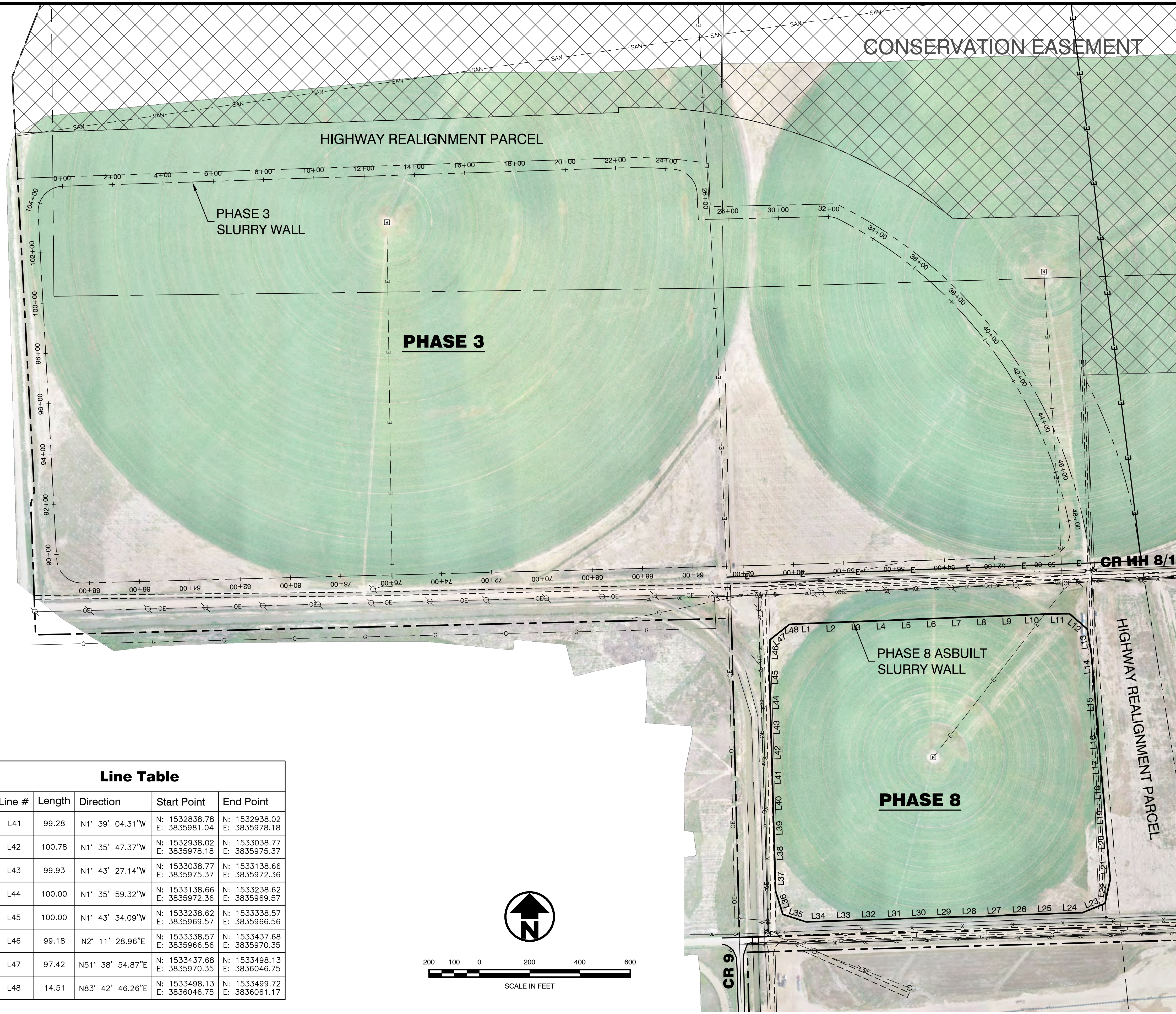
Sheet: 1 Of: 18

P:\07115 GP Ranches LLC - Lamar\Drawings\Plan Sheets\2021 Slurry Wall\JT-2021 PH3 & 8 CoverSheet.dwg, 1 Cover Sheet, 3/22/2024 11:47:06 AM

P:\07115 GP Ranches LLC - Lamar\Drawings\Plan Sheets\2021 Slurry Wall\JT-2021 Ph3-8 Horiz Control.dwg, 2 Slurry Wall Horizontal Control Plan, 3/22/2024 11:04:41 AM

Line Table

Line #	Length	Direction	Start Point	End Point
L1	100.07	N87° 42' 42.95"E	N: 1533499.72 E: 3836061.17	N: 1533503.72 E: 3836161.16
L2	99.93	N87° 43' 15.98"E	N: 1533503.72 E: 3836161.16	N: 1533507.69 E: 3836261.01
L3	100.00	N87° 47' 30.20"E	N: 1533507.69 E: 3836261.01	N: 1533511.54 E: 3836360.94
L4	100.02	N87° 41' 12.36"E	N: 1533511.54 E: 3836360.94	N: 1533515.58 E: 3836460.88
L5	99.98	N87° 47' 27.72"E	N: 1533515.58 E: 3836460.88	N: 1533519.43 E: 3836560.78
L6	100.17	N87° 41' 09.80"E	N: 1533519.43 E: 3836560.78	N: 1533523.48 E: 3836660.87
L7	99.83	N87° 33' 16.18"E	N: 1533523.48 E: 3836660.87	N: 1533527.74 E: 3836760.61
L8	100.00	N87° 58' 57.91"E	N: 1533527.74 E: 3836760.61	N: 1533531.26 E: 3836860.55
L9	100.00	N87° 40' 40.48"E	N: 1533531.26 E: 3836860.55	N: 1533535.31 E: 3836960.47
L10	100.00	N87° 39' 55.96"E	N: 1533535.31 E: 3836960.47	N: 1533539.38 E: 3837060.38
L11	99.90	N89° 04' 15.06"E	N: 1533539.38 E: 3837060.38	N: 1533541.00 E: 3837160.27
L12	93.05	S49° 22' 10.20"E	N: 1533541.00 E: 3837160.27	N: 1533480.41 E: 3837230.89
L13	100.24	S9° 39' 21.70"E	N: 1533480.41 E: 3837230.89	N: 1533381.59 E: 3837247.70
L14	100.00	S4° 44' 00.31"E	N: 1533381.59 E: 3837247.70	N: 1533281.93 E: 3837255.95
L15	200.20	S4° 46' 35.49"E	N: 1533281.93 E: 3837255.95	N: 1533082.43 E: 3837272.62
L16	99.87	S4° 46' 35.49"E	N: 1533082.43 E: 3837272.62	N: 1532982.90 E: 3837280.94
L17	99.93	S5° 03' 22.89"E	N: 1532982.90 E: 3837280.94	N: 1532883.36 E: 3837289.75
L18	100.00	S5° 20' 52.25"E	N: 1532883.36 E: 3837289.75	N: 1532783.79 E: 3837299.07
L19	100.01	S3° 57' 34.79"E	N: 1532783.79 E: 3837299.07	N: 1532684.02 E: 3837305.97
L20	100.00	S4° 44' 32.88"E	N: 1532684.02 E: 3837305.97	N: 1532584.37 E: 3837314.24
L21	99.92	S4° 46' 35.49"E	N: 1532584.37 E: 3837314.24	N: 1532484.79 E: 3837322.56
L22	96.83	S12° 24' 31.80"W	N: 1532484.79 E: 3837322.56	N: 1532390.22 E: 3837301.75
L23	96.42	S67° 38' 29.37"W	N: 1532390.22 E: 3837301.75	N: 1532353.54 E: 3837212.59
L24	99.79	S88° 05' 32.15"W	N: 1532353.54 E: 3837212.59	N: 1532350.22 E: 3837112.85
L25	100.13	S88° 01' 37.91"W	N: 1532350.22 E: 3837112.85	N: 1532346.77 E: 3837012.79
L26	100.15	S88° 09' 26.33"W	N: 1532346.77 E: 3837012.79	N: 1532343.55 E: 3836912.69
L27	99.91	S86° 48' 43.11"W	N: 1532343.55 E: 3836912.69	N: 1532337.99 E: 3836812.94
L28	100.19	S89° 17' 35.98"W	N: 1532337.99 E: 3836812.94	N: 1532336.76 E: 3836712.75
L29	99.80	S88° 05' 49.50"W	N: 1532336.76 E: 3836712.75	N: 1532333.44 E: 3836613.01
L30	100.21	S88° 09' 46.98"W	N: 1532333.44 E: 3836613.01	N: 1532330.23 E: 3836512.85
L31	99.90	S88° 05' 32.15"W	N: 1532330.23 E: 3836512.85	N: 1532326.91 E: 3836413.00
L32	99.88	S88° 03' 31.09"W	N: 1532326.91 E: 3836413.00	N: 1532323.52 E: 3836313.17
L33	100.01	S88° 07' 33.05"W	N: 1532323.52 E: 3836313.17	N: 1532320.25 E: 3836213.21
L34	99.74	S88° 05' 32.15"W	N: 1532320.25 E: 3836213.21	N: 1532316.93 E: 3836113.53
L35	96.76	N72° 11' 52.39"W	N: 1532316.93 E: 3836113.53	N: 1532346.51 E: 3836021.40
L36	96.92	N17° 30' 34.18"W	N: 1532346.51 E: 3836021.40	N: 1532438.94 E: 3835992.24
L37	99.77	N1° 34' 13.70"W	N: 1532438.94 E: 3835992.24	N: 1532538.67 E: 3835989.51
L38	100.54	N1° 41' 34.12"W	N: 1532538.67 E: 3835989.51	N: 1532639.17 E: 3835986.54
L39	99.69	N1° 39' 01.92"W	N: 1532639.17 E: 3835986.54	N: 1532738.82 E: 3835983.67
L40	100.00	N1° 30' 21.93"W	N: 1532738.82 E: 3835983.67	N: 1532838.78 E: 3835981.04



Line Table

Line #	Length	Direction	Start Point	End Point
L41	99.28	N1° 39' 04.31"W	N: 1532838.78 E: 3835981.04	N: 1532938.02 E: 3835978.18
L42	100.78	N1° 35' 47.37"W	N: 1532938.02 E: 3835978.18	N: 1533038.77 E: 3835975.37
L43	99.93	N1° 43' 27.14"W	N: 1533038.77 E: 3835975.37	N: 1533138.66 E: 3835972.36
L44	100.00	N1° 35' 59.32"W	N: 1533138.66 E: 3835972.36	N: 1533238.62 E: 3835969.57
L45	100.00	N1° 43' 34.09"W	N: 1533238.62 E: 3835969.57	N: 1533338.57 E: 3835966.56
L46	99.18	N2° 11' 28.96"E	N: 1533338.57 E: 3835966.56	N: 1533437.68 E: 3835970.35
L47	97.42	N51° 38' 54.87"E	N: 1533437.68 E: 3835970.35	N: 1533498.13 E: 3836046.75
L48	14.51	N83° 42' 46.26"E	N: 1533498.13 E: 3836046.75	N: 1533499.72 E: 3836061.17

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.j-tconsulting.com

Phase 3 & Phase 8 Slurry Walls

Slurry Wall Horizontal Control Plan

GP Aggregates, LLC

West Farm Pit

REVISIONS

No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As Constructed

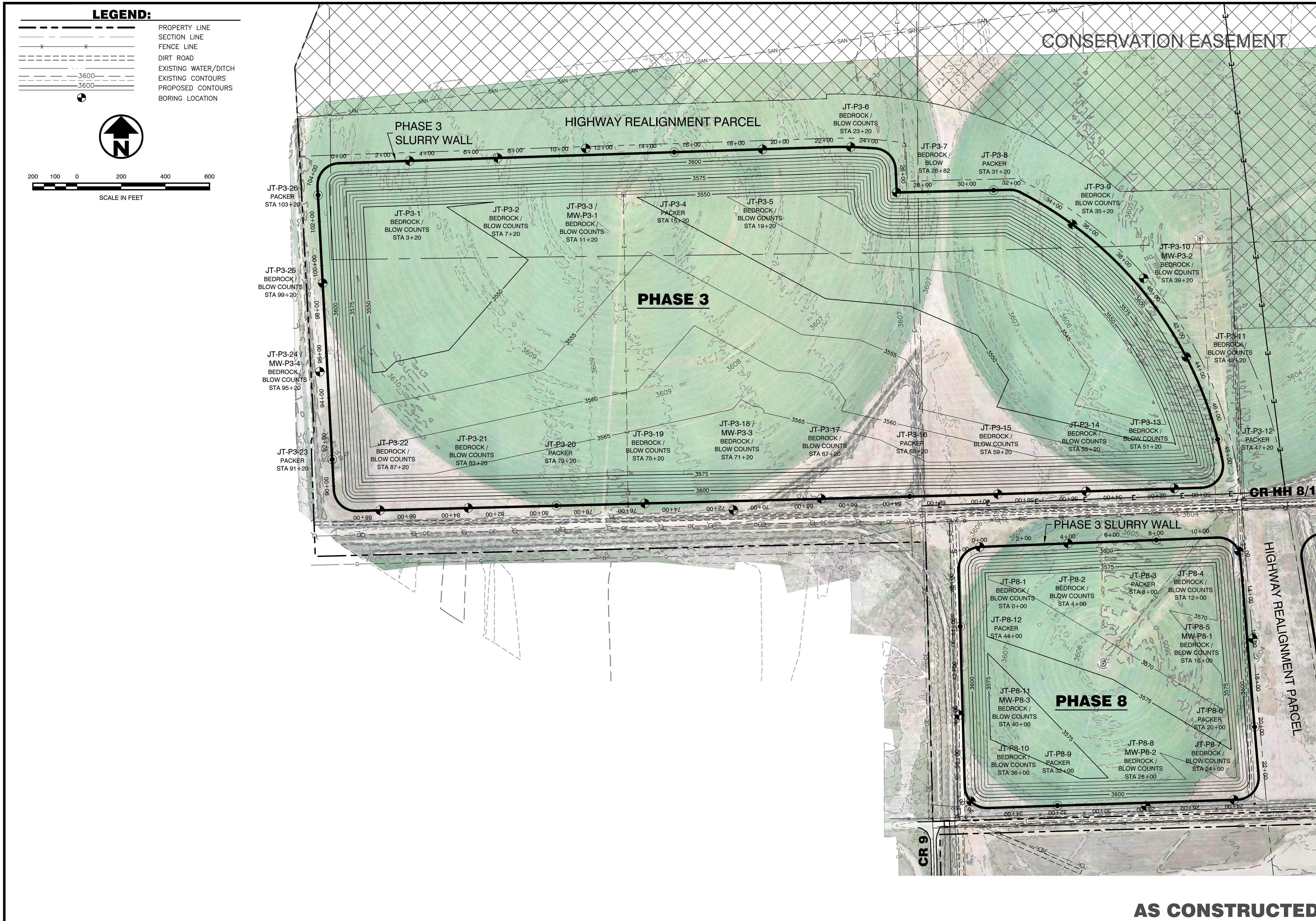
COLORADO REGISTERED JAMES C. YORK 36846 2.10.22 PROFESSIONAL ENGINEER

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

Sheet: 2 Of: 18

AS CONSTRUCTED

P:\07115 GP Ranches LLC - Lamar\Drawings\Plan Sheets\2021 Slurry Wall\JT-2021 Ph3-8 Grading & Boring Map.dwg, 3 Phase 3 & 8 Reservoir Grading & Boring Location Map, 3/22/2024 11:04:54 AM



AS CONSTRUCTED

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.j-tconsulting.com

Phase 3 & Phase 8 Slurry Walls

Phase 3 & 8 Reservoir Grading & Boring Location Map

GP Aggregates, LLC

West Farm Pit

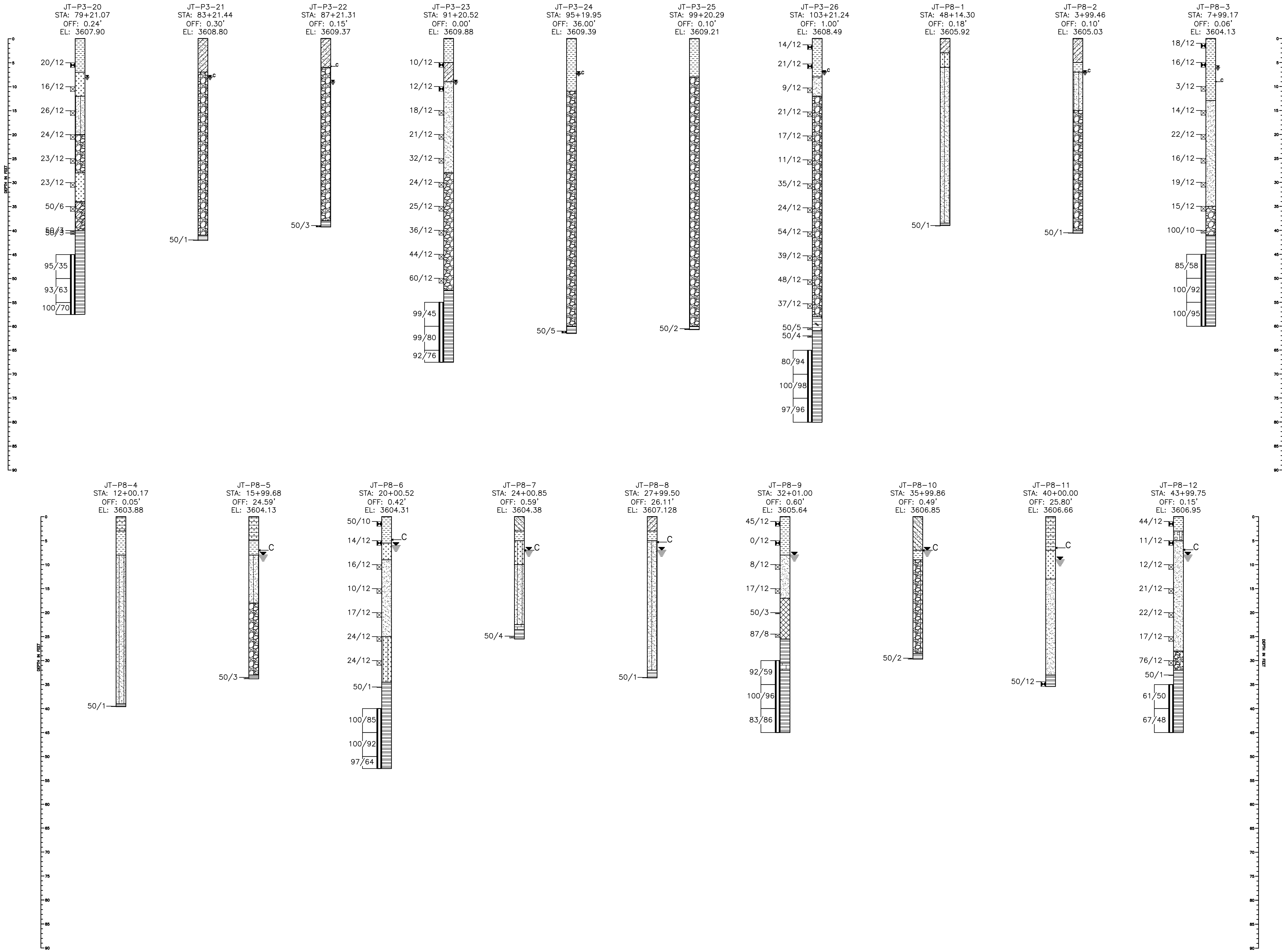
REVISIONS

No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As constructed

COLORADO REGISTERED PROFESSIONAL ENGINEER JAMES C. YORK 36846 2.10.22

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

Sheet: 3 Of: 18



J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.jt-consulting.com

Phase 3 & Phase 8 Slurry Walls

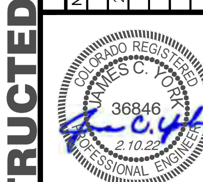
Phase 3 & 8 Boring Logs
P3-20 To P8-12

GP Aggregates, LLC

West Farm Pit

REVISIONS

No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As Constructed



Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

AS CONSTRUCTED

Sheet: 5 Of: 18

P:\07115 GP Ranches LLC - Lamar\Drawings\Plan Sheets\2021 Slurry Wall\JT-2021 Slurry Wall P&P.dwg, Phase 3 & 8 Boring Logs P3-20 to P8-12, 3/22/2024 11:05:14 AM

SYMBOL DESCRIPTION

Strata symbols

CLAY, with sand, soft to medium stiff, moist, occasional organics, dark brown. (CL)

GRAVEL, with sand, with silt, loose to dense, wet, gravels to occasional rounded cobbles, brown.

SHALE, thinly laminated, moderately to highly fractured on bedding planes, moderately to slightly weathered, moderately hard to hard, dark gray to black. Sporadic limestone interlaminations, white. Occasional localized very weathered zones. (SH)

GRAVEL, poorly graded, with sand, with silt, dense, wet, occasional cobble, brown (GP–GM)

CLAYSTONE, very hard, moist, fine sands, some FE spots, tanish light brown.

SAND, poorly graded, with silt, trace organics, loose to medium dense, moist to very moist, light brown. (SM)

SAND, poorly graded, trace silt, trace fine gravel, medium dense, very moist to wet, brown. (SP–SM)

GRAVEL, poorly graded, grades to with sand, with clay to clayey, very dense, wet, light brown (GP–GC).

GRAVEL, sandy, with small round cobbles, trace silt, medium dense to dense, wet, brown. (GW)

SAND, well–graded, with clay, loose to medium dense, moist to very moist, occasional organics, light brown (SW–SC).

SAND, poorly–graded, with occasional fine gravel, loose, moist, occasional organics, brown. (SC)

SAND, poorly–graded, with clay, medium dense, moist, occasional organics, light brown (SP–SC).

GRAVEL, sandy, trace silt, loose to medium dense, wet, fine gravels, brown. (GP)

SAND, well graded. with gravel to gravelly, trace silt, trace round cobbles, medium dense to dense, very moist to wet, brown. (SW–SM)

GRAVEL, sandy, with clay, trace round cobbles, medium dense to dense, very moist to wet, brown. (GC)

LIMESTONE, dolomitic, thinly bedded, moderately weathered, strong cementation, slightly moist, very hard, light gray.

SAND, trace clay, trace fine gravel, medium dense, moist to wet, light brown. (SW)

SAND, trace silt, trace fine gravel, very loose to medium dense, wet brown. (SP)

NOTES;

1. EXPLORATORY BORINGS WERE DRILLED ON JANUARY, 2021.
2. BORING LOCATIONS WERE SURVEYED BY OTHERS PRIOR TO DRILLING.
3. THESE LOGS ARE SUBJECT TO LIMITATIONS, CONCLUSIONS, AND RECOMMENDATIONS IN THE GEOTECHNICAL REPORT BY CESARE, INC.

Water table during drilling

C Depth to caving

Split Spoon

Modified California Sampler

Rock Core

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.jt-consulting.com

Phase 3 & Phase 8 Slurry Walls

Phase 3 & 8 Boring Logs Legend

GP Aggregates, LLC

West Farm Pit

REVISIONS

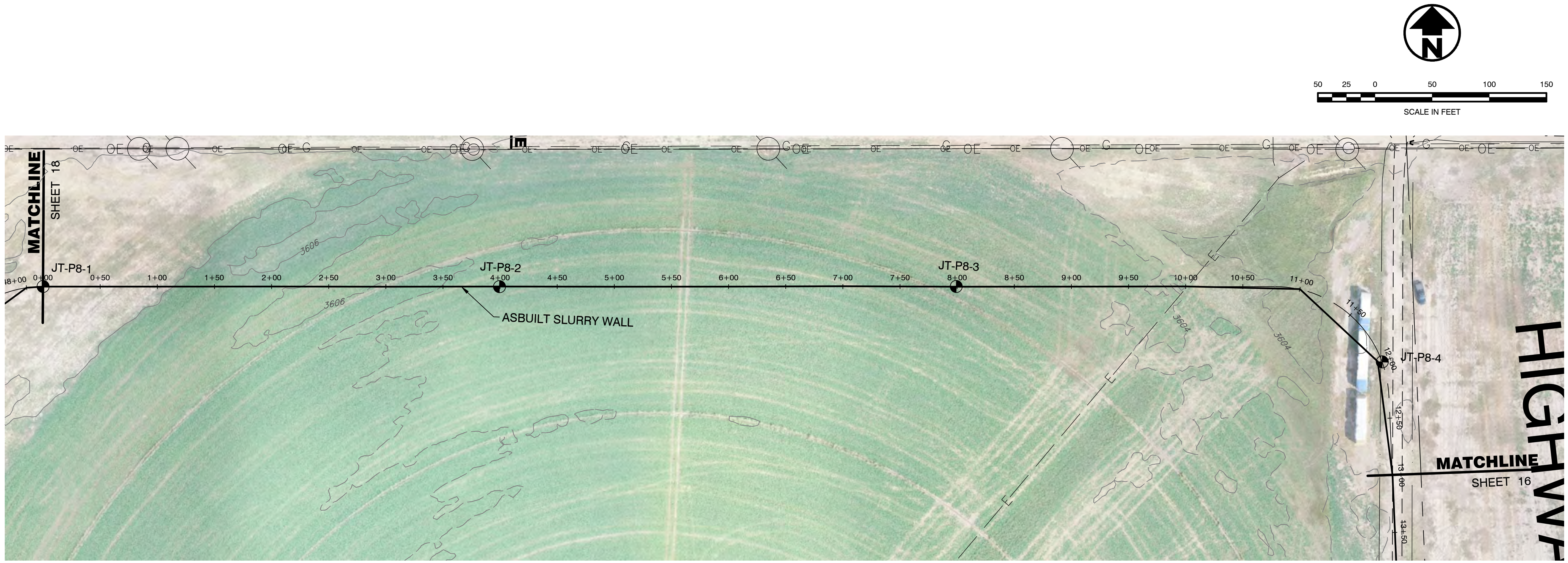
No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As Constructed

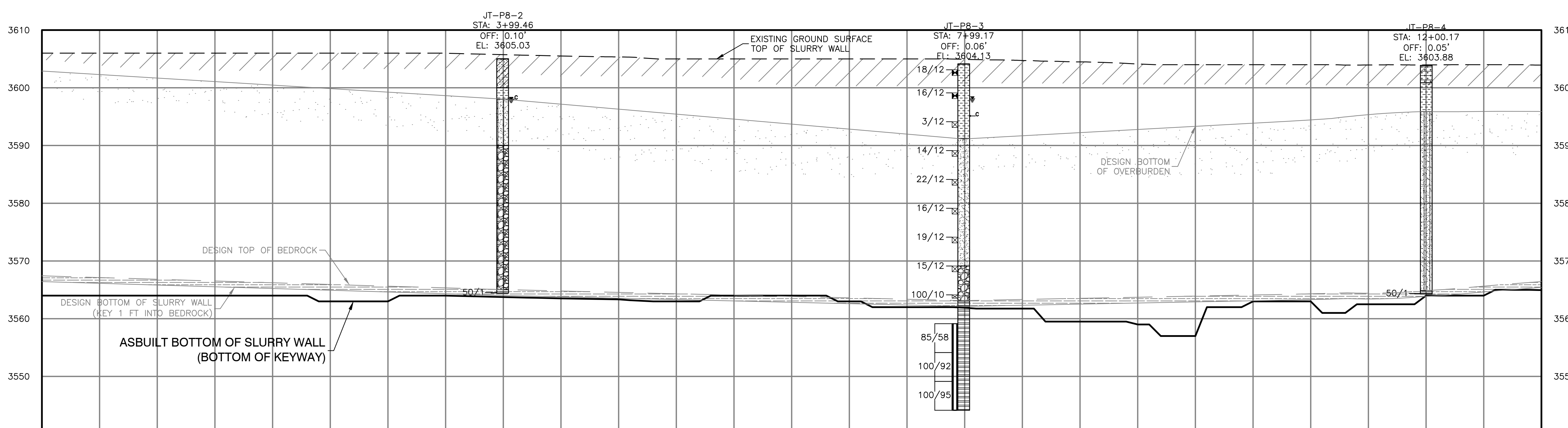
COLORADO REGISTERED PROFESSIONAL ENGINEER JAMES C. YORK 36846 2.10.22

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

Sheet: 6 Of: 18

AS CONSTRUCTED





Station	Existing	AB SW Depth	Top Bedrock	AB Keyway
0+00	3606.00	42.00	3567.42	3564.00
0+50	3606.00	42.00	3567.12	3564.00
1+00	3606.00	42.00	3566.82	3564.00
1+50	3606.00	42.00	3566.52	3564.00
2+00	3606.00	42.00	3566.22	3564.00
2+50	3606.00	43.00	3565.93	3563.00
3+00	3606.00	43.00	3565.63	3563.00
3+50	3605.99	42.00	3565.33	3563.99
4+00	3605.75	42.00	3565.03	3563.75
4+50	3605.51	42.00	3564.79	3563.51
5+00	3605.34	42.00	3564.56	3563.34
5+50	3605.00	42.00	3564.32	3563.00
6+00	3605.00	41.00	3564.08	3564.00
6+50	3605.00	41.00	3563.84	3564.00
7+00	3605.00	42.00	3563.60	3563.00
7+50	3605.00	43.00	3563.37	3562.00
8+00	3604.94	43.04	3563.13	3561.90
8+50	3604.74	42.99	3563.33	3561.75
9+00	3604.49	44.99	3563.52	3559.50
9+50	3604.12	45.12	3563.71	3559.00
10+00	3604.00	47.00	3563.91	3557.00
10+50	3604.00	41.00	3564.10	3563.00
11+00	3604.01	41.01	3564.31	3563.00
11+50	3603.95	41.45	3564.42	3562.50
12+00	3603.97	39.97	3564.88	3564.00
12+50	3604.00	40.00	3565.63	3564.00
13+00	3603.94	39.00	3566.43	3564.94

AS CONSTRUCTED

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.j-tconsulting.com

Phase 3 & Phase 8 Slurry Walls

Phase 8 Slurry Wall Plan & Profile
Sta 0+00 To 13+00

GP Aggregates, LLC

West Farm Pit

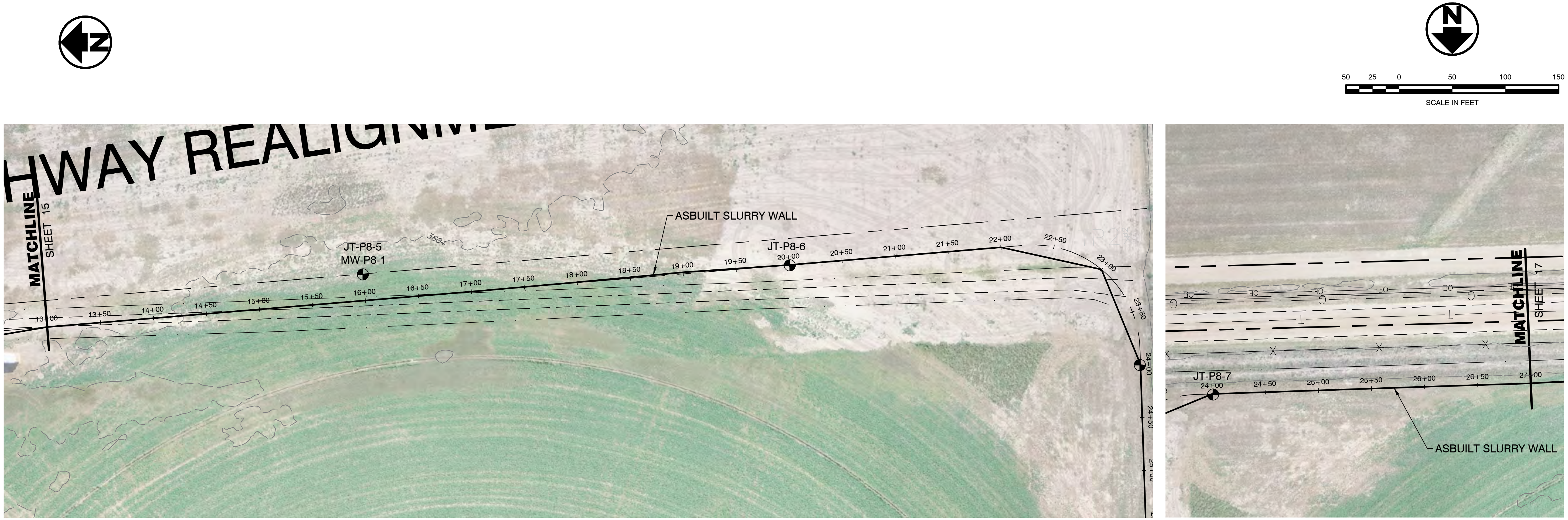
REVISIONS

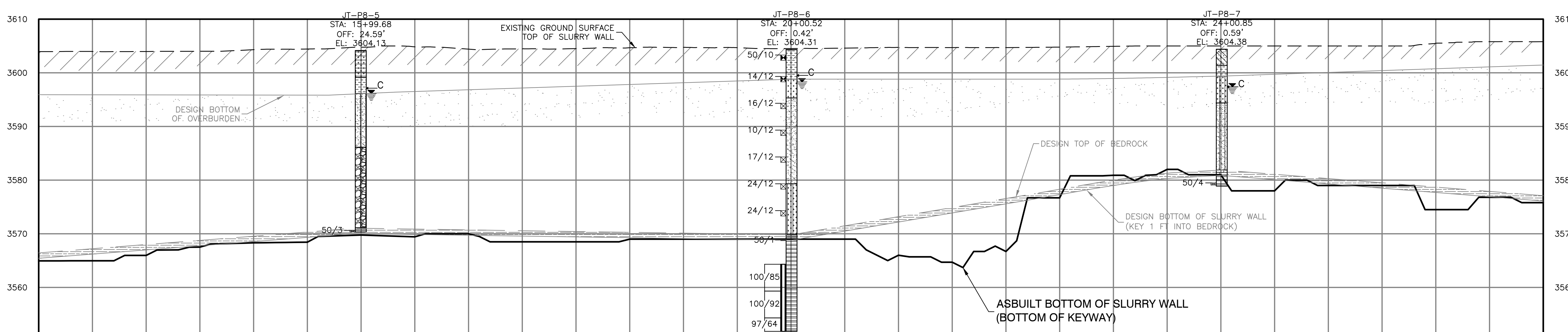
No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TPY	JCY	As Constructed

COLORADO REGISTERED PROFESSIONAL ENGINEER JAMES C. YORK 36846 2.10.22

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

Sheet: 15 Of: 18





Station	Existing	AB SW Depth	Top Bedrock	AB Keyway
13+00	3603.94	39.00	3566.43	3564.94
13+50	3603.97	39.00	3567.21	3564.97
14+00	3603.96	38.00	3567.99	3565.96
14+50	3604.01	36.50	3568.77	3567.51
15+00	3604.31	36.00	3569.55	3568.31
15+50	3604.43	36.00	3570.33	3568.43
16+00	3604.76	35.00	3571.02	3569.76
16+50	3604.83	35.40	3570.87	3569.43
17+00	3604.40	34.40	3570.72	3570.00
17+50	3604.47	35.97	3570.57	3568.50
18+00	3604.50	36.00	3570.42	3568.50
18+50	3604.67	35.67	3570.27	3569.00
19+00	3604.74	35.74	3570.12	3569.00
19+50	3604.68	35.68	3569.97	3569.00
20+00	3604.52	35.52	3569.81	3569.00
20+50	3604.60	35.60	3571.49	3569.00
21+00	3604.72	38.72	3573.18	3566.00
21+50	3604.70	40.00	3574.88	3564.70
22+00	3604.70	38.00	3576.57	3566.70
22+50	3604.79	28.09	3578.29	3576.70
23+00	3604.93	24.03	3579.99	3580.90
23+50	3605.00	23.00	3581.28	3582.00
24+00	3605.00	24.00	3581.87	3581.00
24+50	3605.00	27.00	3581.09	3578.00
25+00	3605.00	26.00	3580.29	3579.00
25+50	3605.00	26.00	3579.49	3579.00
26+00	3605.50	31.00	3578.69	3574.50
26+50	3605.80	29.00	3577.90	3576.80
27+00	3605.79	29.99	3577.10	3575.80

AS CONSTRUCTED

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.jt-consulting.com

Phase 3 & Phase 8 Slurry Walls

Phase 8 Slurry Wall Plan & Profile
Sta 13+00 To 27+00

GP Aggregates, LLC

West Farm Pit

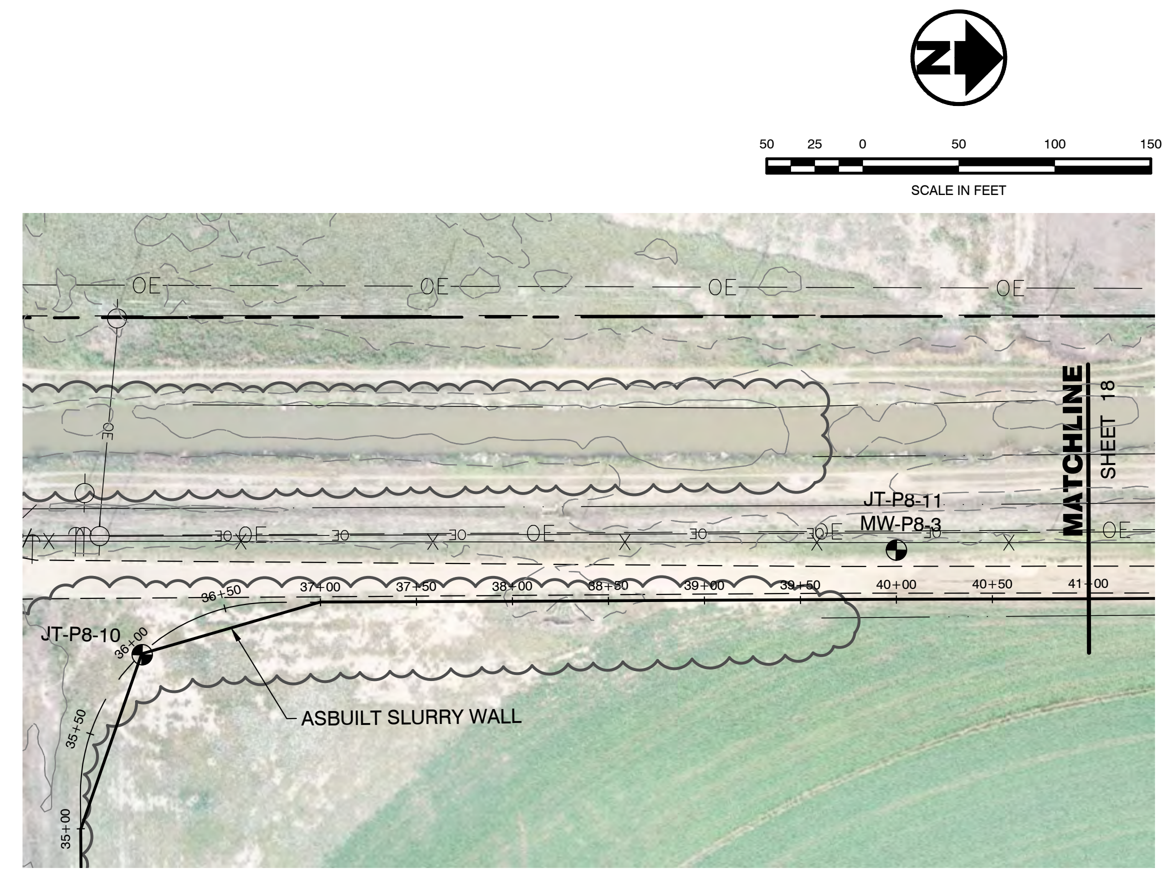
REVISIONS

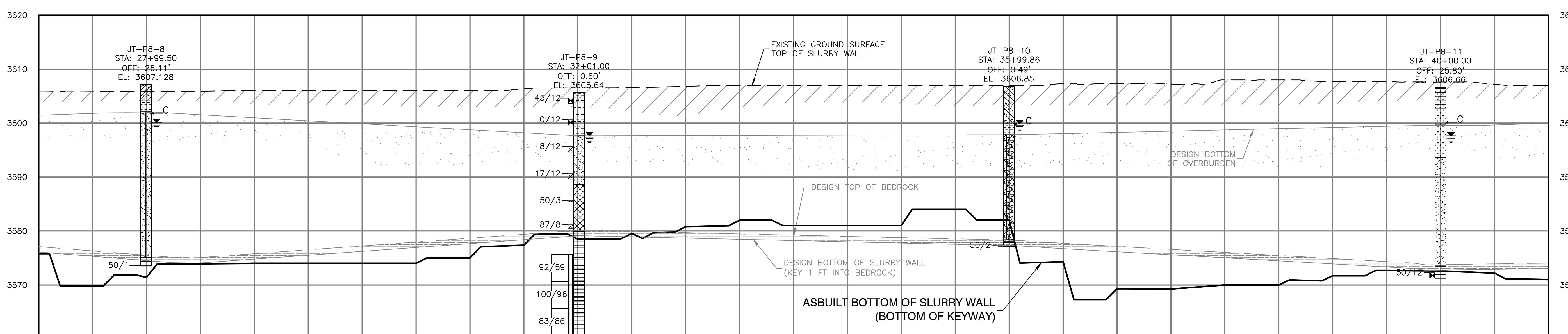
No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TPY	JCY	As Constructed

COLORADO REGISTERED PROFESSIONAL ENGINEER
JAMES C. YORK
36846
2.10.22

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

Sheet: 16 Of: 18





Station	Existing	AB SW Depth	Top Bedrock	AB Keyway
27+00	3605.79	29.99	3577.10	3575.80
27+50	3605.81	36.00	3576.30	3569.81
28+00	3605.89	34.50	3575.51	3571.39
28+50	3605.90	32.00	3575.08	3573.90
29+00	3606.00	32.00	3575.80	3574.00
29+50	3606.00	32.00	3576.52	3574.00
30+00	3606.00	32.00	3577.23	3574.00
30+50	3606.00	32.00	3577.95	3574.00
31+00	3606.00	31.00	3578.67	3575.00
31+50	3606.37	29.00	3579.39	3577.37
32+00	3606.51	28.00	3580.11	3578.51
32+50	3606.56	27.00	3579.92	3579.56
33+00	3606.83	26.00	3579.69	3580.83
33+50	3607.00	25.00	3579.46	3582.00
34+00	3607.00	26.00	3579.23	3581.00
34+50	3607.00	26.00	3579.00	3581.00
35+00	3607.00	26.00	3578.77	3581.00
35+50	3607.00	23.00	3578.54	3584.00
36+00	3607.00	25.00	3578.35	3582.00
36+50	3607.30	33.00	3577.73	3574.30
37+00	3607.29	38.00	3577.16	3569.29
37+50	3607.25	38.00	3576.60	3569.25
38+00	3608.00	38.00	3576.04	3570.00
38+50	3608.00	38.00	3575.47	3570.00
39+00	3607.71	36.00	3574.90	3571.71
39+50	3607.69	35.00	3574.33	3572.69
40+00	3607.61	35.00	3573.74	3572.61
40+50	3607.20	35.00	3573.89	3572.20
41+00	3607.00	36.00	3574.04	3571.00

AS CONSTRUCTED

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.j-tconsulting.com

Phase 3 & Phase 8 Slurry Walls

Phase 8 Slurry Wall Plan & Profile
Sta 27+00 To 41+00

GP Aggregates, LLC
West Farm Pit

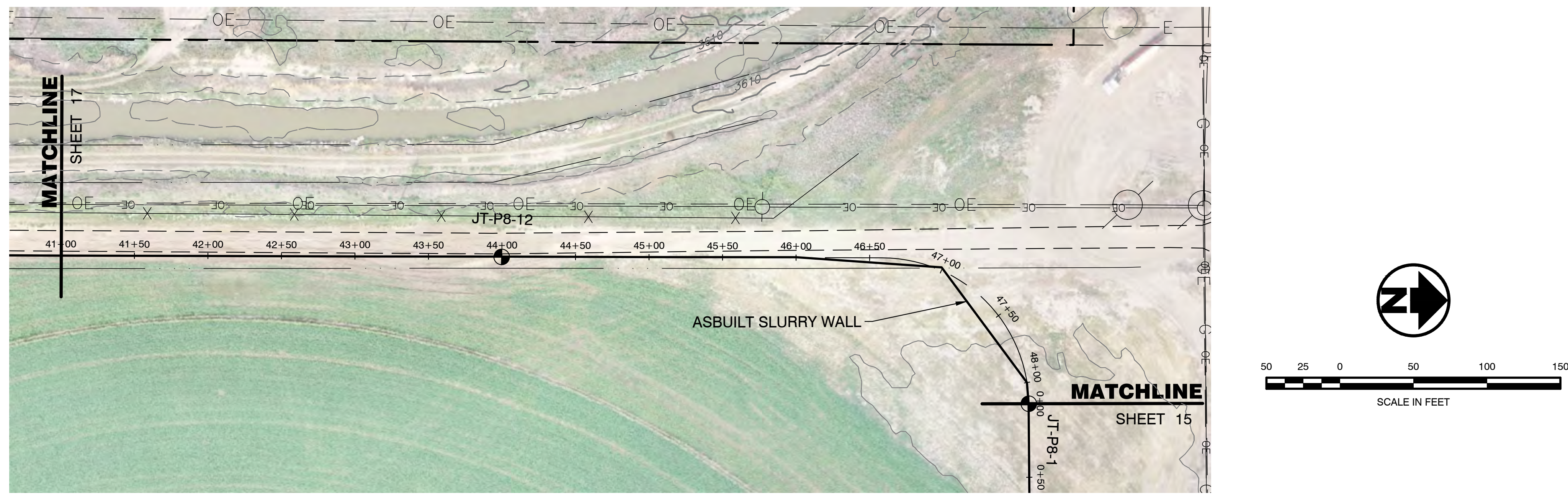
REVISIONS

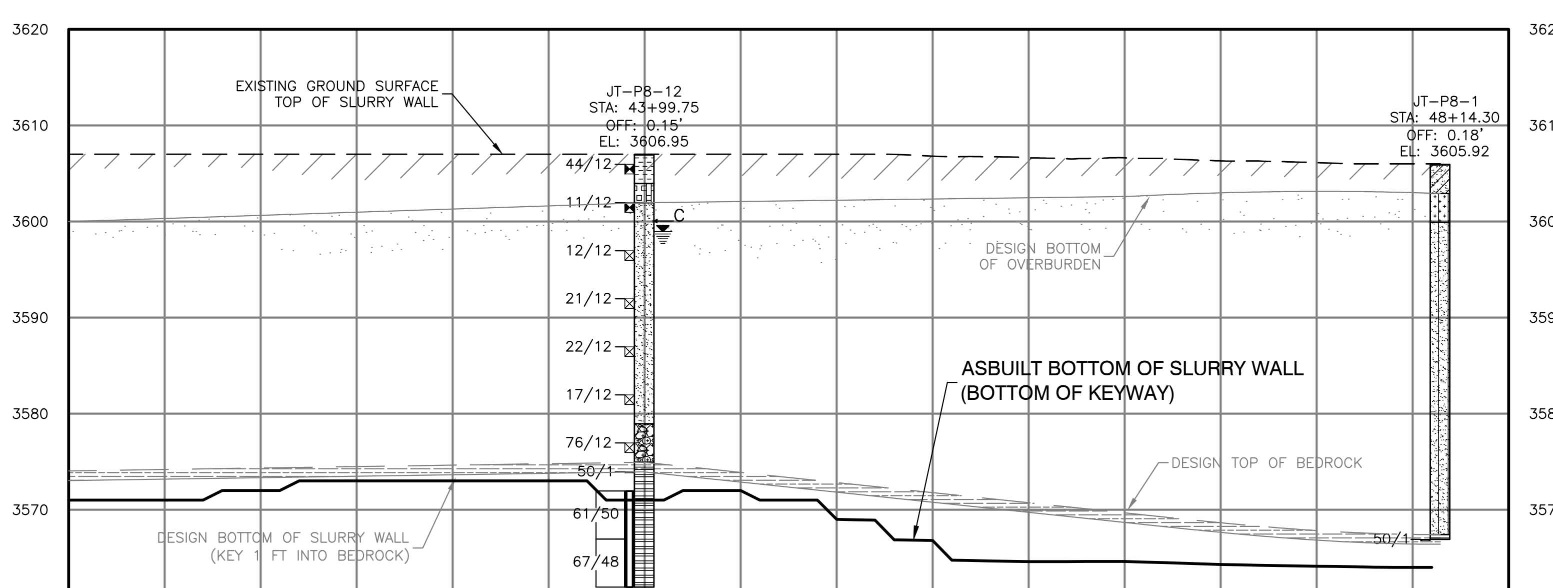
No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TPY	JCY	As Constructed

COLORADO REGISTERED
JAMES C. YORK
36846
2.10.22
PROFESSIONAL ENGINEER

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

Sheet: 17 Of: 18





Station	Existing	AB SW Depth	Top Bedrock	AB Keyway
41+00	3607.00	36.00	3574.04	3571.00
41+50	3607.00	36.00	3574.20	3571.00
42+00	3607.00	35.00	3574.35	3572.00
42+50	3607.00	34.00	3574.50	3573.00
43+00	3607.00	34.00	3574.65	3573.00
43+50	3607.00	34.00	3574.80	3573.00
44+00	3607.00	36.00	3574.94	3571.00
44+50	3607.00	35.00	3573.89	3572.00
45+00	3607.00	38.00	3572.84	3569.00
45+50	3606.80	40.00	3571.78	3566.80
46+00	3606.61	42.00	3570.73	3564.61
46+50	3606.62	42.00	3569.68	3564.62
47+00	3606.31	42.00	3568.65	3564.31
47+50	3606.13	42.00	3567.84	3564.13
48+00	3606.00	42.00	3567.44	3564.00
48+50				

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.j-tconsulting.com

Phase 3 & Phase 8 Slurry Walls

Phase 8 Slurry Wall Plan & Profile
Sta 41+00 To 46+50

GP Aggregates, LLC

West Farm Pit

REVISIONS

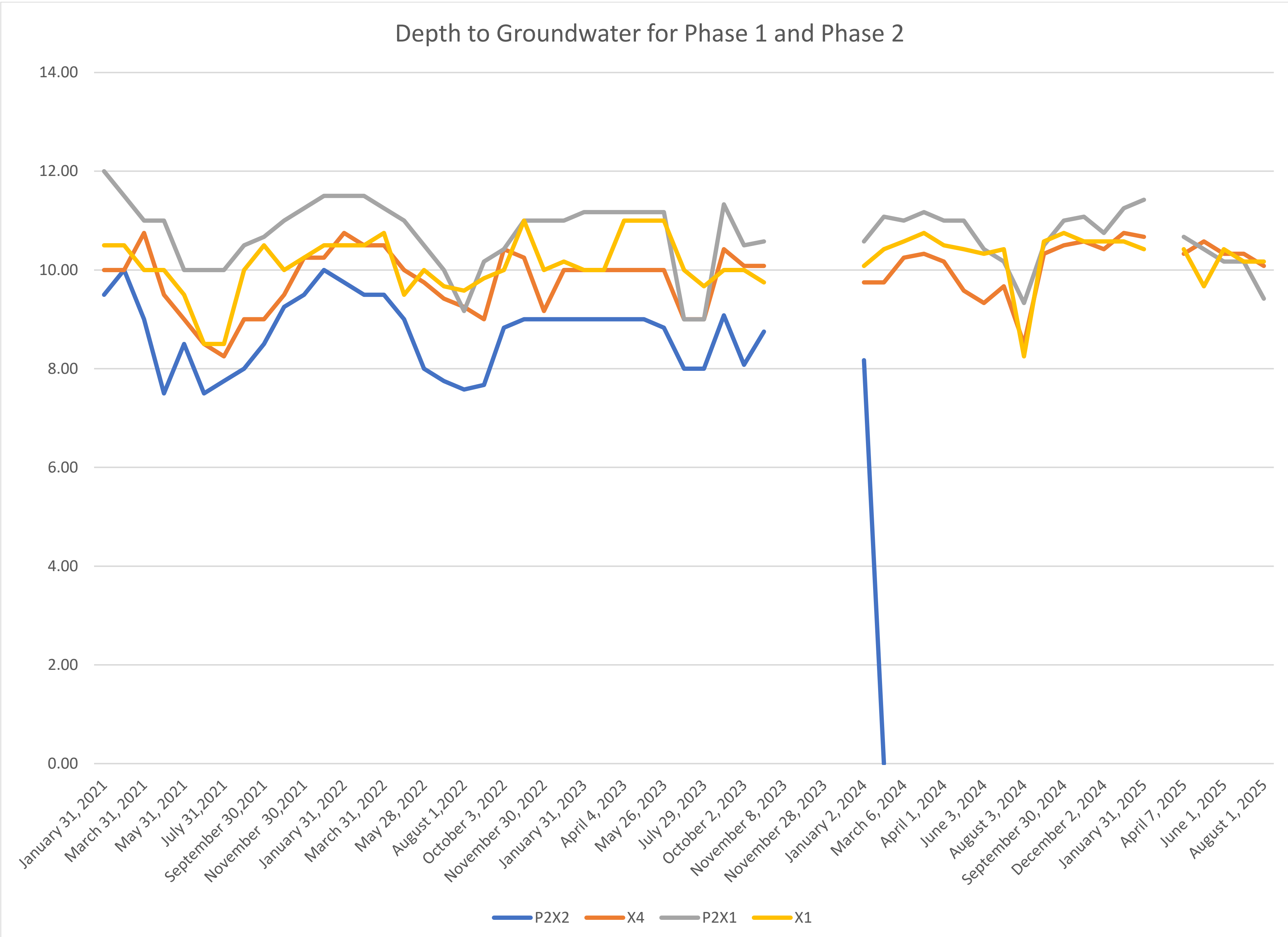
No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TPY	JCY	As Constructed

COLORADO REGISTERED JAMES C. YORK 36846 2.10.22 PROFESSIONAL ENGINEER

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

AS CONSTRUCTED

Sheet: 18 Of: 18


Depth to Groundwater for Phase 1 and Phase 2
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
January 31, 2021
March 31, 2021
May 31, 2021
July 31,2021
September 30,2021
November 30,2021
January 31, 2022
March 31, 2022
May 28, 2022
August 1,2022
October 3, 2022
November 30, 2022
January 31, 2023
April 4, 2023
May 26, 2023
July 29, 2023
October 2, 2023
November 8, 2023
November 28, 2023
January 2, 2024
March 6, 2024
April 1, 2024
June 3, 2024
August 3, 2024
September 30, 2024
December 2, 2024
January 31, 2025
April 7, 2025
June 1, 2025
August 1, 2025
P2X2
X4
P2X1
X1

BRANNAN
Sand and Gravel Co. / Ready Mix
Founded 1906

August 27, 2025

Ursula Armstrong, Environmental Protection Specialist
Active Mines Program
Colorado Division of Reclamation, Mining and Safety
1313 Sherman Street, Room 215
Denver, CO 80203

Sent via email to ursula.armstrong@state.co.us.

Subject: Response to May 21, 2025, Inspection Report for West Farm Pit, M-2008-078

Ms. Armstrong:

Thank you for working with Brannan on our West Farm Pit, M-2008-078, in Lamar. Our company remains committed to operating all aspects of the mine in compliance with DRMS rules and regulations. This letter responds to the four points brought up in the May 21, 2025, Inspection Report.

#1 – Issue: Lack of valid well permit, SWSP, or approved water augmentation plan for exposed groundwater. The M-2008-078 operation does have a gravel well permit: Permit No. 75864-F (please see attached). Brannan, through its hydrologic consultant, Hendrix Wai Engineering, requested renewal for the 2025-26 SWSP on February 26, 2025 (copy of transmittal email, attached). The request was entered into the state's system on February 27, 2025, so the agency has it on file but has not yet approved or denied it. We were under the impression, per our consultant, that the DWR office that handles the paperwork was short-staffed and that the lead person was on maternity leave. Recently, we learned that processing of our SWSP is being held up by a de minimis technical question (acreage of a dewatering trench); we took immediate steps to resolve the issue by providing the requested acreage and are again waiting for DWR's administrative action. In the meantime, Brannan is following the proposed SWSP and will forward you the approval once received.

There is no injury to existing water rights. There is no manifest problem with any other water use, nor is it reasonable to characterize any visible water as automatically being "groundwater," since its presence in a slurry-walled pit is the result of either wash cycle or incidental precipitation (note that there was significant rain in Lamar on May 19, not even two days before the inspection).

More critically, out-of-priority depletions at the M-2008-078 operation are accounted for as noted in the SWSP narrative (previously transmitted), and replaced both under an SWSP and an approved augmentation decree (Case 02CW181, as amended); specifically, as described in the SWSP narrative, water used for the wash cycle is obtained from a well and is augmented under LAWMA's decreed plan. The Operator categorically disputes any allegation that it is in violation of C.R.S. 34-32.5-116(4)(h) or Construction Material Rule 3.1.6(1)(a).

#2 – Issue: Failure to include groundwater level data with annual report. This was an oversight stemming from the Succession of Operators from Prowers Aggregate Operators to Brannan Sand & Gravel while AM-2 was in process. The obligation to include data with the annual report is now written into our internal compliance calendar. In the meantime, Brannan appreciates this opportunity to update the file with well data and clarify that there is no disturbance to the hydrologic balance due to the M-2008-078 permit.

Since supplying the inadvertently forgotten data does not involve changing the mining permit or application, the simplest path to resolution is submission of these documents (please see enclosure list).

For Phase 1 and Phase 2 data the most obvious change—other than expected seasonal variation—is the fact that Monitoring Well P2X2 was buried and no longer reports data. Data from two "interior" wells (P2I1 and P2I2) simply report reservoir depth and are not shown on the accompanying graph.

The data for Phase 3 and Phase 8 are consistent with the predictions in the 2021 Groundwater Modeling Report. For example:

- Mounding on the upgradient side of Phase 3 and Phase 8 as shown in Figure 11 (see, for example, P3-4).
- One to two years to reach a steady state after a slurry wall installation as described on page 2 of the Report (see, for example, P3-3 and P8-1).

Monitoring well data is consistent with expected seasonal and climatological variability, as well as operational effects (i.e., completion of Phase 2 mining, replacing pit dewatering with reservoir filling). Wells P5-1 and P6-1 are instructive, as these wells are substantially removed from current mining activity but reflect expected variability.

#3 – Issue: Failure to follow the approved mining plan in regards to management of the settling ponds. Prior to AM-2, silt-laden water from settling ponds had been discharged due to inadequate controls, prompting specific performance guidelines. In its present layout and in accordance with these guidelines, West Farm Pit now has adequate capacity to run its wash cycle and comply with its water quality/discharge permit. Settling ponds are part of a closedloop system to contain and re-use process water. There is typically no discharge, and if there is, it is from pit dewatering rather than spillover from the aggregate plant. No evidence points to the settling ponds being an operational problem or a regulatory compliance issue. In AM-2, the settling ponds are to be "cleaned as needed." The Operator does and will continue to periodically clean out settling ponds when warranted.

#4 – Issue: Financial warranty is not adequate to reclaim the site in accordance with the approved reclamation plan. Brannan disputes any failure to maintain adequate bond. Installation of new slurry wall and other progressive changes to the site offset DRMS self-initiated changes to unit costs. We do not presently have administrative capacity to assemble and process a bond reduction application, and are confident financial warranty is presently sufficient. The Operator is likely to submit a "SR" in the foreseeable future, at which time it will be appropriate to reassess unit costs and site-specific quantities for outstanding reclamation.

With any questions or further discussion, please do not hesitate to contact me at aschatz@brannan1.com or 303-853-5161. Your time and consideration are appreciated.

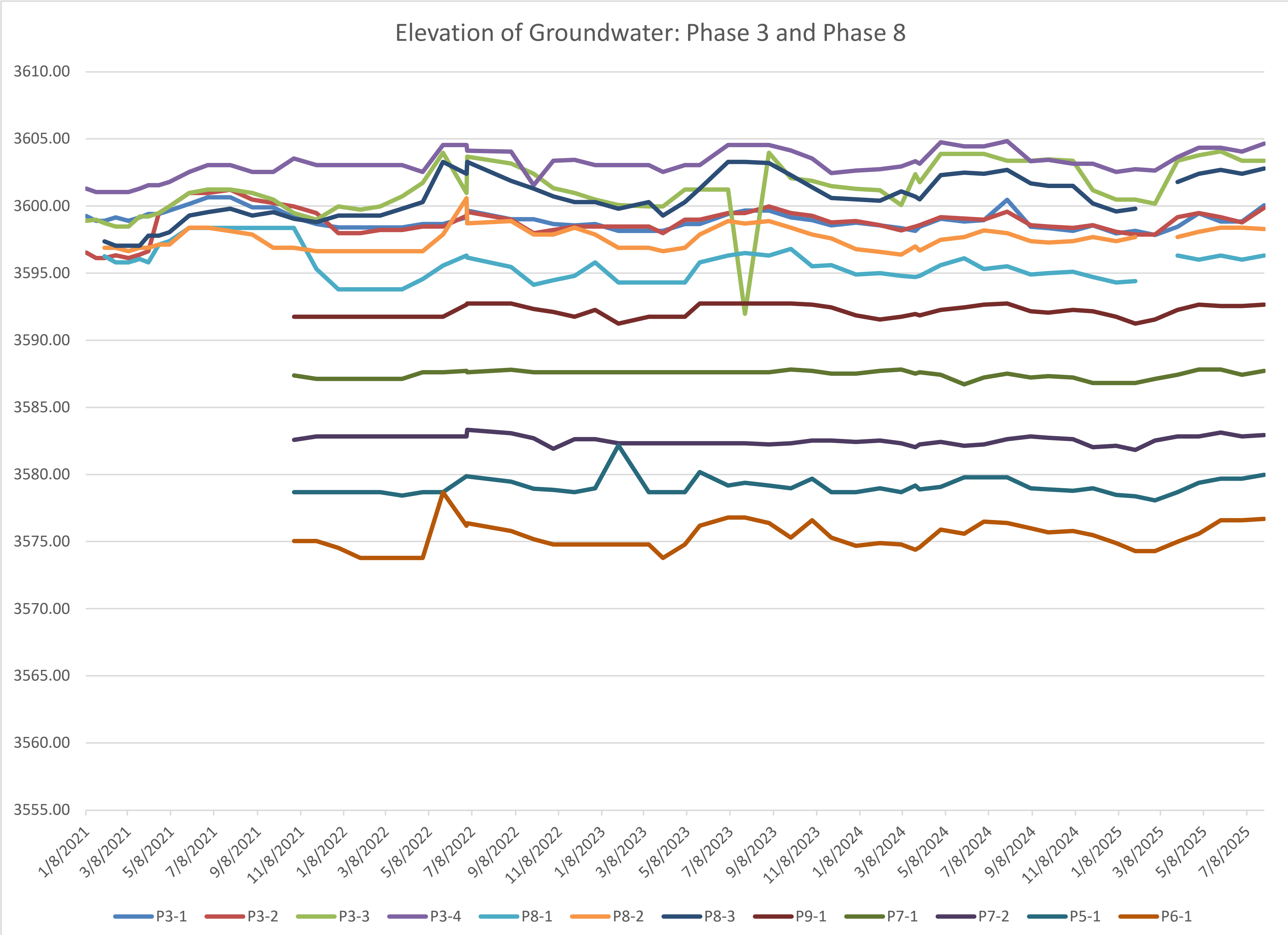
Respectfully,

BRANNAN SAND AND GRAVEL COMPANY, LLC

Alex Schatz
Legal and Regulatory Affairs Manager

Enclosures:

- Well Permit No. 75864-F
- Email transmittal of SWSP to SEO
- Approvals of slurry walls/liner tests for Phases 3 and 8
- As-built documentation for slurry walls, Phases 3 and 8
- Phase 1 and 2 well data from January 2021 to current
- Phase 3 and 8 well data
- Trend graphs of groundwater elevations
- Map showing 17 monitoring well locations
- 2021 Groundwater Modeling Report (already part of DRMS record)



Elevation of Groundwater: Phase 3 and Phase 8
3610.00
3605.00
3600.00
3595.00
3590.00
3585.00
3580.00
3575.00
3570.00
3565.00
3560.00
3555.00
1/8/2021
3/8/2021
5/8/2021
7/8/2021
9/8/2021
11/8/2021
1/8/2022
3/8/2022
5/8/2022
7/8/2022
9/8/2022
11/8/2022
1/8/2023
3/8/2023
5/8/2023
7/8/2023
9/8/2023
11/8/2023
1/8/2024
3/8/2024
5/8/2024
7/8/2024
9/8/2024
11/8/2024
1/8/2025
3/8/2025
5/8/2025
7/8/2025
P3-1
P3-2
P3-3
P3-4
P8-1
P8-2
P8-3
P9-1
P7-1
P7-2
P5-1
P6-1

Form No. GWS-25

OFFICE OF THE STATE ENGINEER
COLORADO DIVISION OF WATER RESOURCES

818 Centennial Bldg., 1313 Sherman St., Denver, Colorado 80203
(303) 866-3581

WELL PERMIT NUMBER 75864 -F -
DIV. 2 WD 67 DES. BASIN MD

APPLICANT

GP AGGREGATES, LLC
7991 SHAFFER PARKWAY
SUITE 200
LITTLETON, CO 80127-

(303) 369-5100

APPROVED WELL LOCATION
PROWERS COUNTY
1/4 NE 1/4 Section 33
Township 22 S Range 46 W Sixth P.M.

DISTANCES FROM SECTION LINES
Ft. from Section Line
Ft. from Section Line

UTM COORDINATES (Meters,Zone:13,NAD83)
Easting: Northing:

PERMIT TO EXPOSE WATER IN A PIT

ISSUANCE OF THIS PERMIT DOES NOT CONFER A WATER RIGHT

CONDITIONS OF APPROVAL

1) This well shall be used in such a way as to cause no material injury to existing water rights. The issuance of this permit does not assure the applicant that no injury will occur to another vested water right or preclude another owner of a vested water right from seeking relief in a civil court action.
2) The construction of this well shall be in compliance with the Water Well Construction Rules 2 CCR 402-2, unless approval of a variance has been granted by the State Board of Examiners of Water Well Construction and Pump Installation Contractors in accordance with Rule 18.
3) Approved pursuant to CRS 37-90-137 (2) and (11) for the construction and operation of a well (gravel pit ground water pond) in accordance with the temporary substitute water supply plan approved by the State Engineer on January 9, 2012, for the West Farm Pit, Division of Reclamation Mining and Safety, Permit Number M2008-078. The well (pond) shall not be operated unless it is included in a substitute water supply plan approved by the State Engineer or a plan for augmentation approved by the Water Court. The water supply plan for this pit is currently valid through April 30, 2012 and if it is not extended or if a court decree is not entered for a plan for augmentation, this well permit is null and void and diversion of ground water from this well must cease immediately.
4) This well is subject to administration by the Division Engineer in accordance with applicable decrees, statutes, rules, and regulations.
5) The average annual amount of ground water to be appropriated shall not exceed 746.21 acre-feet with the total build-out surface area of the proposed ground water pond limited to 175.1 acres or the surface area covered under a water court approved plan for augmentation or substitute water supply plan approved by the State Engineer, whichever is less . No additional water surface shall be exposed unless a permit therefor is approved.
6) The use of ground water, in addition to dewatering (at a rate of 4,000 gallons per minute) is limited to 717.91 acre-feet of evaporative loss, 6.2 acre-foot of water used for dust control, and 22.1 acre-feet of water lost with the mined product (750,000 tons/yr) or the amounts covered under a water court approved plan for augmentation or substitute water supply plan approved by the State Engineer, whichever is less. No other use of water is allowed unless a permit therefor is approved.
7) The owner shall mark the well (pond) in a conspicuous place with well permit number(s) and court case number(s) as appropriate. The owner shall take necessary means and precautions to preserve these markings.
8) A metering method must be established for this well pursuant to the Amended Rules Governing the Measurement of Tributary Ground Water Diversions Located in the Arkansas River Basin. Permanent records of all diversions from the gravel pit, tonage of mined product, and the surface area of ground water exposure shall be maintained by the well owner (recorded at least annually) and submitted to the Division Engineer upon request.

Permit Expiration Date Extended to February 10, 2014 - AOT 1-31-13

APPROVED
IDC

Dick Wolfe
State Engineer

H Romanic
By

Receipt No. 3652084 DATE ISSUED 02-10-2012 EXPIRATION DATE 02-10-2013

ISSUANCE OF THIS PERMIT DOES NOT CONFER A WATER RIGHT

CONDITIONS OF APPROVAL

9) Pursuant to Policy 2000-4 (as amended October 1, 2002) of the State Board of Examiners of Water Well Construction and Pump Installation Contractors (Board), the minimum construction standards in Rule 10 of the Water Well Construction Rules shall be waived for gravel pit wells except Rule 10.1 and its subsections10.1.2, 10.1.4, 10.1.6 and Rule 10.2 and its subsection 10.2.1. The owner of the gravel pit shall take necessary means and precautions to prevent contaminants from entering the gravel pit ground water pond.

10) Pursuant to Policy 2000-4 (as amended October 1, 2002) of the Board, the disinfection standards of Rule 15 of the Water Well Construction Rules shall be waived and the water well construction report requirement of Rule 17 shall be waived, except compliance with Rules 17.1.4, 17.3 and 17.4 is required.

11) The boundaries of the gravel pit pond shall be more than 600 feet from any existing well constructed in the same source, that is not owned by the applicant.

12) Pursuant to Policy 2000-4 (as amended October 1, 2002) of the Board, no pumping equipment shall be installed in the gravel pit well to withdraw water for any beneficial use, unless a separate written request for a variance has been approved by the Board.

NOTE: Expired permit no. 68574-F was previously issued for this gravel pit.

02.10.2012
I.D.C.

April 11, 2025

J.C. York, P.E.
J&T Consulting, Inc.
305 Denver Ave, Suite D
Fort Lupton, CO 80621

Subject: West Farm Gravel Pit Phase 3
Slurry Wall 90-Day Performance Test Final Report
Sections 28, 29, 32, 33, T22S, R46W, DRMS #M2008078
Water Division 2, Water District 67

Dear J.C. York,

The purpose of this letter is to approve the leak test of the above referenced site. This approval is for one cell as shown in Enclosure 1 of the applicants February 26, 2025 letter, known as the West Farm Gravel Pit, Phase 3.

This approval is based on the information provided by you, J&T Consulting, Inc., on behalf of the applicants as described under the cover letter dated February 26, 2025 (attached). The estimated site groundwater inflow and the outflow due to pumping indicate that this site has been lined to the performance standard as referenced in the August, 1999 State Engineer Guidelines for Lining Criteria for Gravel Pits. Meeting the performance standard requires that all water inflows and outflows for this site must be accounted for on at least a weekly basis, by the end of the week following the accounting. Your application indicates that Prowers Aggregate Operators will be responsible for providing this accounting.

As detailed in the State Engineer Guidelines for Lining Criteria for Gravel Pits, “In the event that the average daily unregulated groundwater inflow to the reservoir exceeds the Performance Standard for two consecutive months, as evidenced by accounting (see above), the applicant or their successor and the State Engineer's Office shall consult regarding the probable cause of the unregulated groundwater inflow, and the appropriate actions to be taken in response thereto.” Continued monitoring and accounting will be used to determine compliance with the Guidelines. Please coordinate with the Water Commissioner, Brandy Cole, regarding getting an account set up in the accounting uploader tool to submit the weekly accounting.

Please call me if you have any questions.

Sincerely,

Noah Friesen, P.E.
Augmentation Engineer

enc:
ec: Rachel Zancanella, Division Engineer
Brandy Cole, Water Commissioner Water District 67
Melissa van der Poel, Denver SEO Team 237

COLORADO
Division of Water Resources
Department of Natural Resources
Water Division 2 - Main Office

April 25, 2024

J.C. York, P.E.
J&T Consulting, Inc.
305 Denver Ave, Suite D
Fort Lupton, CO 80621

Subject: West Farm Gravel Pit Phase 8
Slurry Wall 90-Day Performance Test Final Report
Section 33, T22S, R46W, DRMS #M2008078
Water Division 2, Water District 67

Dear J.C. York,

The purpose of this letter is to approve the leak test of the above referenced site. This approval is for one cell as shown in Enclosure 1 of the applicants March 22, 2024 letter, known as the West Farm Gravel Pit, Phase 8.

This approval is based on the information provided by you, J&T Consulting, Inc., on behalf of the applicants as described under the cover letter dated March 22, 2024 (attached). The estimated site groundwater inflow and the outflow due to pumping indicate that this site has been lined to the performance standard as referenced in the August, 1999 State Engineer Guidelines for Lining Criteria for Gravel Pits. Meeting the performance standard requires that all water inflows and outflows for this site must be accounted for on at least a weekly basis, by the end of the week following the accounting. Please provide the specific contact information of the person who will be responsible for this reporting at your earliest convenience.

As detailed in the State Engineer Guidelines for Lining Criteria for Gravel Pits, "In the event that the average daily unregulated groundwater inflow to the reservoir exceeds the Performance Standard for two consecutive months, as evidenced by accounting (see above), the applicant or their successor and the State Engineer's Office shall consult regarding the probable cause of the unregulated groundwater inflow, and the appropriate actions to be taken in response thereto." Continued monitoring and accounting will be used to determine compliance with the Guidelines.

Please call me if you have any questions.

Sincerely,

Noah Friesen

Noah Friesen, P.E.
Augmentation Engineer

enc:

ec: Rachel Zancanella, Division Engineer
Brandy Cole, Water Commissioner Water District 67
Melissa van der Poel, Denver SEO Team 237

GP AGGREGATES, LLC
West Farm Pit
Phase 3 & Phase 8 Slurry Walls

LOCATED IN
TOWNSHIP 22 SOUTH, RANGE 48 WEST, 6th P.M.
COUNTY of PROWERS, STATE of COLORADO
February, 2021

GENERAL NOTES:

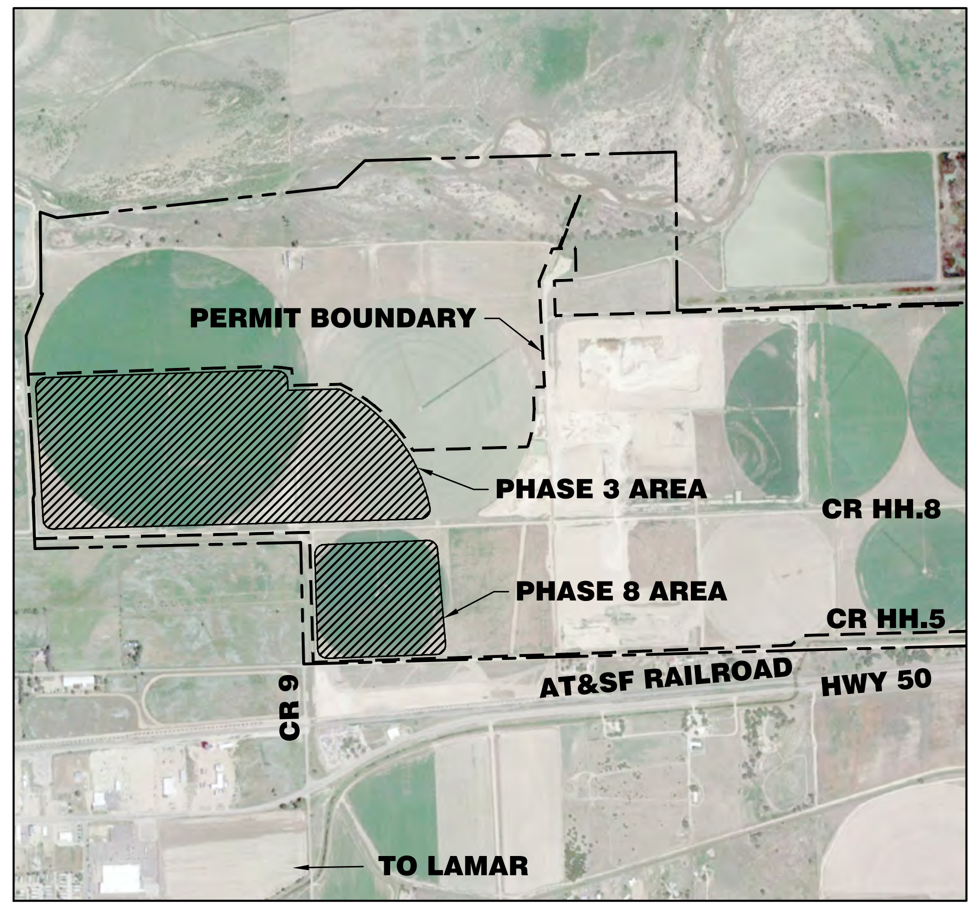
1. THESE CONSTRUCTION PLANS ARE TO BE USED IN CONJUNCTION WITH THE TECHNICAL SPECIFICATIONS PREPARED BY J&T CONSULTING, INC., AND GEOTECHNICAL INVESTIGATION AND ENGINEERING DESIGN RECOMMENDATIONS PREPARED BY CESARE, INC.
2. COMPLY WITH ALL REQUIREMENTS OF OWNER OBTAINED PROJECT PERMITS: INCLUDING, BUT NOT LIMITED TO, PERMITS FROM THE U.S. ARMY CORPS OF ENGINEERS AND COLORADO DEPARTMENT OF HEALTH AND ENVIRONMENT. CONTRACTOR SHALL OBTAIN ALL OTHER PERMITS NECESSARY FOR CONSTRUCTION OF THE WORK.
3. PROTECT ALL EXISTING WETLANDS.
4. THE CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING EROSION AND SEDIMENT CONTROL MEASURES AT ALL TIMES DURING CONSTRUCTION.
5. ALL CONSTRUCTION ACTIVITIES MUST COMPLY WITH THE STATE OF COLORADO PERMITTING PROCESS FOR "STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY." FOR INFORMATION, PLEASE CONTACT THE COLORADO DEPARTMENT OF HEALTH, WATER QUALITY CONTROL DIVISION, 4300 CHERRY DRIVE SOUTH, DENVER, COLORADO 80246-1530. ATTENTION: PERMITS SECTION. PHONE 303-692-3500.
6. IF DEWATERING IS REQUIRED, A STATE CONSTRUCTION DEWATERING DISCHARGE PERMIT IS REQUIRED FOR DISCHARGES TO A STORM SEWER, CHANNEL, IRRIGATION DITCH, ANY STREET THAT IS TRIBUTARY TO THE AFOREMENTIONED FACILITIES, OR ANY WATER OF THE UNITED STATES.
7. PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION, THE CONTRACTOR SHALL CONTACT ALL UTILITIES TO COORDINATE SCHEDULES.
8. THE CONTRACTOR SHALL REGULARLY PATROL THE PUBLIC LANDS ADJACENT TO THE PROJECT, REMOVE CONSTRUCTION DEBRIS AND KEEP AREAS CLEAN AND SAFE.
9. THE CONTRACTOR IS RESPONSIBLE FOR DEVELOPING AND IMPLEMENTING A SEQUENCE AND SCHEDULE FOR COMPLETION OF THE WORK IN ACCORDANCE WITH APPLICABLE PROVISIONS OF THE CONTRACT DOCUMENTS.
10. READ THOROUGHLY AND BECOME FAMILIAR WITH THE SPECIFICATIONS AND INSTALLATION DETAILS FOR THIS RELATED WORK PRIOR TO CONSTRUCTION.
11. VERIFY SITE ELEVATIONS PRIOR TO CONSTRUCTION.
12. THE CONTRACTOR SHALL PROCURE ALL PERMITS AND LICENSES, PAY ALL CHARGES AND FEES INCLUDING, BUT NOT LIMITED TO, ALL INSPECTION CHARGES OF AGENCIES HAVING APPROPRIATE JURISDICTION.
13. CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS OF ENTIRE PROJECT, AS SPECIFIED, UPON FINAL COMPLETION OF PROJECT.

SEDIMENT AND EROSION CONTROL:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SEDIMENT AND EROSION CONTROL AT THE SITE THROUGHOUT CONSTRUCTION.
2. BEST MANAGEMENT PRACTICES (BMP'S) SHALL BE USED AS NECESSARY TO ADDRESS SEDIMENT AND DUST FROM SITE DISTURBANCE. ADDITIONAL MEASURES MAY BE REQUIRED AT THE DIRECTION OF THE ENGINEER.
3. BMP'S MAY INCLUDE, BUT ARE NOT LIMITED TO:

   MINIMAL DISTURBANCE FOR MINIMAL TIME PERIODS
   GRAVEL CONSTRUCTION ENTRIES
   SILT FENCE, STRAW BALE OR SAND BAG BARRIERS, ROCK CHECK DAMS
   STORM SEWER INLET PROTECTION
   SEDIMENT CAPTURE PONDS
   SITE WATERING FOR DUST SUPPRESSION

4. BMP'S SHALL BE MAINTAINED AND KEPT IN GOOD REPAIR FOR THE DURATION OF THE PROJECT. THE CONTRACTOR SHALL INSPECT BMP'S WEEKLY AND AFTER SIGNIFICANT (GREATER THAN 0.1" PRECIPITATION) STORM EVENTS. THE MAINTENANCE AND REPAIR SHALL BE COMPLETED IN A TIMELY MANNER. SEDIMENT AND DEBRIS SHALL BE REMOVED WHEN THEY REACH HALF THE BMP HEIGHT OR IMPACT THE FUNCTION OF THE BMP.
5. SOIL STOCKPILES SHALL BE PROTECTED FROM SEDIMENT TRANSPORT BY SURFACE ROUGHENING, WATERING AND PERIMETER SILT FENCING. SOILS THAT WILL BE STOCKPILED FOR MORE THAN 30 DAYS SHALL BE MULCHED AND SEEDED WITH A GRASS COVER WITHIN 14 DAYS OF STOCKPILE CONSTRUCTION.
6. THE CONTRACTOR SHALL INSURE THAT ALL LOADS OF CUT AND FILL SOILS IMPORTED TO OR EXPORTED FROM THE SITE ARE PROPERLY LOADED AND COVERED TO PREVENT LOSS DURING TRANSPORT.
7. THE CONTRACTOR SHALL REMOVE ALL SEDIMENT, MUD, AND CONSTRUCTION DEBRIS RESULTING FROM THIS PROJECT FROM FLOWLINES AND PAVEMENT OF PUBLIC STREETS IN A TIMELY MANNER.
8. SOILS EXPOSED DURING LAND DISTURBING ACTIVITY SHALL BE KEPT IN A ROUGHENED CONDITION BY RIPPING OR DISCING ALONG LAND CONTOURS UNTIL MULCH, VEGETATION OR OTHER PERMANENT EROSION CONTROL IS IN PLACE. NO SOILS SHALL REMAIN EXPOSED BY LAND DISTURBING ACTIVITY FOR MORE THAN THIRTY (30) DAYS BEFORE REQUIRED TEMPORARY OR PERMANENT EROSION CONTROL IS INSTALLED UNLESS OTHERWISE APPROVED.
9. ALL TEMPORARY SEDIMENT CONTROLS WILL BE REMOVED WITHIN 30 DAYS AFTER THE FINAL STABILIZATION IS ACHIEVED OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, WHICHEVER OCCURS FIRST.
10. NATURAL VEGETATION SHALL BE RETAINED AND PROTECTED WHENEVER POSSIBLE. EXPOSURE OF SOIL TO EROSION BY REMOVAL OR DISTURBANCE OF VEGETATION SHALL BE LIMITED TO THE AREA REQUIRED FOR IMMEDIATE CONSTRUCTION OPERATIONS AND FOR THE SHORTEST PRACTICAL PERIOD OF TIME.



1000 500 0 1000
SCALE IN FEET

VICINITY MAP
SCALE 1" = 1000

SHEET INDEX

LEGEND:

PROPERTY LINE
SECTION LINE
FENCE LINE
OE — OVERHEAD ELECTRIC LINES
T — UNDERGROUND TELECOM LINE
G — UNDERGROUND GAS LINE
SAN — EXISTING SANITARY SEWER
DIRT ROAD
EXISTING WATER/DITCH
3590 — EXISTING CONTOURS
3590 — PROPOSED CONTOURS
FUTURE HIGHWAY REALIGNMENT PARCEL
PERMIT BOUNDARY
ELECTRIC RISER BOX
GUY WIRE
POWER POLE
WATER PUMP
BORING LOCATION

OWNER
GP Aggregates, LLC
Karl Nyquist
7991 Shaffer Parkway, Ste. 200
Littleton, CO 80127
303-369-5100

SURVEYOR
American West Land Surveying Co.
331 South 4th Avenue
P.O. Box 129
Brighton, CO 80601
303-659-1532

ENGINEER
J&T Consulting, Inc.
J.C. York
305 Denver Ave., Ste. D
Fort Lupton, CO 80621
303-857-6222
Fax: 303-857-6224

GEOTECHNICAL/SOIL INVESTIGATIONS
Cesare, Inc.
7108 S Alton Way, Bldg. B
Centennial, CO 80112
303-220-0300

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

Engineer's Certification
I hereby certify that these As Constructed plans for the West Farm Pit Phase 8 Slurry Wall were prepared by me or under my direct supervision for GP Aggregates, LLC.

James C. York, P.E.
Colorado Registration No. 36846

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.j-tconsulting.com

Phase 3 & Phase 8 Slurry Walls
Cover Sheet
GP Aggregates, LLC
West Farm Pit

REVISIONS

No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As constructed

COLORADO REGISTERED PROFESSIONAL ENGINEER JAMES C. YORK 36846 2.10.22

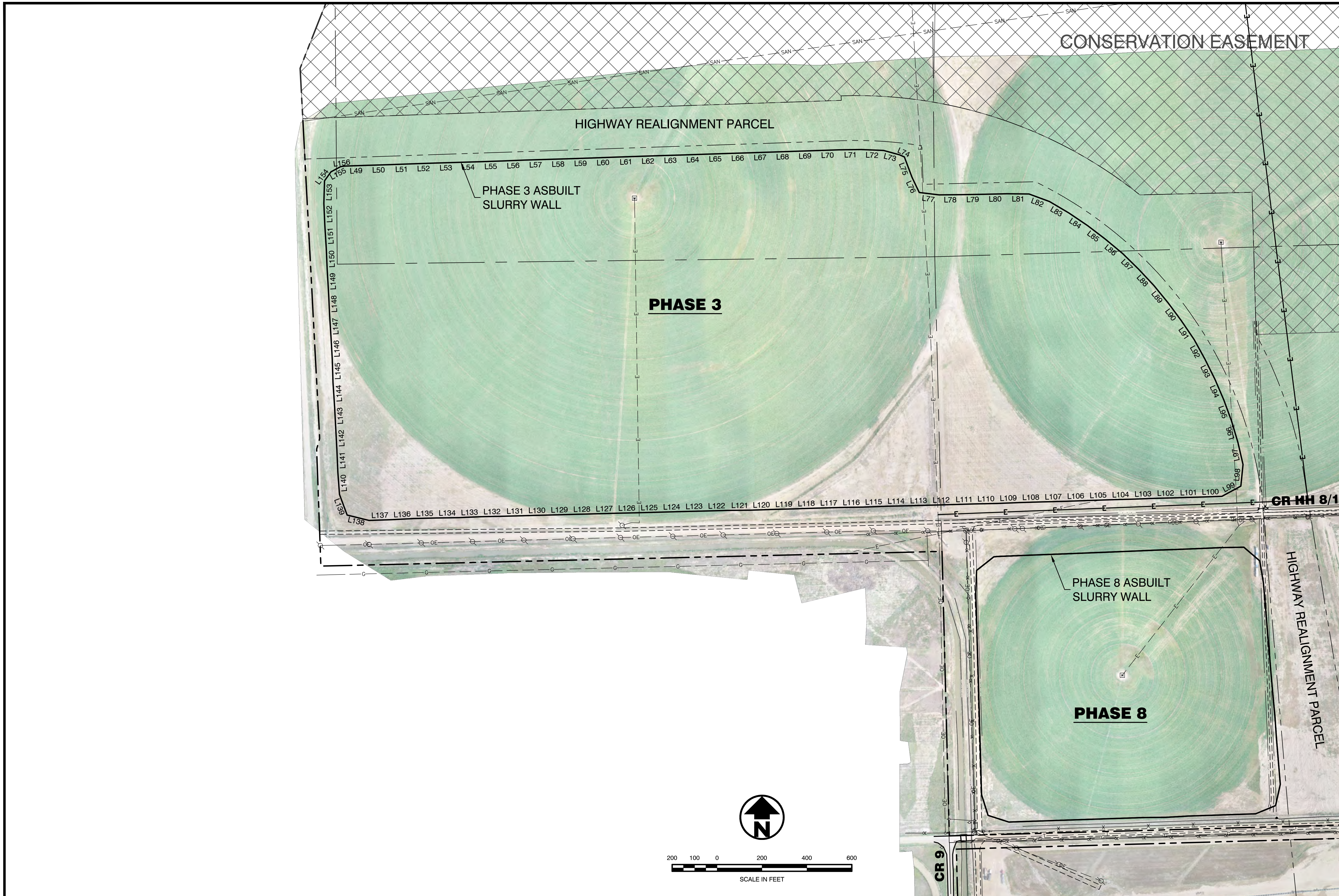
AS CONSTRUCTED

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	Cover Sheet
Scale	As Shown

Sheet: 1 Of: 18

P:\07115 GP Ranches LLC - Lamar\Drawings\Plan Sheets\2021 Slurry Wall\JT-2021 PH3 & 8 CoverSheet.dwg, 1 Cover Sheet, 1/28/2025 2:57:55 PM

P:\07115 GP Ranches LLC - Lamar\Drawings\Plan Sheets\2021 Slurry Wall\JT-2021 Ph3-8 Horiz Control.dwg, 2 Slurry Wall Horizontal Control Plan, 1/28/2025 2:57:56 PM



AS CONSTRUCTED

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.j-tconsulting.com

Phase 3 & Phase 8 Slurry Walls

Slurry Wall Horizontal Control Plan

GP Aggregates, LLC

West Farm Pit

REVISIONS

No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As Constructed

COLORADO REGISTERED JAMES C. YORK 36846 2.10.22 PROFESSIONAL ENGINEER

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

Sheet: 2 Of: 18

Line Table

Line #	Length	Direction	Start Point	End Point
L49	100.29	N88° 01' 26.79"E	N: 1535238.99 E: 3833157.26	N: 1535242.45 E: 3833257.49
L50	99.66	N88° 13' 24.72"E	N: 1535242.45 E: 3833257.49	N: 1535245.54 E: 3833357.10
L51	100.15	N88° 02' 31.15"E	N: 1535245.54 E: 3833357.10	N: 1535248.96 E: 3833457.19
L52	100.02	N88° 01' 59.16"E	N: 1535248.96 E: 3833457.19	N: 1535252.40 E: 3833557.15
L53	99.95	N88° 13' 42.01"E	N: 1535252.40 E: 3833557.15	N: 1535255.49 E: 3833657.05
L54	99.83	N88° 19' 30.36"E	N: 1535255.49 E: 3833657.05	N: 1535258.40 E: 3833756.84
L55	100.00	N88° 01' 10.34"E	N: 1535258.40 E: 3833756.84	N: 1535261.86 E: 3833856.78
L56	100.04	N87° 44' 18.20"E	N: 1535261.86 E: 3833856.78	N: 1535265.81 E: 3833956.73
L57	100.28	N88° 13' 58.74"E	N: 1535265.81 E: 3833956.73	N: 1535268.90 E: 3834056.97
L58	99.65	N88° 25' 15.04"E	N: 1535268.90 E: 3834056.97	N: 1535271.65 E: 3834156.58
L59	100.16	N87° 55' 57.64"E	N: 1535271.65 E: 3834156.58	N: 1535275.26 E: 3834256.68
L60	99.85	N88° 01' 46.98"E	N: 1535275.26 E: 3834256.68	N: 1535278.69 E: 3834356.46
L61	100.20	N88° 05' 25.20"E	N: 1535278.69 E: 3834356.46	N: 1535282.03 E: 3834456.60
L62	99.91	N88° 06' 54.92"E	N: 1535282.03 E: 3834456.60	N: 1535285.32 E: 3834556.46
L63	100.04	N88° 13' 33.07"E	N: 1535285.32 E: 3834556.46	N: 1535288.41 E: 3834656.45
L64	99.90	N88° 07' 18.13"E	N: 1535288.41 E: 3834656.45	N: 1535291.69 E: 3834756.30
L65	100.25	N88° 07' 41.39"E	N: 1535291.69 E: 3834756.30	N: 1535294.96 E: 3834856.49
L66	99.88	N88° 07' 15.73"E	N: 1535294.96 E: 3834856.49	N: 1535298.24 E: 3834956.32
L67	100.08	N88° 07' 29.79"E	N: 1535298.24 E: 3834956.32	N: 1535301.51 E: 3835056.34
L68	100.09	N88° 07' 07.78"E	N: 1535301.51 E: 3835056.34	N: 1535304.80 E: 3835156.38
L69	100.25	N88° 07' 41.39"E	N: 1535304.80 E: 3835156.38	N: 1535308.07 E: 3835256.58
L70	99.56	N88° 06' 54.71"E	N: 1535308.07 E: 3835256.58	N: 1535311.35 E: 3835356.08
L71	100.22	N89° 06' 42.79"E	N: 1535311.35 E: 3835356.08	N: 1535312.90 E: 3835456.29
L72	99.58	S87° 43' 07.69"E	N: 1535312.90 E: 3835456.29	N: 1535308.94 E: 3835555.80
L73	73.42	S74° 43' 50.98"E	N: 1535308.94 E: 3835555.80	N: 1535289.60 E: 3835626.63
L74	24.12	S66° 10' 50.21"E	N: 1535289.60 E: 3835626.63	N: 1535279.86 E: 3835648.69
L75	97.68	S20° 35' 30.11"E	N: 1535279.86 E: 3835648.69	N: 1535188.43 E: 3835683.04
L76	74.00	S25° 26' 53.47"E	N: 1535188.43 E: 3835683.04	N: 1535121.61 E: 3835714.84
L77	89.08	S82° 56' 14.81"E	N: 1535121.61 E: 3835714.84	N: 1535110.65 E: 3835803.24
L78	99.90	N89° 25' 13.91"E	N: 1535110.65 E: 3835803.24	N: 1535111.66 E: 3835903.14
L79	100.09	N88° 57' 47.99"E	N: 1535111.66 E: 3835903.14	N: 1535113.48 E: 3836003.21
L80	100.03	N88° 43' 14.46"E	N: 1535113.48 E: 3836003.21	N: 1535115.71 E: 3836103.22
L81	100.29	S89° 31' 17.51"E	N: 1535115.71 E: 3836103.22	N: 1535114.87 E: 3836203.50
L82	97.53	S69° 43' 21.95"E	N: 1535114.87 E: 3836203.50	N: 1535081.07 E: 3836294.98
L83	100.30	S59° 22' 49.96"E	N: 1535081.07 E: 3836294.98	N: 1535029.99 E: 3836381.29
L84	100.46	S56° 04' 06.46"E	N: 1535029.99 E: 3836381.29	N: 1534973.91 E: 3836464.65
L85	99.03	S52° 41' 42.82"E	N: 1534973.91 E: 3836464.65	N: 1534913.89 E: 3836543.42
L86	100.51	S50° 05' 24.06"E	N: 1534913.89 E: 3836543.42	N: 1534849.40 E: 3836620.52
L87	99.58	S45° 33' 12.18"E	N: 1534849.40 E: 3836620.52	N: 1534779.68 E: 3836691.60
L88	99.96	S43° 12' 25.26"E	N: 1534779.68 E: 3836691.60	N: 1534706.82 E: 3836760.04

Line Table

Line #	Length	Direction	Start Point	End Point
L89	100.01	S39° 13' 19.62"E	N: 1534706.82 E: 3836760.04	N: 1534629.34 E: 3836823.28
L90	100.19	S36° 37' 54.63"E	N: 1534629.34 E: 3836823.28	N: 1534548.94 E: 3836883.06
L91	100.36	S34° 04' 17.42"E	N: 1534548.94 E: 3836883.06	N: 1534465.81 E: 3836939.28
L92	99.72	S28° 48' 18.36"E	N: 1534465.81 E: 3836939.28	N: 1534378.43 E: 3836987.33
L93	100.35	S26° 27' 43.50"E	N: 1534378.43 E: 3836987.33	N: 1534288.60 E: 3837032.04
L94	99.20	S23° 02' 32.36"E	N: 1534288.60 E: 3837032.04	N: 1534197.31 E: 3837070.87
L95	100.47	S20° 11' 16.61"E	N: 1534197.31 E: 3837070.87	N: 1534103.01 E: 3837105.54
L96	99.37	S16° 39' 47.10"E	N: 1534103.01 E: 3837105.54	N: 1534007.82 E: 3837134.04
L97	100.56	S13° 02' 47.47"E	N: 1534007.82 E: 3837134.04	N: 1533909.86 E: 3837156.74
L98	96.80	S5° 47' 47.10"W	N: 1533909.86 E: 3837156.74	N: 1533813.55 E: 3837146.96
L99	96.01	S61° 34' 50.06"W	N: 1533813.55 E: 3837146.96	N: 1533767.86 E: 3837062.52
L100	99.50	S88° 04' 14.21"W	N: 1533767.86 E: 3837062.52	N: 1533764.51 E: 3836963.08
L101	100.27	S88° 16' 13.02"W	N: 1533764.51 E: 3836963.08	N: 1533761.48 E: 3836862.86
L102	99.76	S88° 23' 47.65"W	N: 1533761.48 E: 3836862.86	N: 1533758.69 E: 3836763.13
L103	100.35	S87° 55' 38.59"W	N: 1533758.69 E: 3836763.13	N: 1533755.06 E: 3836662.85
L104	99.75	S88° 33' 24.56"W	N: 1533755.06 E: 3836662.85	N: 1533752.55 E: 3836563.13
L105	100.23	S88° 00' 50.74"W	N: 1533752.55 E: 3836563.13	N: 1533749.07 E: 3836462.96
L106	100.03	S87° 57' 51.63"W	N: 1533749.07 E: 3836462.96	N: 1533745.52 E: 3836362.98
L107	99.58	S88° 33' 09.83"W	N: 1533745.52 E: 3836362.98	N: 1533743.01 E: 3836263.44
L108	100.42	S88° 24' 19.58"W	N: 1533743.01 E: 3836263.44	N: 1533740.21 E: 3836163.05
L109	100.14	S87° 45' 03.41"W	N: 1533740.21 E: 3836163.05	N: 1533736.28 E: 3836063.00
L110	99.85	S88° 43' 01.47"W	N: 1533736.28 E: 3836063.00	N: 1533734.05 E: 3835963.17
L111	99.31	S88° 23' 14.94"W	N: 1533734.05 E: 3835963.17	N: 1533731.25 E: 3835863.90
L112	100.52	S88° 27' 21.88"W	N: 1533731.25 E: 3835863.90	N: 1533728.54 E: 3835763.42
L113	100.07	S88° 29' 48.55"W	N: 1533728.54 E: 3835763.42	N: 1533725.92 E: 3835663.38
L114	100.06	S88° 33' 34.78"W	N: 1533725.92 E: 3835663.38	N: 1533723.40 E: 3835563.35
L115	100.00	S88° 01' 28.08"W	N: 1533723.40 E: 3835563.35	N: 1533719.96 E: 3835463.41
L116	99.86	S89° 00' 10.33"W	N: 1533719.96 E: 3835463.41	N: 1533718.22 E: 3835363.57
L117	99.99	S88° 29' 01.82"W	N: 1533718.22 E: 3835363.57	N: 1533715.57 E: 3835263.61
L118	100.02	S88° 07' 42.30"W	N: 1533715.57 E: 3835263.61	N: 1533712.31 E: 3835163.65
L119	100.13	S88° 19' 34.32"W	N: 1533712.31 E: 3835163.65	N: 1533709.38 E: 3835063.56
L120	99.89	S88° 04' 00.43"W	N: 1533709.38 E: 3835063.56	N: 1533706.01 E: 3834963.73
L121	100.16	S89° 34' 58.23"W	N: 1533706.01 E: 3834963.73	N: 1533705.28 E: 3834863.57
L122	99.96	S88° 26' 43.20"W	N: 1533705.28 E: 3834863.57	N: 1533702.57 E: 3834763.65
L123	99.93	S88° 37' 15.51"W	N: 1533702.57 E: 3834763.65	N: 1533700.16 E: 3834663.75
L124	99.83	S88° 27' 20.29"W	N: 1533700.16 E: 3834663.75	N: 1533697.47 E: 3834563.96
L125	99.99	S88° 27' 43.48"W	N: 1533697.47 E: 3834563.96	N: 1533694.79 E: 3834464.01
L126	100.36	S88° 40' 07.06"W	N: 1533694.79 E: 3834464.01	N: 1533692.46 E: 3834363.68
L127	99.65	S88° 27' 10.07"W	N: 1533692.46 E: 3834363.68	N: 1533689.77 E: 3834264.07
L128	100.17	S88° 33' 28.84"W	N: 1533689.77 E: 3834264.07	N: 1533687.25 E: 3834163.93

Line Table

Line #	Length	Direction	Start Point	End Point
L129	99.83	S88° 21' 09.68"W	N: 1533687.25 E: 3834163.93	N: 1533684.38 E: 3834064.14
L130	100.38	S88° 34' 18.57"W	N: 1533684.38 E: 3834064.14	N: 1533681.88 E: 3833963.79
L131	99.97	S88° 31' 10.21"W	N: 1533681.88 E: 3833963.79	N: 1533679.29 E: 3833863.85
L132	99.96	S88° 41' 02.12"W	N: 1533679.29 E: 3833863.85	N: 1533677.00 E: 3833763.92
L133	100.17	S87° 38' 53.14"W	N: 1533677.00 E: 3833763.92	N: 1533672.89 E: 3833663.83
L134	99.47	S89° 12' 16.91"W	N: 1533672.89 E: 3833663.83	N: 1533671.51 E: 3833564.37
L135	100.26	S88° 31' 25.26"W	N: 1533671.51 E: 3833564.37	N: 1533668.92 E: 3833464.15
L136	99.78	S87° 01' 56.92"W	N: 1533668.92 E: 3833464.15	N: 1533663.76 E: 3833364.50
L137	99.98	S88° 11' 26.46"W	N: 1533663.76 E: 3833364.50	N: 1533660.60 E: 3833264.57
L138	100.05	N76° 14' 19.14"W	N: 1533660.60 E: 3833264.57	N: 1533684.40 E: 3833167.38
L139	97.86	N20° 16' 28.02"W	N: 1533684.40 E: 3833167.38	N: 1533776.20 E: 3833133.47
L140	99.60	N4° 13' 26.65"W	N: 1533776.20 E: 3833133.47	N: 1533875.53 E: 3833126.14
L141	100.49	N2° 38' 02.99"W	N: 1533875.53 E: 3833126.14	N: 1533975.91 E: 3833121.52
L142	100.02	N2° 58' 49.04"W	N: 1533975.91 E: 3833121.52	N: 1534075.80 E: 3833116.32
L143	99.94	N2° 58' 47.38"W	N: 1534075.80 E: 3833116.32	N: 1534175.60 E: 3833111.12
L144	100.31	N3° 47' 45.00"W	N: 1534175.60 E: 3833111.12	N: 1534275.69 E: 3833104.48
L145	99.86	N1° 49' 19.28"W	N: 1534275.69 E: 3833104.48	N: 1534375.50 E: 3833101.31
L146	99.69	N3° 19' 11.64"W	N: 1534375.50 E: 3833101.31	N: 1534475.02 E: 3833095.54
L147	99.96	N3° 37' 07.88"W	N: 1534475.02 E: 3833095.54	N: 1534574.78 E: 3833089.23
L148	100.25	N2° 40' 05.69"W	N: 1534574.78 E: 3833089.23	N: 1534674.92 E: 3833084.56
L149	100.18	N3° 17' 58.76"W	N: 1534674.92 E: 3833084.56	N: 1534774.94 E: 3833078.79
L150	99.80	N2° 39' 11.41"W	N: 1534774.94 E: 3833078.79	N: 1534874.64 E: 3833074.17
L151	100.57	N3° 27' 20.05"W	N: 1534874.64 E: 3833074.17	N: 1534975.02 E: 3833068.11
L152	99.30	N2° 39' 51.14"W	N: 1534975.02 E: 3833068.11	N: 1535074.22 E: 3833063.50
L153	99.28	N1° 49' 57.83"E	N: 1535074.22 E: 3833063.50	N: 1535173.45 E: 3833066.67
L154	49.06	N35° 30' 54.99"E	N: 1535173.45 E: 3833066.67	N: 1535213.38 E: 3833095.17
L155	49.33	N61° 51' 55.47"E	N: 1535213.38 E: 3833095.17	N: 1535236.64 E: 3833138.67
L156	18.73	N82° 47' 34.21"E	N: 1535236.64 E: 3833138.67	N: 1535238.99 E: 3833157.25

AS CONSTRUCTED

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.j-tconsulting.com

Phase 3 & Phase 8 Slurry Walls

Slurry Wall Horizontal Control Data

GP Aggregates, LLC

West Farm Pit

REVISIONS

No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As Constructed

COLORADO REGISTERED PROFESSIONAL ENGINEER
JAMES C. YORK
36846
2.10.22

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

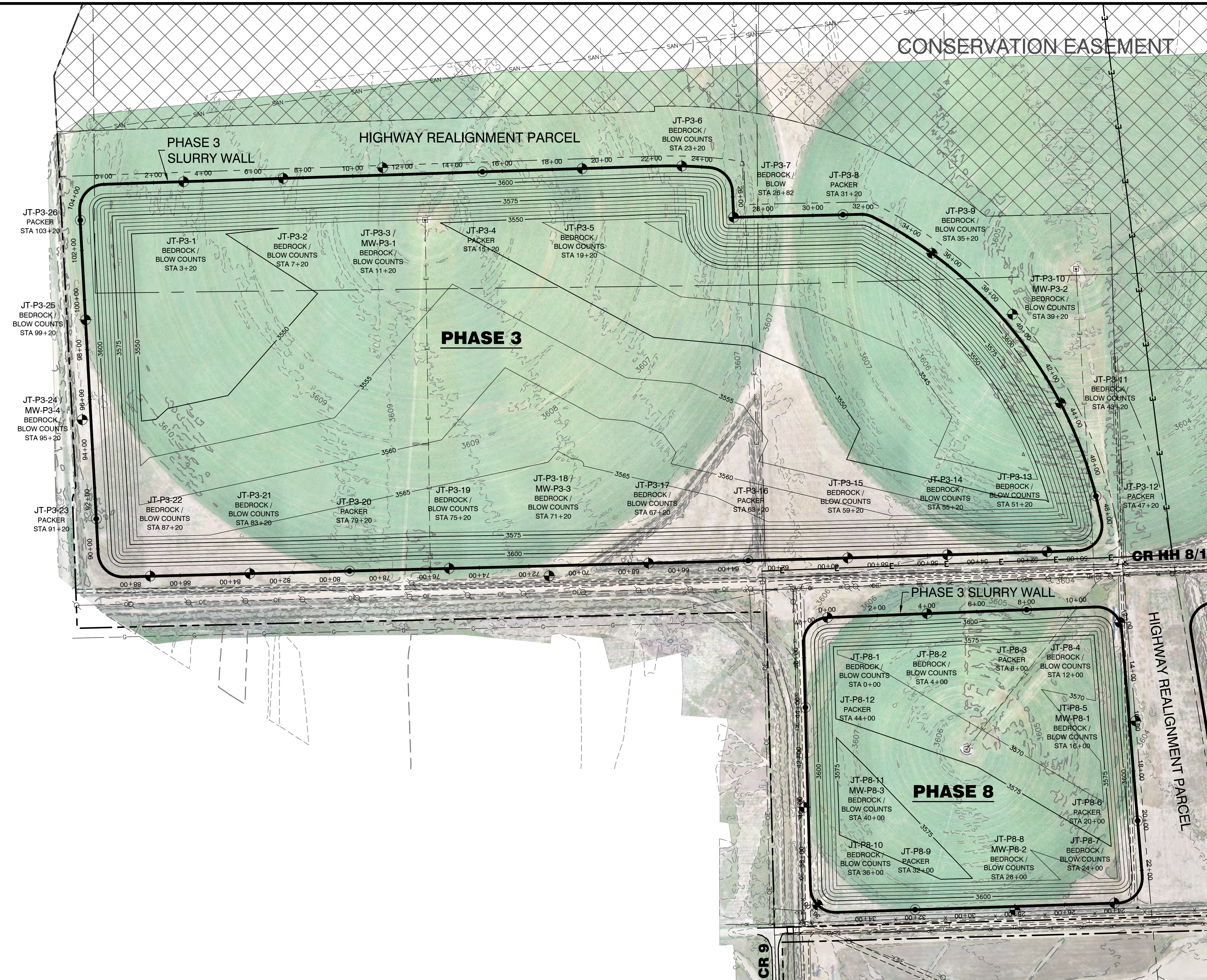
Sheet: 2a Of: 18

LEGEND:

- PROPERTY LINE
- SECTION LINE
- FENCE LINE
- DIRT ROAD
- EXISTING WATER/DITCH
- EXISTING CONTOURS
- PROPOSED CONTOURS
- BORING LOCATION

200 100 0 200 400 600

SCALE IN FEET



AS CONSTRUCTED

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.j-tconsulting.com

Phase 3 & Phase 8 Slurry Walls

Phase 3 & 8 Reservoir Grading & Boring Location Map

GP Aggregates, LLC

West Farm Pit

REVISIONS

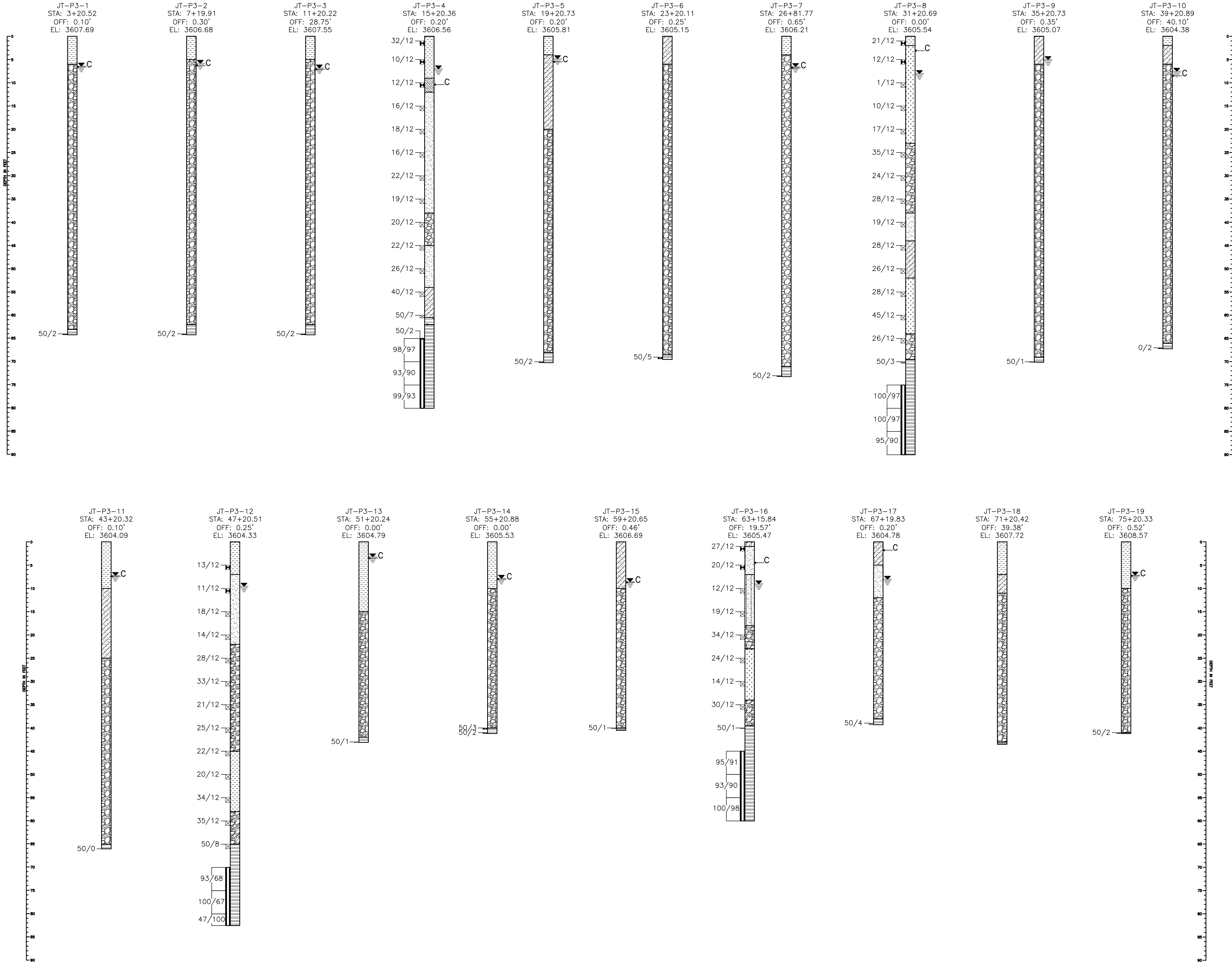
No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As constructed

COLORADO REGISTERED JAMES C. YORK 36846 2.10.22 PROFESSIONAL ENGINEER

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

Sheet: 3 Of: 18

P:\07115 GP Ranches LLC - Lamar\Drawings\Plan Sheets\2021 Slurry Wall\JT-2021 Ph3-8 Grading & Boring Map.dwg, 3 Phase 3 & 8 Reservoir Grading & Boring Location Map, 1/28/2025 3:04:35 PM



P:\07115 GP Ranches LLC - Lamar\Drawings\Plan Sheets\2021 Slurry Wall\JT-2021 Slurry Wall P&P.dwg, Phase 3 & 8 Boring Logs P3-1 to P3-19, 7/10/2024 11:15:04 AM

AS CONSTRUCTED

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.j-tconsulting.com

Phase 3 & Phase 8 Slurry Walls

Phase 3 & 8 Boring Logs
P3-1 To P3-19

GP Aggregates, LLC

West Farm Pit

REVISIONS

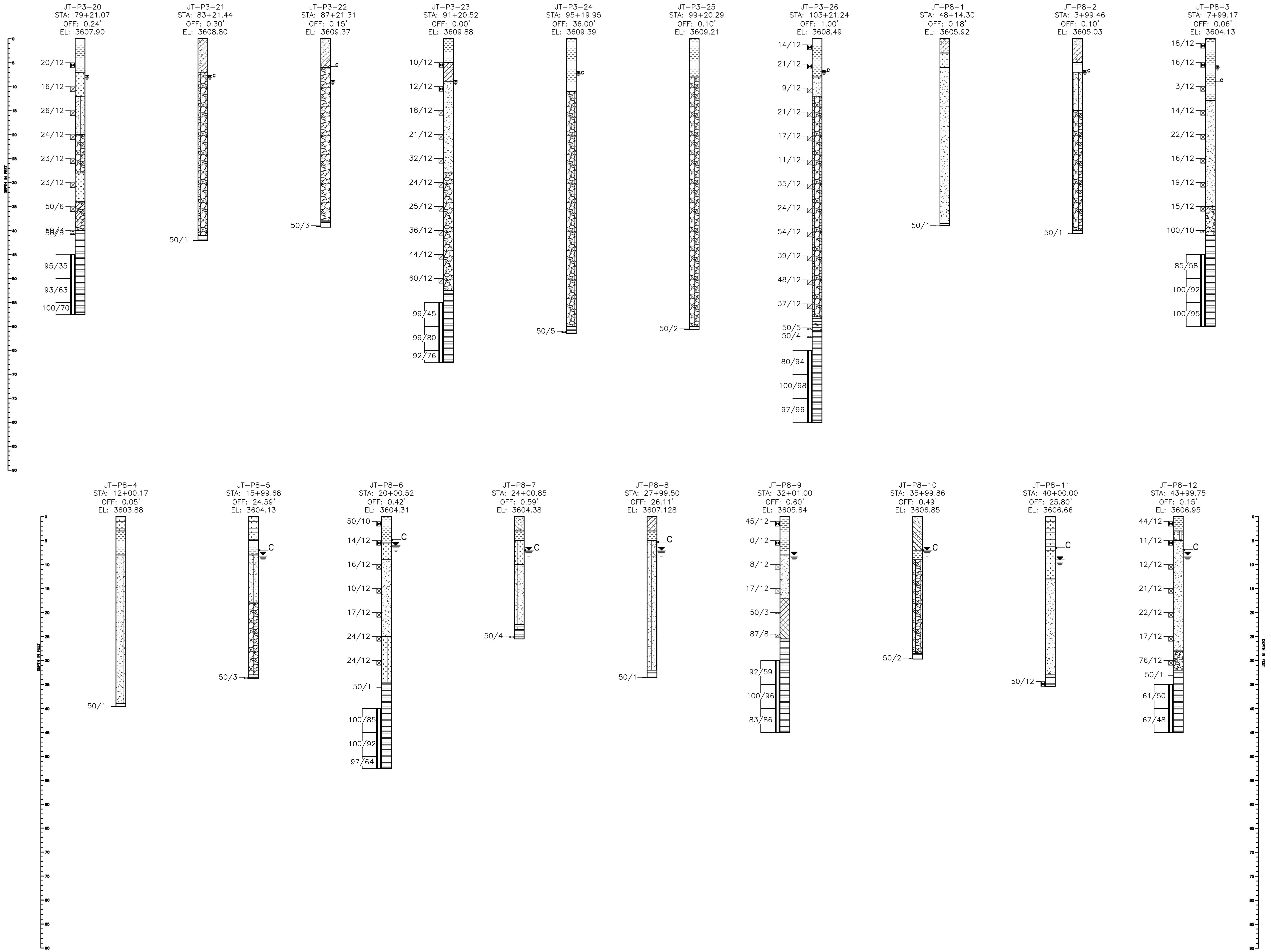
No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As Constructed

COLORADO REGISTERED PROFESSIONAL ENGINEER JAMES C. YORK 36846 2.10.22

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

Sheet: 4 Of: 18

P:\07115 GP Ranches LLC - Lamar\Drawings\Plan Sheets\2021 Slurry Wall\JT-2021 Slurry Wall P&P.dwg, Phase 3 & 8 Boring Logs P3-20 to P8-12, 7/10/2024 11:15:21 AM



J&T Consulting, Inc.

305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.jt-consulting.com

Phase 3 & Phase 8 Slurry Walls

Phase 3 & 8 Boring Logs
P3-20 To P8-12

GP Aggregates, LLC

West Farm Pit

REVISIONS

No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As Constructed

COLORADO REGISTERED
JAMES C. YORK
36846
2.10.22
PROFESSIONAL ENGINEER

AS CONSTRUCTED

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

Sheet: 5 Of: 18

SYMBOL DESCRIPTION

Strata symbols

CLAY, with sand, soft to medium stiff, moist, occasional organics, dark brown. (CL)

GRAVEL, with sand, with silt, loose to dense, wet, gravels to occasional rounded cobbles, brown.

SHALE, thinly laminated, moderately to highly fractured on bedding planes, moderately to slightly weathered, moderately hard to hard, dark gray to black. Sporadic limestone interlaminations, white. Occasional localized very weathered zones. (SH)

GRAVEL, poorly graded, with sand, with silt, dense, wet, occasional cobble, brown (GP–GM)

CLAYSTONE, very hard, moist, fine sands, some FE spots, tanish light brown.

SAND, poorly graded, with silt, trace organics, loose to medium dense, moist to very moist, light brown. (SM)

SAND, poorly graded, trace silt, trace fine gravel, medium dense, very moist to wet, brown. (SP–SM)

GRAVEL, poorly graded, grades to with sand, with clay to clayey, very dense, wet, light brown (GP–GC).

GRAVEL, sandy, with small round cobbles, trace silt, medium dense to dense, wet, brown. (GW)

SAND, well–graded, with clay, loose to medium dense, moist to very moist, occasional organics, light brown (SW–SC).

SAND, poorly–graded, with occasional fine gravel, loose, moist, occasional organics, brown. (SC)

SAND, poorly–graded, with clay, medium dense, moist, occasional organics, light brown (SP–SC).

GRAVEL, sandy, trace silt, loose to medium dense, wet, fine gravels, brown. (GP)

SAND, well graded. with gravel to gravelly, trace silt, trace round cobbles, medium dense to dense, very moist to wet, brown. (SW–SM)

GRAVEL, sandy, with clay, trace round cobbles, medium dense to dense, very moist to wet, brown. (GC)

LIMESTONE, dolomitic, thinly bedded, moderately weathered, strong cementation, slightly moist, very hard, light gray.

SAND, trace clay, trace fine gravel, medium dense, moist to wet, light brown. (SW)

SAND, trace silt, trace fine gravel, very loose to medium dense, wet brown. (SP)

NOTES;

1. EXPLORATORY BORINGS WERE DRILLED ON JANUARY, 2021.
2. BORING LOCATIONS WERE SURVEYED BY OTHERS PRIOR TO DRILLING.
3. THESE LOGS ARE SUBJECT TO LIMITATIONS, CONCLUSIONS, AND RECOMMENDATIONS IN THE GEOTECHNICAL REPORT BY CESARE, INC.

Water table during drilling

C Depth to caving

Split Spoon

Modified California Sampler

Rock Core

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.jt-consulting.com

Phase 3 & Phase 8 Slurry Walls

Phase 3 & 8 Boring Logs Legend

GP Aggregates, LLC

West Farm Pit

REVISIONS

No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As Constructed

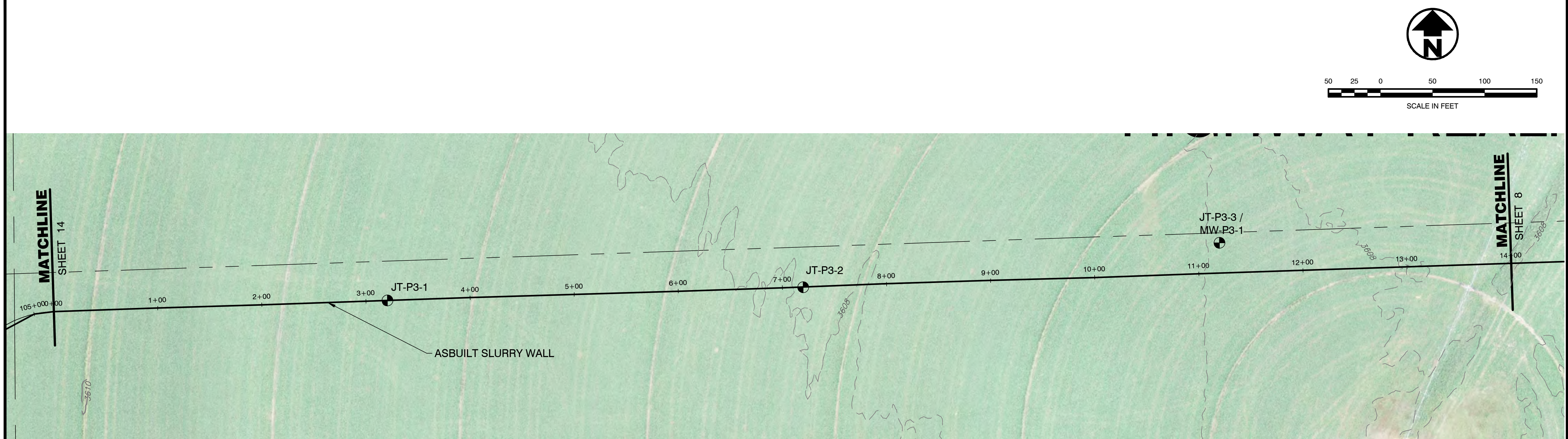
COLORADO REGISTERED JAMES C. YORK 36846 2.10.22 PROFESSIONAL ENGINEER

AS CONSTRUCTED

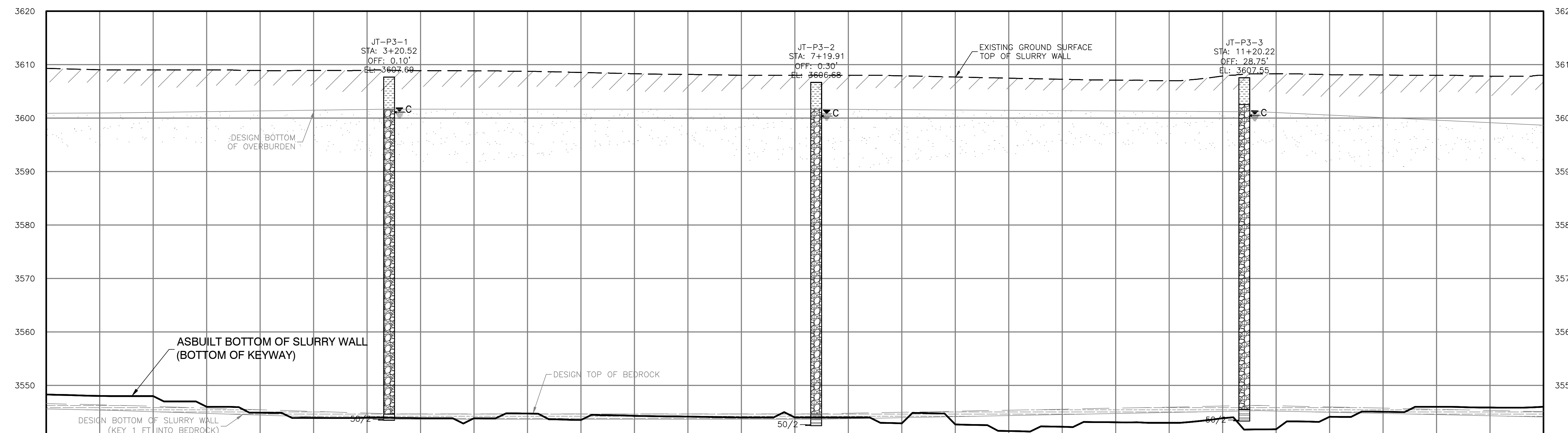
Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

Sheet: 6 Of: 18

P:\07115 GP Ranches LLC - Lamar\Drawings\Plan Sheets\2021 Slurry Wall\JT-2021 Slurry Wall P&P.dwg, Phase 3 Slurry Wall Plan & Profile Sta 0+00 to 14+00, 7/10/2024 11:15:43 AM



TOTAL PHASE 3 SLURRY WALL CONSTRUCTED = 599,878 SF



Station	Existing	SW Depth	Top Bedrock	Bot Keyway
0+00	3609.31	63.70	3546.60	3545.60
0+50	3609.03	63.65	3546.38	3545.38
1+00	3609.00	63.91	3546.09	3545.09
1+50	3609.00	64.23	3545.77	3544.77
2+00	3608.90	64.44	3545.45	3544.45
2+50	3608.91	64.78	3545.14	3544.14
3+00	3608.96	65.14	3544.82	3543.82
3+50	3608.89	65.21	3544.69	3543.69
4+00	3608.86	65.17	3544.69	3543.69
4+50	3608.75	65.07	3544.69	3543.69
5+00	3608.55	64.86	3544.68	3543.68
5+50	3608.31	64.63	3544.68	3543.68
6+00	3608.18	64.50	3544.68	3543.68
6+50	3608.02	64.33	3544.68	3543.68
7+00	3608.00	64.32	3544.68	3543.68
7+50	3608.00	64.21	3544.79	3543.79
8+00	3607.92	63.94	3544.98	3543.98
8+50	3607.70	63.52	3545.17	3544.17
9+00	3607.48	63.11	3545.37	3544.37
9+50	3607.26	62.70	3545.56	3544.56
10+00	3607.10	62.35	3545.75	3544.75
10+50	3607.00	62.06	3545.94	3544.94
11+00	3607.88	62.74	3546.14	3545.14
11+50	3608.30	63.10	3546.19	3545.19
12+00	3608.13	63.15	3545.97	3544.97
12+50	3608.07	63.31	3545.75	3544.75
13+00	3608.00	63.46	3545.54	3544.54
13+50	3607.86	63.54	3545.32	3544.32
14+00	3608.00	63.90	3545.10	3544.10

AS CONSTRUCTED

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.j-tconsulting.com

Phase 3 & Phase 8 Slurry Walls

Phase 3 Slurry Wall Plan & Profile
Sta 0+00 To 14+00

GP Aggregates, LLC

West Farm Pit

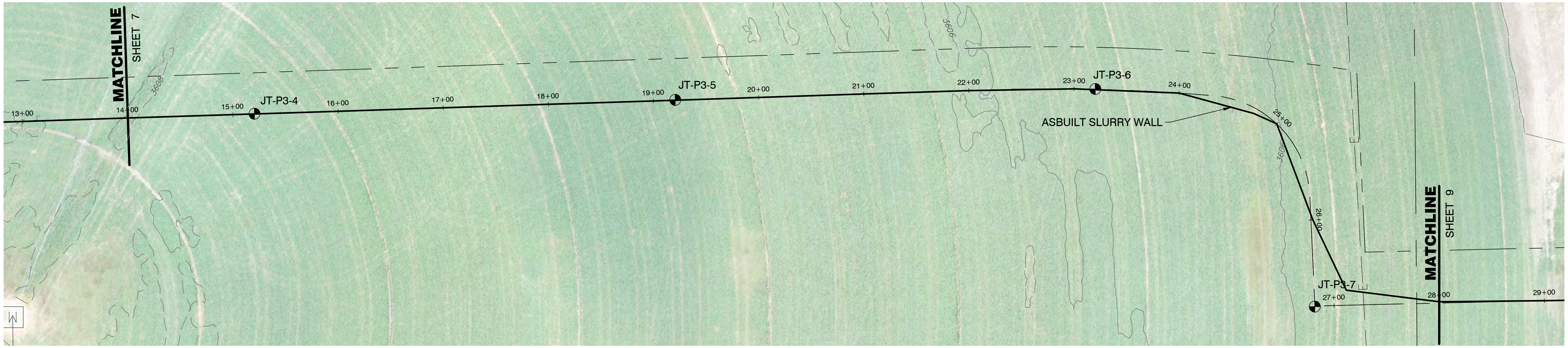
REVISIONS

No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As Constructed

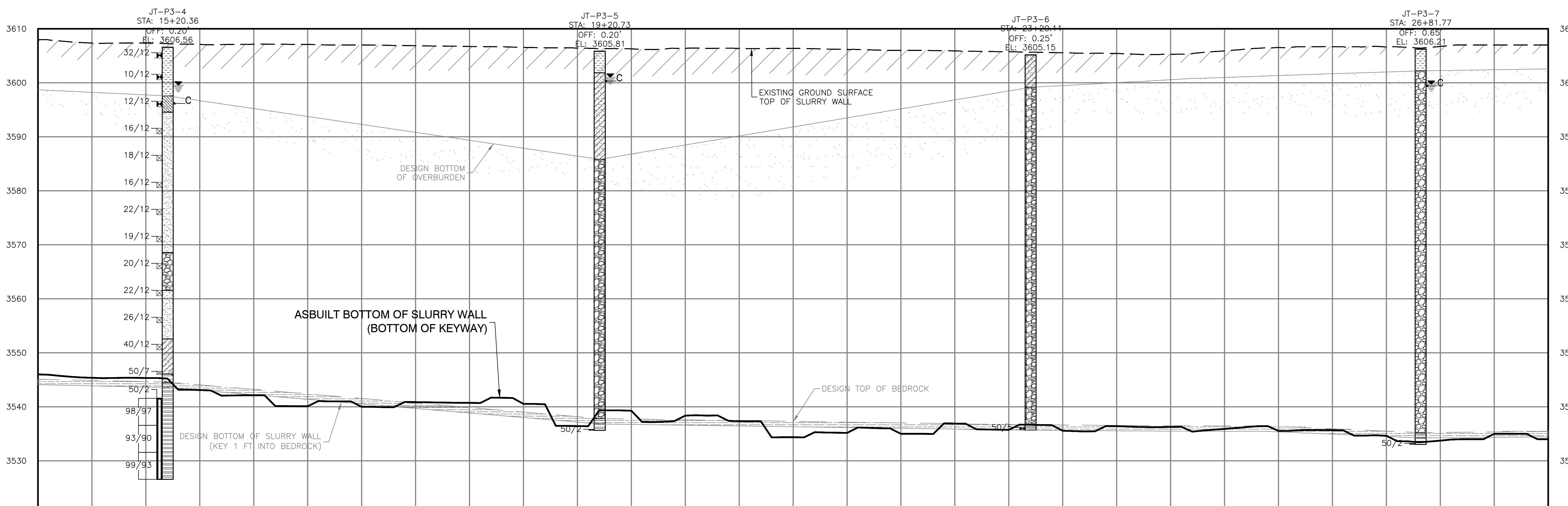
COLORADO REGISTERED
JAMES C. YORK
36846
2.10.22
PROFESSIONAL ENGINEER

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

Sheet: 7 Of: 18



TOTAL PHASE 3 SLURRY WALL CONSTRUCTED = 599,878 SF



Station	Existing	SW Depth	Top Bedrock	Bot Keyway
14+00	3608.00	63.90	3545.10	3544.10
14+50	3607.35	63.48	3544.88	3543.88
15+00	3607.33	63.67	3544.66	3543.66
15+50	3607.09	64.02	3544.07	3543.07
16+00	3607.13	64.91	3543.22	3542.22
16+50	3607.08	65.71	3542.38	3541.38
17+00	3607.00	66.46	3541.54	3540.54
17+50	3606.85	67.16	3540.69	3539.69
18+00	3606.71	67.86	3539.85	3538.85
18+50	3606.54	68.54	3539.00	3538.00
19+00	3606.43	69.26	3538.16	3537.16
19+50	3606.27	69.54	3537.72	3536.72
20+00	3606.37	69.79	3537.58	3536.58
20+50	3606.34	69.91	3537.43	3536.43
21+00	3606.36	70.07	3537.29	3536.29
21+50	3606.17	70.02	3537.14	3536.14
22+00	3606.00	70.00	3537.00	3536.00
22+50	3605.89	70.03	3536.85	3535.85
23+00	3605.73	70.02	3536.71	3535.71
23+50	3605.55	69.94	3536.61	3535.61
24+00	3605.41	69.86	3536.55	3535.55
24+50	3605.26	69.77	3536.49	3535.49
25+00	3605.90	70.44	3536.46	3535.46
25+50	3606.51	71.18	3536.34	3535.34
26+00	3606.66	71.75	3535.92	3534.92
26+50	3606.64	72.15	3535.49	3534.49
27+00	3606.72	72.47	3535.25	3534.25
27+50	3607.00	72.66	3535.34	3534.34
28+00	3607.00	72.56	3535.44	3534.44

AS CONSTRUCTED

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.jt-consulting.com

Phase 3 & Phase 8 Slurry Walls

Phase 3 Slurry Wall Plan & Profile
Sta 14+00 To 28+00

GP Aggregates, LLC

West Farm Pit

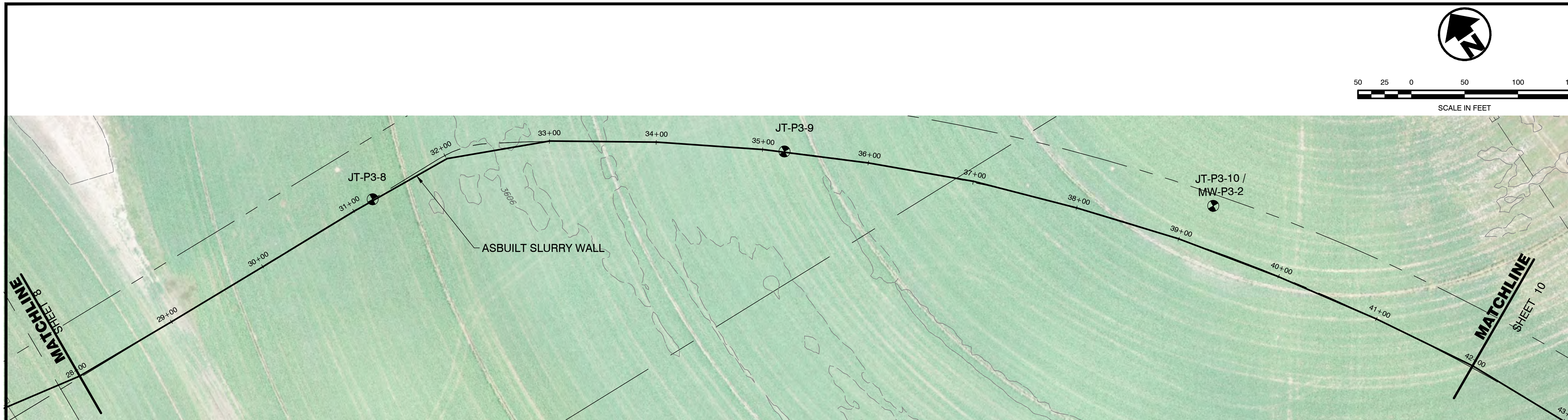
REVISIONS

No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As Constructed

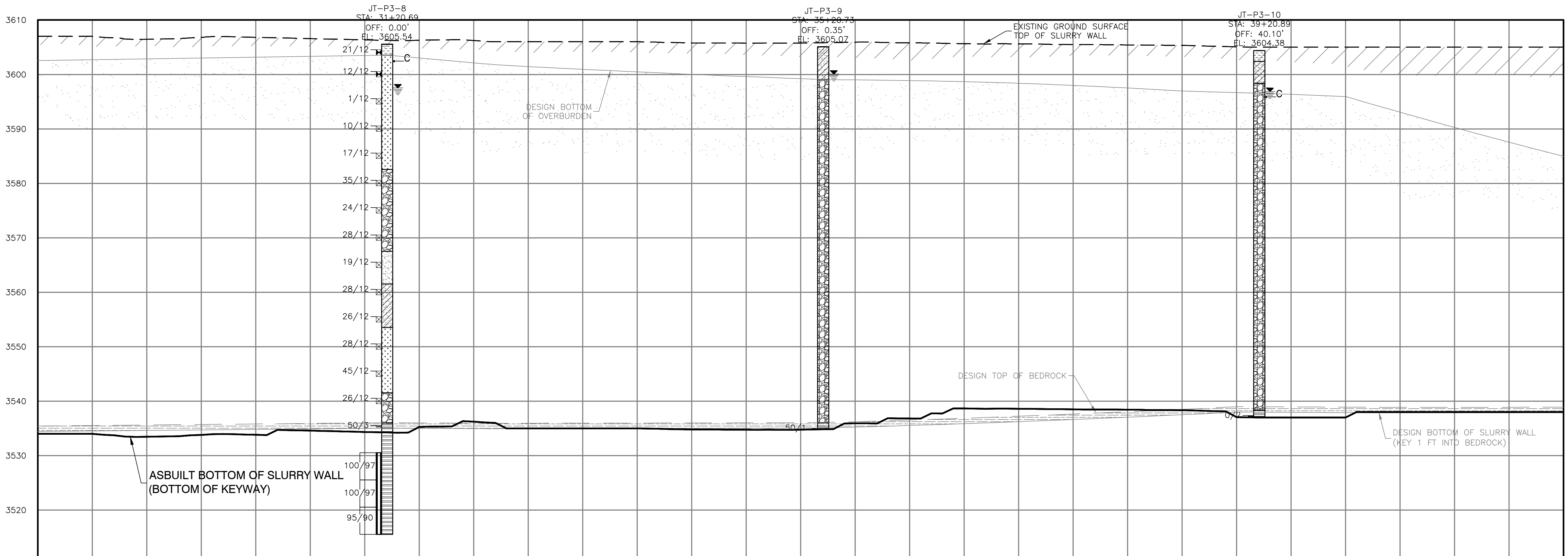
COLORADO REGISTERED PROFESSIONAL ENGINEER JAMES C. YORK 36846 2.10.22

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph 3-8 Slurry
Scale	As Shown

Sheet: 8 Of: 18



TOTAL PHASE 3 SLURRY WALL CONSTRUCTED = 599,878 SF



Station	Existing	SW Depth	Top Bedrock	Bot Keyway
28+00	3607.00	72.56	3535.44	3534.44
28+50	3607.00	72.47	3535.53	3534.53
29+00	3606.48	71.85	3535.63	3534.63
29+50	3606.81	72.09	3535.72	3534.72
30+00	3606.83	72.01	3535.81	3534.81
30+50	3606.59	71.68	3535.91	3534.91
31+00	3606.35	71.35	3536.00	3535.00
31+50	3606.27	71.26	3536.01	3535.01
32+00	3606.23	71.27	3535.96	3534.96
32+50	3606.00	71.05	3535.95	3534.95
33+00	3606.00	71.04	3535.96	3534.96
33+50	3606.00	71.02	3535.98	3534.98
34+00	3605.80	70.80	3536.00	3535.00
34+50	3605.76	70.74	3536.03	3535.03
35+00	3605.77	70.72	3536.05	3535.05
35+50	3605.93	70.70	3536.24	3535.24
36+00	3605.82	70.28	3536.54	3535.54
36+50	3605.65	69.78	3536.87	3535.87
37+00	3605.60	69.37	3537.24	3536.24
37+50	3605.50	68.87	3537.63	3536.63
38+00	3605.42	68.37	3538.06	3537.06
38+50	3605.34	67.82	3538.52	3537.52
39+00	3605.08	67.11	3538.97	3537.97
39+50	3605.00	67.05	3538.95	3537.95
40+00	3605.00	67.10	3538.90	3537.90
40+50	3605.00	67.13	3538.87	3537.87
41+00	3605.00	67.14	3538.86	3537.86
41+50	3605.00	67.12	3538.88	3537.88
42+00	3605.00	67.08	3538.92	3537.92

AS CONSTRUCTED

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.j-tconsulting.com

Phase 3 & Phase 8 Slurry Walls

Phase 3 Slurry Wall Plan & Profile
Sta 28+00 To 42+00

GP Aggregates, LLC

West Farm Pit

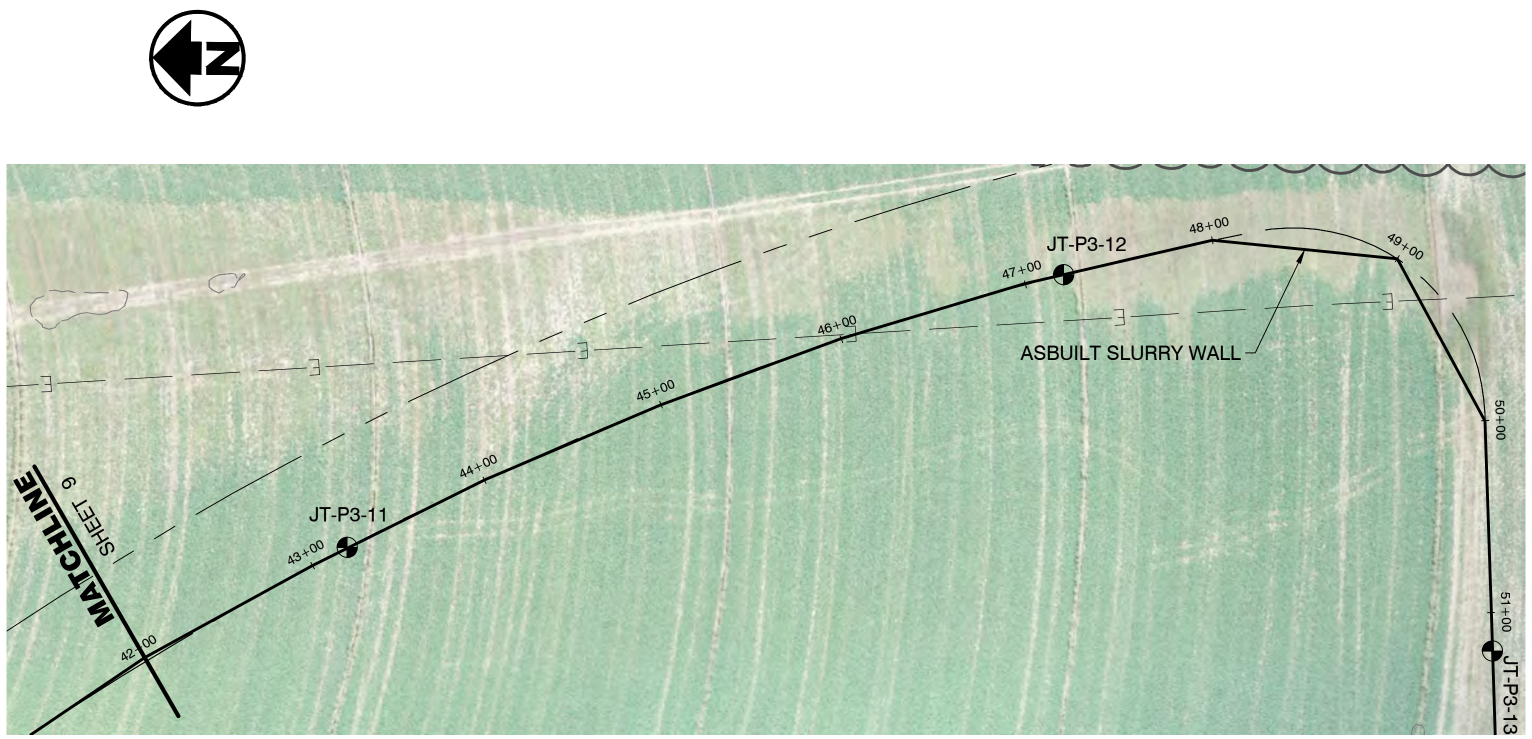
REVISIONS

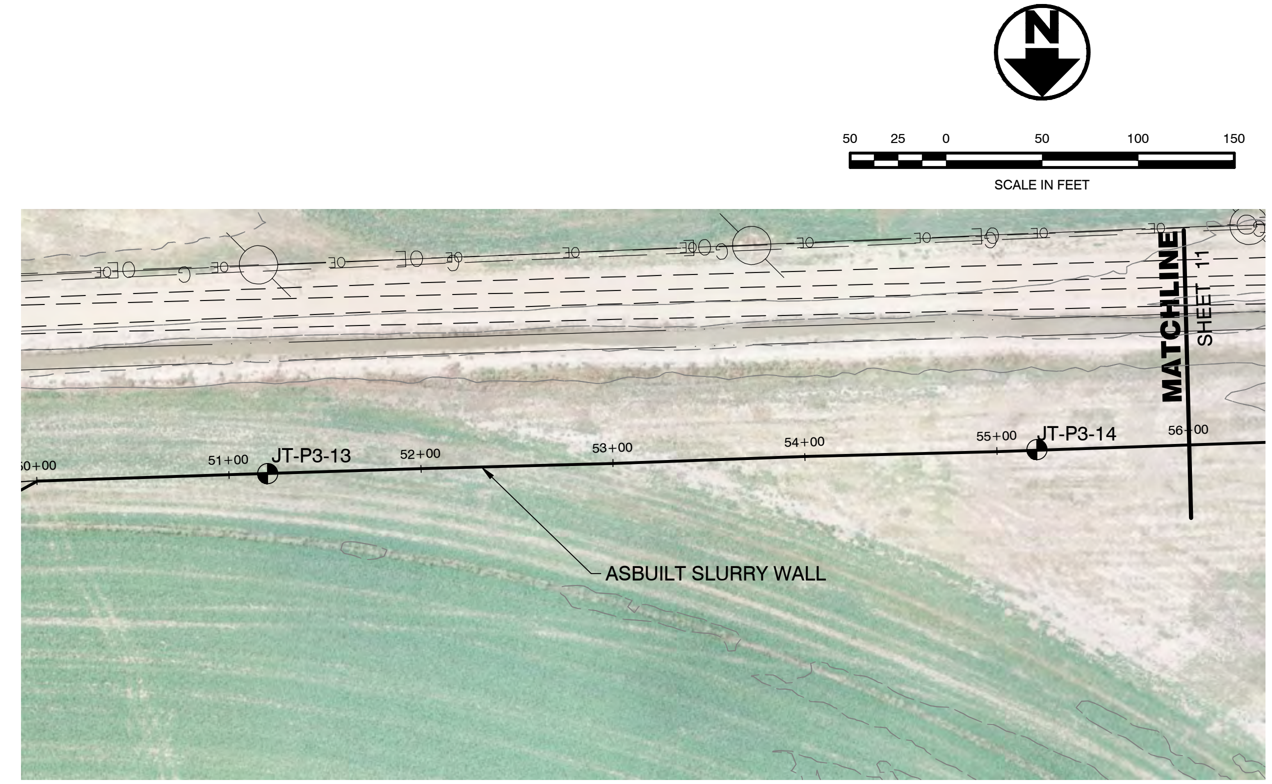
No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As Constructed

COLORADO REGISTERED PROFESSIONAL ENGINEER JAMES C. YORK 36846 2.10.22

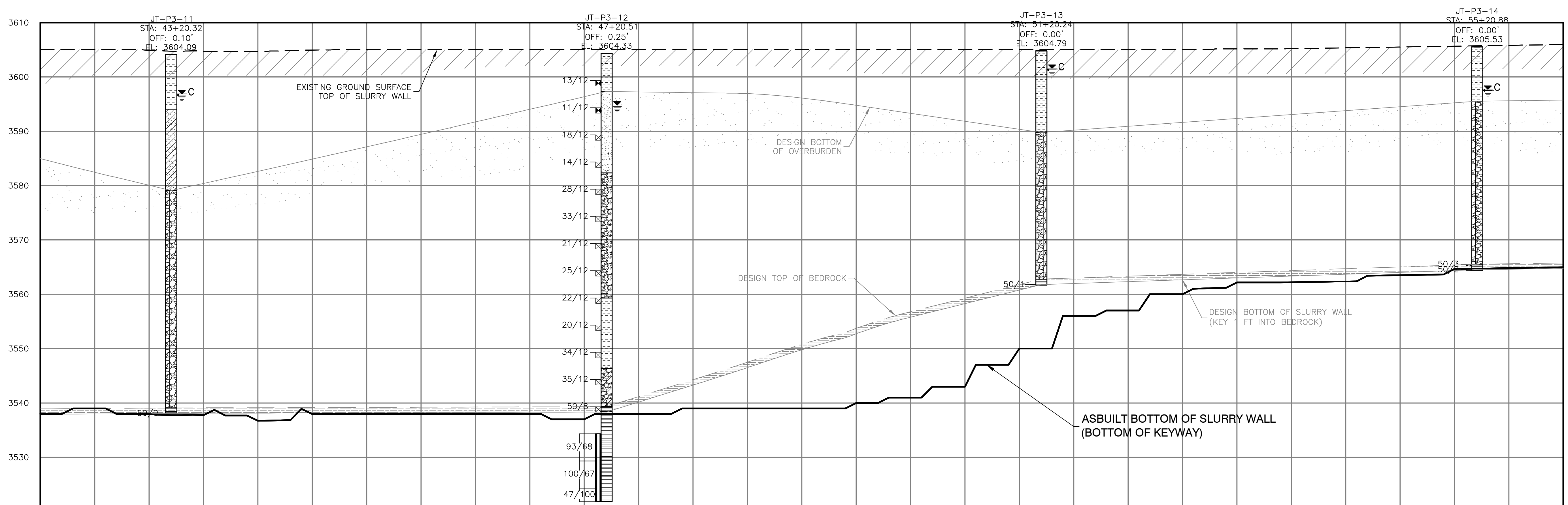
Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

Sheet: 9 Of: 18





TOTAL PHASE 3 SLURRY WALL CONSTRUCTED = 599,878 SF



Station	Existing	SW Depth	Top Bedrock	Bot Keyway
42+00	3605.00	67.08	3538.92	3537.92
42+50	3605.00	67.02	3538.97	3537.97
43+00	3604.91	66.85	3539.06	3538.06
43+50	3604.75	66.64	3539.10	3538.10
44+00	3604.71	66.58	3539.12	3538.12
44+50	3604.94	66.79	3539.15	3538.15
45+00	3605.00	66.82	3539.18	3538.18
45+50	3605.00	66.79	3539.21	3538.21
46+00	3605.00	66.76	3539.24	3538.24
46+50	3605.00	66.72	3539.28	3538.28
47+00	3605.00	66.68	3539.32	3538.32
47+50	3605.00	64.84	3541.16	3540.16
48+00	3605.00	61.72	3544.28	3543.28
48+50	3605.00	58.50	3547.50	3546.50
49+00	3605.00	55.21	3550.79	3549.79
49+50	3605.00	52.27	3553.73	3552.73
50+00	3605.00	49.21	3556.79	3555.79
50+50	3605.00	46.71	3559.29	3558.29
51+00	3605.00	44.22	3561.78	3560.78
51+50	3605.00	43.01	3562.99	3561.99
52+00	3605.00	42.67	3563.33	3562.33
52+50	3605.00	42.33	3563.67	3562.67
53+00	3605.17	42.15	3564.02	3563.02
53+50	3605.20	41.84	3564.36	3563.36
54+00	3605.36	41.66	3564.70	3563.70
54+50	3605.52	41.47	3565.04	3564.04
55+00	3605.67	41.28	3565.38	3564.38
55+50	3605.82	41.21	3565.61	3564.61
56+00	3605.97	41.22	3565.76	3564.76

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.j-tconsulting.com

Phase 3 & Phase 8 Slurry Walls

Phase 3 Slurry Wall Plan & Profile
Sta 42+00 To 56+00

GP Aggregates, LLC

West Farm Pit

REVISIONS

No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As Constructed

COLORADO REGISTERED
JAMES C. YORK
36846
2.10.22
PROFESSIONAL ENGINEER

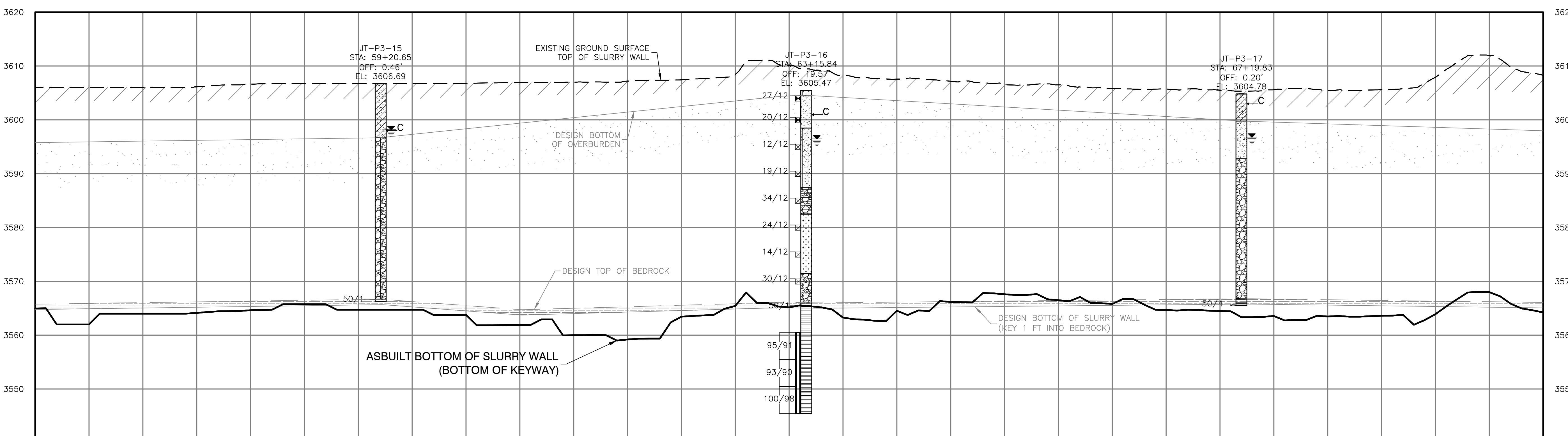
AS CONSTRUCTED

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

Sheet: 10 Of: 18

P:\07115 GP Ranches LLC - Lamar\Drawings\Plan Sheets\2021 Slurry Wall\JT-2021 Slurry Wall P&P.dwg, Phase 3 Slurry Wall Plan & Profile Sta 56+00 to 70+00, 7/10/2024 11:16:38 AM

TOTAL PHASE 3 SLURRY WALL CONSTRUCTED = 599,878 SF



Station	Existing	SW Depth	Top Bedrock	Bot Keyway
56+00	3605.97	41.22	3565.76	3564.76
56+50	3606.00	41.10	3565.90	3564.90
57+00	3606.00	40.95	3566.05	3565.05
57+50	3606.13	40.94	3566.19	3565.19
58+00	3606.62	41.28	3566.33	3565.33
58+50	3606.72	41.25	3566.48	3565.48
59+00	3606.73	41.11	3566.62	3565.62
59+50	3606.74	41.50	3566.24	3565.24
60+00	3606.78	42.29	3565.49	3564.49
60+50	3606.90	43.16	3564.74	3563.74
61+00	3607.00	43.00	3564.99	3563.99
61+50	3607.20	42.92	3565.28	3564.28
62+00	3607.42	42.86	3565.56	3564.56
62+50	3608.43	43.59	3565.85	3564.85
63+00	3610.17	45.10	3566.07	3565.07
63+50	3608.27	43.22	3566.04	3565.04
64+00	3607.55	42.41	3566.14	3565.14
64+50	3607.16	41.92	3566.24	3565.24
65+00	3606.60	41.26	3566.34	3565.34
65+50	3606.50	41.06	3566.44	3565.44
66+00	3605.80	40.26	3566.54	3565.54
66+50	3605.70	40.06	3566.64	3565.64
67+00	3605.50	39.76	3566.74	3565.74
67+50	3605.58	39.88	3566.70	3565.70
68+00	3605.46	39.88	3566.58	3565.58
68+50	3605.60	40.14	3566.45	3565.45
69+00	3607.91	42.58	3566.33	3565.33
69+50	3612.01	46.81	3566.20	3565.20
70+00	3608.25	43.17	3566.08	3565.08

AS CONSTRUCTED

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.jt-consulting.com

Phase 3 & Phase 8 Slurry Walls

Phase 3 Slurry Wall Plan & Profile
Sta 56+00 To 70+00

GP Aggregates, LLC

West Farm Pit

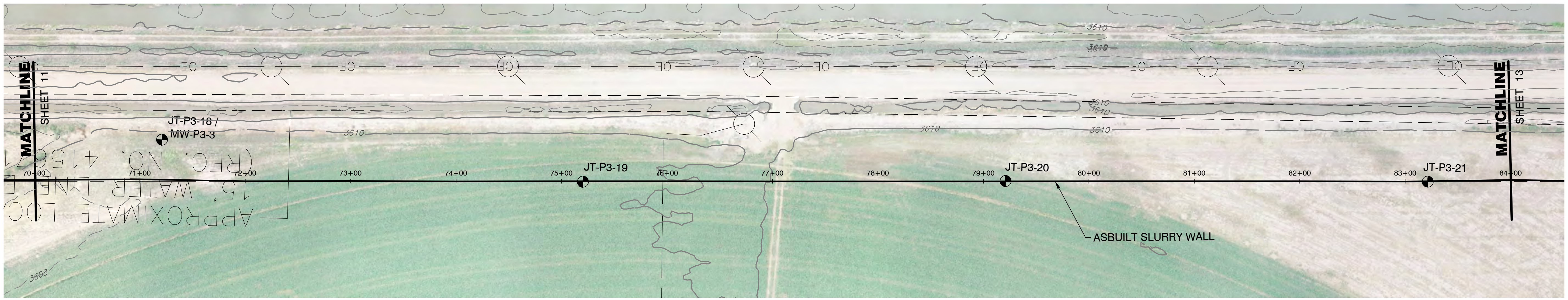
REVISIONS

No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As Constructed

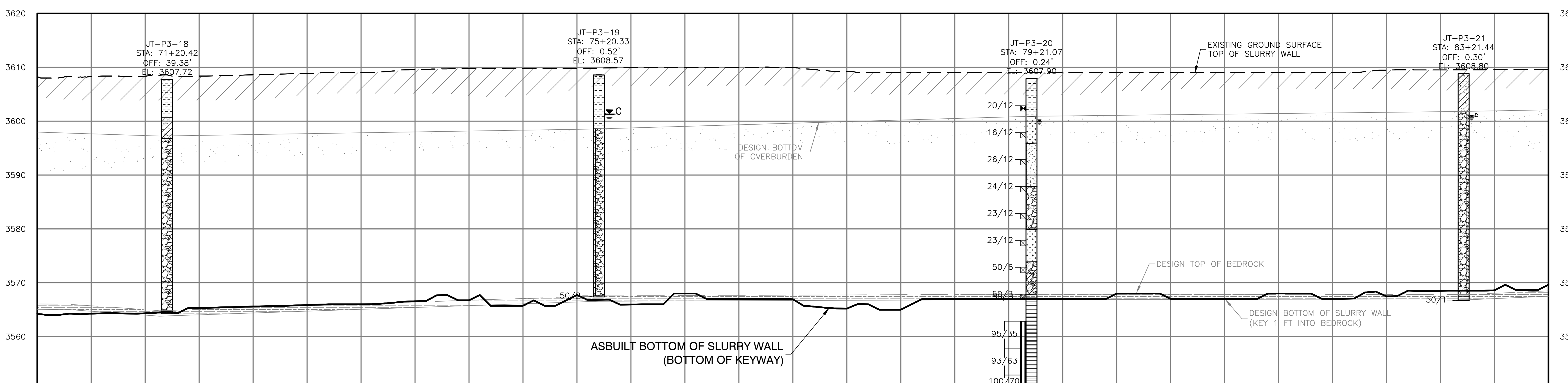
COLORADO REGISTERED PROFESSIONAL ENGINEER JAMES C. YORK 36846 2.10.22

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

Sheet: 11 Of: 18



TOTAL PHASE 3 SLURRY WALL CONSTRUCTED = 599,878 SF



Station	Existing	SW Depth	Top Bedrock	Bot Keyway
70+00	3608.25	43.17	3566.08	3565.08
70+50	3608.28	43.54	3565.74	3564.74
71+00	3608.34	44.32	3565.02	3564.02
71+50	3608.36	44.28	3565.07	3564.07
72+00	3608.60	44.19	3565.41	3564.41
72+50	3608.88	44.13	3565.75	3564.75
73+00	3609.01	43.92	3566.09	3565.09
73+50	3609.59	44.17	3566.42	3565.42
74+00	3609.75	43.99	3566.76	3565.76
74+50	3609.75	43.65	3567.10	3566.10
75+00	3609.76	43.33	3567.43	3566.43
75+50	3609.97	43.38	3567.60	3566.60
76+00	3610.00	43.36	3567.64	3566.64
76+50	3610.01	43.33	3567.68	3566.68
77+00	3609.96	43.24	3567.72	3566.72
77+50	3609.21	42.45	3567.76	3566.76
78+00	3609.00	42.20	3567.80	3566.80
78+50	3609.00	42.15	3567.85	3566.85
79+00	3609.00	42.11	3567.89	3566.89
79+50	3609.00	42.10	3567.90	3566.90
80+00	3609.00	42.12	3567.88	3566.88
80+50	3609.00	42.13	3567.87	3566.87
81+00	3609.00	42.14	3567.86	3566.86
81+50	3609.00	42.16	3567.85	3566.85
82+00	3609.05	42.21	3567.83	3566.83
82+50	3609.48	42.66	3567.82	3566.82
83+00	3609.50	42.69	3567.81	3566.81
83+50	3609.62	42.56	3568.06	3567.06
84+00	3609.65	42.14	3568.50	3567.50

SCALE IN FEET: 50 25 0 50 100 150

P:\07115 GP Ranches LLC - Lamar\Drawings\Plan Sheets\2021 Slurry Wall\JT-2021 Slurry Wall P&P.dwg, Phase 3 Slurry Wall Plan & Profile Sta 70+00 to 84+00, 7/10/2024 11:16:49 AM

AS CONSTRUCTED

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.jt-consulting.com

Phase 3 & Phase 8 Slurry Walls

Phase 3 Slurry Wall Plan & Profile
Sta 70+00 To 84+00

GP Aggregates, LLC

West Farm Pit

REVISIONS

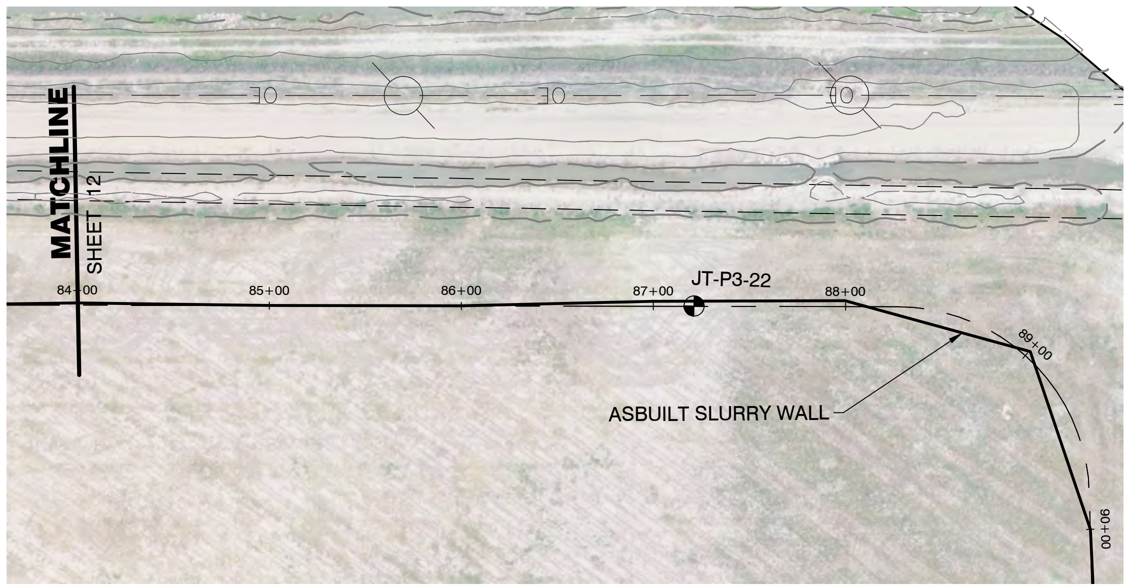
No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As Constructed

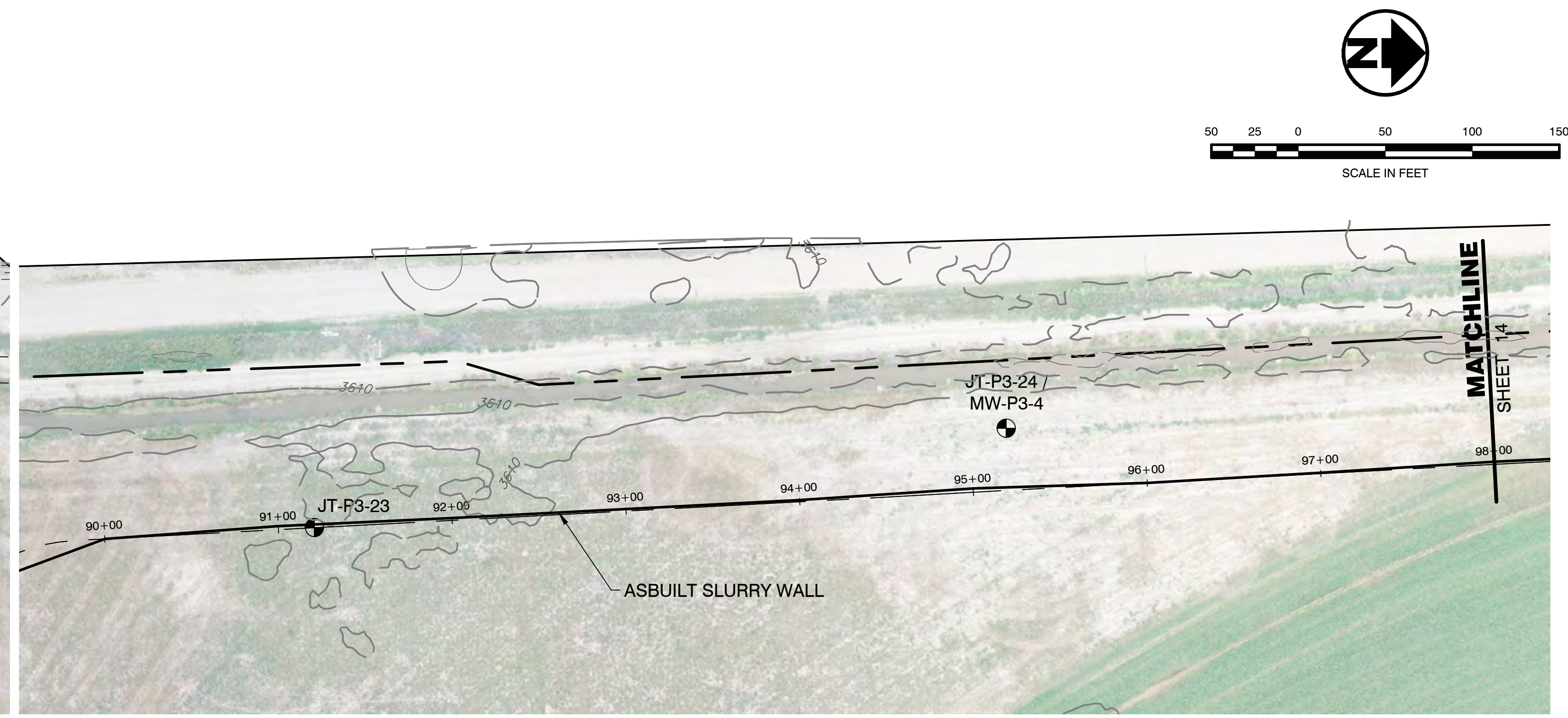
COLORADO REGISTERED PROFESSIONAL ENGINEER JAMES C. YORK 36846 2.10.22

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

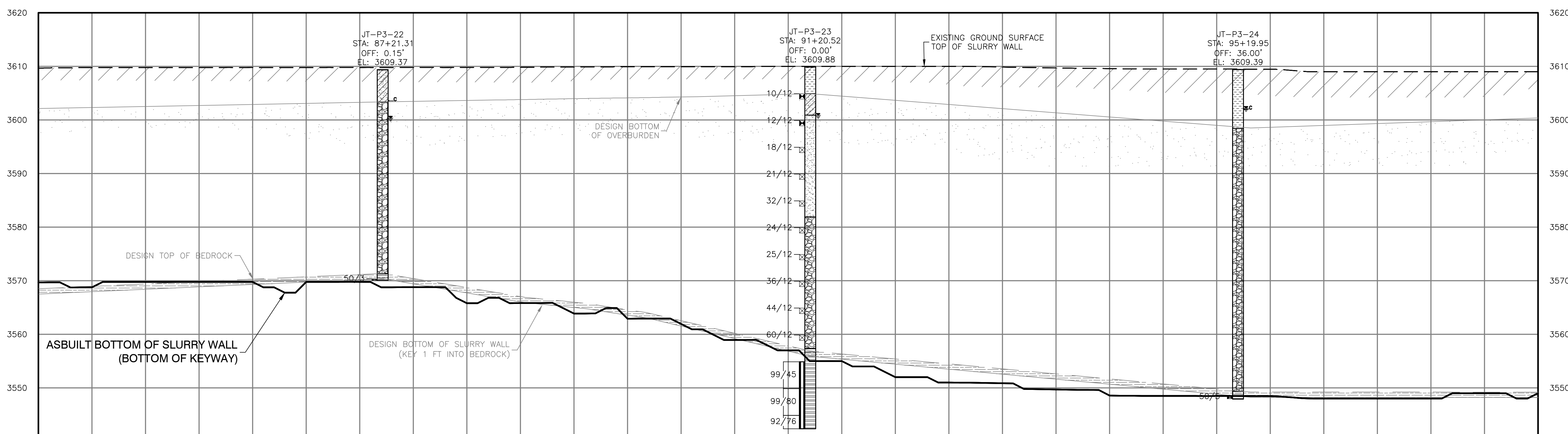
Sheet: 12 Of: 18

P:\07115 GP Ranches LLC - Lamar\Drawings\Plan Sheets\2021 Slurry Wall\JT-2021 Slurry Wall P&P.dwg, Phase 3 Slurry Wall Plan & Profile Sta 84+00 to 98+00, 7/10/2024 11:17:01 AM





TOTAL PHASE 3 SLURRY WALL CONSTRUCTED = 599,878 SF



Station	Existing	SW Depth	Top Bedrock	Bot Keyway
84+00	3609.65	42.14	3568.50	3567.50
84+50	3609.77	41.82	3568.95	3567.95
85+00	3609.76	41.37	3569.39	3568.39
85+50	3609.76	40.92	3569.84	3568.84
86+00	3609.77	40.49	3570.28	3569.28
86+50	3609.77	40.04	3570.72	3569.72
87+00	3609.77	39.61	3571.16	3570.16
87+50	3609.78	40.39	3570.40	3569.40
88+00	3609.78	42.06	3568.72	3567.72
88+50	3609.82	43.78	3567.03	3566.03
89+00	3609.87	44.88	3565.99	3564.99
89+50	3609.91	46.35	3564.57	3563.57
90+00	3609.93	48.39	3562.53	3561.53
90+50	3609.92	50.73	3560.19	3559.19
91+00	3610.00	53.15	3557.84	3556.84
91+50	3610.00	54.67	3556.33	3555.33
92+00	3610.00	55.60	3555.40	3554.40
92+50	3610.00	56.53	3554.47	3553.47
93+00	3609.86	57.32	3553.54	3552.54
93+50	3609.69	58.08	3552.61	3551.61
94+00	3609.56	58.89	3551.68	3550.68
94+50	3609.50	59.75	3550.74	3549.74
95+00	3609.49	60.68	3549.81	3548.81
95+50	3609.46	61.24	3549.22	3548.22
96+00	3609.00	60.78	3549.22	3548.22
96+50	3609.00	60.78	3549.22	3548.22
97+00	3609.00	60.78	3549.22	3548.22
97+50	3609.00	60.79	3549.21	3548.21
98+00	3609.00	60.79	3549.21	3548.21

AS CONSTRUCTED

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.jt-consulting.com

Phase 3 & Phase 8 Slurry Walls

Phase 3 Slurry Wall Plan & Profile
Sta 84+00 To 98+00

GP Aggregates, LLC

West Farm Pit

REVISIONS

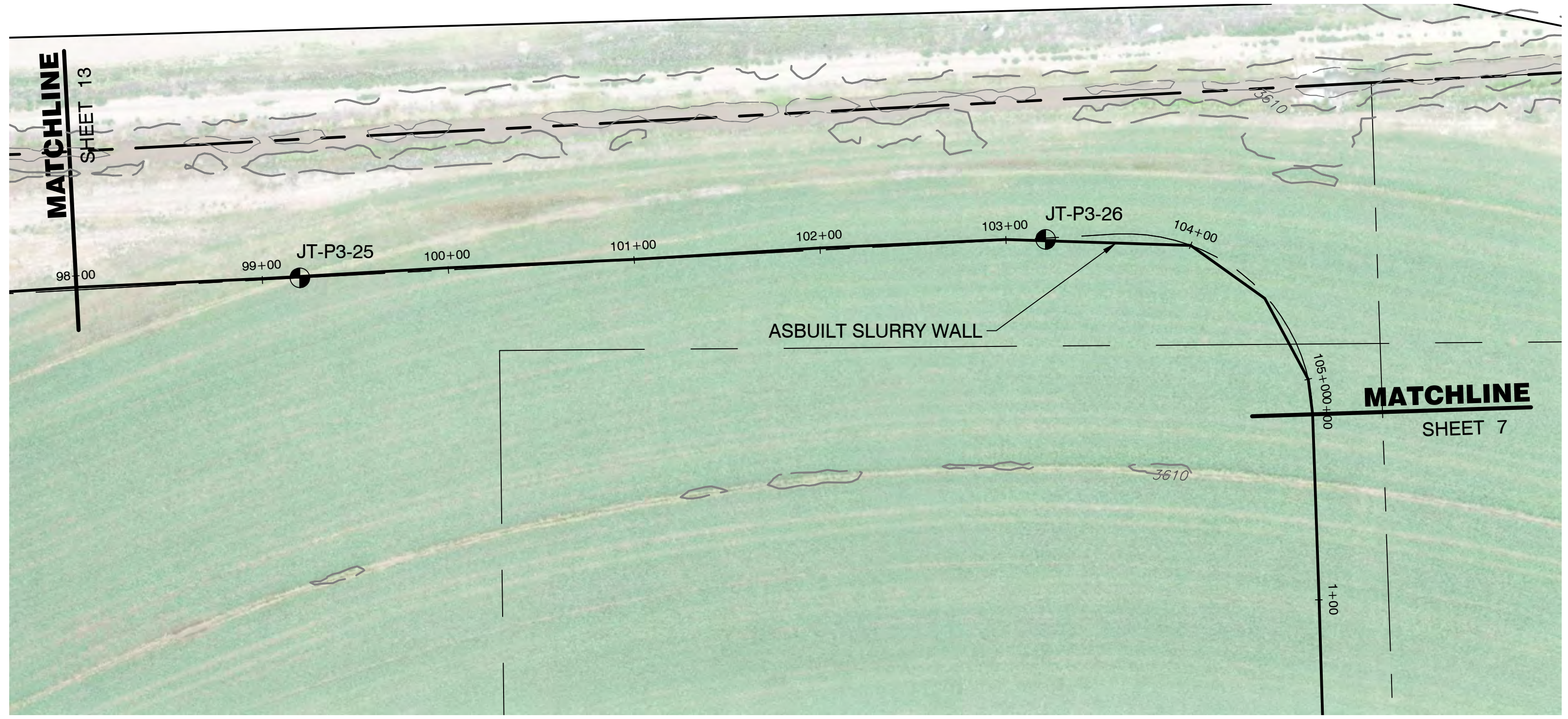
No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As Constructed

COLORADO REGISTERED JAMES C. YORK 36846 2.10.22 PROFESSIONAL ENGINEER

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

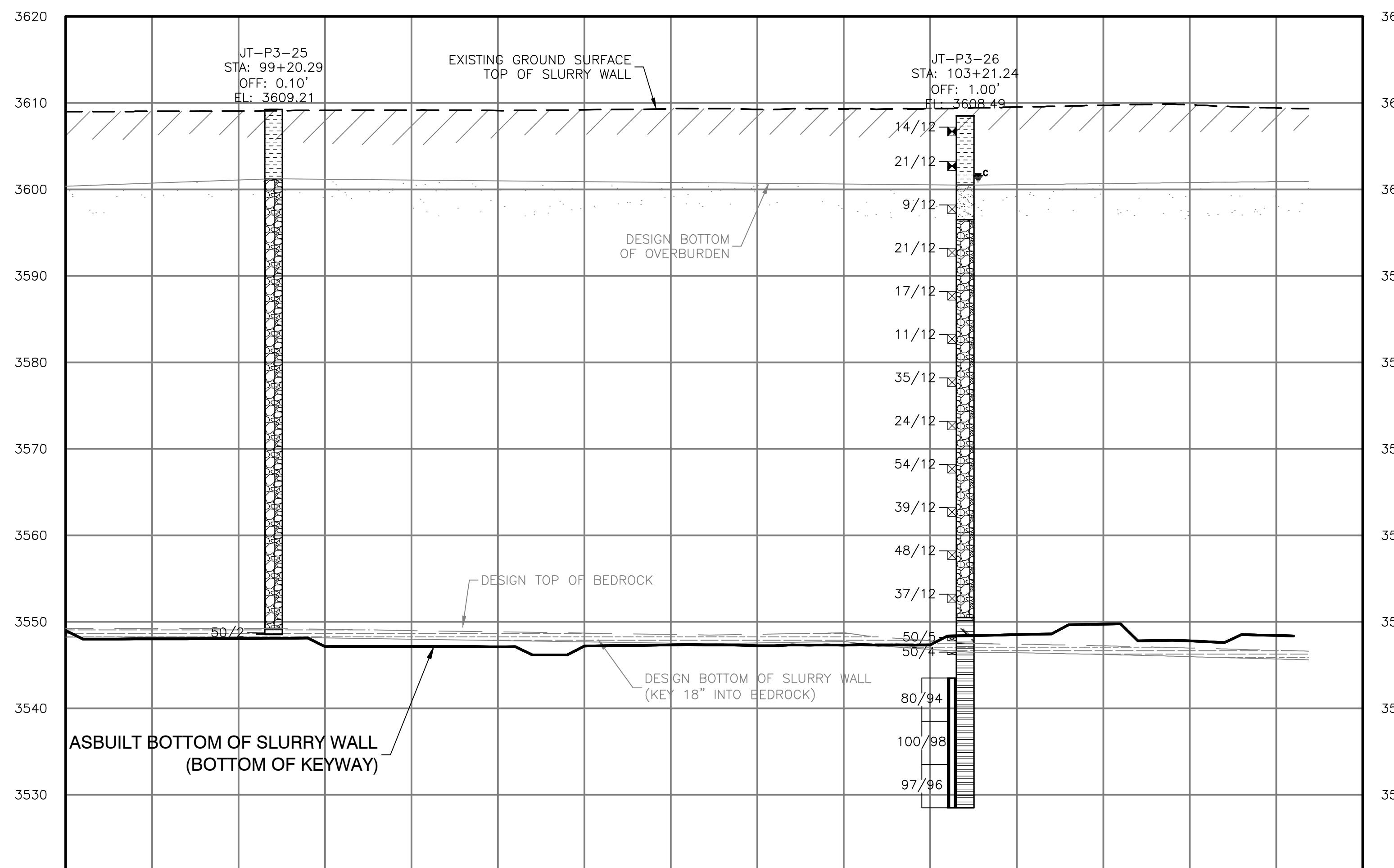
Sheet: 13 Of: 18

P:\07115 GP Ranches LLC - Lamar\Drawings\Plan Sheets\2021 Slurry Wall\JT-2021 Slurry Wall P&P.dwg, Phase 3 Slurry Wall Plan & Profile Sta 98+00 to 105+50, 7/10/2024 11:17:16 AM



50 25 0 50 100 150
SCALE IN FEET

TOTAL PHASE 3 SLURRY WALL CONSTRUCTED = 599,878 SF



Station	Existing	SW Depth	Top Bedrock	Bot Keyway
98+00	3609.00	60.79	3549.21	3548.21
98+50	3609.02	60.81	3549.21	3548.21
99+00	3609.07	60.86	3549.21	3548.21
99+50	3609.13	61.01	3549.12	3548.12
100+00	3609.16	61.18	3548.97	3547.97
100+50	3609.10	61.27	3548.83	3547.83
101+00	3609.19	61.51	3548.68	3547.68
101+50	3609.33	61.80	3548.53	3547.53
102+00	3609.23	61.68	3548.56	3547.56
102+50	3609.29	61.58	3548.71	3547.71
103+00	3609.31	62.51	3547.80	3546.80
103+50	3609.51	63.11	3547.40	3546.40
104+00	3609.72	63.51	3547.21	3546.21
104+50	3609.78	63.82	3546.96	3545.96
105+00	3609.41	63.72	3546.69	3545.69
105+50				

AS CONSTRUCTED

J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
Ph: 303-857-6222 Fax: 303-857-6224
www.j-tconsulting.com

Phase 3 & Phase 8 Slurry Walls

Phase 3 Slurry Wall Plan & Profile
Sta 98+00 To 105+50

GP Aggregates, LLC
West Farm Pit

REVISIONS

No	Date	By	Chk	Description
1	6.24.21	TPY	JCY	Issued for Construction
2	2.10.22	TWT	JCY	As Constructed

COLORADO REGISTERED PROFESSIONAL ENGINEER JAMES C. YORK 36846 2.10.22

Job #	20124
Date	2.19.21
Drawn By	KJS
Designed By	TPY
Checked By	JCY
File	JT-Ph3-8 Slurry
Scale	As Shown

Sheet: 14 Of: 18

Steve Kelton

From: Ayrton Hendrix <Ayrton@Hendrix-wai.com>
Sent: Wednesday, February 26, 2025 1:44 PM
To: Melissa Van Der Poel; rachel.zancanella@state.co.us; Arnold - DNR, Bethany; DWRPermitsOnline
Cc: randy@hendrix-wai.com; Ayrton Hendrix; toddyee@j-tconsulting.com; JC York; Alex Schatz; Roy Cue; LAWMA Office; Steve Kelton
Subject: [EXTERNAL] BS&G West Farm SWSP ID No. 5121 2025 renewal request
Attachments: 2025 Brannan Sand and Gravel SWSP Renewal Request.pdf

To all;

Attached is a substitute water supply plan renewal request for the West Farm Gravel pit operations under C.R.S. § 37-90-137(11). Upon reviewing C.R.S. § 37-90-137(11) we have found that the provision has no period for filing of comments on the plan by other water rights owners like in a C.R.S. § 37-92-308 SWSP, as such no notice has been prepared; however, if so directed by your office we will prepare a similar notification to past renewals of this SWSP. Payment will be made upon receipt of invoice.

Ayrton

--

McGrane Water Engineering, LLC

4475 Driftwood Place • Boulder, CO 80301 • Phone: (303) 917-1247
E-Mail: dennis@mcgranewater.com

March 25, 2021

Mr. JC York
J&T Consulting, Inc.
305 Denver Avenue, Suite D
Ft. Lupton, CO 80621

Via email at: jcyork@j-tconsulting.com

RE: West Farm Gravel Pits DRMS amendment AM-02 - Slurry Wall Assessment

Dear Mr. York:

The West Farm gravel pits are located in Lamar, Colorado in Sections 25-29 and 32-36, Township 22 South, Range 46 West of the 6^{th} principal meridian. There are nine pits as shown on **Figure 1**. The pits are located within a mile of the Arkansas River upstream of the Clay Creek tributary. Part of the reclamation plan is to install slurry walls around each pit.

J&T Consulting, Inc. (JTC) requested that McGrane Water Engineers, LLC. (MWE) evaluate the hydrologic impacts of installing a slurry walls around the pits. Prowers Aggregate Operators, LLC is the permit "Owner." Anticipated impacts include a rise in the water table on the up gradient side of the slurry wall and a decline in the water table on the down-gradient side. Water levels within 10 feet of the surface could flood existing structures such as basements or cause cropland damage and phreatophyte growth. Depending on the amount, a decline in water levels on the down-gradient side could reduce the aquifer saturated thickness and decrease well yields of high capacity agricultural and municipal wells. Ongoing well pumping for mining operations could also affect vicinity well yields if the wells used are up-gradient and drawdown is accelerated by the presence of the slurry walls. Potential mitigation includes installing drains to equalize mounding and shadowing and future pumping further away from neighboring wells. Monitoring is important to evaluate future changes.

Mining and Reclamation Plan

The Phase 1 pit slurry wall was installed in 2014 and the area is now a reclaimed reservoir. Phase 2 mining is ongoing, and the perimeter slurry wall was constructed in 2016. The next phases are Phase 8 and Phase 3, and slurry wall construction is proposed to occur this summer. Phases 4-7 and Phase 9 are planned for the future. The reclamation time table will occur over the next decade as shown in **Table 1**.

Table 1 – Reclamation Time Table

Phase Sequence	Estimated Time Required to Mine Phases (Years)	Estimated Total Mining Time (Years)	Year
1	Mining Complete	0 years	2020
2	1 years	1 years	2021
8	0.75 years	1.75	2022
3	5 years	7 years	2027
4	9.5 years	16.5 years	2037
5	2.5 years	19 years	2039
6	4.5 years	23.5 years	2043
7	3.75 years	27.25 years	2047
9	2.75 years	30 years	2050

Modeling Result Summary

Using the US Geological Survey's MODFLOW program, MWE determined the steady state change in water levels after each phase. The maximum expected increase in water levels is approximately 3 feet, and the maximum decrease is approximately -2 feet. We modeled the phased development using "steady state" which assumes a new equilibrium has been achieved after a modeled stress (installation of a slurry wall). In reality, the changes modeled will not reach steady state until a year or two after a slurry wall installation.

Approximately half of the eight wells that have water level increases have a reported depth to water of less than 10 feet. This suggests that increases in water levels could intersect basements and shallow excavations if they exist. **Table 2** shows those wells that have more than 1 foot of expected change during any phase. **Table 11,** at the end of the report, tabulates modeled water level changes from each pit phase.

Table 2 – Wells with Greater than +/- 1 foot of Modeled Change

Permit Number	Contact Name	Use(s)	Pump Test Yield (gpm)	Static Water Level	Max. Modeled Change over +/- 1 ft (All Phases)	Permit Info
79628-F	GP RESOURCES LLC	Commercial, Industrial	1729	ND	2.5	https://dwr.state.co.us/Tools/WellPermits/3668741E
79629-F/4231-F	GP IRRIGATED FARMS LLC	Irrigation	1600	7	2	https://dwr.state.co.us/Tools/WellPermits/9092586
5061-F	LAMAR FARMS	Irrigation	1200	8	1.5	https://dwr.state.co.us/Tools/WellPermits/9092671
79631-F/5060-F	GP IRRIGATED FARMS LLC	Irrigation	1200	12	2.5	https://dwr.state.co.us/Tools/WellPermits/9092670
6433-R	LAMAR FARMS	Irrigation	1099	8.3	3	https://dwr.state.co.us/Tools/WellPermits/9092768
9302-F	LAMAR UTILITIES BOARD	Irrigation	1012	15	1.5	https://dwr.state.co.us/Tools/WellPermits/9092841
68784-	LAZY Y CROSS LND CO	Stock	30	8	3	https://dwr.state.co.us/Tools/WellPermits/9093720
21283-	BAKER, J R	Domestic	15	18	1	https://dwr.state.co.us/Tools/WellPermits/9093371
74258-	HOSS INMAN JAMES A	Domestic, Stock	15	24	1.5	https://dwr.state.co.us/Tools/WellPermits/9093731
19650-MH	SOUTHEASTERN COLORADO COOP	Monitoring/ Sampling	na	8.45	2	https://dwr.state.co.us/Tools/WellPermits/0019650
75864-F	GP AGGREGATES LLC	Gravel Pit	ND	ND	2.5	https://dwr.state.co.us/Tools/WellPermits/3652084
68785-	LAZY Y CROSS LND CO	Stock	30	6	-2	https://dwr.state.co.us/Tools/WellPermits/9093721
79630-F/4230-F	GP RESOURCES LLC	Commercial, Industrial	na	9	2.5	https://dwr.state.co.us/Tools/WellPermits/3668741A

Wells registered to GP Resources and GP Irrigated Farms are associated with the Owner. One low yielding stock well (permit 68785-F), located on the east side, is expected to experience -2 foot decline. Since well yield is proportional to the saturated thickness and this change is small, we do not expect a noticeable decline in well yield.

The modeled change in water levels is however, sensitive to vicinity pumping. This is because slurry walls act as boundaries to the spreading cones of depression which causes additional drawdown. We evaluated this "interference" effect by adding pumping from three existing agricultural wells to the model baseline and "change" runs. The three wells, pumping at a combined 1788 gallons per minute (gpm), are located approximately 2000 feet west of western pits, reduced the predicted 3 ft high mound to approximately 1 ft. The sensitivity run also demonstrated that the slurry wall interference could also increase down-gradient shadowing effects by a similar amount (approximately -2 feet). Due to the lack of high capacity down-gradient wells, we do not expect amplified shadowing caused by off-site pumping to be an issue.

Despite some uncertainties, we believe the model is the best tool to evaluate impacts caused by pit development for the following reasons:

- The model was constructed using most available data;
- We accounted for the most important inflow and outflow parameters using available data and reasonable assumptions;
- We used site specific test data to determine aquifer properties;
- Modeled water levels (**Figure 9**) appear reasonable compared to past (**Figure 6**) and recent measurements;
- The model mass balances show minimal error; and
- The model results are relatively insensitive to aquifer properties.

Monitoring and Mitigation

We conclude that upgradient slurry walls will most likely benefit upgradient wells by increasing water levels despite the potential for some additional drawdown caused by interference effects. Monitor wells located between the up-gradient Phase 3 and Phase 8 pits have already been installed. We recommend that a select few be monitored throughout the mine life to evaluate the net impacts. We also recommend that the mine owner minimize future pumping on the west side of Phase 3 and 8 pits to reduce the potential for additional interference.

Available Data

We compiled hydrogeologic data from:

- Existing reports from the US Geological Survey and Colorado Division of Water Resources;
- 141 completed registered wells less than 100 feet deep were identified in the Colorado Division of Water Resources (CDWR) Well database (**Appendix A**); and
- Various gravel pit studies that include geologic logs and water levels compiled by JTC;

Figure 2 is a Google Earth image that shows: aerial imagery, the planned pits, the CDWR wells color coded by use (domestic, commercial, industrial, irrigation, and monitoring) and the model boundary. Most of the wells in Lamar are domestic water wells. Numerous irrigation, industrial and stock wells are evenly distributed north and east of the town. **Figure 3** shows the 76 additional soil borings and monitor wells with water level and bedrock depth information.

Hydrogeology

Ground water is present in unconsolidated alluvial deposits on either side of the Arkansas River. Within the model area, the U.S. Geological Survey (Sharpe, 1976) maps Quaternary alluvium (Qa) along the floodplain and older "Broadway" (Qb) alluvium and loess (Qlo) on higher terraces. The alluvial aquifer within the pit area consists of mostly clean, high permeability sand and gravel. **Figure 4** shows the surficial geology and reported well yields from the CDWR well database. Well yields range from 10 to 75 gallons per minute (gpm) for domestic wells and up to 2000 gpm for commercial and irrigation wells. The largest yields are where the alluvium is thickest, closer to the Arkansas River. The Dakota outcrop located just south of the southeast corner of the Phase 6 pit and Hwy 50 supports borehole data that shows deepening gravel deposits to the north. The alluvium adjacent to the perennial streams is hydraulically connected to the streams in most places (Voegeli, 1965).

The non-floodplain deposits are more fine-grained and therefore have lower permeability that the alluvial sediments. Eolian windblown dune deposits (Qe) occur on top of the Dakota sandstone (Kd) bedrock on the south side of the model. The sand dunes act as excellent catchment areas for precipitation which recharges underlying water-bearing formations (Voegeli, 1965). Wells within eolian and bedrock formations typically produce much less than alluvial aquifer wells.

Appendix A contains compiled registered well data from the State's well database including permit number, owner, use, completed well depth, pump test yield, water level when drilled, pump test method and testing water level. Well depths range from 9 to 97 feet and average 43 feet. The depth to water when drilled ranges from 6 to 40 feet. Test data was used to calculate aquifer properties used in the model discussed below.

Water Level Contours

Water table elevations were determined by subtracting the depth to water from surveyed elevations (monitoring wells) or DEM elevations (CDWR wells). **Figure 6** shows the "Baseline Water Table Conditions" compared to the US Geological Survey's map of the water table in

1966 (Nelson et al., 1989). Groundwater flows perpendicular to the contours and generally toward the river. The gradient west to east is controlled by the river where water freely passes to and from the aquifer. Overall, the water table drops from an elevation of approximately 3615 feet on the west to elevation 3565 ft (50 ft) over approximately 6.5 miles. Steeper gradients (closer contours) exist from the north and south, through thinner, lower permeability sediment.

The 1966 water table map shows a modest cone of depression at the 3580 ft contour within the Town of Lamar which was likely caused by agricultural, industrial and municipal pumping. In 2021, pumping on the east side of Lamar has lowered the water table approximately 5 feet between the town and east end of the proposed pits.

Seasonal Water Level Changes

"The water table is not stationary, but varies in a manner somewhat similar to an open reservoir that fills and empties (Voegeli, 1965)." The pit applicants are currently conducting monthly monitoring of numerous monitoring wells around Phase 1, Phase2, Phase 3 and 8 pits. Seasonal monitoring show that the alluvial aquifer fluctuates 1 to 2 feet throughout the year. Numerous USGS hydrographs (Voegeli, 1965) confirm a similar amount of seasonal change caused by river and precipitation recharge, canal seepage and agricultural return flows. Because water level changes caused by seasonal variations are of the same magnitude as those caused by pit slurry walls, we recommend continued monthly monitoring to evaluate and discern the difference.

Hydraulic Conductivity and Transmissivity

The aquifer hydraulic conductivity (K) is the measure of aquifer permeability (ft/dy). The aquifer transmissivity (T) is product of the aquifer K multiplied by the saturated thickness. We estimated transmissivity using specific capacity data (yield divided by the drawdown) obtained from 25 high capacity (>400 gpm) wells that were pump tested as shown in **Appendix A.** Transmissivity can be estimated using the following equation:

$$\text{Transmissivity (gpd/ft)} = 1500 \times \text{Specific Capacity (gpm/ft)}$$
$$\text{Whereas: Specific Capacity (gpm/ft)} = \text{Yield (gpm)/ Drawdown (ft)}$$

Source: (Driscoll, Fletcher, 1985)

Yield and calculated drawdown, specific capacity and transmissivity values are shown in **Appendix A**. Well test rates ranged from 500 to 2000 gpm. Drawdowns ranged from 8.7 to 35 feet, and specific capacities ranged from 21 to 200 gpm/ft. The resulting transmissivities range from 31,250 to 300,000 gpd/ft. By dividing the average transmissivity (117,270 gpd/ft) by the average saturated thickness (22 ft), we obtained an average K value of approximately 550 ft/day which is characteristic a clean sand and gravel aquifer (Todd, 1980). **Figure 7** shows the modeled transmissivity which was calculated using saturated thickness multiplied by the hydraulic conductivity and contoured. The saturated thickness was determined by subtracting the aquifer bottom (**Figure 5**) from the modeled water table. The transmissivity map shows the highest values (approximately 200,000 gpd/ft) are in the deepest portions of the channel (**Figure 5**).

Since there were very few wells completed in the older alluvium (Qb), we assumed its hydraulic conductivity is approximately five times less than the floodplain aquifer (approximately 100 ft/day). According to Todd, 1980, eolian sand has a K of approximately 50 ft/day. We also modeled all bedrock as "no-flow" meaning it effectively has a K of zero. The aquifer properties of geologic units simulated in the model are shown in **Table 3**.

Table 3 – Modeled Hydraulic Conductivity (K) Values

Geologic Unit	Symbol	K (ft/day)
Floodplain Alluvium	Qa	550
Older "Broadway" Alluvium	Qb	100
Eolian sand*	Qe	50
Bedrock (Dakota Sandstone)	Kd	0
***Source:** Todd, 1980 (p. 71)		

Modeling

We used the USGS MODFLOW2000 (Harbaugh et al, 2000) modeling program to evaluate the existing and future groundwater conditions. The model area is approximately 3 miles high and 6 miles wide (west to east) centered on the pits.

Impacts caused by lining gravel pits were computed by applying the principal of superposition (Reilly, Thomas E. et al, 1987). The principal states that solution to individual problems can be added to obtain solutions to more complex problems. It also means that if precipitation and canal recharge, and evapotranspiration are not expected to change significantly, then their influence can be ignored in the evaluation.

Using superposition, we evaluated the effects of nine pits through a series of seven model runs. The runs are done in steady state, which reflect average conditions. The baseline steady state run is meant to reasonably simulate pre-pit conditions. We then ran the model successively turning off the pit group cells to simulate the effect of slurry walls. We then subtract the heads from baseline run from the "pit" run to determine the expected "change."

To simplify this report, we included additional modeling details in **Appendix B** including:

- Model software and construction;
- Boundary condition details and calculations for:

  - The aquifer bottom;
  - Alluvial aquifer inflows and outflows using constant head cells;
  - River cell inflows and outflows;
  - Drain cells; and
- A discussion of model residuals and comparison statistics.

Figure 8 shows modeled boundary conditions around the model area. Some “dry cells” were also encountered in the southeast corner and along the southern boundary where general head boundaries were used to simulate inflow from the eolian sands (Qe). Dry cells are caused when the simulated water table gets too close or below the bedrock surface. Excessive dry cells can affect the model mass balance. To prevent this, we extended the “no-flow” boundary (dark hatched cells) up to 1000 feet north of the Qe/Qa contact (Sharp, 1976). We do not believe this action reduces model accuracy.

Baseline Water Table Comparison

Figure 9 compares the modeled water table contours with the contoured baseline water level conditions shown in **Figure 6.** The model results are also shown with color coded flood effects. By comparing the contours, the model results do not show the strong concave east shape. This is expected because there is no pumping occurring in the model which pull back the contours toward the west. We tried including pumping in the baseline model to better match the contoured data, but the slurry walls caused “interference effects” that significantly reduced up-gradient mounding. As a result, we abandoned pumping in the model runs so we could focus on modeling just mounding and shadowing effects caused by the pits themselves. A pumping sensitivity discussion is included later in this report.

Model Predictive Results

The predicted change in water levels due to successive slurry wall installation was created by subtracting the model heads with slurry walls from the baseline run (**Figure 6**). The results show mounding (blue positive contours) on the up-gradient sides of the pits and shadowing (negative red contours) on the down-gradient sides.

Model Mass Balance

Mass balances for each run lend insight into how changes in water levels affect the hydrologic system. Net inflow into the model and MODFLOW boundary conditions used (in parentheses) include:

- Alluvial aquifer subflow (constant head cells);
- South end subflow from eolian sand (general head boundary); and
- North side subflow from within the alluvial aquifer (constant head cells).

Net outflow to the model includes:

- River gains (river cells); and
- Flow into the unnamed drain located south of the pits and north of Hwy 50 (drain cells).

The Arkansas River and Clay Creek tributaries provide both aquifer inflow and outflow, but the net outflow is to the Arkansas River. Details of how the model boundaries are conceptualized and calculated are included in **Appendix B**.

For the baseline run, the alluvial inflow on the west and north sides (13.46 cubic feet per second) exceeds the outflow of -4.61 cfs out the east end of the model. The difference is made up by river gains (-7.60 cfs) and drain outflow (-3.10 cfs). Alluvial aquifer gains from the south side through eolian deposits is approximately 1.96 cfs which is consistent with operator observations (J&T Consulting, Inc.,March, 2021). **Table 4** summarizes the mass balance and calculated model error (difference between inflows and outflows). The model error in all model runs is less than 0.1 percent which is excellent.

Table 4: Mass Balance – Baseline Conditions (no pit slurry walls) in cfs

Boundary	Inflows	Outflows	Net inflow/outflow
Alluvial aquifer subflow	13.46	-4.61	8.85
S. side subflow	1.96	0.00	1.96
River gains/losses	7.60	-15.29	-7.69
Drain	0.00	-3.10	-3.10
Total:	23.02	-23.00	0.02
		Cumulative Error =	0.09%

Pit Phases 1 and 2 Changes

Figure 10 shows the modeled water level changes after slurry walls are installed around the Phase 1 and 2 pits. The results are that a 1.5 ft mound on the west side and -1.5 ft shadow on the east side of the developed pits.

Table 5 summarizes the mass balance components and net difference between this run and the baseline values shown in **Table 4**. The Phase 1 and 2 slurry wall mounding deflects groundwater to the north, thereby increasing river outflows over half a cfs (-0.54 cfs) compared to the base run. As a result, there is less groundwater moving to the south side of the pits which causes a decrease in drain outflows of an equal amount (0.54 cfs). The changes to alluvial inflows and outflows are insignificant because the model boundaries are far enough away that there is very little effect.

Table 5: Mass Balance – With Phase 1 and 2 Pit Slurry Walls (cfs)

Boundary	Inflows	Outflows	Net inflow/outflow	Change from Base Run
Alluvial aquifer subflow	13.45	-4.61	8.84	-0.01
S. side subflow	1.96	0.00	1.96	0.00
River gains/losses	7.41	-15.64	-8.23	-0.54
Drain	0.00	-2.56	-2.56	0.54
Total:	22.82	-22.81	0.01	-0.01
		Cumulative Error =	0.04%	

Pit Phases 1, 2, 8 and 3 Changes

Figure 11 shows the modeled water level changes after slurry walls are installed around the Phase 1, 2, 8 and 3 pits. The results are that a 3 ft mound and a -1 ft shadow on the west and east sides of the Phase 3 and 8 pits, and a 1 ft mound and -2 ft shadow on the west and east sides of Phases 1 and 2.

The Phases 1, 2, 8 and 3 pit slurry wall mounding on the west side cause a net increase in river outflows of -0.52 cfs to the Arkansas River compared to the base run. As a result, there is less groundwater moving to the south side of the pits which causes a decrease in outflows to the drain of 0.67 cfs. Other minor changes in the mass balance components are insignificant. **Table 6** summarizes the mass balance components and net difference between this run and the baseline values shown in **Table 4**.

Table 6: Mass Balance – With Phase 1, 2, 8 and 3 Pit Slurry Walls (cfs)

Boundary	Inflows	Outflows	Net inflow/outflow	Change from Base Run
Alluvial aquifer subflow	13.37	-4.66	8.71	-0.14
S. side subflow	1.94	0.00	1.94	-0.02
River gains/losses	7.47	-15.68	-8.21	-0.52
Drain	0.00	-2.43	-2.43	0.67
Total:	22.78	-22.77	0.01	
		Cumulative Error =	0.04%	

Pit Phases 1, 2, 8, 3 and 4 Changes

Figure 12 shows the modeled water level changes after slurry walls are installed around the Phase 1, 2, 8, 3 and 4 pits. The results are that a 3 ft mound and a -1 ft shadow on the west and east sides of Phase 3 and 8; and a 1 ft mound and -1.5 ft shadow on the west and east sides of Phases 1, 2 and 4. There is also a 0.5 ft mound and a -1 ft shadow on the north and south sides of Phase 1, 2 and 4.

The Phases 1, 2, 8, 3 and 4 pit slurry wall mounding on the west side cause a net increase in river outflows of -0.92 cfs to the Arkansas River compared to the base run. As a result, there is less groundwater moving to the south side of the pits which causes a decrease in outflows to the drain of 1.08 cfs. Other minor changes in the mass balance components are insignificant. **Table 7** summarizes the mass balance components and net difference between this run and the baseline values shown in **Table 4**.

Table 7: Mass Balance – With Phase 1, 2, 8, 3 and 4 Pit Slurry Walls (cfs)

Boundary	Inflows	Outflows	Net inflow/outflow	Change from Base Run
Alluvial aquifer subflow	13.36	-4.66	8.70	-0.15
S. side subflow	1.94	0.00	1.94	-0.02
River gains/losses	7.05	-15.66	-8.61	-0.92
Drain	0.00	-2.02	-2.02	1.08
Total:	22.35	-22.34	0.01	
		Cumulative Error =	0.04%	

Pit Phases 1, 2, 8, 3, 4 and 5 Changes

Figure 13 shows the modeled water level changes after slurry walls are installed around the Phase 1, 2, 8, 3, 4 and 5 pits. The results are that a 3 ft mound and a -1 ft shadow on the west and east sides of Phase 3 and 8; and a 1 ft mound and -3.5 ft shadow on the west and east sides of Phases 1, 2, 4 and 5. There is also a 0.5 ft mound and a -1 ft shadow on the north and south sides of Phases 1, 2 and 4.

The Phases 1, 2, 8, 3, 4 and 5 pit slurry wall mounding on the west side cause a net increase in river outflows of -0.65 cfs to the Arkansas River compared to the base run. As a result, there is less groundwater moving to the south side of the pits which causes a decrease in outflows to the drain of 0.80 cfs. Other minor changes in the mass balance components are insignificant. **Table 8** summarizes the mass balance components and net difference between this run and the baseline values shown in **Table 4**.

Table 8: Mass Balance – With Phase 1, 2, 8, 3, 4 and 5 Pit Slurry Walls (cfs)

Boundary	Inflows	Outflows	Net inflow/outflow	Change from Base Run
Alluvial aquifer subflow	13.36	-4.66	8.70	-0.15
S. side subflow	1.94	0.00	1.94	-0.02
River gains/losses	7.15	-15.49	-8.34	-0.65
Drain	0.00	-2.30	-2.30	0.80
Total:	22.45	-22.45	0.00	
		Cumulative Error =	0.00%	

Pit Phases 1, 2, 8, 3, 4, 5 and 6 Changes

Figure 14 shows the modeled water level changes after slurry walls are installed around the Phases 1, 2, 8, 3, 4, 5 and 6 pits. The results are that a 3 ft mound and a -1 ft shadow on the west and east sides of Phase 3 and 8; a 1 foot mound on the west side of Phase 1 and 2; a 0.5 ft mound and a -1 foot shadow on the north and south sides of Phases 1, 2 and 4; and a -2.5 ft shadow on the east side of Phases 5 and 6.

The Phases 1, 2, 8, 3, 4, 5 and 6 pit slurry wall mounding on the west side cause a net increase in river outflows of -0.36 cfs to the Arkansas River compared to the base run. As a result, there is less groundwater moving to the south side of the pits which causes a decrease in outflows to the drain of 0.51 cfs. Other minor changes in the mass balance components are insignificant. **Table 9** summarizes the mass balance components and net difference between this run and the baseline values shown in **Table 4**.

Table 9: Mass Balance – With Phase 1, 2, 8, 3, 4, 5 and 6 Pit Slurry Walls (cfs)

Boundary	Inflows	Outflows	Net inflow/outflow	Change from Base Run
Alluvial aquifer subflow	13.36	-4.65	8.71	-0.14
S. side subflow	1.94	0.00	1.94	-0.02
River gains/losses	7.21	-15.26	-8.05	-0.36
Drain	0.00	-2.59	-2.59	0.51
Total:	22.51	-22.50	0.01	
		Cumulative Error =	0.04%	

Pit Phases 1, 2, 8, 3, 4, 5, 6, 7 and 9 Changes

Figure 15 shows the modeled water level changes after slurry walls are installed around the Phases 1, 2, 8, 3, 4, 5, 6, 7 and 9 pits. The results are that a 3 ft mound on the west side of Phase 3 and 8; a 2 ft mound on the west side of Phases 1 and 2; a -2.5 ft shadow on the east side of Phases 5 and 6; a -0.5 ft shadow on the south side of Phase 9; and a 1 to 3 foot rise within the 200 ft wide gap between Phases 1,2 and 4 and Phases 7 and 9.

The Phases 1, 2, 8, 3, 4, 5, 6, 7 and 9 pit slurry wall mounding on the west side cause a net increase in river outflows of -0.79 cfs to the Arkansas River compared to the base run. As a result, there is less groundwater moving to the south side of the pits which causes a decrease in outflows to the drain of 0.97 cfs. Other minor changes in the mass balance components are insignificant. **Table 10** summarizes the mass balance components and net difference between this run and the baseline values shown in **Table 4**.

Table 10: Mass Balance – With Phase 1, 2, 8, 3, 4, 5, 6, 7 and 9 Pit Slurry Walls (cfs)

Boundary	Inflows	Outflows	Net inflow/outflow	Change from Base Run
Alluvial aquifer subflow	13.34	-4.65	8.69	-0.16
S. side subflow	1.93	0.00	1.93	-0.03
River gains/losses	7.14	-15.62	-8.48	-0.79
Drain	0.00	-2.13	-2.13	0.97
Total:	22.41	-22.40	0.01	
		Cumulative Error =	0.04%	

Net Change Summary

We summarized the modeled changes in water levels to registered wells in **Table 11** at the end of the report.

Model Sensitivity

The mounding results are insensitive to the hydraulic conductivity (K) of the aquifer. An increase in K causes a proportional increase in model inflows, but also increases the hydraulic connection with the creek which offsets any additional mounding or shadow effects. Therefore, there is no expected difference in the change contours.

Model results are insensitive to storage properties of the aquifer. Aquifer storage properties are not used in steady state runs. If transient model runs were used, then the time it took to achieve steady state conditions would be affected. To accommodate this variability, we believe steady state will be established approximately 1 to 3 years after the pit walls are constructed.

The model results are very sensitive to the presence of streams, but there is no realistic chance that either river will cease flowing due to strict river administration by the State. We used a conservatively low Arkansas River width of only 50 feet based on the average minimum monthly flows (see **Appendix B** for more details).

Model results are insensitive to streambed leakance. Even using a conservatively low Ksb value of 5.5 ft/day, the river covers a large enough surface area to quickly respond to changes in the groundwater system caused by pit development.

The model is sensitive to pumping. This is because slurry walls act as boundaries to the spreading cone of depression causing additional drawdown in the vicinity of the slurry walls. The effect of this was quantified by adding pumping of three existing agricultural wells located west of the Phase 3 and 8 pits to the baseline model. We pumped the wells at half of their tested rates (assuming a 6 month irrigation season) as shown in **Table 12** totaling 1787.5 gpm (approximately 4 cfs).

Table 12: Off-Site Pumping Sensitivity Run

CDWR Well Permit	Pumping Rate (gpm)
6434-R-R	1000.00
26655-F	450.00
20329-R	337.50
Total:	**1787.50**

Figure 16 shows the results of the pumping sensitivity run with all 9 slurry walls installed. Mounding was reduced on the west side of the Phase 3 and 8 pits from approximately 3 ft (**Figure 15**) to approximately 1 ft. This is because the additional drawdown caused by the slurry wall boundaries allowed more drawdown from future pumping to occur due to the interference caused by the slurry walls. In other areas of the model (east of Phase 6 and south of Phase 9) additional shadowing is predicted. We conclude that continued pumping of existing high capacity wells within approximately 0.5 miles of the pit could reduce up gradient mounding by approximately 2 feet, but also increase downgradient shadowing.

We did not evaluate how continued pumping of wells belonging to the applicant could affect future groundwater levels. We assume wells will be pumped much less due lower demands of gravel washing operations compared to current irrigation. We recommend that the pit owner minimize pumping on the west sides of Phase 3 and 8 to avoid causing additional drawdown at neighboring wells caused by the slurry walls. We also recommend continued monitoring of select Phase 3 and 8 monitoring throughout pit development.

Model Uncertainty

There is uncertainty in our predictions related to measurement and modeling error. Modeled predictions include three types of error: 1) conceptual error (how the model is set up and what boundary conditions are used); 2) parametric error (how aquifer properties are measured and calculated); and 3) predictive error (which includes other influences such as seasonal recharge or climate change variations). It was beyond the scope of this project to quantitatively evaluate the sum of these errors. We do believe however that the model is an accurate tool to evaluate impacts caused by pit development.

Sources

Anderson, Mary, P. and Woessner, William W. 1992. Applied Ground Water Modeling. Academic Press., San Diego, California

Cesare Inc, September 30, 2020. Project Memo for West Farm Gravel Evaluation, Subject: Boring Logs.

Colorado Division of Water Resources (CDWR), February, 2021. Well permit website search: https://dwr.state.co.us/Tools/WellPermits?submitButton=Submit&SelectedGeoValue=waterDivisionDiv&SelectedPermitUse=All&SelectedAdditionalValue=permitNumberDiv&PermitNumberSearch.StartPermitNo=79631&PermitNumberSearch.SufOperator=0&PermitNumberSearch.RplOperator=0

Driscoll, Fletcher, 1985. Groundwater and Wells; Appendix 16D. Published by Johnson Screens, 2nd Edition.

Harbaugh, A.W., Banta, Edward R., Hill, Mary C. and McDonald, Michael.G, 2000. MODFLOW 2000, the U,S. Geological Survey Modular Ground-water Model- User Guide to Modularization Concepts and the Ground-Water Flow Process; United States Geological Survey Open File Report 00-92.

Hurr, R. Therodore, and Moore, John E., 1972. Hydrogeologic Characteristics of the Valley-Fill Aquifer in the Arkansas River Valley, Bent County, Co. U.S. Geological Survey Hydrologic Investigation Atlas HA-461 (2 sheets).

J&T Consulting, Inc, 2021. Compiled RMI borehole information (file: JT-RMI Bore Hole Info.xlsx and ESRI shape files); Compiled Water levels (files: Phase 3 and 8 Monitoring Well Readings.xlsx and ESRI shape files).

J&T Consulting, March, 2021. Telephone discussions with JC York.

Nelson, Gregory A., Hurr, R. Theodore, and Moore, John, E, 1989. Hydrogeologic Characteristics of the Valley-Fill Aquifer in the Arkansas River Valley, Prowers County, Colorado. U.S. Geological Survey Open File Report 89-254 (3 sheets).

Reilly, Thomas, Franke, O. Lehn, and Bennett, Gordon D., 1987. The principles of Superposition and its Application in Ground-Water Hydraulics. Techniques of Water Resources Investigations of the USGS. Chapter B6, Book 3.

Rumbaugh, Jim and Rumbaugh, Doug. Copyright 1996-2011. Groundwater Vistas Version 6.85 Build 11. Available through Environmental Simulations Inc., website: https://www.groundwatermodels.com/Online_Store.php

Sharps, Joseph, 1976. Geologic Map of the Lamar Quadrangle, Colorado, and Kansas. U.S. Geologic Survey Miscellaneous Geologic Investigation I-944.

Todd, David Keith, 1980. Groundwater Hydrology. John Wiley and Sons, Inc. (pgs. 71-72).

US Geological Survey NWIS database, March 24, 2021. Surface Water Monthly Statistics for Gage Station 07133000 Arkansas River at Lamar, Co. Website: waterdata.usgs.gov/nwis/monthly?site_no=07133000&agency_cd=USGS&por_07133000_18246=345138,00060,18246,1913-06,2020-11&partial_periods=on&referred_module=sw&format=html_table&start_dt=2010-11&end_dt=2020-11

Voegeli, Paul T., and Hershey, Lloyd A., 1965. Geology and Ground-Water Resources of Prowers County, Colorado. U.S. Geological Survey Water Supply Paper 1772 (Report and 6 sheets).

Professional Credentials

The technical material in this report was prepared by or under the supervision and direction of Dennis McGrane P.E, C.P.G., whose seal as a Professional Engineer in the State of Colorado and American Institute of Professional Geologists (AIPG) Certified Profession Geologist (CPG) are affixed below:

AMERICAN INSTITUTE OF PROFESSIONAL GEOLOGISTS
CERTIFICATE NUMBER 9621
AIPG
DENNIS R. McGRANE
CERTIFIED PROFESSIONAL GEOLOGIST
3/30/21

COLORADO REGISTERED
DENNIS R. McGRANE
PROFESSIONAL ENGINEER
3/30/21

Dennis McGrane, P.E., C.P.G.

FIGURES

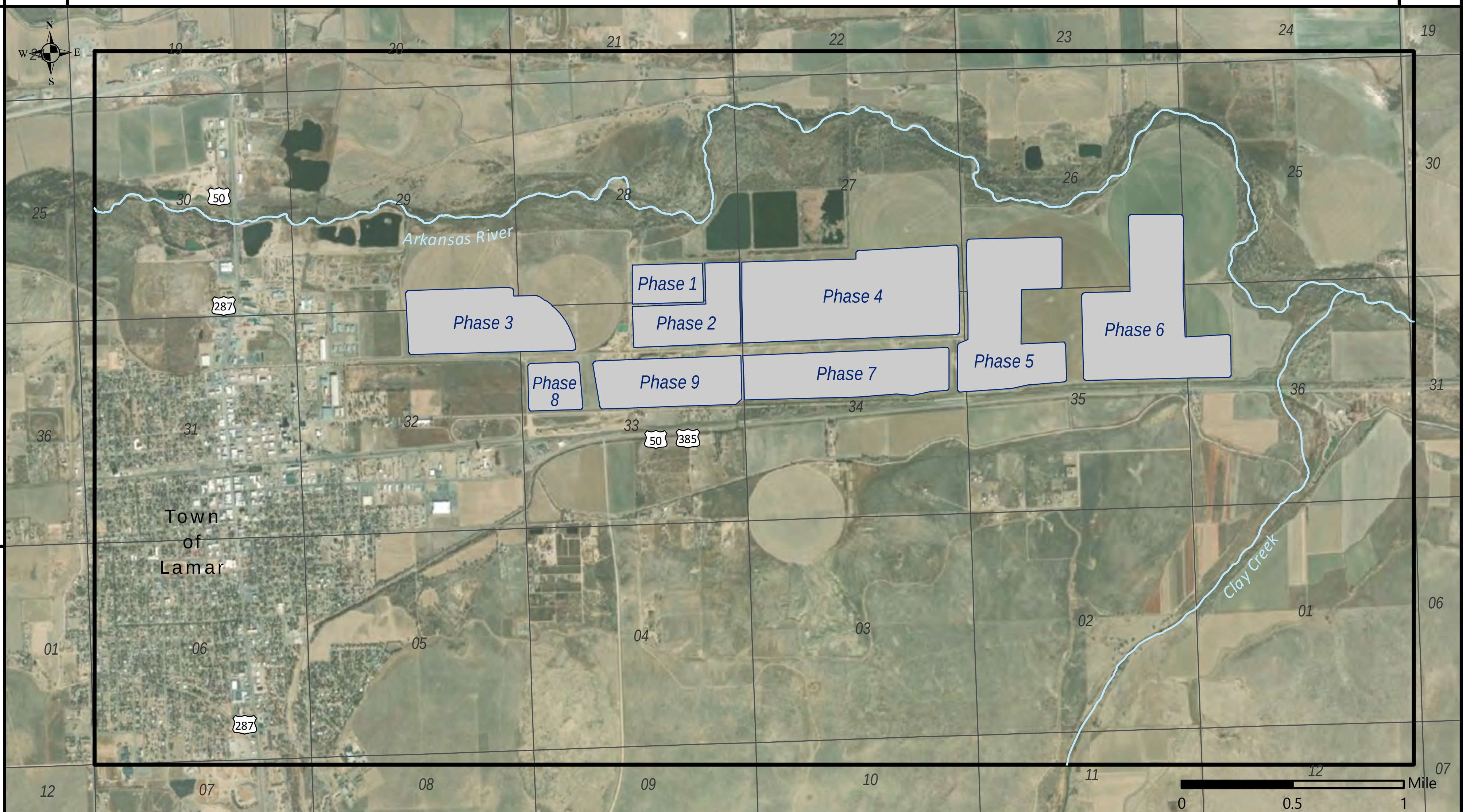


Figure 1
Model Area with Pits

West Farm Pit
Prowers County, Colorado

Map Legend

Model Extent

Mining Limits (labeled with phase)

Sources:
J&T Consulting MW/Pit Location GIS Shapefiles, NHD (photorevised), ESRI World Imagery (2020)

Date: March 22, 2021
Datum/Projection: NAD83/Colorado State Plane South, feet

McGrane Water Engineering, LLC

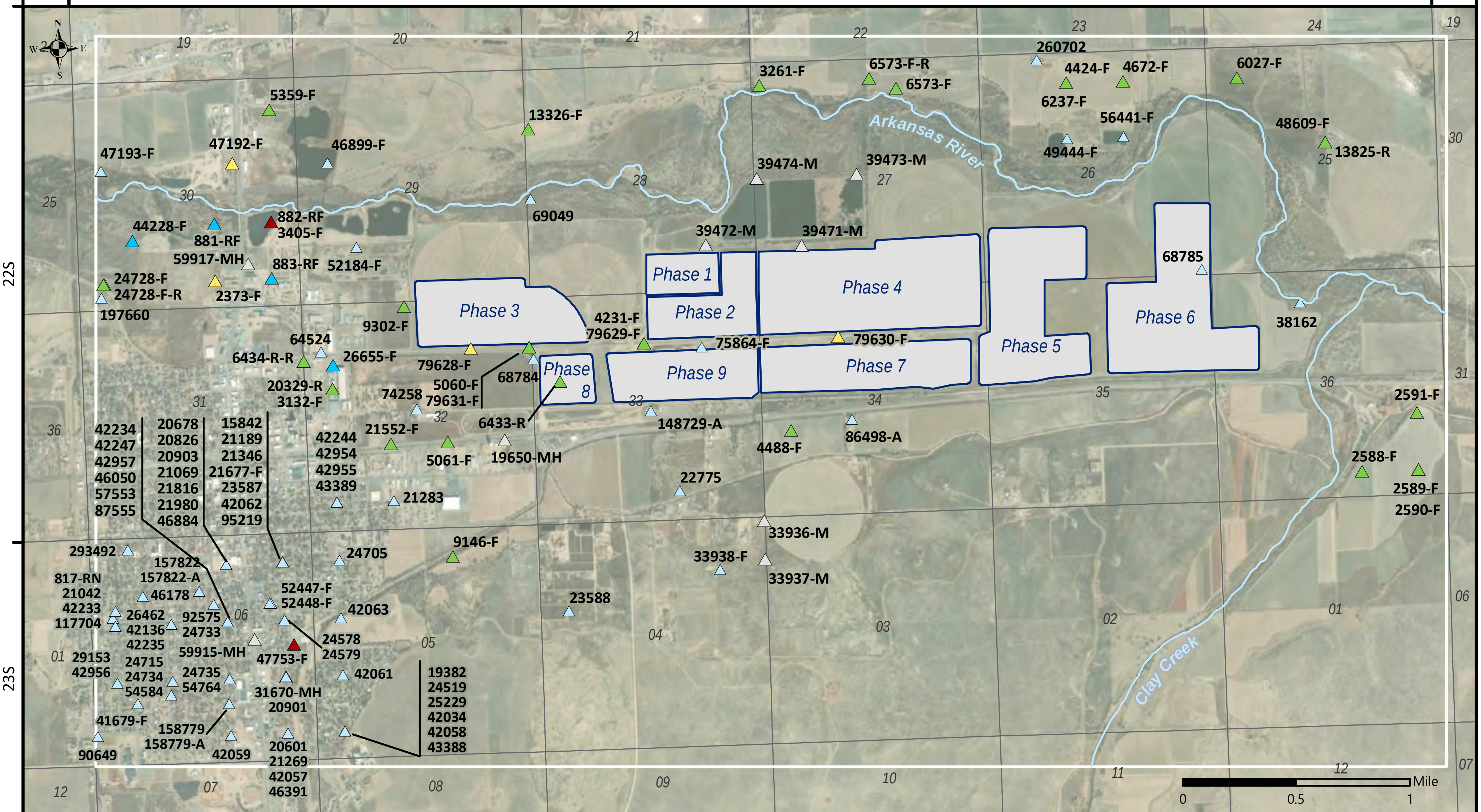


Figure 2
Model Area with Well Permits

West Farm Pit
Prowers County, Colorado

Map Legend

- 2020 Mining Limits (labeled with phase)
- Model Extent

CO-DWR Well (by type)
[labeled with permit number]

- Municipal
- Commercial
- Industrial
- Irrigation
- Domestic/Stock/Other
- Monitoring/Sampling

Sources:
CDSS Well Permit Database, J&T Consulting MW/Pit Location GIS Shapefiles, NHD (photorevised), ESRI World Imagery (2020)

Date: March 22, 2021
Datum/Projection: NAD83/Colorado State Plane South, feet

McGrane Water Engineering, LLC

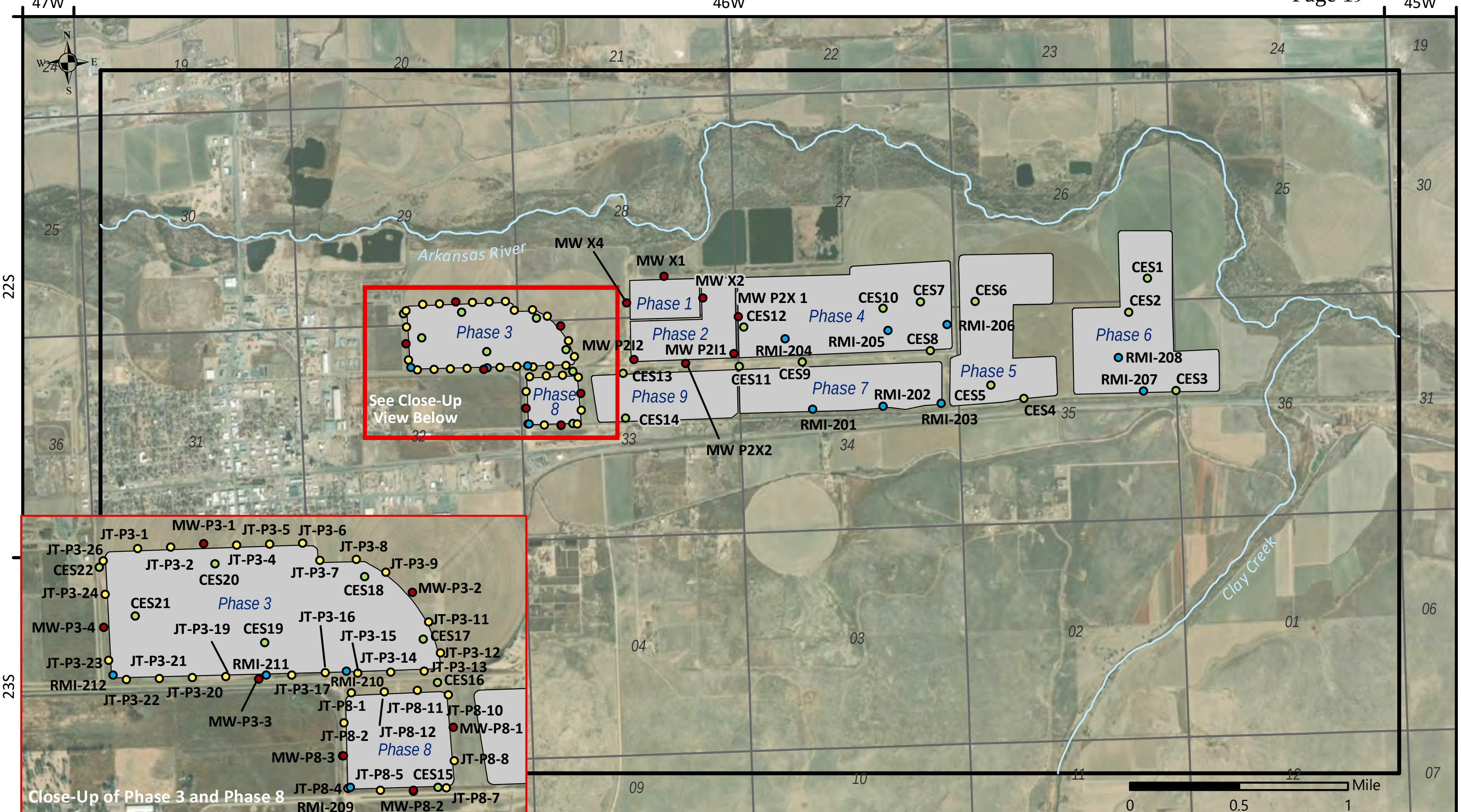


Figure 3
Model Area with Monitoring Wells and Borings

West Farm Pit
Prowers County, Colorado

Map Legend

- Model Extent
- Mining Limits (labeled with phase)
- Monitoring Well (J&T Phase 3 and 8, 2020)
- Boring, Cesare (9-30-2020)
- Boring Logs (Cesare (Dec., 2020)
- Boring-RMI

Sources:
CDSS Well Permit Database, J&T Consulting MW/Pit Location GIS Shapefiles, NHD (photorevised), ESRI World Imagery (2020)

Date: March 22, 2021
Datum/Projection: NAD83/Colorado State Plane South, feet

McGrane Water Engineering, LLC

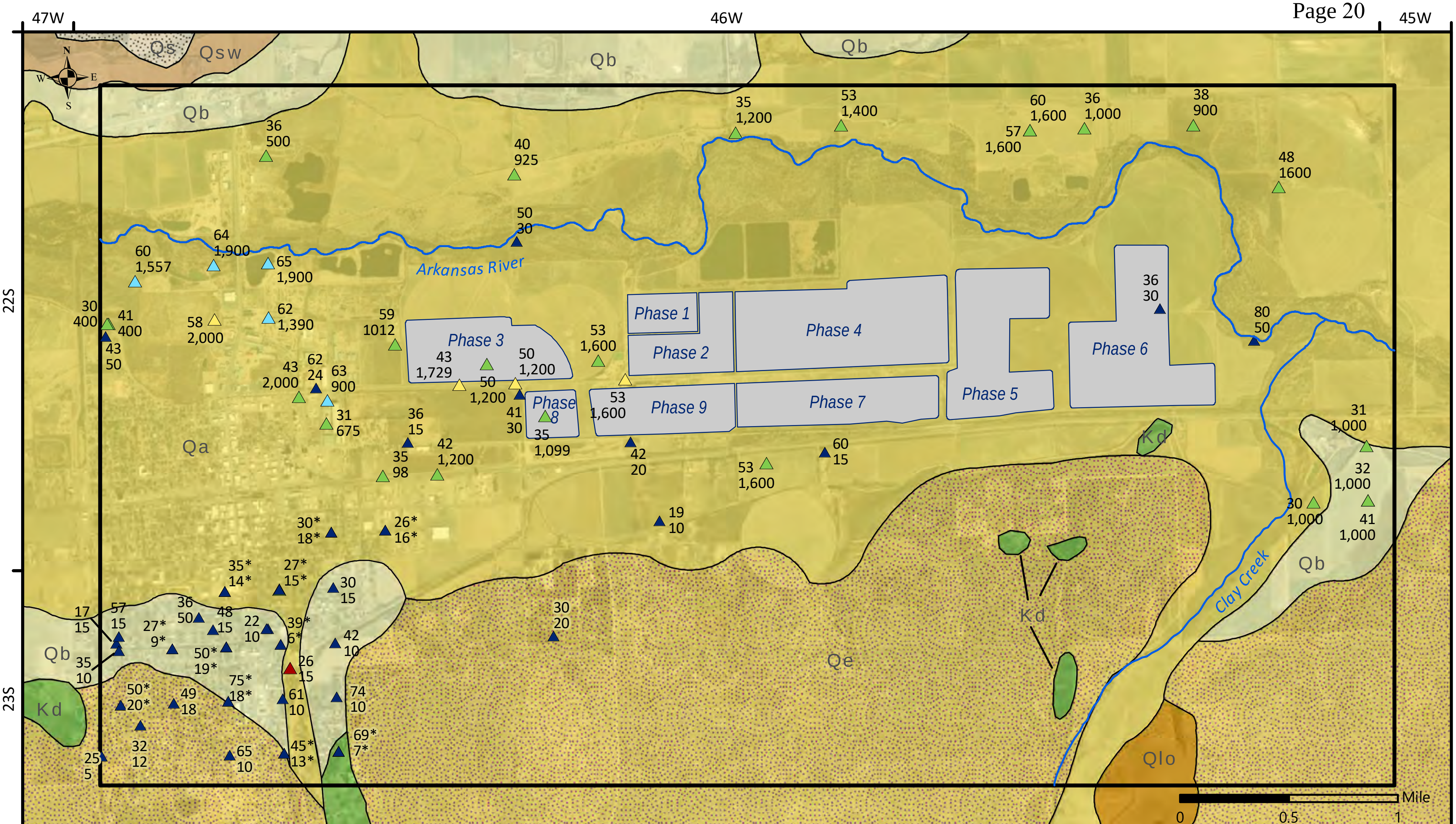


Figure 4
Model Area Geology, Well Depth, and Well Yield

West Farm Pit
Prowers County, Colorado

Map Legend

Model Extent

Mining Limits
(labeled with phase)

^Modified from 'Geologic Map of the Lamar Quadrangle, Colorado and Kansas' (Sharps, 1976)

CO-DWR Well
(labeled with well depth and yield [gpm])

- Municipal
- Commercial
- Industrial
- Irrigation
- Domestic/Stock/Other

*Labels with * = well depth and well yield are an average of all wells at that location.*

Geology of Model Area^

- Qa - Alluvium
- Qsw - Slopewash
- Qe - Eolian Sand
- Qlo - Loess
- Qb - Broadway Alluvium
- Qs - Slocum Alluvium
- Kd - Dakota Sandstone

Sources:
CDSS Well Permit Database; J&T Consulting MW/Pit Location GIS Shapefiles; NHD (photorevised); Geologic Map of the Lamar Quadrangle, Colorado and Kansas (Sharps, 1976); ESRI World Imagery (2020)

Date: March 22, 2021
Datum/Projection: NAD83/Colorado State Plane South, feet

McGrane Water Engineering, LLC

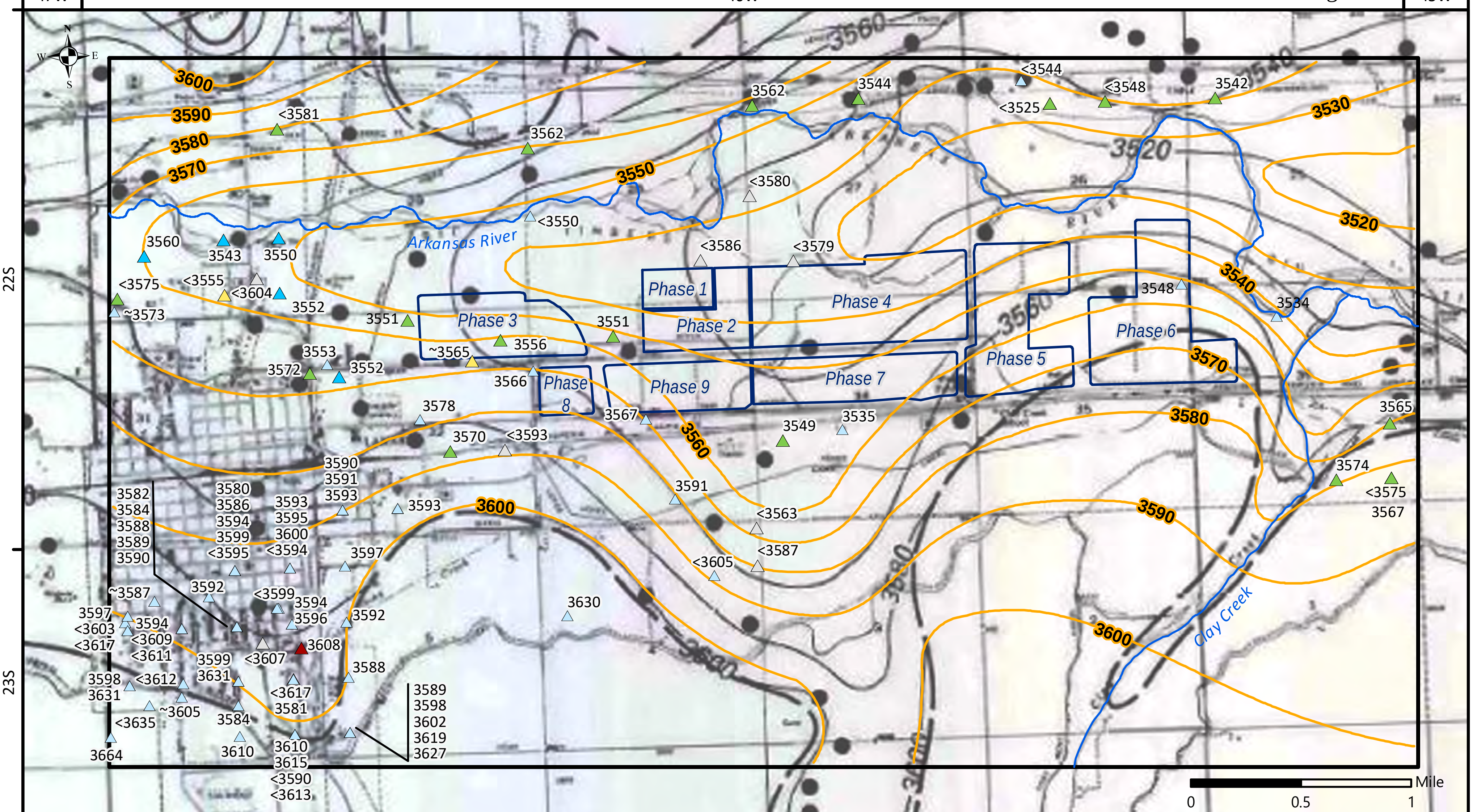


Figure 5

Bedrock Elevation

West Farm Pit
Prowers County, Colorado

Map Legend

Model Extent

Mining Limits
(labeled with phase)

Bedrock Elevation Contour
(contour interval = 10 ft)
*Modified from Nelson et al., 1989

CO-DWR Well (labeled with bedrock elevation)
- Municipal
- Commercial
- Industrial
- Irrigation
- Domestic/Stock/Other
- Monitoring/Sampling

Sources:
CDSS Well Permit Database; J&T Consulting MW/Pit Location GIS Shapefiles; NHD (photorevised); Nelson et al., 1989

Date: March 22, 2021
Datum/Projection: NAD83/Colorado State Plane South, feet

McGrane Water
Engineering, LLC

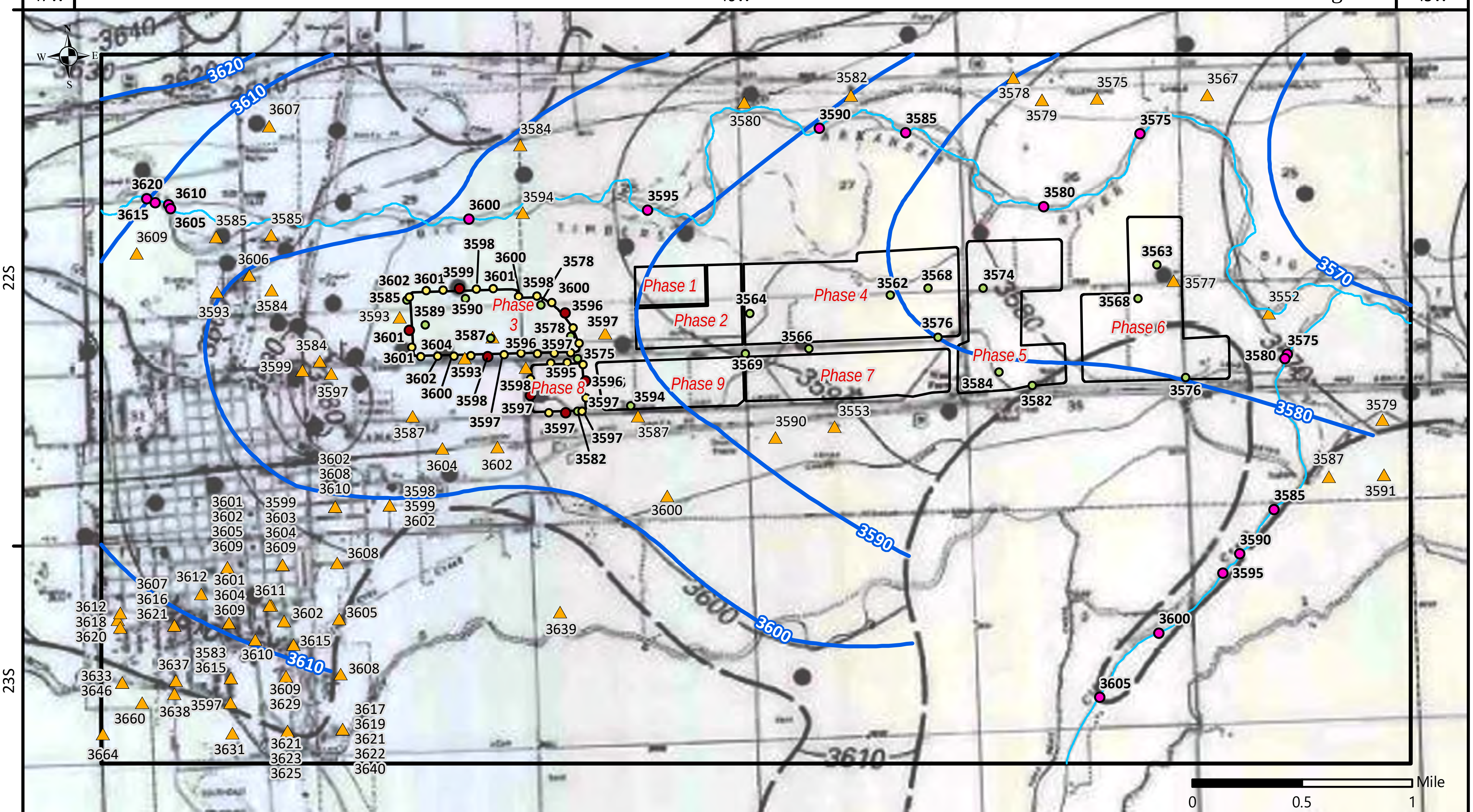


Figure 6
1966 Water Table and Baseline Model Conditions

West Farm Pit
Prowers County, Colorado

Map Legend

- Model Extent
- Mining Limits (labeled with phase)
- Monitoring Well (J&T Phase 3 and 8, 2020)
- Boring, Cesare (9-30-2020)
- Boring Logs (Cesare (Dec., 2020)
- Boring-RMI
- CO-DWR Well
- Water Table Elevation Contour* (contour interval = 10 ft) *Modified from Nelson et al., 1989
- River Elevation* (elevation assigned from USGS 10m DEM)

Sources:
CDSS Well Permit Database; J&T Consulting MW/Pit Location GIS Shapefiles; USGS 10m DEM; NHD (photorevised); Nelson et al., 1989

Date: March 22, 2021
Datum/Projection: NAD83/Colorado State Plane South, feet

McGrane Water Engineering, LLC

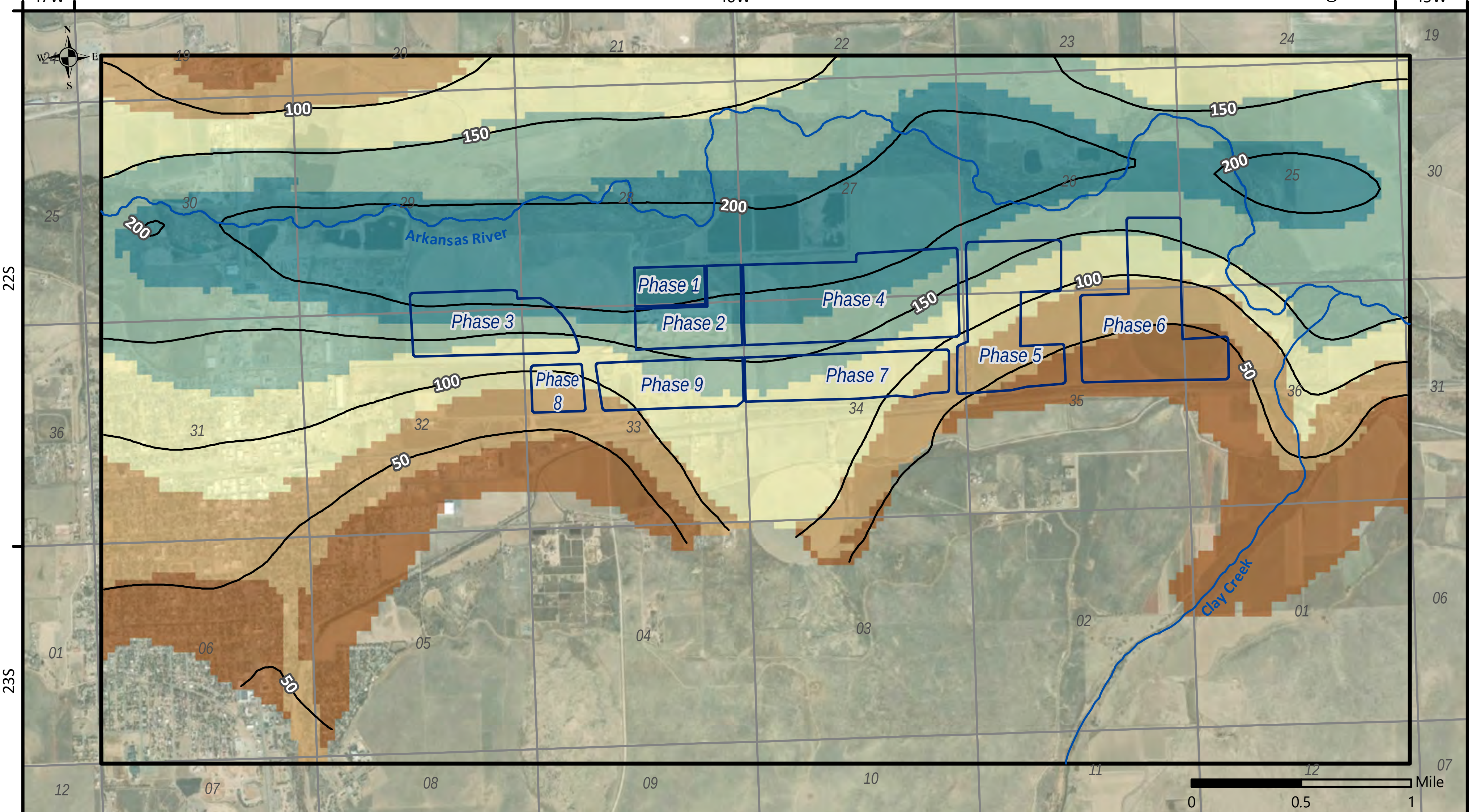


Figure 7
Aquifer Transmissitivy

West Farm Pit
Prowers County, Colorado

Map Legend

Model Extent

Mining Limits
(labeled with phase)

Modeled Transmissivity
(1,000s gpd/ft)
< 50
50 - 100
100 - 150
150 - 200
200 - 248

Transmissivity Contour
Calculated from Revised Nelson (1989) Water Table and Bedrock Contours and a hydraulic conductivity of 550 ft/day
(contour interval in 1,000s gpd/ft= 50)

Sources:
CDSS Well Permit Database; J&T Consulting MW/Pit Location GIS Shapefiles; USGS 10m DEM; NHD (photorevised); Nelson et al., 1989

Date: March 22, 2021
Datum/Projection: NAD83/Colorado State Plane South, feet

McGrane Water
Engineering, LLC

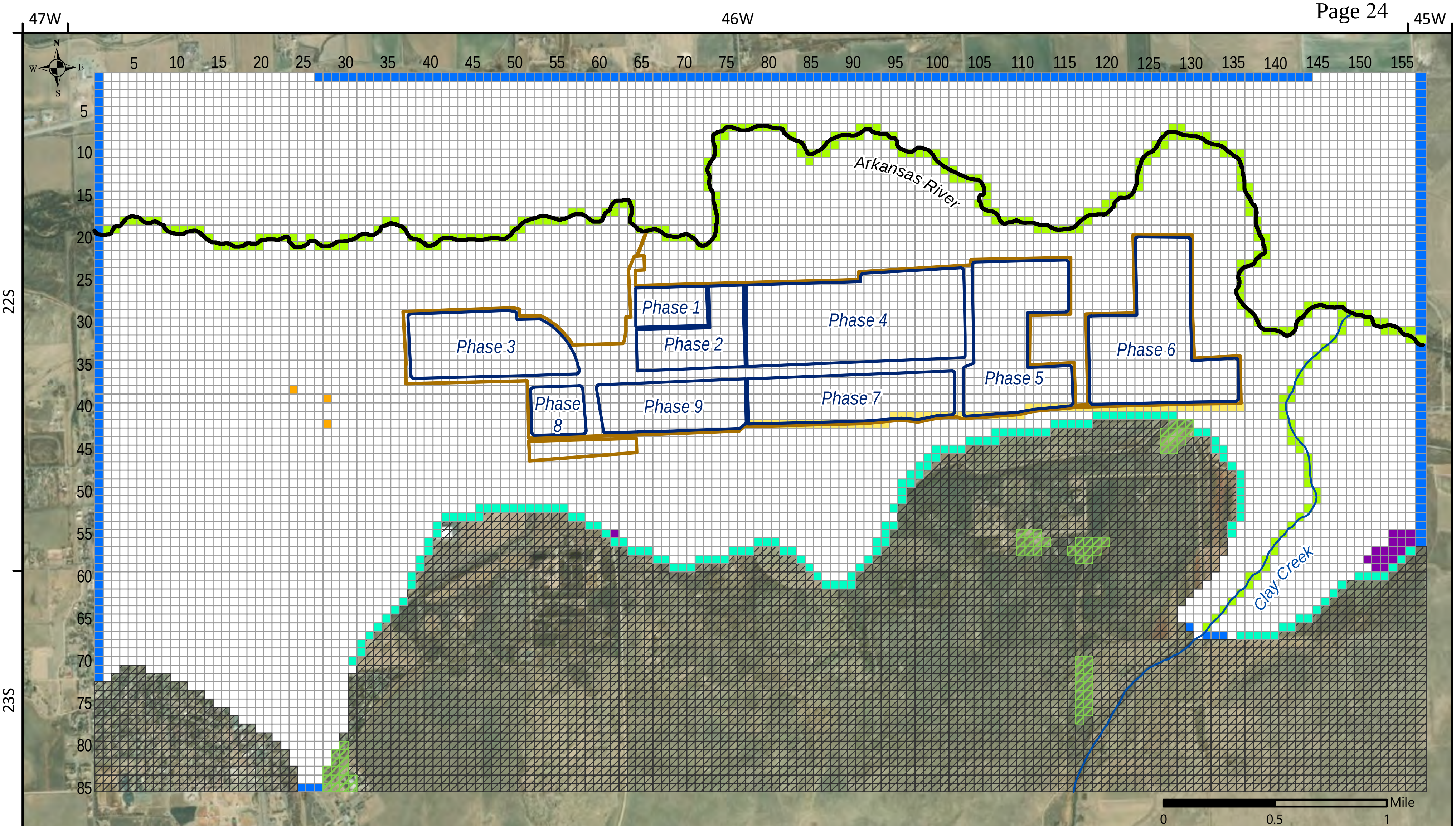


Figure 8
Model Boundary Conditions

West Farm Pit
Prowers County, Colorado

Map Legend

2020 Mining Limits (labeled with phase)
2020 Permit Boundary

Model Cell Type (row and column are labeled)

- Alluvial Aquifer
- Constant Head Cell
- Dakota Sandstone
- Drain Cell
- Dry Cell
- General Head Cell
- No-Flow Boundary
- Off Site Modeled Well
- River Cell

Sources:
CDSS Well Permit Database 06.07.2020, J&T Consulting MW/Pit Location GIS Shapefiles, March 2021 McGrane Model Outputs, Nelson et al. (1989), NHD (photorevised), ESRI World Imagery

Date: March 22, 2021
Datum/Projection: NAD83/Colorado State Plane South, feet

McGrane Water Engineering, LLC

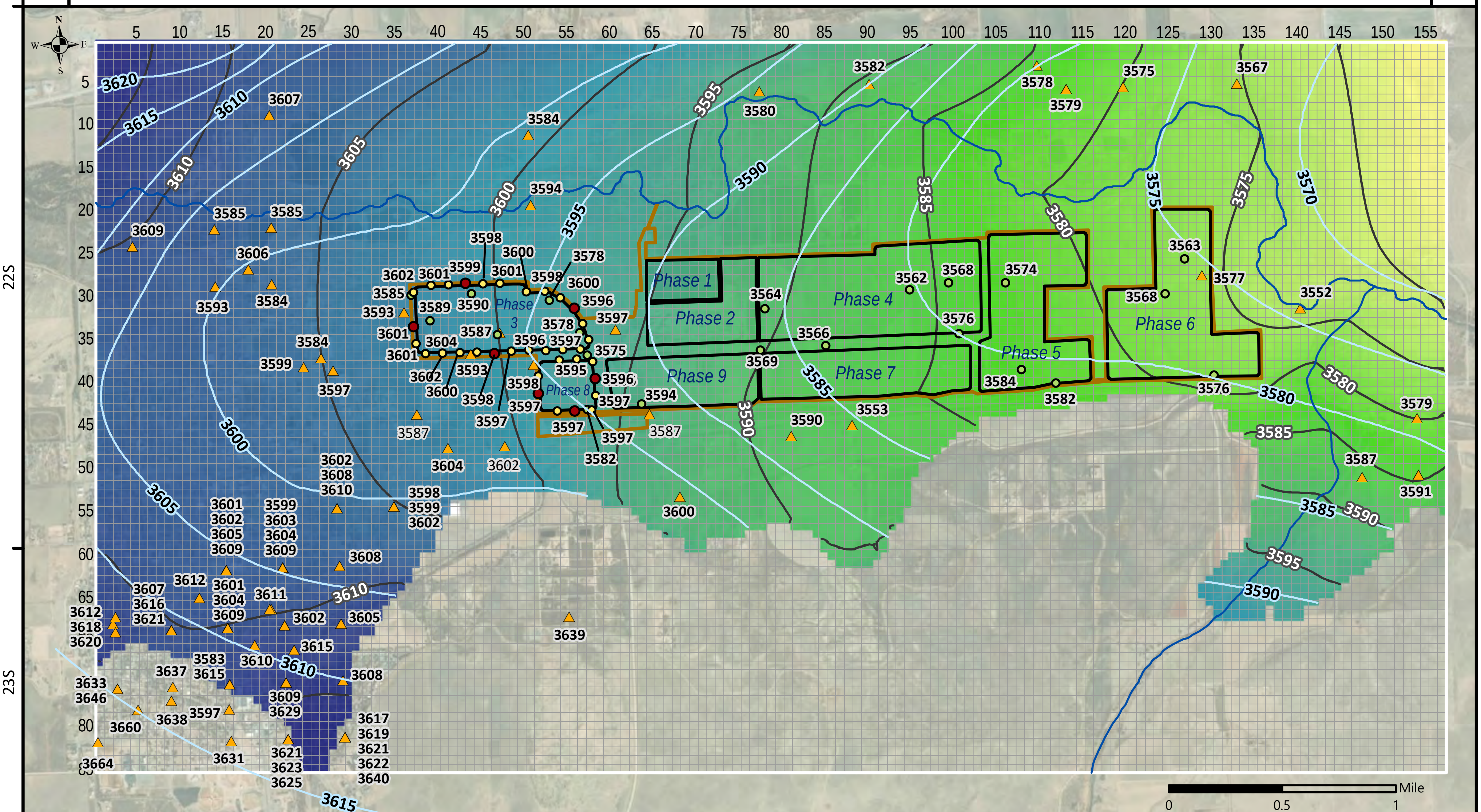


Figure 9
Modeled Water Table Comparison

West Farm Pit
Prowers County, Colorado

Map Legend

- 2020 Mining Limits
- 2020 Permit Boundary
- Model Cell
- Model Extent
- Water Table Elevation Contour - Revised from Nelson et al., 1989 (interval = 5 ft)
- Water Table Elevation Contour - Modeled (interval = 5 ft)

Modeled Water Table Elevation (ft asl)
3,620'
3,565'

- Monitoring Well (J&T Phase 3 and 8, 2020)
- Boring, Cesare (9-30-2020)
- Boring Logs (Cesare (Dec., 2020)
- Boring-RMI
- CO-DWR Well

Sources:
CDSS Well Permit Database 06.07.2020, J&T Consulting MW/Pit Location GIS Shapefiles, March 2021 McGrane Model Outputs, Nelson et al. (1989), NHD (photorevised), ESRI World Imagery

Date: March 19, 2021
Datum/Projection: NAD83/Colorado State Plane South, feet

McGrane Water Engineering, LLC

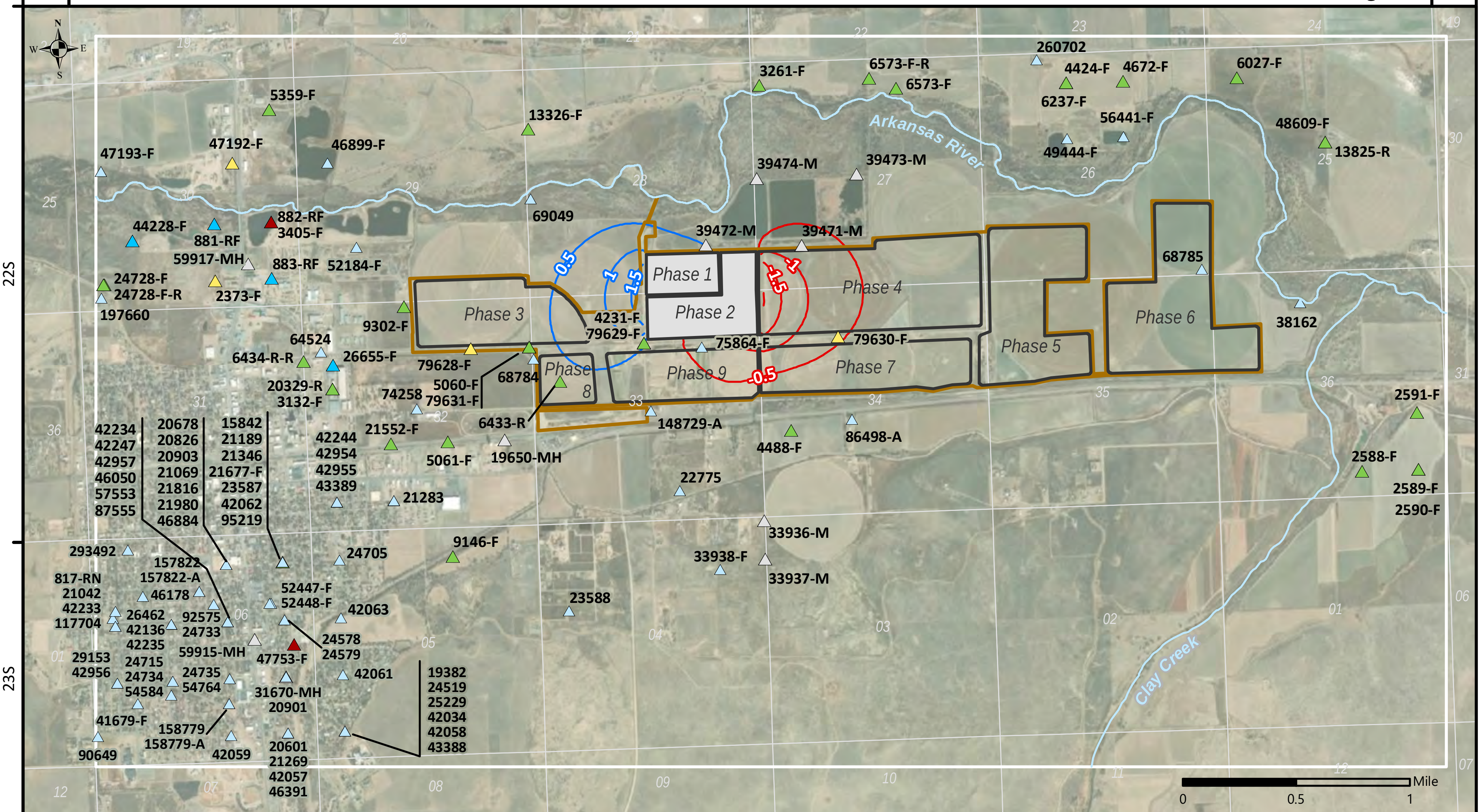


Figure 10
Modeled Changes in Groundwater Conditions - Phase 1 and 2 Pit Slurry Walls

West Farm Pit
Prowers County, Colorado

Map Legend

- 2020 Mining Limits
- Lined Pit
- 2020 Permit Boundary
- Model Extent

Change in Water Level Contour*
- Drawdown
- Mounding

*Contour interval = 0.5 ft

CO-DWR Well (by type)
[labeled with permit number]
- Municipal
- Commercial
- Industrial
- Irrigation
- Domestic/Stock/Other
- Monitoring/Sampling

Sources:
CDSS Well Permit Database 06.07.2020, J&T Consulting MW/Pit Location GIS Shapefiles, March 2021 McGrane Model Outputs, Nelson et al. (1989), NHD (photorevised), ESRI World Imagery

Date: March 22, 2021
Datum/Projection: NAD83/Colorado State Plane South, feet

McGrane Water Engineering, LLC

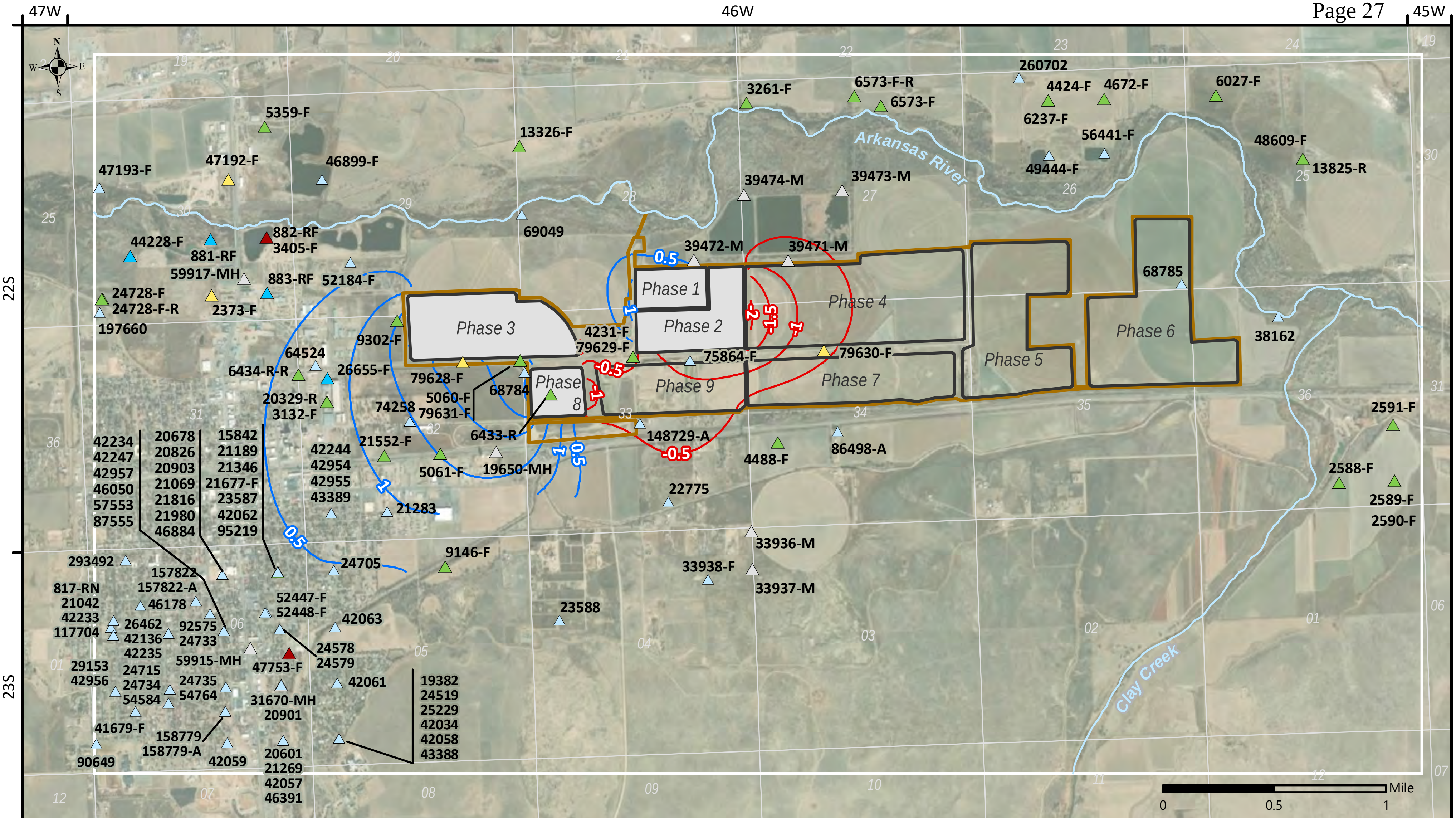


Figure 11
Modeled Changes in Groundwater Conditions - Phase 1, 2, 8 and 3 Pit Slurry Walls

West Farm Pit
Prowers County, Colorado

Map Legend

- 2020 Mining Limits
- Lined Pit
- 2020 Permit Boundary
- Model Extent

Change in Water Level Contour*
- Drawdown
- Mounding

*Contour interval = 0.5 ft

CO-DWR Well (by type)
[labeled with permit number]
- Municipal
- Commercial
- Industrial
- Irrigation
- Domestic/Stock/Other
- Monitoring/Sampling

Sources:
CDSS Well Permit Database 06.07.2020, J&T Consulting MW/Pit Location GIS Shapefiles, March 2021 McGrane Model Outputs, Nelson et al. (1989), NHD (photorevised), ESRI World Imagery

Date: March 22, 2021
Datum/Projection: NAD83/Colorado State Plane South, feet

McGrane Water Engineering, LLC

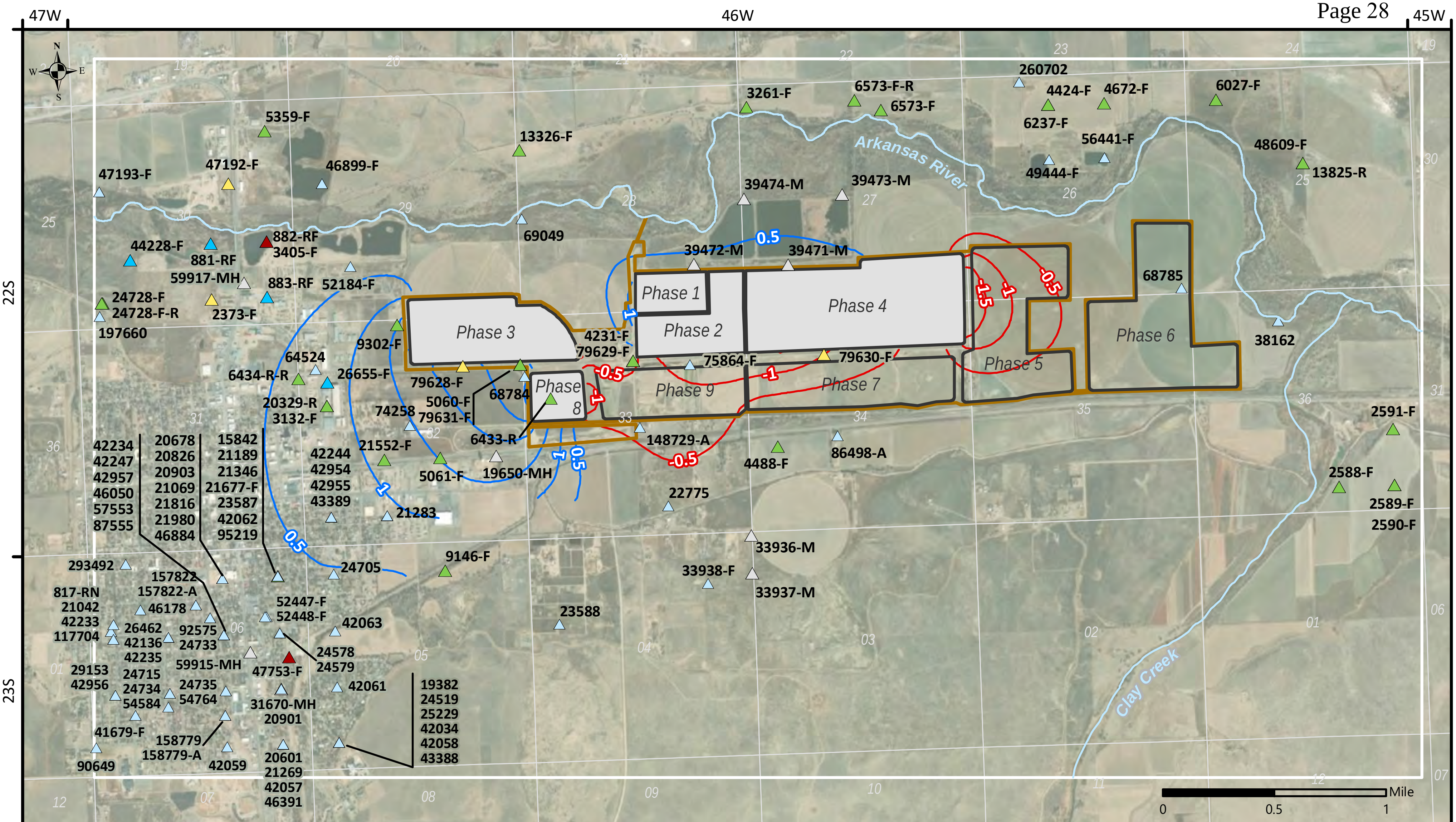


Figure 12
Modeled Changes in Groundwater Conditions - Phase 1, 2, 8, 3 and 4 Pit Slurry Walls

West Farm Pit
Prowers County, Colorado

Map Legend

- 2020 Mining Limits
- Lined Pit
- 2020 Permit Boundary
- Model Extent

Change in Water Level Contour*
- Drawdown
- Mounding

*Contour interval = 0.5 ft

CO-DWR Well (by type)
[labeled with permit number]
- Municipal
- Commercial
- Industrial
- Irrigation
- Domestic/Stock/Other
- Monitoring/Sampling

Sources:
CDSS Well Permit Database 06.07.2020, J&T Consulting MW/Pit Location GIS Shapefiles, March 2021 McGrane Model Outputs, Nelson et al. (1989), NHD (photorevised), ESRI World Imagery

Date: March 22, 2021
Datum/Projection: NAD83/Colorado State Plane South, feet

McGrane Water Engineering, LLC

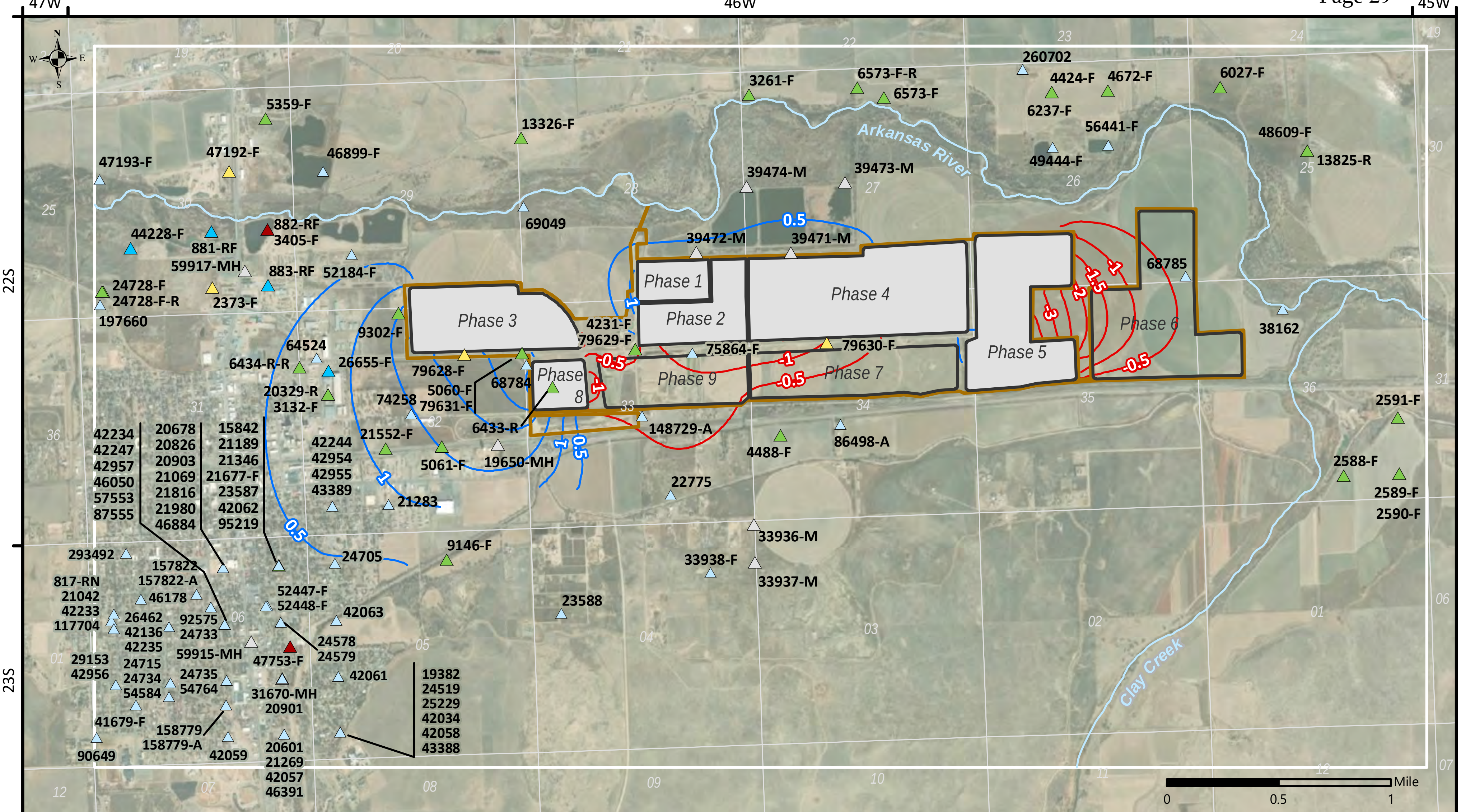


Figure 13
Modeled Changes in Groundwater Conditions - Phase 1, 2, 8, 3, 4 and 5 Pit Slurry Walls

West Farm Pit
Prowers County, Colorado

Map Legend

2020 Mining Limits
Lined Pit
2020 Permit Boundary
Model Extent

Change in Water Level Contour*
Drawdown
Mounding

*Contour interval = 0.5 ft

CO-DWR Well (by type)
[labeled with permit number]
Municipal
Commercial
Industrial
Irrigation
Domestic/Stock/Other
Monitoring/Sampling

Sources:
CDSS Well Permit Database 06.07.2020, J&T Consulting MW/Pit Location GIS Shapefiles, March 2021 McGrane Model Outputs, Nelson et al. (1989), NHD (photorevised), ESRI World Imagery

Date: March 22, 2021
Datum/Projection: NAD83/Colorado State Plane South, feet

McGrane Water Engineering, LLC

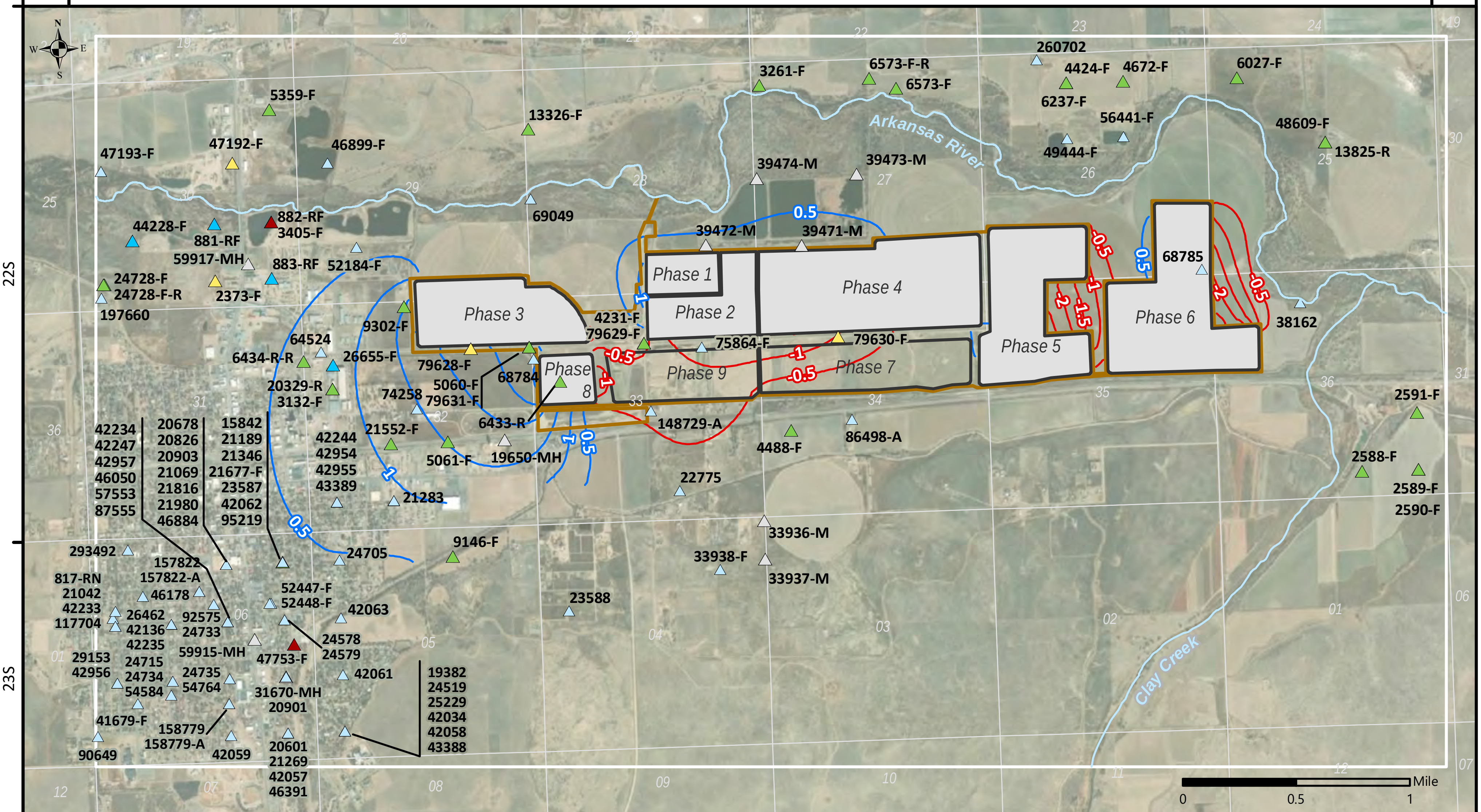


Figure 14
Modeled Changes in Groundwater Conditions - Phase 1, 2, 8, 3, 4, 5 and 6 Pit Slurry Walls

West Farm Pit
Prowers County, Colorado

Map Legend

2020 Mining Limits
Lined Pit
2020 Permit Boundary
Model Extent

Change in Water Level Contour*
Drawdown
Mounding

*Contour interval = 0.5 ft

CO-DWR Well (by type)
[labeled with permit number]
Municipal
Irrigation
Commercial
Domestic/Stock/Other
Industrial
Monitoring/Sampling

Sources:
CDSS Well Permit Database 06.07.2020, J&T Consulting MW/Pit Location GIS Shapefiles, March 2021 McGrane Model Outputs, Nelson et al. (1989), NHD (photorevised), ESRI World Imagery

Date: March 22, 2021
Datum/Projection: NAD83/Colorado State Plane South, feet

McGrane Water Engineering, LLC

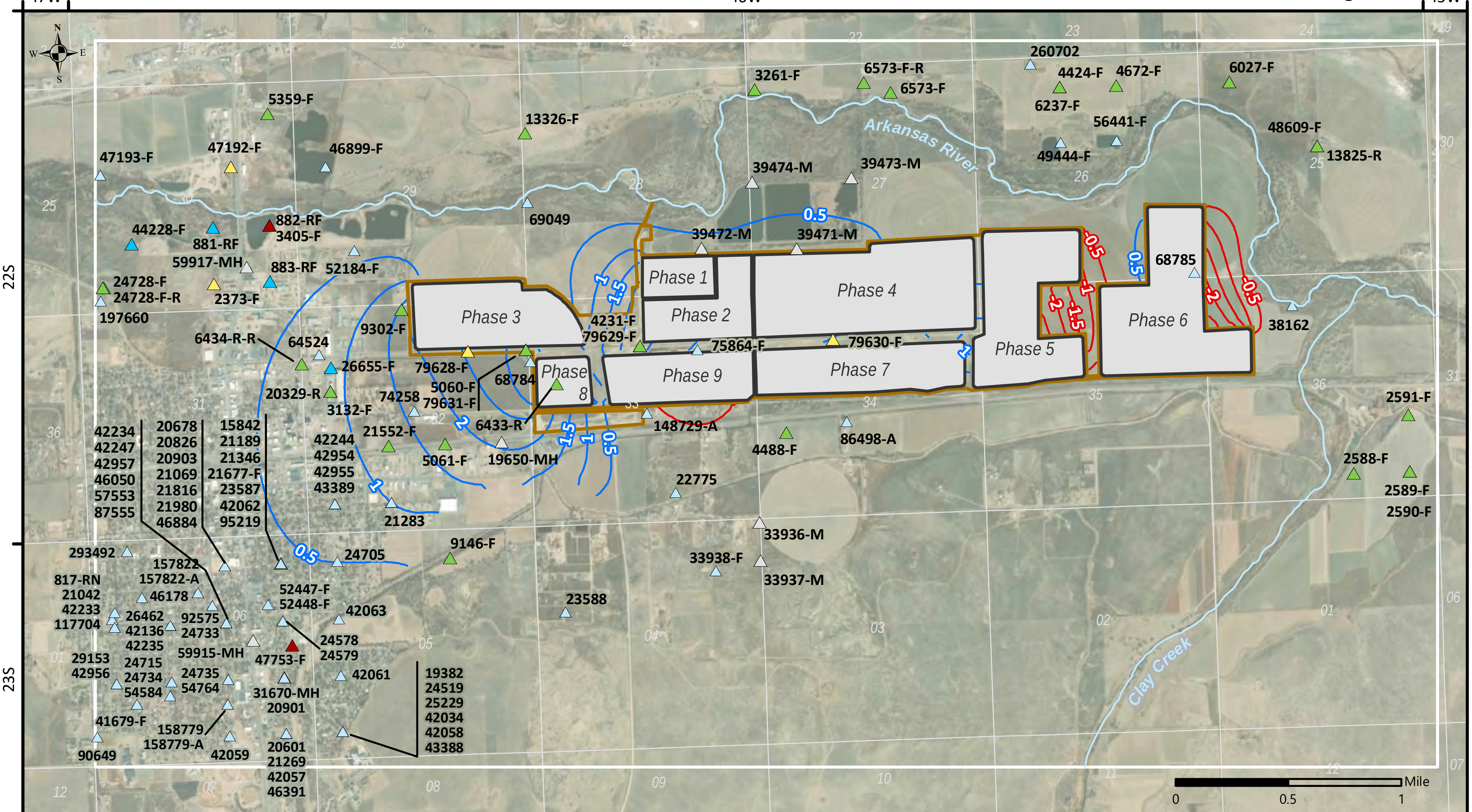


Figure 15
Modeled Changes in Groundwater Conditions - Phase 1, 2, 8, 3, 4, 5, 6, 7 and 9 Pit Slurry Walls

West Farm Pit
Prowers County, Colorado

Map Legend

- 2020 Mining Limits
- Lined Pit
- 2020 Permit Boundary
- Model Extent

Change in Water Level Contour*
- Drawdown
- Mounding

*Contour interval = 0.5 ft

CO-DWR Well (by type)
[labeled with permit number]
- Municipal
- Irrigation
- Commercial
- Domestic/Stock/Other
- Industrial
- Monitoring/Sampling

Sources:
CDSS Well Permit Database 06.07.2020, J&T Consulting MW/Pit Location GIS Shapefiles, March 2021 McGrane Model Outputs, Nelson et al. (1989), NHD (photorevised), ESRI World Imagery

Date: March 30, 2021
Datum/Projection: NAD83/Colorado State Plane South, feet

McGrane Water Engineering, LLC

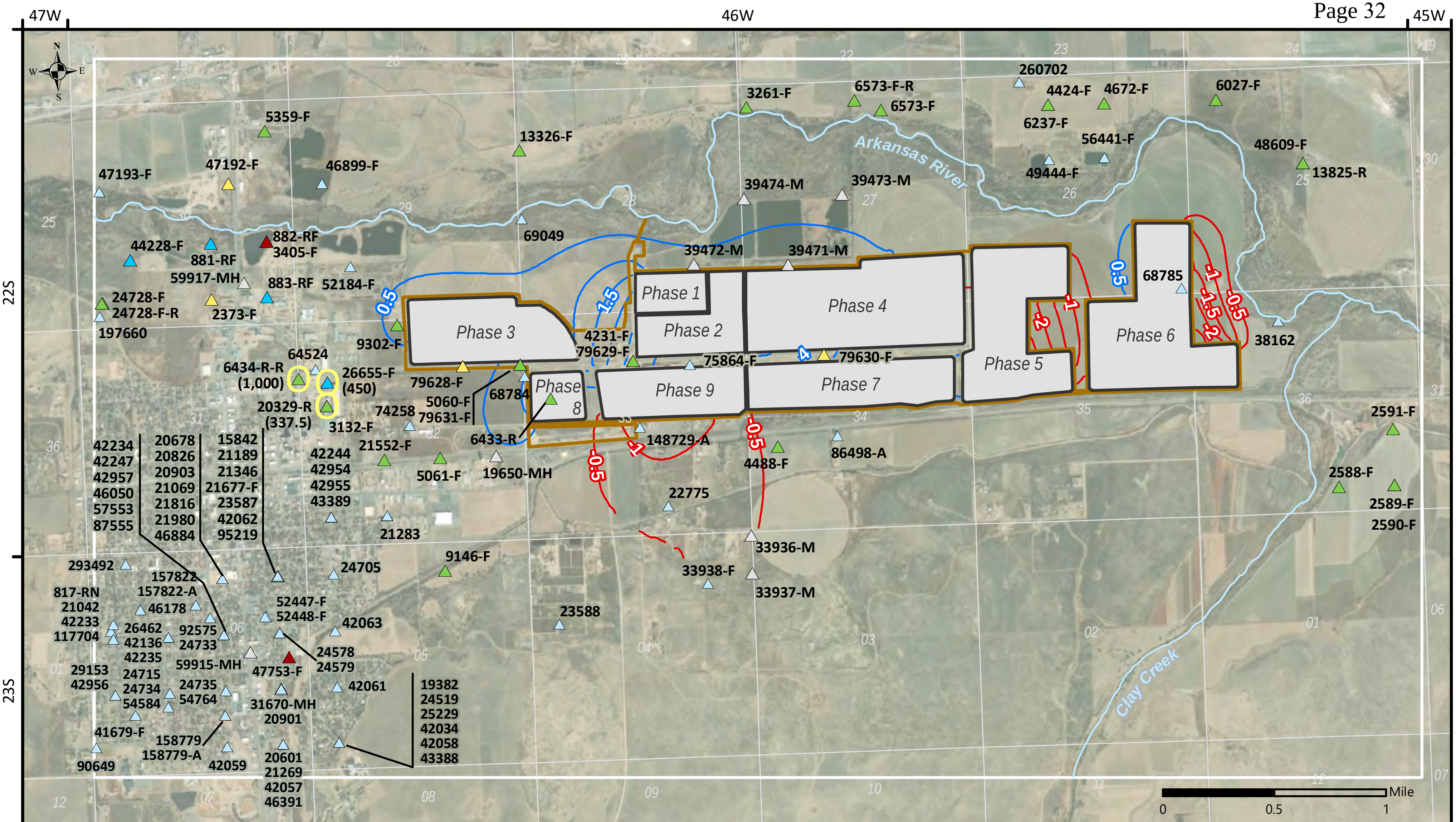


Figure 16
Sensitivity to Off-Site Pumping

West Farm Pit
Prowers County, Colorado

Map Legend

- 2020 Mining Limits
- Lined Pit
- 2020 Permit Boundary
- Model Extent
- Off-Site Pumping Well (well yield [gpm] shown in parenthesis)

Change in Water Level Contour*
- Drawdown
- Mounding

*Contour interval = 0.5 ft

CO-DWR Well (by type)
[labeled with permit number]
- Municipal
- Irrigation
- Commercial
- Domestic/Stock/Other
- Industrial
- Monitoring/Sampling

Sources:
CDSS Well Permit Database 06.07.2020, J&T Consulting MW/Pit Location GIS Shapefiles, March 2021 McGrane Model Outputs, Nelson et al. (1989), NHD (photorevised), ESRI World Imagery

Date: March 30, 2021
Datum/Projection: NAD83/Colorado State Plane South, feet

McGrane Water Engineering, LLC

Table 11: Model Run Summary - Modeled Water Level Changes At Registered Wells

Permit Number	Contact Name	Use(s)	Pump Test Yield (gpm)	Static Water Level	Permit Info
79628-F	GP RESOURCES LLC	Commercial, Industrial	1729	ND	https://dwr.state.co.us/Tools/WellPermits/3668741E
79629-F/ 4231-F	GP IRRIGATED FARMS LLC	Irrigation	1600	7	https://dwr.state.co.us/Tools/WellPermits/9092586
5061-F	LAMAR FARMS	Irrigation	1200	8	https://dwr.state.co.us/Tools/WellPermits/9092671
79631-F/ 5060-F	GP IRRIGATED FARMS LLC	Irrigation	1200	12	https://dwr.state.co.us/Tools/WellPermits/9092670
6433-R	LAMAR FARMS	Irrigation	1099	8.3	https://dwr.state.co.us/Tools/WellPermits/9092768
9302-F	LAMAR UTILITIES BOARD	Irrigation	1012	15	https://dwr.state.co.us/Tools/WellPermits/9092841
68784-	LAZY Y CROSS LND CO	Stock	30	8	https://dwr.state.co.us/Tools/WellPermits/9093720
21283-	BAKER, J R	Domestic	15	18	https://dwr.state.co.us/Tools/WellPermits/9093371
74258-	HOSS INMAN JAMES A	Domestic, Stock	15	24	https://dwr.state.co.us/Tools/WellPermits/9093731
19650-MH	SOUTHEASTERN COLORADO COOP	Monitoring/ Sampling	na	8.45	https://dwr.state.co.us/Tools/WellPermits/0019650
75864-F	GP AGGREGATES LLC	Gravel Pit	ND	ND	https://dwr.state.co.us/Tools/WellPermits/3652084
68785-	LAZY Y CROSS LND CO	Stock	30	6	https://dwr.state.co.us/Tools/WellPermits/9093721
79630-F/ 4230-F	GP RESOURCES LLC	Commercial, Industrial	na	9	https://dwr.state.co.us/Tools/WellPermits/3668741A

Permit Number	Contact Name	Max Modeled Change (+/- 1 ft)					
		Pit Phase: 1 and 2	1,2,8, and 3	1,2,8,3 and 4	1,2,8,3,4 and 5	1,2,8,3,4, 5 and 6	1,2,8,3,4,5,6,7 and 9
		Report Figure: 10	11	12	13	14	15
79628-F	GP RESOURCES LLC	-	2	2	2	2	2.5
79629-F/ 4231-F	GP IRRIGATED FARMS LLC	-	-	-	-	-	2
5061-F	LAMAR FARMS	-	1.5	1.5	1.5	1.5	1.5
79631-F/ 5060-F	GP IRRIGATED FARMS LLC	-	2.5	2.5	2.5	2.5	2.5
6433-R	LAMAR FARMS	-	3	3	3	3	3
9302-F	LAMAR UTILITIES BOARD	-	1.5	1.5	1.5	1.5	1.5
68784-	LAZY Y CROSS LND CO	-	2.5	2.5	2.5	2.5	3
21283-	BAKER, J R	-	-	-	-	-	1
74258-	HOSS INMAN JAMES A	-	1	1	1	1	1.5
19650-MH	JTHEASTERN COLORADO CC	-	1.5	1.5	1.5	1.5	2
75864-F	GP AGGREGATES LLC	-	-	-	-	-1	2.5
68785-	LAZY Y CROSS LND CO	-	-	-	-	-2	-2
79630-F/ 4230-F	GP RESOURCES LLC	-	-	-	-	-	2.5

APPENDIX A - CDWR Well Data

Appendix A - Well Data From the State of Colorado Well Database

Permit Number	Contact Name	Use(s)	Completed Well Depth (ft)	Pump Test Yield (gpm)	Water Level when Drilled (ft)	Saturated Thickness (ft)	Pumping Level (ft bgl)	Drawdown (ft)	Test Method - pump hp	Specific Capacity (gpm/ft)	Transmiss-ivity (gpd/ft)	Hydraulic Conduct-ivity (ft/day)	State Engineer's website link
6434-R-R	GP IRRIGATED FARMS LLC	Irrigation	43	2000	15	27	30	15	pump	133	200000	992	https://dwr.state.co.us/Tools/WellPermits/9092769
2373-F	ARK VALLEY CONCRETE	Commercial	58	2000	20	37	30	10	pump_15hp	200	300000	1085	https://dwr.state.co.us/Tools/WellPermits/9092478
881-RF	LAMAR CITY OF UTILITIES BOARD	Industrial, Muni.	64	1900	17	40	47	30	pump_50hp	63	95000	318	https://dwr.state.co.us/Tools/WellPermits/0917155
882-RF	LAMAR CITY OF BOARD OF UTILITIES	Industrial, Muni.	65	1900	22	35	40	18	pump_50hp	106	158333	606	https://dwr.state.co.us/Tools/WellPermits/0007703
79628-F	GP RESOURCES LLC	Commercial, Ind.	43	1729									https://dwr.state.co.us/Tools/WellPermits/3668741E
13825-R	ROGERS JAMES & CHARLOTTE M	Irrigation	48	1600					tractor				https://dwr.state.co.us/Tools/WellPermits/9093030
79629-F	GP RESOURCES LLC	Commercial, Ind.	53	1600									https://dwr.state.co.us/Tools/WellPermits/3668741B
4231-F	GP IRRIGATED FARMS LLC	Irrigation	53	1600	7	46	46	39	pump_180hp	41	61538	179	https://dwr.state.co.us/Tools/WellPermits/9092586
4488-F	FOUR STATES FEEDYARD INC	Irrigation	53	1600	10	41	45	35	pump_15hp	46	68571	224	https://dwr.state.co.us/Tools/WellPermits/9092608
4424-F	S & S LAND & CATTLE INC	Irrigation	57	1600	6	51	20	14	pump_180hp	114	171429	450	https://dwr.state.co.us/Tools/WellPermits/9092601
6237-F	HATCHETT, B R	Irrigation	60	1600	6	51	30	24	pump	67	100000	262	https://dwr.state.co.us/Tools/WellPermits/9092750
44228-F	VALCO INC	Industrial	60	1557	10	47	40	30	pump_100	52	77850	222	https://dwr.state.co.us/Tools/WellPermits/0376778
6573-F-R	PARMELY, NEIL	Irrigation	53	1400	11	37	26	15	pump_20hp	93	140000	507	https://dwr.state.co.us/Tools/WellPermits/0325018
883-RF	LAMAR CITY OF BOARD OF UTILITIES	Industrial, Muni.	62	1390	28.4	28.6	46	17.6	pump	79	118466	555	https://dwr.state.co.us/Tools/WellPermits/0007704
3261-F	GRUENLOH, MARVIN	Irrigation	35	1200	14	18	29	15	pump	80	120000	892	https://dwr.state.co.us/Tools/WellPermits/9092527
5061-F	LAMAR FARMS	Irrigation	42	1200	8	34	39	31	pump_25hp	39	58065	229	https://dwr.state.co.us/Tools/WellPermits/9092671
5060-F	GP IRRIGATED FARMS LLC	Irrigation	50	1200	12	38	47	35	pump_25hp	34	51429	181	https://dwr.state.co.us/Tools/WellPermits/9092670
79631-F	GP RESOURCES LLC	Commercial, Ind.	50	1200									https://dwr.state.co.us/Tools/WellPermits/3668741D
6433-R	LAMAR FARMS	Irrigation	35	1099	8.3	26.7	17	8.7	pump	126	189483	950	https://dwr.state.co.us/Tools/WellPermits/9092768
9302-F	LAMAR UTILITIES BOARD	Irrigation	59	1012	15	42	24	9	pump	112	168667	538	https://dwr.state.co.us/Tools/WellPermits/9092841
2588-F	CRUIKSHANK, C G	Irrigation	30	1000	16	13	30	14	pump_30hp	71	107143	1103	https://dwr.state.co.us/Tools/WellPermits/9092486
2591-F	CRUICKSHANK, C G	Irrigation	31	1000	16	14	31	15	pump_30hp	67	100000	956	https://dwr.state.co.us/Tools/WellPermits/9092489
2589-F	CRUIKSHANK, C G	Irrigation	32	1000	16	16	32	16	pump_30hp	63	93750	784	https://dwr.state.co.us/Tools/WellPermits/9092487
4672-F	NEWMAN, ERNEST E	Irrigation	36	1000	9	27	19	10	pump	100	150000	744	https://dwr.state.co.us/Tools/WellPermits/9092633
2590-F	CRUIKSHANK, C G	Irrigation	41	1000	16	24	34	18	pump	56	83333	465	https://dwr.state.co.us/Tools/WellPermits/9092488
13326-F	HATCHETT B R & HILDA B H	Irrigation	40	925	15	22	34	19	pump	49	73026	444	https://dwr.state.co.us/Tools/WellPermits/9093005
6027-F	SEILING KENNETH W & LINDA L	Irrigation	38	900	13	25	30	17	pump	53	79412	425	https://dwr.state.co.us/Tools/WellPermits/9092738
26655-F	DRAGON ESP LTD	Industrial	63	900	16	41	26	10	pump_25hp	90	135000	441	https://dwr.state.co.us/Tools/WellPermits/0008879
20329-R	JOHNS LOUISE W MRS	Irrigation	31	675									https://dwr.state.co.us/Tools/WellPermits/9093314
5359-F	DORENKAMP, JOSEPH	Irrigation	36	500	10	26	34	24	pump	21	31250	161	https://dwr.state.co.us/Tools/WellPermits/9092693
24728-F	COW PALACE INC	Irrigation	30	400									https://dwr.state.co.us/Tools/WellPermits/0200313A
24728-F-R	SANDERS, TERRY J	Irrigation	41	400									https://dwr.state.co.us/Tools/WellPermits/0200313
21552-F	EATON DWAIN W & DONNA J	Irrigation	35	98									https://dwr.state.co.us/Tools/WellPermits/9093387
157822--A	HENRY, FRANKLIN S	Domestic	36	50	12	20	30	18	pump				https://dwr.state.co.us/Tools/WellPermits/0315716B
197660-	HARTSHORN MONTE & KAREN	Domestic	43	50									https://dwr.state.co.us/Tools/WellPermits/0403302
38162-	LAMAR FARMS	Stock	80	50	20	37	40	20	bailer				https://dwr.state.co.us/Tools/WellPermits/9093564
21677-F	PASSINI PRIMO & MARGARET	Irrigation	30	30									https://dwr.state.co.us/Tools/WellPermits/9093401
42246-	SULLIVAN, FRED E	Domestic	30	30	15	12	20	5	bailer				https://dwr.state.co.us/Tools/WellPermits/9093610
68785-	LAZY Y CROSS LND CO	Stock	36	30	6	29	18	12	bailer				https://dwr.state.co.us/Tools/WellPermits/9093721
42247-	CRIMOND, RICHARD P	Domestic	41	30	20	19	28	8	bailer				https://dwr.state.co.us/Tools/WellPermits/9093611
68784-	LAZY Y CROSS LND CO	Stock	41	30	8	32	20	12	bailer				https://dwr.state.co.us/Tools/WellPermits/9093720

Appendix A - Well Data From the State of Colorado Well Database (cont)

Permit Number	Contact Name	Use(s)	Completed Well Depth	Pump Test Yield (gpm)	Water Level when Drilled (ft)	Saturated Thickness (ft)	Pumping Level (ft bgl)	Drawdown (ft)	Test Method - pump hp	Specific Capacity (gpm/ft)	Transmiss-ivity (gpd/ft)	Hydraulic Conduct-ivity (ft/day)	State Engineer's website link
69049-	LAZY Y CROSS LAND & CATTLE CO	Stock	50	30	6		18	12	bailer				https://dwr.state.co.us/Tools/WellPermits/9093722
43389-	HALL, JAMES	Domestic	32	25	10	20	15	5	bailer				https://dwr.state.co.us/Tools/WellPermits/9093647
42956-	PRATT, C F	Domestic	67	25	30	27	45	15	bailer				https://dwr.state.co.us/Tools/WellPermits/9093642
64524-	APPEL ILLA JO	Domestic, Stock	62	24	30	27	36	6	bailer				https://dwr.state.co.us/Tools/WellPermits/9093706
21980-	MOUNT OLIVE LUTHERAN CHURCH	Domestic	26	20	19		21	2	bailer				https://dwr.state.co.us/Tools/WellPermits/9093407
23588-	FOUR STATES FEEDYARD INC	Domestic	30	20	16	9							https://dwr.state.co.us/Tools/WellPermits/9093434
21269-	BELLOMY, JAMES	Domestic	32	20	23		32	9	bailer				https://dwr.state.co.us/Tools/WellPermits/9093370
148729--A	RASMUSSEN, DAVID	Domestic	42	20	15	20	41	26	bailer				https://dwr.state.co.us/Tools/WellPermits/0520431
46884-	BRUCKNER, HAZEL T	Domestic	43	20	20	21	30	10	bailer				https://dwr.state.co.us/Tools/WellPermits/9093671
42957-	WHITTEN, B E	Domestic	48	20	20	27	30	10	bailer				https://dwr.state.co.us/Tools/WellPermits/9093643
46050-	DONART, HARRY J	Domestic	48	20	25	20	30	5	bailer				https://dwr.state.co.us/Tools/WellPermits/9093663
87555-	SCHMIDT, LAIL W	Domestic	80	20									https://dwr.state.co.us/Tools/WellPermits/9093790
24735-	ENGLAND, ALTA	Domestic	83	20									https://dwr.state.co.us/Tools/WellPermits/9093456
24715-	YOUNG, ALFRED R	Domestic	49	18	24		30	6	bailer				https://dwr.state.co.us/Tools/WellPermits/9093452
817-RN	WALLACE H T & CLORIA W	Domestic	17	15	14		14	0	bail				https://dwr.state.co.us/Tools/WellPermits/9092442
42235-	BRANNON JR JOHN R	Domestic	22	15	10		20	10	bailer				https://dwr.state.co.us/Tools/WellPermits/9093607
21346-	ROUSE, HARVEY	Domestic	23	15	16	3	16	0	bailer				https://dwr.state.co.us/Tools/WellPermits/9093373
21283-	BAKER, J R	Domestic	25	15	18	6	23	5	bailer				https://dwr.state.co.us/Tools/WellPermits/9093371
47753-F	LAMAR CITY OF	Municipal	26	15	18	7	25	7	bailer				https://dwr.state.co.us/Tools/WellPermits/0395314A
42244-	MONTGOMERY, EMERY	Domestic	28	15	18	9	23	5	bailer				https://dwr.state.co.us/Tools/WellPermits/9093608
42955-	CHANDLER, AARON L.	Domestic	28	15	18	9	23	5	bailer				https://dwr.state.co.us/Tools/WellPermits/9093641
24705-	KNOBBE, JESS	Domestic	30	15	16	11	16	0	bailer				https://dwr.state.co.us/Tools/WellPermits/9093450
42954-	CLODFELLTER, ROBERT J	Domestic	30	15	12	17	17	5	bailer				https://dwr.state.co.us/Tools/WellPermits/9093640
29153-	COOK, RAYMOND L	Domestic	32	15	17	15							https://dwr.state.co.us/Tools/WellPermits/9093504
20903-	MAUCH, GEORGE	Domestic	35	15	16	11	16	0	bailer				https://dwr.state.co.us/Tools/WellPermits/9093353
23587-	AUGUSTINE, BEVERLY J	Domestic	35	15	15	9							https://dwr.state.co.us/Tools/WellPermits/9093433
74258-	HOSS INMAN JAMES A	Domestic, Stock	36	15	24	9	26	2	bailer				https://dwr.state.co.us/Tools/WellPermits/9093731
20826-	TERRILL ORRIE & EMILY	Domestic	41	15	16	19	16	0	bailer				https://dwr.state.co.us/Tools/WellPermits/9093344
92575-	ECKLES, ROY	Domestic	48	15									https://dwr.state.co.us/Tools/WellPermits/9093825
117704-	HAYS, C A	Domestic, Stock	57	15	20	15	35	15	bailer				https://dwr.state.co.us/Tools/WellPermits/9093860
86498--A	LAMAR FARMS	Domestic, Stock	60	15	40	17	58	18	bailer				https://dwr.state.co.us/Tools/WellPermits/0235803
54764-	BRANTLEY THOMAS L & JOYCE	Domestic	66	15	30	27	40	10	bailer				https://dwr.state.co.us/Tools/WellPermits/9093690
95219-	PEERY, H E	Domestic	23	14									https://dwr.state.co.us/Tools/WellPermits/9093839
57553-	SWEAT, J B	Domestic	40	14									https://dwr.state.co.us/Tools/WellPermits/9093691
41679-F	AUSTIN, LYNN C	Other	32	11.5	6.5		27	20.5	pump_0.5 hp				https://dwr.state.co.us/Tools/WellPermits/0343259
22775-	SNIFF, LEONARD	Stock	19	10	9	9	9	0	bail				https://dwr.state.co.us/Tools/WellPermits/9093429
52447-F	ASHLEY, STACIE	Other	22	10	10		20	10	pump				https://dwr.state.co.us/Tools/WellPermits/0421314A
52448-F	ASHLEY MICHAEL & STACIE	Other	22	10									https://dwr.state.co.us/Tools/WellPermits/0421314B
21816-	CHURCH OF THE NAZARENE	Domestic	24	10	12	10	12	0	bailer				https://dwr.state.co.us/Tools/WellPermits/9093404
15842-	RAY ROBERT W JR	Domestic	25	10	20		20	0	bailer				https://dwr.state.co.us/Tools/WellPermits/9093129
42062-	GREEN, ROLAND	Domestic	25	10	10	14	12	2	bailer				https://dwr.state.co.us/Tools/WellPermits/9093600
21189-	DILLON, PHILLIP	Domestic	27	10	20	6	20	0	bailer				https://dwr.state.co.us/Tools/WellPermits/9093369
42233-	ECKELS, ROY	Domestic	35	10	20		20	0	bailer				https://dwr.state.co.us/Tools/WellPermits/9093605
21069-	HAYS, WAYNE	Domestic	37	10	16	19	16	0	bailer				https://dwr.state.co.us/Tools/WellPermits/9093361
46391-	WHITMIRE, CHARLES P	Domestic	40	10	25	11	40	15	air				https://dwr.state.co.us/Tools/WellPermits/9093668
20678-	LEIGHTON, GERALD	Domestic	41	10	16	19							https://dwr.state.co.us/Tools/WellPermits/9093340
42063-	SANCHEZ URIEL SALAZAR	Domestic	42	10	27	13	29	2	bailer				https://dwr.state.co.us/Tools/WellPermits/9093601
42234-	GILBERT, PHIL	Domestic	42	10	28	13	33	5	bailer				https://dwr.state.co.us/Tools/WellPermits/9093606
19382-	RAY ROBERT W JR & MARY E	Domestic	50	10	31	2	40	9	bailer				https://dwr.state.co.us/Tools/WellPermits/9093233
20601-	HARPER BESSIE & JAMES R	Domestic	52	10	25	6	25	0	bailer				https://dwr.state.co.us/Tools/WellPermits/9093335
42057-	GARBACZ, SHERRI	Domestic	56	10	21		21	0	bailer				https://dwr.state.co.us/Tools/WellPermits/9093595
20901-	SPRINGER, CHARLES	Domestic	61	10	30	27	30	0	bailer				https://dwr.state.co.us/Tools/WellPermits/9093351
42059-	WARREN, LEROY	Domestic	65	10	35	22	50	15	bailer				https://dwr.state.co.us/Tools/WellPermits/9093597

Permit Number	Contact Name	Use(s)	Completed Well Depth	Pump Test Yield (gpm)	Water Level when Drilled (ft)	Saturated Thickness (ft)	Pumping Level (ft bgl)	Drawdown (ft)	Test Method - pump hp	Specific Capacity (gpm/ft)	Transmiss-ivity (gpd/ft)	Hydraulic Conduct-ivity (ft/day)	State Engineer's website link
42058-	OXLEY, WAYNE	Domestic	70	10	35	22	45	10	bailer				https://dwr.state.co.us/Tools/WellPermits/9093596
42034-	TURNER, TERRY	Domestic	74	10	30	27	30	0	bailer				https://dwr.state.co.us/Tools/WellPermits/9093594
42061-	CURREY, DUDLEY	Domestic	74	10	30	27	40	10	bailer				https://dwr.state.co.us/Tools/WellPermits/9093599
42136-	MERRIFIELD, WILLIAM H	Domestic	39	8	24	13	31	7	bailer				https://dwr.state.co.us/Tools/WellPermits/9093603
43388-	ANDERSON, ELBERT	Domestic	95	8									https://dwr.state.co.us/Tools/WellPermits/9093646
24579-	STICKLIN, BYRON	Domestic	39	7	27	7	27	0	bailer				https://dwr.state.co.us/Tools/WellPermits/9093446
24519-	REESE, WARREN E	Domestic	63	7	12	45							https://dwr.state.co.us/Tools/WellPermits/9093442
90649-	SAPP, E J	Domestic	25	5	15	0	15	0	bailer				https://dwr.state.co.us/Tools/WellPermits/9093814
24578-	TROY, C B	Domestic	38	5	26	6	26	0	bailer				https://dwr.state.co.us/Tools/WellPermits/9093445
25229-	CORNELIUS, G	Domestic	61	5									https://dwr.state.co.us/Tools/WellPermits/9093465
26462-	BEAVERS, J K	Domestic	20	4	15								https://dwr.state.co.us/Tools/WellPermits/9093483
24706-	AUSMUS, VIVIAN	Domestic	24	4	19	4	19	0	bailer				https://dwr.state.co.us/Tools/WellPermits/9093451
52184-F	LAMAR CITY OF	Other	ND										https://dwr.state.co.us/Tools/WellPermits/0447777A
59917-MH	LAMAR CITY OF	Monitoring	9		7.3								https://dwr.state.co.us/Tools/WellPermits/0059917
39472-M	LAMAR CITY OF	Monitoring	10		ND								https://dwr.state.co.us/Tools/WellPermits/0326721B
39471-M	LAMAR CITY OF	Monitoring	13		ND								https://dwr.state.co.us/Tools/WellPermits/0326721A
39474-M	LAMAR CITY OF	Monitoring	13		ND								https://dwr.state.co.us/Tools/WellPermits/0326721D
293492-	HENDRICKS SHARON & JEFF	Domestic	14										https://dwr.state.co.us/Tools/WellPermits/3663362
19650-MH	SOUTHEASTERN COLORADO COOP	Monitoring	15		8.45								https://dwr.state.co.us/Tools/WellPermits/0019650
31670-MH	GELHAUSEN, JAN	Monitoring	22		10								https://dwr.state.co.us/Tools/WellPermits/0031670
9146-F	HOHENSEE, VENDEL	Irrigation	24										https://dwr.state.co.us/Tools/WellPermits/9092837
33938-F	FOX & ASSOC OF CO	Other	25										https://dwr.state.co.us/Tools/WellPermits/0289420C
59915-MH	LAMAR CITY OF	Monitoring	25		22.3								https://dwr.state.co.us/Tools/WellPermits/0059915A
33937-M	FOX & ASSOC OF CO	Monitoring	35										https://dwr.state.co.us/Tools/WellPermits/0289420B
157822-	HENRY, FRANKLIN S	Domestic	35										https://dwr.state.co.us/Tools/WellPermits/0315716A
46178-	BAGGETT, W C	Domestic	40										https://dwr.state.co.us/Tools/WellPermits/9093667
3132-F	JOHN, LOUISE W	Irrigation	43										https://dwr.state.co.us/Tools/WellPermits/9092519
260702-	CEDAR BREAKS ACRES TRUST	Domestic, Stock	44										https://dwr.state.co.us/Tools/WellPermits/0528962
6573-F	PARMELY, NEIL	Irrigation	49						pump_20hp				https://dwr.state.co.us/Tools/WellPermits/9092783
33936-M	FOX & ASSOC OF CO	Monitoring	50										https://dwr.state.co.us/Tools/WellPermits/0289420A
48609-F	RISING, KEITH L	Irrigation	52										https://dwr.state.co.us/Tools/WellPermits/0417690
54584-	HALL JACK & BONEVA C	Domestic	60		27	33							https://dwr.state.co.us/Tools/WellPermits/9093686
79630-F	GP RESOURCES LLC	Commercial, Ind.	63										https://dwr.state.co.us/Tools/WellPermits/3668741A
4230-F	GP IRRIGATED FARMS LLC	Irrigation	63		9	48							https://dwr.state.co.us/Tools/WellPermits/9092585
158779-	BELL, CLYDE W	Domestic, Stock	74										https://dwr.state.co.us/Tools/WellPermits/0315127A
158779--A	BELL, CLYDE W	Domestic, Stock	80										https://dwr.state.co.us/Tools/WellPermits/0315127B
21042-	FELTER, ROBERT C	Domestic	97		20								https://dwr.state.co.us/Tools/WellPermits/9093359
Min			9	4	6	0	9	0		21	31250	161	
Max			97	2000	40	51	58	39		200	300000	1103	
Avg			**43**	**390**	**18**	**22**	**28**	**10**		**78**	**117270**	**548**	

APPENDIX B – MODELING DETAILS

The purpose of this memorandum is to provide additional details on modeling software, grid selection, boundary conditions and a statistical results comparison. Referenced figures are the same as in the report and can be found in the "Figures" section.

Software

We used the USGS MODFLOW2000 (Harbaugh et al, 2000) modeling program to evaluate the existing and future groundwater conditions at the West Farm pit. We used the Groundwater Vistas (GV) version 6.85 Build 11 pre and post processor (Jim and Doug Rumbaugh), preprocessor to construct, run and display model results. We then exported model results to ESRI software to create the report figures.

Model Grid

The model consists of 85 rows and 157 columns using 200 foot square model cells. The model area is approximately 3 miles high and 6 miles wide (west to east) centered on the pits as shown on the report figures.

Boundary Conditions

Boundary Conditions represent locations in the model where water flows in or out due to external factors.

Aquifer Bottom and Slurry Walls

The bottom of the model is bedrock which is simulated using "no-flow" cells, meaning the cells are essentially turned off no flow is simulated. We simulate pits with slurry walls by turning off the cells within the pit, making them also "no-flow" cells.

Alluvial Aquifer Inflow and Outflow

Alluvial Aquifer inflow and outflows are simulated using "constant head" cells along the western, northern and eastern specified head model boundaries. The assigned cell elevations remain constant during the model run and water either flows in or out of them based on the gradient established inside the model. The heads were assigned at the 10 ft contour lines shown on the baseline water table map (**Figure 6)** and extrapolated in between using the GV extrapolation tool.

We used general head boundary (GHB) on the south side of the model to simulate inflow from the Quaternary eolian deposits (Qe). Conceptually, a GHB is a fixed head elevation outside the model. In this case the next 10 foot water table contours on **Figure 6** located outside the model ranging from 3590 to 3610 feet in elevation. The conductance term (COND) is calculated based on the area of the wetted cell side multiplied by the hydraulic conductivity divided by the distance to the GHB, which we calculated as being around 4000 feet outside the model. The flow between the hypothetical boundary and the head in the cell is proportional to the difference between the head in the cell (determined by the model) and the GHB. The flow into the model is then a function of the head difference x COND.

$$COND = \frac{(L \times W) \times K}{D}$$

whereas:

W = model cell width (200 ft)
L = wetted interface thickness = (40 ft).
K = average hydraulic conductivity of the eolian deposit (50 ft/day)
D = distance to the external head (4,000 ft)

$$\text{Therefore: } COND = \frac{200 \text{ ft} \times 40 \text{ ft} * 50 \text{ ft/day}}{4000 \text{ ft}} = 100 \text{ ft}^2\text{/day}$$

River inflow and outflow

The Arkansas River extends along the west to east axis approximately 1,500 to 4,000 feet from the northern model boundary. Clay Creek is a northward flowing tributary into the Arkansas River. We simulated approximately 1.5 miles of Clay Creek before its confluence with the Arkansas River. We modeled the aquifer's connection to the river using the MODFLOW "River" package which uses a streambed conductance term (COND) to calculated flow between the river and the aquifer based on the head difference between the cell and the river stage multiplied by COND.

$$COND = \frac{(L \times W) \times Ksb}{M}$$

whereas:

W = River width (50 ft)
L = River length (calculated by GWV based on digitize river length in each cell (ft).
Ksb = average hydraulic conductivity of the streambed = K of the aquifer (550/100) (ft/day)
M = River bottom thickness (1 ft)

$$\text{Therefore: } COND = \frac{\text{River length in cell (ft)} \times 50 \text{ ft} * 5.5 \text{ ft/day}}{1 \text{ ft}}$$

We assume Ksb is 1/100th of the K of the aquifer (5.5 ft/day). By assuming heterogeneity of the streambed, we lower the connection between the aquifer and the river. We believe limiting movement to and from the river makes predicted changes in water levels caused by pit slurry walls more conservative (ie. larger than they may be in reality).

We determined the river stage height by based on the mean September - May monthly flow (28.3 cfs) at USGS gage station 07133000 (Arkansas River at Lamar, Co) between 2010 and 2020. We divided the flow by the average river width (50 ft) measured from Google Earth (1/27/2017), to determine the stage height of 0.6 ft. We assigned model river stage elevations where the 10-ft water table contour lines (**Figure 6)** cross the river. Those contours were assigned based on the DEM ground elevation which assumes that a hydraulic connection between the river and aquifer exist. We then invoke the GV interpolating tool to assign stage elevations to each cell. GV subtracts the river stage elevation to determine the river bottom elevation at each river cell. For a gaining stream (where the head in the cell is above the river stage), MODFLOW calculates the flow into the river based on the head difference between the river cell and its stage multiplied by COND. Under losing stream conditions, MODFLOW calculates the flow into the aquifer based on the head difference between the river stage and cell bottom multiplied by COND until a maximum leakance is achieved when the head in the cell drops below the river bottom.

Canals

We did not simulate canal recharge in the model. Since the model is set up as a "change" model, we do not believe that canal recharge is going to change as a result of pit lining.

Drains

We modeled the unnamed drain on the south side of the pits (paralleling Hwy 50) using MODFLOW "Drain" package which uses a streambed conductance term (COND) to calculated flow between the drain and the aquifer based on the head difference between the drain cell and the drain bottom multiplied by COND.

$$COND = \frac{(L \times W) \times Kv}{M}$$

whereas:

W = Drain width (assume 5 ft)
L = Drain length (200 ft per cell)
Kv = average vertical hydraulic conductivity of the drain = Kv of the aquifer (550/10) (ft/day)
M = Drain bottom thickness (1 ft)
Therefore: $COND = \frac{200\text{ (ft)} \times 5\text{ ft} * 55\text{ ft/day}}{1\text{ ft}} = 55000\text{ ft\^{}2/day}$

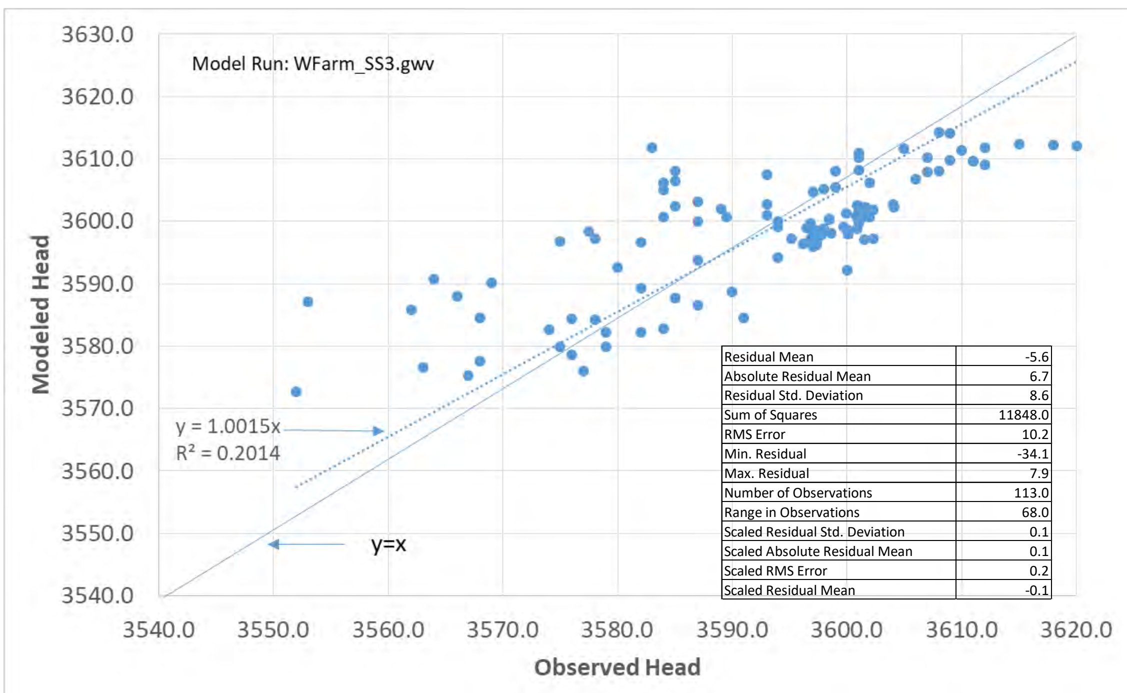
We assume Kv is or 55 ft/day. By assuming the Kv of the drain is only 1/10th of the aquifer, we lower the connection between the aquifer and the drain. We believe limiting leakance to the drain makes predicted changes in water levels caused by pit slurry walls more conservative (ie. larger than they may be in reality).

Model Results Statistics

Figure B2 compares modeled water levels in cells with wells to 113 measured water levels, either from the CDWR database or from monitoring wells. For a perfect match, the data would have no scatter and fall along a straight line where y = x and the R^2 = 1.0. However, a perfect match is never expected due to: measurement error; location error, error in the DEM data used to calculate elevations, annual (dry year/wet year) or seasonal variability; and proximity to pumping wells which may cause daily variability. This accounts for the low R^2 (0.20) of the best-fit line. However, the plot of x verses y is very close where y = 1.0015x.

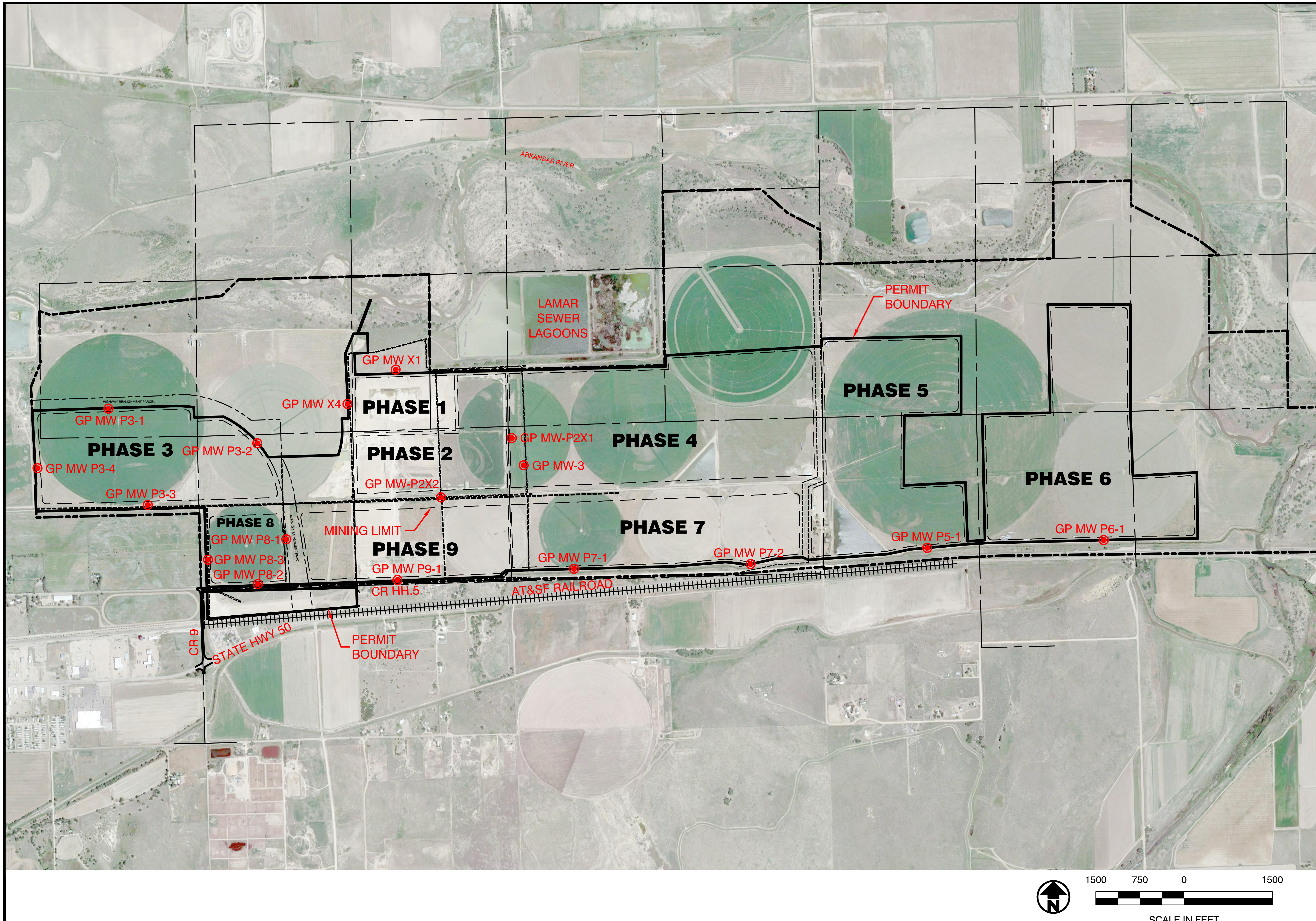
A typical assessment of the degree of "error" in the model calibration is the root-mean-square (RMS) of the residuals (residual means the difference between modeled and observed water level at each well). A rule-of-thumb goal is for the RMS error to be less than 10% of the range in heads across the observed data. Our data set covers observations between 3550 and 3620 ft (a 70 ft range). The scaled RMS values of 10.2 ft which is higher than the 10% goal of 7 ft (70/10). Again, we believe this is due to the many sources of error in the measured data set.

Figure A-1: Observed verses Modeled Water Levels



Despite some uncertainties, we believe the model is the best tool to evaluate impacts caused by pit development for the following reasons:

- The model was constructed using most available data;
- We accounted for the most important inflow and outflow parameters using available data and reasonable assumptions;
- We used site specific test data to determine aquifer properties;
- Modeled water levels (**Figure 9**) appear reasonable compared to past (**Figure 6**) and recent measurements;
- The model mass balances show minimal error; and
  The model results are relatively insensitive to aquifer properties.



J&T Consulting, Inc.
305 Denver Avenue - Suite D
Fort Lupton, CO 80621
303-857-6222

West Farm Pit

Monitoring Well Location Map

Powers Aggregate Operators, LLC

No	Date	By	Chk	Description

REVISIONS

Job #	07115
Date	4.23.21
Drawn By	TPY
Designed By	TPY
Checked By	JCY
File	2020 Mon Wells
Scale	As Shown

Sheet: 1 Of: 1

P:\07115 GP Ranches LLC - Lamar\Drawings\Monitoring Wells\2020 Monitoring Well Location Map.dwg, MonitoringLocations, 4/23/2021 10:49:14 AM

WELL NAME													Environmental Will Track Gc			
DATE	**MW X1**		**MW X4**		**MW P2X1**		**MW P2I1**		**MW P2X2**		**MW P2I2**		out fall 001A	Outfall 003A Cell 8	Outfall 003-3 Cell 3 Well	Cell 3 Diesel
	Top of well to ground	Top of pipe to water	Top of well to ground	Top of pipe to water	Top of well to ground	Top of pipe to water	Top of well to ground	Top of pipe to water	Top of well to ground	Top of pipe to water	Top of well to ground	Top of pipe to water	acre feet discharge read out	Record in Acre Feet	Record in Acre Feet	
January 31, 2021	3'1"	10'6"	3'1"	10'	2'4"	12'	2'5"	31'	2'3"	9'6"	2'8"	58'	3501.25			
February 29, 2021	3'1"	10'6"	3'1"	10'	2'4"	11'6"	2'5"	31'	2'3"	10'	2'8"	58'	3560.75			
March 31, 2021	3'1"	10'	3'1"	10.75'	2'4"	11'	2'5"	31'	2'3"	9'	2'8"	58'	3626.72			
April 30, 2021	3'1"	10'	3'1"	9'6"	2'4"	11'	2'5"	31'	2'3"	7'6"	2'8"	58'	3704			
May 31, 2021	3'1"	9'6"	3'1"	9'	2'4"	10'	2'5"	30'6"	2'3"	8'6"	2'8"	58'	3766			
June 29, 2021	3'1"	8'6"	3'1"	8'6"	2'4"	10'	2'5"	31'	2'3"	7'6"	2'8"	58'6"	3826.44			
July 31,2021	3'1"	8'6"	3'1"	8'3"	2'4"	10	2'5"	29'6"	2'3"	7'9"	2'8"	58'	3890.8			
August 31,2021	3'1"	10'	3'1"	9'	2'4"	10'6"	2'5"	29'6"	2'3"	8'	2'8"	58'	3958.59			
September 30,2021	3'1"	10'6"	3'1"	9'	2'4"	10'8"	2'5"	30'6"	2'3"	8'6"	2'8"	58'	4016.24			
October 29, 2021	3'1"	10'	3'1"	9'6"	2'4"	11'	2'5"	34'	2'3"	9'3"	2'8"	58'	4076.18			
November 30,2021	3'1"	10'3"	3'1"	10'3"	2'4"	11'3"	2'5"	34'9"	2'3"	9'6"	2'8"	58'	4143.72			
December 31, 2021	3'1"	10'6"	3'1"	10'3"	2'4"	11'6"	2'5"	35'	2'3"	10'	2'8"	58'	4224.13			
January 31, 2022	3'1"	10'6"	3'1"	10'9"	2'4"	11'6"	2'5"	41	2'3"	9'9"	2'8"	58'	4275.16			
Febuary 28, 2022	3'1"	10'6"	3'1"	10'6"	2'4"	11'6"	2'5"	41'	2'3"	9'6"	2'8"	58'	4286.7			
March 31, 2022	3'1"	10'9"	3'1"	10'6"	2'4"	11'3"	2'5"	41'	2'3"	9'6"	2'8"	58'	4303.48			
April 29, 2022	3'1"	9'6"	3'1"	10'	2'4"	11'	2'5"	41'	2'3"	9'	2'8"	58'	4318.39			
May 28, 2022	3'1"	10'	3'1"	9'9"	2'4"	10'6"	2'5"	41'	2'3"	8'	2'8"	58'	4334.21			
June 30, 2022	3'1"	9'8"	3'1"	9'5"	2'4"	10'	2'5"	40'4"	2'3"	7'9"	2'8"	58'6"	4343.76			
August 1,2022	3'1"	9'7"	3'1"	9'3"	2'4"	9'2"	2'5"	40'11"	2'3"	7'7"	2'8"	58'6"	4343.76			
September 1, 2022	3'1"	9'10"	3'1"	9'	2'4"	10'2"	2'5"	41'	2'3"	7 '8"	2'8"	58'6 "	4343.76			
October 3, 2022	3'1"	10'	3'1"	10'5"	2'4"	10'5"	2'5"	40'	2'3"	8'10"	2'8"	58'6"	8.87			
October 31, 2022	3'1"	11'	3'1"	10'3"	2'4"	11'	2'5"	41'	2'3"	9'	2'8"	58'6"	23.13			
November 30, 2022	3'1"	10'	3'1"	9'2"	2'4"	11'	2'5"	41'	2'3"	9'	2'8"	58'6"	27.7			
December 29, 2022	3'1"	10.2'	3'1"	10'	2'4"	11'	2'5"	41'	2'3"	9'	2'8"	58'6"	47.07	22		
January 31, 2023	3'1"	10'	3'1"	10'	2'4"	11.2'	2'5"	41'	2'3"	9'	2'8"	58'6"	54.96	50.2		
March 15, 2023	3'1"	10'	3'1"	10'	2'4"	11.2'	2'5"	41'	2'3"	9'	2'8"	58'6"	66.51	68.85		
April 4, 2023	3'1"	11'	3'1"	10'	2'4"	11'.2"	2'5"	41'	2'3'	9'	2'8"	58'6"	66.51	78.85		
May 5, 2023	3'1"	11'	3'1"	10'	2'4"	11'2"	2'5"	41'	2'3'	9'	2'8"	58'6"	66.51	78.85		
May 26, 2023	3'1"	11'	3'1"	10'	2'4"	11'2"	2'5"	40'4"	2'3"	8'10"	2'8"	58'6"	80.09	125.16		
July 5, 2023	3'1"	10'	3'1"	9'	2'4"	9'	2'5"	41'.6"	2'3"	8'	2'8"	58'.6"	0	132.82		
July 29, 2023	3'1"	9'8"	3'1"	9'	2'4"	9'	2'5"	41'2"	2'3"	8'	2'8"	58'6"	0	154.02		
September 1, 2023	3'1"	10'	3'1"	10'5"	2'4"	11'4"	2'5"	42'3"	2'3"	9'1"	2'8"	59'2"	0	195.18	Out Fall 003-3	
October 2, 2023	3'1"	10'	3'1"	10'1"	2'4"	10'6"	2'5"	41'7"	2'3"	8'1"	2'8"	58'4"		214.3	0.41	
November 1, 2023	3'1"	9.9	3'1"	10'1"	2'4"	10'7"	2'5"	42'1"	2'3"	8'9"	2'8"	58'1"		229.88		
November 8, 2023	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"			233.76	19.55	
November 17, 2023	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"				70.17	
November 28, 2023	3'1"	10'2"	3'1"	10'1"	2'4"	10'9"	2'5"	41'8"	2'3"	8'1"	2'8"	58'2"			26.87	241.73
November 30, 2023	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"			244.66	81.55	27.96

January 2, 2024	3'1"	10'1"	3'1"	9'9"	2'4"	10'7"	2'5"	41'8"	2'3"	8'2"	2'8"	58'		261.31	124.22	33.43
February 5, 2024	3'1"	10'5"	3'1"	9'9"	2'4"	11'1"	2'5"	41'2"	2'3"	Buried	2'8"	58'3"		280.77	164.82	33.86
March 6, 2024	3'1"	10'7"	3'1"	10'3"	2'4"	11'	2'5"	41'2"	2'3"	Buried	2'8"	58'2"		300.71	201.09	38.59
March 26, 2024	3'1"	10'9"	3'1"	10'4"	2'4"	11'2"	2'5"	41'7"	2'3"	Buried	2'8"	58'6"		311.58	223.69	48.09
April 1, 2024	3'1"	10'6"	3'1"	10'2"	2'4"	11'	2'5"	41'4"	2'3"	Buried	2'8"	58'1"		314.33	230.69	53.85
May 1, 2024	3'1"	10'5"	3'1"	9'7"	2'4"	11'	2'5"	34'2"	2'3"	Buried	2'8"	58'3"		330.13	262.85	106.33
June 3, 2024	3'1"	10'4"	3'1"	9'4"	2'4"	10'5"	2'5"	41'3"	2'3"	Buried	2'8"	58'5"		348.46	294.65	202.59
July 1, 2024	3'1"	10'5"	3'1"	9'8"	2'4"	10'2"	2'5"	41'2"	2'3"	Buried	2'8"	58'1"		365.98	92.41	314.73
August 3, 2024	3'1"	8'3"	3'1"	8'6"	2'4"	9'4"	2'5"	42'	2'3"	Buried	2'8"	58'3"		380.76	144.44	340.36
September 5, 2024	3'1"	10'7"	3'1"	10'4"	2'4"	10'6"	2'5"	41'2"	2'3"	Buried	2'8"	58'4"		398.65	151.08	374.63
September 30, 2024	3'1"	10'9"	3'1"	10'6"	2'4"	11'	2'5"	41'3"	2'3"	Buried	2'8"	58'		409.38	321.81	398.59
November 4, 2024	3'1"	10'7"	3'1"	10'7"	2'4"	11'1"	2'5"	41'5"	2'3"	Buried	2'8"	58'2"		397.37	428.43	412.8
December 2, 2024	3'1"	10'7"	3'1"	10'5"	2'4"	10'9"	2'5"	41'4"	2'3"	Buried	2'8"	57'1"		450.05	438.64	422.93
January 4, 2025	3'1"	10'7"	3'1"	10'9"	2'4"	11'3"	2'5"	42'1"	2'3"	Buried	2'8"	57'4"		477.78	433.68	468.96
January 31, 2025	3'1"	10'5"	3'1"	10'8"	2'4"	11'5"	2'5"	41'9"	2'3"	Buried	2'8"	57'6"		482.21	506.98	441.92
February 28, 2025	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"				544.63	
April 7, 2025	3'1"	10'5"	3'1"	10'4"	2'4"	10'8"	2'5"	34'8"	2'3"	Buried	2'8"	26'9"			596.51	
May 1, 2025	3'1"	9'8"	3'1"	10'7"	2'4"	10'5"	2'5"	41'2"	2'3"	Buried	2'8"	21'3"			649.61	
June 1, 2025	3'1"	10'5"	3'1"	10'4"	2'4"	10'2"	2'5"	41'3"	2'3"	Buried	2'8"	21'3"				
July 1, 2025	3'1"	10'2"	3'1"	10'4"	2'4"	10'2"	2'5"	41'2"	2'3"	Buried	2'8"	21'7"			732.82	
August 1, 2025	3'1"	10'2"	3'1"	10'1"	2'4"	9'5"	2'5"	41'2"	2'3"	Buried	2'8"	21'7"			752.96	
	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"					
	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"					
	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"					
	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"					
	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"					
	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"					
	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"					
	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"					
	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"					
	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"					
	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"					
	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"					
	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"					
	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"					
	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"					
	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"					
	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"					
	3'1"		3'1"		2'4"		2'5"		2'3"		2'8"					

ping Forward

Floating Pump Reading Cell 3
acre feet discharge read out
22.26
22.26
56.34
69.78
69.78
70.16
0
0

Well Designation	MW P3-1			MW P3-2			MW P3-3			MW P3-4		
Description	North Side Phase 3			East Side Phase 3			South Side Phase 3			West Side Phase 3		
Top of Well Elevation (ft)	3609.65			3606.63			3609.97			3611.54		
Ground Elevation (ft)	3607.55			3604.38			3607.72			3609.39		
Date	Depth to Groundwater from Top of Well (ft)	Depth to Groundwater from Ground (ft)	Elevation of Groundwater (ft)	Depth to Groundwater from Top of Well (ft)	Depth to Groundwater from Ground (ft)	Elevation of Groundwater (ft)	Depth to Groundwater from Top of Well (ft)	Depth to Groundwater from Ground (ft)	Elevation of Groundwater (ft)	Depth to Groundwater from Top of Well (ft)	Depth to Groundwater from Ground (ft)	Elevation of Groundwater (ft)
1/8/2021	10.40	8.30	3599.25	10.10	7.85	3596.53	11.07	8.82	3598.90	10.25	8.10	3601.29
1/22/2021	10.75	8.65	3598.90	10.50	8.25	3596.13	11.00	8.75	3598.97	10.50	8.35	3601.04
2/3/2021	10.75	8.65	3598.90	10.50	8.25	3596.13	11.25	9.00	3598.72	10.50	8.35	3601.04
2/19/2021	10.5	8.4	3599.15	10.3	8.05	3596.33	11.5	9.25	3598.47	10.5	8.35	3601.04
3/9/2021	10.75	8.65	3598.9	10.5	8.25	3596.13	11.5	9.25	3598.47	10.5	8.35	3601.04
3/25/2021	10.5	8.4	3599.15	10.25	8	3596.38	10.75	8.5	3599.22	10.25	8.1	3601.29
4/6/2021	10.25	8.15	3599.4	10	7.75	3596.63	10.75	8.5	3599.22	10	7.85	3601.54
4/21/2021	10.25	8.15	3599.4	10.5	8.25	3599.47	10.5	8.25	3599.47	10	7.85	3601.54
5/6/2021	10	7.9	3599.65	10	7.75	3599.97	10	7.75	3599.97	9.75	7.6	3601.79
6/3/2021	9.5	7.4	3600.15	9	6.75	3600.97	9	6.75	3600.97	9	6.85	3602.54
6/29/2021	9	6.9	3600.65	9	6.75	3600.97	8.75	6.5	3601.22	8.5	6.35	3603.04
7/31/2021	9	6.9	3600.65	8.75	6.5	3601.22	8.75	6.5	3601.22	8.5	6.35	3603.04
8/31/2021	9.75	7.65	3599.9	9.5	7.25	3600.47	9	6.75	3600.97	9	6.85	3602.54
9/30/2021	9.75	7.65	3599.9	9.75	7.5	3600.22	9.5	7.25	3600.47	9	6.85	3602.54
10/29/2021	10.5	8.4	3599.15	10	7.75	3599.97	10.5	8.25	3599.47	8	5.85	3603.54
11/30/2021	11	8.9	3598.65	10.5	8.25	3599.47	11	8.75	3598.97	8.5	6.35	3603.04
12/31/2021	11.25	9.15	3598.4	12	9.75	3597.97	10	7.75	3599.97	8.5	6.35	3603.04
1/31/2022	11.25	9.15	3598.4	12	9.75	3597.97	10.25	8	3599.72	8.5	6.35	3603.04
2/28/2022	11.25	9.15	3598.4	11.75	9.5	3598.22	10	7.75	3599.97	8.5	6.35	3603.04
3/31/2022	11.25	9.15	3598.4	11.75	9.5	3598.22	9.25	7	3600.72	8.5	6.35	3603.04
4/29/2022	11	8.9	3598.65	11.5	9.25	3598.47	8.25	6	3601.72	9	6.85	3602.54
5/28/2022	11	8.9	3598.65	11.5	9.25	3598.47	6	3.75	3603.97	7	4.85	3604.54
6/30/2022	10.5	8.4	3599.15	10.7	8.45	3599.27	9	6.75	3600.97	7	4.85	3604.54
7/1/2022	10	7.9	3599.65	10.42	8.17	3599.55	6.3	4.05	3603.67	7.42	5.27	3604.12
9/1/2022	10.64	8.54	3599.01	11	8.75	3598.97	6.8	4.55	3603.17	7.49	5.34	3604.05
10/3/2022	10.64	8.54	3599.01	12	9.75	3597.97	7.58	5.33	3602.39	10	7.85	3601.54
10/31/2022	11	8.9	3598.65	11.75	9.5	3598.22	8.64	6.39	3601.33	8.17	6.02	3603.37
11/30/2022	11.1	9	3598.55	11.5	9.25	3598.47	9	6.75	3600.97	8.1	5.95	3603.44
12/29/2022	11	8.9	3598.65	11.5	9.25	3598.47	9.5	7.25	3600.47	8.5	6.35	3603.04
1/31/2023	11.5	9.4	3598.15	11.5	9.25	3598.47	9.9	7.65	3600.07	8.5	6.35	3603.04
3/15/2023	11.5	9.4	3598.15	11.5	9.25	3598.47	10	7.75	3599.97	8.5	6.35	3603.04
4/4/2023	11.5	9.4	3598.15	12	9.75	3597.97	10	7.75	3599.97	9	6.85	3602.54
5/5/2023	11	8.9	3598.65	11	8.75	3598.97	8.75	6.5	3601.22	8.5	6.35	3603.04
5/26/2023	11	8.9	3598.65	11	8.75	3598.97	8.75	6.5	3601.22	8.5	6.35	3603.04
7/5/2023	10.25	8.15	3599.4	10.5	8.25	3599.47	8.75	6.5	3601.22	7	4.85	3604.54
7/29/2023	10	7.9	3599.65	10.5	8.25	3599.47	18	15.75	3591.97	7	4.85	3604.54
9/1/2023	10	7.9	3599.65	10	7.75	3599.97	6	3.75	3603.97	7	4.85	3604.54
10/2/2023	10.5	8.4	3599.15	10.5	8.25	3599.47	7.9	5.65	3602.07	7.4	5.25	3604.14

MW P8-1			MW P8-2			MW P8-3			MW P9-1		
East Side Phase 8			South Side Phase 8			West Side Phase 8			South Side Phase 9		
3606.80			3607.88			3609.29			3602.75		
3604.13			3605.13			3606.66			3601.00		
Depth to Groundwater from Top of Well (ft)	Depth to Groundwater from Ground (ft)	Elevation of Groundwater (ft)	Depth to Groundwater from Top of Well (ft)	Depth to Groundwater from Ground (ft)	Elevation of Groundwater (ft)	Depth to Groundwater from Top of Well (ft)	Depth to Groundwater from Ground (ft)	Elevation of Groundwater (ft)	Depth to Groundwater from Top of Well (ft)	Depth to Groundwater from Ground (ft)	Elevation of Groundwater (ft)
10.54	7.87	3596.26	11.00	8.25	3596.88	11.92	9.29	3597.37			
11	8.33	3595.8	11	8.25	3596.88	12.25	9.62	3597.04			
11	8.33	3595.8	11.25	8.5	3596.63	12.25	9.62	3597.04			
10.75	8.08	3596.05	11	8.25	3596.88	12.25	9.62	3597.04			
11	8.33	3595.8	11	8.25	3596.88	11.5	8.87	3597.79			
10.75	11	3597.13	10.75	8	3597.13	11.5	8.87	3597.79			
10.5	7.75	3597.38	10.75	8	3597.13	11.25	8.62	3598.04			
9.5	6.75	3598.38	9.5	6.75	3598.38	10	7.37	3599.29			
9.5	6.75	3598.38	9.5	6.75	3598.38	9.75	7.12	3599.54			
9.5	6.75	3598.38	9.75	7	3598.13	9.5	6.87	3599.79			
10.25	6.75	3598.38	10	7.25	3597.88	10	7.37	3599.29			
11.25	6.75	3598.38	11	8.25	3596.88	9.75	7.12	3599.54			
11.75	6.75	3598.38	11	8.25	3596.88	10.25	7.62	3599.04	11	9.25	3591.75
11.5	8.83	3595.3	11.25	8.5	3596.63	10.5	7.87	3598.79	11	9.25	3591.75
13	10.33	3593.8	11.25	8.5	3596.63	10	7.37	3599.29	11	9.25	3591.75
13	10.33	3593.8	11.25	8.5	3596.63	10	7.37	3599.29	11	9.25	3591.75
13	10.33	3593.8	11.25	8.5	3596.63	10	7.37	3599.29	11	9.25	3591.75
13	10.33	3593.8	11.25	8.5	3596.63	9.5	6.87	3599.79	11	9.25	3591.75
12.25	9.58	3594.55	11.25	8.5	3596.63	9	6.37	3600.29	11	9.25	3591.75
11.25	8.58	3595.55	10	7.25	3597.88	6	3.37	3603.29	11	9.25	3591.75
10.5	7.83	3596.3	7.3	4.55	3600.58	6.9	4.27	3602.39	10.1	8.35	3592.65
10.65	7.98	3596.15	9.18	6.43	3598.7	6	3.37	3603.29	10	8.25	3592.75
11.34	8.67	3595.46	9	6.25	3598.88	7.42	4.79	3601.87	10	8.25	3592.75
12.67	10	3594.13	10	7.25	3597.88	8	5.37	3601.29	10.42	8.67	3592.33
12.33	9.66	3594.47	10	7.25	3597.88	8.58	5.95	3600.71	10.64	8.89	3592.11
12	9.33	3594.8	9.5	6.75	3598.38	9	6.37	3600.29	11	9.25	3591.75
11	8.33	3595.8	10	7.25	3597.88	9	6.37	3600.29	10.5	8.75	3592.25
12.5	9.83	3594.3	11	8.25	3596.88	9.5	6.87	3599.79	11.5	9.75	3591.25
12.5	9.83	3594.3	11	8.25	3596.88	9	6.37	3600.29	11	9.25	3591.75
12.5	9.83	3594.3	11.25	8.5	3596.63	10	7.37	3599.29	11	9.25	3591.75
12.5	9.83	3594.3	11	8.25	3596.88	9	6.37	3600.29	11	9.25	3591.75
11	8.33	3595.8	10	7.25	3597.88	8	5.37	3601.29	10	8.25	3592.75
10.5	7.83	3596.3	9	6.25	3598.88	6	3.37	3603.29	10	8.25	3592.75
10.3	7.63	3596.5	9.2	6.45	3598.68	6	3.37	3603.29	10	8.25	3592.75
10.5	7.83	3596.3	9	6.25	3598.88	6.1	3.47	3603.19	10	8.25	3592.75
10	7.33	3596.8	9.5	6.75	3598.38	7	4.37	3602.29	10	8.25	3592.75

MW P7-1			MW P7-2			MW P5-1			MWP6-1		
South Side Phase 7			South Side Phase 7			South Side Phase 5			South Side Phase 6		
3597.62			3592.33			3590.18			3586.79		
3595.45			3590.33			3588.01			3584.79		
Depth to Groundwater from Top of Well (ft)	Depth to Groundwater from Ground (ft)	Elevation of Groundwater (ft)	Depth to Groundwater from Top of Well (ft)	Depth to Groundwater from Ground (ft)	Elevation of Groundwater (ft)	Depth to Groundwater from Top of Well (ft)	Depth to Groundwater from Ground (ft)	Elevation of Groundwater (ft)	Depth to Groundwater from Top of Well (ft)	Depth to Groundwater from Ground (ft)	Elevation of Groundwater (ft)
10.25	8.08	3587.37	9.75	7.75	3582.58	11.5	9.33	3578.68	11.75	9.75	3575.04
10.5	8.33	3587.12	9.5	7.5	3582.83	11.5	9.33	3578.68	11.75	9.75	3575.04
10.5	8.33	3587.12	9.5	7.5	3582.83	11.5	9.33	3578.68	12.25	10.25	3574.54
10.5	8.33	3587.12	9.5	7.5	3582.83	11.5	9.33	3578.68	13	11	3573.79
10.5	8.33	3587.12	9.5	7.5	3582.83	11.5	9.33	3578.68	13	11	3573.79
10.5	8.33	3587.12	9.5	7.5	3582.83	11.75	9.58	3578.43	13	11	3573.79
10	7.83	3587.62	9.5	7.5	3582.83	11.5	9.33	3578.68	13	11	3573.79
10	7.83	3587.62	9.5	7.5	3582.83	11.5	9.33	3578.68	11.5	9.33	3578.68
9.9	7.73	3587.72	9.5	7.5	3582.83	10.3	8.13	3579.88	10.6	8.6	3576.19
10	7.83	3587.62	9	7	3583.33	10.33	8.16	3579.85	10.42	8.42	3576.37
9.82	7.65	3587.8	9.25	7.25	3583.08	10.72	8.55	3579.46	11	9	3575.79
10	7.83	3587.62	9.64	7.64	3582.69	11.25	9.08	3578.93	11.62	9.62	3575.17
10	7.83	3587.62	10.42	8.42	3581.91	11.33	9.16	3578.85	12	10	3574.79
10	7.83	3587.62	9.7	7.7	3582.63	11.5	9.33	3578.68	12	10	3574.79
10	7.83	3587.62	9.7	7.7	3582.63	11.2	9.03	3578.98	12	10	3574.79
10	7.83	3587.62	10	8	3582.33	8	5.83	3582.18	12	10	3574.79
10	7.83	3587.62	10	8	3582.33	11.5	9.33	3578.68	12	10	3574.79
10	7.83	3587.62	10	8	3582.33	11.5	9.33	3578.68	13	11	3573.79
10	7.83	3587.62	10	8	3582.33	11.5	9.33	3578.68	12	10	3574.79
10	7.83	3587.62	10	8	3582.33	10	7.83	3580.18	10.6	8.6	3576.19
10	7.83	3587.62	10	8	3582.33	11	8.83	3579.18	10	8	3576.79
10	7.83	3587.62	10	8	3582.33	10.8	8.63	3579.38	10	8	3576.79
10	7.83	3587.62	10.1	8.1	3582.23	11	8.83	3579.18	10.4	8.4	3576.39
9.8	7.63	3587.82	10	8	3582.33	11.2	9.03	3578.98	11.5	9.5	3575.29