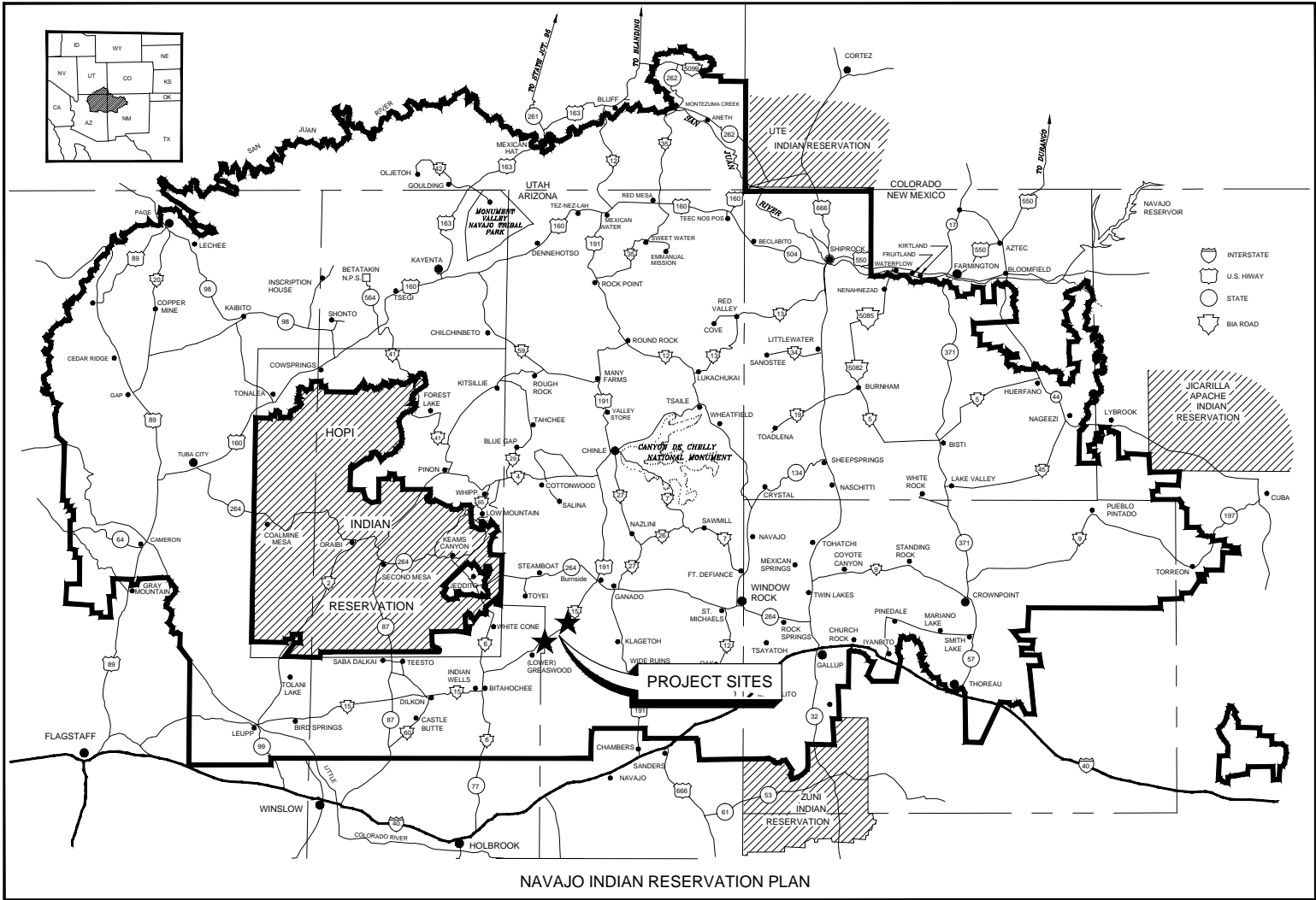




NAVAJO NATION
LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES
JUNE 2017



NAVAJO INDIAN RESERVATION PLAN

LOCATION MAP
NOT TO SCALE

Call at least two full working days
before you begin excavation.

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Arizona Blue Stake, Inc.

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In Maricopa County: (602) 263-1100



SALT LAKE CITY, UTAH

SUBMITTED:  DATE: 6/2/17
APPROVED:  DATE: 6/2/17

LINE IS 2 INCHES
AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)

SCALE: NONE

DESIGNED: MK
DRAWN: DD
CHECKED: MAF
APPROVED: MK

EXTERNAL REFERENCE FILES	

BID ISSUE



REVISIONS				
ZONE	REV.	DESCRIPTION	BY	DATE



LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES
GENERAL

COVER SHEET

FILENAME PIPE_G-001.dwg BC PROJECT NUMBER 143956
DRAWING NUMBER G-001
SHEET NUMBER 1 OF 36

Path: P:\Projects\Navajo Nation\143956_lowergreasewooddesign\CAD\contract No. 2 - Interconnection Pipelines\2-Sheets\General Filename: PIPE_G-002.dwg Plot Date: June 13, 2017 - 7:23 AM CADD User: David Davidse

DRAWING INDEX

SHEET NUMBER	DRAWING NUMBER	DESCRIPTION
GENERAL		
1	G-001	COVER SHEET
2	G-002	INDEX OF DRAWINGS AND VICINITY MAP
SURVEY		
3	V-001	RESULTS OF SURVEY LGW WATER SYSTEM IMPROVEMENT
CIVIL		
4	C-001	GENERAL CIVIL NOTES AND SYMBOLS
5	C-002	MISCELLANEOUS DETAILS
6	C-003	PIPE CONNECTION DETAILS - 1
7	C-004	PIPE CONNECTION DETAILS - 2
8	C-100	KEY PLAN
9	C-101	STA 0+00 TO STA 2+30 PLAN AND PROFILE
10	C-102	STA 1000+00 TO STA 1010+00 PLAN AND PROFILE
11	C-103	STA 1010+00 TO STA 1020+00 PLAN AND PROFILE
12	C-104	STA 1020+00 TO STA 1030+00 PLAN AND PROFILE
13	C-105	STA 1030+00 TO STA 1040+00 PLAN AND PROFILE
14	C-106	STA 1040+00 TO STA 1050+00 PLAN AND PROFILE
15	C-107	STA 1050+00 TO STA 1060+00 PLAN AND PROFILE
16	C-108	STA 1060+00 TO STA 1070+00 PLAN AND PROFILE
17	C-109	STA 1070+00 TO STA 1080+00 PLAN AND PROFILE
18	C-110	STA 2000+00 TO STA 2010+00 PLAN AND PROFILE
19	C-111	STA 2010+00 TO STA 2020+00 PLAN AND PROFILE
20	C-112	STA 2020+00 TO STA 2030+00 PLAN AND PROFILE
21	C-113	STA 2030+00 TO STA 2040+00 PLAN AND PROFILE
22	C-114	STA 2040+00 TO STA 2050+00 PLAN AND PROFILE
23	C-115	STA 2050+00 TO STA 2060+00 PLAN AND PROFILE
24	C-116	STA 2060+00 TO STA 2070+00 PLAN AND PROFILE
25	C-117	STA 2070+00 TO STA 2080+00 PLAN AND PROFILE
26	C-118	STA 2080+00 TO STA 2090+00 PLAN AND PROFILE
27	C-119	STA 2090+00 TO STA 2100+00 PLAN AND PROFILE
28	C-120	STA 2100+00 TO STA 2110+00 PLAN AND PROFILE
29	C-121	STA 2110+00 TO STA 2120+00 PLAN AND PROFILE
30	C-122	STA 2120+00 TO STA 2130+00 PLAN AND PROFILE
31	C-123	STA 2130+00 TO STA 2140+00 PLAN AND PROFILE
32	C-124	STA 3000+00 TO STA 3007+00 PLAN AND PROFILE
33	C-125	STA 3007+00 TO STA 3017+00 PLAN AND PROFILE
34	C-126	STA 3017+00 TO STA 3020+00 PLAN AND PROFILE
35	C-127	CORNFIELDS EAST TANK SITE PLAN
36	C-128	CORNFIELDS PRV SITE PLAN

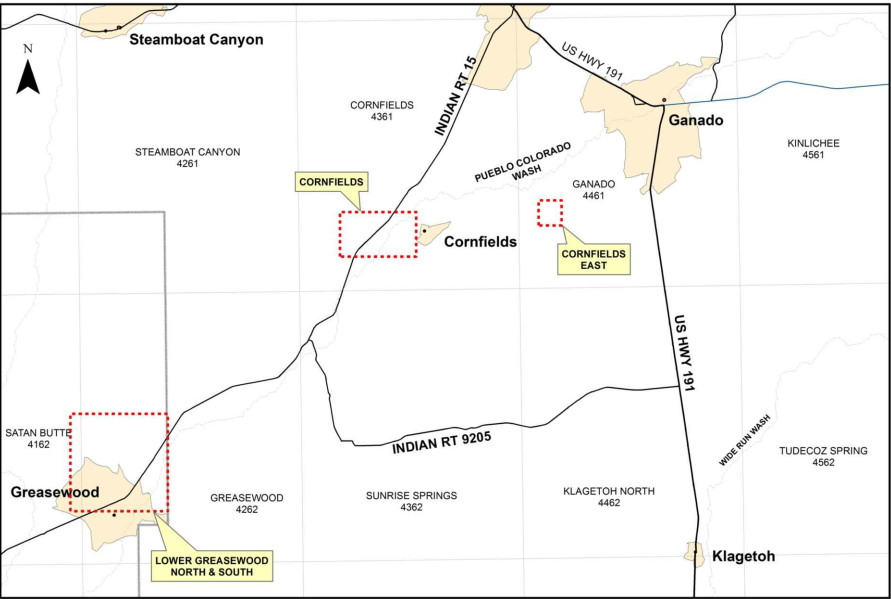
RECORD DRAWINGS (REFERENCE)
SHT NO 30

IHS STANDARD DETAILS (REFERENCE)

W-1
W-2
W-3
W-3A
W-4
W-4A
W-7
W-11
W-12
W-13
W-16
W-24
W-27
W-28
W-33
W-35
W-36
W-39
W-39
W-40

TANK SITE NO. 2 DETAILS (NOT A CONTRACT DOCUMENT)

FLUSH VALVE 2-INCH
AIR RELEASE VALVE
WATER SERVICE LINE 1" URBAN
WATER SERVICE LINE 1" URBAN
WATER SERVICE LINE 1" URBAN
WATER SERVICE LINE 1" URBAN
3/4" x 2" x 2" PRESSURE REDUCING VAULT
CONCRETE THRUST BLOCK
2" x 4" PRESSURE REDUCING VALVE
GAS/OIL LINE CROSSING
GATE VALVE INSTALLATION
INSTALLATION OF PVC PIPE IN CASING
TYPICAL TRENCH DETAIL
ALTITUDE VALVE VAULT
HDPE WASH CROSSING
ROAD CROSSINGS
MARKER POST DETAIL
SILT FENCE (DRAWING 1 OF 2)
SILT FENCE (DRAWING 2 OF 2)
STRAW BALES



VICINITY MAP

Call at least two full working days before you begin excavation.



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SALT LAKE CITY, UTAH

SUBMITTED:  DATE: 6/2/17
APPROVED:  DATE: 6/2/17

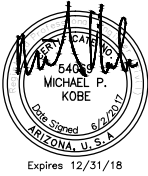
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AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)

SCALE: NONE

DESIGNED: MK
DRAWN: DD
CHECKED: MAF
APPROVED: MK

EXTERNAL REFERENCE FILES	

BID ISSUE



REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.



LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES
GENERAL

INDEX OF DRAWINGS AND VICINITY MAP

FILENAME PIPE_G-002.dwg BC PROJECT NUMBER 143956
DRAWING NUMBER G-002
SHEET NUMBER 2 OF 36

RESULTS OF SURVEY
LOWER GREASEWOOD WATER SYSTEM IMPROVEMENT
9.68 ± ACRE
LOCATED IN SECTIONS 24 & 25, T. 25 N., R. 23 E., G.&S.R.M.
AND SECTIONS 18 & 19, T. 25 N., R. 24 E., G.&S.R.M.
DISTRICT 17, NAVAJO NATION
GREASEWOOD, NAVAJO COUNTY, ARIZONA

LEGAL DESCRIPTION:

A STRIP OF LAND 30 FEET WIDE SITUATED WITHIN SECTION 24 & 25, TOWNSHIP 25 NORTH, RANGE 23 EAST, GILA & SALT RIVER MERIDIAN, AND WITHIN SECTIONS 18 & 19, TOWNSHIP 25 NORTH, RANGE 24 EAST, G.&S.R.M., DISTRICT 17, NAVAJO NATION, IN GREASEWOOD, NAVAJO COUNTY, STATE OF ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE WEST QUARTER CORNER OF SECTION 18 MARKED BY B.L.M. BRASS CAP, FROM WHICH THE SOUTHWEST CORNER OF SAID SECTION 18 LIES S 00°00'12" E, A DISTANCE OF 2640.08 FEET (BASIS OF BEARINGS, ARIZONA STATE PLANE EAST ZONE GRID BEARING)(NORTH, 2640.00 FEET PER B.L.M. SURVEY PLAT 1114-2, DATED NOVEMBER 12, 2004, R2); THENCE S 86°44'43" E, A DISTANCE OF 2506.56 FEET TO THE POINT OF BEGINNING OF THE HEREIN DESCRIBED CENTERLINE;
THENCE S 33°10'52" W, A DISTANCE OF 2715.31 FEET;
THENCE S 33°11'08" W, A DISTANCE OF 1646.34 FEET;
THENCE S 33°11'00" W, A DISTANCE OF 1696.51 FEET;
THENCE S 33°11'05" W, A DISTANCE OF 2655.54 FEET;
THENCE S 33°11'05" W, A DISTANCE OF 372.40 FEET;
THENCE S 35°01'34" W, A DISTANCE OF 366.17 FEET;
THENCE S 35°01'34" W, A DISTANCE OF 826.25 FEET;
THENCE S 35°01'09" W, A DISTANCE OF 1610.34 FEET;
THENCE S 63°11'36" E, A DISTANCE OF 1976.23 FEET;
THENCE S 30°38'51" E, A DISTANCE OF 94.69 FEET;
THENCE S 58°40'17" W, A DISTANCE OF 56.12 FEET;
THENCE S 30°38'47" E, A DISTANCE OF 35.83 FEET TO THE POINT OF TERMINUS OF SAID CENTERLINE.

THE SIDE LINES OF SAID 30 FOOT WIDE EASEMENT LYING 15 FEET ON EACH SIDE OF CENTERLINE TO BE EXTENDED OR SHORTENED TO MEET AT ANGLE POINTS AND TO TERMINATE AT THE CENTERLINE OF EXISTING WATER LINE.

SAID PARCEL BEING 9.68 ACRES MORE OR LESS AND BEING SUBJECT TO ANY AND ALL EXISTING EASEMENTS FOR UTILITIES LOCATED THEREIN.

EXHIBIT "A"

LEGEND:

- - FOUND 3" BRASS CAP, B.L.M. SECTION CORNER
- - FOUND 3" BRASS CAP, B.L.M. 1/4 CORNER
- ▲ - FOUND 3" BRASS CAP, B.L.M. REFERENCE MARKER
- ⊙ - FOUND 3" BRASS CAP, B.I.A RIGHT-OF-WAY
- - CALCULATED POINT, NOTHING FOUND OR SET

REFERENCES:

- (R1) BUREAU OF LAND MANAGEMENT SURVEY PLAT 1114-1, DATED MARCH 30, 2004.
- (R2) BUREAU OF LAND MANAGEMENT SURVEY PLAT 1114-2, DATED NOVEMBER 12, 2004.
- (R3) CONSTRUCTION PLANS, N15(3)2&4 SUNRISE SPRINGS TO GREASEWOOD, BUREAU OF INDIAN AFFAIRS, DIVISION OF TRANSPORTATION, DATED SEPTEMBER 22, 1964.
- (R4) STATE PLANE COORDINATES PER NATIONAL GEODETIC SURVEY, O.P.U.S. PROCESSED GPS DATA.

BASIS OF BEARINGS:

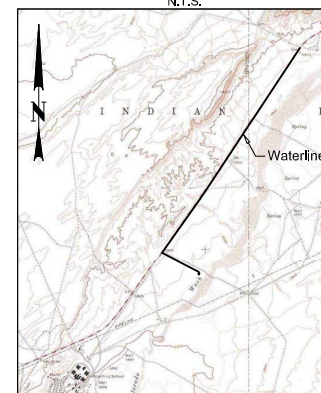
THE WEST SECTION LINE OF SECTION 18, T. 25 N., R. 24 E., WITH ARIZONA STATE PLANE COORDINATE EAST ZONE GRID BEARING OF S 00°12'00" E AND A B.L.M. BEARING OF NORTH PER B.L.M. PLAT 1114-2.

CERTIFICATION:

THIS IS TO CERTIFY THAT THE SURVEY DESCRIBED AND PLATTED HEREON WAS MADE UNDER MY DIRECTION DURING THE MONTHS OF MARCH & APRIL OF 2013 AND JANUARY OF 2014; THAT THE SURVEY IS TRUE AND COMPLETE AS SHOWN; THAT MONUMENTS SHOWN ACTUALLY EXIST OR WILL BE SET AS SHOWN; THAT THEIR POSITIONS ARE CORRECTLY SHOWN; AND THAT SAID MONUMENTS ARE SUFFICIENT TO ENABLE THE SURVEY TO BE RETRACED.

Halbert O. Goldtooth
HALBERT O. GOLDTOOTH, AZ RLS 42048

VICINITY MAP
N.T.S.



DRAWING NUMBER
V-001

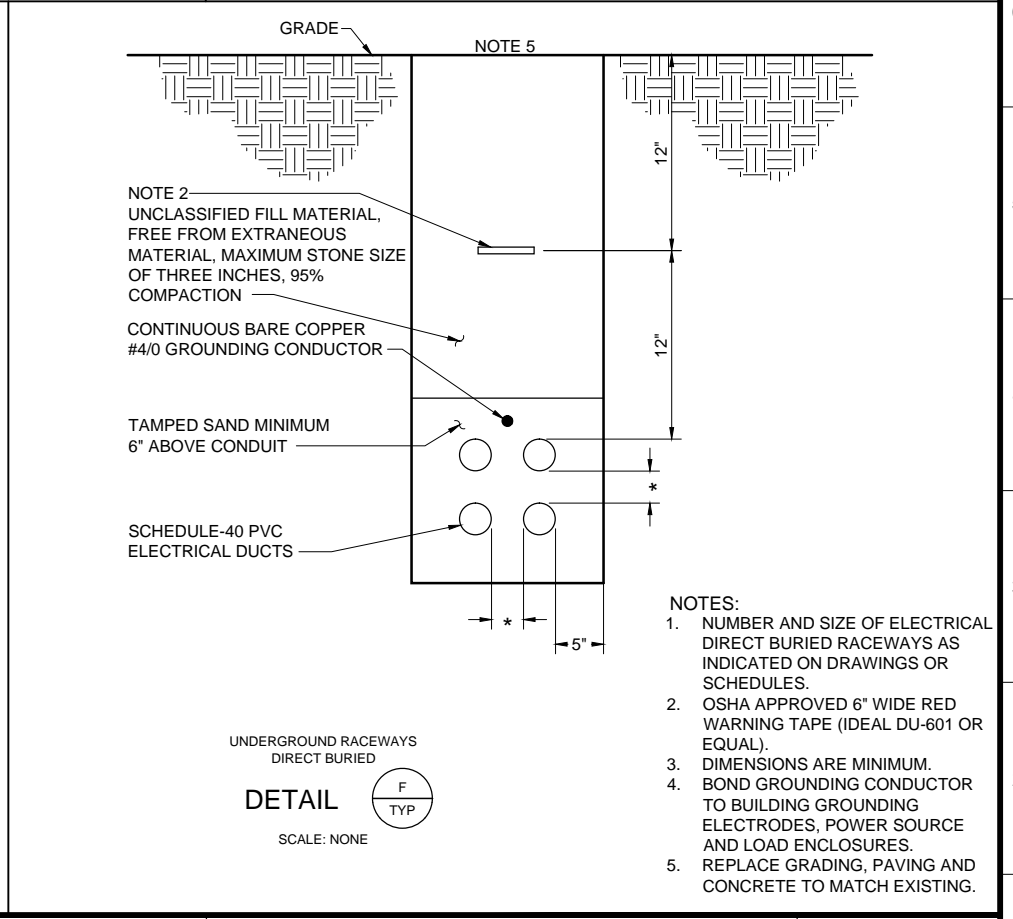
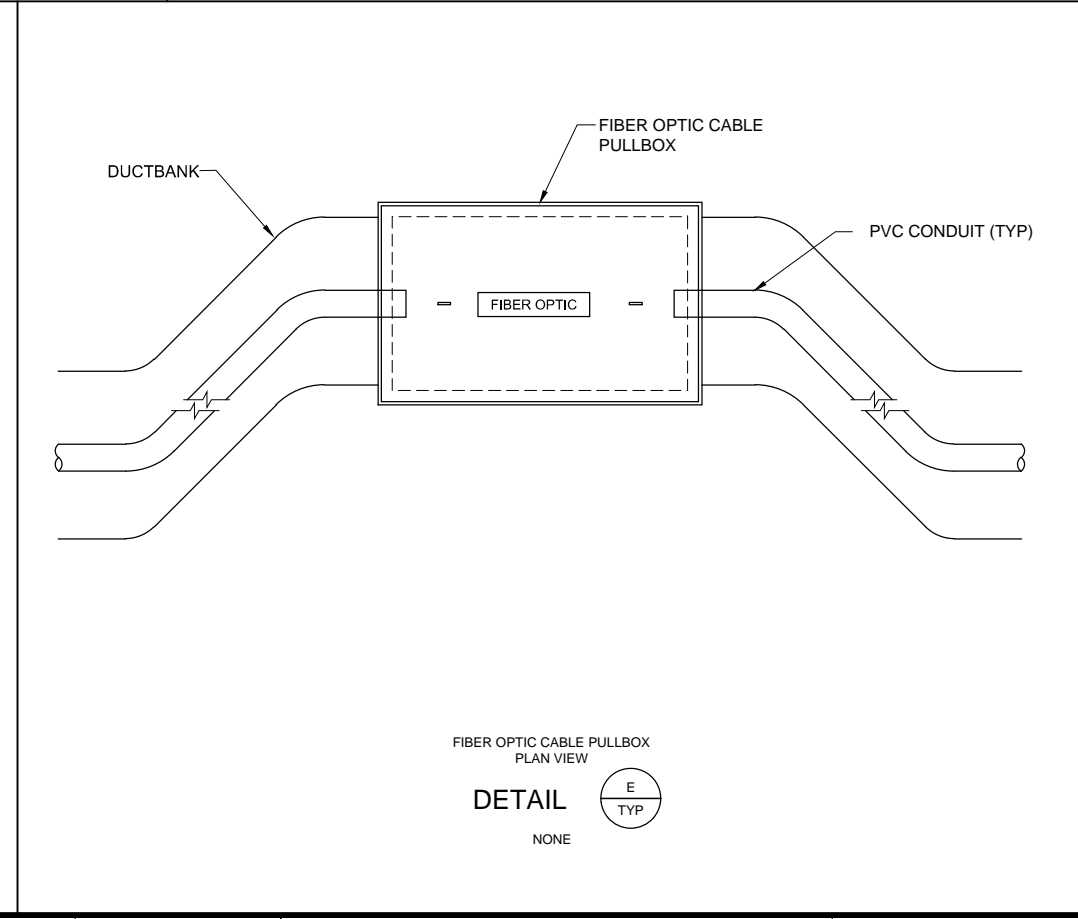
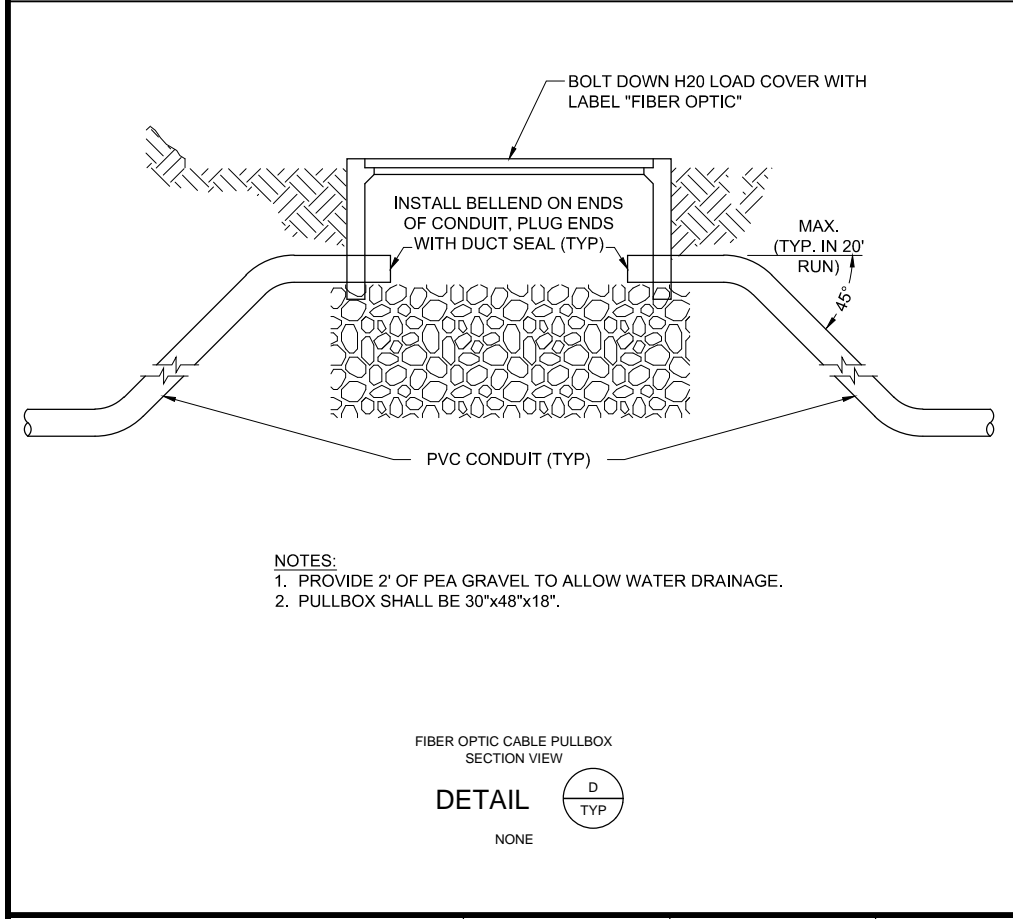
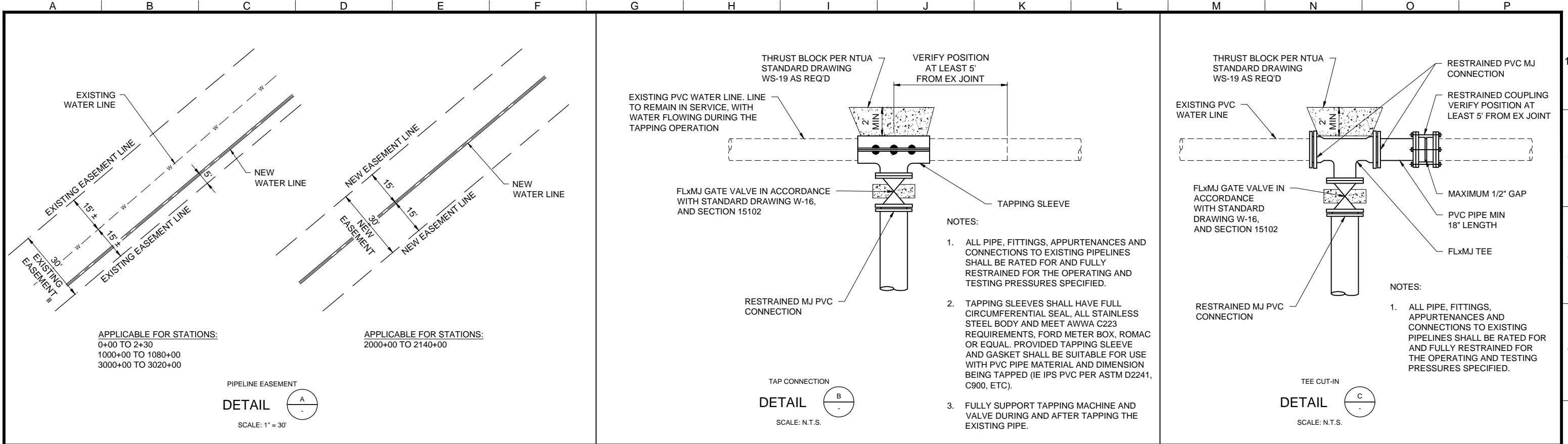
GOLDTOOTH PRECISION SOLUTIONS, INC.

P.O. BOX 640 TUBA CITY, AZ 86045 Ph: (928)283-4652 Fax: (928)283-5073

Job No.: 1311
Surveyed: March & April 2013 and
January 1, 2014
File: 1311 Lower Greasewood ROW.dwg
Drawn by: H.Goldtooth
Checked by: H.Goldtooth
Revised: n/a
Scale: 1" = 600'
Sheet: 1 of 1



Halbert O. Goldtooth
Halbert O. Goldtooth, AZ RLS 42048



Brown and Caldwell
SALT LAKE CITY, UTAH

SUBMITTED: DATE: 6/2/17
APPROVED: DATE: 6/2/17

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)
SCALE: NONE
DESIGNED: MK
DRAWN: DD
CHECKED: TR
APPROVED: MK

EXTERNAL REFERENCE FILES

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REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.

LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES
CIVIL

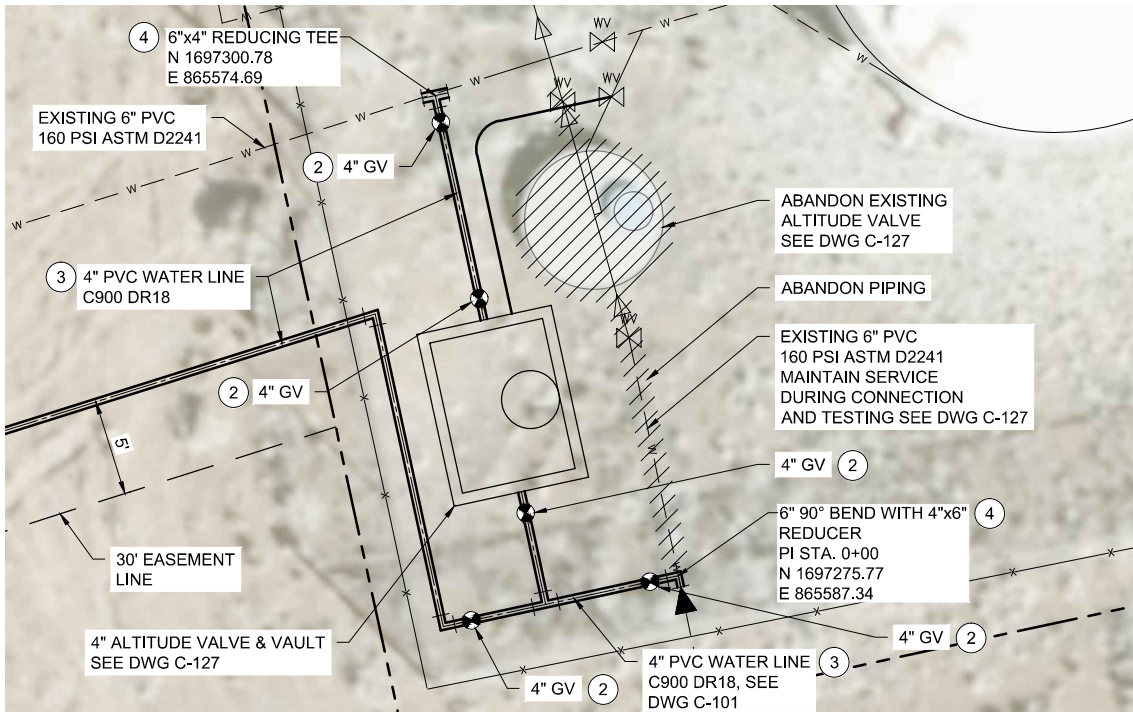
MISCELLANEOUS DETAILS

FILENAME
PIPE_C-002.dwg
BC PROJECT NUMBER
143956

DRAWING NUMBER
C-002

SHEET NUMBER
5 OF 36

Path: P:\Projects\Navajo Nation\143956_Lowergreasewooddesign\CAD\Contract No. 2 - Interconnection Pipelines\2-Sheets\Civil File: PIPE_C-003.dwg Plot Date: June 13, 2017 - 7:24 AM CADD User: David Davids



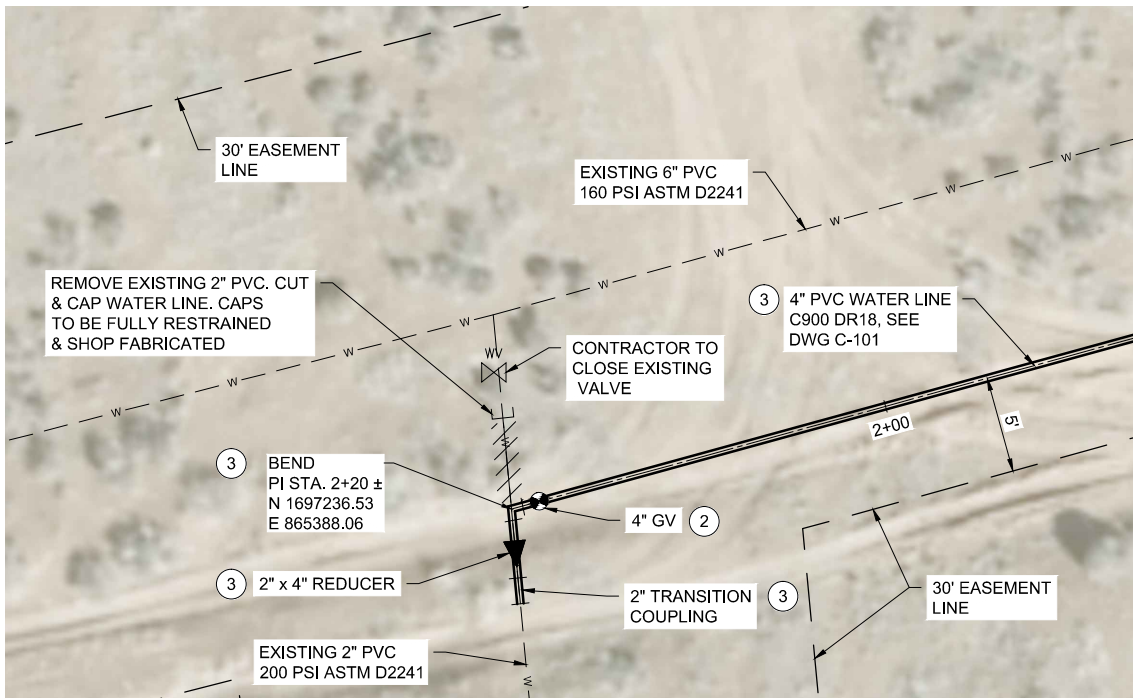
DETAIL A

SCALE: 1" = 5'



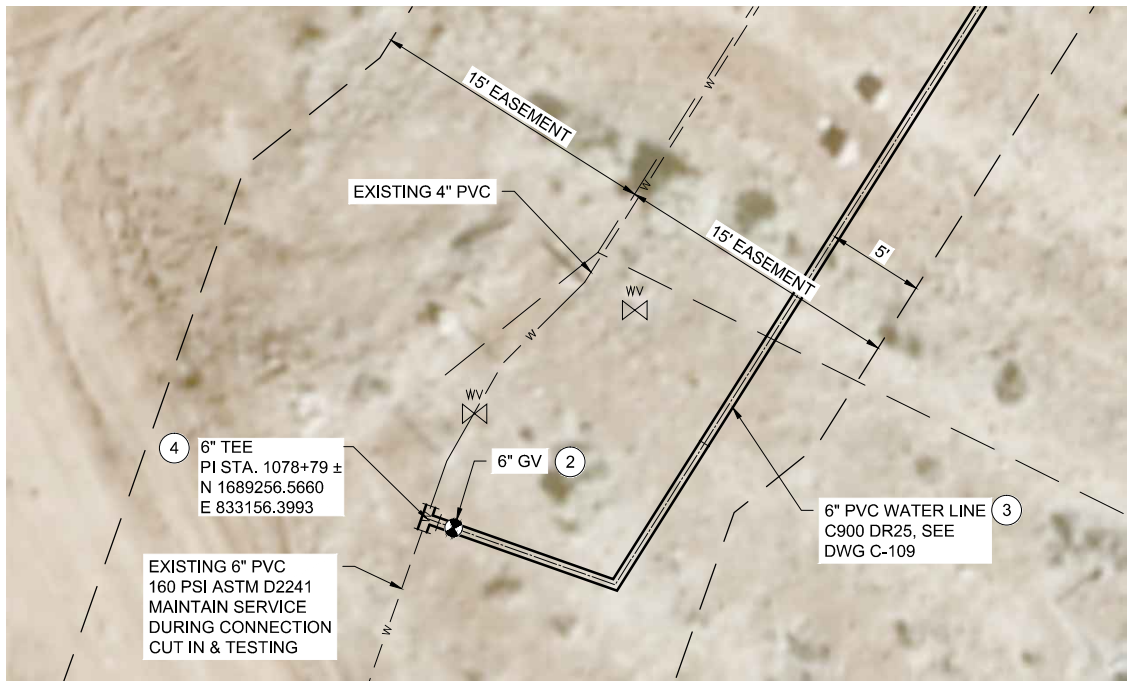
DETAIL C

SCALE: 1" = 5'



DETAIL B

SCALE: 1" = 5'



DETAIL D

SCALE: 1" = 5'

GENERAL NOTES:

1. THE CONTRACTOR SHALL VERIFY THE LOCATION, ELEVATION, MATERIAL, DIMENSIONS AND CONDITION OF EXISTING WATER LINES PRIOR TO ORDERING PIPE, FITTINGS AND APPURTENANCES.

KEY NOTES:

1. CONSTRUCT CONNECTION TO EXISTING WATER LINE PER DETAIL B/C-002.
2. CONTRACTOR TO INSTALL GATE VALVE PER NTUA STANDARD DRAWING WS-14 AND SECTION 15102.
3. CONTRACTOR TO PROVIDE THRUST RESTRAINT PER SECTION 15064.
4. INSTALL TEE PER DETAIL C/C-002.

Call at least two full working days before you begin excavation.

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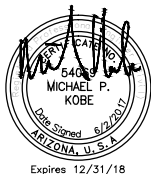
SALT LAKE CITY, UTAH

SUBMITTED: *[Signature]* DATE: 6/2/17
APPROVED: *[Signature]* DATE: 6/2/17

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)
SCALE: 1" = 5'
DESIGNED: MK
DRAWN: DD
CHECKED: TR
APPROVED: MK

EXTERNAL REFERENCE FILES

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REVISIONS				
ZONE	REV.	DESCRIPTION	BY	DATE

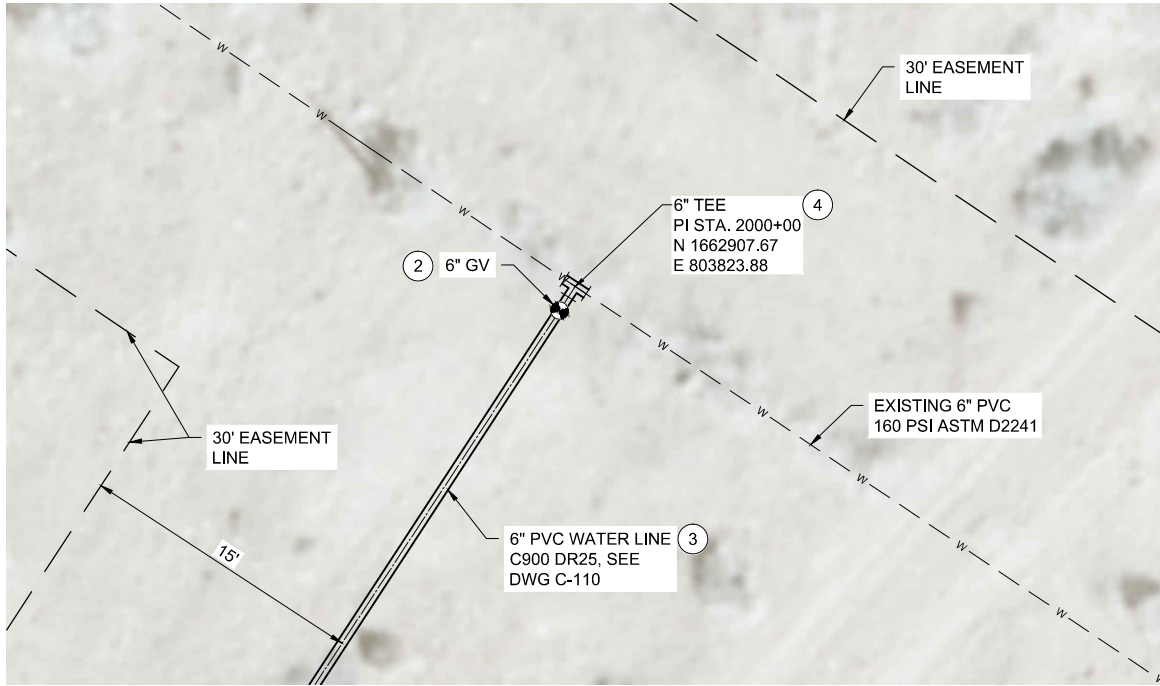


LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES
CIVIL

PIPE CONNECTION DETAILS - 1

FILENAME: PIPE_C-003.dwg
BC PROJECT NUMBER: 143956
DRAWING NUMBER: C-003
SHEET NUMBER: 6 OF 36

Path: P:\Projects\Navajo Nation\143956_lowergreasewooddesign\CAD\contract No. 2 - Interconnection Pipelines\2-Sheets\Civil File name: PIPE_C-004.dwg Plot Date: June 13, 2017 - 7:24 AM CADD User: David Davids

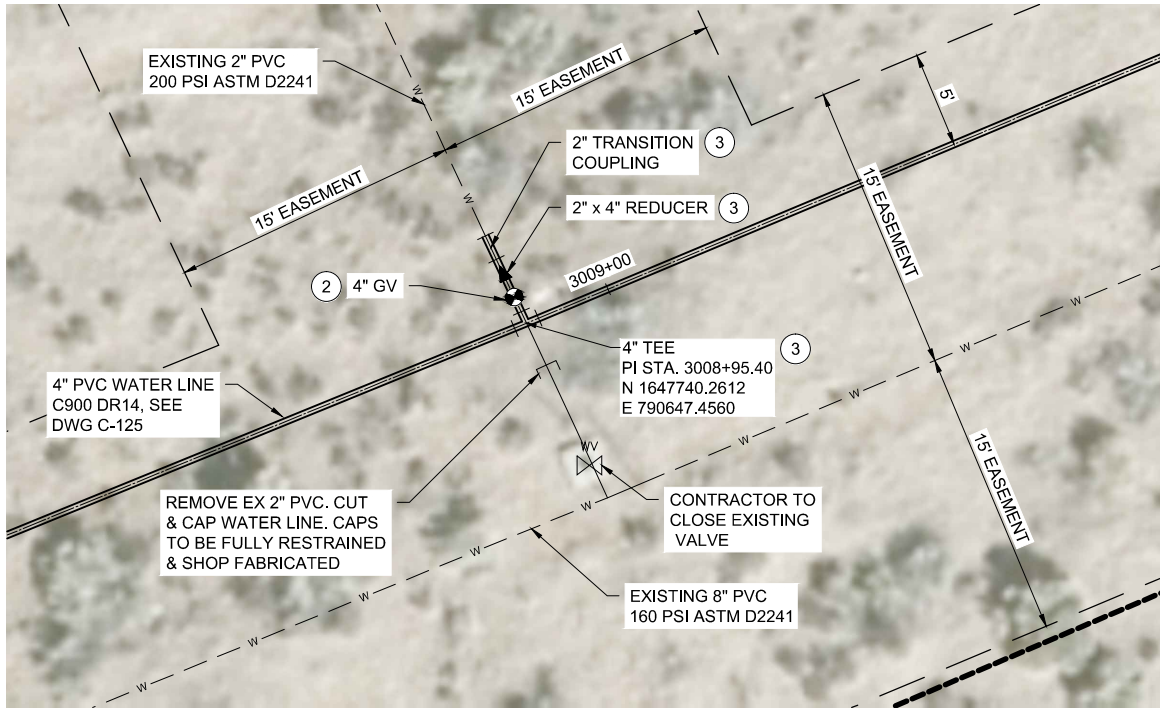


GREASEWOOD (NORTH)
PIPE ALIGNMENT
PIPE CONNECTION

DETAIL A



SCALE: 1" = 5'



GREASEWOOD (SOUTH)
PIPE ALIGNMENT
PIPE CONNECTION

DETAIL C



SCALE: 1" = 5'

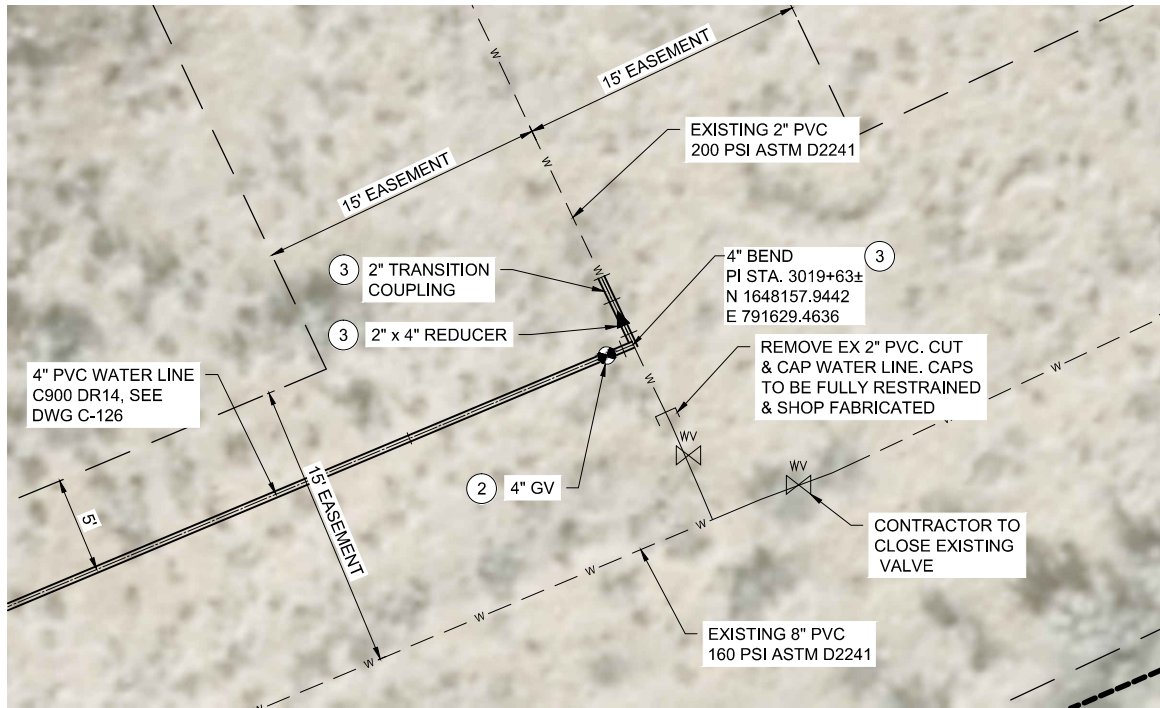


GREASEWOOD (SOUTH)
PIPE ALIGNMENT
PIPE CONNECTION

DETAIL B



SCALE: 1" = 5'



GREASEWOOD (SOUTH)
PIPE ALIGNMENT
PIPE CONNECTION

DETAIL D



SCALE: 1" = 5'

GENERAL NOTES:

1. THE CONTRACTOR SHALL VERIFY THE LOCATION, ELEVATION, MATERIAL, DIMENSIONS AND CONDITION OF EXISTING WATERLINES PRIOR TO ORDERING PIPE, FITTINGS AND APPURTENANCES.

KEY NOTES:

1. CONSTRUCT CONNECTION TO EXISTING WATER LINE PER DETAIL B/C-002.
2. CONTRACTOR TO INSTALL GATE VALVE PER NTUA STANDARD DRAWING WS-14 AND SECTION 15102.
3. CONTRACTOR TO PROVIDE THRUST RESTRAINT PER SECTION 15064.
4. INSTALL TEE PER DETAIL C/C-002.

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LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)
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DRAWN: DD
CHECKED: TR
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EXTERNAL REFERENCE FILES	

BID ISSUE



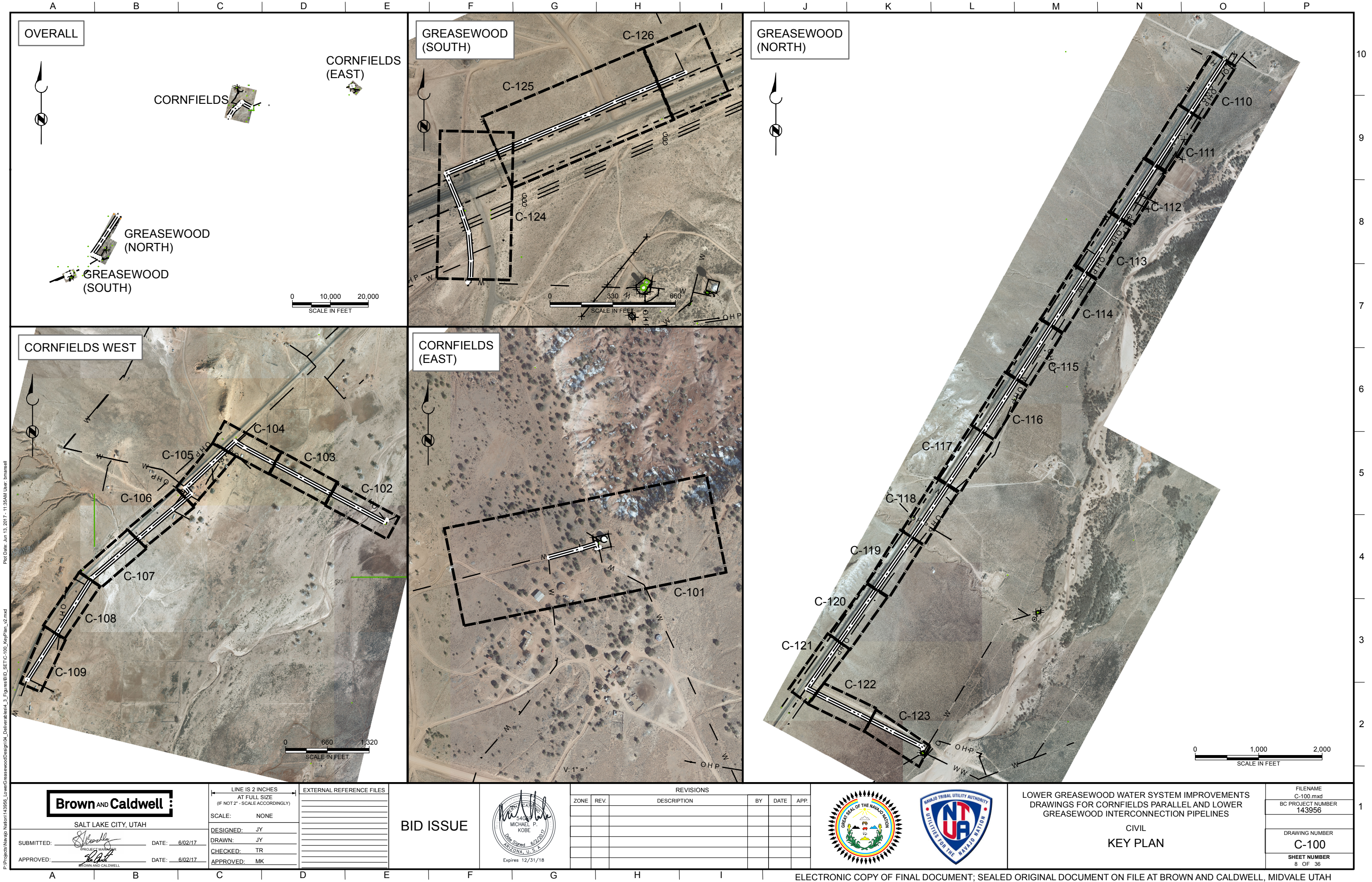
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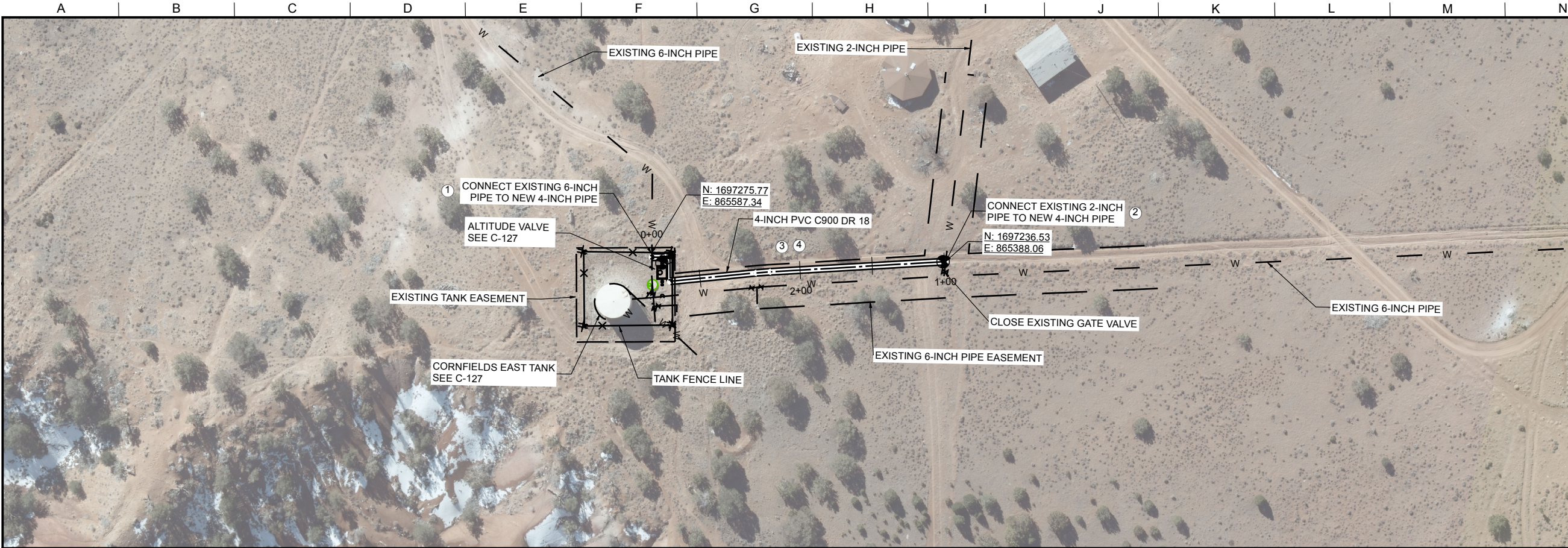
LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES
CIVIL

PIPE CONNECTION DETAILS - 2

FILENAME PIPE_C-004.dwg BC PROJECT NUMBER 143956
DRAWING NUMBER C-004
SHEET NUMBER 7 OF 36

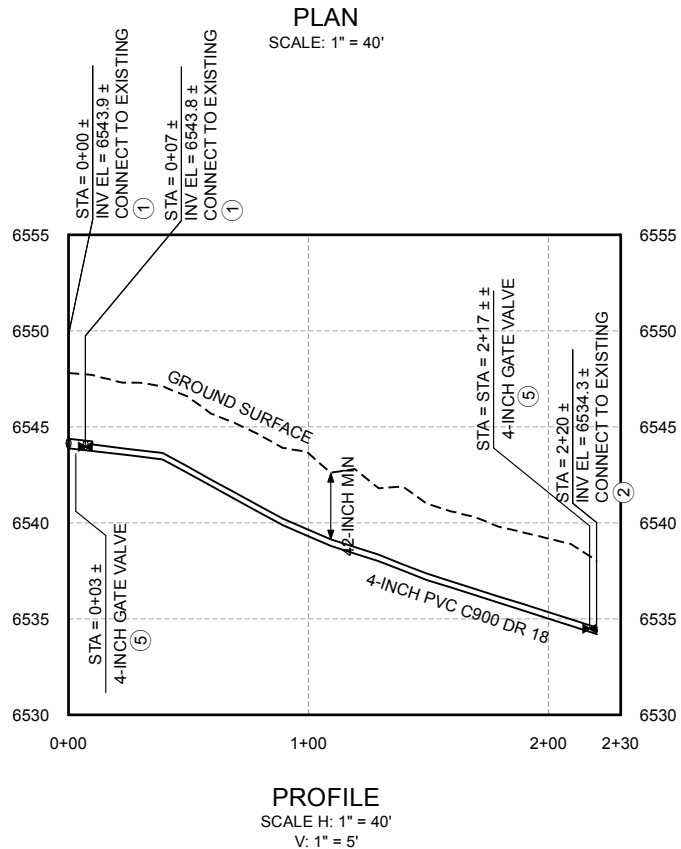


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- GENERAL NOTES:
1. ALL LOCATIONS OF UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY AND POTHOLE AS REQUIRED TO COMPLETE THE WORK.
 2. CONTRACTOR TO FIELD VERIFY PHYSICAL LOCATION, ELEVATIONS AND INVERTS. ELEVATIONS ARE BASED ON A LOCAL COORDINATE SYSTEM MODIFIED FROM NAVD 83 INTERNATIONAL FEET.
 3. CONTRACTOR TO PROVIDE THRUST BLOCKS AT ALL ELBOWS, TEES, CROSSES PER NTUA STANDARD DRAWING WS-19,
 4. CONTRACTOR TO INSTALL PIPE IN TRENCH PER NTUA STANDARD DRAWING WS-15.
 5. CONTRACTOR TO INSTALL MARKER POSTS PER NTUA STANDARD DRAWING WS-13.
 6. EASEMENT DIMENSIONS AND PIPELINE OFFSETS ARE SHOWN IN DETAIL A ON SHEET C-002.
 7. CONTRACTOR WILL POTHOLE 300 FEET AHEAD OF EXISTING WATER LINE TO VERIFY LOCATION.
 8. DEFLECT PIPE AT JOINTS AS NECESSARY.

- KEY NOTES:
- 1 SEE CONNECTION DETAIL A/C-003.
 - 2 SEE CONNECTION DETAIL B/C-003.
 - 3 LOCATE PIPELINE IN EASEMENT PER DETAIL A/C-002 (TYP).
 - 4 CONTRACTOR SHALL PROVIDE WATER BARS PER SECTION 02200.
 - 5 SEE NTUA STD DWG WS-14.



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SUBMITTED:  DATE: 6/02/17

APPROVED:  DATE: 6/02/17

LINE IS 2 INCHES
AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)

SCALE: NONE

DESIGNED: JY
DRAWN: JY
CHECKED: TR
APPROVED: MK

EXTERNAL REFERENCE FILES

BID ISSUE



REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.



LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

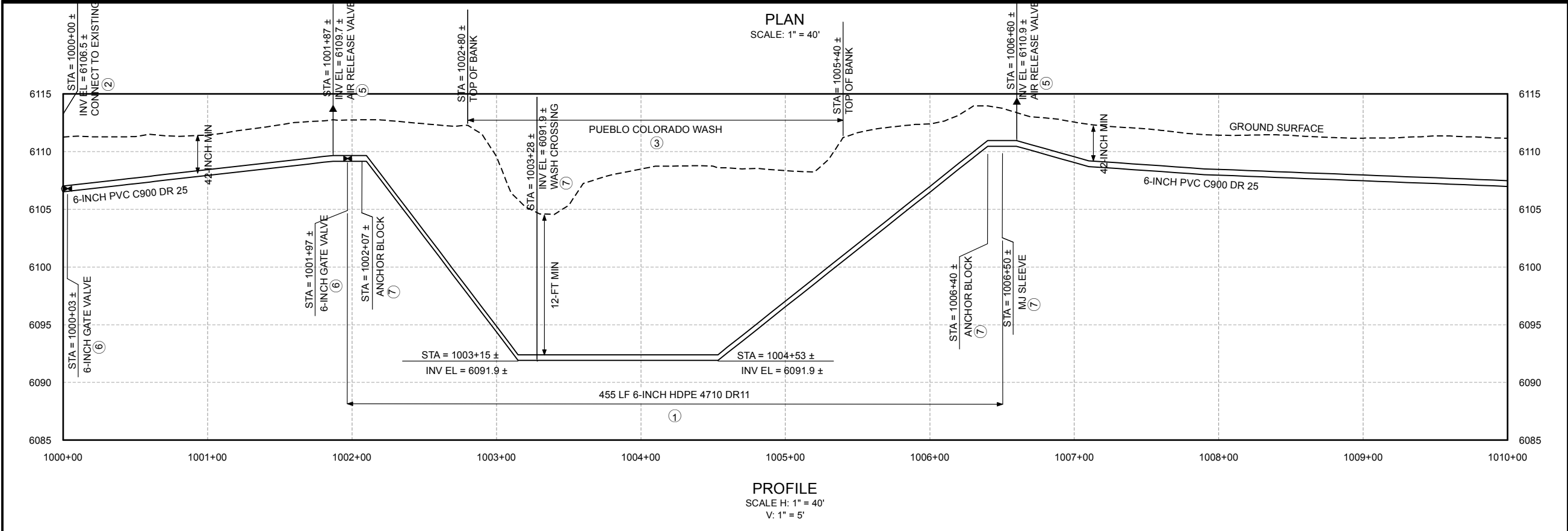
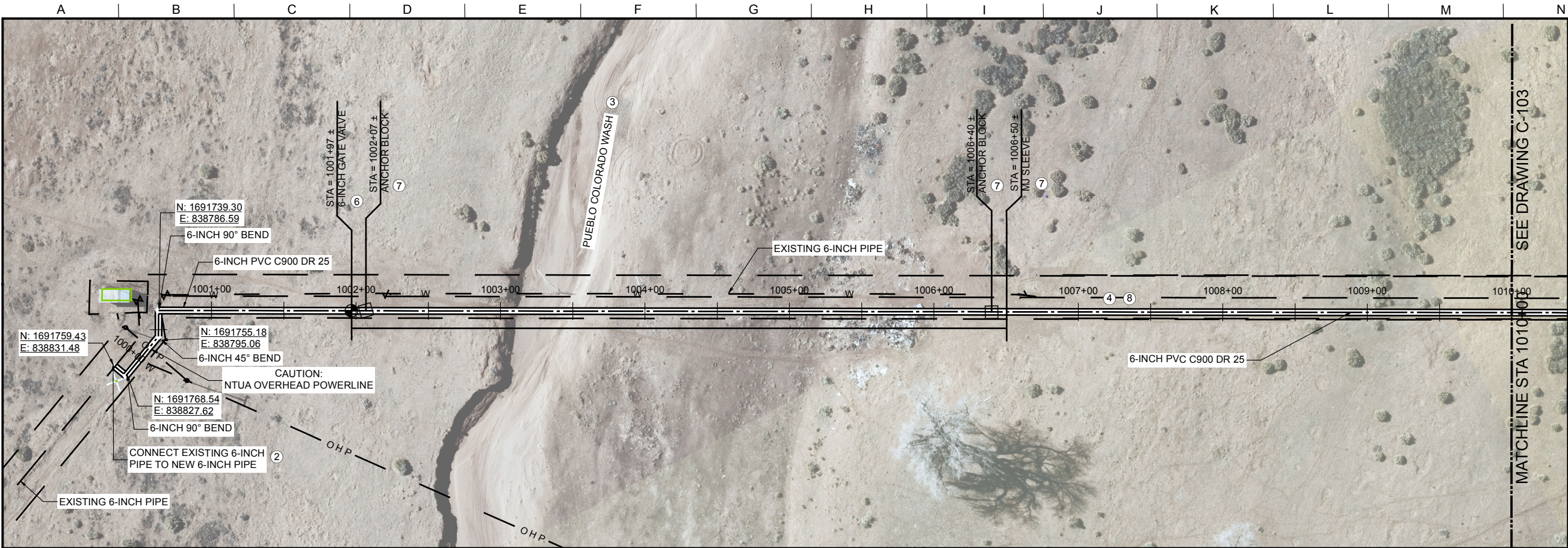
CIVIL
STA 0+00 TO STA 2+30
PLAN AND PROFILE

FILENAME
C-101.mxd
BC PROJECT NUMBER
143956

DRAWING NUMBER
C-101

SHEET NUMBER
9 OF 36

P:\Projects\Navajo Nation\143956_LowerGreasewoodDesign\04_Deliverables\4_3_Figures\BID_SET\C-101_v6.mxd Plot Date: Jun 13, 2017 - 10:53AM User: jyzazie



- GENERAL NOTES:
1. ALL LOCATIONS OF UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY AND POTHOLE AS REQUIRED TO COMPLETE THE WORK.
 2. CONTRACTOR TO FIELD VERIFY PHYSICAL LOCATION, ELEVATIONS AND INVERTS. ELEVATIONS ARE BASED ON A LOCAL COORDINATE SYSTEM MODIFIED FROM NAVD 83 INTERNATIONAL FEET.
 3. CONTRACTOR TO PROVIDE THRUST BLOCKS AT ALL ELBOWS, TEES, CROSSES PER NTUA STANDARD DRAWING WS-19,
 4. CONTRACTOR TO INSTALL PIPE IN TRENCH PER NTUA STANDARD DRAWING WS-15.
 5. CONTRACTOR TO INSTALL MARKER POSTS PER NTUA STANDARD DRAWING WS-13.
 6. EASEMENT DIMENSIONS AND PIPELINE OFFSETS ARE SHOWN IN DETAIL A ON SHEET C-002.
 7. CONTRACTOR WILL POTHOLE 300 FEET AHEAD OF EXISTING WATER LINE TO VERIFY LOCATION.
 8. DEFLECT PIPE AT JOINTS AS NECESSARY.

- KEY NOTES:
1. CONTRACTOR TO INSTALL HDPE PIPELINE PER IHS STANDARD DRAWING W-33, UNLESS OTHERWISE SPECIFIED.
- CAUTION TO CONTRACTOR: CONTRACTOR SHALL BE RESPONSIBLE FOR HDD MEANS AND METHODS INCLUDING BUT NOT LIMITED TO SELECTION OF HDD EQUIPMENT, DRILLING MUD, SPOILS REMOVAL, ALIGNMENT CONTROL AND BORE PATH SUBJECT TO REVIEW BY THE ENGINEER.
- CONTRACTOR SHALL BE RESPONSIBLE TO CONDUCT ALL SUBSURFACE GEOTECHNICAL INVESTIGATION NECESSARY TO PERFORM THE WORK. NO GEOTECHNICAL INVESTIGATION HAS BEEN PERFORMED ON THE ALIGNMENT.
2. SEE CONNECTION DETAIL C/C-003.
 3. 401 CERTIFICATION REQUIRED FOR WASH CROSSING. SEE SECTION 02160.
 4. LOCATE PIPELINE IN EASEMENT PER DETAIL A/C-002 (TYP).
 5. SEE NTUA STD DWG WS-10.
 6. SEE NTUA STD DWG WS-14.
 7. SEE IHS STD DWG W-33.
 8. CONTRACTOR SHALL PROVIDE WATER BARS PER SECTION 02200.

Call at least two full working days before you begin excavation.

ARIZONA 811

Arizona Blue Stake, Inc.

Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602) 263-1100

Brown and Caldwell

SALT LAKE CITY, UTAH

SUBMITTED: *[Signature]* DATE: 6/02/17

APPROVED: *[Signature]* DATE: 6/02/17

LINE IS 2 INCHES
AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)

SCALE: NONE

DESIGNED: JY

DRAWN: JY

CHECKED: TR

APPROVED: MK

EXTERNAL REFERENCE FILES

BID ISSUE



REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.



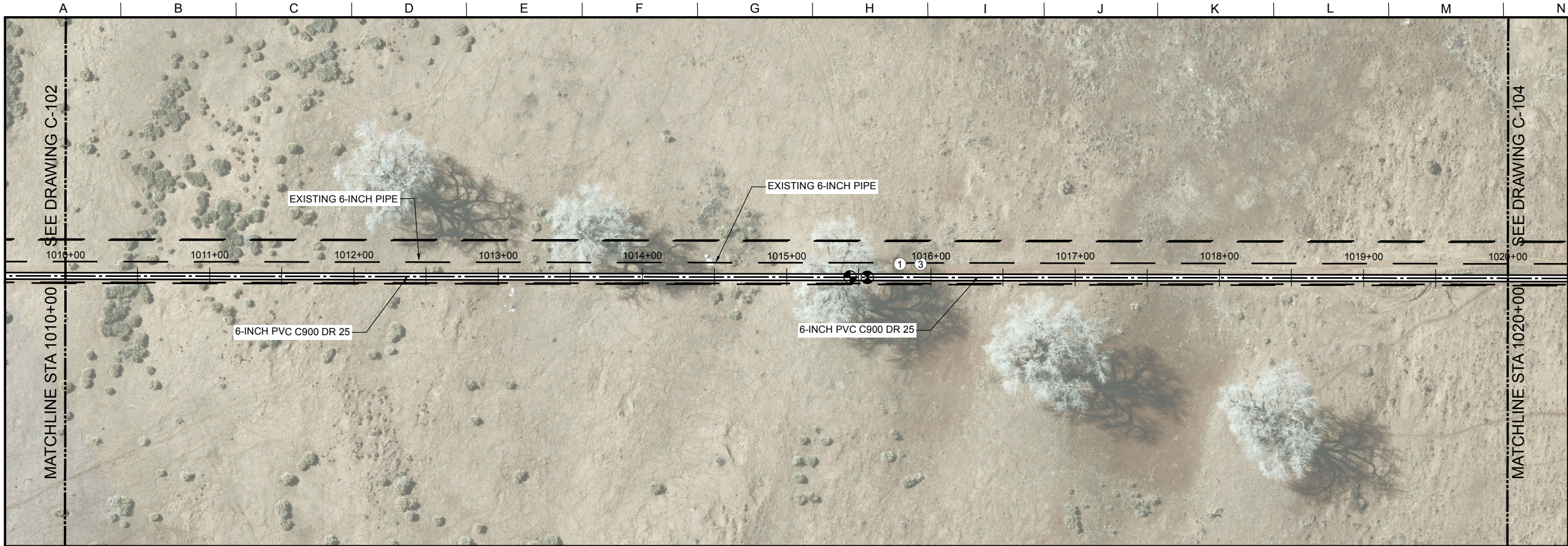
LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

CIVIL

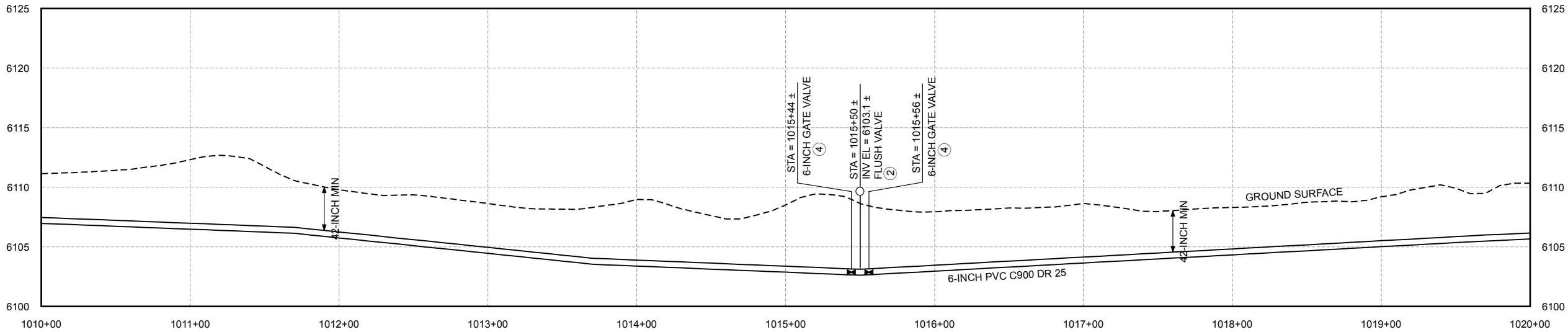
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PLAN AND PROFILE

FILENAME C-101.mxd
BC PROJECT NUMBER 143956
DRAWING NUMBER C-102
SHEET NUMBER 10 OF 36

P:\Projects\Navajo Nation\143956_LowerGreasewoodDesign\04_Deliverables\4_3_Figures\BID_SET\TC-101_v6.mxd Plot Date: Jun 13, 2017 - 10:53AM User: jyzazle



PLAN
SCALE: 1" = 40'



PROFILE
SCALE H: 1" = 40'
V: 1" = 5'

GENERAL NOTES:

1. ALL LOCATIONS OF UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY AND POTHOLE AS REQUIRED TO COMPLETE THE WORK.
2. CONTRACTOR TO FIELD VERIFY PHYSICAL LOCATION, ELEVATIONS AND INVERTS. ELEVATIONS ARE BASED ON A LOCAL COORDINATE SYSTEM MODIFIED FROM NAVD 83 INTERNATIONAL FEET.
3. CONTRACTOR TO PROVIDE THRUST BLOCKS AT ALL ELBOWS, TEES, CROSSES PER NTUA STANDARD DRAWING WS-19,
4. CONTRACTOR TO INSTALL PIPE IN TRENCH PER NTUA STANDARD DRAWING WS-15.
5. CONTRACTOR TO INSTALL MARKER POSTS PER NTUA STANDARD DRAWING WS-13.
6. EASEMENT DIMENSIONS AND PIPELINE OFFSETS ARE SHOWN IN DETAIL A ON SHEET C-002.
7. CONTRACTOR WILL POTHOLE 300 FEET AHEAD OF EXISTING WATER LINE TO VERIFY LOCATION.
8. DEFLECT PIPE AT JOINTS AS NECESSARY.

KEY NOTES:

1. LOCATE PIPELINE IN EASEMENT PER DETAIL A/C-002 (TYP).
2. SEE NTUA STD DWG WS-11.
3. CONTRACTOR SHALL PROVIDE WATER BARS PER SECTION 02200.

Call at least two full working days
before you begin excavation.

ARIZONA 811
Arizona Blue Stake, Inc.

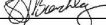
Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602) 263-1100




0 40 80
SCALE IN FEET

Brown and Caldwell

SALT LAKE CITY, UTAH

SUBMITTED:  DATE: 6/02/17

APPROVED:  DATE: 6/02/17

LINE IS 2 INCHES
AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)

SCALE: NONE

DESIGNED: JY

DRAWN: JY

CHECKED: TR

APPROVED: MK

EXTERNAL REFERENCE FILES

BID ISSUE



REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.



LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

CIVIL

STA 1010+00 TO STA 1020+00

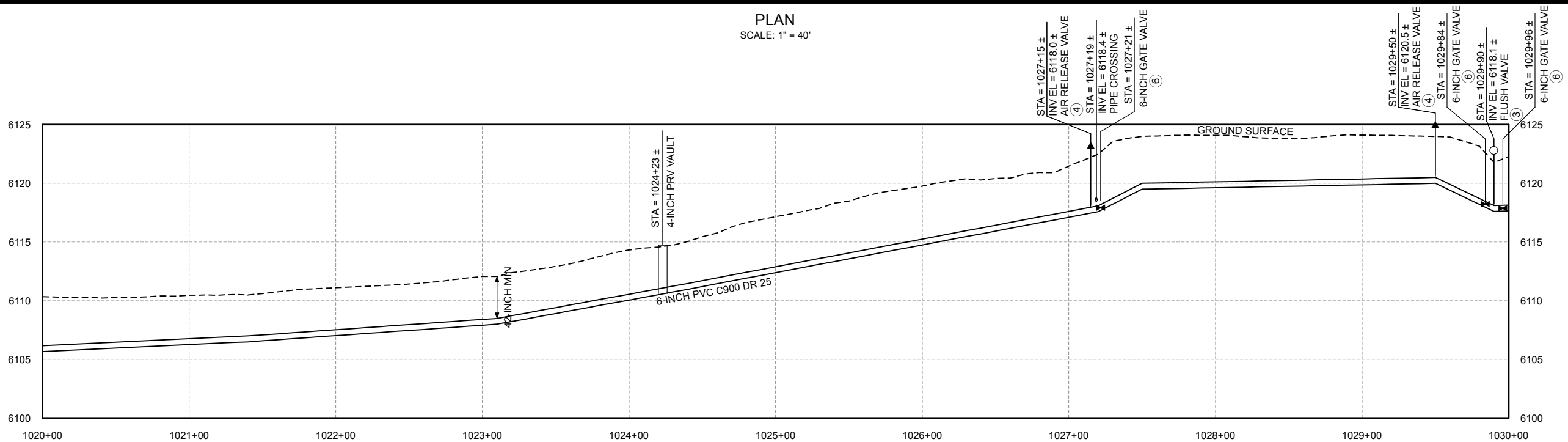
PLAN AND PROFILE

FILENAME C-101.mxd
BC PROJECT NUMBER 143956
DRAWING NUMBER C-103
SHEET NUMBER 11 OF 36

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PLAN
SCALE: 1" = 40'



PROFILE
SCALE H: 1" = 40'
V: 1" = 5'

- GENERAL NOTES:
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 - CONTRACTOR TO PROVIDE THRUST BLOCKS AT ALL ELBOWS, TEES, CROSSES PER NTUA STANDARD DRAWING WS-19,
 - CONTRACTOR TO INSTALL PIPE IN TRENCH PER NTUA STANDARD DRAWING WS-15.
 - CONTRACTOR TO INSTALL MARKER POSTS PER NTUA STANDARD DRAWING WS-13.
 - EASEMENT DIMENSIONS AND PIPELINE OFFSETS ARE SHOWN IN DETAIL A ON SHEET C-002.
 - CONTRACTOR WILL POT HOLE 300 FEET AHEAD OF EXISTING WATER LINE TO VERIFY LOCATION.
 - DEFLECT PIPE AT JOINTS AS NECESSARY.

- KEY NOTES:
- LOCATE PIPELINE IN EASEMENT PER DETAIL A/C-002 (TYP).
 - SEE SHEET C-128.
 - SEE NTUA STD DWG WS-11.
 - SEE NTUA STD DWG WS-10.
 - CONTRACTOR SHALL PROVIDE WATER BARS PER SECTION 02200.
 - SEE NTUA STD DWG WS-14.

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Arizona Blue Stake, Inc.

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In Maricopa County: (602) 263-1100

Brown and Caldwell

SALT LAKE CITY, UTAH

SUBMITTED:  DATE: 6/02/17
APPROVED:  DATE: 6/02/17

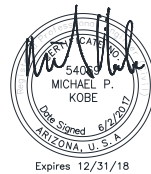
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AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)

SCALE: NONE

DESIGNED: JY
DRAWN: JY
CHECKED: TR
APPROVED: MK

EXTERNAL REFERENCE FILES

BID ISSUE



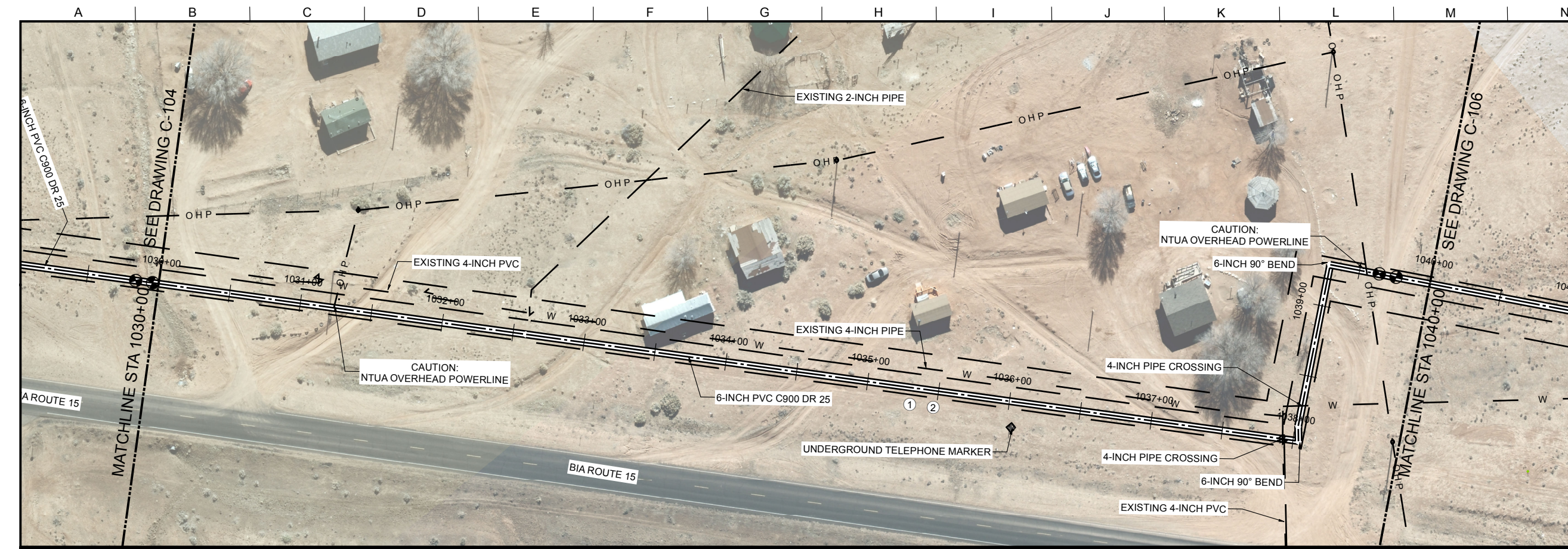
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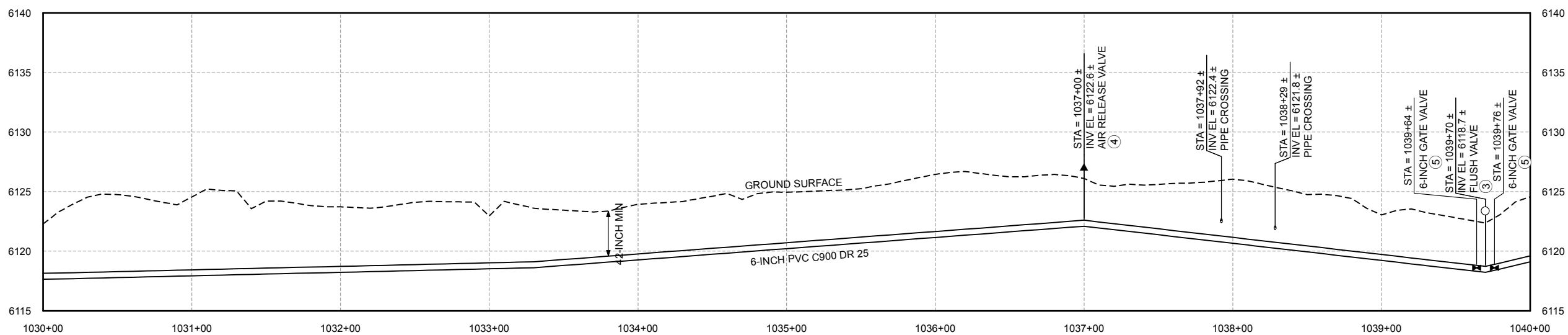
LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

CIVIL
STA 1020+00 TO STA 1030+00
PLAN AND PROFILE

FILENAME
C-101.mxd
BC PROJECT NUMBER
143956
DRAWING NUMBER
C-104
SHEET NUMBER
12 OF 36



PLAN
SCALE: 1" = 40'



PROFILE
SCALE H: 1" = 40'
V: 1" = 5'

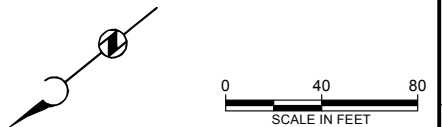
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 7. CONTRACTOR WILL POT HOLE 300 FEET AHEAD OF EXISTING WATER LINE TO VERIFY LOCATION.
 8. DEFLECT PIPE AT JOINTS AS NECESSARY.

- KEY NOTES:
1. LOCATE PIPELINE IN EASEMENT PER DETAIL A/C-002 (TYP).
 2. CONTRACTOR SHALL PROVIDE WATER BARS PER SECTION 02200.
 3. SEE NTUA STD DWG WS-11.
 4. SEE NTUA STD DWG WS-10.
 5. SEE NTUA STD DWG WS-14.

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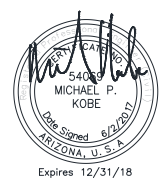
SALT LAKE CITY, UTAH

SUBMITTED: *[Signature]* DATE: 6/02/17
APPROVED: *[Signature]* DATE: 6/02/17

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)
SCALE: NONE
DESIGNED: JY
DRAWN: JY
CHECKED: TR
APPROVED: MK

EXTERNAL REFERENCE FILES	

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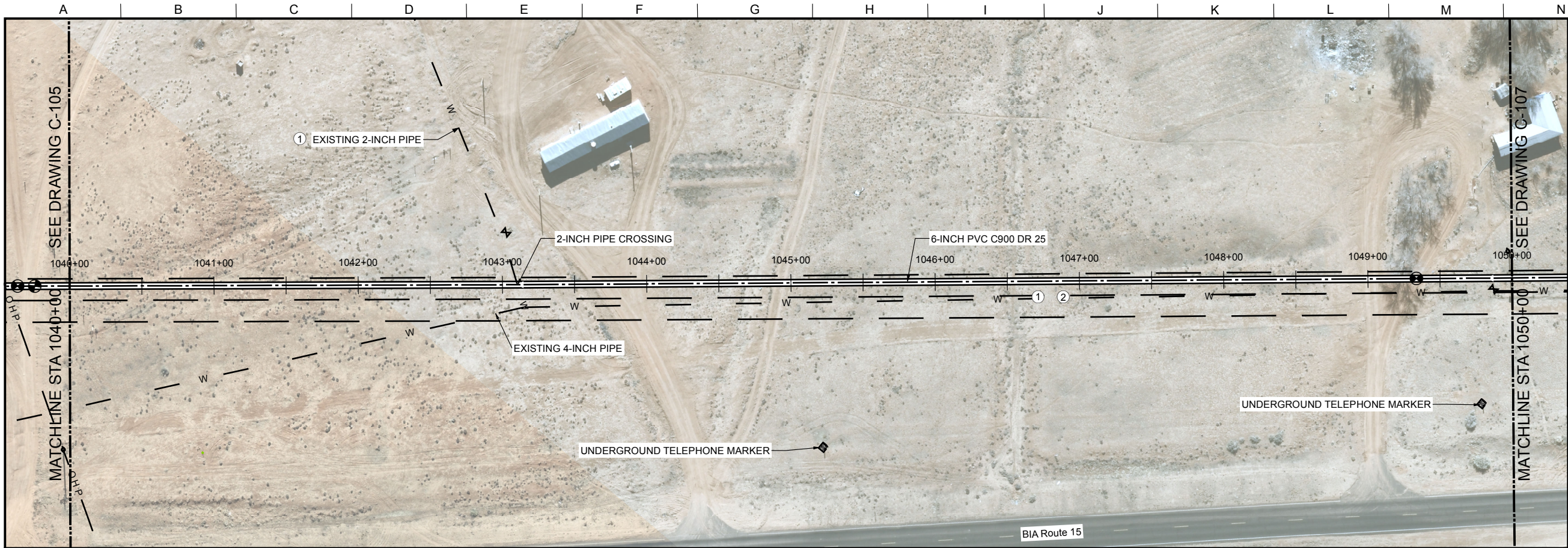


LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

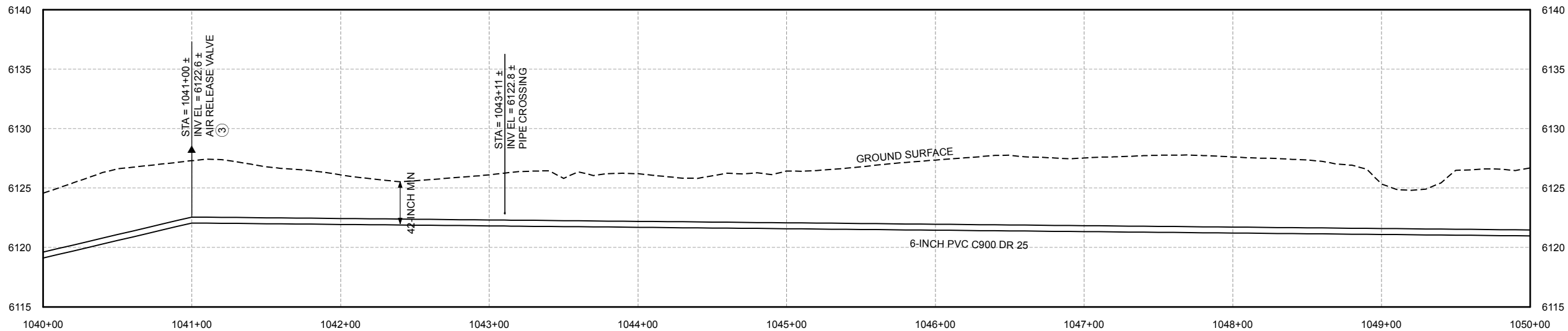
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PLAN AND PROFILE

FILENAME C-101.mxd
BC PROJECT NUMBER 143956
DRAWING NUMBER C-105
SHEET NUMBER 13 OF 36

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PLAN
SCALE: 1" = 40'



PROFILE
SCALE H: 1" = 40'
V: 1" = 5'

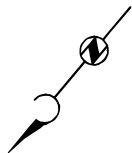
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 8. DEFLECT PIPE AT JOINTS AS NECESSARY.

- KEY NOTES:
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 - ② CONTRACTOR SHALL PROVIDE WATER BARS PER SECTION 02200.
 - ③ SEE NTUA STD DWG WS-10.

Call at least two full working days
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Brown and Caldwell

SALT LAKE CITY, UTAH

SUBMITTED:  PROJECT MANAGER DATE: 6/02/17

APPROVED:  DATE: 6/02/17


LINE IS 2 INCHES
AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)

SCALE: NONE

DESIGNED: JY
DRAWN: JY
CHECKED: TR
APPROVED: MK

EXTERNAL REFERENCE FILES

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ZONE	REV.	DESCRIPTION	BY	DATE	APP.



LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

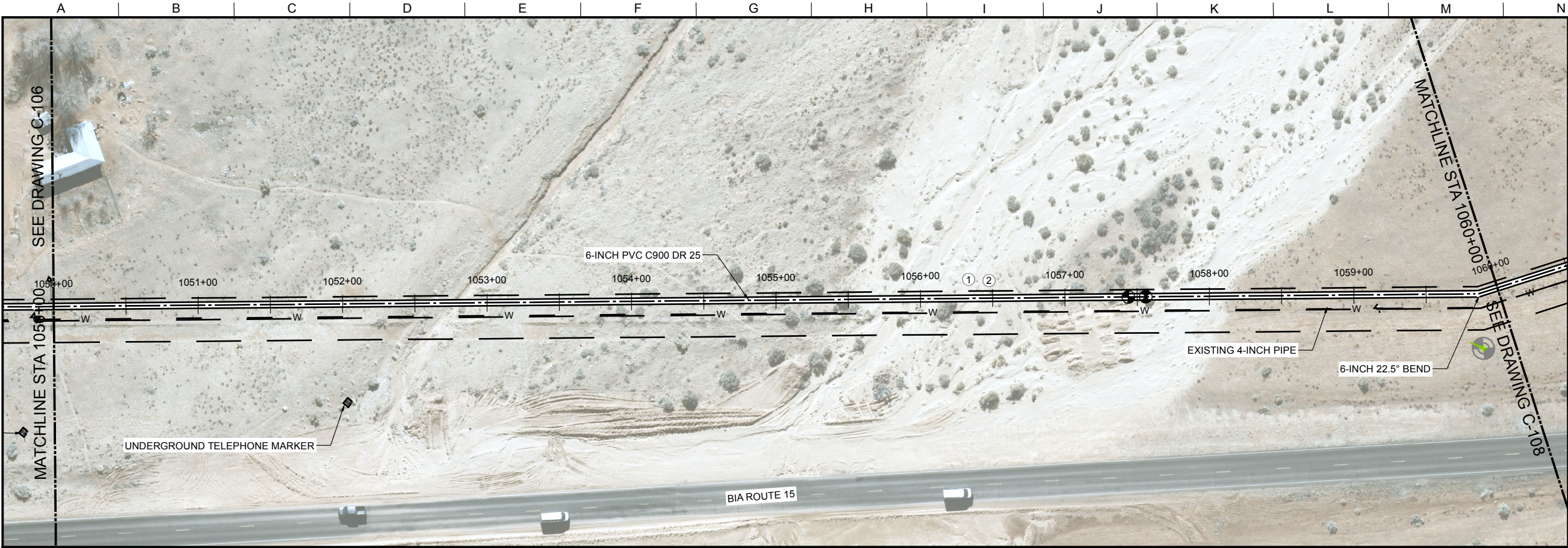
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BC PROJECT NUMBER
143956

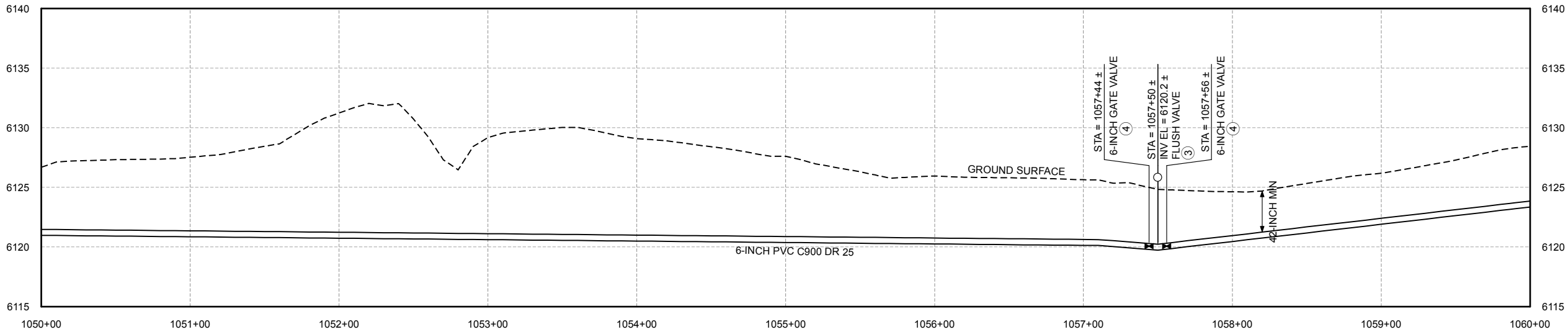
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SHEET NUMBER
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PLAN
SCALE: 1" = 40'



PROFILE
SCALE H: 1" = 40'
V: 1" = 5'

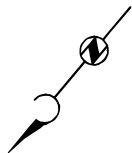
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 5. CONTRACTOR TO INSTALL MARKER POSTS PER NTUA STANDARD DRAWING WS-13.
 6. EASEMENT DIMENSIONS AND PIPELINE OFFSETS ARE SHOWN IN DETAIL A ON SHEET C-002.
 7. CONTRACTOR WILL POTHOLE 300 FEET AHEAD OF EXISTING WATER LINE TO VERIFY LOCATION.
 8. DEFLECT PIPE AT JOINTS AS NECESSARY.

- KEY NOTES:
- ① LOCATE PIPELINE IN EASEMENT PER DETAIL A/C-002 (TYP).
 - ② CONTRACTOR SHALL PROVIDE WATER BARS PER SECTION 02200.
 - ③ SEE NTUA STD DWG WS-11.
 - ④ SEE NTUA STD DWG WS-14.

Call at least two full working days
before you begin excavation.

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0 40 80
SCALE IN FEET

Brown and Caldwell

SALT LAKE CITY, UTAH

SUBMITTED:  DATE: 6/02/17
APPROVED:  DATE: 6/02/17

LINE IS 2 INCHES
AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)

SCALE: NONE

DESIGNED: JY
DRAWN: JY
CHECKED: TR
APPROVED: MK

EXTERNAL REFERENCE FILES

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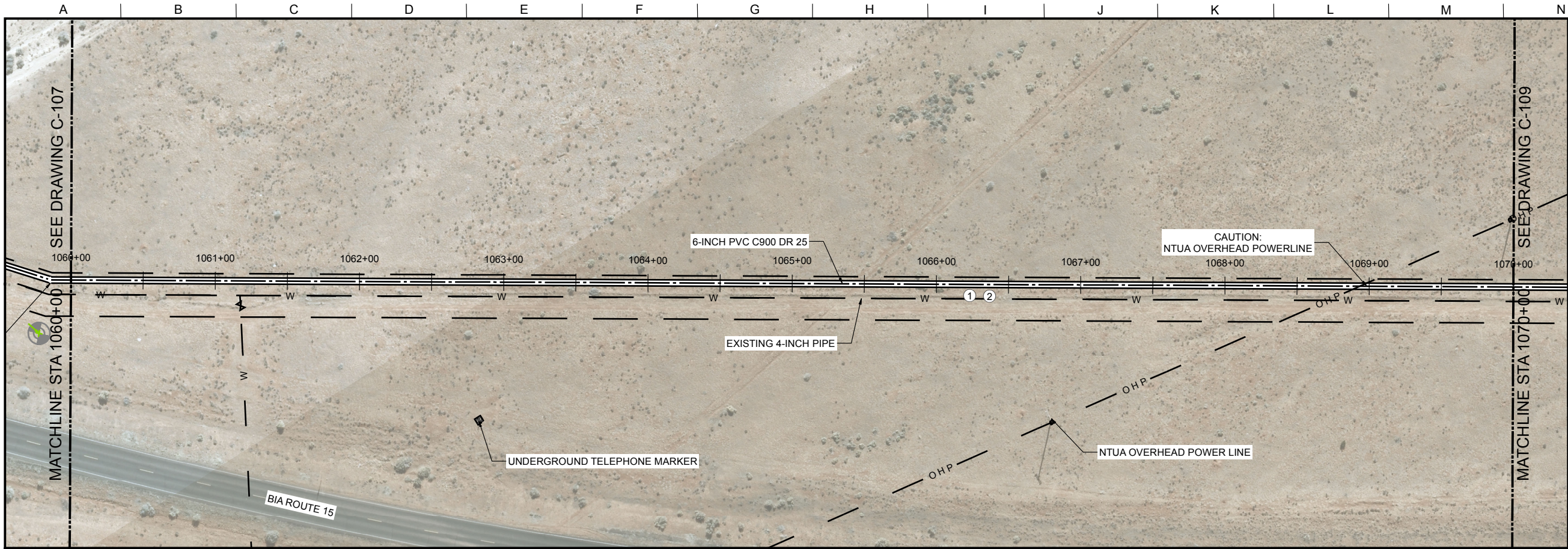


LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

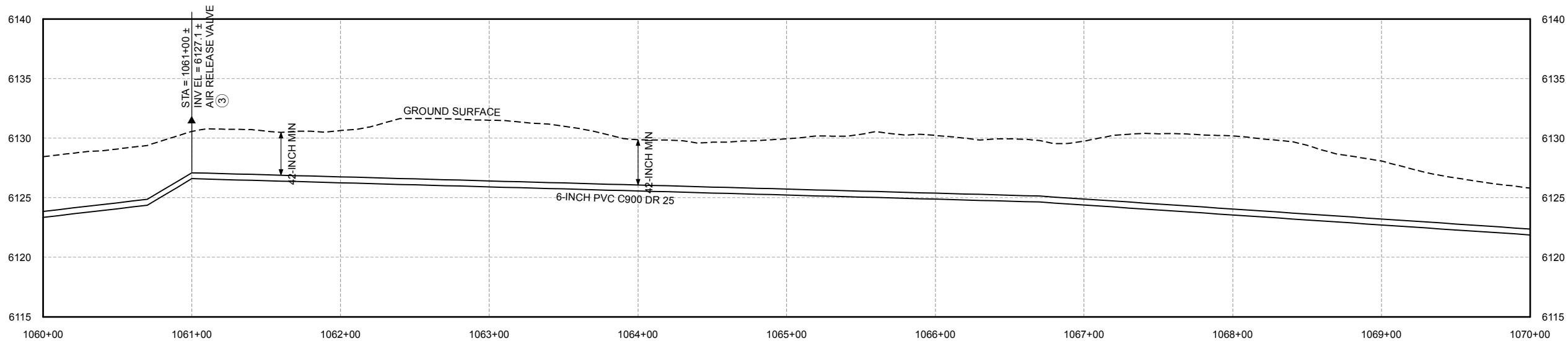
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STA 1050+00 TO STA 1060+00
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FILENAME
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BC PROJECT NUMBER
143956
DRAWING NUMBER
C-107
SHEET NUMBER
15 OF 36

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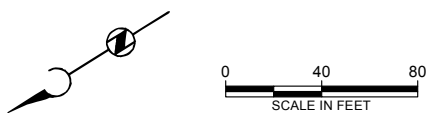
PLAN
SCALE: 1" = 40'



PROFILE
SCALE H: 1" = 40'
V: 1" = 5'

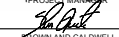
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 8. DEFLECT PIPE AT JOINTS AS NECESSARY.

- KEY NOTES:
- ① LOCATE PIPELINE IN EASEMENT PER DETAIL A/C-002 (TYP).
 - ② CONTRACTOR SHALL PROVIDE WATER BARS PER SECTION 02200.
 - ③ SEE NTUA STD DWG WS-10.



Brown and Caldwell

SALT LAKE CITY, UTAH

SUBMITTED:  DATE: 6/02/17
APPROVED:  DATE: 6/02/17

LINE IS 2 INCHES
AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)

SCALE: NONE

DESIGNED: JY
DRAWN: JY
CHECKED: TR
APPROVED: MK

EXTERNAL REFERENCE FILES

BID ISSUE



REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.



LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

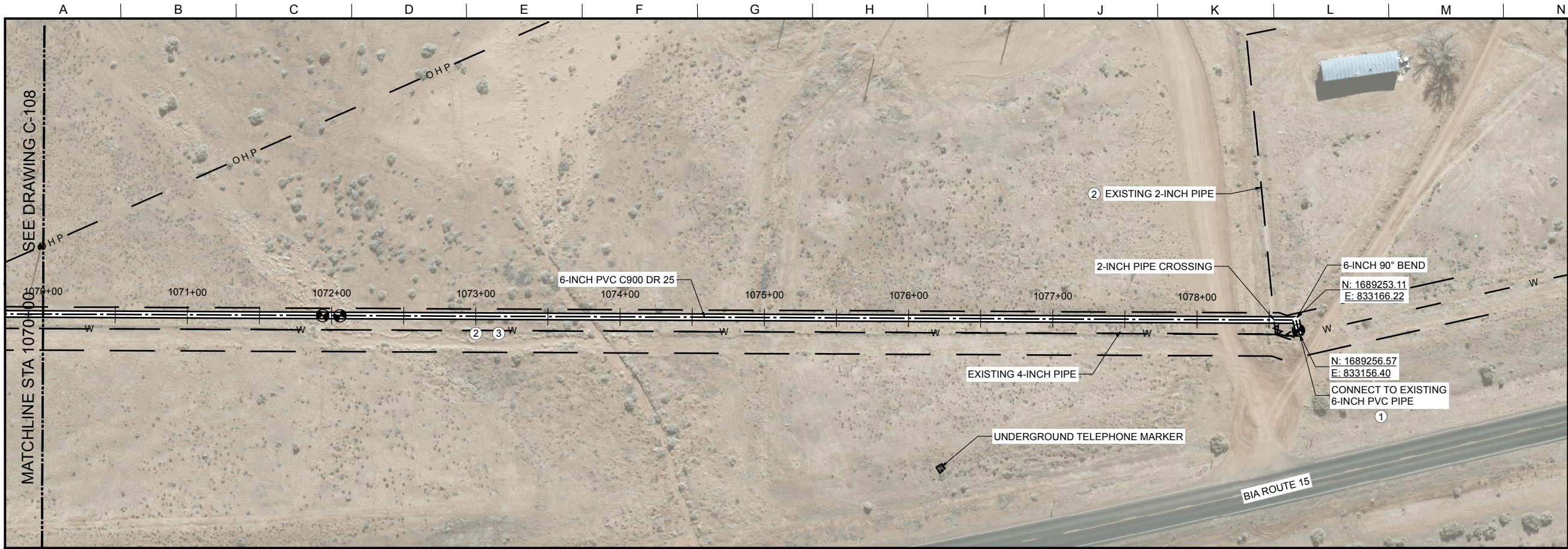
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PLAN AND PROFILE

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BC PROJECT NUMBER
143956

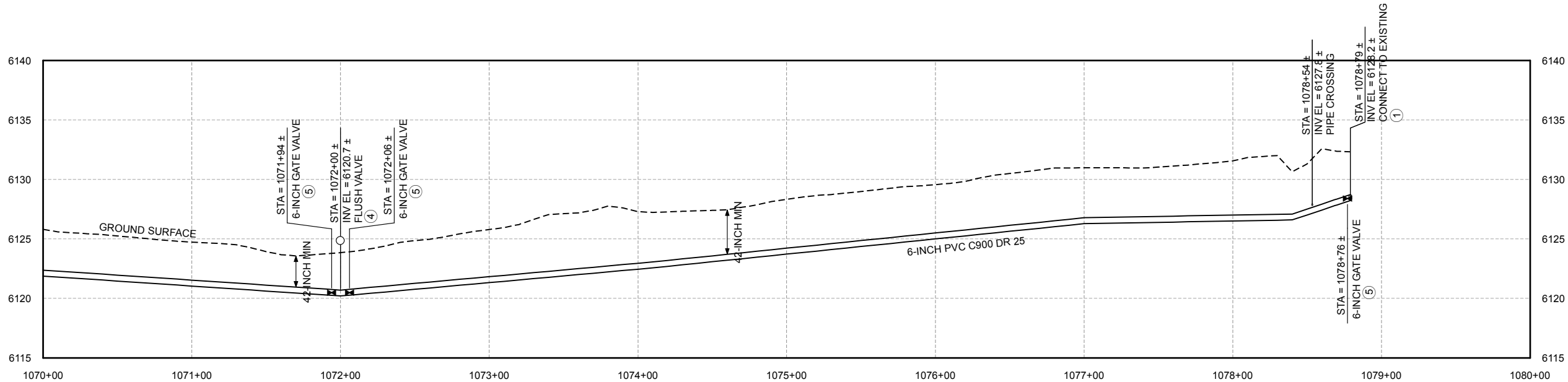
DRAWING NUMBER
C-108

SHEET NUMBER
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PLAN
SCALE: 1" = 40'



PROFILE
SCALE H: 1" = 40'
V: 1" = 5'

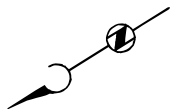
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 7. CONTRACTOR WILL POT HOLE 300 FEET AHEAD OF EXISTING WATER LINE TO VERIFY LOCATION.
 8. DEFLECT PIPE AT JOINTS AS NECESSARY.

- KEY NOTES:
- 1 SEE CONNECTION DETAIL D/C-003.
 - 2 LOCATE PIPELINE IN EASEMENT PER DETAIL A/C-002 (TYP).
 - 3 CONTRACTOR SHALL PROVIDE WATER BARS PER SECTION 02200.
 - 4 SEE NTUA STD DWG WS-11.
 - 5 SEE NTUA STD DWG WS-14.

Call at least two full working days
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0 40 80
SCALE IN FEET

Brown and Caldwell

SALT LAKE CITY, UTAH

SUBMITTED: *[Signature]* DATE: 6/02/17
APPROVED: *[Signature]* DATE: 6/02/17

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SCALE: NONE

DESIGNED: JY
DRAWN: JY
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EXTERNAL REFERENCE FILES

BID ISSUE



REVISIONS					
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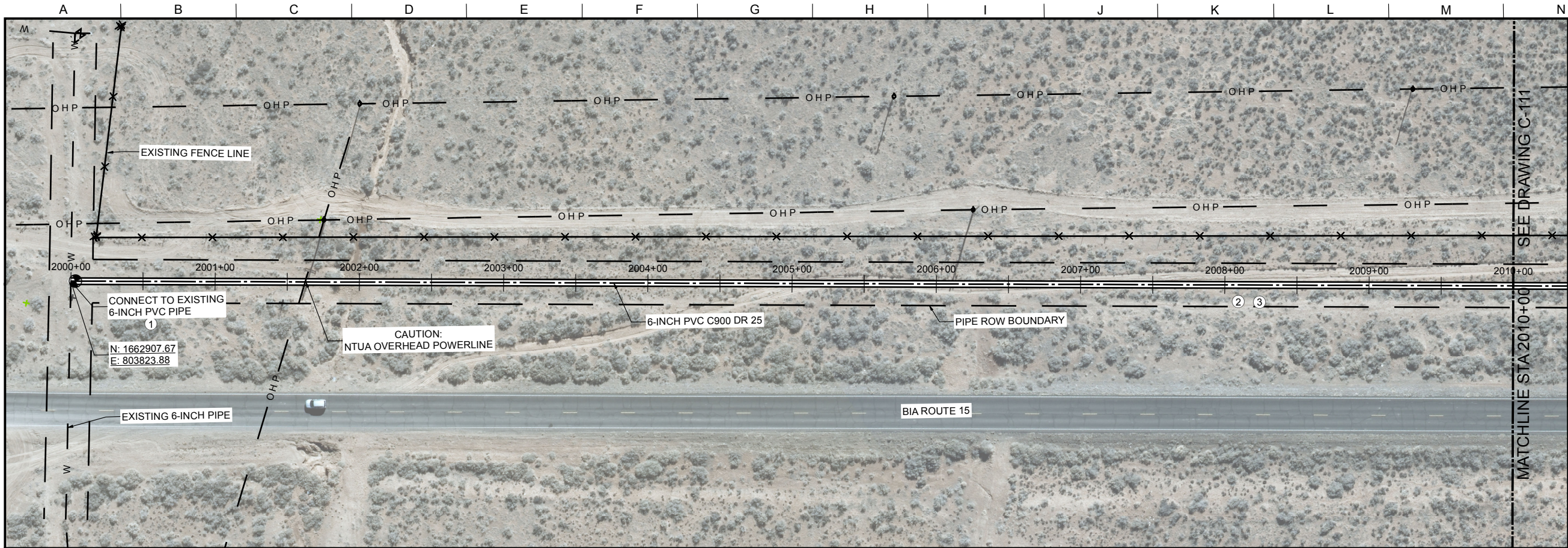


LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

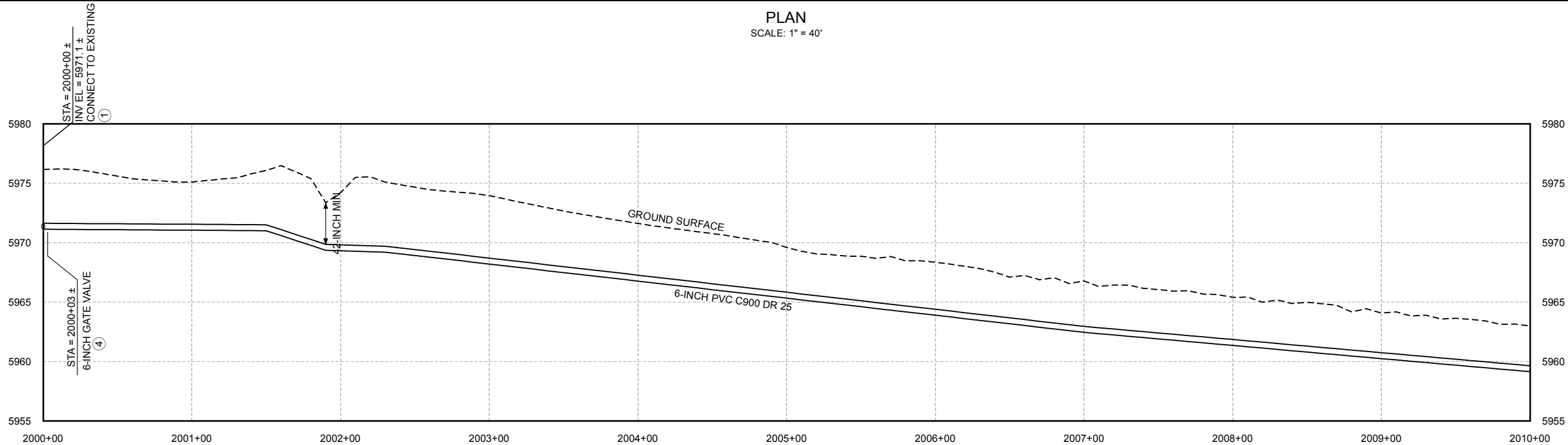
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PLAN AND PROFILE

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143956
DRAWING NUMBER
C-109
SHEET NUMBER
17 OF 36

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PLAN
SCALE: 1" = 40'



PROFILE
SCALE H: 1" = 40'
V: 1" = 5'

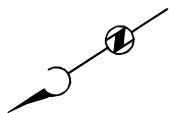
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 6. EASEMENT DIMENSIONS AND PIPELINE OFFSETS ARE SHOWN IN DETAIL A ON SHEET C-002.
 7. CONTRACTOR WILL POTHOLE 300 FEET AHEAD OF EXISTING WATER LINE TO VERIFY LOCATION.
 8. DEFLECT PIPE AT JOINTS AS NECESSARY.

- KEY NOTES:
- 1 SEE CONNECTION DETAIL A/C-004.
 - 2 CONTRACTOR SHALL PROVIDE WATER BARS PER SECTION 02200.
 - 3 LOCATE PIPELINE IN EASEMENT PER DETAIL A/C-002 (TYP).
 - 4 SEE NTUA STD DWG WS-14.

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In Maricopa County: (602) 263-1100



0 40 80
SCALE IN FEET

Brown and Caldwell

SALT LAKE CITY, UTAH

SUBMITTED: *[Signature]* DATE: 6/02/17
APPROVED: *[Signature]* DATE: 6/02/17

LINE IS 2 INCHES
AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)

SCALE: NONE

DESIGNED: JY
DRAWN: JY
CHECKED: TR
APPROVED: MK

EXTERNAL REFERENCE FILES

BID ISSUE



REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.



LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

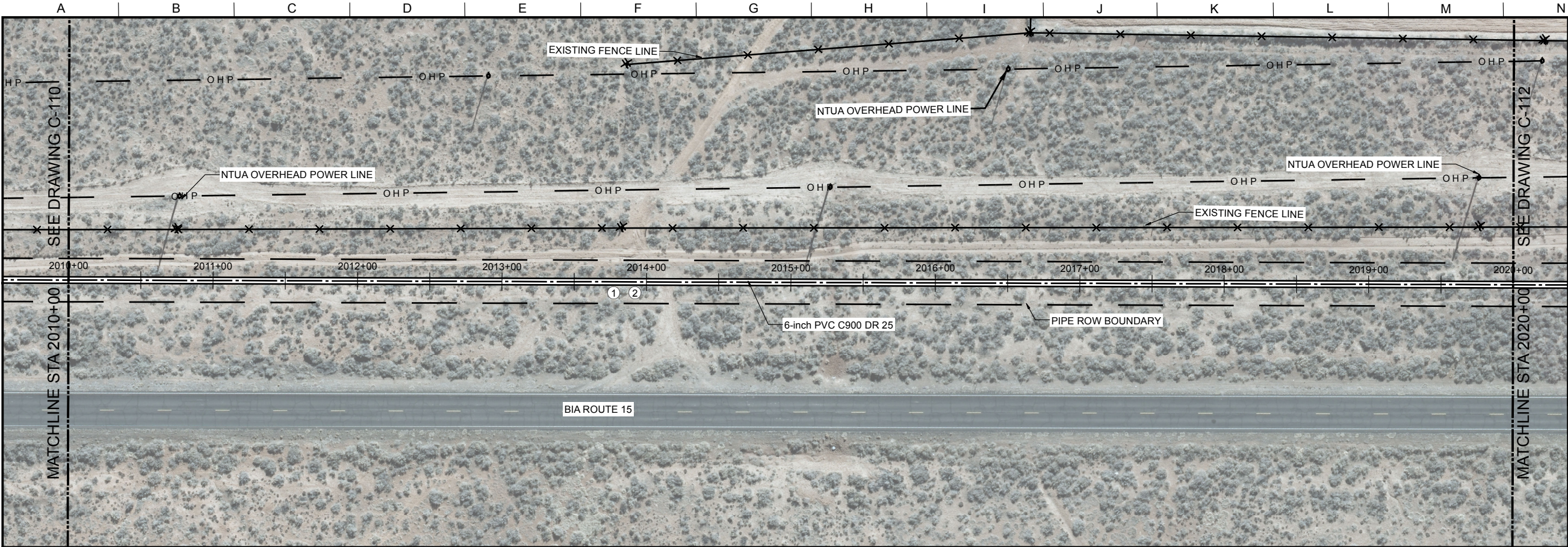
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PLAN AND PROFILE

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BC PROJECT NUMBER
143956

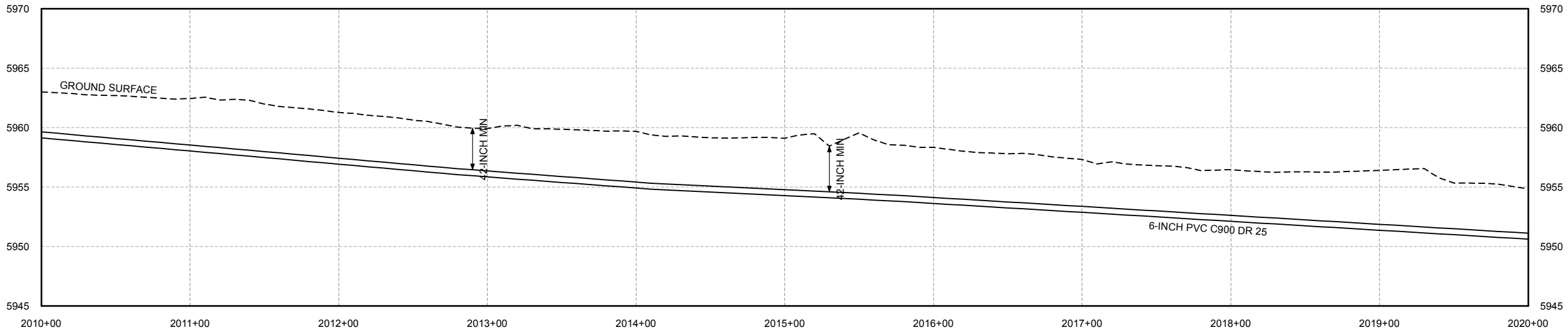
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C-110

SHEET NUMBER
18 OF 36

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PLAN
SCALE: 1" = 40'



PROFILE
SCALE H: 1" = 40'
V: 1" = 5'

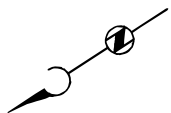
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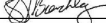
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


0 40 80
SCALE IN FEET

Brown and Caldwell

SALT LAKE CITY, UTAH

SUBMITTED:  DATE: 6/02/17

APPROVED:  DATE: 6/02/17

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SCALE: NONE

DESIGNED: JY

DRAWN: JY

CHECKED: TR

APPROVED: MK

EXTERNAL REFERENCE FILES

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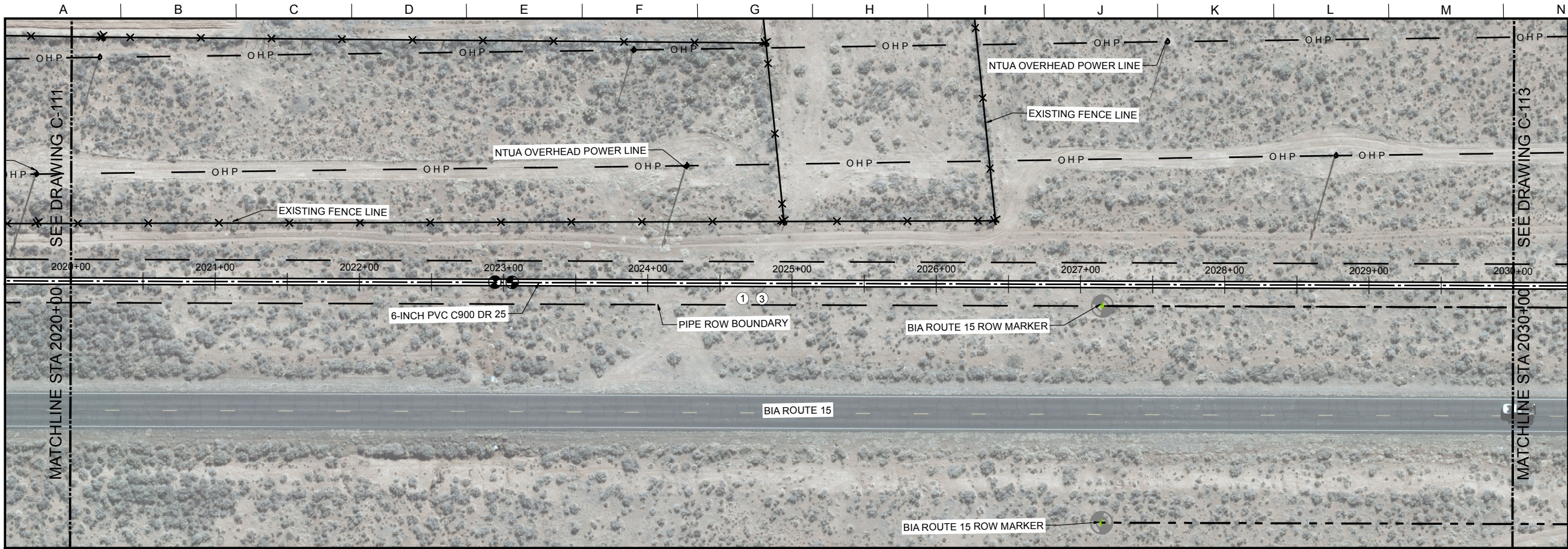
LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

CIVIL

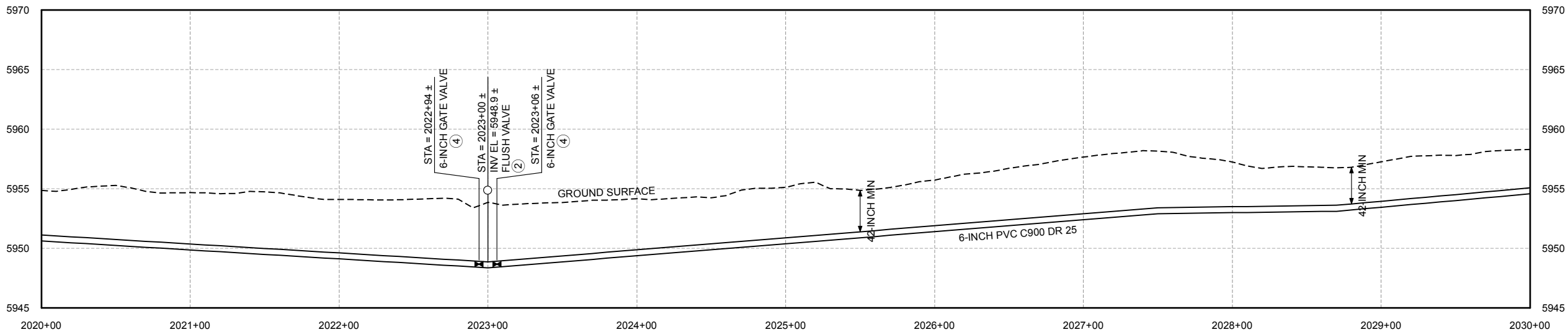
STA 2010+00 TO STA 2020+00
PLAN AND PROFILE

FILENAME C-101.mxd
BC PROJECT NUMBER 143956
DRAWING NUMBER C-111
SHEET NUMBER 19 OF 36

P:\Projects\Navajo Nation\143956_LowerGreasewoodDesign\04_Deliverables\4_3_Figures\BID_SET\C-101_v6.mxd Plot Date: Jun 13, 2017 - 11:02AM User: jyzazie



PLAN
SCALE: 1" = 40'



PROFILE
SCALE H: 1" = 40'
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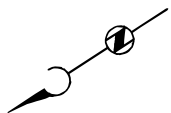
KEY NOTES:

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Brown and Caldwell

SALT LAKE CITY, UTAH

SUBMITTED:  DATE: 6/02/17

APPROVED:  DATE: 6/02/17

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SCALE: NONE

DESIGNED: JY
DRAWN: JY
CHECKED: TR
APPROVED: MK

EXTERNAL REFERENCE FILES

BID ISSUE



REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.



LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

CIVIL

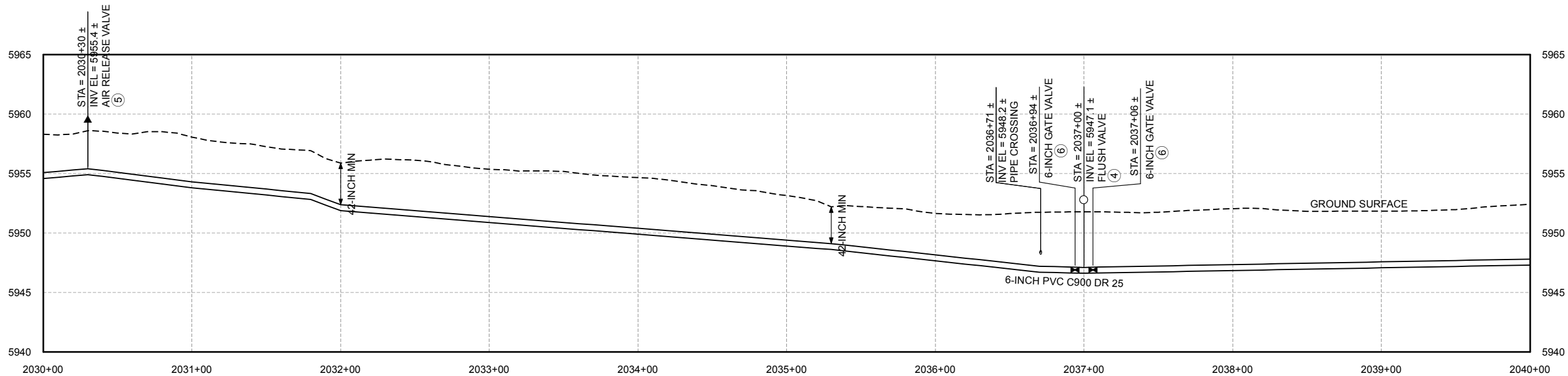
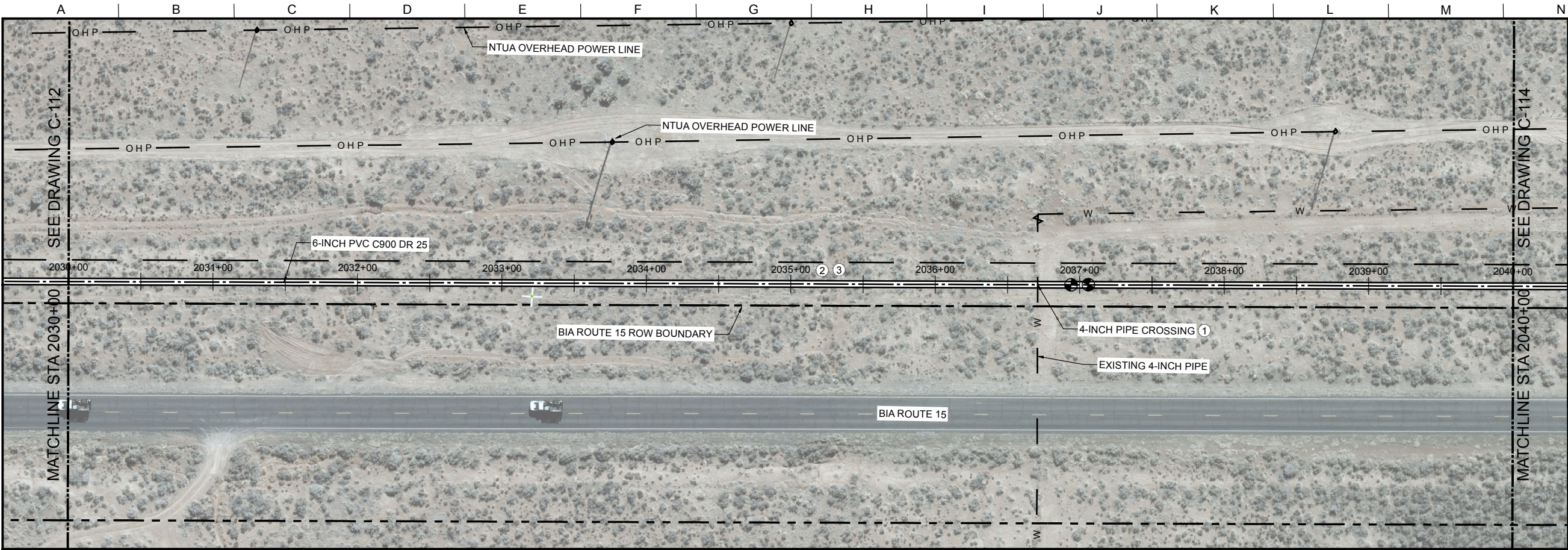
STA 2020+00 TO STA 2030+00
PLAN AND PROFILE

FILENAME
C-101.mxd
BC PROJECT NUMBER
143956

DRAWING NUMBER
C-112

SHEET NUMBER
20 OF 36

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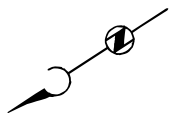
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- KEY NOTES:
- ① SEE NTUA TECHNICAL PROVISIONS 2.03
 - ② LOCATE PIPELINE IN EASEMENT PER DETAIL A/C-002 (TYP).
 - ③ CONTRACTOR SHALL PROVIDE WATER BARS PER SECTION 02200.
 - ④ SEE NTUA STD DWG WS-11.
 - ⑤ SEE NTUA STD DWG WS-10.
 - ⑥ SEE NTUA STD DWG WS-14.

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0 40 80
SCALE IN FEET

Brown and Caldwell

SALT LAKE CITY, UTAH

SUBMITTED: *[Signature]* DATE: 6/02/17

APPROVED: *[Signature]* DATE: 6/02/17

LINE IS 2 INCHES
AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)

SCALE: NONE

DESIGNED: JY

DRAWN: JY

CHECKED: TR

APPROVED: MK

EXTERNAL REFERENCE FILES

BID ISSUE



REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.



LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

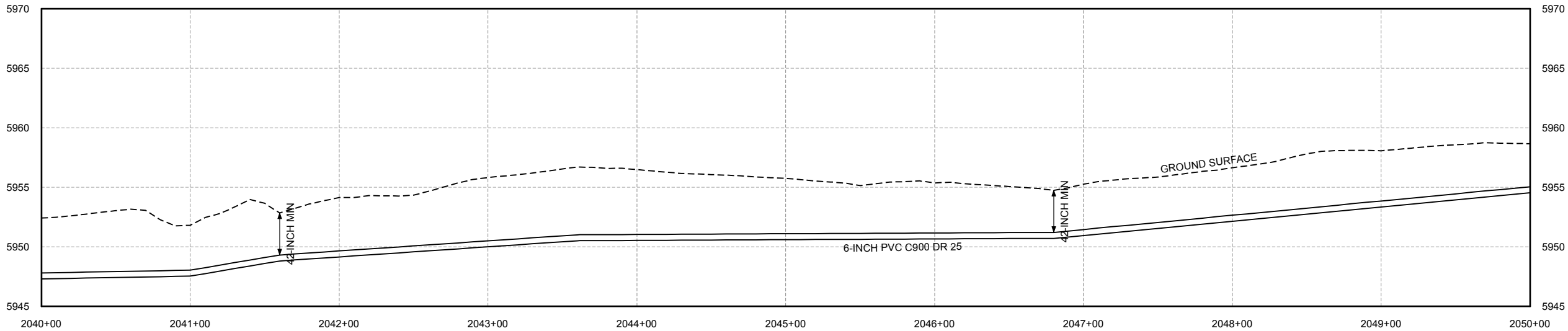
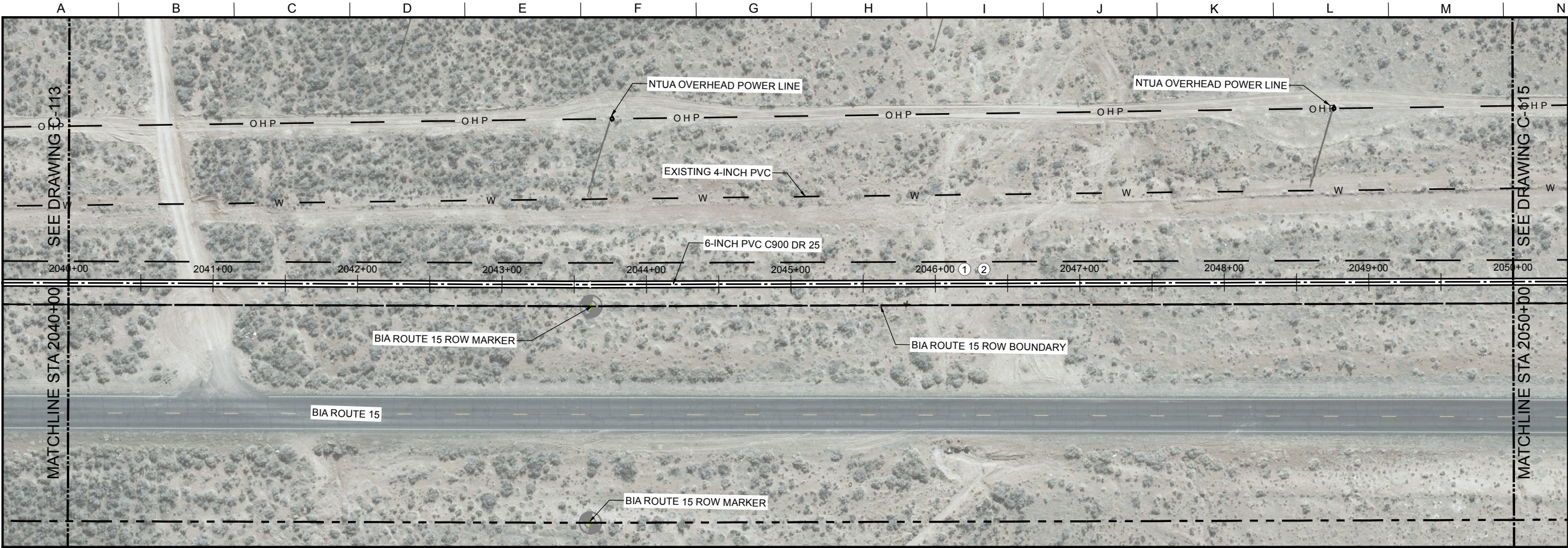
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STA 2030+00 TO STA 2040+00

PLAN AND PROFILE

FILENAME C-101.mxd
BC PROJECT NUMBER 143956
DRAWING NUMBER C-113
SHEET NUMBER 21 OF 36

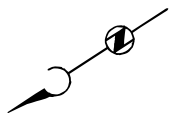
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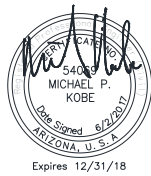
SALT LAKE CITY, UTAH

SUBMITTED:  DATE: 6/02/17
APPROVED:  DATE: 6/02/17

LINE IS 2 INCHES
AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)
SCALE: NONE
DESIGNED: JY
DRAWN: JY
CHECKED: TR
APPROVED: MK

EXTERNAL REFERENCE FILES

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MICHAEL P. KOBE
Date Signed: 6/2/2017
ARIZONA, U.S.A.
Expires 12/31/18

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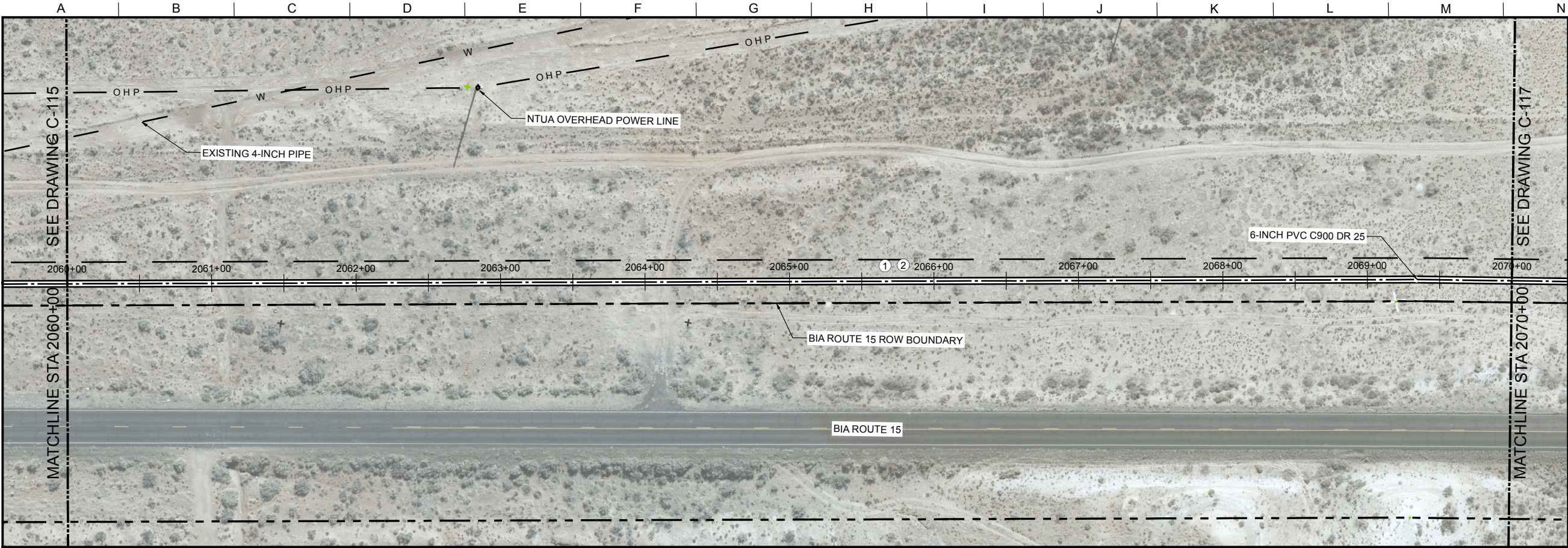


LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

CIVIL
STA 2040+00 TO STA 2050+00
PLAN AND PROFILE

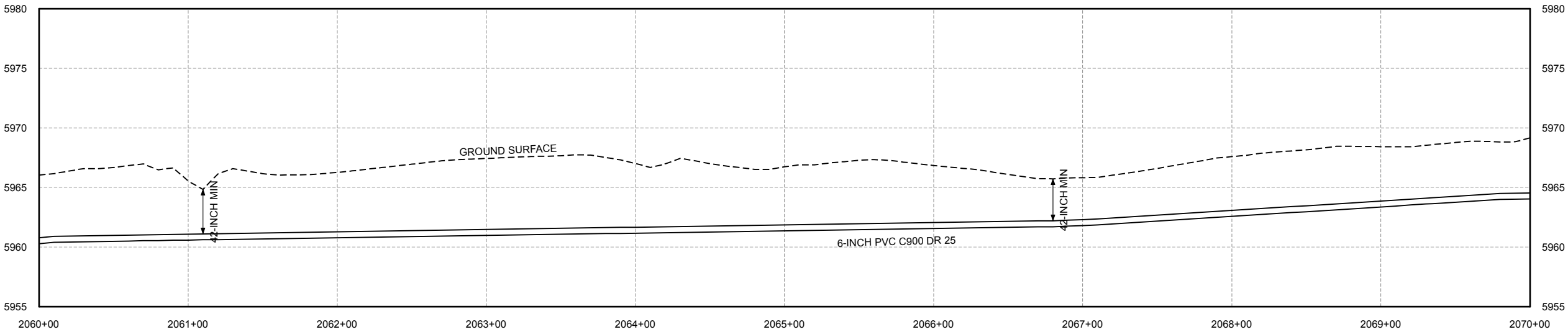
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C-114
SHEET NUMBER
22 OF 36

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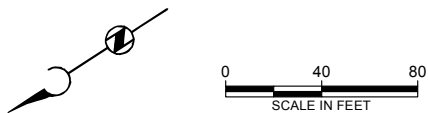


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Brown and Caldwell


SALT LAKE CITY, UTAH

SUBMITTED:  DATE: 6/02/17
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ARIZONA, U.S.A.
Expires: 12/31/18

REVISIONS					
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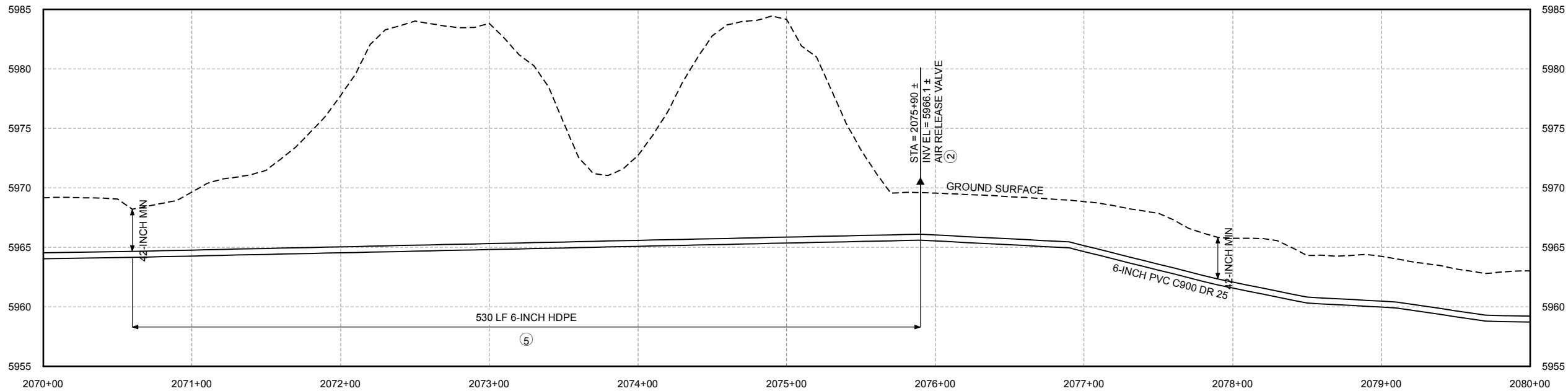
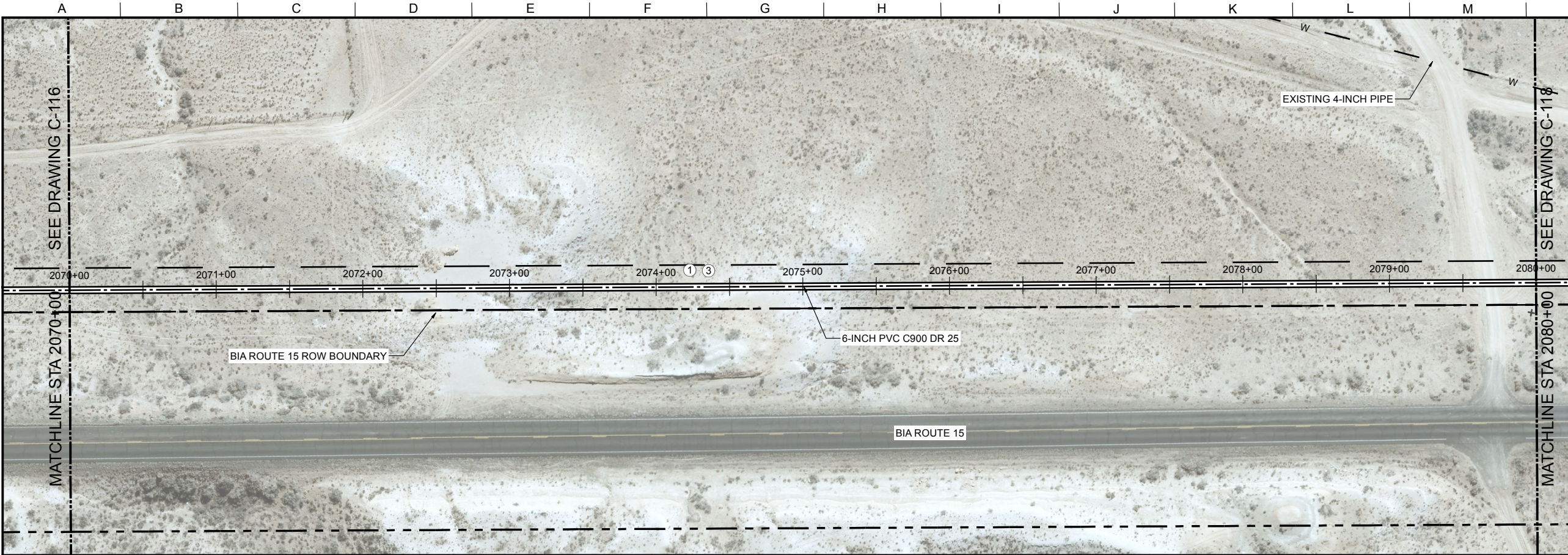


LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

CIVIL
STA 2060+00 TO STA 2070+00
PLAN AND PROFILE

FILENAME
C-101.mxd
BC PROJECT NUMBER
143956
DRAWING NUMBER
C-116
SHEET NUMBER
24 OF 36

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 - 4 SEE NTUA STD DWG WS-14.
 - 5 CONTRACTOR TO INSTALL HDPE PIPELINE PER IHS STANDARD DRAWING W-33, UNLESS OTHERWISE SPECIFIED.

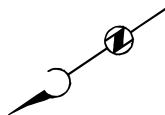
CAUTION TO CONTRACTOR: CONTRACTOR SHALL BE RESPONSIBLE FOR HDD MEANS AND METHODS INCLUDING BUT NOT LIMITED TO SELECTION OF HDD EQUIPMENT, DRILLING MUD, SPOILS REMOVAL, ALIGNMENT CONTROL AND BORE PATH SUBJECT TO REVIEW BY THE ENGINEER.

CONTRACTOR SHALL BE RESPONSIBLE TO CONDUCT ALL SUBSURFACE GEOTECHNICAL INVESTIGATION NECESSARY TO PERFORM THE WORK. NO GEOTECHNICAL INVESTIGATION HAS BEEN PERFORMED ON THE ALIGNMENT.

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Arizona Blue Stake, Inc.

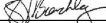
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0 40 80
SCALE IN FEET

Brown and Caldwell

SALT LAKE CITY, UTAH

SUBMITTED:  PROJECT MANAGER DATE: 6/02/17

APPROVED:  DATE: 6/02/17

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SCALE: NONE

DESIGNED: JY

DRAWN: JY

CHECKED: TR

APPROVED: MK

EXTERNAL REFERENCE FILES

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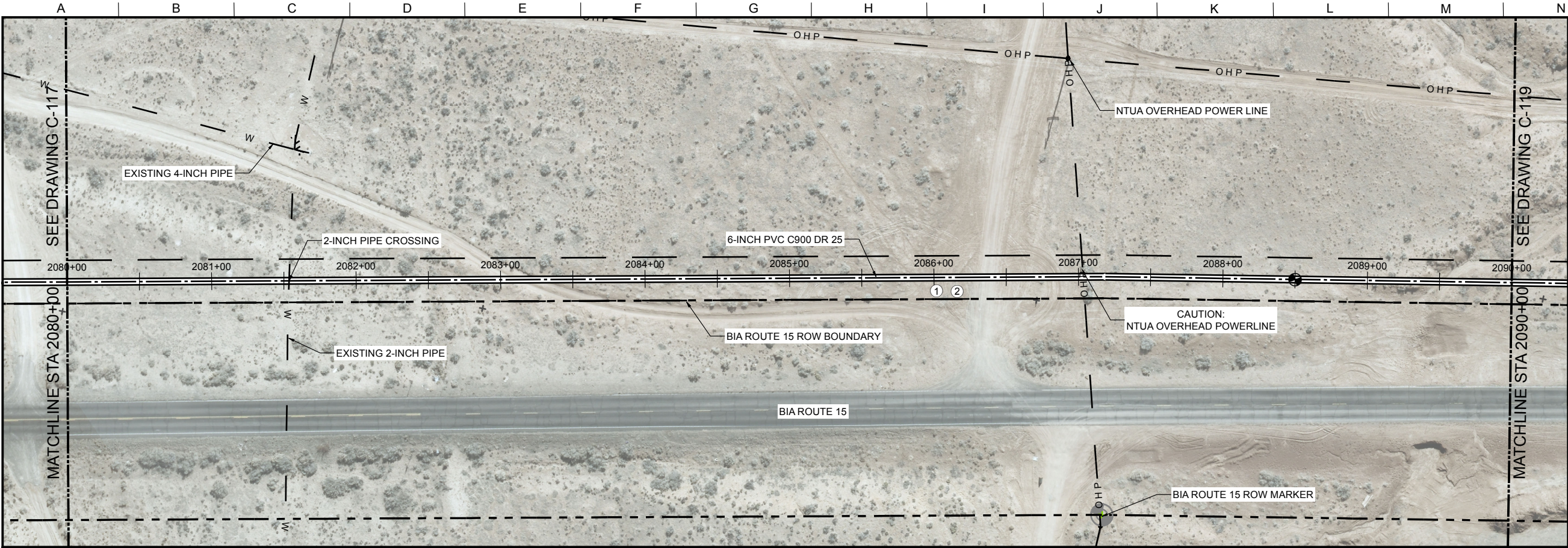
LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

CIVIL

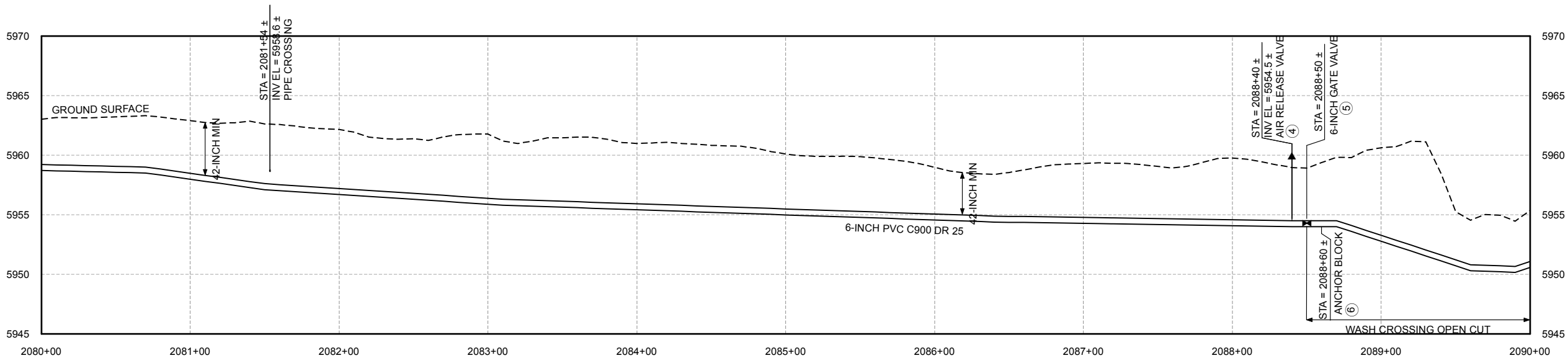
STA 2070+00 TO STA 2080+00
PLAN AND PROFILE

FILENAME C-101.mxd
BC PROJECT NUMBER 143956
DRAWING NUMBER C-117
SHEET NUMBER 25 OF 36

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PROFILE
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V: 1" = 5'

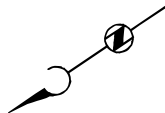
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- KEY NOTES:
- LOCATE PIPELINE IN EASEMENT PER DETAIL A/C-002 (TYP).
 - CONTRACTOR SHALL PROVIDE WATER BARS PER SECTION 02200.
 - SEE NTUA STD DWG WS-11.
 - SEE NTUA STD DWG WS-10.
 - SEE NTUA STD DWG WS-14.
 - SEE IHS STD DWG W-33.

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0 40 80
SCALE IN FEET

Brown and Caldwell

SALT LAKE CITY, UTAH

SUBMITTED:  DATE: 6/02/17

APPROVED:  DATE: 6/02/17

LINE IS 2 INCHES
AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)

SCALE: NONE

DESIGNED: JY
DRAWN: JY
CHECKED: TR
APPROVED: MK

EXTERNAL REFERENCE FILES

BID ISSUE



REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.



LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

CIVIL

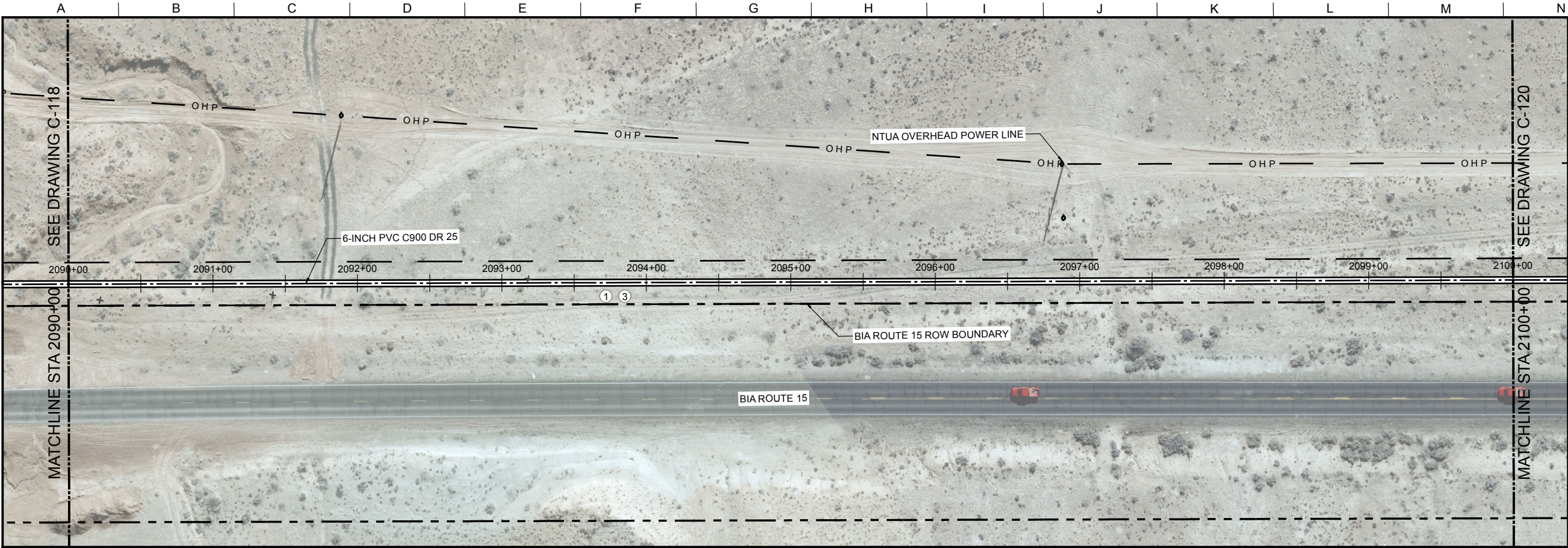
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PLAN AND PROFILE

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BC PROJECT NUMBER
143956

DRAWING NUMBER
C-118

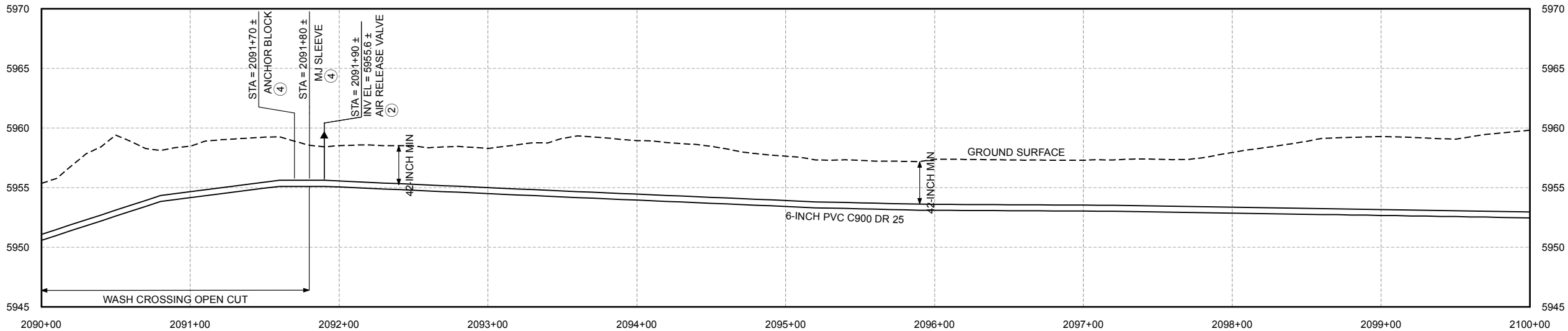
SHEET NUMBER
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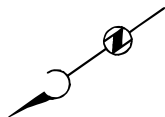


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 - CONTRACTOR TO INSTALL MARKER POSTS PER NTUA STANDARD DRAWING WS-13.
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 - DEFLECT PIPE AT JOINTS AS NECESSARY.

- KEY NOTES:
- CONTRACTOR SHALL PROVIDE WATER BARS PER SECTION 02200.
 - SEE NTUA STD DWG WS-10.
 - LOCATE PIPELINE IN EASEMENT PER DETAIL A/C-002 (TYP).
 - SEE IHS STD DWG W-33.



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Brown and Caldwell

SALT LAKE CITY, UTAH

SUBMITTED: *[Signature]* DATE: 6/02/17

APPROVED: *[Signature]* DATE: 6/02/17

LINE IS 2 INCHES
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SCALE: NONE

DESIGNED: JY

DRAWN: JY

CHECKED: TR

APPROVED: MK

EXTERNAL REFERENCE FILES

BID ISSUE



REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.



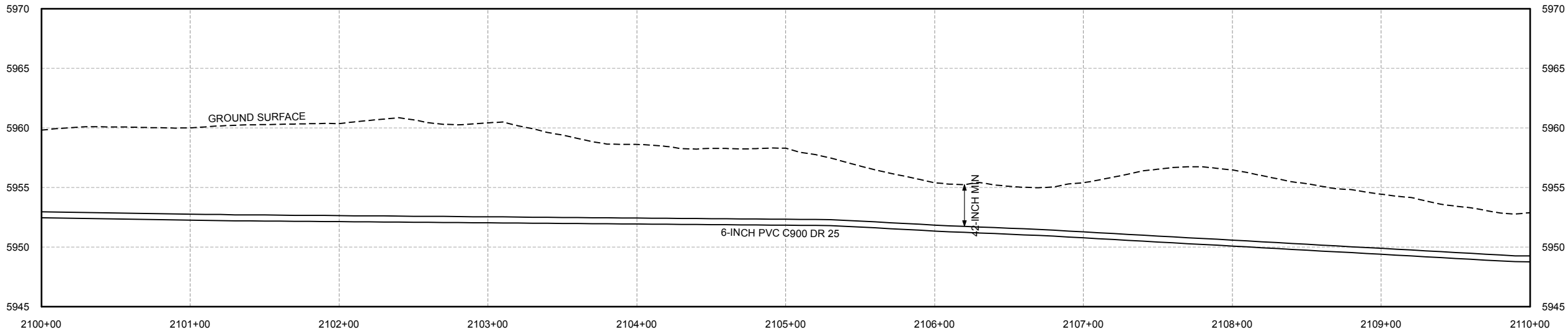
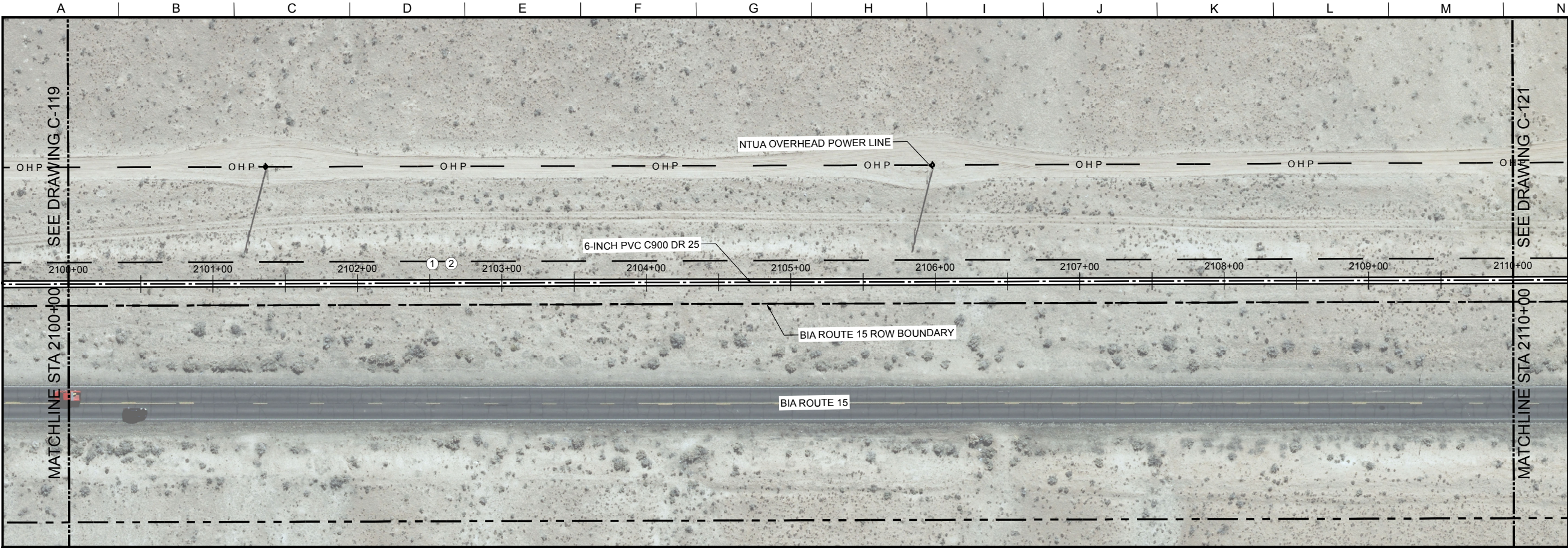
LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

CIVIL

STA 2090+00 TO STA 2100+00
PLAN AND PROFILE

FILENAME C-101.mxd
BC PROJECT NUMBER 143956
DRAWING NUMBER C-119
SHEET NUMBER 27 OF 36

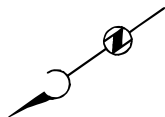
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 - DEFLECT PIPE AT JOINTS AS NECESSARY.

- KEY NOTES:
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0 40 80
SCALE IN FEET

Brown and Caldwell

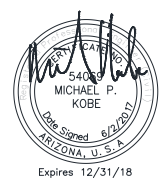
SALT LAKE CITY, UTAH

SUBMITTED:  DATE: 6/02/17
APPROVED:  DATE: 6/02/17

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AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)
SCALE: NONE
DESIGNED: JY
DRAWN: JY
CHECKED: TR
APPROVED: MK

EXTERNAL REFERENCE FILES

BID ISSUE


MICHAEL P. KOB
ARIZONA, U.S.A.
Expires 12/31/18

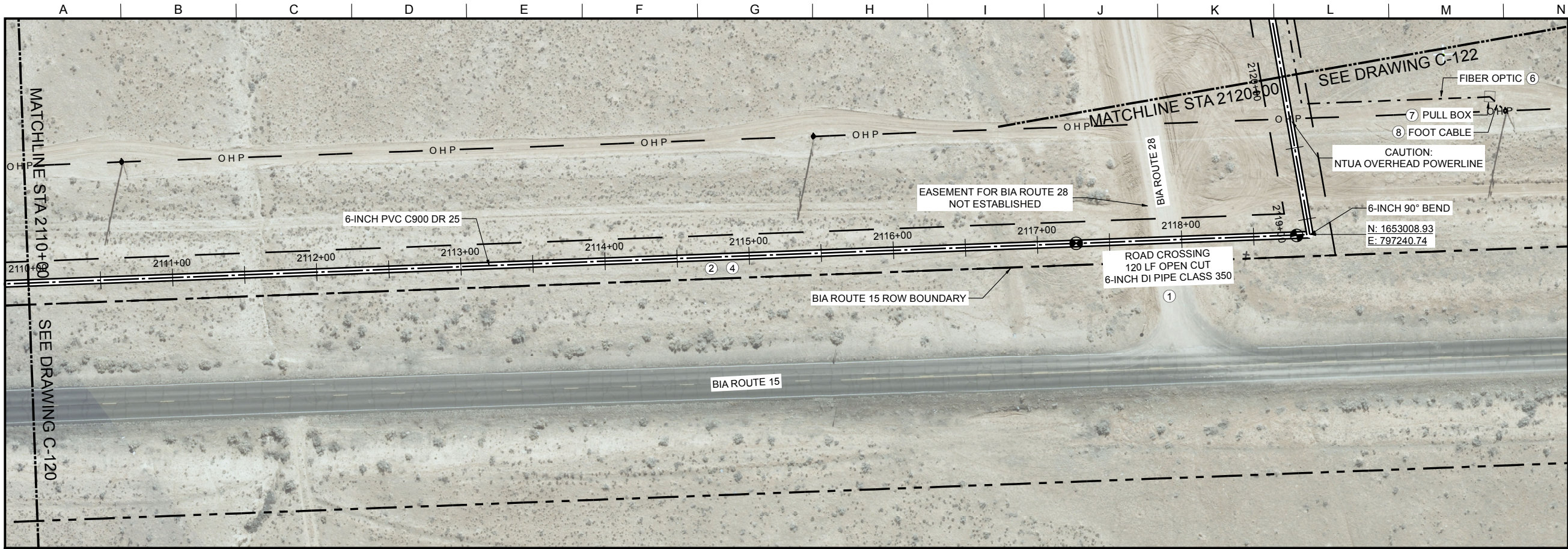
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LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES
CIVIL
STA 2100+00 TO STA 2110+00
PLAN AND PROFILE

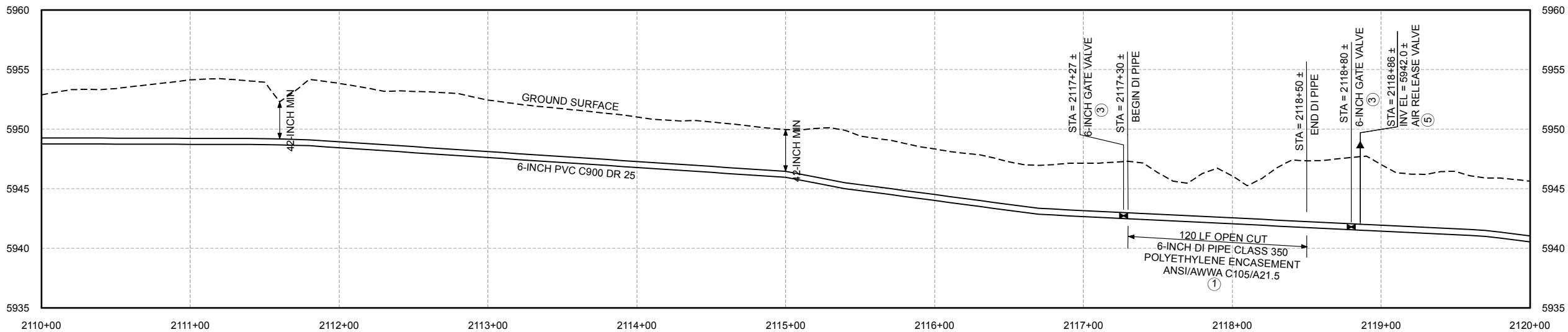
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BC PROJECT NUMBER
143956
DRAWING NUMBER
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SHEET NUMBER
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PLAN

SCALE: 1" = 40'



PROFILE

SCALE H: 1" = 40'
V: 1" = 5'

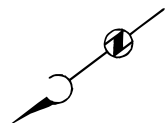
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5. CONTRACTOR TO INSTALL MARKER POSTS PER NTUA STANDARD DRAWING WS-13.
6. EASEMENT DIMENSIONS AND PIPELINE OFFSETS ARE SHOWN IN DETAIL A ON SHEET C-002.
7. CONTRACTOR WILL POTHOLE 300 FEET AHEAD OF EXISTING WATER LINE TO VERIFY LOCATION.
8. DEFLECT PIPE AT JOINTS AS NECESSARY.

KEY NOTES:

1. CONTRACTOR SHALL INSTALL DUCTILE IRON PIPE PER NTUA STANDARD DRAWING WS-17b.
2. CONTRACTOR SHALL PROVIDE WATER BARS PER SECTION 02200.
3. SEE NTUA STD DWG WS-14.
4. LOCATE PIPELINE IN EASEMENT PER DETAIL A/C-002 (TYP).
5. SEE NTUA STD DWG WS-10.
6. FIBER OPTIC CIRCUIT SC-1 PER DETAIL F/C-002 (TYP).
7. FIBER OPTIC PULL BOX PER DETAILS D AND E/C-002 (TYP).
8. PROVIDE SLACK ENCLOSURE AND 100 FOOT CABLE ON EXISTING POLE. TERMINATION OF FIBERS BY NTUA. ENCLOSURE: CARLON SLK12 OR EQUAL.

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SCALE IN FEET

Brown and Caldwell

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APPROVED:  DATE: 6/02/17

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SCALE: NONE
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EXTERNAL REFERENCE FILES

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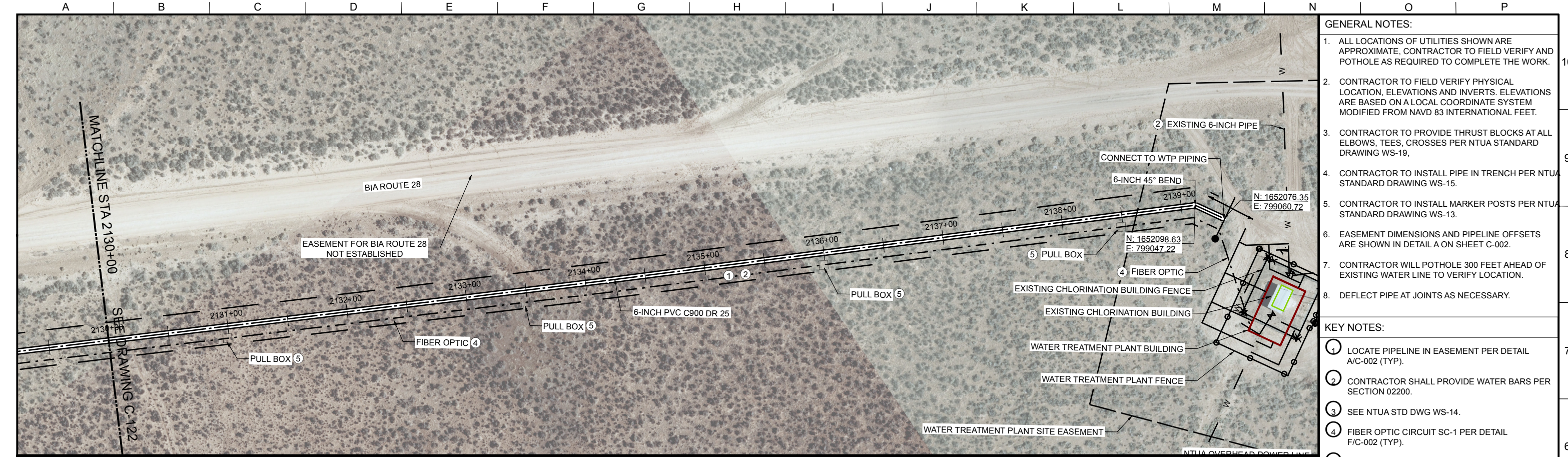
REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.



LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

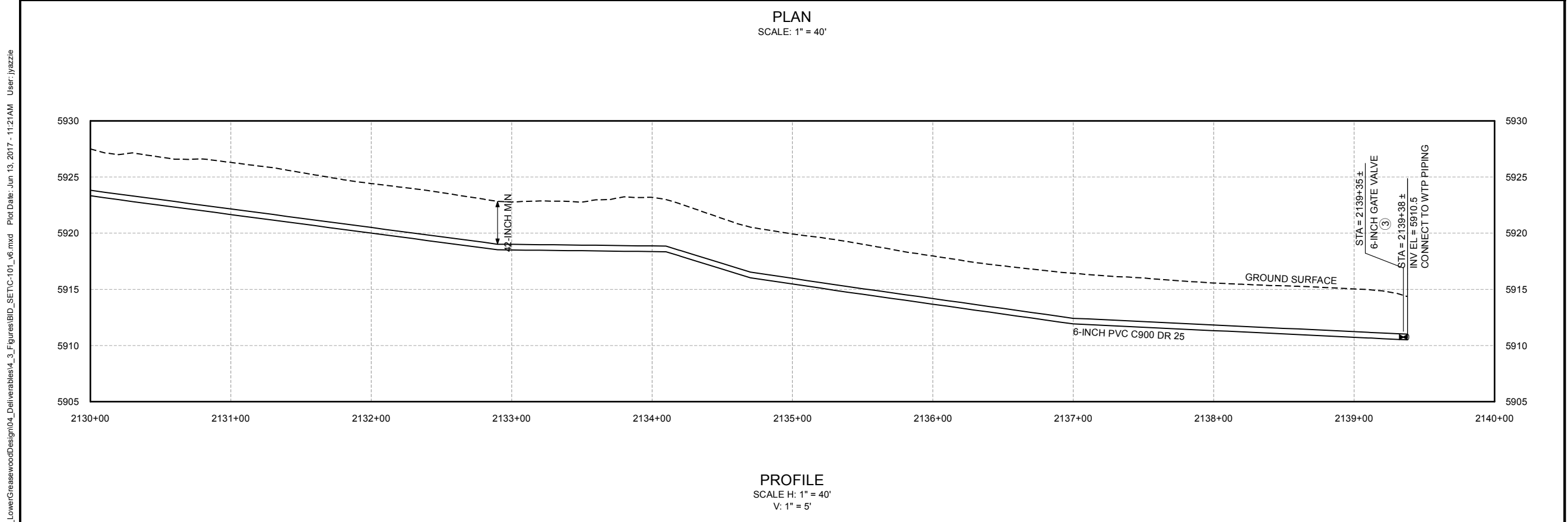
CIVIL
STA 2110+00 TO STA 2120+00
PLAN AND PROFILE

FILENAME
C-101.mxd
BC PROJECT NUMBER
143956
DRAWING NUMBER
C-121
SHEET NUMBER
29 OF 36



- GENERAL NOTES:
1. ALL LOCATIONS OF UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY AND POTHOLE AS REQUIRED TO COMPLETE THE WORK.
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 4. CONTRACTOR TO INSTALL PIPE IN TRENCH PER NTUA STANDARD DRAWING WS-15.
 5. CONTRACTOR TO INSTALL MARKER POSTS PER NTUA STANDARD DRAWING WS-13.
 6. EASEMENT DIMENSIONS AND PIPELINE OFFSETS ARE SHOWN IN DETAIL A ON SHEET C-002.
 7. CONTRACTOR WILL POTHOLE 300 FEET AHEAD OF EXISTING WATER LINE TO VERIFY LOCATION.
 8. DEFLECT PIPE AT JOINTS AS NECESSARY.

- KEY NOTES:
1. LOCATE PIPELINE IN EASEMENT PER DETAIL A/C-002 (TYP).
 2. CONTRACTOR SHALL PROVIDE WATER BARS PER SECTION 02200.
 3. SEE NTUA STD DWG WS-14.
 4. FIBER OPTIC CIRCUIT SC-1 PER DETAIL F/C-002 (TYP).
 5. FIBER OPTIC PULL BOX PER DETAILS D AND E/C-002 (TYP).



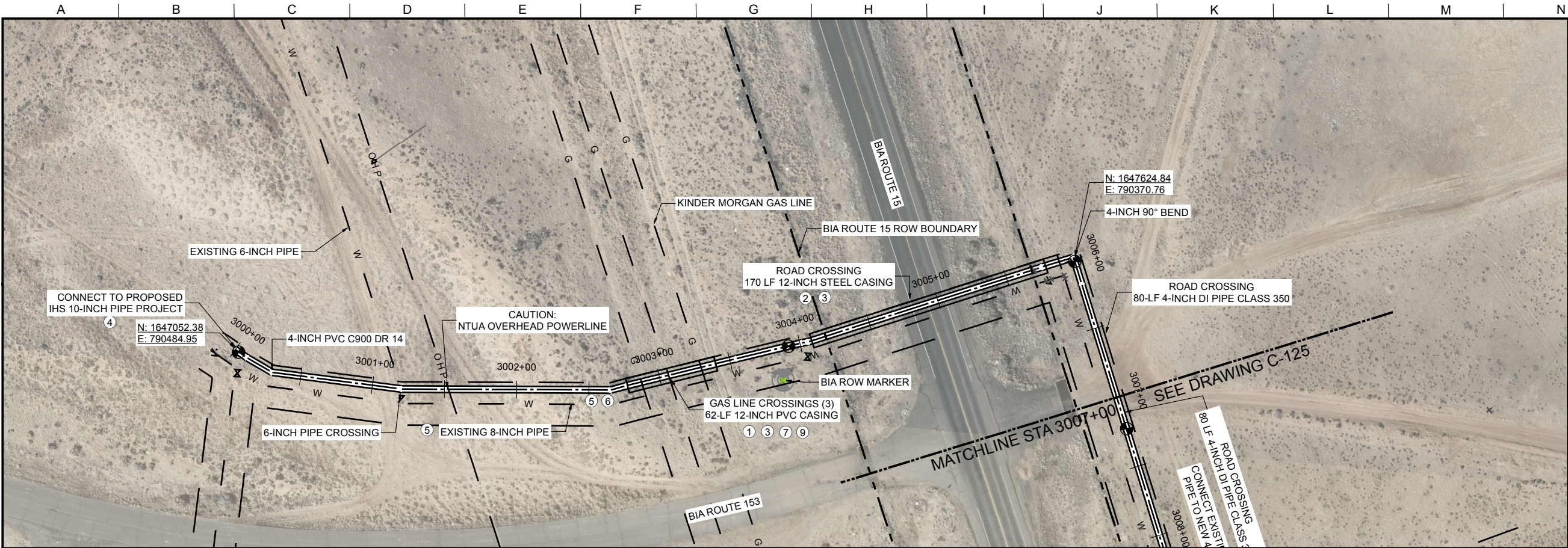
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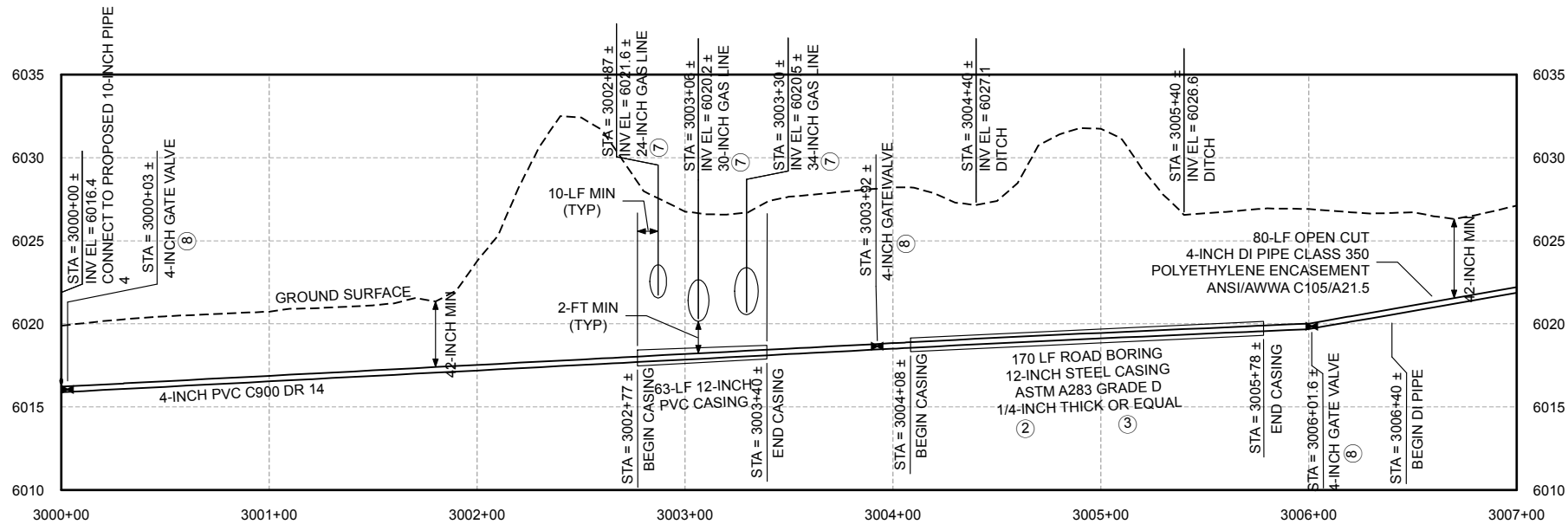
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In Maricopa County: (602) 263-1100

Brown and Caldwell SALT LAKE CITY, UTAH	LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)	EXTERNAL REFERENCE FILES	BID ISSUE		REVISIONS							LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER GREASEWOOD INTERCONNECTION PIPELINES	FILENAME C-101.mxd
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SUBMITTED:	DATE: 6/02/17												DRAWING NUMBER C-123
APPROVED:	DATE: 6/02/17												SHEET NUMBER 31 OF 36

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PLAN
SCALE: 1" = 40'



PROFILE
SCALE H: 1" = 40'
V: 1" = 5'

GENERAL NOTES:

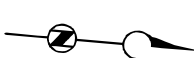
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4. CONTRACTOR TO INSTALL PIPE IN TRENCH PER NTUA STANDARD DRAWING WS-15.
5. CONTRACTOR TO INSTALL MARKER POSTS PER NTUA STANDARD DRAWING WS-13.
6. EASEMENT DIMENSIONS AND PIPELINE OFFSETS ARE SHOWN IN DETAIL A ON SHEET C-002.
7. CONTRACTOR WILL POTHOLE 300 FEET AHEAD OF EXISTING WATER LINE TO VERIFY LOCATION.
8. DEFLECT PIPE AT JOINTS AS NECESSARY.

KEY NOTES:

1. CONTRACTOR SHALL INSTALL PVC CASING PER IHS STANDARD DRAWING W-13.
2. CONTRACTOR SHALL INSTALL STEEL CASING PER NTUA STANDARD DRAWING WS-17a.

CAUTION TO CONTRACTOR: CONTRACTOR SHALL BE RESPONSIBLE FOR HDD MEANS AND METHODS INCLUDING BUT NOT LIMITED TO SELECTION OF HDD EQUIPMENT, DRILLING MUD, SPOILS REMOVAL, ALIGNMENT CONTROL AND BORE PATH SUBJECT TO REVIEW BY THE ENGINEER.
3. CONTRACTOR SHALL INSTALL PVC PIPE IN CASING PER NTUA STANDARD DRAWING WS-18.
4. SEE CONNECTION DETAIL B/C-004.
5. LOCATE PIPE IN EASEMENT PER DETAIL A/C-002 (TYP).
6. CONTRACTOR SHALL PROVIDE WATER BARS PER SECTION 02200.
7. SEE IHS STD DWG W-13.
8. SEE NTUA STD DWG WS-14.
9. HYDROVAC METHOD FOR EXCAVATION WORK SHALL BE PERFORMED IN ACCORDANCE WITH KINDER MORGAN STANDARDS.

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Brown and Caldwell

SALT LAKE CITY, UTAH

SUBMITTED: *[Signature]* DATE: 6/02/17

APPROVED: *[Signature]* DATE: 6/02/17

LINE IS 2 INCHES
AT FULL SIZE
(IF NOT 2" - SCALE ACCORDINGLY)

SCALE: NONE

DESIGNED: JY

DRAWN: JY

CHECKED: TR

APPROVED: MK

EXTERNAL REFERENCE FILES

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ZONE	REV.	DESCRIPTION	BY	DATE	APP.



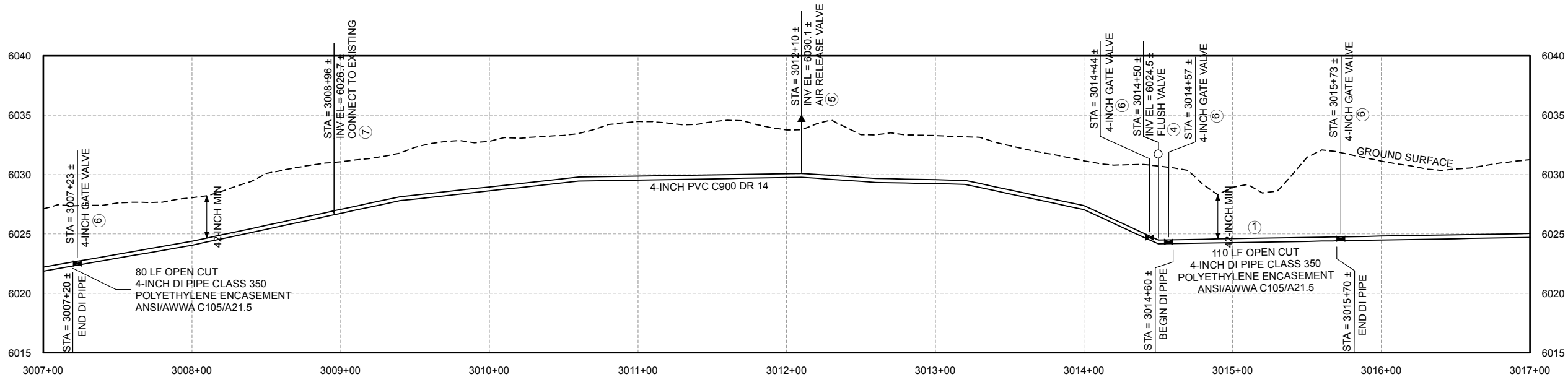
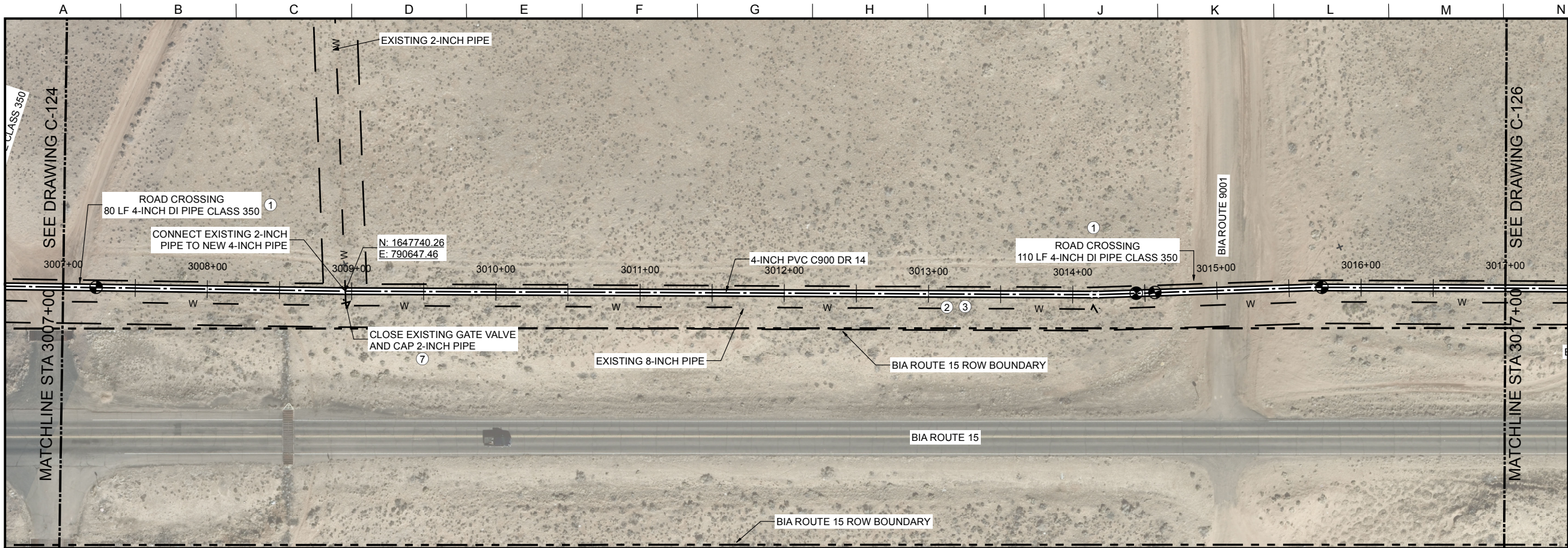
LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

CIVIL

STA 3000+00 TO STA 3007+00
PLAN AND PROFILE

FILENAME C-101.mxd
BC PROJECT NUMBER 143956
DRAWING NUMBER C-124
SHEET NUMBER 32 OF 36

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- KEY NOTES:
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 - 2 LOCATE PIPELINE IN EASEMENT PER DETAIL A/C-002 (TYP).
 - 3 CONTRACTOR SHALL PROVIDE WATER BARS PER SECTION 02200.
 - 4 SEE NTUA STD DWG WS-11.
 - 5 SEE NTUA STD DWG WS-10.
 - 6 SEE NTUA STD DWG WS-14.
 - 7 SEE CONNECTION DETAIL C/C-004.

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Brown and Caldwell

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SUBMITTED:  PROJECT MANAGER DATE: 6/02/17

APPROVED:  DATE: 6/02/17

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)

SCALE: NONE

DESIGNED: JY


DRAWN: JY

CHECKED: TR

APPROVED: MK

EXTERNAL REFERENCE FILES

BID ISSUE


MICHAEL P. KOBE
Date Signed: 6/2/2017
ARIZONA, U.S.A.
Expires 12/31/18

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ZONE	REV.	DESCRIPTION	BY	DATE	APP.



LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

CIVIL
STA 3007+00 TO STA 3017+00
PLAN AND PROFILE

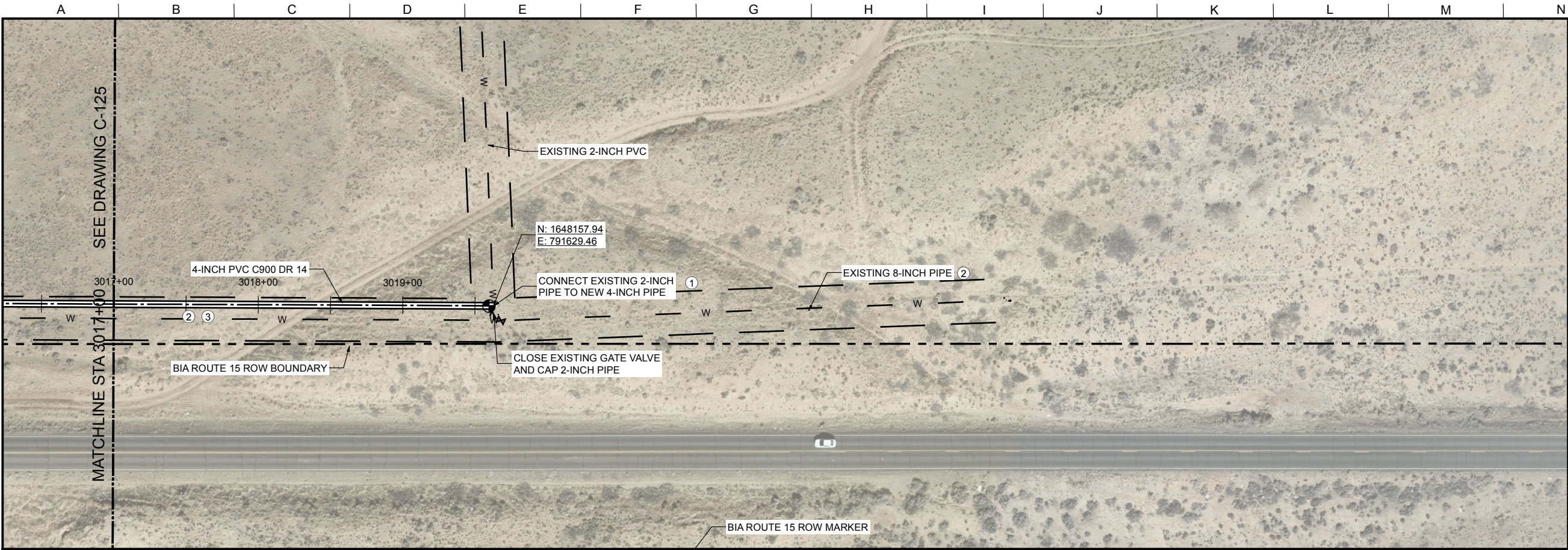
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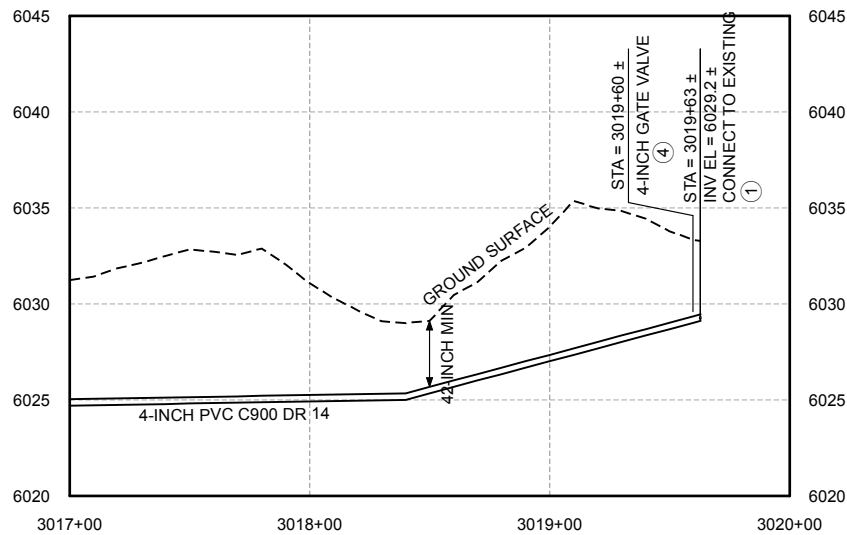
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SHEET NUMBER
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PLAN
SCALE: 1" = 40'



PROFILE
SCALE H: 1" = 40'
V: 1" = 5'

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8. DEFLECT PIPE AT JOINTS AS NECESSARY.

KEY NOTES:

- 1 SEE CONNECTION DETAIL D/C-004.
- 2 LOCATE PIPELINE IN EASEMENT PER DETAIL A/C-002 (TYP).
- 3 CONTRACTOR SHALL PROVIDE WATER BARS PER SECTION 02200.
- 4 SEE NTUA STD DWG WS-14.

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SCALE IN FEET

Brown and Caldwell

SALT LAKE CITY, UTAH

SUBMITTED: *[Signature]* DATE: 6/02/17

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APPROVED: MK

EXTERNAL REFERENCE FILES

BID ISSUE



REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	APP.



LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES

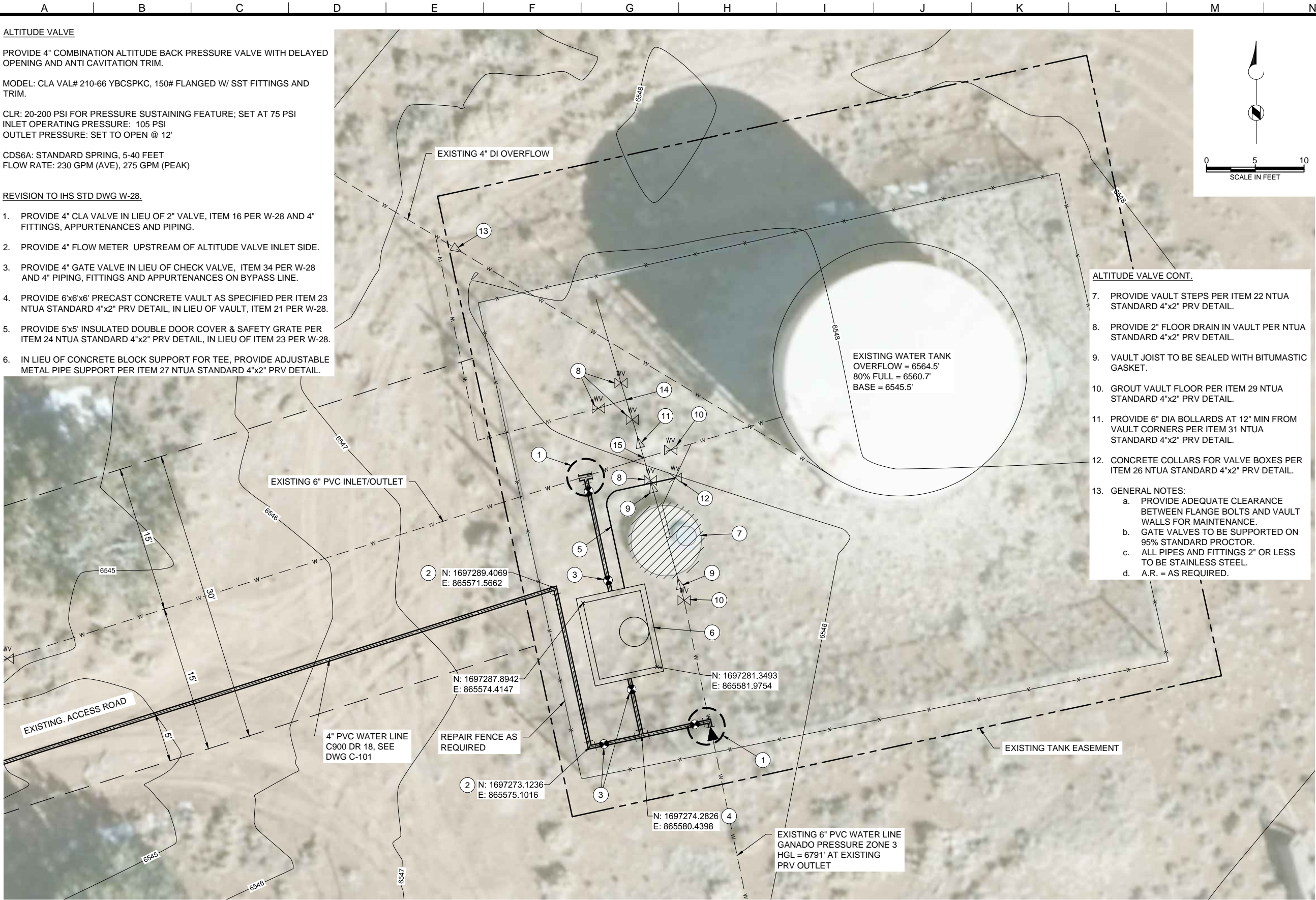
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STA 3017+00 TO STA 3020+00

PLAN AND PROFILE

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BC PROJECT NUMBER 143956
DRAWING NUMBER C-126
SHEET NUMBER 34 OF 36

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ALTITUDE VALVE

PROVIDE 4" COMBINATION ALTITUDE BACK PRESSURE VALVE WITH DELAYED OPENING AND ANTI CAVITATION TRIM.

MODEL: CLA VAL# 210-66 YBCSPKC, 150# FLANGED W/ SST FITTINGS AND TRIM.

CLR: 20-200 PSI FOR PRESSURE SUSTAINING FEATURE; SET AT 75 PSI
INLET OPERATING PRESSURE: 105 PSI
OUTLET PRESSURE: SET TO OPEN @ 12'

CDS6A: STANDARD SPRING, 5-40 FEET
FLOW RATE: 230 GPM (AVE), 275 GPM (PEAK)

REVISION TO IHS STD DWG W-28.

1. PROVIDE 4" CLA VALVE IN LIEU OF 2" VALVE, ITEM 16 PER W-28 AND 4" FITTINGS, APPURTENANCES AND PIPING.
2. PROVIDE 4" FLOW METER UPSTREAM OF ALTITUDE VALVE INLET SIDE.
3. PROVIDE 4" GATE VALVE IN LIEU OF CHECK VALVE, ITEM 34 PER W-28 AND 4" PIPING, FITTINGS AND APPURTENANCES ON BYPASS LINE.
4. PROVIDE 6'x6' PRECAST CONCRETE VAULT AS SPECIFIED PER ITEM 23 NTUA STANDARD 4"x2" PRV DETAIL, IN LIEU OF VAULT, ITEM 21 PER W-28.
5. PROVIDE 5'x5' INSULATED DOUBLE DOOR COVER & SAFETY GRATE PER ITEM 24 NTUA STANDARD 4"x2" PRV DETAIL, IN LIEU OF ITEM 23 PER W-28.
6. IN LIEU OF CONCRETE BLOCK SUPPORT FOR TEE, PROVIDE ADJUSTABLE METAL PIPE SUPPORT PER ITEM 27 NTUA STANDARD 4"x2" PRV DETAIL.

ALTITUDE VALVE CONT.

7. PROVIDE VAULT STEPS PER ITEM 22 NTUA STANDARD 4"x2" PRV DETAIL.
8. PROVIDE 2" FLOOR DRAIN IN VAULT PER NTUA STANDARD 4"x2" PRV DETAIL.
9. VAULT JOIST TO BE SEALED WITH BITUMASTIC GASKET.
10. GROUT VAULT FLOOR PER ITEM 29 NTUA STANDARD 4"x2" PRV DETAIL.
11. PROVIDE 6" DIA BOLLARDS AT 12" MIN FROM VAULT CORNERS PER ITEM 31 NTUA STANDARD 4"x2" PRV DETAIL.
12. CONCRETE COLLARS FOR VALVE BOXES PER ITEM 26 NTUA STANDARD 4"x2" PRV DETAIL.
13. GENERAL NOTES:
 - a. PROVIDE ADEQUATE CLEARANCE BETWEEN FLANGE BOLTS AND VAULT WALLS FOR MAINTENANCE. GATE VALVES TO BE SUPPORTED ON 95% STANDARD PROCTOR.
 - b. ALL PIPES AND FITTINGS 2" OR LESS TO BE STAINLESS STEEL.
 - c. A.R. = AS REQUIRED.

GENERAL NOTES:

1. ALL LOCATIONS OF UTILITIES SHOWN ARE APPROXIMATE, CONTRACTOR TO FIELD VERIFY AND POTHOLE AS REQUIRED TO COMPLETE THE WORK.
2. CONTRACTOR TO FIELD VERIFY PHYSICAL LOCATION, ELEVATIONS AND INVERTS. ELEVATIONS ARE BASED ON A LOCAL COORDINATE SYSTEM MODIFIED FROM NAVD 83 INTERNATIONAL FEET.
3. CONTRACTOR TO PROVIDE THRUST BLOCKS AT ALL ELBOWS, TEES, CROSSES PER NTUA STANDARD DRAWING WS-19.
4. CONTRACTOR TO INSTALL PIPE IN TRENCH PER NTUA STANDARD DRAWING WS-15.
5. CONTRACTOR TO INSTALL MARKER POSTS PER NTUA STANDARD DRAWING WS-13.
6. EASEMENT DIMENSIONS AND PIPELINE OFFSETS ARE SHOWN IN DETAIL A ON SHEET C-002.

KEY NOTES:

- ① SEE CONNECTION DETAIL A/C-003
- ② 4" ELBOW
- ③ 4" GATE VALVE PER NTUA STD DWG WS-14 AND SECTION 15102
- ④ 4" TEE
- ⑤ 1" PE SENSING LINE. CONNECT TO EXISTING 1" SADDLE & CORP STOP
- ⑥ 4" ALTITUDE VALVE & VAULT PER IHS STD DWG W-28 AND AS SPECIFIED
- ⑦ ABANDON EXISTING 2" ALTITUDE VALVE & VAULT
- ⑧ EXISTING 4" GATE VALVE. CLOSE VALVE AND REMOVE VALVE BOX
- ⑨ EXISTING 6" x 2" CAP TAP
- ⑩ EXISTING 6" GATE VALVE
- ⑪ EXISTING 6" x 4" REDUCER
- ⑫ EXISTING 1" CORP STOP
- ⑬ EXISTING 4" x 3" REDUCER
- ⑭ EXISTING 4" TEE
- ⑮ EXISTING 6" CROSS

Call at least two full working days before you begin excavation.

ARIZONA811
Arizona Blue Stake, Inc.

Dial 8-1-1 or 1-800-STAKE-IT (782-5348) in Maricopa County: (602) 263-1100

Brown and Caldwell

SALT LAKE CITY, UTAH

SUBMITTED:  DATE: 6/2/17
APPROVED:  DATE: 6/2/17

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)
SCALE: 1" = 10'
DESIGNED: MK
DRAWN: DD
CHECKED: TR
APPROVED: MK

EXTERNAL REFERENCE FILES	

BID ISSUE



REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.

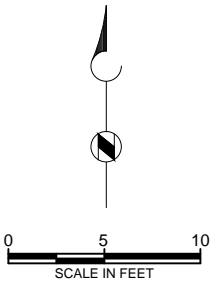
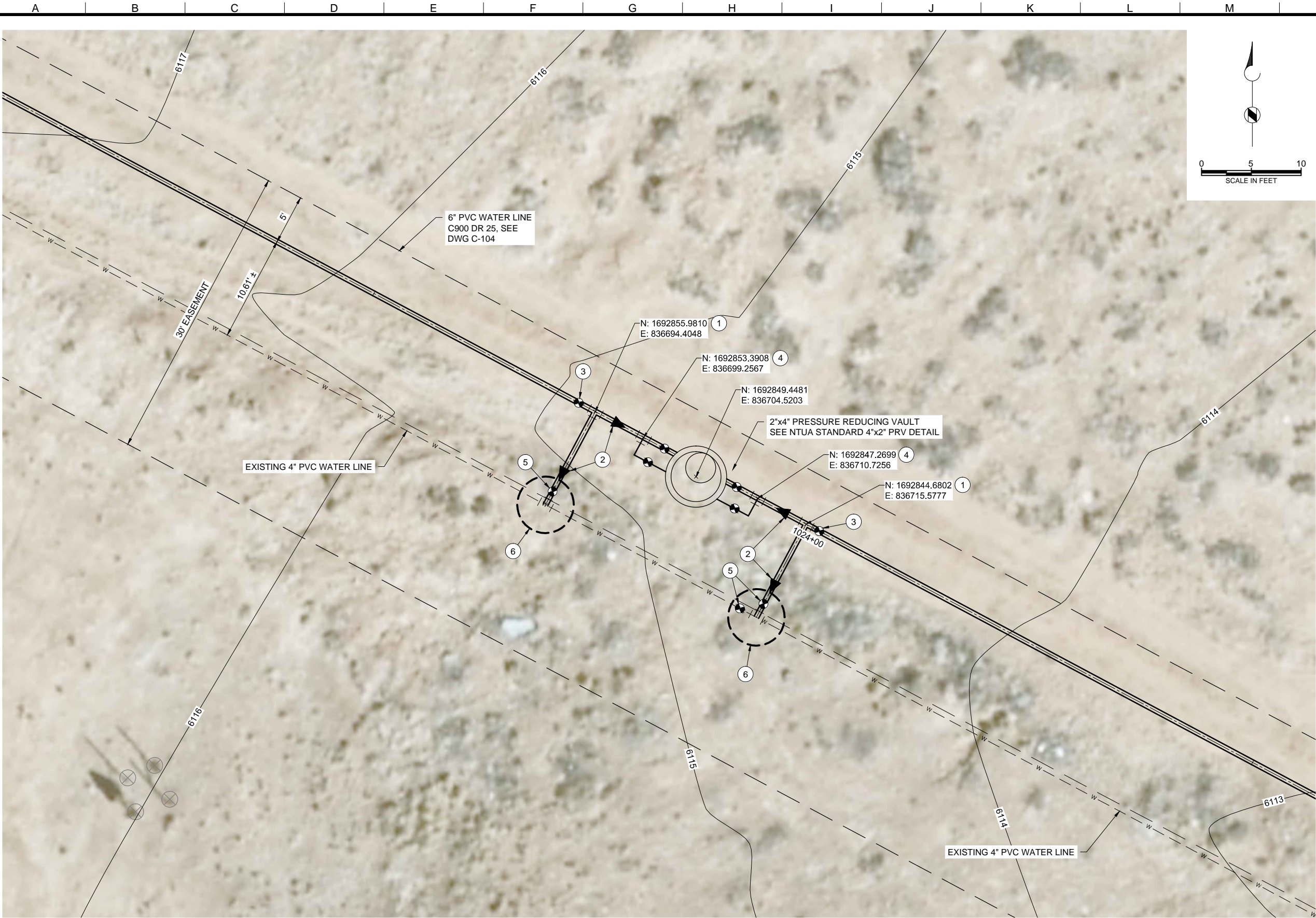


LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES
CIVIL

CORNFIELDS EAST TANK
SITE PLAN

FILENAME PIPE_C-127.dwg BC PROJECT NUMBER 143956
DRAWING NUMBER C-127
SHEET NUMBER 35 OF 36

Path: P:\Projects\Navajo Nation\143956_lowergreasewooddesign\CAD\Contract No. 2 - Interconnection Pipelines\2-Sheets\Civil File Name: PIPE_C-128.dwg Plot Date: June 13, 2017 - 7:26 AM CADD User: David Davids



- GENERAL NOTES:
1. ALL LOCATIONS OF UTILITIES SHOWN ARE APPROXIMATE, CONTRACTOR TO FIELD VERIFY AND POTHOLE AS REQUIRED TO COMPLETE THE WORK.
 2. CONTRACTOR TO FIELD VERIFY PHYSICAL LOCATION, ELEVATIONS AND INVERTS. ELEVATIONS ARE BASED ON A LOCAL COORDINATE SYSTEM MODIFIED FROM NAVD 83 INTERNATIONAL FEET.
 3. CONTRACTOR TO PROVIDE THRUST BLOCKS AT ALL ELBOWS, TEES, CROSSES PER NTUA STANDARD DRAWING WS-19.
 4. CONTRACTOR TO INSTALL PIPE IN TRENCH PER NTUA STANDARD DRAWING WS-15.
 5. CONTRACTOR TO INSTALL MARKER POSTS PER NTUA STANDARD DRAWING WS-13.
 6. EASEMENT DIMENSIONS AND PIPELINE OFFSETS ARE SHOWN IN DETAIL A ON SHEET C-002.

- KEY NOTES:
- ① 6" TEE
 - ② 6" x 4" REDUCER
 - ③ 6" GATE VALVE PER NTUA STD DWG WS-14 AND SECTION 15102
 - ④ 4" TEE
 - ⑤ 4" GATE VALVE
 - ⑥ 4" TEE PER DETAIL C/C-002

Call at least two full working days before you begin excavation.

ARIZONA811
Arizona Blue Stake, Inc.

Dial 8-1-1 or 1-800-STAKE-IT (782-5348) in Maricopa County: (602) 263-1100

Brown and Caldwell

SALT LAKE CITY, UTAH

SUBMITTED:  DATE: 6/2/17
APPROVED:  DATE: 6/2/17

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)
SCALE: 1" = 10'
DESIGNED: MK
DRAWN: DD
CHECKED: TR
APPROVED: MK

EXTERNAL REFERENCE FILES	

BID ISSUE



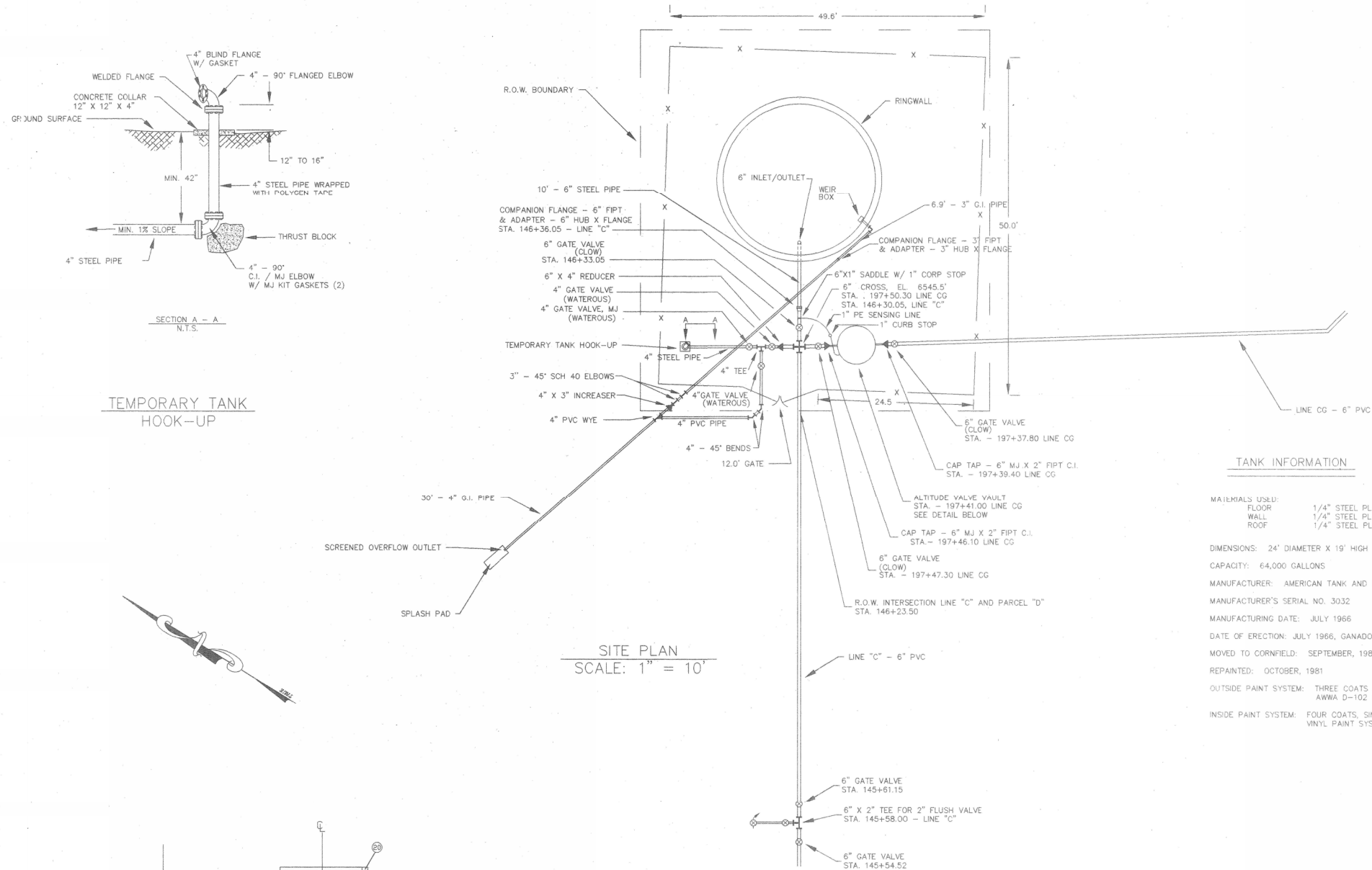
REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.

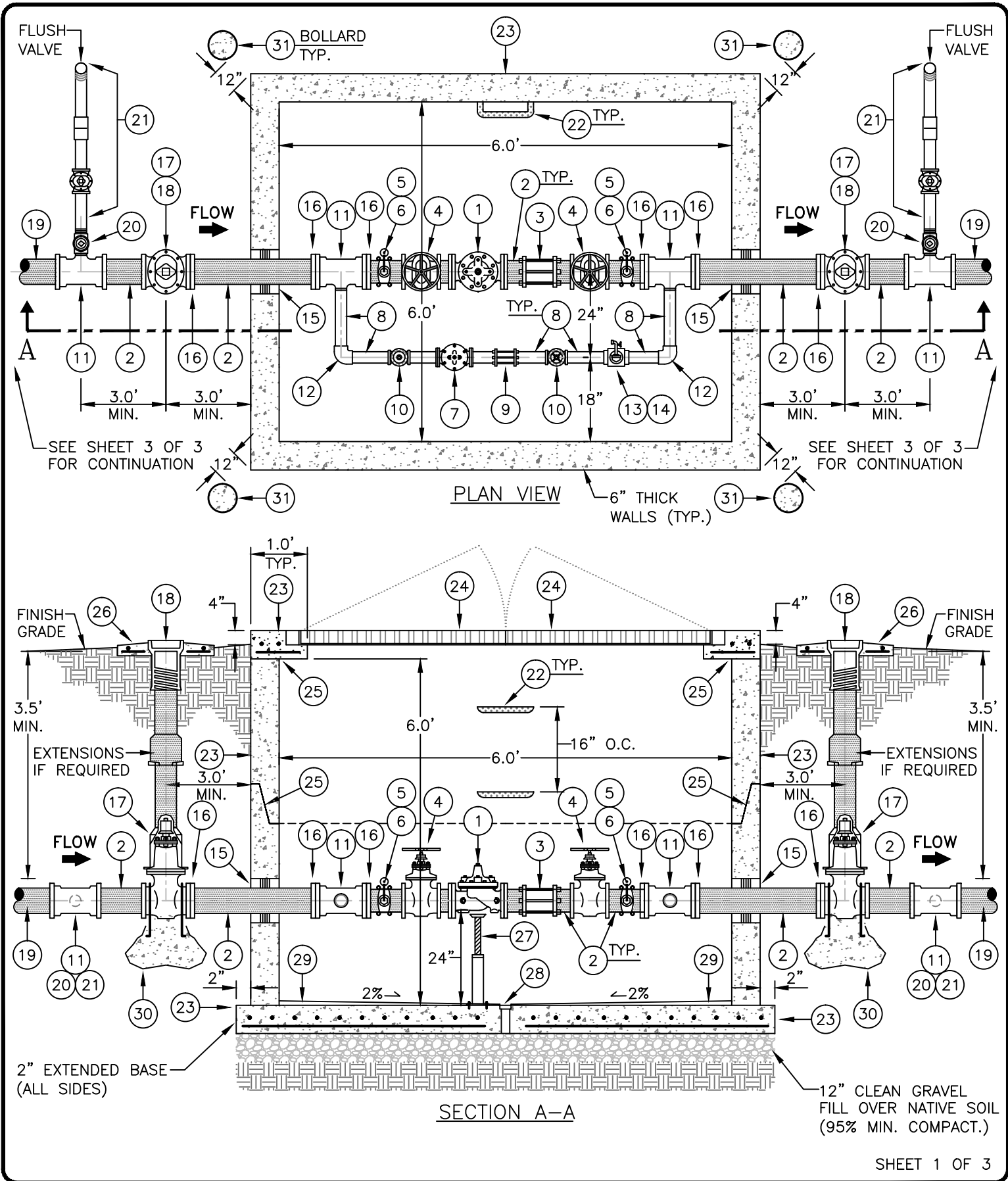


LOWER GREASEWOOD WATER SYSTEM IMPROVEMENTS
DRAWINGS FOR CORNFIELDS PARALLEL AND LOWER
GREASEWOOD INTERCONNECTION PIPELINES
CIVIL

CORNFIELDS PRV SITE PLAN

FILENAME PIPE_C-128.dwg BC PROJECT NUMBER 143956
DRAWING NUMBER C-128
SHEET NUMBER 36 OF 36





SHEET 1 OF 3

DESIGNED BY:	NTUA
SURVEYED BY:	-
DRAFTED BY:	NTUA
APPROVED BY:	NTUA
DATE:	12/2014
PROJECT NO.:	-
SCALE:	NTS
ACAD FILENAME:	NTUA Water Details.dwg
DETAIL NO.:	Custom Detail

NAVAJO TRIBAL UTILITY AUTHORITY
CIVIL ENGINEERING DEPARTMENT

4" x 2" P.R.V.

E&TS HEADQUARTERS

FT.DEFIANCE, AZ

REVISIONS

No.	Date	Brief	By
01	12/14	2014 Addition	A.S.
02			
03			
04			
05			
06			



4" x 2" P.R.V.

#

MATERIAL LIST

ITEM	QTY	DESCRIPTION
1	1	4" CLA-VAL, PRESSURE REDUCING VALVE, THREADED ENDS, STAINLESS STEEL (S.S.) TRIM & PILOT TUBING, 90 SERIES W/ OPTIONS A, B, C, D, V & M
2	A.R.	4" DUCTILE IRON (D.I.) PIPE, CLASS 350, PLAIN END, CUT AS NEEDED
3	1	4" DRESSER COUPLING (6" LONG FOR D.I. PIPE)
4	2	4" GATE VALVE, F.I.P.T., N.R.S., R.H.T., HAND WHEEL
5	2	2" DOUBLE STRAP W/ 2" x 3/4" BUSHING AND 3/4" x 1/4" BUSHING FOR PRESSURE GAGE
6	2	PRESSURE GAUGE W/ 1/4" BRASS SHUTOFF VALVE
7	1	2" CLA-VAL, PRESSURE REDUCING VALVE, THREADED ENDS, STAINLESS STEEL (S.S.) TRIM & PILOT TUBING, 90 SERIES W/ OPTIONS A, B, C, D, V & M
8	A.R.	2" S.S. PIPE, THREADED, CUT AS NEEDED
9	1	2" DRESSER COUPLING (6" LONG FOR S.S. PIPE)
10	2	2" GATE VALVE, F.I.P.T., N.R.S., R.H.T., HAND WHEEL
11	4	4" x 4" x 2" D.I., M.J. TAPPED TEE, CLASS 350, FLANGED
12	2	2" 90° S.S. ELBOW, F.I.P.T.
13	1	2" S.S. HOSE BIB
14	1	2" S.S. TEE W/ 2" x 3/4" BUSHING AND 3/4" x 1/4" BUSHING FOR HOSE BIB
15	2	VAULT BORE DONUT, 6" W/ 4" HOLE
16	6	4" D.I. 'E-Z' FLANGED ADAPTER, CLASS 350
17	2	4" GATE VALVE, M.J., RESILIENT SEAT, FLANGED, N.R.S., R.H.T., W/ 2" OPERATING NUT
18	4	VALVE BOX, 2-PIECE SCREW TYPE, 5-1/4" SHAFT W/ CAST IRON DROP LID
19	-	4" SDR-21 PVC PIPE -OR- EXISTING WATER LINE
20	2	2" CORPORATION STOP, MIPT x FIPT
21	2	INSTALL 2" FLUSH VALVE PER NTUA STD. DTL. WS-11 (AFTER THE CORP. STOP)
22	A.R.	PLASTIC COATED STEEL OR ALUMINUM STEP @ 16" O.C., INSTALL TO 12" ABOVE VAULT FLOOR
23	1	6' x 6' x 6' (INT. DIM.) PRECAST CONCRETE VAULT (4,000 PSI MIN.), 6" THICK WALLS W/ 6" THICK REINFORCED CONCRETE TOP (NON-TRAFFIC RATED) AND 6" REINFORCED CONCRETE BASE
24	1	5' x 5' SQ., INSULATED, DOUBLE DOOR COVER AND SAFETY GRATE, ALUMINUM CHANNEL FRAME W/ T-HANDLE SLAM LOCK AND COVERED PADLOCK CLIP
25	A.R.	VAULT JOINTS TO BE SEALED WITH BITUMASTIC GASKET
26	4	24" x 24" x 4" CONCRETE COLLAR W/ #4 REBAR, E.W., INDICATE PIPE SIZE & FLOW DIRECTION
27	2	ADJUSTABLE METAL PIPE SUPPORT (UNDER BOTH PRV'S INSIDE VAULT)
28	1	2" FLOOR DRAIN W/ SCREEN, DRAIN TO 5" CLEAN GRAVEL (ADJUST PER FIELD CONDITIONS)
29	A.R.	CEMENT, NON-SHRINK GROUT, SLOPE FINISH @ 2% (0.02%) TOWARD VAULT DRAIN
30	A.R.	CONCRETE ANCHOR BLOCK PER NTUA STD. DTL. WS-19 & WS-19a
31	4	6" DIA. BOLLARDS AT 12" MIN. FROM VAULT CORNERS PER MAG. STD. 140, TYPE 1

GENERAL NOTES:

1. PROVIDE ADEQUATE CLEARANCE BETWEEN FLANGE BOLTS AND VAULT WALLS FOR MAINTENANCE.
2. GATE VALVES TO BE SUPPORTED ON 95% STANDARD PROCTOR.
3. ALL PIPES AND FITTINGS ~~4"~~ OR LESS TO BE STAINLESS STEEL. **2-INCH**
4. HEX HEAD BOLTS/NUTS TO BE STAINLESS STEEL, TYPE 304.
5. A.R. = AS REQUIRED.

SHEET 2 OF 3

DESIGNED BY:	NTUA
SURVEYED BY:	-
DRAFTED BY:	NTUA
APPROVED BY:	NTUA
DATE:	12/2014
PROJECT NO.:	-
SCALE:	NTS
ACAD FILENAME:	NTUA Water Details.dwg
DETAIL NO.:	Custom Detail

NAVAJO TRIBAL UTILITY AUTHORITY
CIVIL ENGINEERING DEPARTMENT

MATERIAL LIST:
4" x 2" P.R.V.

E&TS HEADQUARTERS

FT.DEFIANCE, AZ

REVISIONS

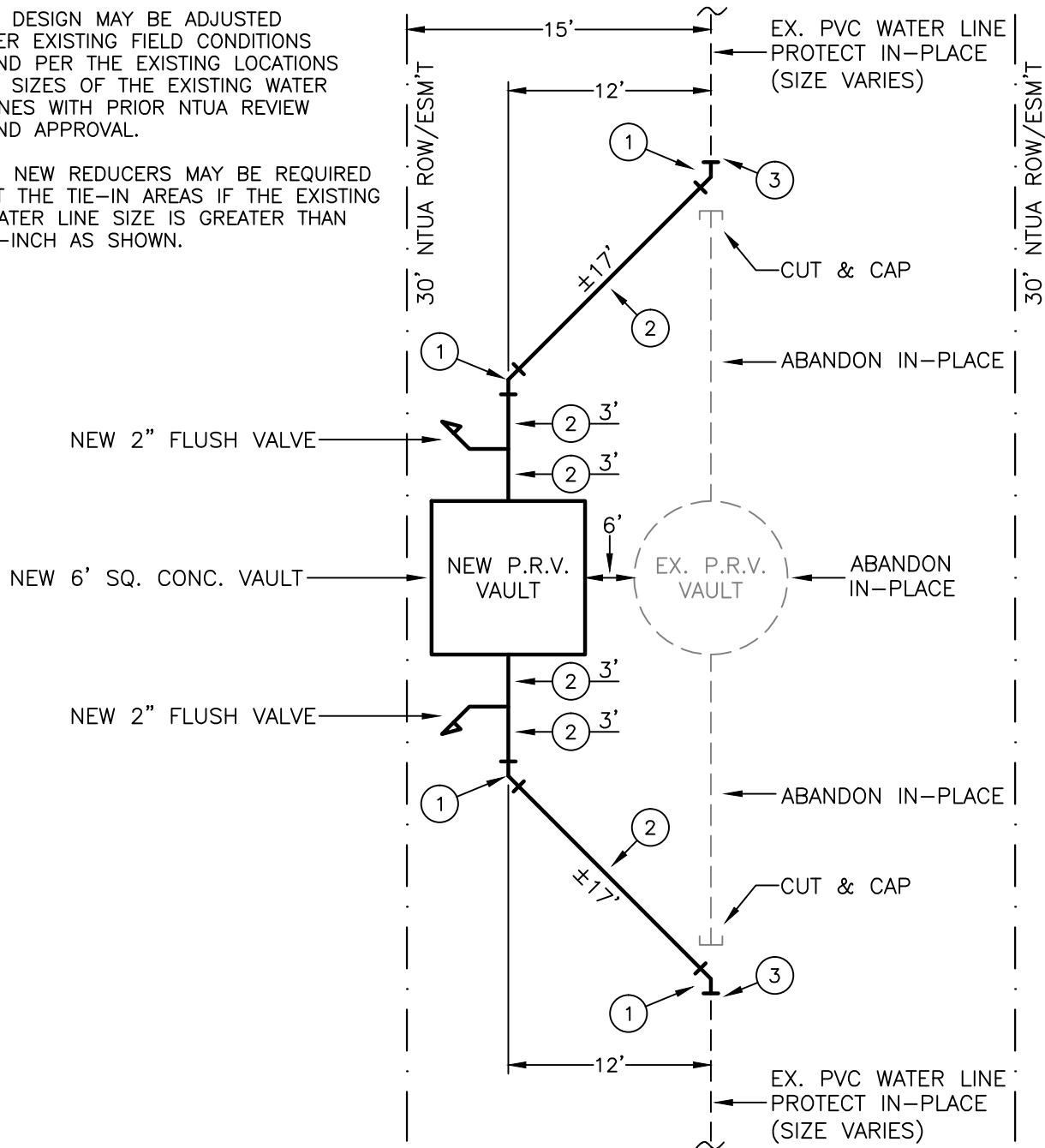
No.	Date	Brief	By
01	12/14	2014 Addition	A.S.
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GENERAL NOTES:

1. DESIGN MAY BE ADJUSTED PER EXISTING FIELD CONDITIONS AND PER THE EXISTING LOCATIONS & SIZES OF THE EXISTING WATER LINES WITH PRIOR NTUA REVIEW AND APPROVAL.

2. NEW REDUCERS MAY BE REQUIRED AT THE TIE-IN AREAS IF THE EXISTING WATER LINE SIZE IS GREATER THAN 4-INCH AS SHOWN.



CONCRETE VAULT INSTALLATION AREA (4" x 2" P.R.V.)

# MATERIAL LIST		
ITEM	QTY	DESCRIPTION
1	4	4" x 45 DEGREE ELL, D.I.P., CLASS 350, MJ, W/ CONCRETE THRUST BLOCK PER WS-19
2	A.R.	4" D.I. PIPE, CLASS 350, PLAIN END, CUT AS NEEDED
3	2	4" D.I. TRANSITION COUPLING, CLASS 350, D.I. x P.V.C. (IPS) 6" LONG

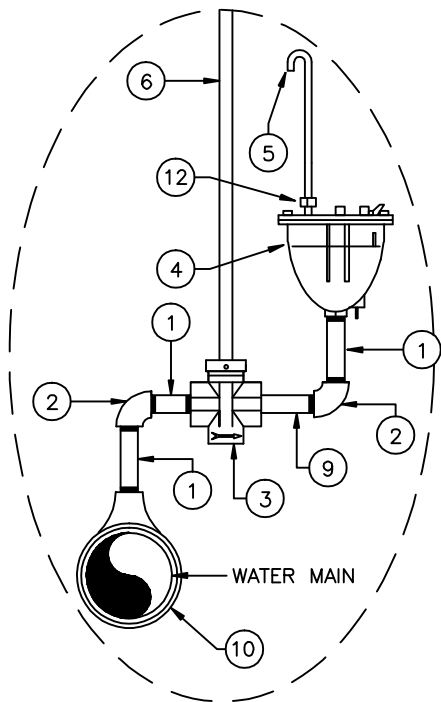
SHEET 3 OF 3

DESIGNED BY:	NTUA
SURVEYED BY:	-
DRAFTED BY:	NTUA
APPROVED BY:	NTUA
DATE:	12/2014
PROJECT NO.:	-
SCALE:	NTS
ACAD FILENAME:	NTUA Water Details.dwg
DETAIL NO.:	Custom Detail

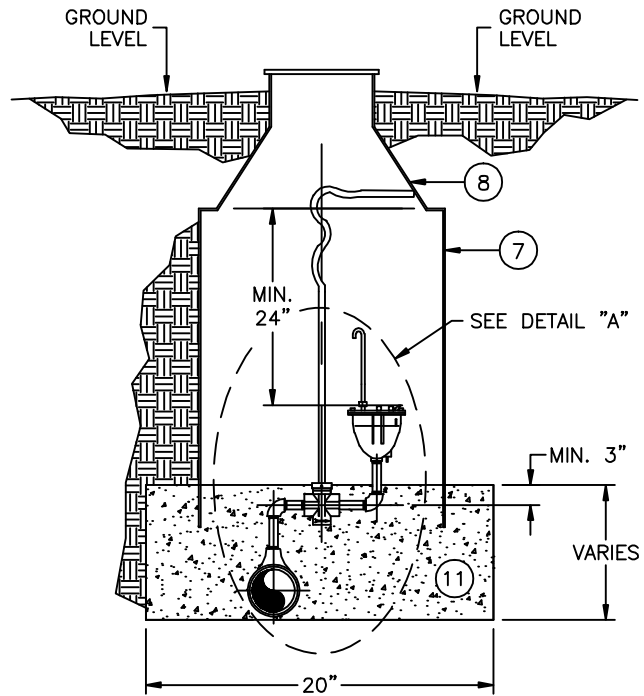
NAVAJO TRIBAL UTILITY AUTHORITY
CIVIL ENGINEERING DEPARTMENT
CONCRETE VAULT INSTALLATION
AREA (4" x 2" P.R.V.)
E&TS HEADQUARTERS **FT. DEFIANCE, AZ**

REVISIONS			
No.	Date	Brief	By
01	12/14	2014 Addition	A.S.
02			
03			
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06			





DETAIL "A"



MATERIAL LIST

ITEM	QUAN	DESCRIPTION
1	3	3/4" x 3" NIPPLE, BRASS
2	2	3/4" x 90° ELBOW, BRASS
3	1	3/4" CURB STOP VALVE, FIPT, MUELLER H-10287, OAE
4	1	3/4" IN x 3/8" OUT AIR RELEASE VALVE
5	1	3/8" O.D. PIPE, COPPER, 12" MIN.
6	1	STATIONARY ROD, 42"
7	1	METER CAN, 20" O.D. x 30" DEPTH, SONOLOC
8	1	METER CAN COVER W/ DOUBLE LID (FROST PLATE) FOR 20" O.D. CAN, CASTING M-70
9	1	3/4" x 6" NIPPLE, BRASS
10	1	SADDLE, BRASS, 3/4" TAP x APPROPRIATE PIPE O.D. SIZE
11	3 CF*	1" TO 2" FILTER ROCK
12	1	ADAPTER, 3/8" MIPT x 1/2" COMPRESSION

*CF = CUBIC FEET

DESIGNED BY:	NTUA
SURVEYED BY:	
DRAWN BY:	NTUA
APPROVED BY:	NTUA
DATE:	04/08
PROJECT NO.	
SCALE:	NTS
ACAD FILENAME:	Water Standard
DWG. NO.	WS-10.DWG

NAVAJO TRIBAL UTILITY AUTHORITY
By Civil Engineering Department

AIR RELEASE VALVE DETAIL

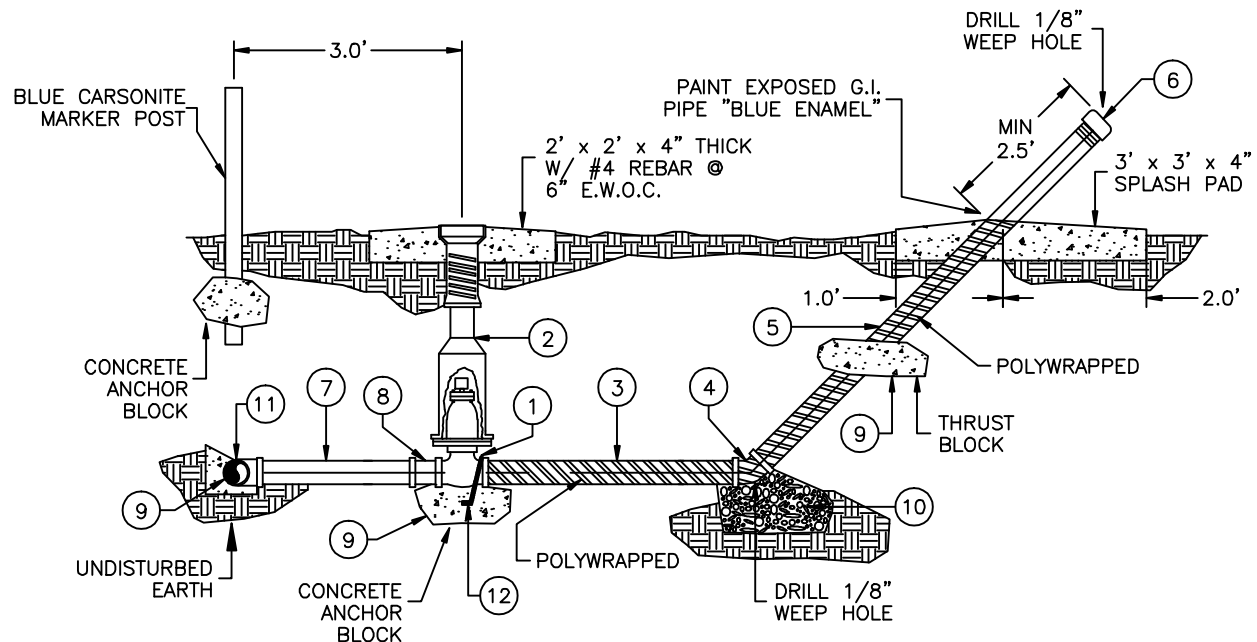
BQ-ENGINEERING

FT. DEFENCE, AZ

REVISIONS

No.	Date	Brief	By
01	04/08	Revised	L.H.
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MATERIAL LIST

ITEM	QUAN	DESCRIPTION
1	1	2' GATE VALVE, C.I., FIPT, RW, NRS, RHT, W/ 2' OPERATING NUT, MUELLER A-2360-37
2	1	VALVE BOX, SCREW-TYPE, C.I., 2 PIECE, 5 1/4" SHAFT, TYLER 6850
3	1	2" x 3' PIPE (MIN.), G.I., COATED OR POLYWRAPPED
4	1	2" x 45° ELBOW, G.I., W/ 1/8" WEEP HOLE
5	1	2" PIPE, G.I. x CUT TO LENGTH AS NEEDED
6	1	2" CAP, G.I. W/ 1/8" VENT HOLE
7	1	2" PIPE, PVC CUT TO LENGTH AS NEEDED
8	1	2" ADAPTER, PVC, SLIP-GASKET x MIPT, SDR-21
9	A.R.	CONCRETE THRUST BLOCK, (DO NOT COVER JOINTS OR BOLTS), MIN. 1.5 CUBIC FEET
10	1.5 CF	CLEAN GRAVEL
11	1	MAIN LINE SADDLE OR TEE
12	A.R.	#4 REBAR

DESIGNED BY:	NTUA
SURVEYED BY:	
DRAWN BY:	NTUA
APPROVED BY:	NTUA
DATE:	04/08
PROJECT NO.	
SCALE:	NTS
ACAD FILENAME:	Water Standard
DWG. NO.	WS-11.DWG

NAVAJO TRIBAL UTILITY AUTHORITY
By Civil Infrastructure Department

2" FLUSH VALVE DETAIL

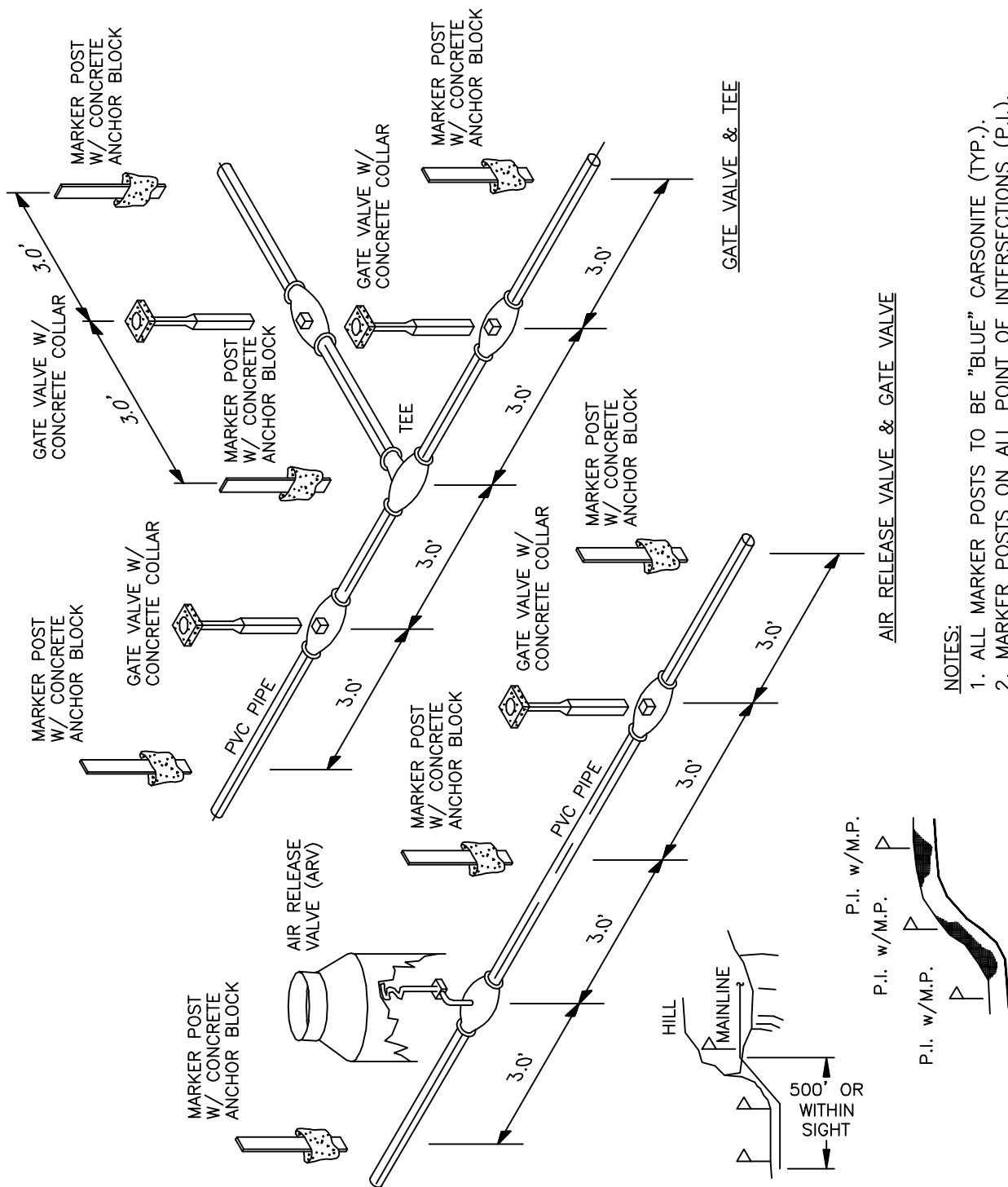
BQ-ENGINEERING

FT. DEFENCE, AZ

REVISIONS

No.	Date	Brief	By
01	04/08	Revised	L.H.
02			
03			
04			
05			
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NOTES:

1. ALL MARKER POSTS TO BE "BLUE" CARSONITE (TYP.).
2. MARKER POSTS ON ALL POINT OF INTERSECTIONS (P.I.).
3. MARKER POSTS ON ALL GRADE CHANGES.
4. MARKER POSTS WILL HAVE A MAX. HEIGHT OF 30 INCHES.

P.I. AND GRADE CHANGES

DESIGNED BY:	NTUA
SURVEYED BY:	
DRAWN BY:	NTUA
APPROVED BY:	NTUA
DATE:	04/08
PROJECT NO.	
SCALE:	NTS
ACAD FILENAME:	Water Standard
DWG. NO.	WS-13.DWG

NAVAJO TRIBAL UTILITY AUTHORITY
By Civil Engineering Department

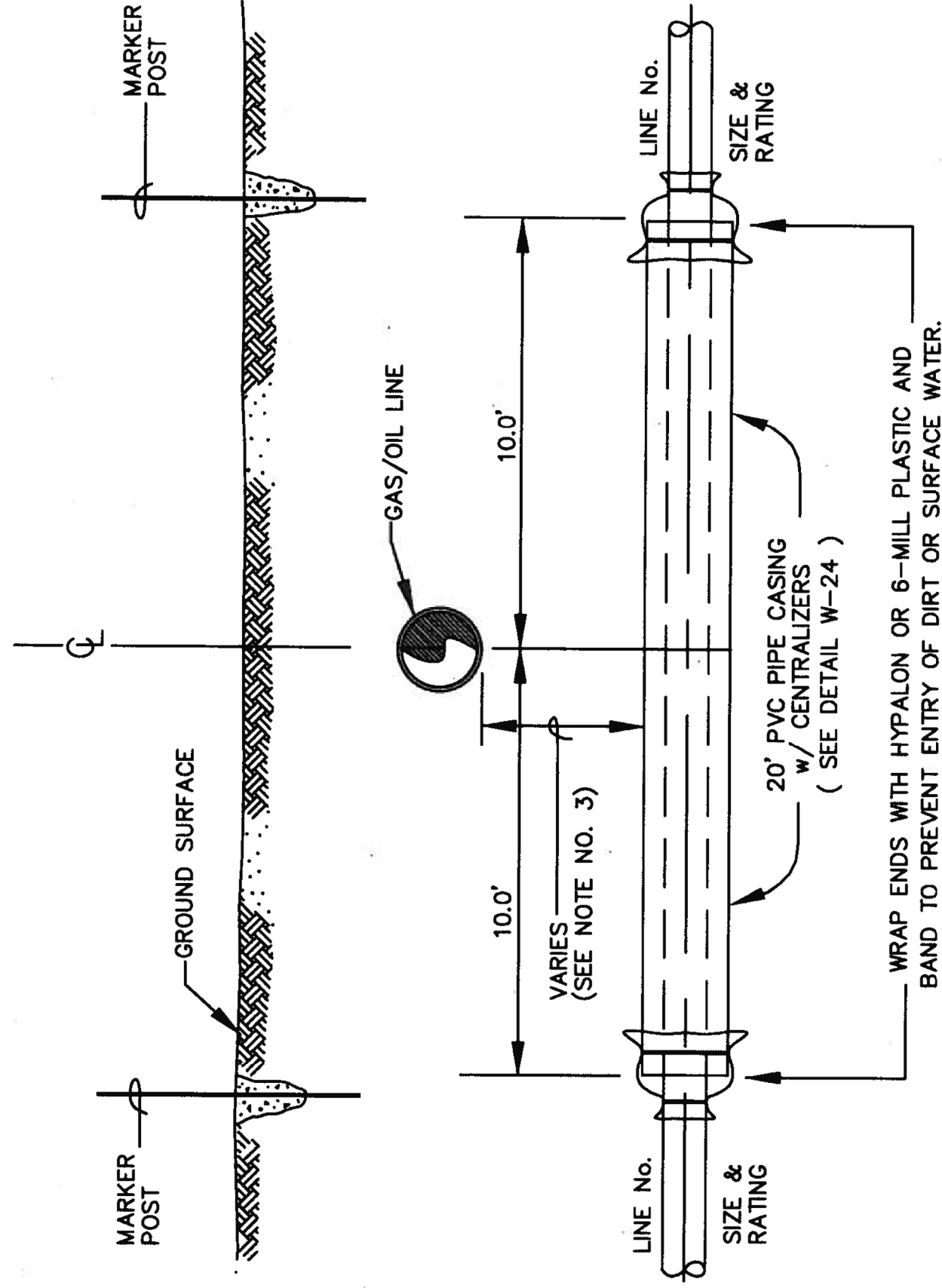
MARKER POST DETAILS

EQ-ENGINEERING

FT. DEFENCE, AZ

REVISIONS			
No.	Date	Brief	By
01	04/08	Revised	L.H.
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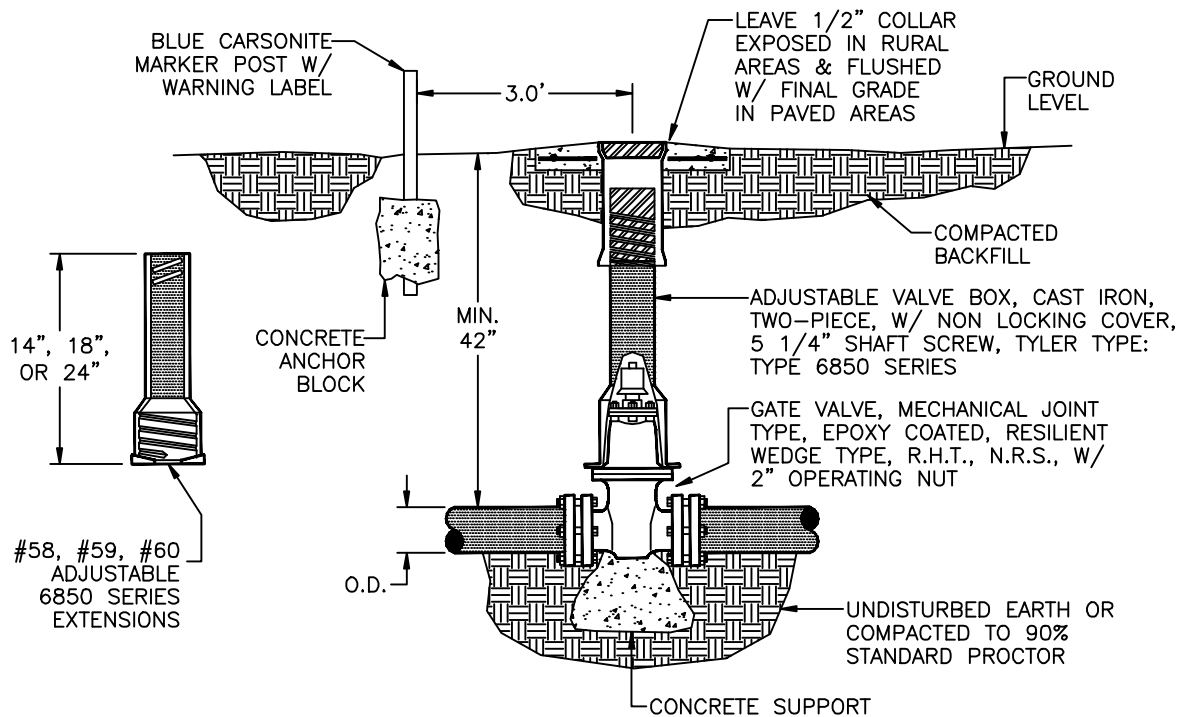
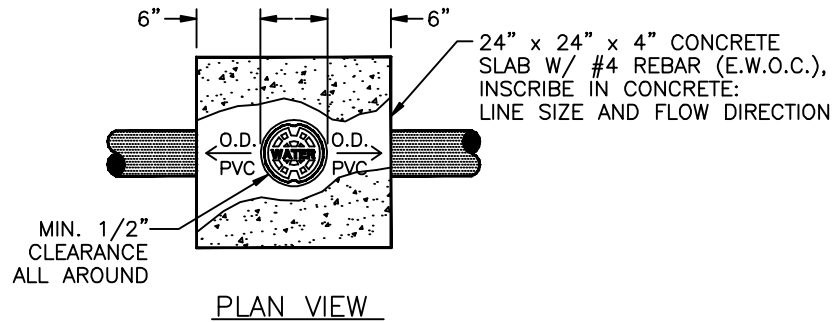
PROFILE OF GAS/OIL LINE-XING

NOT TO SCALE

NOTES:

1. UTILITY CROSSING PERMITS ARE REQUIRED FROM THE GAS OR OIL COMPANY.
2. CASING SHOULD BE PVC SO AS NOT TO INTERFERE WITH GAS/OIL LINE CATHODIC PROTECTION.
3. MINIMUM SEPARATION BETWEEN THE GAS/OIL LINE AND THE WATER LINE CASING IS 24" PER DEPT. OF TRANSPORTATION REGULATIONS. HOWEVER, ACTUAL DEPTH OF BURY AND PLACEMENT OF THE WATERLINE (ABOVE OR BELOW GAS/OIL LINE) SHOULD BE IN ACCORDANCE WITH THE CONDITIONS SET FORTH IN THE INDIVIDUAL UTILITY CROSSING PERMIT ISSUED BY THE GAS/OIL PIPELINE COMPANY.

1	7/99	STANDARDIZED	B.M.
REVISION	DATE	BRIEF	BY
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES PUBLIC HEALTH SERVICE INDIAN HEALTH SERVICE NAVAJO NATION			
NAVAJO NATION, STANDARD DRAWING NO. W-13 GAS/OIL LINE CROSSING DETAIL			
OFFICE OF ENVIRONMENTAL HEALTH AND ENGINEERING NAVAJO AREA OFFICE, WINDOW ROCK, ARIZONA			
DRAWN BY: L.S. DATE: 12/92	CHECKED BY: P.S. DATE: 12/92	APPR. BY: P.S. DATE: 12/92	AUTOCAD DRAWING



NOTES:

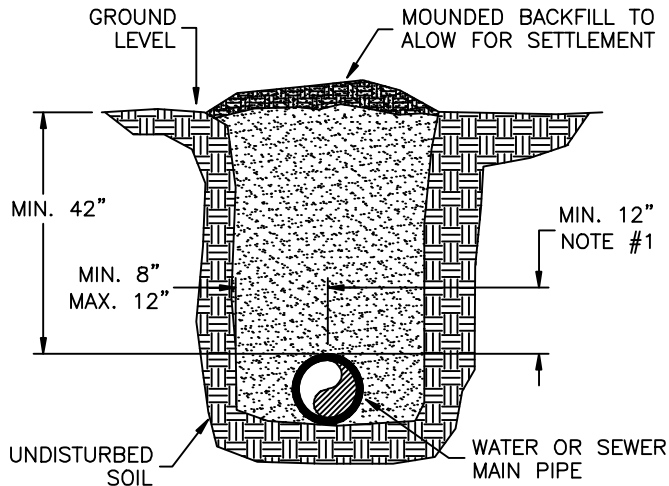
1. IF APPROPRIATE, USE SERIES 2000 PV MEGALUG GLANDS FOR SDR-21, PVC TO SECURE GATE VALVE(S) TO OTHER FITTINGS/PIPE, USE OTHER MEGALUGS FOR DIFFERENT OUTSIDE DIAMETER PIPE/TYPE.
2. DO NOT COVER JOINTS AND BOLTS WITH CONCRETE.
3. SEE WS-13 FOR APPROPRIATE LOCATION OF MARKER POST.

DESIGNED BY:	NTUA
SURVEYED BY:	
DRAWN BY:	NTUA
APPROVED BY:	NTUA
DATE:	04/08
PROJECT NO.	
SCALE:	NTS
ACAD FILENAME:	Water Standard
DWG. NO.	WS-14.DWG

NAVAJO TRIBAL UTILITY AUTHORITY <small>By Civil Engineering Department</small>	
WATER MAIN VALVE INSTALLATION	
EQ-ENGINEERING	FT.DEPANCE, AZ

REVISIONS			
No.	Date	Brief	By
01	04/08	Revised	L.H.
02			
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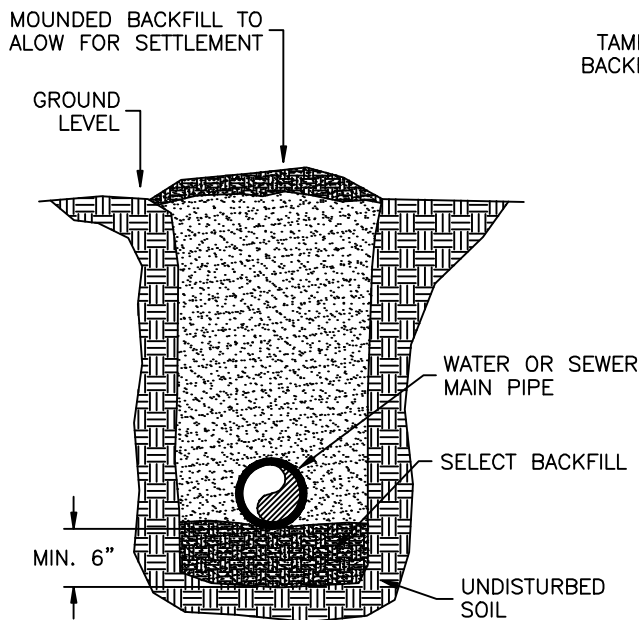




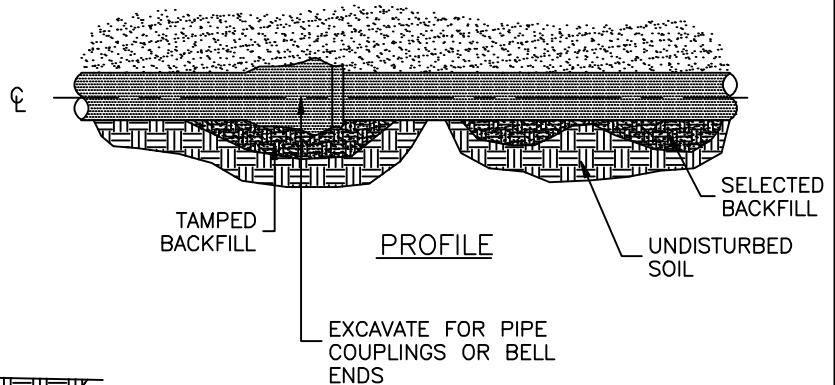
TYPICAL TRENCH DETAIL

NOTES:

1. HAND COMPACTED IN 6" LIFTS FROM BOTTOM OF TRENCH TO 12" ABOVE PIPE CROWN.
2. OPEN CUT OR PAVED OR GRAVEL ROADS (IF REQUIRED), BACK FILL MINIMUM COMPACTION 95% OPTIMUM DENSITY IN LIFTS.
3. REPAVING AND REGRAVELING WILL BE DONE TO ROAD OWNER'S REQUIREMENTS.
4. KEEP LOWER 5' OF TRENCH WALL VERTICAL IF POSSIBLE. UPPER PART OF THE TRENCH WILL VARY IN WIDTH TO COMPENSATE FOR UNSTABLE SOIL. APPLICABLE O.S.H.A. REQUIREMENTS SHALL BE MET.



ALTERNATE TRENCH DETAIL



DESIGNED BY:	NTUA
SURVEYED BY:	
DRAWN BY:	NTUA
APPROVED BY:	NTUA
DATE:	04/08
PROJECT NO.	
SCALE:	NTS
ACAD FILENAME:	Water Standard
DWG. NO.	WS-15.DWG

NAVAJO TRIBAL UTILITY AUTHORITY
By Civil Engineering Department

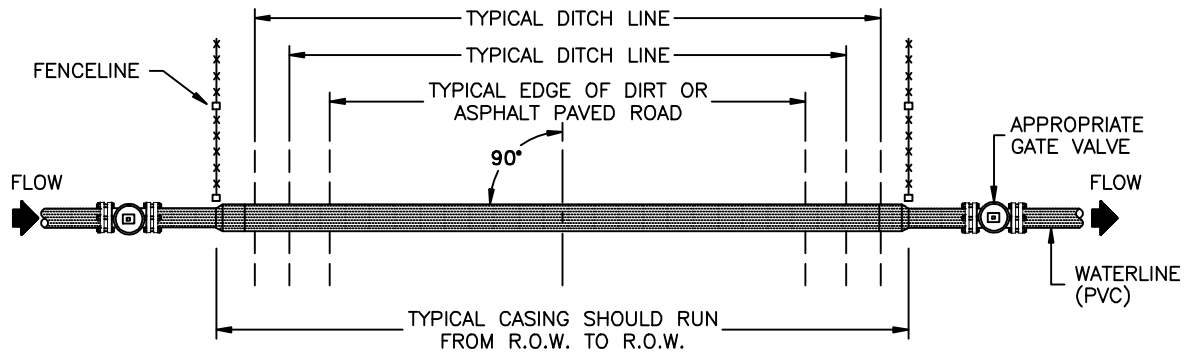
TRENCH DETAIL

BQ-ENGINEERING

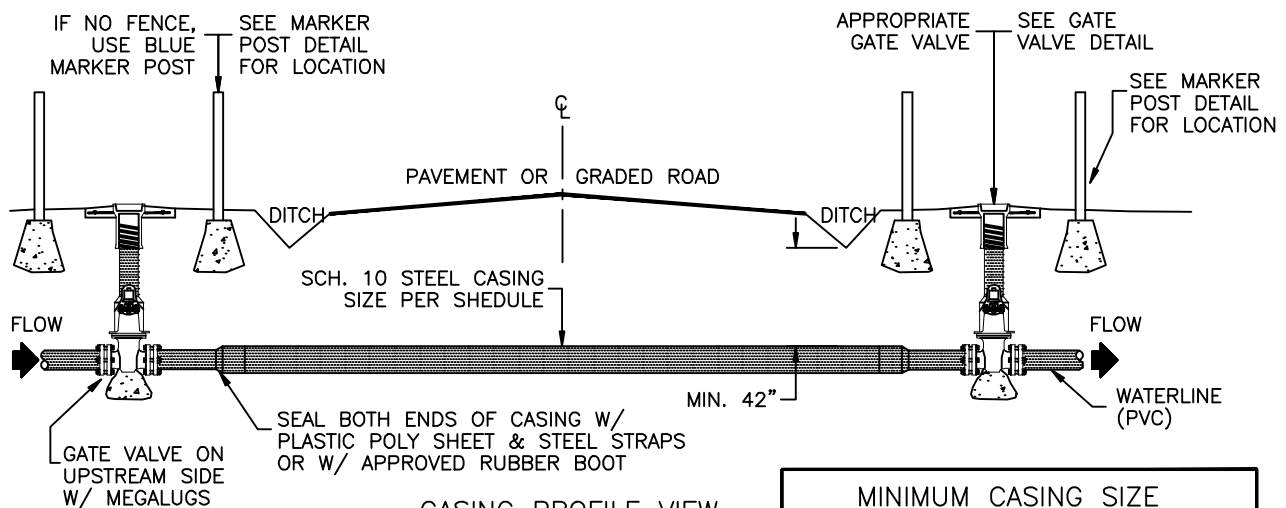
FT. DEFENCE, AZ

REVISIONS			
No.	Date	Brief	By
01	04/08	Revised	L.H.
02			
03			
04			
05			
06			





CASING PLAN VIEW



CASING PROFILE VIEW

MINIMUM CASING SIZE	
PIPE SIZE (O.D.)	CASING SIZE (I.D.)
4"	12"
6"	14"
8"	16"
10"	18"
12"	20"
14"	22"

NOTES:

1. ALL CASINGS WILL TYPICALLY RUN FROM ROW TO ROW UNLESS OTHERWISE SPECIFIED.
2. BACKFILL SHALL BE 95% OF STANDARD PROCTOR DENSITY – TESTED IN 6" LIFTS.
3. ALL WOOD SKIDS ARE TO BE REDWOOD GRADE OR APPROVED EQUAL (OAE)
4. ALL SKIDS WILL BE SECURELY FASTENED TO PIPE WITH STAINLESS STEEL STRAPS.
5. ROAD SHALL BE BORED UNDER EXISTING PAVEMENT AND OPEN TRENCH ON REMAINDER, UNLESS OTHERWISE SPECIFIED.
6. IF SYSTEM IS LOOPED FOR A ROAD BORING APPLICATION, INSTALL GATE VALVE ON UPSTREAM AND DOWNSTREAM SIDES OF ROADWAY.
7. DUCTILE IRON SHALL BE CLASS 50.
8. DUCTILE IRON ROAD CROSSING IN B.I.A. RURAL AREAS SHALL BE FROM 10' BEYOND DITCH LINE UNLESS OTHERWISE SPECIFIED.

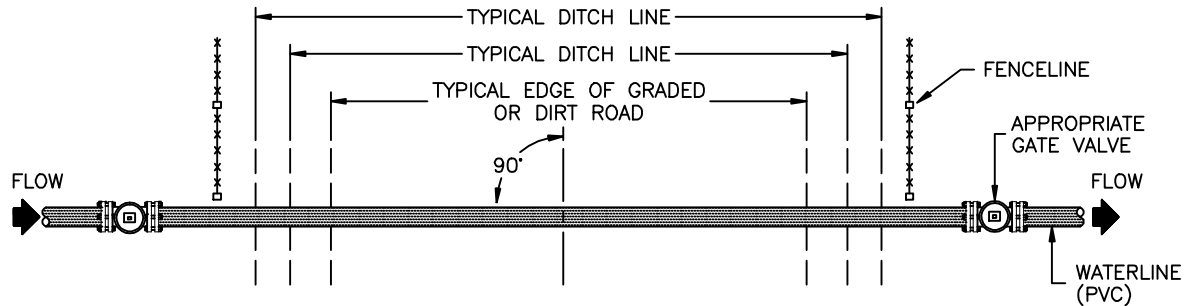
SHEET 1 OF 2

DESIGNED BY:	NTUA
SURVEYED BY:	
DRAWN BY:	NTUA
APPROVED BY:	NTUA
DATE:	04/08
PROJECT NO.	
SCALE:	NTS
ACAD FILENAME:	Water Standard
DWG. NO.	WS-17a.DWG

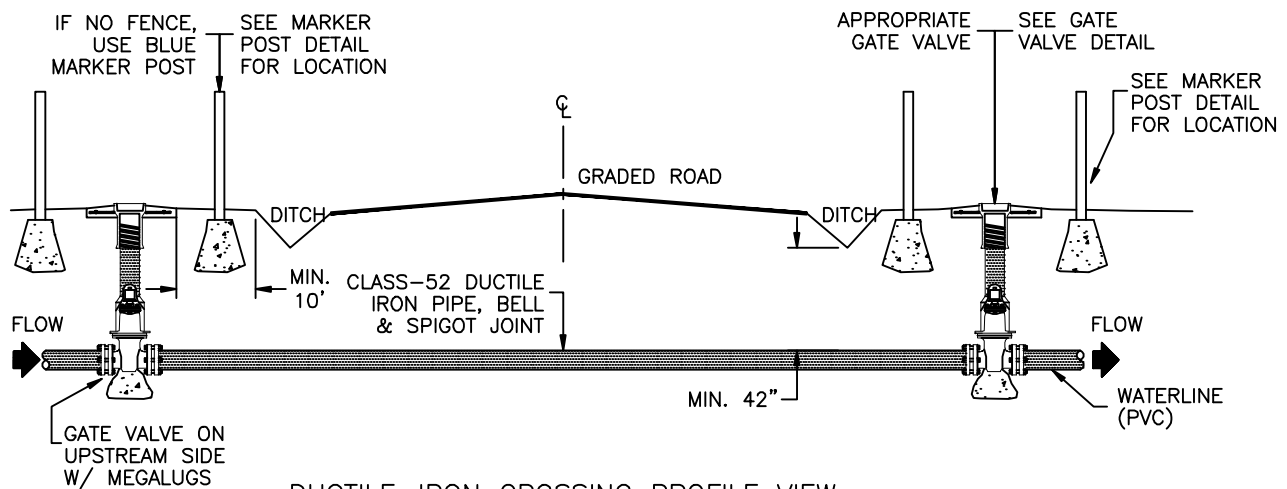
NAVAJO TRIBAL UTILITY AUTHORITY <small>By Civil Engineering Department</small>	
TYPICAL ROAD CROSSING FOR NTUA WATERLINES	
EE-ENGINEERING	FT.DEPANCE, AZ

REVISIONS			
No.	Date	Brief	By
01	04/08	Revised	L.H.
02			
03			
04			
05			
06			





DUCTILE-IRON CROSSING PLAN VIEW



DUCTILE-IRON CROSSING PROFILE VIEW

NOTES:

1. ALL CASINGS WILL TYPICALLY RUN FROM ROW TO ROW, UNLESS OTHERWISE SPECIFIED.
2. BACKFILL SHALL BE 95% OF STANDARD PROCTOR DENSITY - TESTED IN 6" LIFTS.
3. ALL WOOD SKIDS ARE TO BE REDWOOD GRADE OR APPROVED EQUAL (OAE)
4. ALL SKIDS WILL BE SECURELY FASTENED TO PIPE WITH STAINLESS STEEL STRAPS.
5. ROAD SHALL BE BORED UNDER EXISTING PAVEMENT AND OPEN TRENCH ON REMAINDER, UNLESS OTHERWISE SPECIFIED.
6. IF SYSTEM IS LOOPED FOR A ROAD BORING APPLICATION, INSTALL GATE VALVE ON UPSTREAM AND DOWNSTREAM SIDES OF THE ROADWAY.
7. DUCTILE IRON SHALL BE CLASS 52.
8. DUCTILE IRON ROAD CROSSING IN B.I.A. RURAL AREAS SHALL BE FROM 10' BEYOND DITCH LINE UNLESS OTHERWISE SPECIFIED.

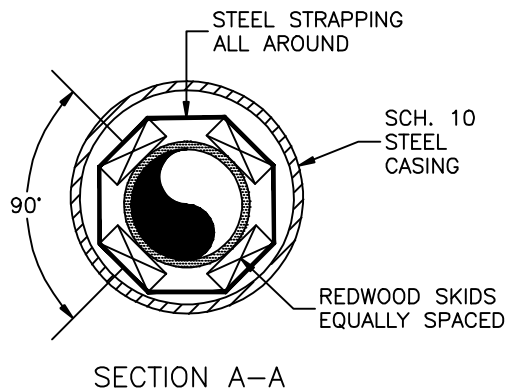
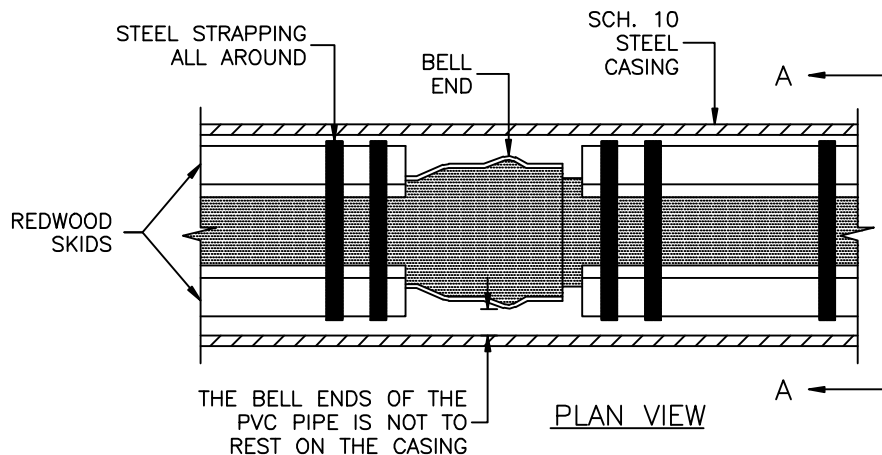
SHEET 2 OF 2

DESIGNED BY:	NTUA
SURVEYED BY:	
DRAWN BY:	NTUA
APPROVED BY:	NTUA
DATE:	04/08
PROJECT NO.	
SCALE:	NTS
ACAD FILENAME:	Water Standard
DWG. NO.	WS-17b.DWG

NAVAJO TRIBAL UTILITY AUTHORITY <small>By Civil Engineering Department</small>	
TYPICAL ROAD CROSSING FOR NTUA WATERLINES	
EE-ENGINEERING	FT.DEPANCE, AZ

REVISIONS			
No.	Date	Brief	By
01	04/08	Revised	L.H.
02			
03			
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NOTES:

1. ALL SKIDS SHALL RUN THE LENGTH OF THE PVC PIPE, BELL TO BELL.
2. ALL SKIDS TO BE REDWOOD LUMBER, OR APPROVED EQUAL.
3. BELL AND SPIGOT DUCTILE IRON PIPE MAY BE INSTALLED DIRECTLY WITHIN THE CASING.
4. TYPICAL ROAD BORES BY NAVAJO ENGINEERING AND CONSTRUCTION AUTHORITY ARE 8" AND 14" CASING SIZES.
5. ALL STRAPPING MUST BE STAINLESS STEEL AND BE SECURELY FASTENED TO THE PVC CARRIER PIPE FOR PROPER SUPPORT OF PIPE DURING INSTALLATION.
6. SEAL ENDS OF CASING W/ PLASTIC POLY SHEET AND STAINLESS STEEL STRAPS OR AN APPROVED RUBBER BOOT.

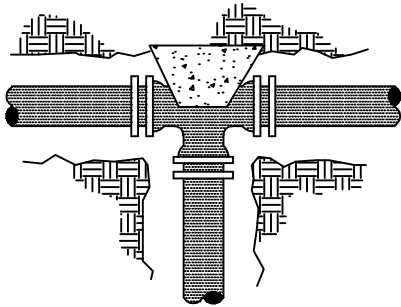
MINIMUM CASING SIZE	
PIPE SIZE (O.D.)	CASING SIZE (I.D.)
4"	12"
6"	14"
8"	16"
10"	18"
12"	20"
14"	22"

DESIGNED BY:	NTUA
SURVEYED BY:	
DRAWN BY:	NTUA
APPROVED BY:	NTUA
DATE:	04/08
PROJECT NO.	
SCALE:	NTS
ACAD FILENAME:	Water Standard
DWG. NO.	WS-18.DWG

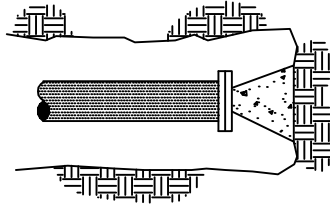
NAVAJO TRIBAL UTILITY AUTHORITY <small>By Civil Engineering Department</small>	
INSTALLATION OF SKIDS INSIDE CASING	
EE-ENGINEERING	FT.DEFANCE, AZ

REVISIONS			
No.	Date	Brief	By
01	04/08	Revised	L.H.
02			
03			
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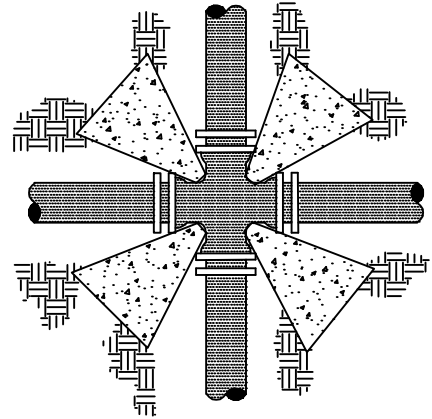




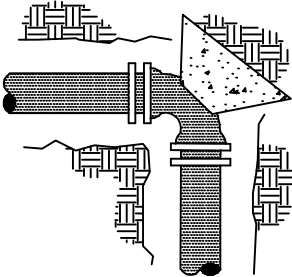
TEE
(PLAN VIEW)



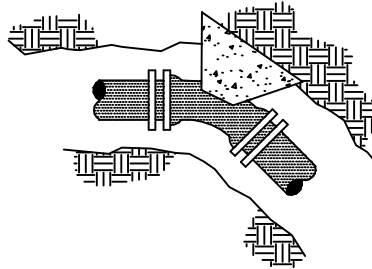
DEAD END CAPPED OR PLUG
(PLAN VIEW)



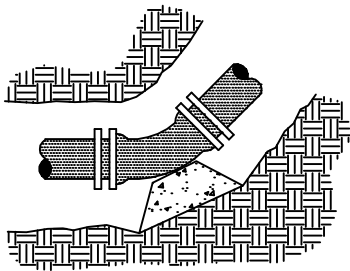
CROSS
(PLAN VIEW)



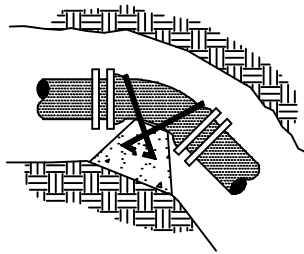
90° ELBOW
(PLAN VIEW)



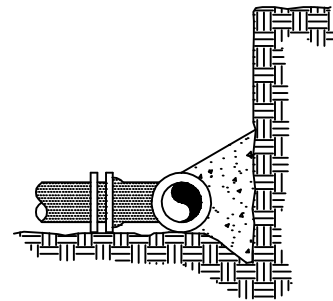
45° ELBOW
(PLAN VIEW)



VERTICAL BENDS
(SECTION VIEW)



VERTICAL GRAVITY THRUST BLOCK
(SECTION VIEW)



BEARING AREA
(SECTION VIEW)

NOTES:

1. DO NOT COVER GASKETED JOINTS AND NUTS/BOLTS.

MINIMUM BEARING AREAS IN SQUARE FEET

PIPE SIZE	TEE & PLUG	90° ELBOW	45° OR 22 1/2° ELBOW	CROSS
2"	0.5	0.5	0.5	0.5
4"	1.5	2.0	1.5	1.0
6"	3.0	4.5	2.5	2.0
8"	5.0	7.5	4.0	4.0
10"	8.0	11.0	6.5	5.5
12"	11.0	15.5	9.0	8.0
14"	15.0	21.0	12.0	10.5
16"	19.0	27.0	15.5	13.5
18"	24.0	34.0	19.0	17.0

SHEET 1 OF 2

DESIGNED BY:	NTUA
SURVEYED BY:	
DRAWN BY:	NTUA
APPROVED BY:	NTUA
DATE:	04/08
PROJECT NO.	
SCALE:	NTS
ACAD FILENAME:	Water Standard
DWG. NO.	WS-19.DWG

NAVAJO TRIBAL UTILITY AUTHORITY
By Civil Engineering Department

GRAVITY/THRUST
BLOCK DETAILS

BQ-ENGINEERING

FT.DENANCE, AZ

REVISIONS			
No.	Date	Brief	By
01	04/08	Revised	L.H.
02			
03			
04			
05			
06			



GRAVITY THRUST BLOCK
(ALSO TO BE USED IN UNSTABLE TRENCH CONDITIONS)
RESULTANT THRUST IN POUNDS OF FITTINGS AT 100 PSI WATER PRESSURE

TOTAL POUNDS					
PIPE SIZE	DEAD END	90° ELBOW	45° ELBOW	22 1/2° ELBOW	11 1/4° ELBOW
3"	1,232	1,742	943	481	241
4"	1,810	2,559	1,385	706	355
6"	3,739	5,288	2,862	1,459	733
8"	6,433	9,097	4,923	2,510	1,261
10"	9,677	13,685	7,406	3,776	1,897
12"	13,685	19,353	10,474	5,340	2,683
14"	18,385	26,001	14,072	7,174	3,604
16"	23,799	33,628	18,199	9,278	4,661
18"	29,865	42,235	22,858	11,653	5,855
20"	36,644	51,822	28,046	14,298	7,183
24"	52,279	73,934	40,013	20,398	10,249
30"	80,425	113,738	61,554	31,380	15,766
36"	115,209	162,931	88,177	44,952	22,585
42"	155,528	219,950	119,036	60,684	30,489
48"	202,683	286,637	155,127	79,083	39,733
54"	260,214	367,999	199,160	101,531	51,011
60"	298,121	421,606	228,172	116,321	58,442
64"	338,707	479,004	259,235	132,157	66,398

NOTES:

1. THE THRUST (IN TOTAL POUNDS) IN THE CHART IS BASED ON DUCTILE IRON OUTSIDE DIAMETER PIPE DIMENSION. SURGES SHOULD BE CONSIDERED AT TWICE THE NORMAL OPERATING PRESSURE. THE VOLUME OF THE GRAVITY THRUST BLOCK IS BASED ON CONCRETE AT 150 LBS./FT³.
2. TO OBTAIN VOLUME OF CONCRETE REQUIRED, USE:

$$\text{VOLUME OF CONCRETE(FT}^3\text{)} = \text{THRUST(LBS.)} \times \text{SYSTEM PRESSURE(PSI)} / 100 \text{ PSI} // 150 \text{ LBS./FT}^3.$$

E.G.: CALCULATE THE VOLUME OF THE GRAVITY THRUST BLOCK FOR AN 8" x 45° BEND AT AN OPERATING PRESSURE OF 80 PSI.

ANSWER: 4923 LBS. x 160 PSI/100 PSI DIVIDED BY 150 LBS./CUBIC FT. = 52.5 CUBIC FEET OR 2 CUBIC YARDS.

SHEET 2 OF 2

DESIGNED BY:	NTUA
SURVEYED BY:	
DRAWN BY:	NTUA
APPROVED BY:	NTUA
DATE:	04/08
PROJECT NO.	
SCALE:	NTS
ACAD FILENAME:	Water Standard
DWG. NO.	WS-19a.DWG

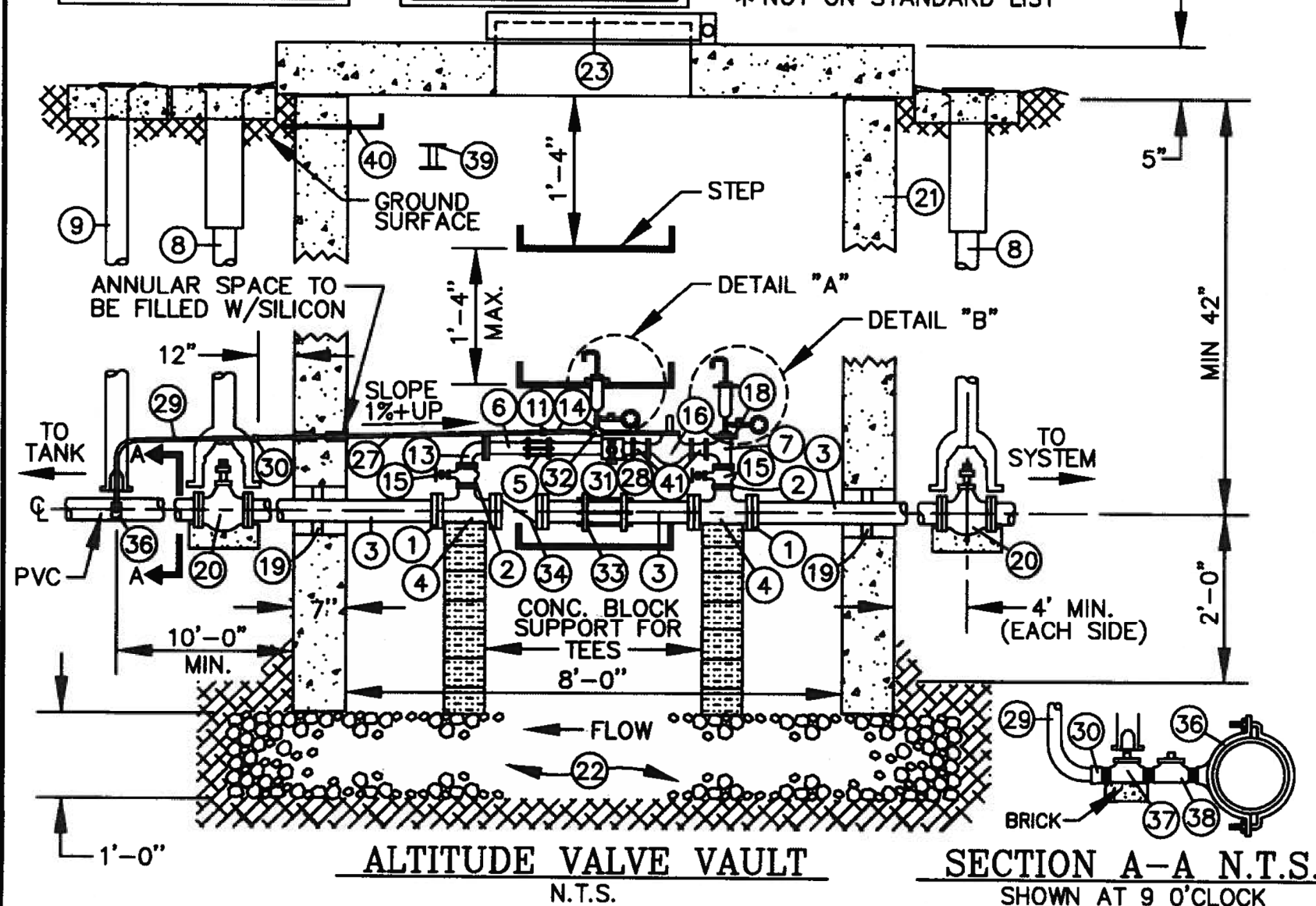
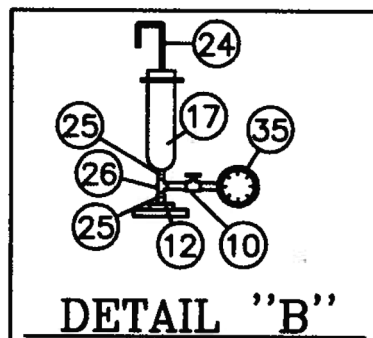
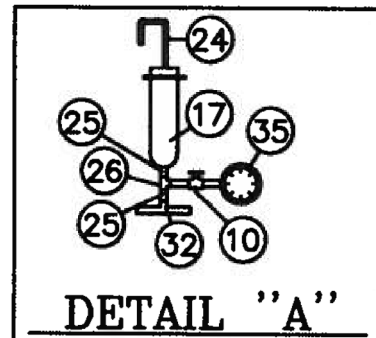
NAVAJO TRIBAL UTILITY AUTHORITY <small>By Civil Engineering Department</small>	
GRAVITY/THRUST BLOCK CHART	
EQ-ENGINEERING	FT.DEFIANCE, AZ

REVISIONS			
No.	Date	Brief	By
01	04/08	Revised	L.H.
02			
03			
04			
05			
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NOTES:

1. SENSING LINE TO TAP INTO MAINLINE A MIN. OF 10 FT. TOWARDS TANK FROM THE VAULT
2. SENSING LINE SHOULD BE TAPPED AT 9 OR 3 O'CLOCK
3. ALTITUDE VAULT TO BE A MAX. OF 30 FT. FROM TANK
4. CONTINUE SAME SIZE PIPING AS MAINLINE THROUGH THE VAULT. BRANCH FOR ALTITUDE VALVE IS 2". (see note 5)
5. ALTITUDE VALVE SIZE MAY NEED TO BE LARGER DEPENDING ON HEAD LOSSES THRU VALVE. MAX. 200 GPM FOR 2" DESIGN AVERAGE 100 GPM. FOR 4" ALTITUDE VALVE, USE D.I. PIPE & FITTINGS.
6. SEE DETAIL W-31 FOR VAULT LOCATION.
7. NOTE: ORDER THE APPROPRIATE BOLT AND GASKET KITS FOR FLANGED FITTINGS.



ITEM	QUAN.	DESCRIPTION
* 1	3	MAINLINE SIZE "EZ" FLANGE
2	2	4" FLANGE BY 2" THREADED REDUCER
* 3	3	PIPE, D.I., ML SIZE, FLANGED x PLAIN END (SPECIAL ORDER)
4	2	TEE, ML SIZE, FLANGED x ML SIZE, FLANGED x 4" FLANGED
5	1	2" DRESSER COUPLING, D.I.
* 6	3	2" G.I. FIELD CUT
7	1	2" TEE, THREADED
8	2	VALVE BOX, G.V., 5 1/4" W/LID
9	1	CURB STOP BOX AND STATIONARY ROD
10	2	VALVE, BRASS STOP COCK, 1/4" + 2 EA. 1/4" G.I. NIPPLE
11	1	1" UNION, G.I.
12	1	BUSHING, 2"x 3/4"
13	1	ELBOW, 90°, 2" G.I., THREADED
14	1	G.I., NIPPLE 1"
15	2	G.V., 2" W/WHEEL THREADED

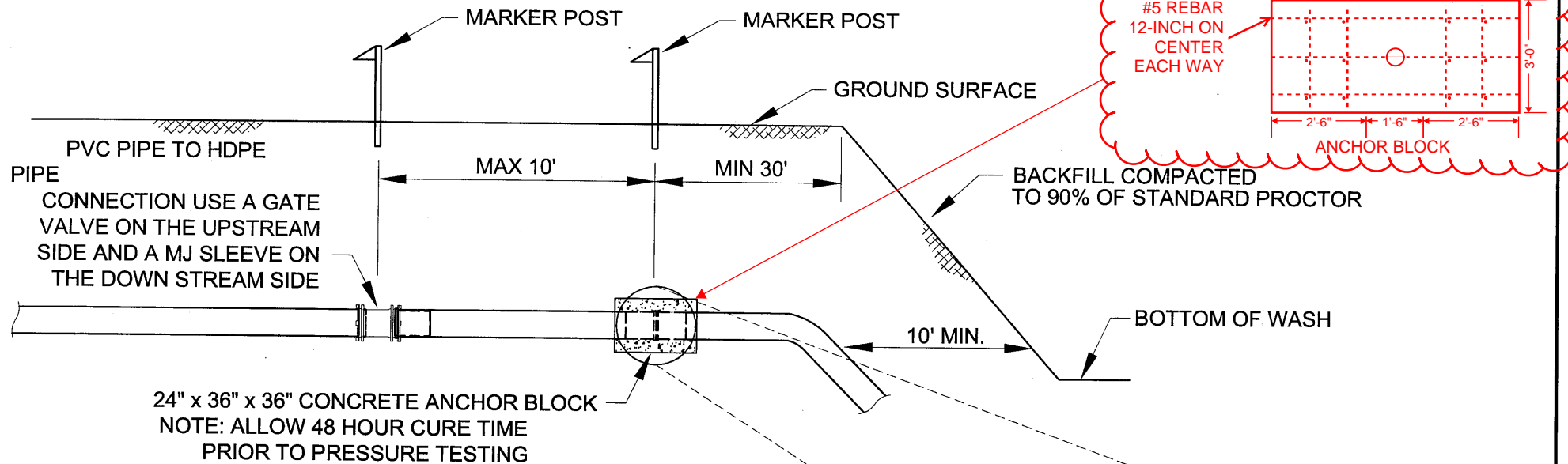
* NOT ON STANDARD LIST

*16	1	ALTITUDE VALVE, 2" FLANGE, CLA-VAL #210G-XX CLASS 125, 75 PSI MAX. WITH COMPANION FLANGES, POSITION INDICATOR, CLOSE-SPEED CONTROL
17	2	ARV, 3/4" INLET & 3/8" OUTLET
18	1	2" G.I. CLOSE NIPPLE S.S.
*19	2	APPROVED GASKET, CAST IN PLACE
*20	2	G.V., MJ x MJ, SAME SIZE AS MAINLINE
*21	1	VAULT, PRECAST 8' L. x 6' W. x 5 1/2' D. INSIDE
*22	80 sq. ft.	GRAVEL, SIZE 3/4" TO 1 1/2"
*23	1	SHALLOW WELL MANHOLE FRAME & COVER, ADJACENT TO WALL W/STEPS
24	2	3/8" Ø PIPE, COPPER, W/ 3/8" COPPER ADAPTER MIPT
25	4	NIPPLE, 3/4"x CLOSE, GALVANIZED
26	2	TEE, 3/4"x 3/4"x 1/4", GALVANIZED
27	Lg.	1" G.I. PIPE WITH G.I. COUPLING S.S.
28	1	2"x 3/4" G.I. , TEE S.S.
29	Lg.	PIPE, 1" PE, 200 PSI SDR 7
30	2	INSTATITE, 1" BRONZE, MIPT
31	1	HOSE BIBB, 3/4" W/VACUUM BREAKER
32	1	TEE, 1"x 3/4", G.I. S.S.
33	1	MAINLINE SIZE DRESSER COUPLING
*34	1	CHECK VALVE, CLA-VAL 501, 125 CLASS, WAFER
35	2	1 EA. PRESSURE GAUGE, 0-30 PSI, 1 EA. FOR CLOSED VALVE CONDITION
*36	1	SADDLE, SAME SIZE AS MAINLINE x 1" FIPT, BRONZE
37	1	1" CURB STOP, FIPT x FIPT
38	1	CORPORATION STOP, 1" FIPT x MIPT, WITH 1" BRASS NIPPLE
39	1	2" STEEL SPOOL, FLANGED, SAME LENGTH AS ALTITUDE VALVE (9 3/8")
40	1	1/2" DIA. x 12" LONG BOLT & BEND 90° AT END, W/NUT & 2 WASHERS
41	2	4"x 2" FLANGED REDUCERS

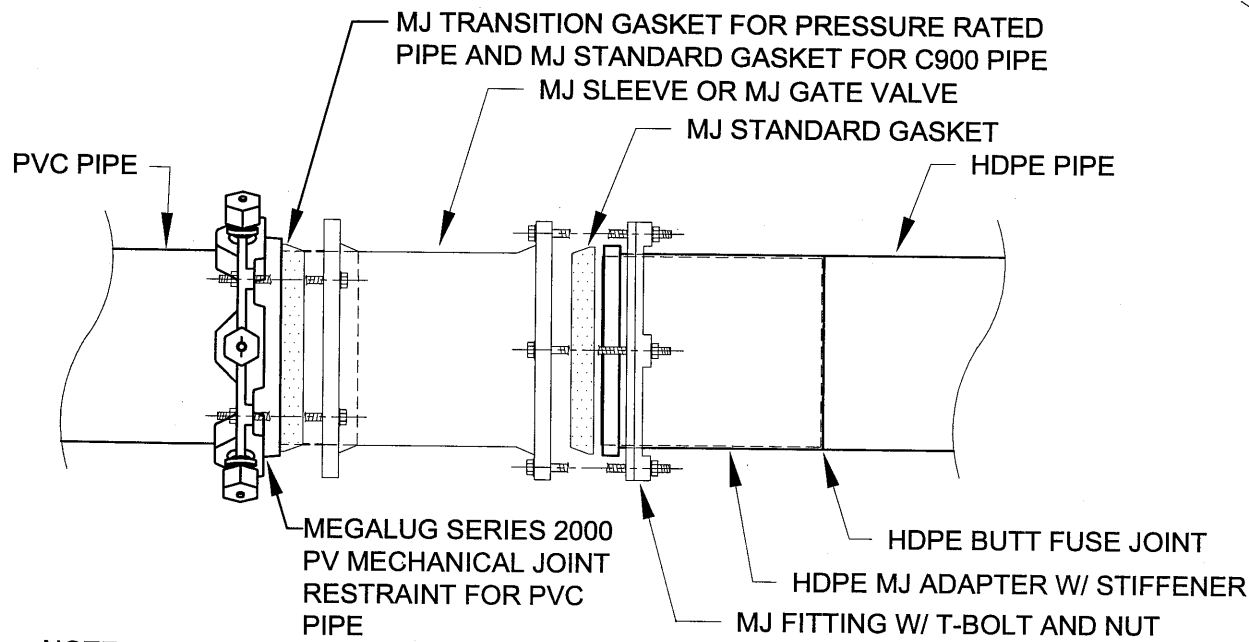
1	7/99	STANDARDIZED	B.M.
REVISION	DATE	BRIEF	BY
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES PUBLIC HEALTH SERVICE INDIAN HEALTH SERVICE NAVAJO NATION			
NAVAJO NATION, STANDARD DRAWING NO. W-28 ALTITUDE VALVE			
OFFICE OF ENVIRONMENTAL HEALTH AND ENGINEERING NAVAJO AREA OFFICE, WINDOW ROCK, ARIZONA			
DRAWN BY: B.T. DATE: 10/84	CHECKED BY: B.M. DATE: 10/84	APPR. BY: DATE:	AUTOCAD DRAWING

*ALL PIPES 3-INCH OR GREATER THAT ARE NOT PVC SHALL BE DUCTILE IRON.

* ALL PIPES 2-INCH OR LESS THAT ARE NOT PVC SHALL BE STAINLESS STEEL.



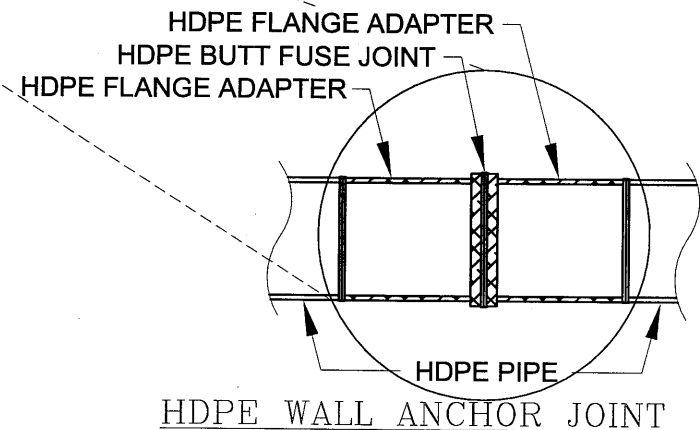
PROFILE VIEW
TYP. HDPE PIPE WASH CROSSING DETAIL
N.T.S.



NOTE: USE STANDARD DETAIL # W-16 FOR GATE VALVE INSTALLATION

PVC PIPE TO SLEEVE OR GATE VALVE TO HDPE PIPE

CONNECTION
N.T.S.



REV	DATE	BRIEF	BY
1	2/14/11	CHANGED ANCHOR & CONNECTIONS	MM
REVISION	DATE	BRIEF	BY

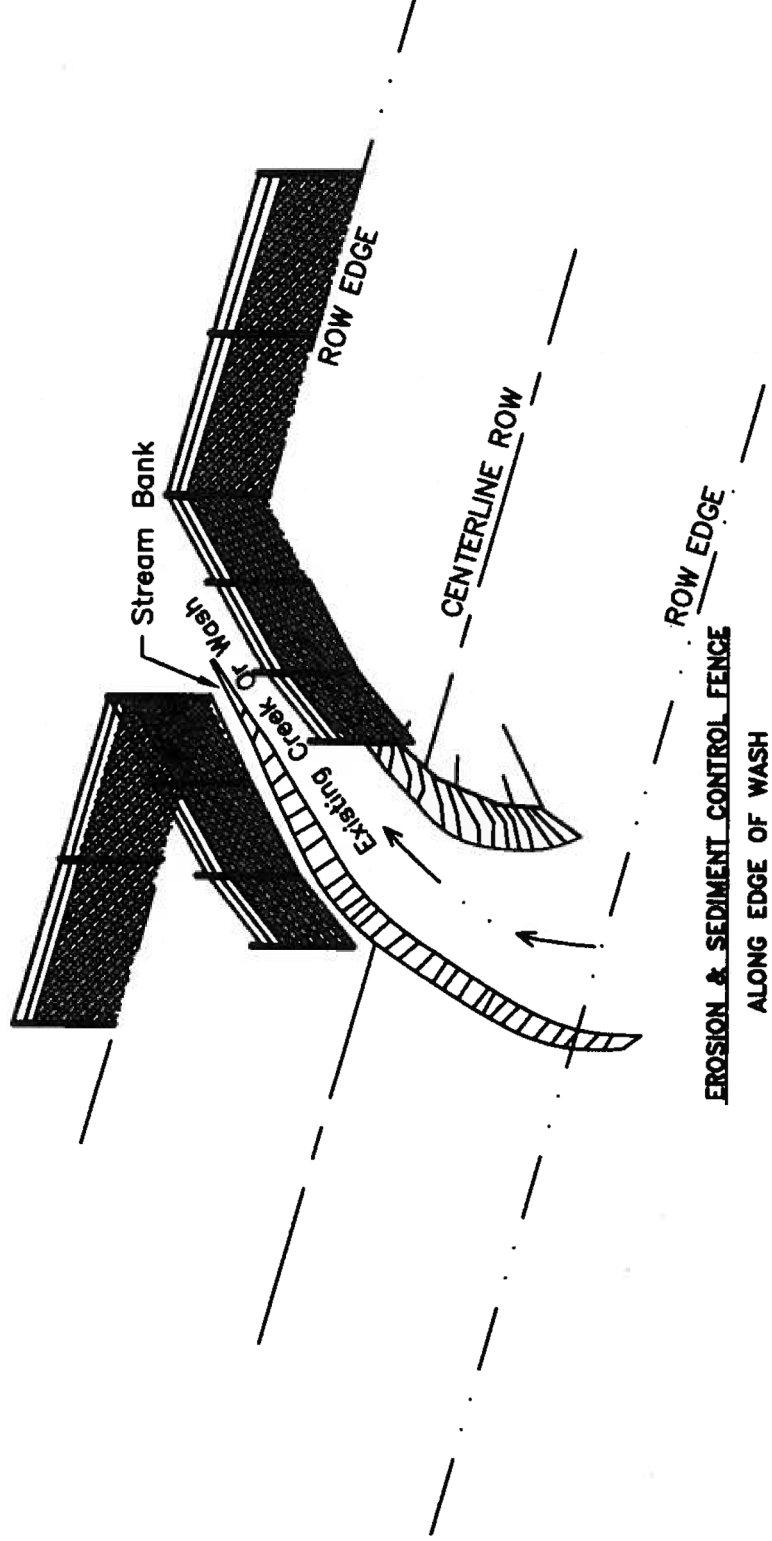
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
INDIAN HEALTH SERVICE
NAVAJO NATION

STANDARD DRAWING No. W-33
HDPE WASH CROSSING DETAIL

NAVAJO ENGINEERING & CONSTRUCTION AUTHORITY

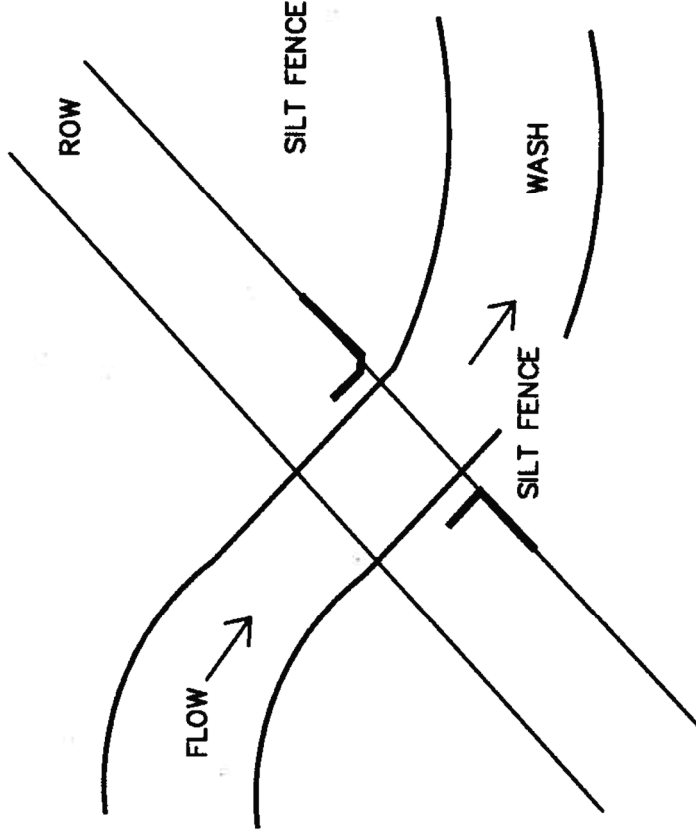
DRAWN BY: CM	CHECKED BY: VC	APPR. BY: MM	AUTOCAD
DATE: 2/14/11	DATE: 2/14/11	DATE: 2/14/11	DRAWING

SILT FENCE DETAILS



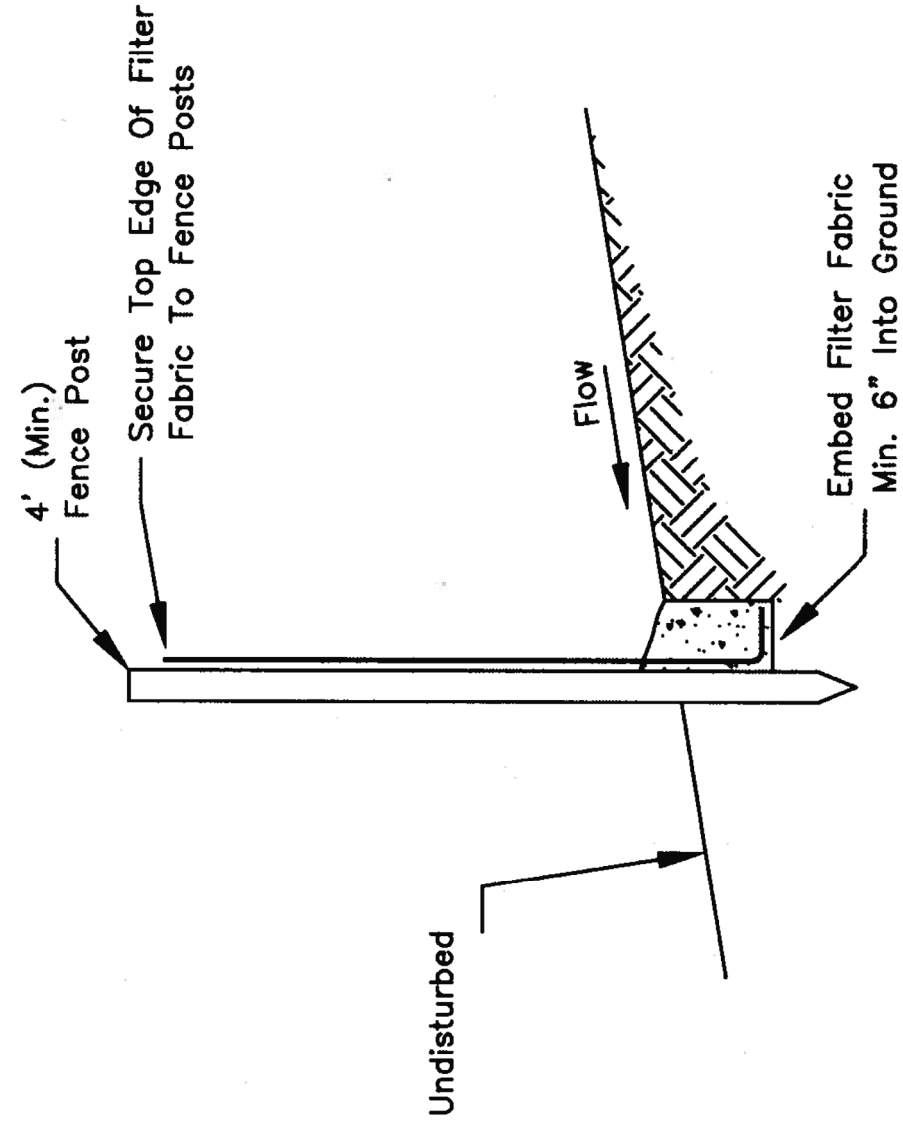
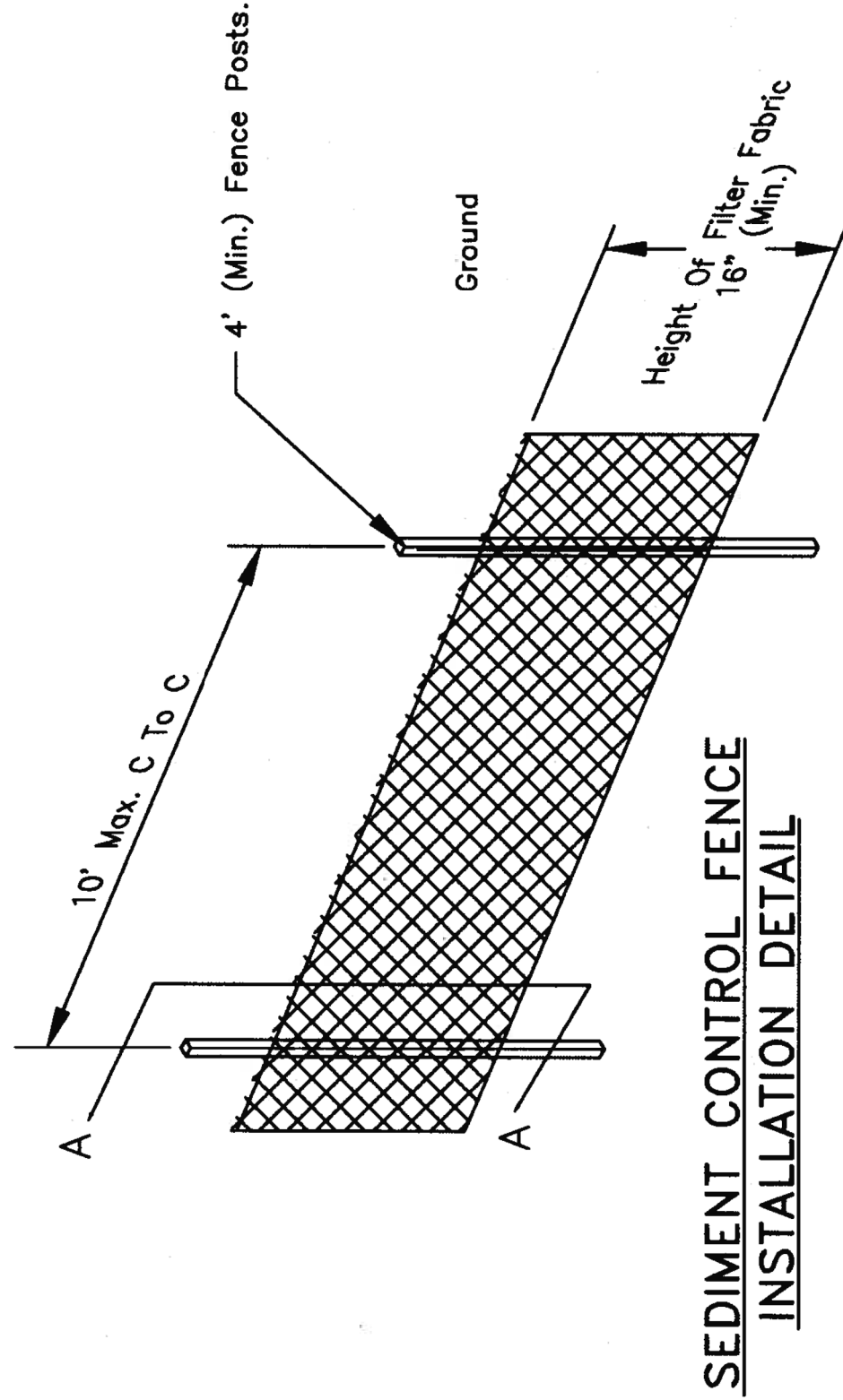
INSTALLATION NOTES

1. THE SILT FENCING CONSISTS OF 3' SEDIMENT CONTROL FABRIC CLOTH WITH BURIED-TOE AND WOODEN OR STEEL POSTS (TEE OR U TYPE) 10' AND SHALL COMPLY WITH AASHTO M-288.
2. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY 6" AND FOLDED. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.



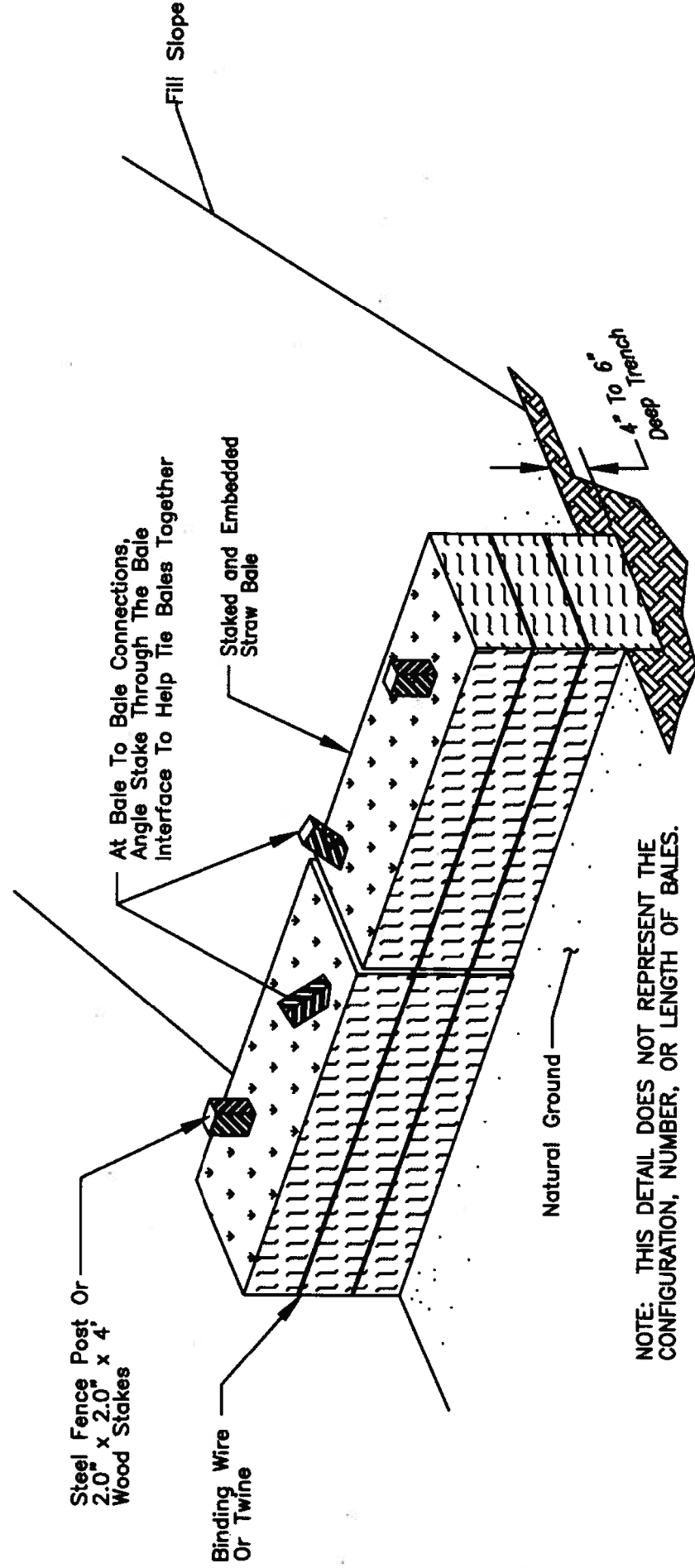
SILT FENCE:
PLAN VIEW

REVISION	DATE	BRIEF	BY
DEPARTMENT OF HEALTH AND HUMAN SERVICES U.S. PUBLIC HEALTH SERVICE INDIAN HEALTH SERVICE NAVAJO NATION			
NAVAJO NATION			
STANDARD DRAWING NO. W-39 SILT FENCE DRAWING 1 OF 2			
PUBLIC LAW 88-121			
OFFICE OF ENVIRONMENTAL HEALTH AND ENGINEERING NAVAJO AREA OFFICE, WINDOW ROCK, ARIZONA			
DESIGNED BY: JL DATE: 9/01	CHECKED BY: RG DATE: 9/01	APPROVED BY: [Signature] DATE: 9/01	AUTOCAD DRAWING



REVISION	DATE	BRIEF	BY
DEPARTMENT OF HEALTH AND HUMAN SERVICES U.S. PUBLIC HEALTH SERVICE INDIAN HEALTH SERVICE NAVAJO NATION			
NAVAJO NATION			
STANDARD DRAWING NO. W-39 SILT FENCE DRAWING 2 OF 2			
PUBLIC LAW 86-121			
OFFICE OF ENVIRONMENTAL HEALTH AND ENGINEERING NAVAJO AREA OFFICE, WINDOW ROCK, ARIZONA			
DESIGNED BY: TL DATE: 9/01	CHECKED BY: RG DATE: 9/01	APPROVED BY: JMC DATE: 9/01	AUTOCAD DRAWING

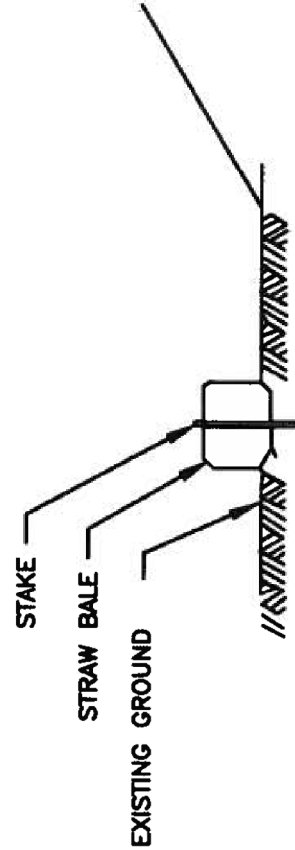
STRAW BALE DETAILS
(For Check Dams to Retain Water and Sediment)



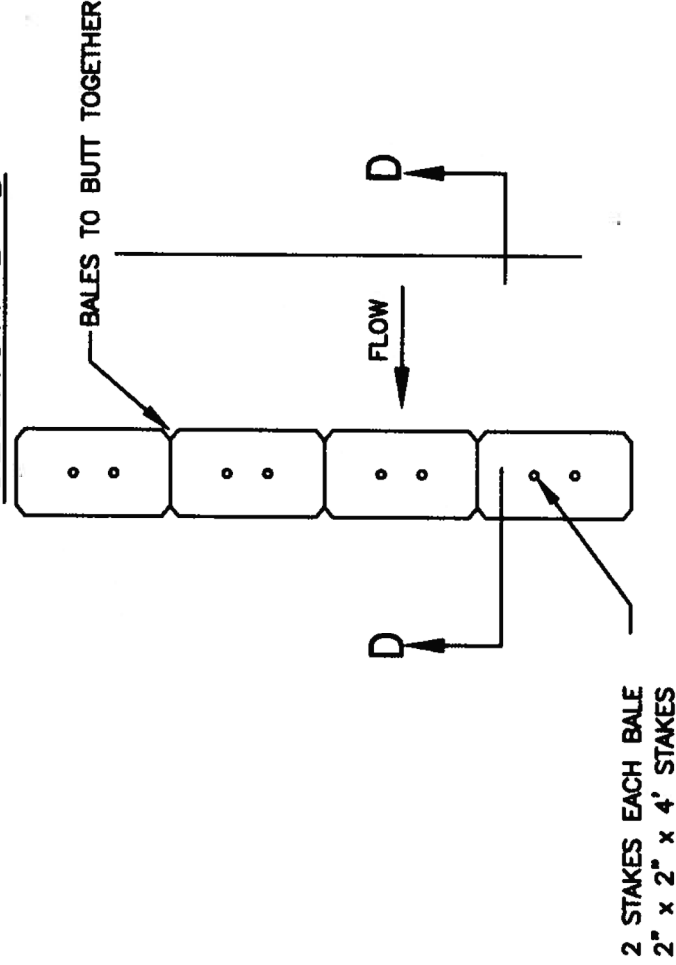
TYPICAL STRAW BALE STAKING
AND TRENCHING DETAIL

INSTALLATION NOTES

1. STRAW BALES MAY BE USED FOR DIKES PROVIDED THEY ARE PROPERLY ANCHORED WITH STEEL FENCE POSTS OR 2" X 2" X 4' WOOD STAKES (TWO PER BALE) ANCHORED 1.5' INTO THE NATURAL GROUND. STRAW BALES SHALL BE CERTIFIED 0.5% WEED FREE. DO NOT USE STRAW BALES IN AREAS OF CONCENTRATED FLOW AND CUT DITCHES.
1. THE CONTRACTOR SHALL HAVE ON-SITE A COPY OF THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) WITH PROJECT SPECIFIC COVER SHEET.
2. CONSTRUCT CHECK DAMS AND/OR FILTERS IN STRATEGIC LOCATIONS ON THE PROJECT TO FILTER STORM RUNOFF BEFORE IT LEAVES THE PROJECT CONSTRUCTION LIMITS OR ENTERS A WASH. SEE PROJECT CONSTRUCTION PLANS FOR LOCATIONS OF CHECK DAMS & FILTERS.
3. CLEAN ALL SEDIMENT BASIN AND TRAPS OF ACCUMULATED SEDIMENT WHEN HALF FULL OF SEDIMENT.
4. THE CONTRACTOR SHALL INSPECT AND MAINTAIN ALL SWPPP MEASURES MONTHLY AND AFTER EACH SIGNIFICANT STORM EVENT (I.E. 0.5 IN. OF MOISTURE IN 24 HOURS).
5. THE CONTRACTOR, IN CONSULTATION WITH THE PROJECT ENGINEER SHALL ADJUST THE DIMENSIONS AND/OR LOCATIONS OF TEMPORARY SEDIMENT AND EROSION CONTROL DEVICES TO FIT ACTUAL FIELD CONDITIONS. ALL ADJUSTMENTS WILL BE DOCUMENTED ON THE INSPECTION FORMS INCLUDED WITH THE SWPPP.
6. REMOVE AND DISPOSE OF EROSION CONTROL MEASURES WHEN THE PERMANENT EROSION CONTROL MEASURES ARE SATISFACTORILY ESTABLISHED.



SECTION D-D



PLAN
STRAW BALE SILT BARRIER

REVISION	DATE	BRIEF	BY
DEPARTMENT OF HEALTH AND HUMAN SERVICES U.S. PUBLIC HEALTH SERVICE INDIAN HEALTH SERVICE NAVAJO NATION			
STANDARD DRAWING NO. W-40 STRAW BALES			
PUB. LAW 95-121			
OFFICE OF ENVIRONMENTAL HEALTH AND ENGINEERING NAVAJO AREA OFFICE, WINDOW ROCK, ARIZONA			
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