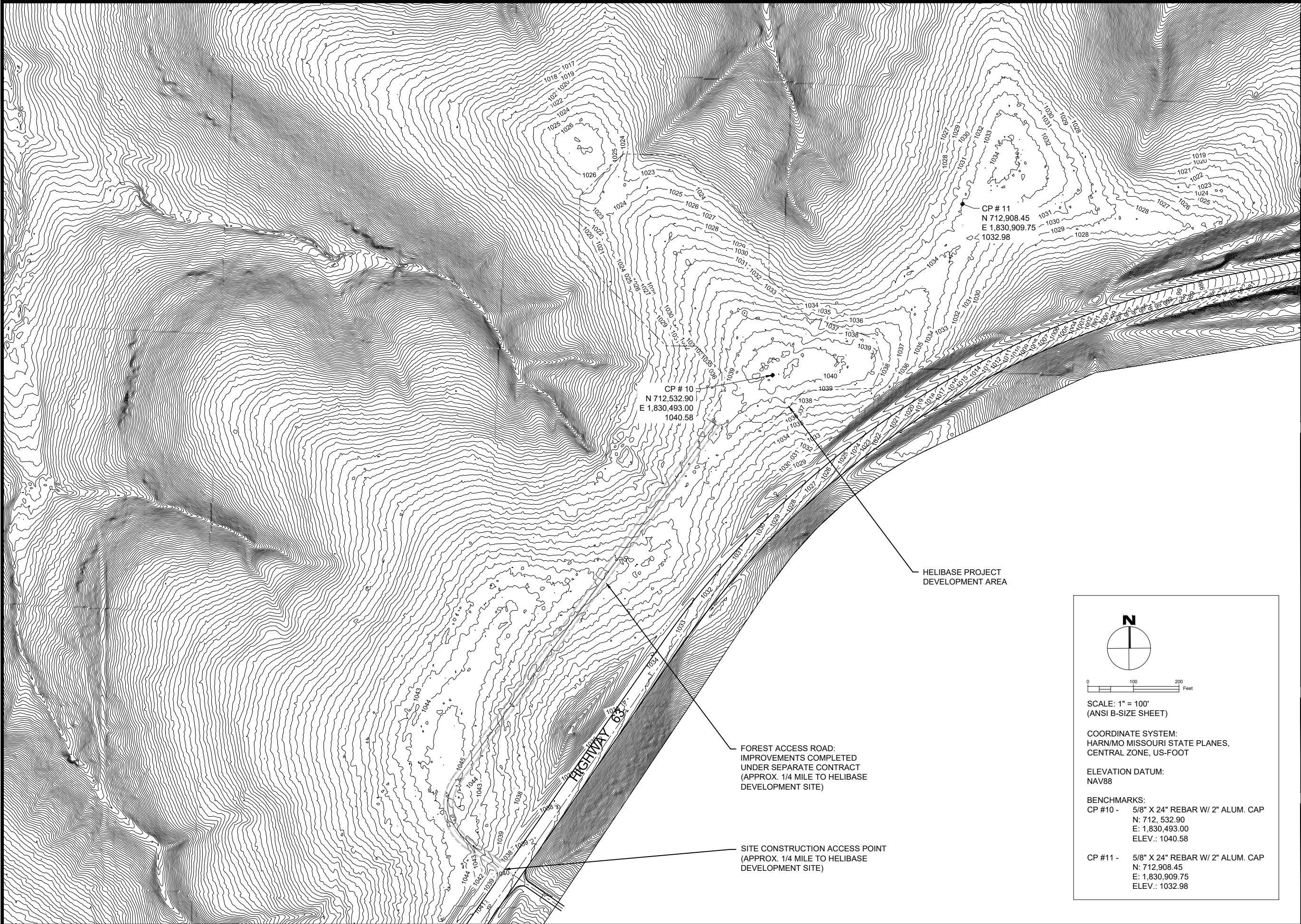


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United States Department of Agriculture
Forest Service

(R09)
EASTERN REGION

STAMPS, LOGOS, AND SEALS

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NO.	REVISION / ISSUE	DATE

PROJECT NAME

HELIBASE
DEVELOPMENT
PROJECT

MARK TWAIN
NATIONAL FOREST

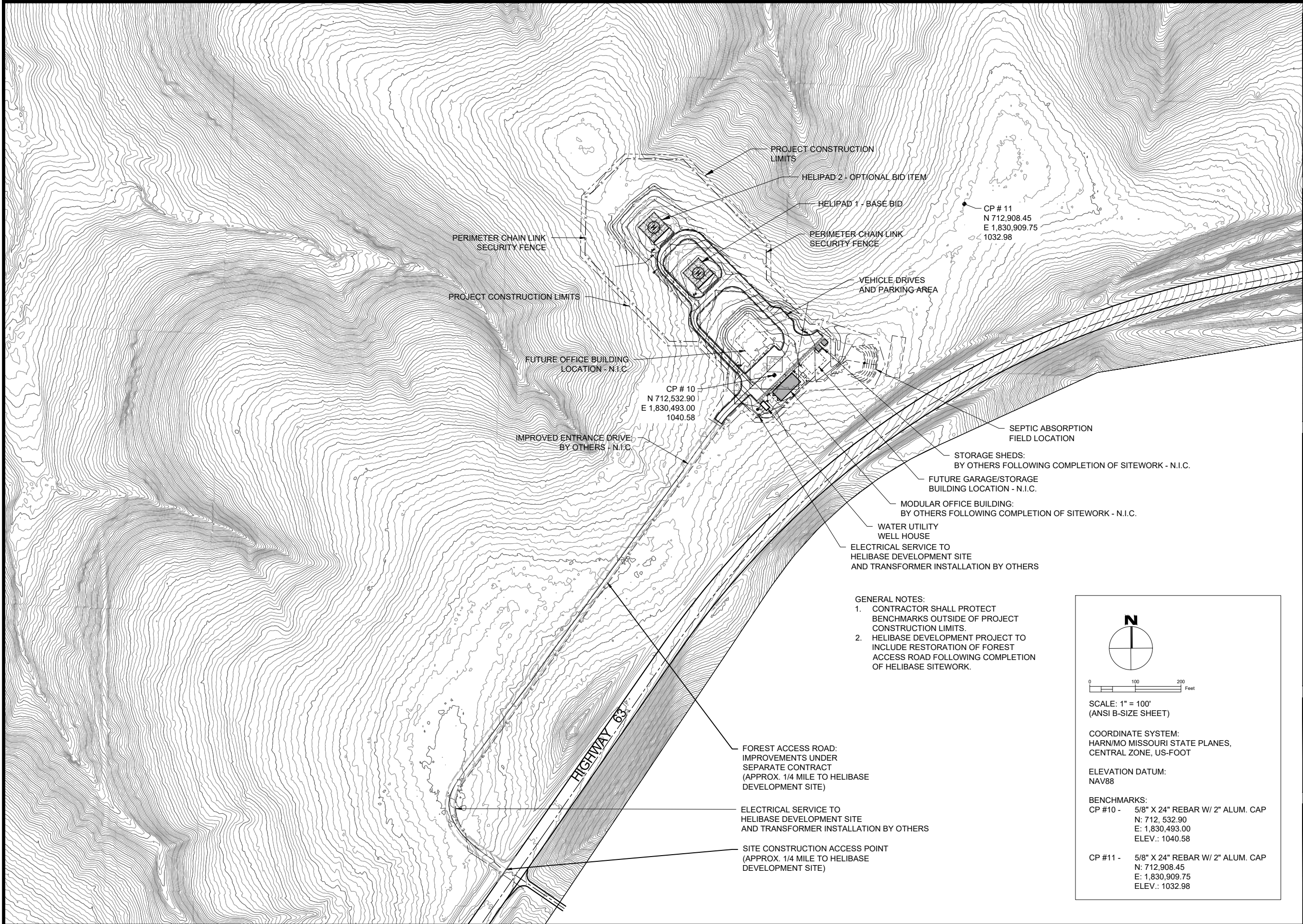
HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

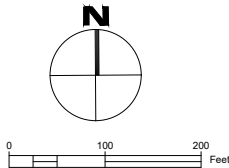
EXISTING
CONDITIONS

DATE 5/17/2021	ARCHIVE NO. 090500-ABL2021-0094D_G0002	DRAWING SHEET NO.
DESIGNER K.KEELEY	G-02	
DRAWN K.KEELEY		
CHECKED A.WILSON		
PROJECT NO. 2021-0094D	SHEET 02 OF 26	

6/10/21 12:38 KENNETHKEELEY\DOOR09 ENG PROJECTS\0909 MT\MULTIPLE DISCIPLINE ASSETS\HELIBASE\DESIGN DEVELOP\CAD\CD2021-05-17-MTN-HELIBASE-G-03-PROJ OVERVIEW.DWG.



- GENERAL NOTES:
1. CONTRACTOR SHALL PROTECT BENCHMARKS OUTSIDE OF PROJECT CONSTRUCTION LIMITS.
 2. HELIBASE DEVELOPMENT PROJECT TO INCLUDE RESTORATION OF FOREST ACCESS ROAD FOLLOWING COMPLETION OF HELIBASE SITEWORK.



SCALE: 1" = 100'
(ANSI B-SIZE SHEET)

COORDINATE SYSTEM:
HARN/MO MISSOURI STATE PLANES,
CENTRAL ZONE, US-FOOT

ELEVATION DATUM:
NAV88

BENCHMARKS:

CP #10 -	5/8" X 24" REBAR W/ 2" ALUM. CAP
	N: 712, 532.90
	E: 1,830,493.00
	ELEV.: 1040.58
CP #11 -	5/8" X 24" REBAR W/ 2" ALUM. CAP
	N: 712,908.45
	E: 1,830,909.75
	ELEV.: 1032.98



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PROJECT NAME

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DEVELOPMENT
PROJECT

MARK TWAIN
NATIONAL FOREST

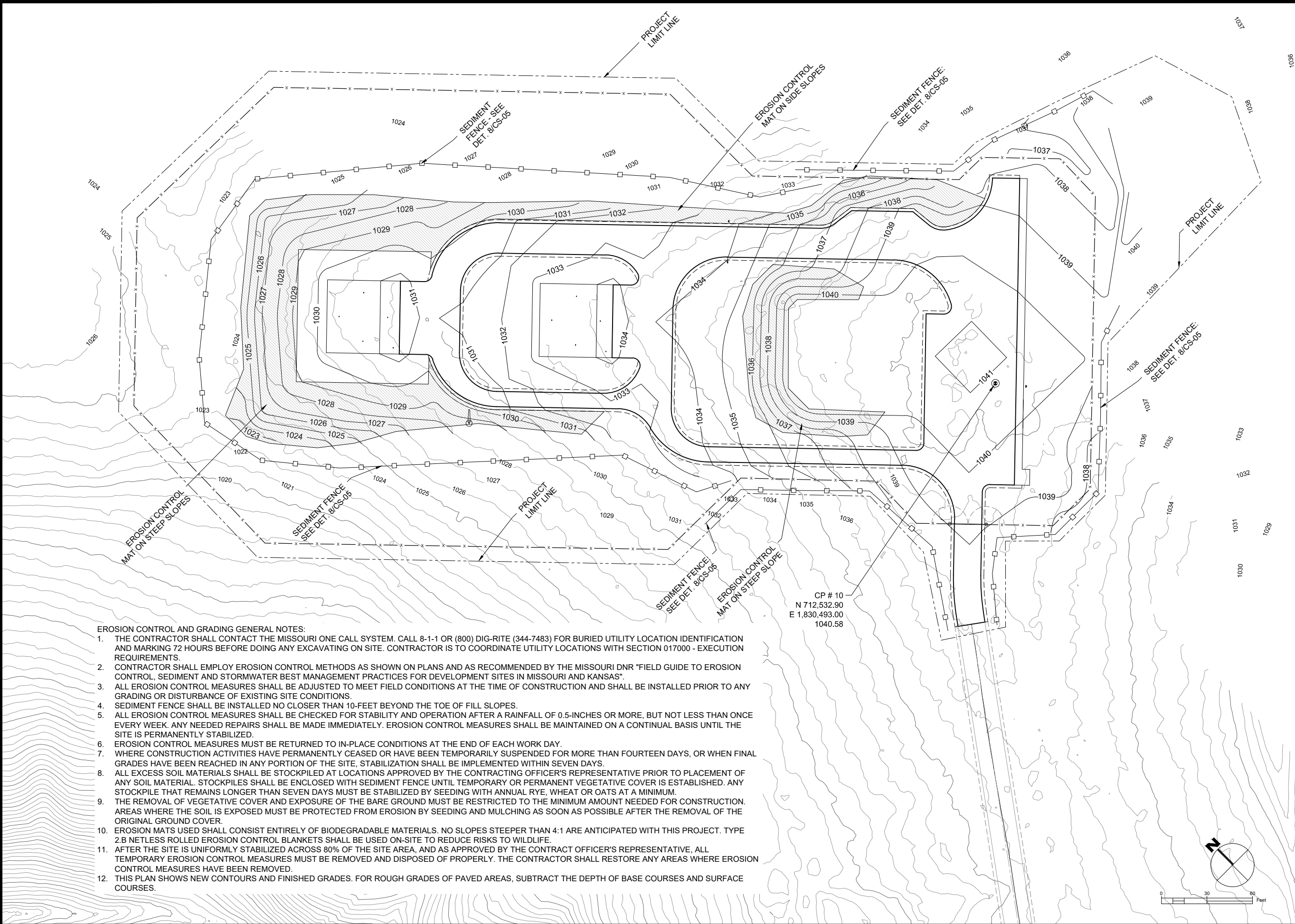
HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

PROJECT
OVERVIEW

DATE 5/17/2021	ARCHIVE NO. 090500-ABL2021-0094D_G0003	DRAWING SHEET NO.
DESIGNER K.KEELEY	G-03	
DRAWN K.KEELEY		
CHECKED A.WILSON		
PROJECT NO. 2021-0094D	SHEET 03 OF 26	

6/11/21 09:35 KENNETHKEELEY\DOX009 ENG PROJECTS\0909 MTNHELIBASE\DESIGN DEVELOP\CD\CD2021-05-17-MTN-HELIBASE-CG-01-PREP_EC.DWG



EROSION CONTROL AND GRADING GENERAL NOTES:

1. THE CONTRACTOR SHALL CONTACT THE MISSOURI ONE CALL SYSTEM. CALL 8-1-1 OR (800) DIG-RITE (344-7483) FOR BURIED UTILITY LOCATION IDENTIFICATION AND MARKING 72 HOURS BEFORE DOING ANY EXCAVATING ON SITE. CONTRACTOR IS TO COORDINATE UTILITY LOCATIONS WITH SECTION 017000 - EXECUTION REQUIREMENTS.
2. CONTRACTOR SHALL EMPLOY EROSION CONTROL METHODS AS SHOWN ON PLANS AND AS RECOMMENDED BY THE MISSOURI DNR "FIELD GUIDE TO EROSION CONTROL, SEDIMENT AND STORMWATER BEST MANAGEMENT PRACTICES FOR DEVELOPMENT SITES IN MISSOURI AND KANSAS".
3. ALL EROSION CONTROL MEASURES SHALL BE ADJUSTED TO MEET FIELD CONDITIONS AT THE TIME OF CONSTRUCTION AND SHALL BE INSTALLED PRIOR TO ANY GRADING OR DISTURBANCE OF EXISTING SITE CONDITIONS.
4. SEDIMENT FENCE SHALL BE INSTALLED NO CLOSER THAN 10-FEET BEYOND THE TOE OF FILL SLOPES.
5. ALL EROSION CONTROL MEASURES SHALL BE CHECKED FOR STABILITY AND OPERATION AFTER A RAINFALL OF 0.5-INCHES OR MORE, BUT NOT LESS THAN ONCE EVERY WEEK. ANY NEEDED REPAIRS SHALL BE MADE IMMEDIATELY. EROSION CONTROL MEASURES SHALL BE MAINTAINED ON A CONTINUAL BASIS UNTIL THE SITE IS PERMANENTLY STABILIZED.
6. EROSION CONTROL MEASURES MUST BE RETURNED TO IN-PLACE CONDITIONS AT THE END OF EACH WORK DAY.
7. WHERE CONSTRUCTION ACTIVITIES HAVE PERMANENTLY CEASED OR HAVE BEEN TEMPORARILY SUSPENDED FOR MORE THAN FOURTEEN DAYS, OR WHEN FINAL GRADES HAVE BEEN REACHED IN ANY PORTION OF THE SITE, STABILIZATION SHALL BE IMPLEMENTED WITHIN SEVEN DAYS.
8. ALL EXCESS SOIL MATERIALS SHALL BE STOCKPILED AT LOCATIONS APPROVED BY THE CONTRACTING OFFICER'S REPRESENTATIVE PRIOR TO PLACEMENT OF ANY SOIL MATERIAL. STOCKPILES SHALL BE ENCLOSED WITH SEDIMENT FENCE UNTIL TEMPORARY OR PERMANENT VEGETATIVE COVER IS ESTABLISHED. ANY STOCKPILE THAT REMAINS LONGER THAN SEVEN DAYS MUST BE STABILIZED BY SEEDING WITH ANNUAL RYE, WHEAT OR OATS AT A MINIMUM.
9. THE REMOVAL OF VEGETATIVE COVER AND EXPOSURE OF THE BARE GROUND MUST BE RESTRICTED TO THE MINIMUM AMOUNT NEEDED FOR CONSTRUCTION. AREAS WHERE THE SOIL IS EXPOSED MUST BE PROTECTED FROM EROSION BY SEEDING AND MULCHING AS SOON AS POSSIBLE AFTER THE REMOVAL OF THE ORIGINAL GROUND COVER.
10. EROSION MATS USED SHALL CONSIST ENTIRELY OF BIODEGRADABLE MATERIALS. NO SLOPES STEEPER THAN 4:1 ARE ANTICIPATED WITH THIS PROJECT. TYPE 2.B NETLESS ROLLED EROSION CONTROL BLANKETS SHALL BE USED ON-SITE TO REDUCE RISKS TO WILDLIFE.
11. AFTER THE SITE IS UNIFORMLY STABILIZED ACROSS 80% OF THE SITE AREA, AND AS APPROVED BY THE CONTRACT OFFICER'S REPRESENTATIVE, ALL TEMPORARY EROSION CONTROL MEASURES MUST BE REMOVED AND DISPOSED OF PROPERLY. THE CONTRACTOR SHALL RESTORE ANY AREAS WHERE EROSION CONTROL MEASURES HAVE BEEN REMOVED.
12. THIS PLAN SHOWS NEW CONTOURS AND FINISHED GRADES. FOR ROUGH GRADES OF PAVED AREAS, SUBTRACT THE DEPTH OF BASE COURSES AND SURFACE COURSES.



United States Department of Agriculture
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(R09)
EASTERN REGION

STAMPS, LOGOS, AND SEALS

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NO.	REVISION / ISSUE	DATE

PROJECT NAME

HELIBASE
DEVELOPMENT
PROJECT

MARK TWAIN
NATIONAL FOREST

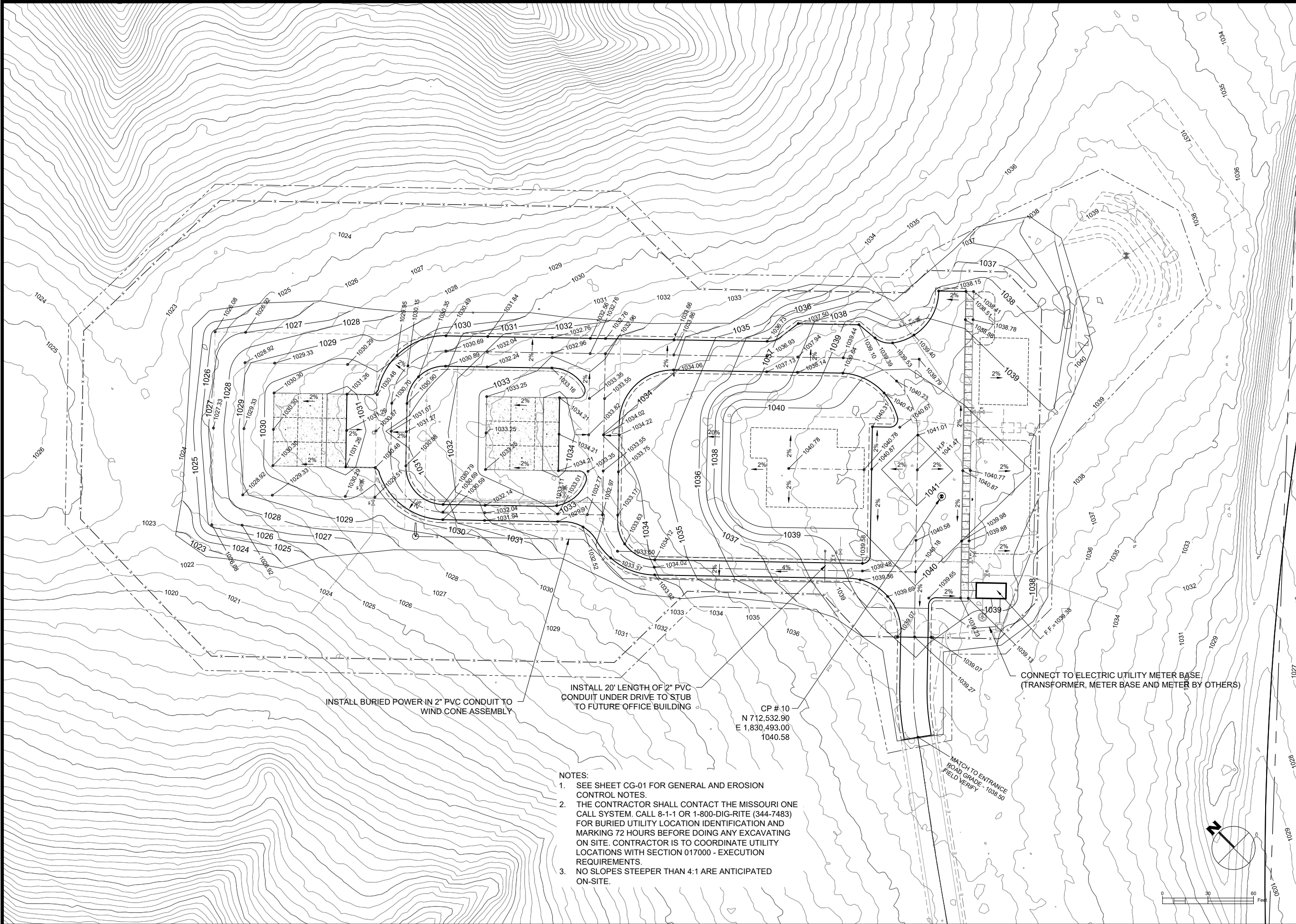
HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

SITE PREPARATION &
EROSION CONTROL
PLAN

DATE 05/17/2021	ARCHIVE NO. 090500-ABL2021-0094D_C0001	DRAWING SHEET NO.
DESIGNER K.KEELEY	CG-01	
DRAWN K.KEELEY		
CHECKED A.WILSON		
PROJECT NO. 2021-0094D	SHEET 04 OF 26	

6/11/21 10:25 KENNETHKEELEY\DOXOR09 ENG PROJECTS\R09 MTNFW\HELIBASE\CG-02 GRADING.DWG



United States Department of Agriculture
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DEVELOPMENT
PROJECT

MARK TWAIN
NATIONAL FOREST

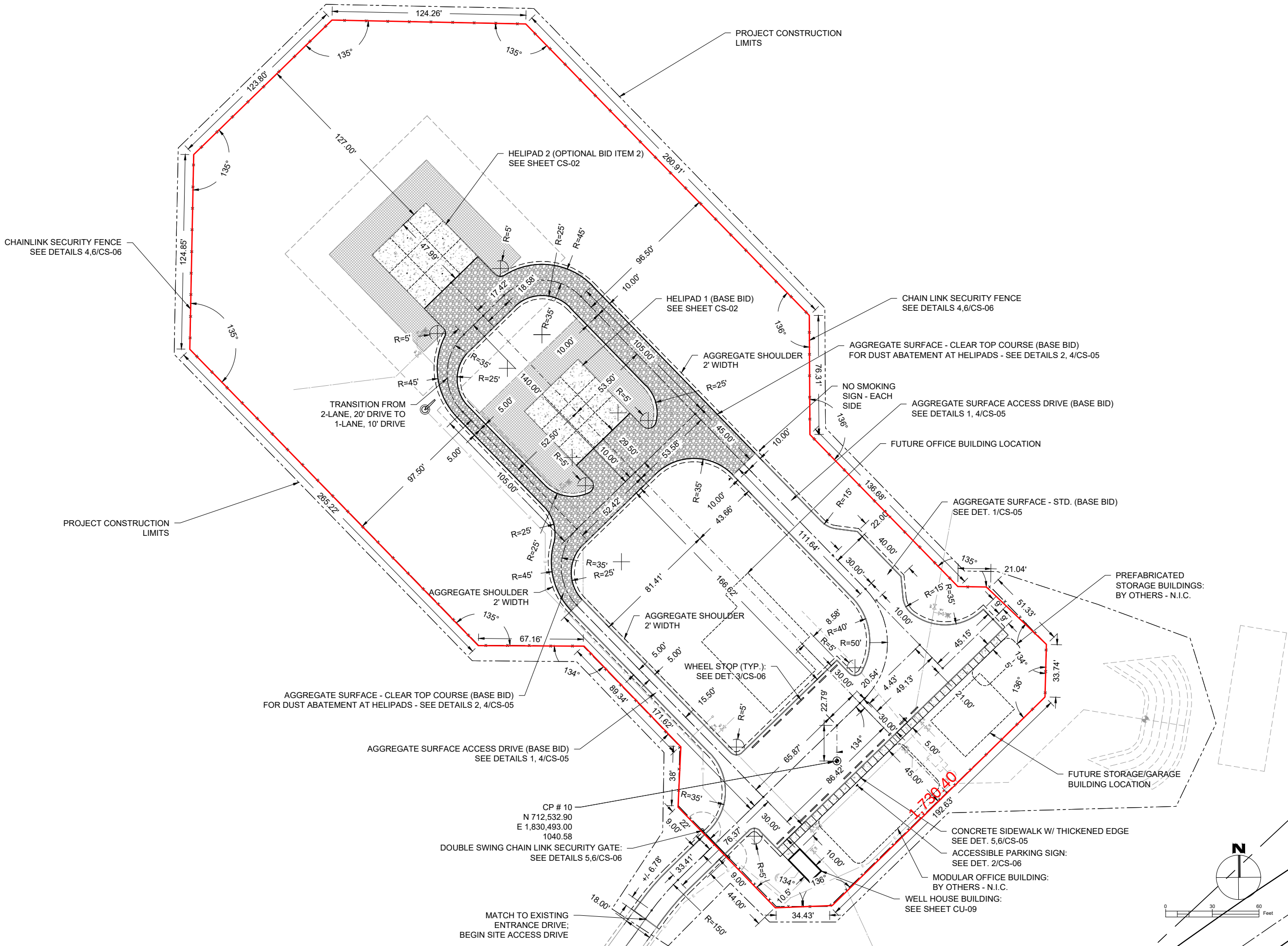
HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

SITE GRADING AND
UTILITY PLAN

DATE 05/17/21	ARCHIVE NO. 090500-ABL2021-0094D_C0002	DRAWING SHEET NO. CG-02
DESIGNER K.KEELEY		
DRAWN K.KEELEY		
CHECKED A.WILSON		
PROJECT NO. 2021-0094D	SHEET 05 OF 26	

6/1/21 09:09 KENNETHKEELEY\BOXR09 ENG PROJECTS\R09 MT\MULTIPLE DISCIPLINE ASSETS\HELIBASE\DESIGN DEVELOP\CD\2021-05-17-MTNF-HELIBASE-CS-01-LAYOUT.DWG;



United States Department of Agriculture
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(R09)
EASTERN REGION

STAMPS, LOGOS, AND SEALS

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NO.	REVISION / ISSUE	DATE

PROJECT NAME

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DEVELOPMENT
PROJECT

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NATIONAL FOREST

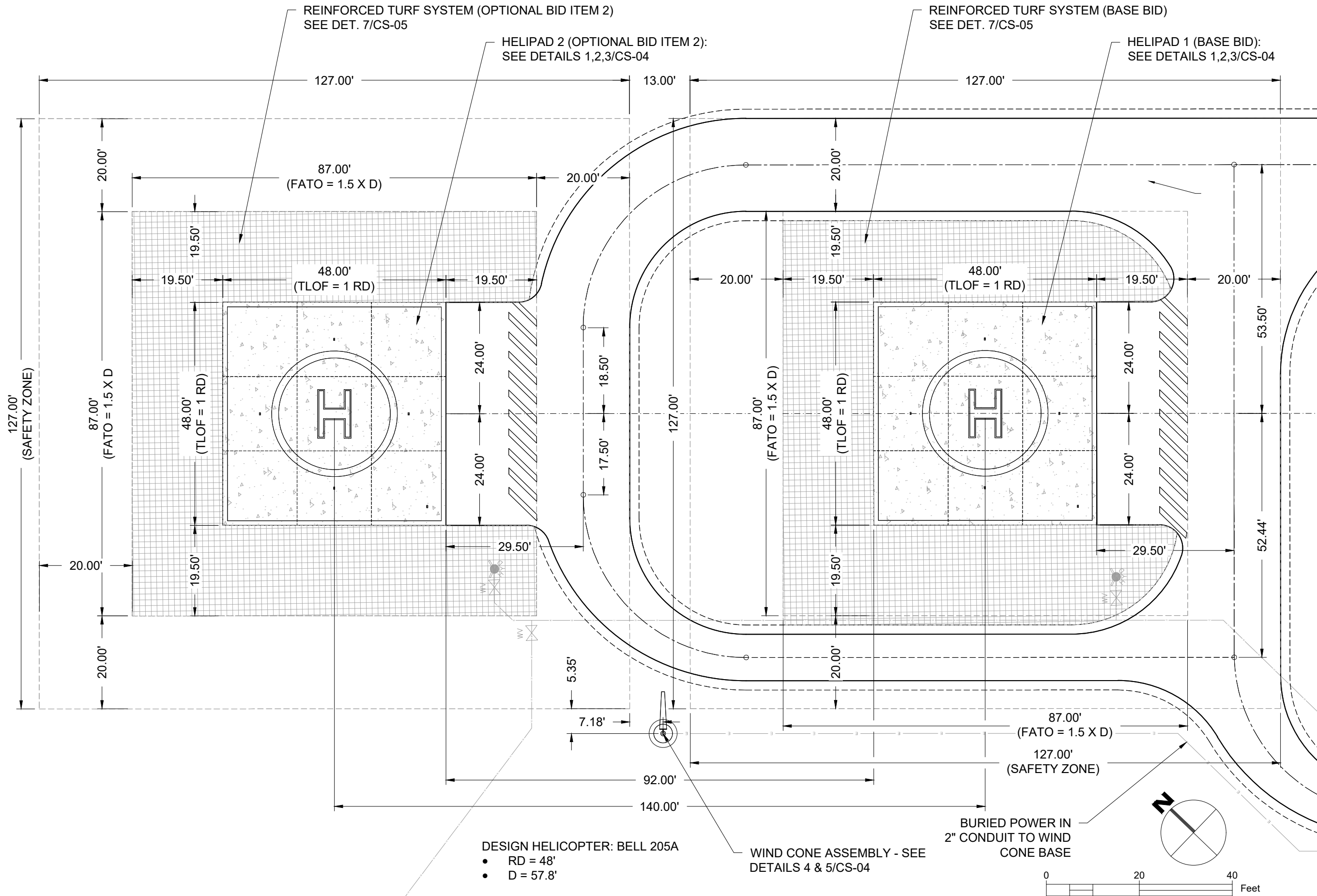
HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

SITE LAYOUT PLAN

DATE 05/17/21	ARCHIVE NO. 090500-ABL2021-0094D_C0001
DESIGNER K.KEELEY	DRAWING SHEET NO. CS-01
DRAWN K.KEELEY	
CHECKED A.WILSON	
PROJECT NO. 2021-0094D	SHEET 06 OF 26

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USDA **FOREST SERVICE**
United States Department of Agriculture
Forest Service

(R09)
EASTERN REGION

STAMPS, LOGOS, AND SEALS		
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NO.	REVISION / ISSUE	DATE

PROJECT NAME

**HELIBASE
DEVELOPMENT
PROJECT**

**MARK TWAIN
NATIONAL FOREST**

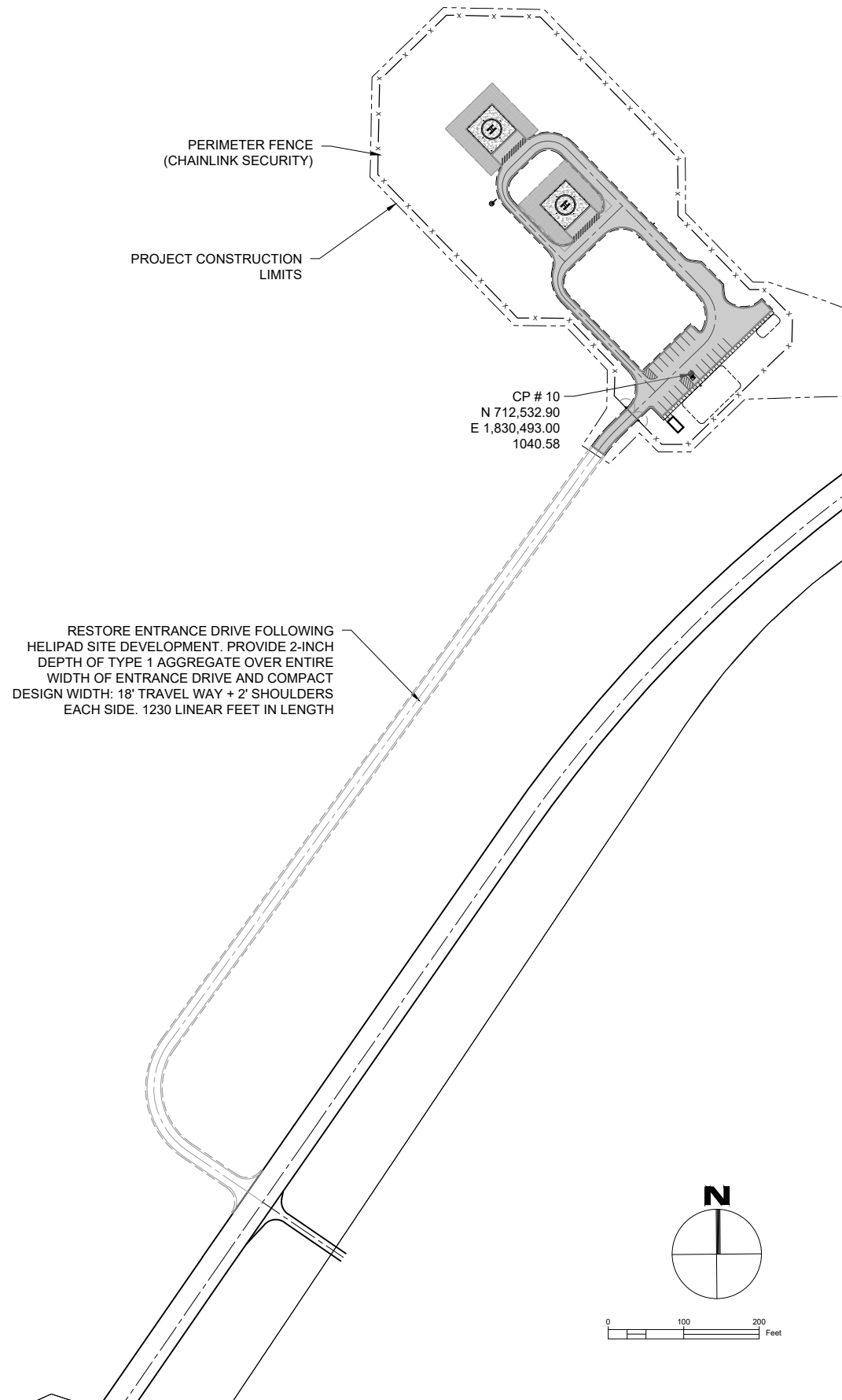
HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

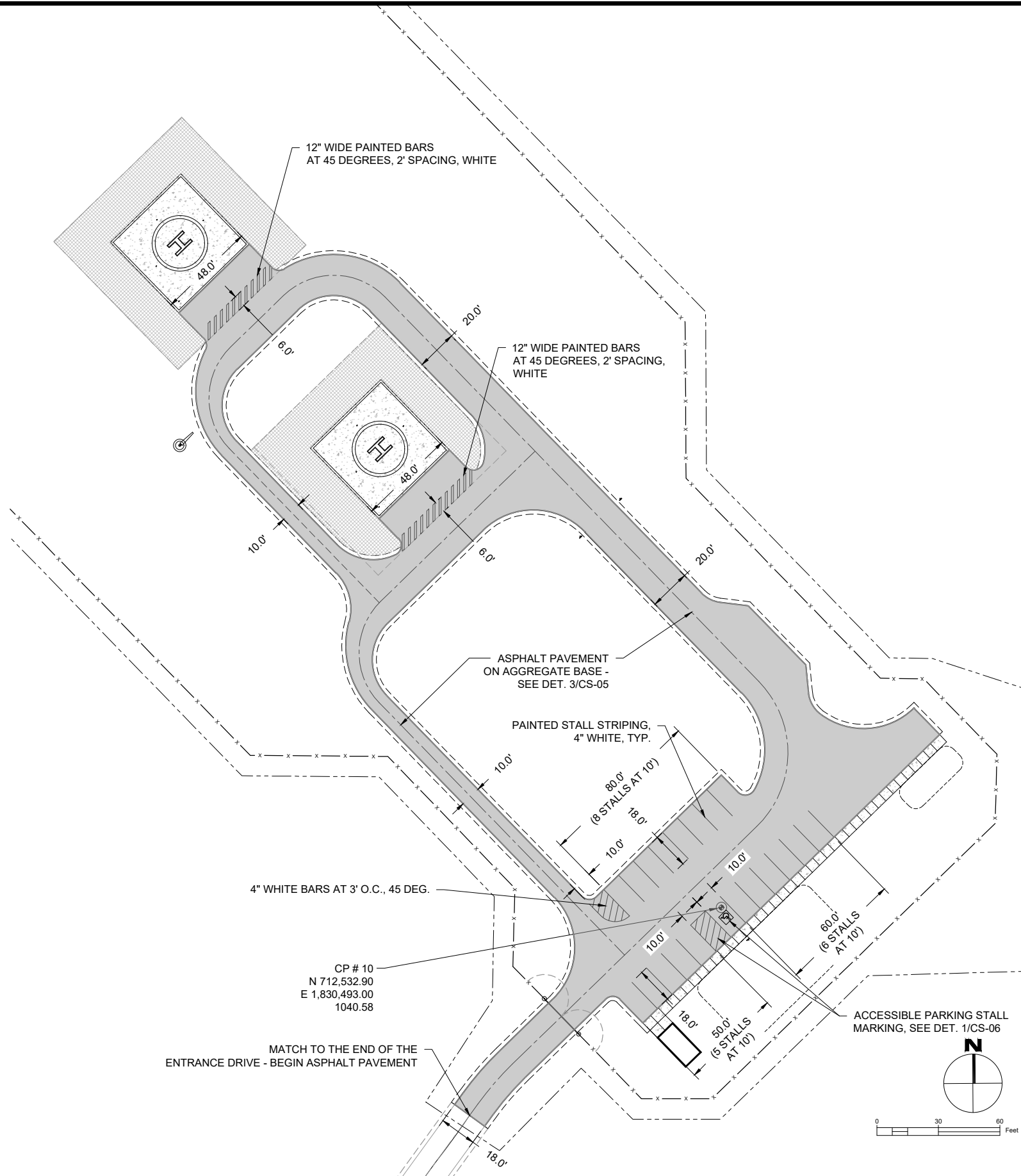
HELIPAD LAYOUT PLAN

DATE 05/17/21	ARCHIVE NO. 090500-ABL2021-0094D_C0003	DRAWING SHEET NO. CS-02
DESIGNER K.KEELEY		
DRAWN K.KEELEY		
CHECKED M.TENDLER		
PROJECT NO. 2021-0094D	SHEET 07 OF 26	

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ENTRANCE ROAD RESTORATION PLAN



PAVING AND MARKING PLAN - OPTIONAL BID ITEM 1



United States Department of Agriculture
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PROJECT

MARK TWAIN
NATIONAL FOREST

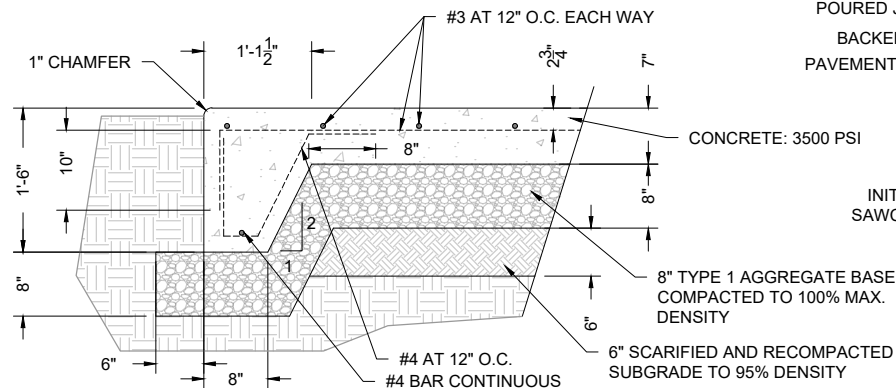
HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

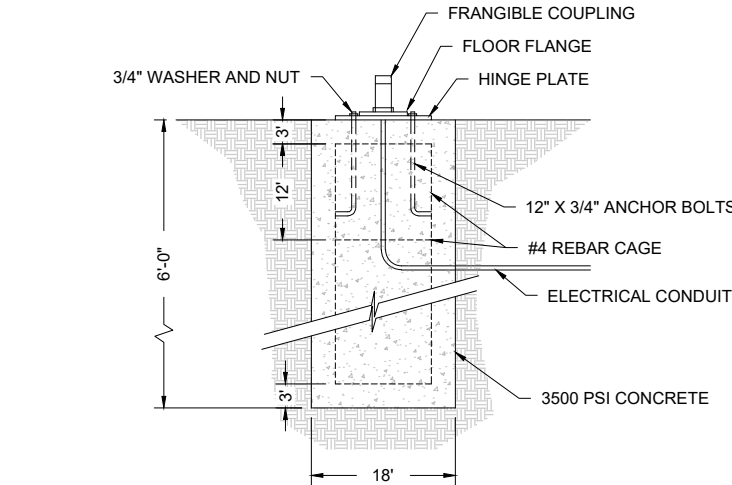
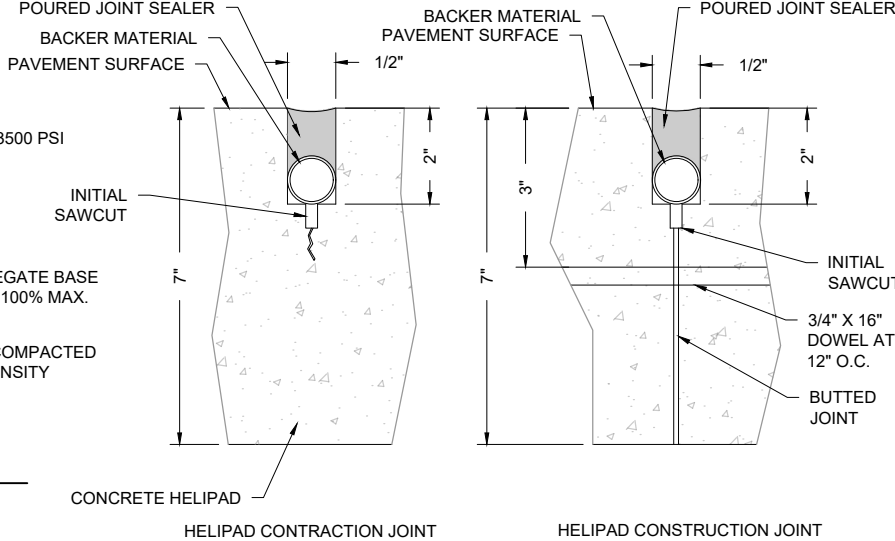
SITE PAVING PLAN

DATE 05/17/21	ARCHIVE NO. 090500-ABL2021-0094D_C0003
DESIGNER K.KEELEY	DRAWING SHEET NO. CS-03
DRAWN K.KEELEY	
CHECKED A.WILSON	
PROJECT NO. 2021-0094D	SHEET 08 OF 26

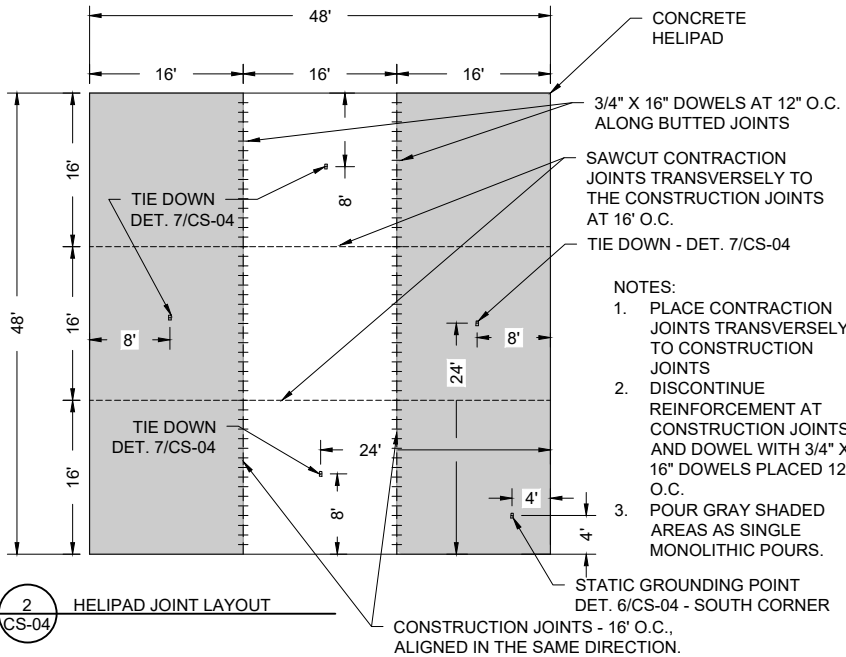
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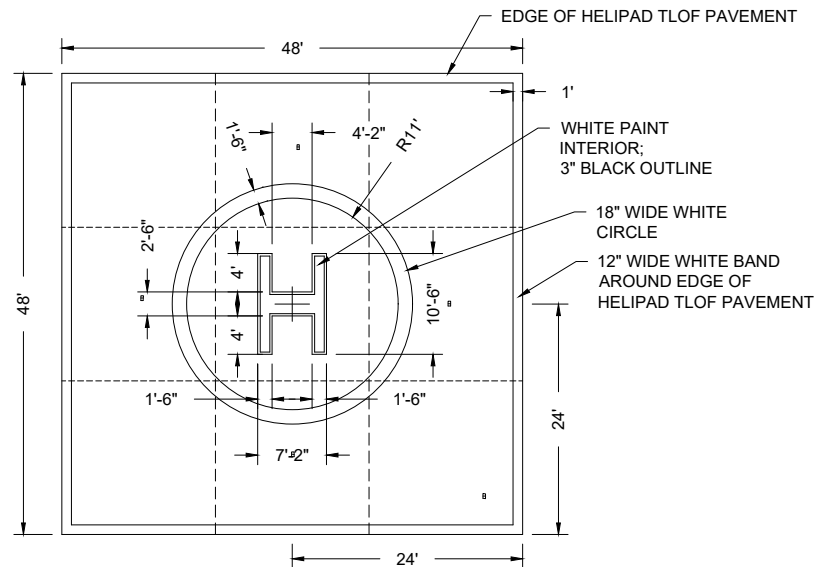
1 CONCRETE HELIPAD PAVEMENT W/ THICKENED EDGE
CS-04



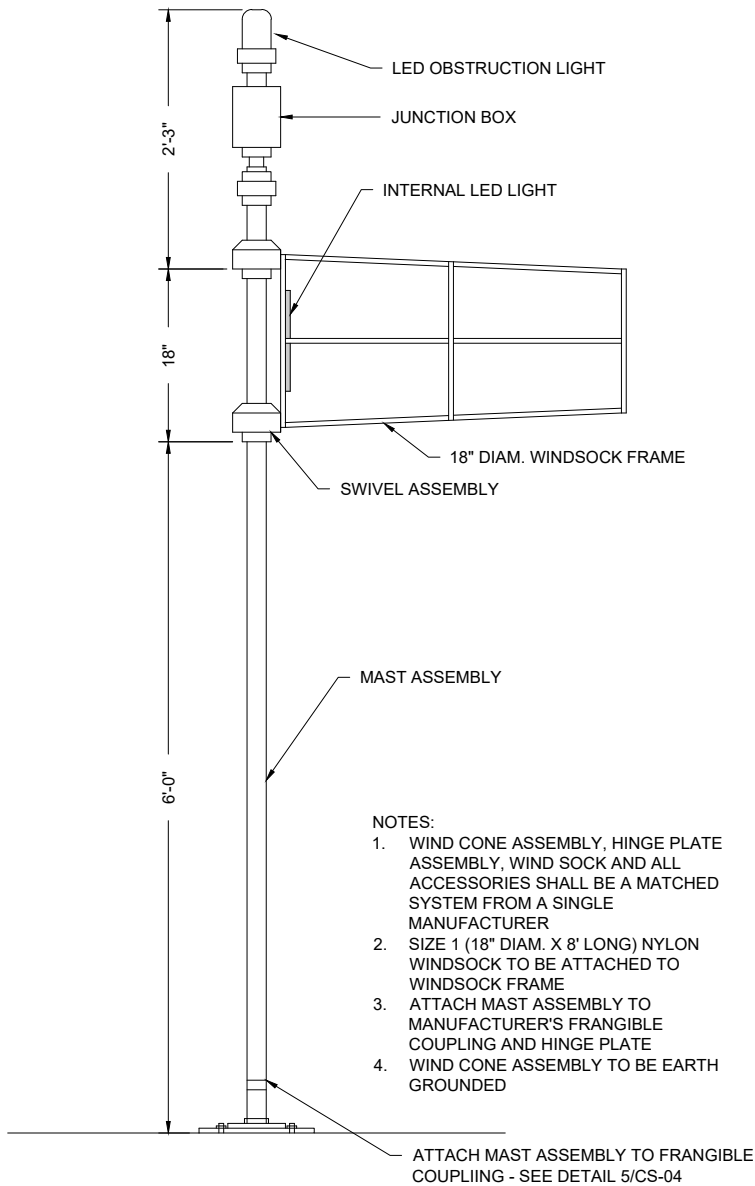
5 WIND CONE FOOTING
CS-05



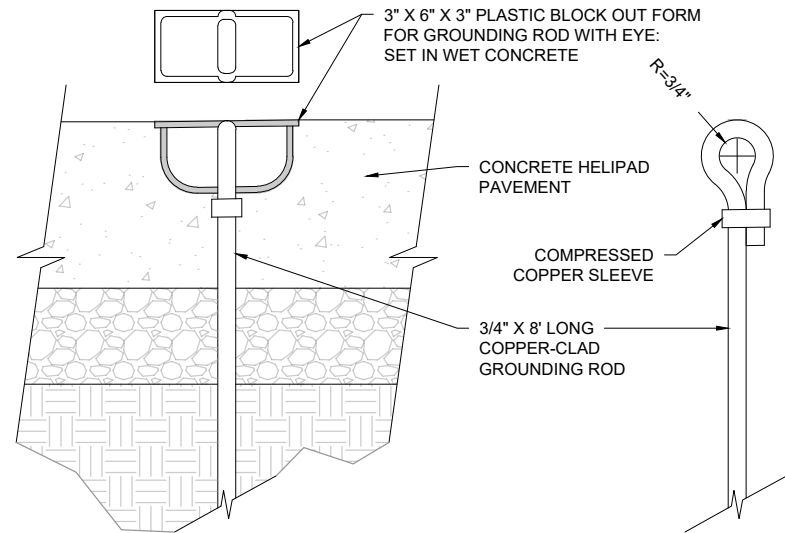
2 HELIPAD JOINT LAYOUT
CS-04



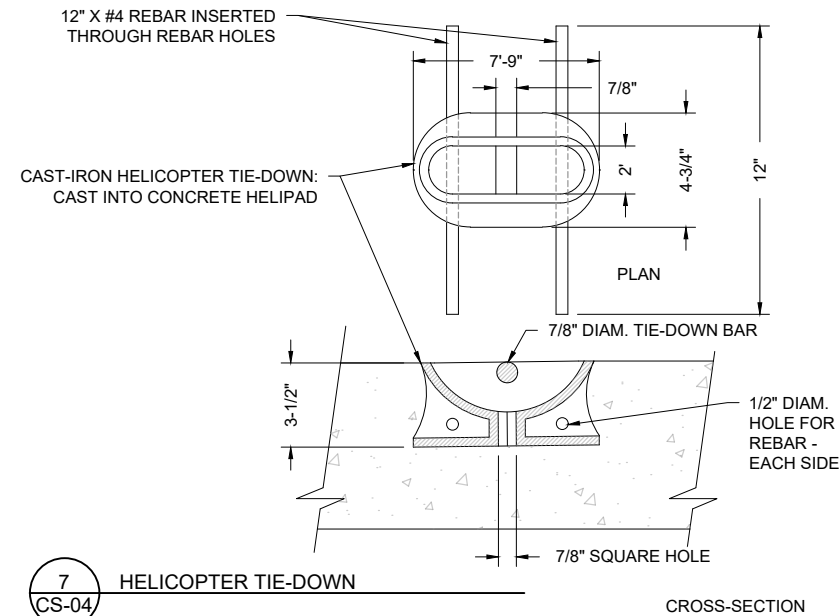
3 HELIPAD MARKING DETAIL
CS-04



4 L806 WIND CONE ASSEMBLY - INTERNALLY LIGHTED
CS-04



6 STATIC GROUNDING POINT - TIE-DOWN
CS-04



7 HELICOPTER TIE-DOWN
CS-04



(R09)
EASTERN REGION

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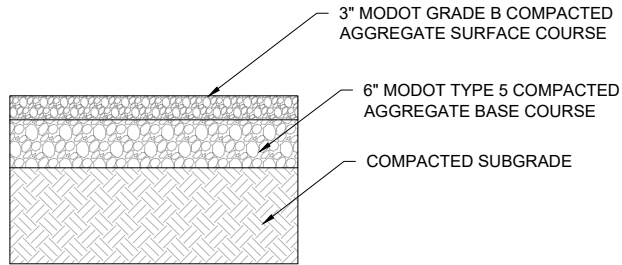
HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

HELIPAD DETAILS

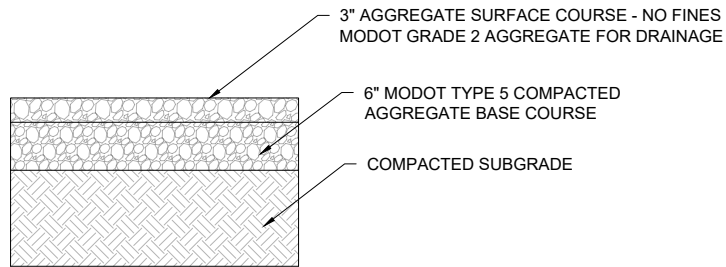
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DESIGNER K.KEELEY		
DRAWN K.KEELEY		
CHECKED A.WILSON		
PROJECT NO. 2021-0094D		
		SHEET 09 OF 26

6/3/21 1807 KENNETHKEELEY\KKEELEY\BOXR09 ENG PROJECT\B09 MULTIPLE DISCIPLINE ASSETS\HELIBASE\DESIGN DEVELOP\CAD\CD2021-05-17-MTNF-HELIBASE-CS-04 SITE DETAILS.DWG.



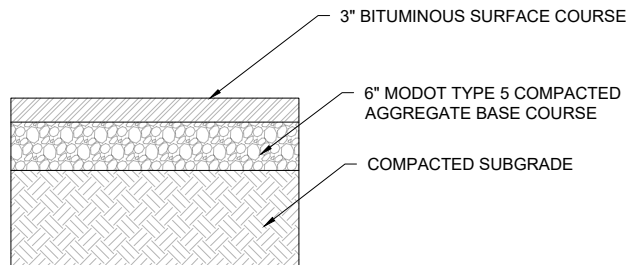
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CS-05

AGGREGATE SURFACE - STANDARD



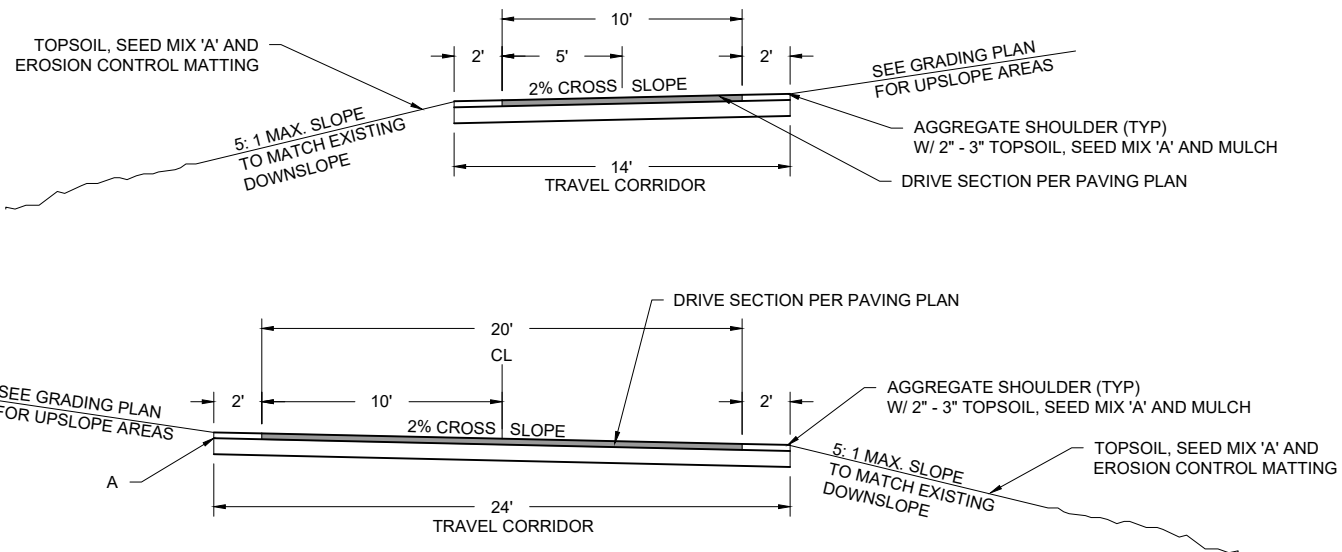
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CS-05

AGGREGATE SURFACE - CLEAR TOP COURSE



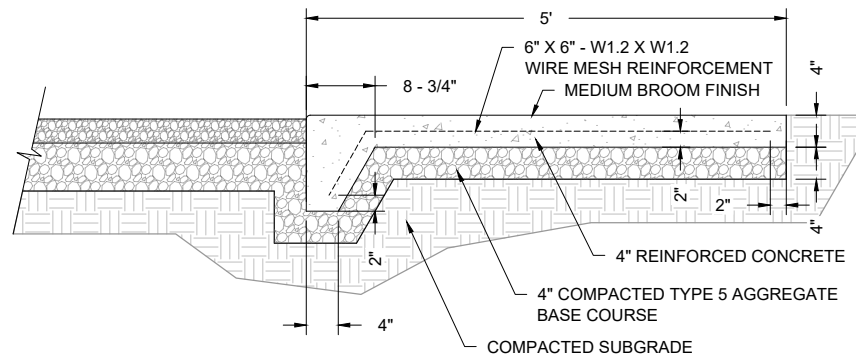
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CS-05

ASPHALT PAVING ON AGGREGATE BASE
(OPTIONAL BID ITEM - 1)



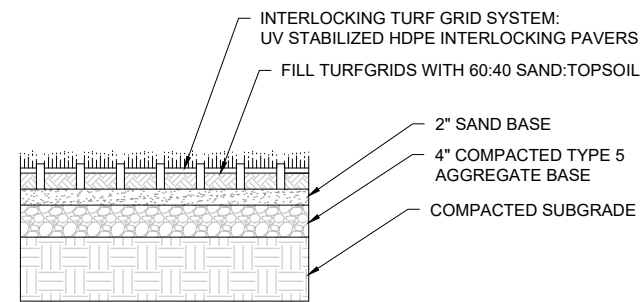
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CS-05

TYPICAL ACCESS DRIVE SECTIONS : 10' (ONE WAY) AND 20' (TWO WAY)



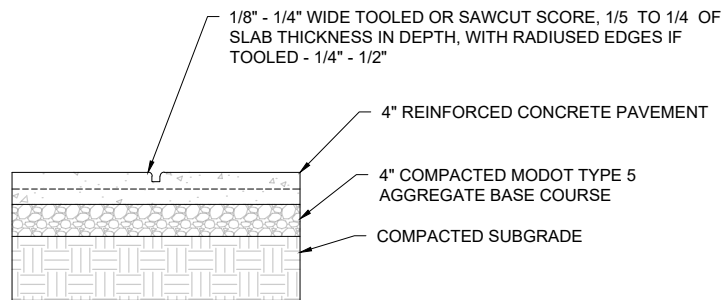
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CS-05

CONCRETE SIDEWALK W/ THICKENED EDGE



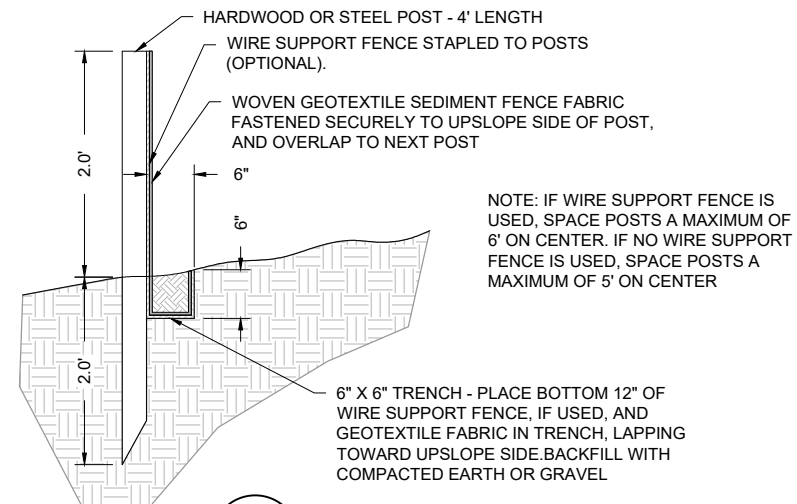
7
CS-05

REINFORCED TURF GRID SYSTEM



6
CS-05

CONTROL JOINT - CONCRETE SIDEWALK



8
CS-05

SEDIMENT FENCE (SILT FENCE)



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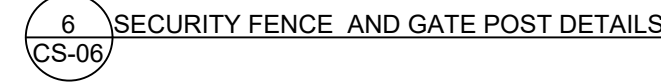
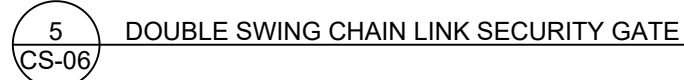
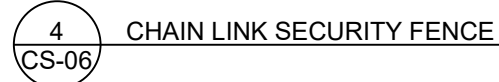
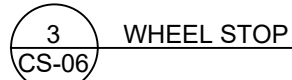
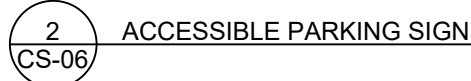
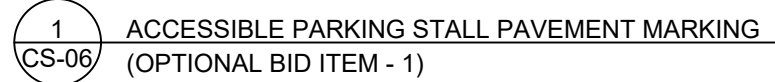
MARK TWAIN
NATIONAL FOREST

HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

SITEWORK STANDARD
DETAILS 1

DATE 05/17/21	ARCHIVE NO. 090500-ABL2021-0094D_C0006	DRAWING SHEET NO. CS-05
DESIGNER K.KEELEY	SHEET 10 OF 26	
DRAWN K.KEELEY		
CHECKED A.WILSON		
PROJECT NO. 2021-0094D		



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**HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT**

SITework STANDARD DETAILS 2

DATE 05/17/21	ARCHIVE NO. 090500-ABL2021-0094D_C0006	
DESIGNER K.KEELEY	DRAWING SHEET NO. CS-06	
DRAWN K.KEELEY		
CHECKED A.WILSON	SHEET 11 OF 26	
PROJECT NO. 2021-0094D		

6/1/21 09:09 KENNETHKEELY C:\USERS\KENNETHKEELY\BOXR09 ENG PROJECTS\R09 MT\MULTIPLE DISCIPLINE ASSETS\HELIBASE\DESIGN DEVELOP\CAD\CD2021-04-07-MTNF-HELIBASE-C-6-WATER-UTIL.DWG;



United States Department of Agriculture
Forest Service

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EASTERN REGION

STAMPS, LOGOS, AND SEALS

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NO.	REVISION / ISSUE	DATE

PROJECT NAME

HELIBASE
DEVELOPMENT
PROJECT

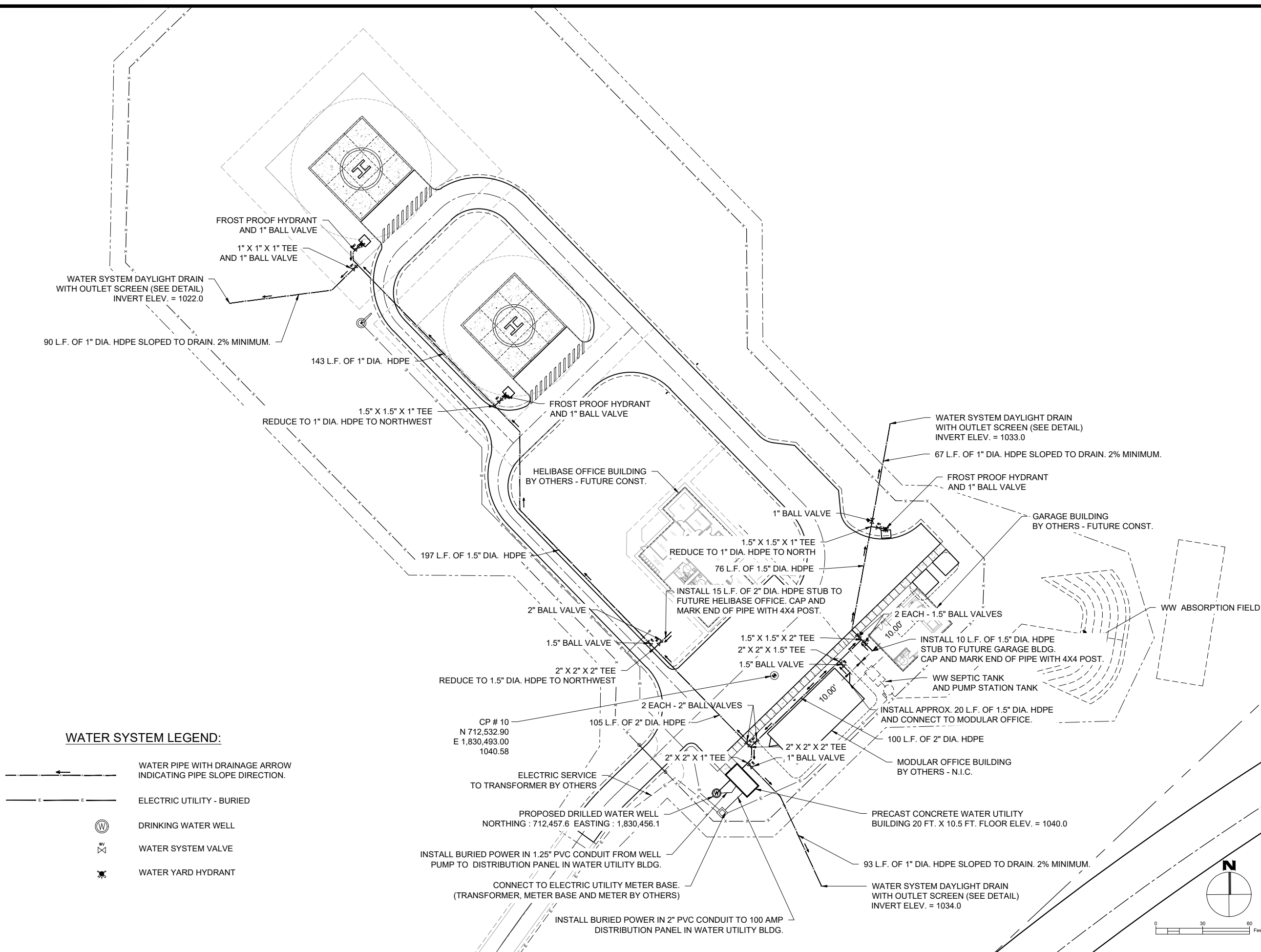
MARK TWAIN
NATIONAL FOREST

HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

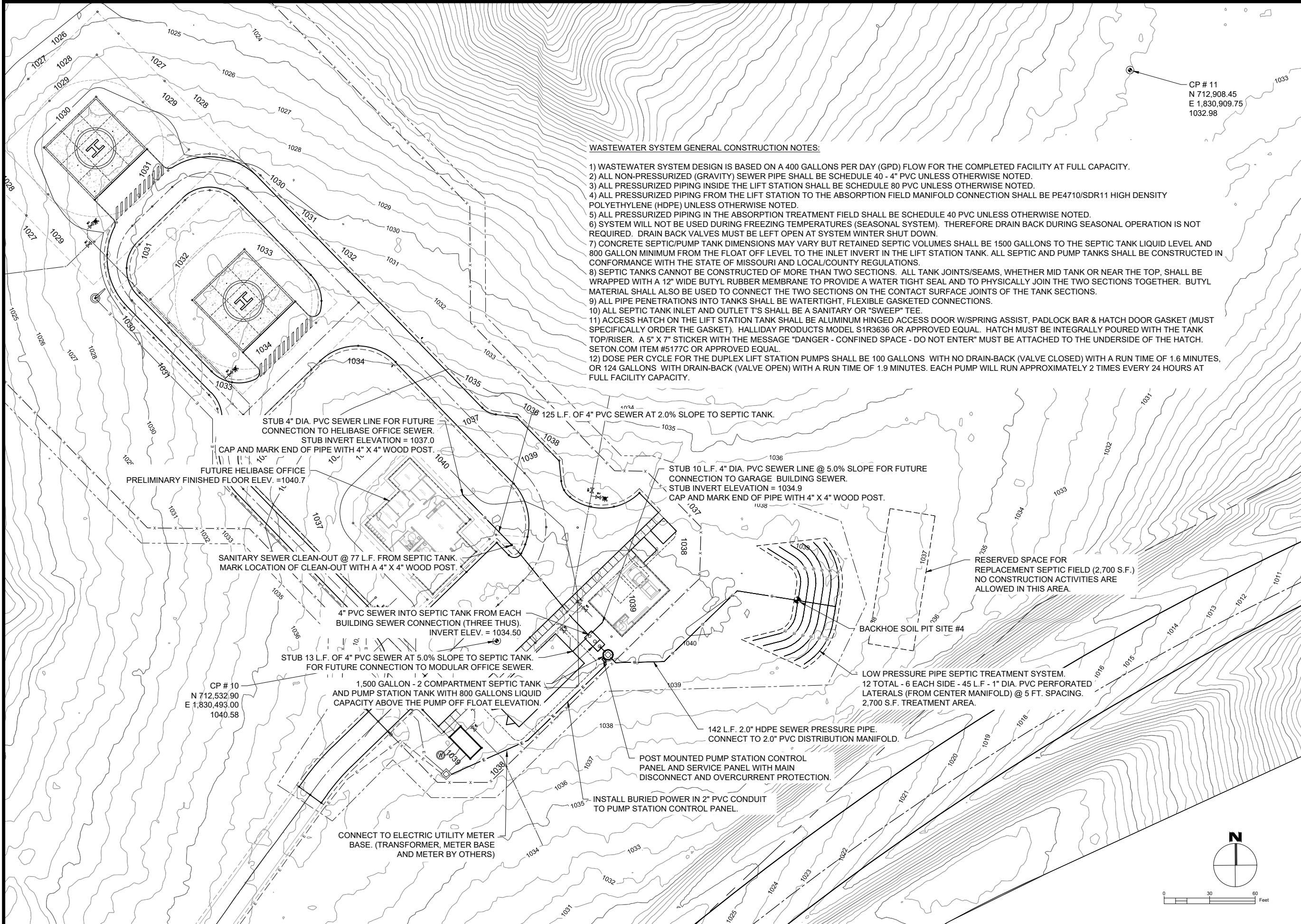
DRAWING TITLE

WATER UTILITY PLAN

DATE 05/13/21	ARCHIVE NO. 090500-ABL2021-0094D_P1	DRAWING SHEET NO. CU-01
DESIGNER D.MATTEI		
DRAWN D.MATTEI		
CHECKED R.SUTTON		
PROJECT NO. 2021-0094		SHEET 12 OF 26



61121 09:54 KENNETHKEELEY\DOXR09 ENG PROJECTS\R09 MT\MULTIPLE DISCIPLINE ASSETS\HELIBASE\DESIGN DEVELOP\CD\2021-05-17-MTN-HELIBASE-CU-02-WW-UTIL PLAN.DWG.



WASTEWATER SYSTEM GENERAL CONSTRUCTION NOTES:

- 1) WASTEWATER SYSTEM DESIGN IS BASED ON A 400 GALLONS PER DAY (GPD) FLOW FOR THE COMPLETED FACILITY AT FULL CAPACITY.
- 2) ALL NON-PRESSURIZED (GRAVITY) SEWER PIPE SHALL BE SCHEDULE 40 - 4" PVC UNLESS OTHERWISE NOTED.
- 3) ALL PRESSURIZED PIPING INSIDE THE LIFT STATION SHALL BE SCHEDULE 80 PVC UNLESS OTHERWISE NOTED.
- 4) ALL PRESSURIZED PIPING FROM THE LIFT STATION TO THE ABSORPTION FIELD MANIFOLD CONNECTION SHALL BE PE4710/SDR11 HIGH DENSITY POLYETHYLENE (HDPE) UNLESS OTHERWISE NOTED.
- 5) ALL PRESSURIZED PIPING IN THE ABSORPTION TREATMENT FIELD SHALL BE SCHEDULE 40 PVC UNLESS OTHERWISE NOTED.
- 6) SYSTEM WILL NOT BE USED DURING FREEZING TEMPERATURES (SEASONAL SYSTEM). THEREFORE DRAIN BACK DURING SEASONAL OPERATION IS NOT REQUIRED. DRAIN BACK VALVES MUST BE LEFT OPEN AT SYSTEM WINTER SHUT DOWN.
- 7) CONCRETE SEPTIC/PUMP TANK DIMENSIONS MAY VARY BUT RETAINED SEPTIC VOLUMES SHALL BE 1500 GALLONS TO THE SEPTIC TANK LIQUID LEVEL AND 800 GALLON MINIMUM FROM THE FLOAT OFF LEVEL TO THE INLET INVERT IN THE LIFT STATION TANK. ALL SEPTIC AND PUMP TANKS SHALL BE CONSTRUCTED IN CONFORMANCE WITH THE STATE OF MISSOURI AND LOCAL/COUNTY REGULATIONS.
- 8) SEPTIC TANKS CANNOT BE CONSTRUCTED OF MORE THAN TWO SECTIONS. ALL TANK JOINTS/SEAMS, WHETHER MID TANK OR NEAR THE TOP, SHALL BE WRAPPED WITH A 12" WIDE BUTYL RUBBER MEMBRANE TO PROVIDE A WATER TIGHT SEAL AND TO PHYSICALLY JOIN THE TWO SECTIONS TOGETHER. BUTYL MATERIAL SHALL ALSO BE USED TO CONNECT THE TWO SECTIONS ON THE CONTACT SURFACE JOINTS OF THE TANK SECTIONS.
- 9) ALL PIPE PENETRATIONS INTO TANKS SHALL BE WATERTIGHT, FLEXIBLE GASKETED CONNECTIONS.
- 10) ALL SEPTIC TANK INLET AND OUTLET T'S SHALL BE A SANITARY OR "SWEEP" TEE.
- 11) ACCESS HATCH ON THE LIFT STATION TANK SHALL BE ALUMINUM HINGED ACCESS DOOR W/SPRING ASSIST, PADLOCK BAR & HATCH DOOR GASKET (MUST SPECIFICALLY ORDER THE GASKET). HALLIDAY PRODUCTS MODEL S1R3636 OR APPROVED EQUAL. HATCH MUST BE INTEGRALLY POURED WITH THE TANK TOP/RISER. A 5" X 7" STICKER WITH THE MESSAGE "DANGER - CONFINED SPACE - DO NOT ENTER" MUST BE ATTACHED TO THE UNDERSIDE OF THE HATCH. SETON.COM ITEM #5177C OR APPROVED EQUAL.
- 12) DOSE PER CYCLE FOR THE DUPLEX LIFT STATION PUMPS SHALL BE 100 GALLONS WITH NO DRAIN-BACK (VALVE CLOSED) WITH A RUN TIME OF 1.6 MINUTES, OR 124 GALLONS WITH DRAIN-BACK (VALVE OPEN) WITH A RUN TIME OF 1.9 MINUTES. EACH PUMP WILL RUN APPROXIMATELY 2 TIMES EVERY 24 HOURS AT FULL FACILITY CAPACITY.



United States Department of Agriculture
Forest Service

(R09)
EASTERN REGION

STAMPS, LOGOS, AND SEALS

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NO.	REVISION / ISSUE	DATE

PROJECT NAME

HELIBASE
DEVELOPMENT
PROJECT

MARK TWAIN
NATIONAL FOREST

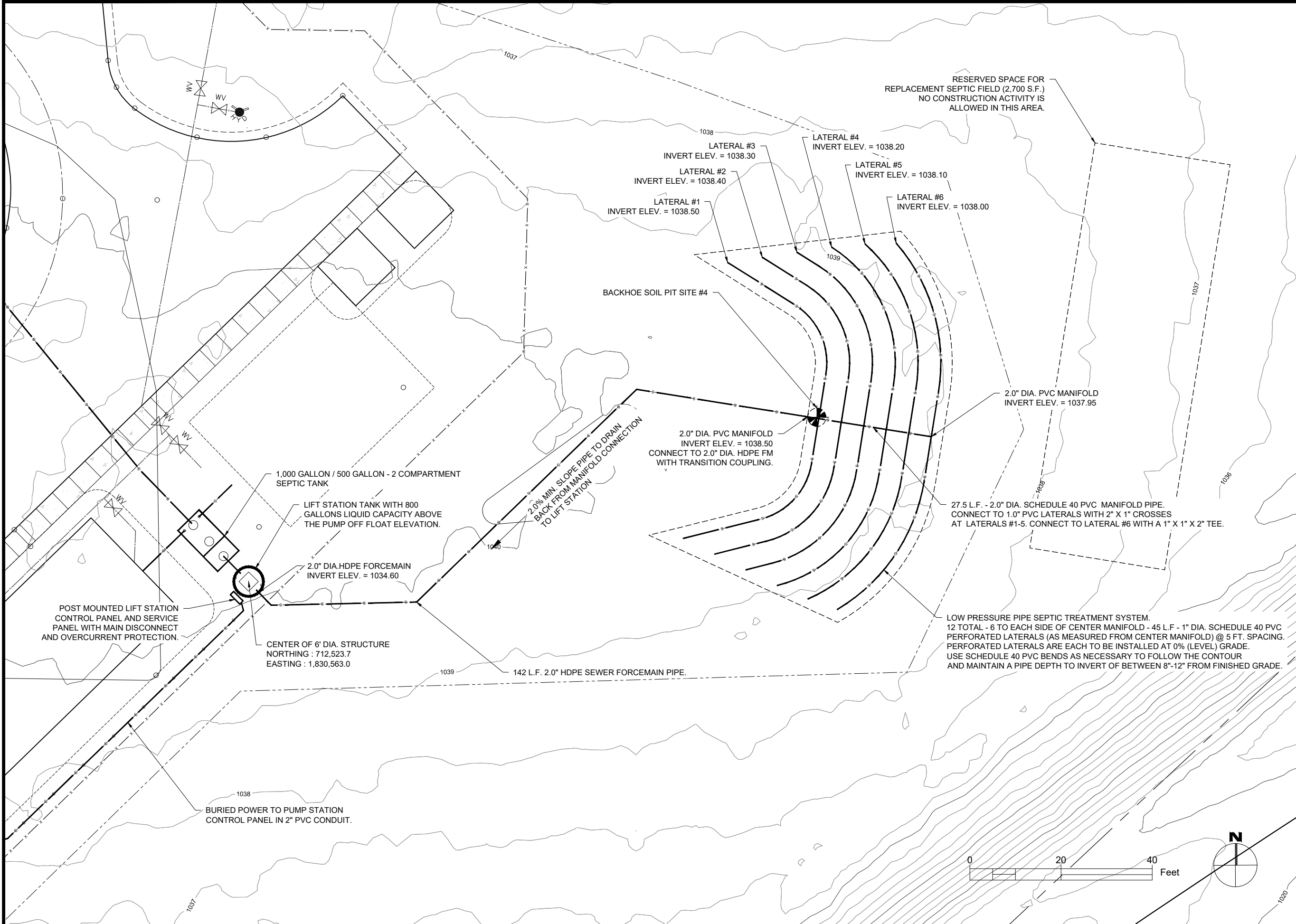
HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

WASTEWATER UTILITY
PLAN

DATE 05/13/21	ARCHIVE NO. 090500-ABL2021-0094D_P1	DRAWING SHEET NO. CU-02
DESIGNER D.MATTEI		
DRAWN D.MATTEI		
CHECKED R.SUTTON		
PROJECT NO. 2021-0094	SHEET 13 OF 26	

6/1/21 09:16 KENNETHKEELY C:\USERS\KENNETHKEELY\BOXR09 ENG PROJECTS\R09 MT\MULTIPLE DISCIPLINE ASSETS\HELIBASE\DESIGN DEVELOP\CADD\2021-04-07-MTNF-HELIBASE-C-7X-WW-DETAILS.DWG;



United States Department of Agriculture
Forest Service

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EASTERN REGION

STAMPS, LOGOS, AND SEALS

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PROJECT NAME

HELIBASE
DEVELOPMENT
PROJECT

MARK TWAIN
NATIONAL FOREST

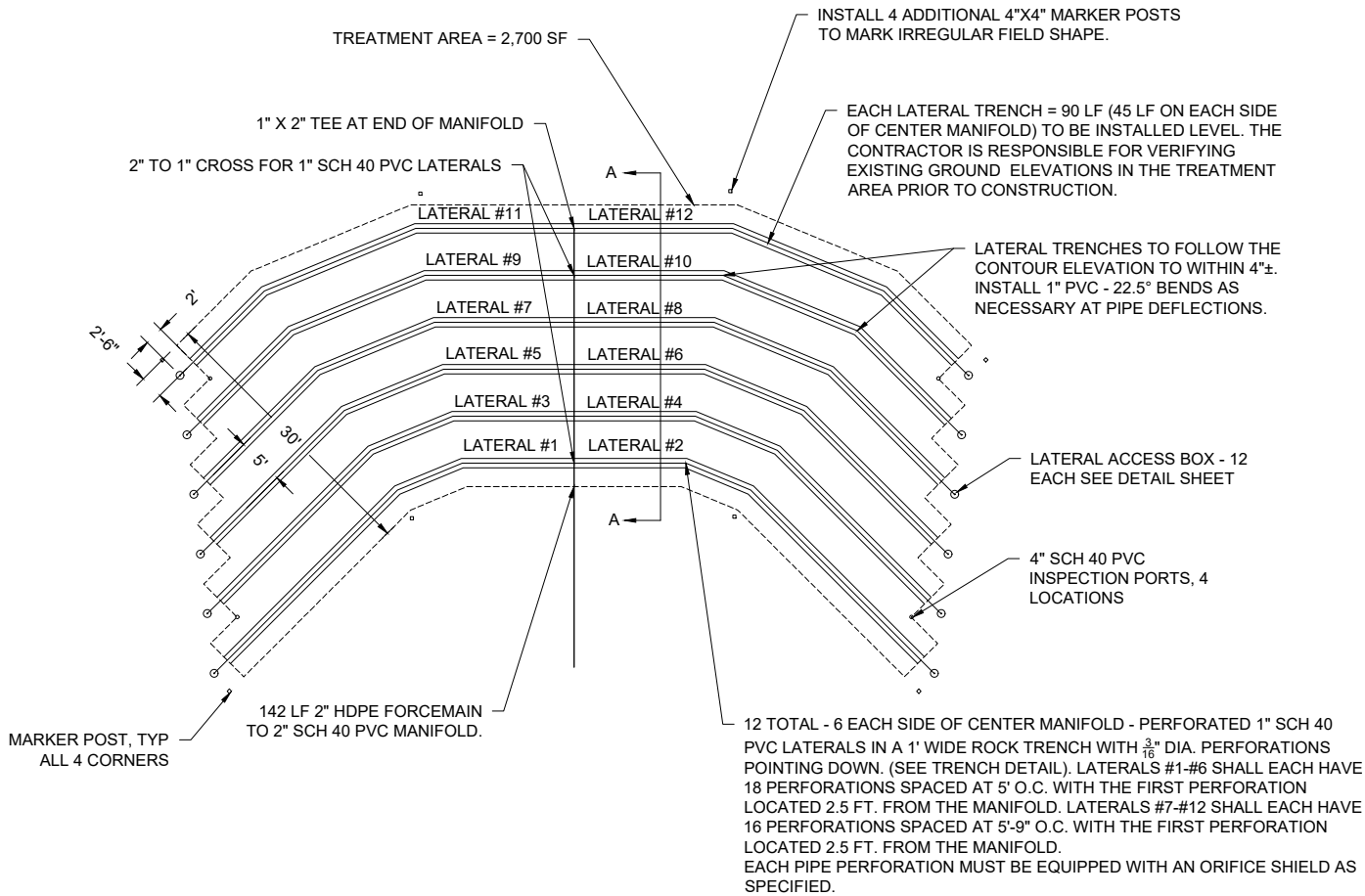
HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

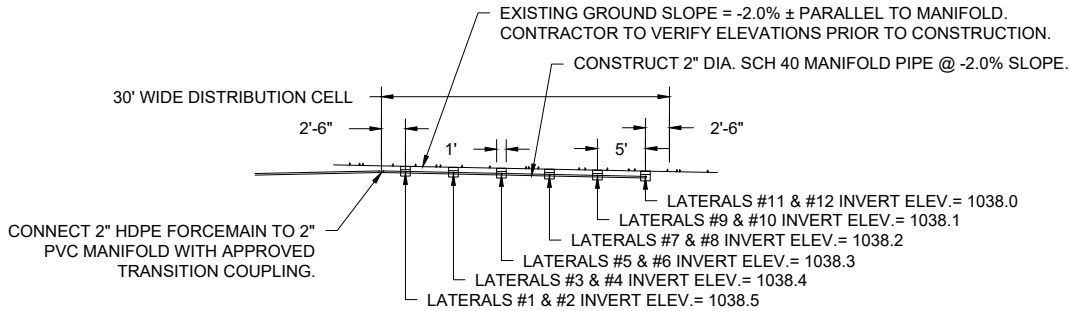
WASTEWATER UTILITY
PLAN
TREATMENT SYSTEM
LAYOUT

DATE 05/13/21	ARCHIVE NO. 090500-ABL2021-0094D_P1	DRAWING SHEET NO. CU-03
DESIGNER D.MATTEI		
DRAWN D.MATTEI		
CHECKED R.SUTTON		
PROJECT NO. 2021-0094		SHEET 14 OF 26

6/10/21 13:37 KENNETHKEELEY\BOXR09 ENG PROJECTS\R09 MT\MULTIPLE DISCIPLINE ASSETS\HELIBASE\DESIGN DEVELOP\CAD\CD2021-04\07-MTN-HELIBASE-C7X-WW-DETAILS.DWG;



SCHEMATIC LAYOUT OF ABSORPTION FIELD
SCALE: 1" = 10'



SECTION A-A
SCALE: 1" = 10'

ABSORPTION FIELD CONSTRUCTION NOTES:

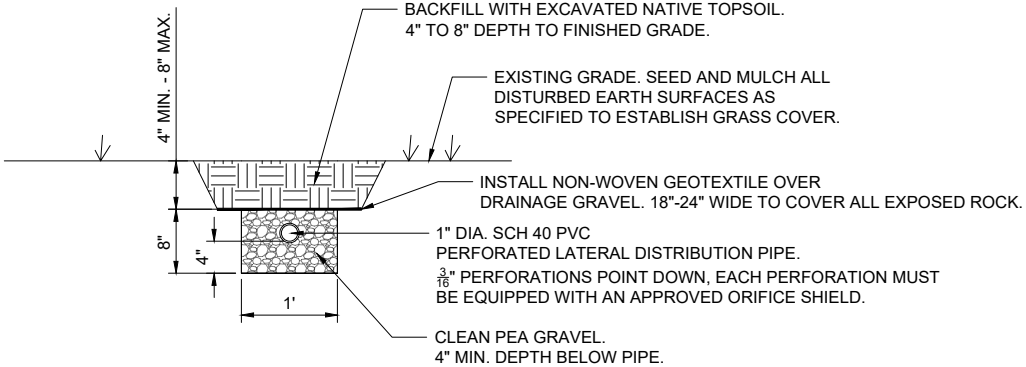
ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STATE OF MISSOURI LAWS GOVERNING ONSITE WASTEWATER TREATMENT SYSTEMS AS APPLICABLE TO LOW PRESSURE PIPE (LPP) SYSTEMS. THE CONTRACTOR MUST BE A CERTIFIED SEPTIC INSTALLER IN THE STATE OF MISSOURI.

THE AREA OF THE WASTEWATER ABSORPTION FIELD CONTAINS TREES AND BRUSH. VEGETATION LESS THAN 3" IN DIAMETER AS MEASURED 4' ABOVE THE GROUND SHALL BE COMPLETELY REMOVED. LARGER TREES SHALL BE CUT FLUSH TO THE GROUND AND THE STUMPS LEFT IN PLACE.

THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING GROUND ELEVATIONS AND SLOPES AND ABSORPTION SYSTEM LAYOUT ADJUSTMENTS PRIOR TO CLEARING TREES AND VEGETATION. THE CONTRACTOR MUST CLEARLY MARK THE PROPOSED LOCATION OF THE MANIFOLD PIPE, LATERAL TRENCHES AND CLEARING LIMITS WITH LATH AND/OR FLAGGING AND PARTICIPATE IN A SITE MEETING WITH THE COR FOR A FIELD REVIEW PRIOR TO PROCEEDING WITH ANY GROUND DISTURBING WORK.

ALL TRENCHES FOR THE DISTRIBUTION LATERALS SHALL BE INSTALLED LEVEL. THE DESIGN ELEVATIONS ARE BASED ON SATELLITE IMAGERY CONTOURS THAT HAVE NOT BEEN FIELD VERIFIED. THE CONTRACTOR MAY ADJUST THE ELEVATIONS AS NECESSARY TO MEET EXISTING REAL GROUND ELEVATIONS AS LONG AS THE DESIGN PARAMETERS OF THE MISSOURI LAWS AND THE DESIGN REQUIREMENTS ARE MET.

DUE TO NATURAL VARIATION IN SITE SLOPE AND LOCALIZED DEPRESSIONS IN THE GROUND, IT MAY BE NECESSARY TO IMPORT FILL TO MEET THE MINIMUM 4" COVER REQUIREMENT OVER THE TRENCH ROCK. BORROW FOR COVER SOIL MAY BE AVAILABLE FROM THE GENERAL SITE GRADING OF THE HELIBASE SITE AT NO COST TO THE CONTRACTOR. COVER SOIL SHALL BE CLASSIFIED AS LOAM TO MATCH THE EXISTING SITE TOPSOIL AND TO BE SUITABLE AS A SEED BED FOR ESTABLISHMENT OF GRASS COVER.



WASTEWATER TREATMENT
LATERAL TRENCH
NTS



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STAMPS, LOGOS, AND SEALS

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PROJECT NAME

**HELIBASE
DEVELOPMENT
PROJECT**

**MARK TWAIN
NATIONAL FOREST**

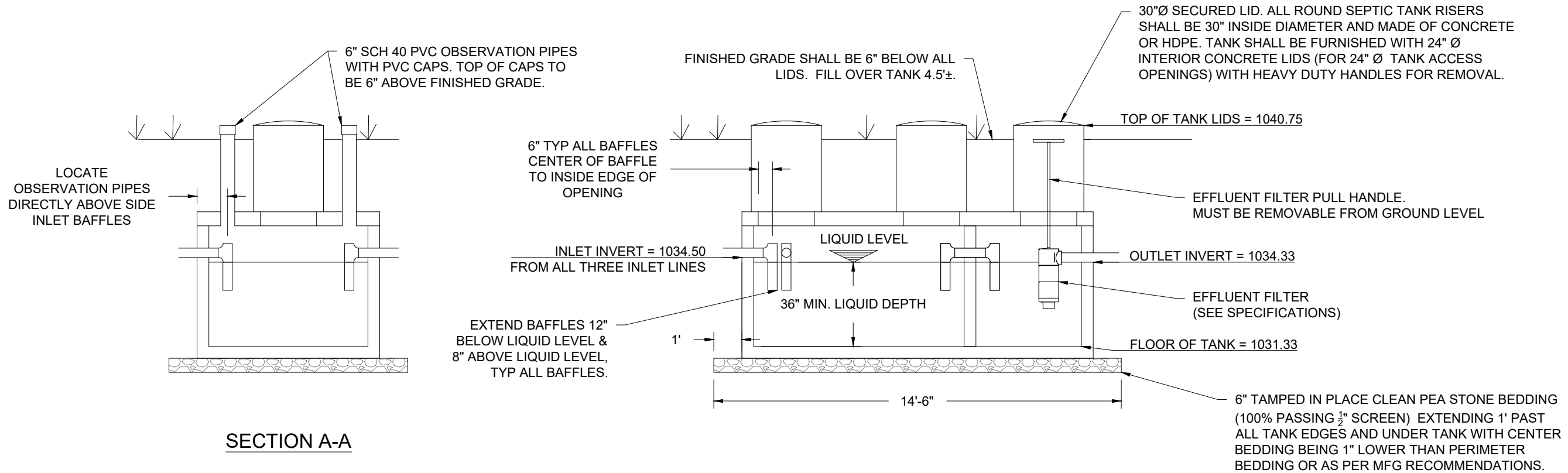
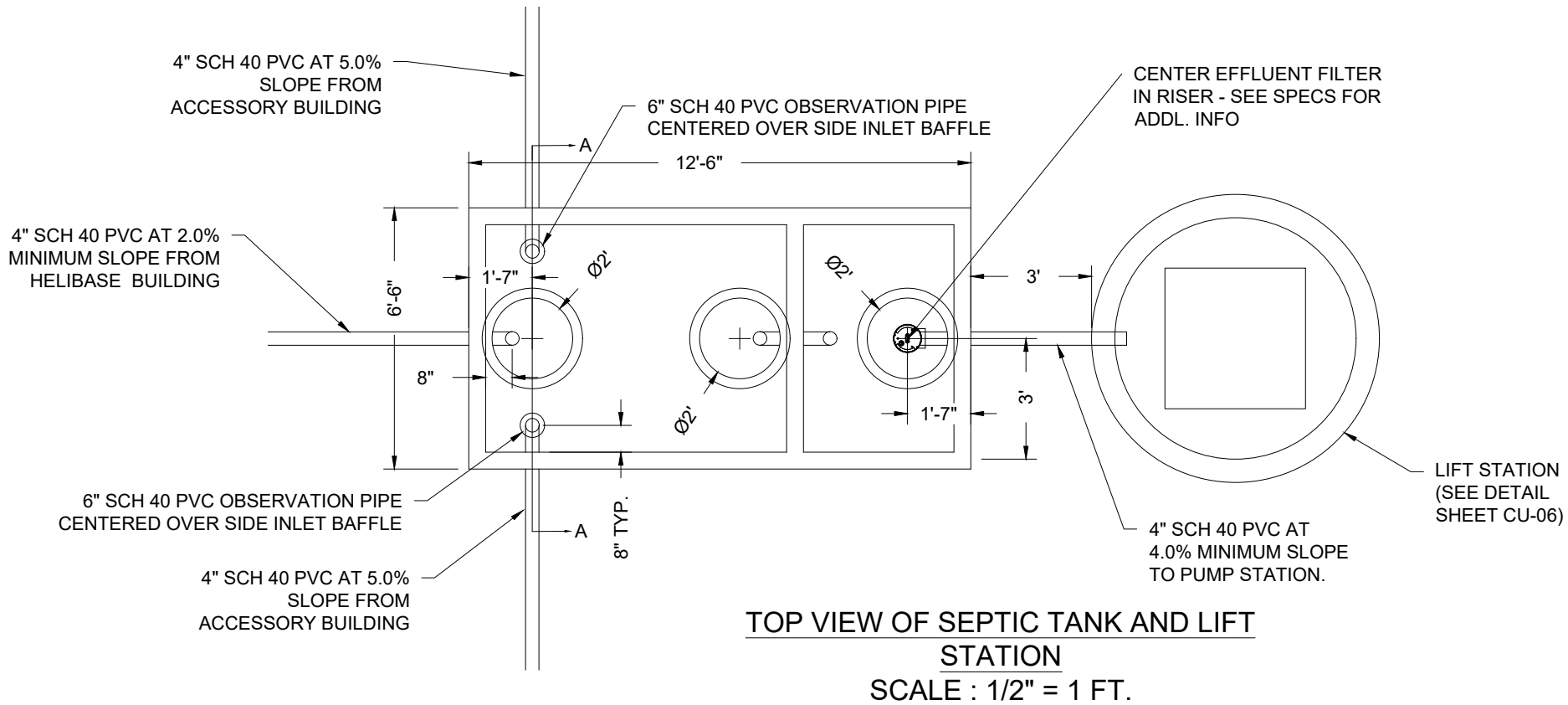
HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

**WASTEWATER SYSTEM
ABSORPTION FIELD
DETAILS**

DATE 05/13/21	ARCHIVE NO. 090500-ABL2021-0094D_P5	DRAWING SHEET NO. CU-04
DESIGNER D.MATTEI		
DRAWN D.MATTEI		
CHECKED R.SUTTON		
PROJECT NO. 2021-0094	SHEET 15 OF 26	

6/10/21 13:37 KENNETHKEELEY C:\USERS\KENNETHKEELEY\WORK\09 ENG PROJECTS\0909 MTN\HELIBASE\DESIGN DEVELOPMENT\CD\CD2021-04-07-MTN-HELIBASE-C7X\WWW-DETAILS.DWG



1000 GALLON / 500 GALLON - TWO COMPARTMENT SEPTIC TANK
SECTION
SCALE : 1/2" = 1 FT.



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PROJECT NAME

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DEVELOPMENT
PROJECT**

**MARK TWAIN
NATIONAL FOREST**

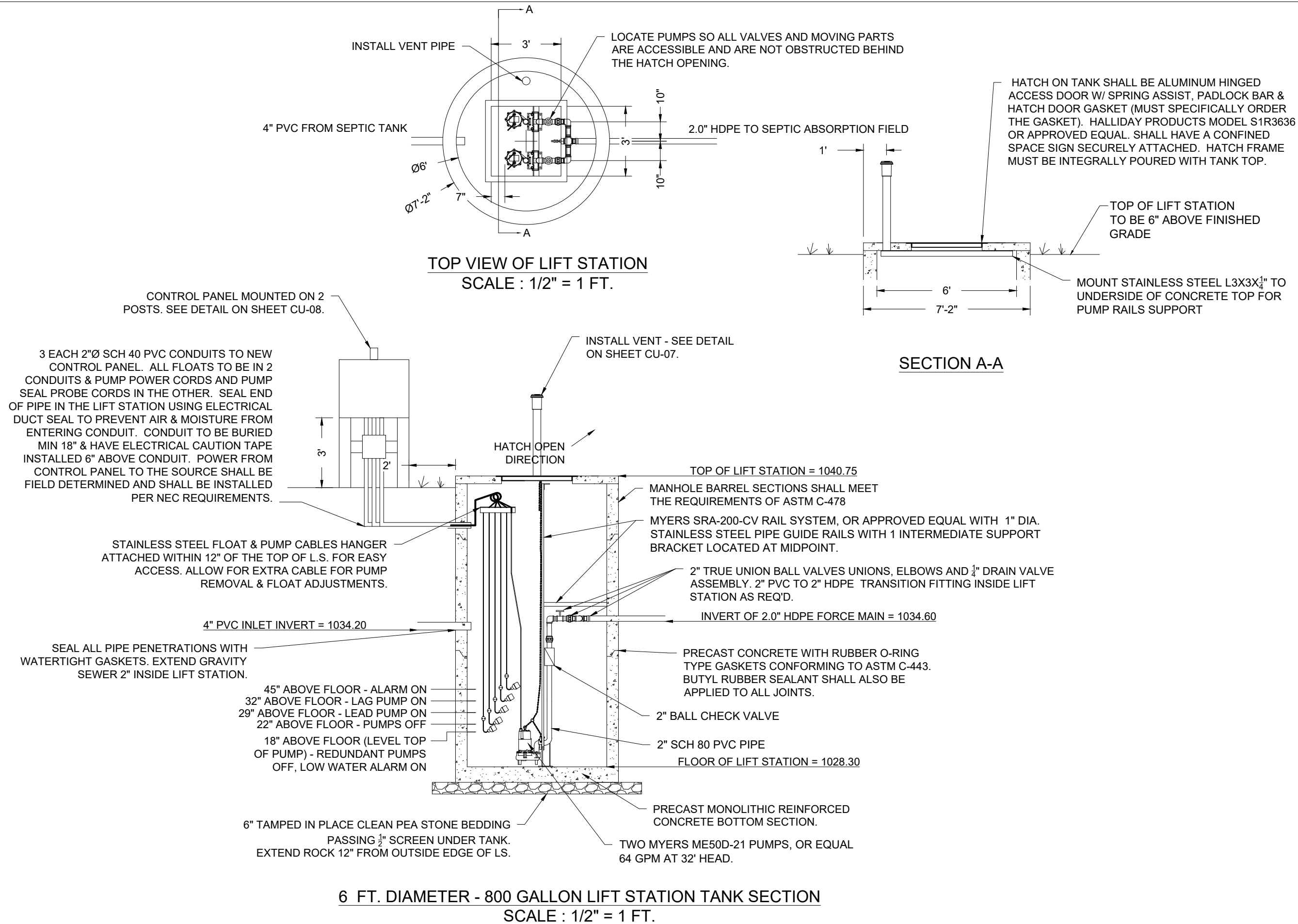
HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

**WASTEWATER SYSTEM
SEPTIC TANK
DETAIL**

DATE 05/13/21	ARCHIVE NO. 090500-ABL2021-0094D_P4	DRAWING SHEET NO. CU-05
DESIGNER D.MATTEI		
DRAWN D.MATTEI		
CHECKED R.SUTTON		
PROJECT NO. 2021-0094	SHEET 16 OF 26	

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PROJECT NAME

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DEVELOPMENT
PROJECT**

**MARK TWAIN
NATIONAL FOREST**

HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

**WASTEWATER SYSTEM
LIFT STATION
DETAIL**

DATE 05/13/21	ARCHIVE NO. 090500-ABL2021-0094D_P4	DRAWING SHEET NO. CU-06
DESIGNER D.MATTEI		
DRAWN D.MATTEI		
CHECKED R.SUTTON		
PROJECT NO. 2021-0094		SHEET 17 OF 26



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PROJECT NAME

HELIBASE DEVELOPMENT PROJECT

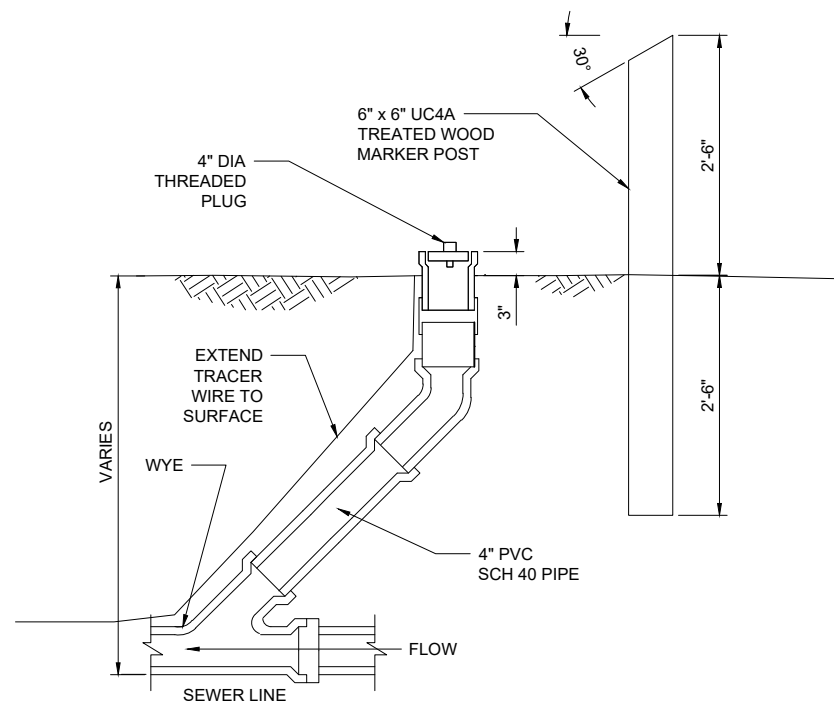
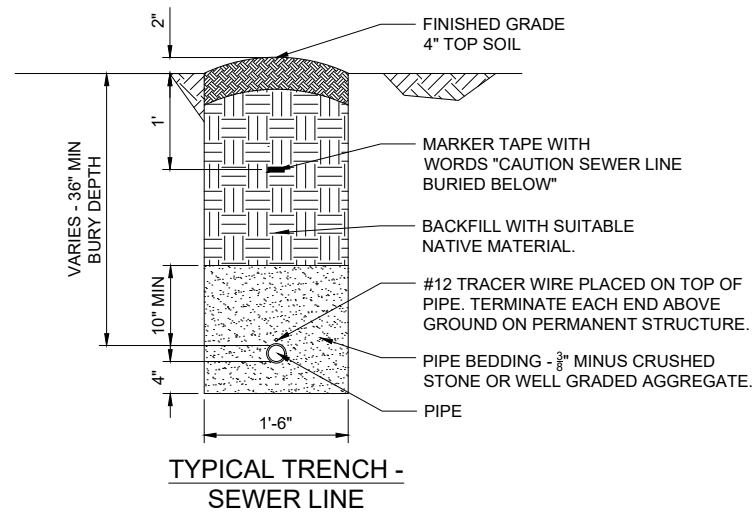
**MARK TWAIN
NATIONAL FOREST**

**HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT**

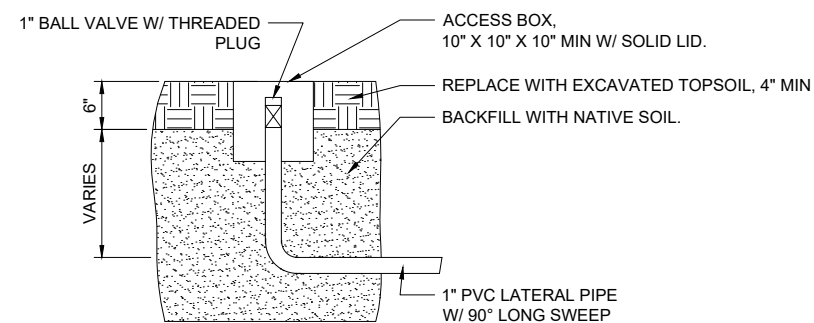
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WASTEWATER SYSTEM STANDARD DETAILS 1

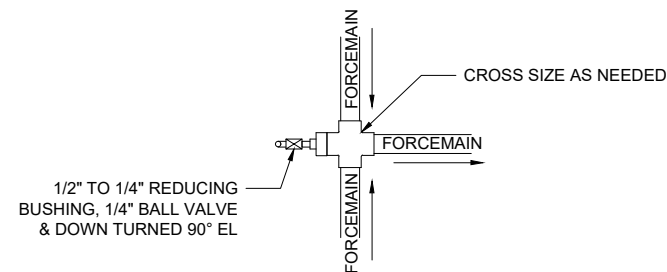
DATE 05/13/21	ARCHIVE NO. 090500-ABL2021-0094D_P5	
DESIGNER D.MATTEI	DRAWING SHEET NO.	
DRAWN D.MATTEI	CU-07	
CHECKED R.SUTTON		
PROJECT NO. 2021-0094	SHEET 18 OF 26	



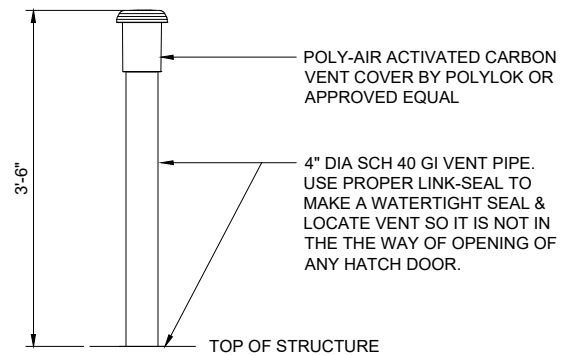
CLEAN OUT



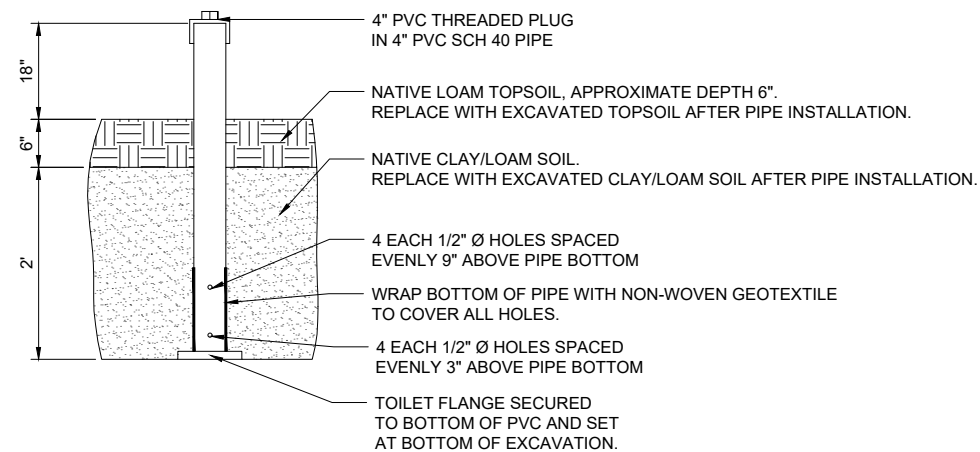
DISTRIBUTION CELL LATERAL ACCESS BOX -
INSTALL 2' PAST END OF LATERAL - 1 PER LATERAL



FORCEMAIN DRAIN VALVE PLAN VIEW
CONNCTED FORCEMAINS



TYPICAL VENT FOR LIFT STATION

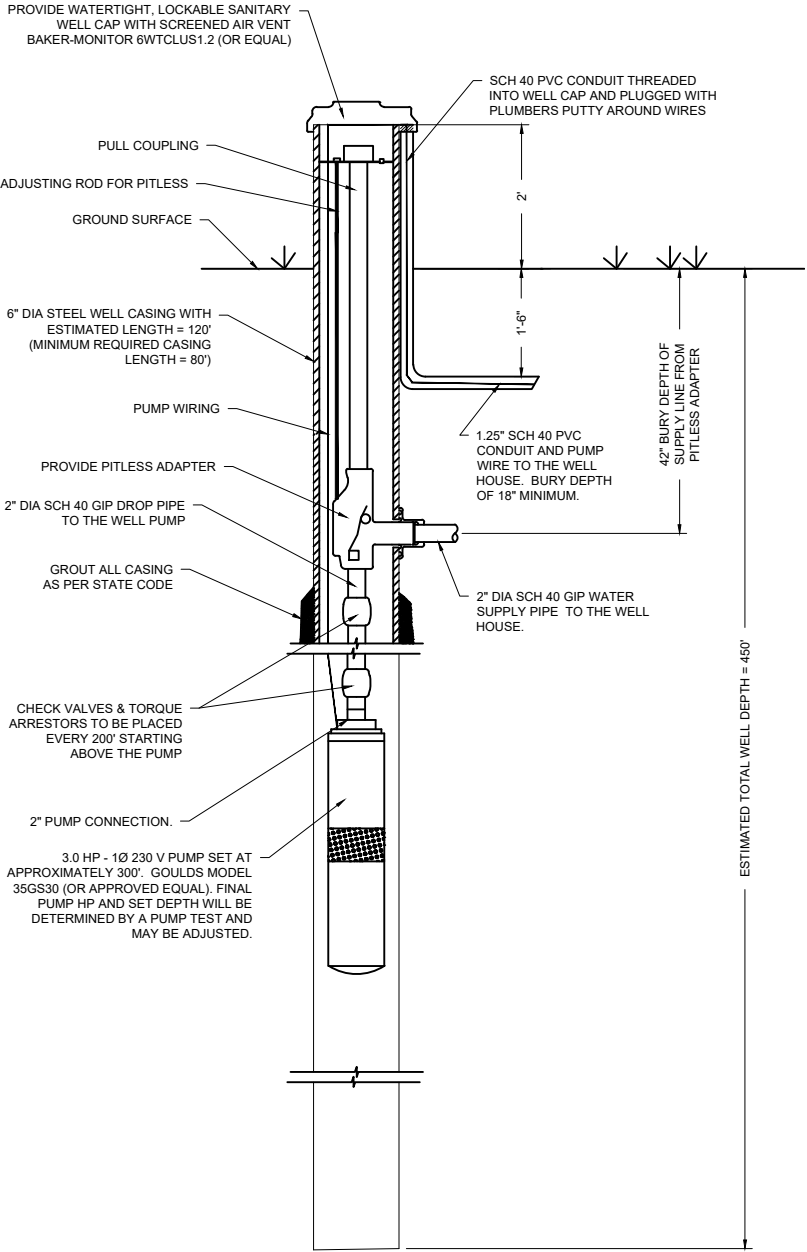


INSPECTION PORT DETAIL

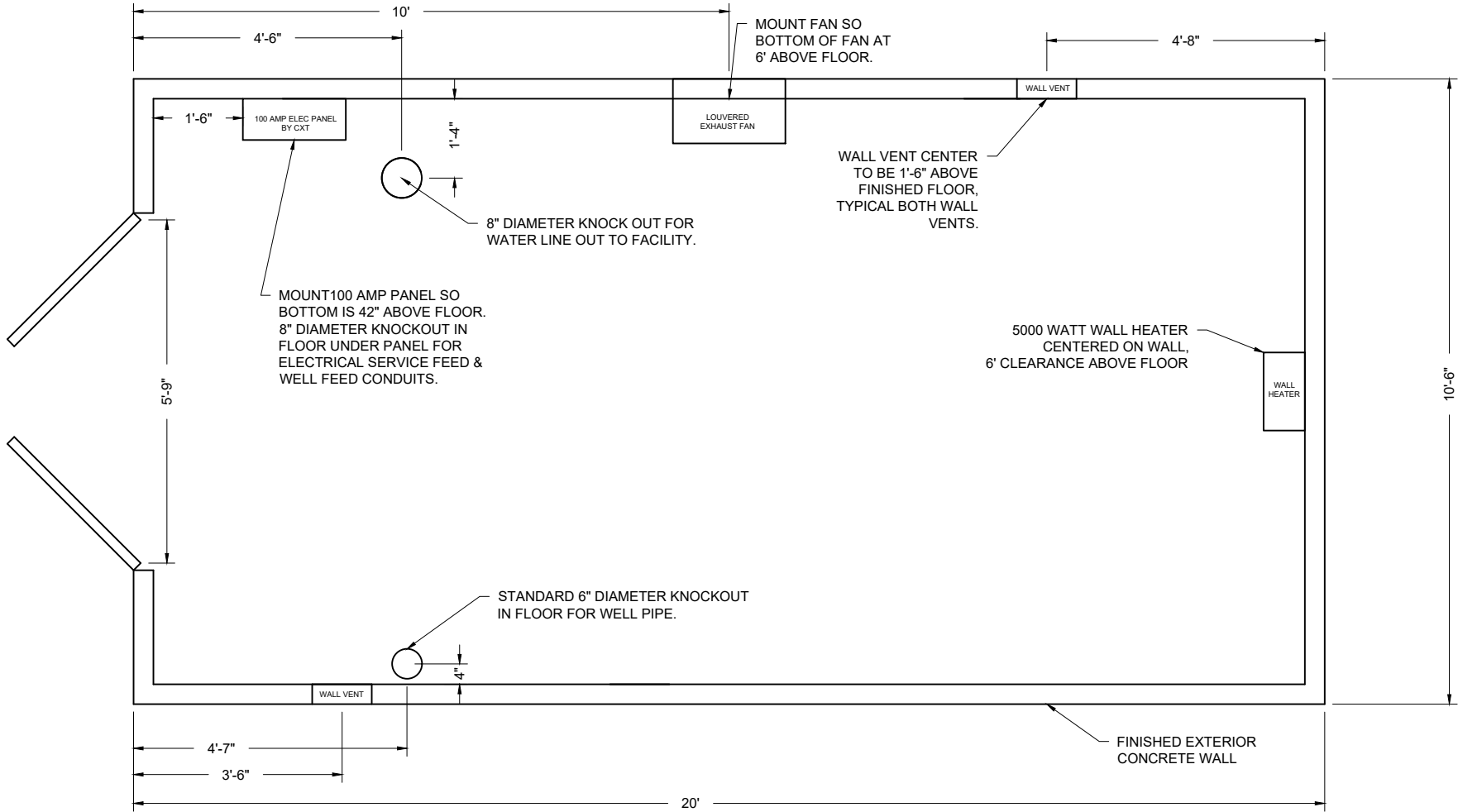
DETAILS THIS SHEET NOT TO SCALE

ELECTRICAL TRENCH DETAIL

6/1/21 09:09 KENNETHKEELY C:\USERS\KENNETHKEELY\BOXR08 ENG PROJECTS\R09 MT\MULTIPLE DISCIPLINE ASSETS\HELIBASE\DESIGN DEVELOP\CAD\CD\2021-04-07-MTNF-HELIBASE-C-6-WATER-UTL.DWG;



WELL & SUBMERSIBLE PUMP DETAIL
NTS



WELL HOUSE PREFABRICATED CONCRETE BUILDING
PLAN VIEW

SCALE: 3/4" = 1'

- GENERAL BUILDING NOTES:
- THIS DRAWING SHOWS THE REQUIRED LAYOUT OF THE CXT WELL HOUSE BUILDING AS IT SHALL BE DELIVERED FROM CXT (DIVISION OF LB FOSTER). THIS IS A STANDARD SCHWEITZER BUILDING (10.5' X 20').
 - THE BUILDING SHALL BE SET CENTERED ON A 6" THICK, 15' X 24" COMPACTED 1" MINUS AGGREGATE BASE.
 - EXTERIOR LIGHT CENTERED OVER DOORS.
 - NO OUTLETS ON THE EXTERIOR.
 - SPACE 5 OUTLETS INSIDE BLDG SO THERE IS ONE ON EACH SIDE OF THE DOORS, ONE ON THE REAR GABLE WALL AND ONE EACH IN THE MIDDLE OF THE EAVE WALLS.
 - INTERIOR LIGHTING WILL BE CONTROLLED BY A MANUAL SWITCH.



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PROJECT NAME

HELIBASE
DEVELOPMENT
PROJECT

MARK TWAIN
NATIONAL FOREST

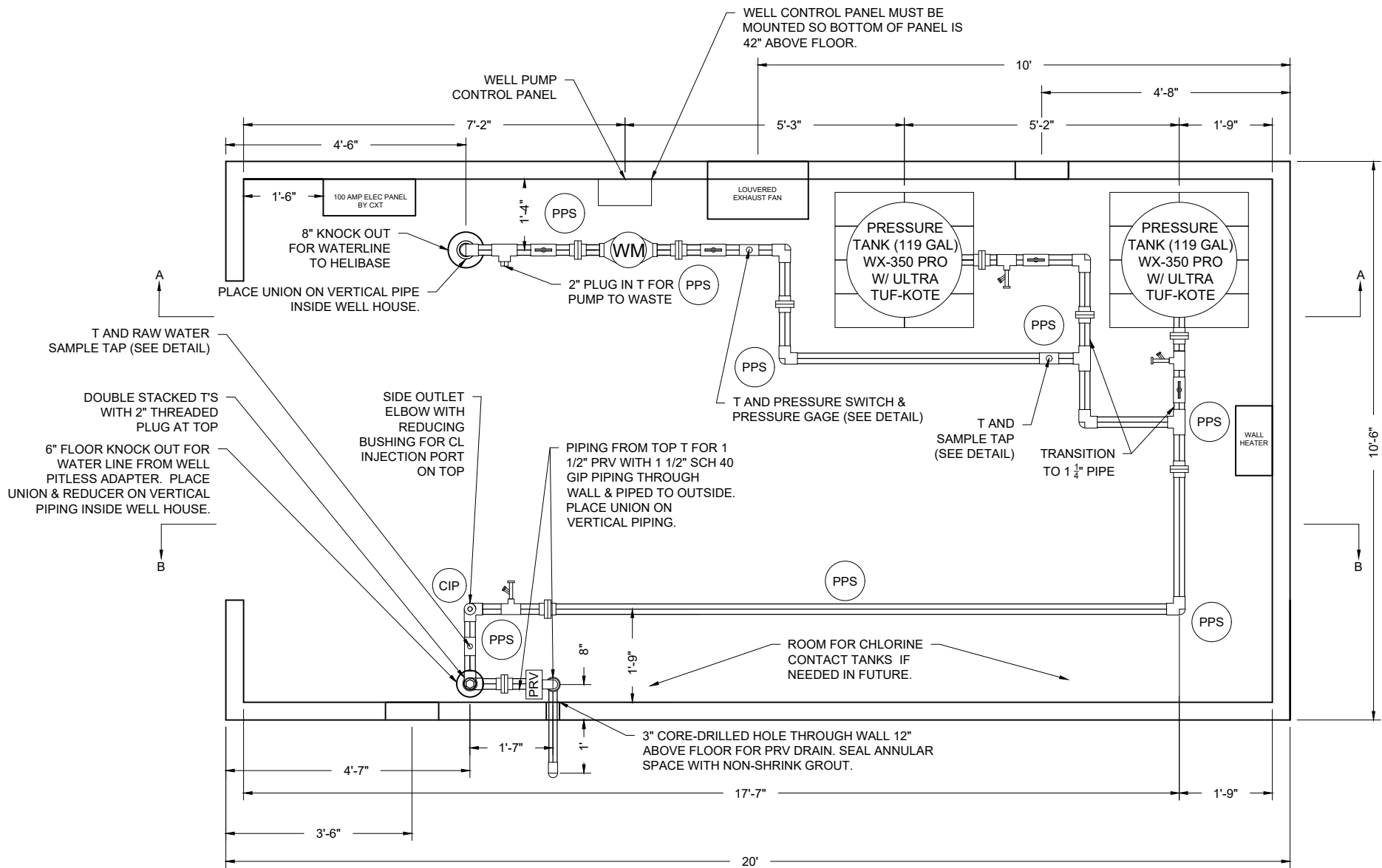
HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

WATER UTILITY
WELL & WELL HOUSE
DETAILS

DATE 05/13/21	ARCHIVE NO. 090500-ABL2021-0094D_P5	DRAWING SHEET NO. CU-09
DESIGNER D.MATTEI		
DRAWN D.MATTEI		
CHECKED R.SUTTON		
PROJECT NO. 2021-0094	SHEET 20 OF 26	

6/10/21 14:21 KENNETHKEELEY C:\USERS\KENNETHKEELEY\WORK\08 ENG PROJECTS\R09 MT\MULTIPLE DISCIPLINE ASSETS\HELIBASE\DESIGN DEVELOP\CAD\CD2021-04-07-MTN-HELIBASE-CU-01-WATER-UTIL PLAN-DET.DWG;



WELL HOUSE PIPING PLAN VIEW
BASE BID CONFIGURATION

SCALE: 3/4" = 1'

LEGEND

UNION

DRAIN W/ VB & SPIGOT CAP

SMOOTH NOSED SAMPLE TAP
(MUST BE INSTALLED
MINIMUM 24" ABOVE FLOOR)

BALL VALVE

AIR RELEASE VALVE

CHLORINE INJECTION PORT

PRESSURE GAGE

PRESSURE RELIEF VALVE

PROPER PIPE SUPPORT

WATER METER

NOTE:

- DIMENSIONS FOR EXACT PIPE FITTINGS IS NOT CALLED OUT DUE TO VARIANCES IN CONSTRUCTION, SUPPLIER DIMENSIONS, ETC. THIS DRAWING SHOWS THE INTENDED DESIGN OUTCOME. IN MOST CASES, THERE IS A MINIMUM OF 3" BETWEEN FITTINGS. CONTRACTOR TO PLACE FITTINGS, UNIONS, ETC. WHERE THEY ARE EASY TO ACCESS AND OPERATE. PIPING IS TO BE RUN LEVEL. DUE TO VARIANCES IN LOCATION OF TANK PORTS, SIZE OF FITTINGS, ETC., CONTRACTOR SHALL ADJUST PIPE DIMENSIONS AND USE CONCRETE BLOCKS TO ENSURE PIPING IS RUN LEVEL. WOOD SHIMS ARE NOT ALLOWED.
- ALL FLOOR PENETRATIONS SHALL BE FILLED WITH CLEAN GRAVEL AND THE TOP 1" SHALL BE GROUTED FLUSH WITH THE CONCRETE FLOOR.
- HORIZONTAL BALL VALVES SHALL HAVE HANDLES ON THE TOP OF THE PIPE AND VERTICAL BALL VALVES SHALL HAVE THE HANDLES IN THE FRONT OF THE PIPE TOWARDS THE DIRECTION OF OPERATION.
- FLOW FROM WELL MUST ENTER CHLORINE CONTACT TANKS (BID OPTION) AT THE BOTTOM AND EXIT AT THE TOP (PIPED IN SERIES).
- ALL PIPING AND FITTINGS ARE 2" SCH 40 GIP UNLESS OTHERWISE NOTED.
- ALL PIPING FOR PRV IS 1 1/2" SCH 40 GIP AND SHALL INCLUDE A SCREENED DAYLIGHT END.
- PIPING FROM 2" MAIN LINE/MANIFOLD TO THE PRESSURE TANK SHALL BE 1-1/4" SCH 40 GIP.
- PIPING FOR THE PRESSURE GAUGE SHALL BE 1/4" GALVANIZED IRON PIPE WITH LEAD FREE BRASS 1/4" BALL VALVE.
- PIPING FOR THE SAMPLE TAPS SHALL BE 1/2" SCH 40 GIP WITH BALL VALVE AND LEAD FREE SMOOTH NOSED SAMPLE TAP.
- CHLORINE INJECTION PORT SHALL BE 1/2" SCH 40 GIP WITH TWO 1/2" NIPPLES X 2" LONG, 1/2" LEAD FREE BRASS BALL VALVE AND THREADED BUSHING TO ACCEPT THE INJECTION QUILL.
- PRESSURE TANK DRAIN SPIGOT SHALL BE LEAD FREE BRASS AND INCLUDE A SPIGOT VACUUM BREAKER AND BRASS SPIGOT CAP.
- WATER LINE ENTERING THE BUILDING SHALL BE NEW 2" GIP SCHEDULE 40 FROM THE NEW WELL PITLESS ADAPTER.
- WATER LINE EXITING THE BUILDING SHALL BE NEW 2" PE4710 HDPE SDR 11 THAT IS TRANSITIONED FROM 2" SCH 40 GIP USING A PROPER TRANSITION FITTING PLACED ON THE VERTICAL PORTION OF THE 2" GIP INSIDE THE BUILDING.
- PROPER PIPE SUPPORTS (PPS) SHALL BE INSTALLED AS SHOWN ON THE DRAWINGS. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING A TOTAL OF 8 AND PLACE WHERE IT IS OBVIOUS THE PIPING REQUIRES ADDITIONAL SUPPORT.
- FLOOR KNOCK OUTS, WALL HEATER, VENTS, LOUVERED EXHAUST FAN, OUTLETS, LIGHTS AND 100 AMP ELECTRICAL PANEL ARE PRE-INSTALLED BY BUILDING MFR. CONTRACTOR IS REQUIRED TO PROVIDE ALL SINGLE PHASE POWER EQUIPMENT, DISCONNECTS, PANELS, WELL CONTROLS, CONNECTION TO THE BLDG PROVIDED 100 AMP PANEL AND SHALL USE PVC CONDUIT PER NEC.
- CONTRACTOR IS REQUIRED TO RUN ALL WELL CONTROL WIRING IN LIQUID TIGHT CONNECTIONS AND NO SPLICES ARE ALLOWED.
- EACH BLADDER PRESSURE TANK TO SIT ON CEMENT BLOCKS AS NEEDED TO ADJUST HEIGHT.



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PROJECT NAME

HELIBASE
DEVELOPMENT
PROJECT

MARK TWAIN
NATIONAL FOREST

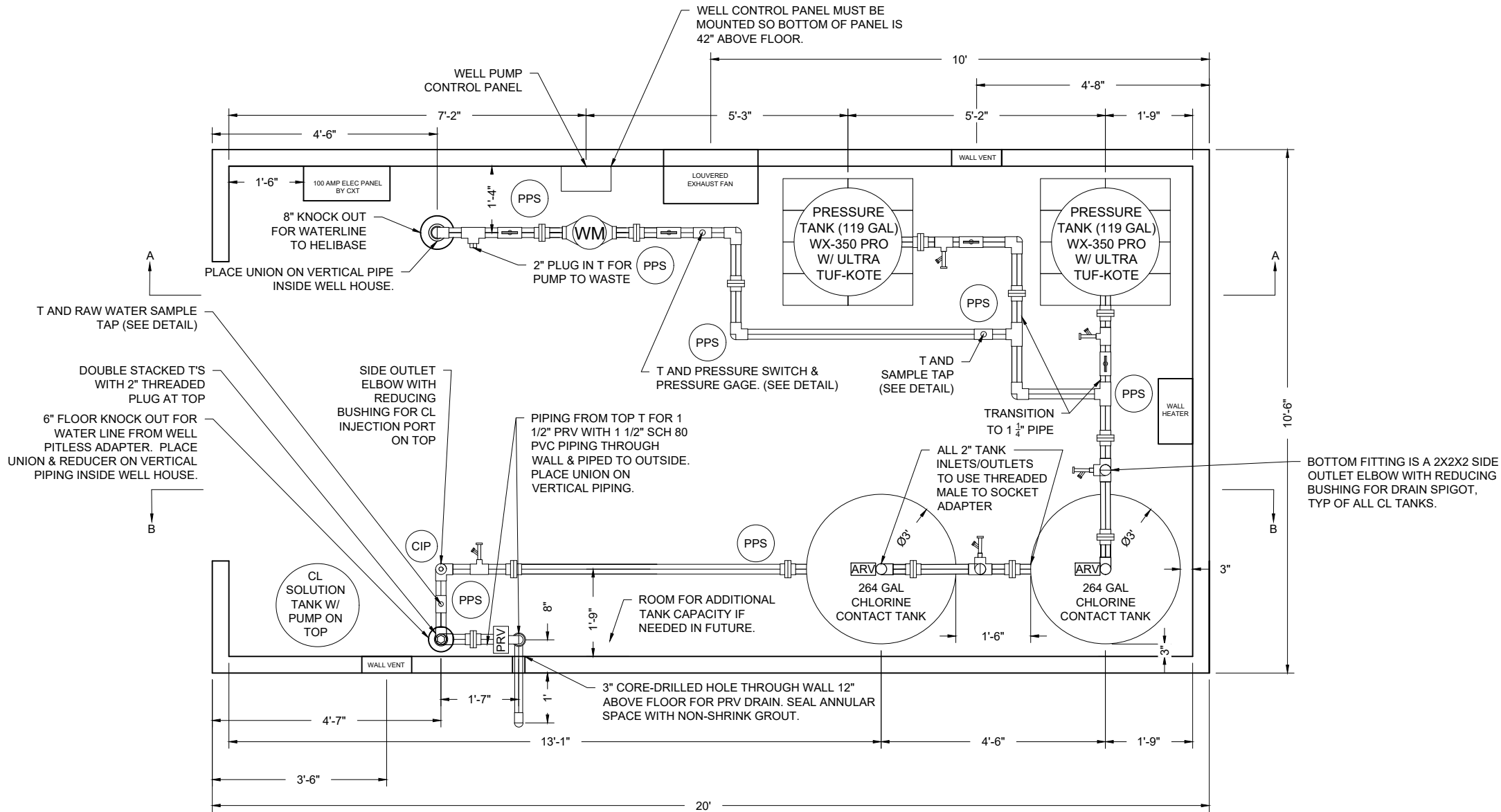
HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

WATER UTILITY
WELL HOUSE
PLUMBING LAYOUT
BASE BID

DATE 05/13/21	ARCHIVE NO. 090500-ABL2021-0094D_P4	DRAWING SHEET NO. CU-10
DESIGNER D.MATTEI	SHEET 21 OF 26	
DRAWN D.MATTEI		
CHECKED R.SUTTON		
PROJECT NO. 2021-0094		

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WELL HOUSE PIPING PLAN VIEW
WITH CHLORINE CONTACT TANK BID OPTION

SCALE: 3/4" = 1'

	UNION		AIR RELEASE VALVE
	DRAIN W/ VB & SPIGOT CAP		CHLORINE INJECTION PORT
	SMOOTH NOSED SAMPLE TAP (MUST BE INSTALLED MINIMUM 24" ABOVE FLOOR)		PRESSURE GAGE
	BALL VALVE		PRESSURE RELIEF VALVE
			PROPER PIPE SUPPORT
			WATER METER

- NOTE:
- SEE ALL NOTES ON WELL HOUSE PLUMBING LAYOUT BASE BID SHEET.
 - CHLORINE CONTACT TANK BID OPTION MAY BE AWARDED BY THE GOVERNMENT IF THE WATER QUALITY TESTING FOR THE PROPOSED WELL WARRANTS FURTHER WATER TREATMENT.
 - BID OPTION INCLUDES CHLORINE CONTACT TANKS AND ASSOCIATED ADDITIONAL PLUMBING, FITTINGS AND VALVES.
 - BID OPTION INCLUDES CHLORINE SOLUTION TANK, CHLORINE PUMP AND ASSOCIATED ADDITIONAL PLUMBING, FITTINGS AND VALVES.
 - BID OPTION INCLUDES ADDITIONAL ELECTRICAL WORK AND CONTROL WIRING TO INSTALL A DEDICATED POWER OUTLET FOR THE CHLORINE PUMP AND NECESSARY RELAY SWITCH TO ACTIVATE THE OUTLET WHEN THE WELL PUMP IS ENERGIZED.
 - BID OPTION INCLUDES ADDITIONAL ELECTRICAL WORK TO INSTALL A MOTION ACTIVATED SENSOR SWITCH TO TURN ON THE EXHAUST FAN WHEN THE BUILDING IS OCCUPIED AND A MANUAL ON/OFF OVERRIDE TOGGLE SWITCH.



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PROJECT NAME

HELIBASE
DEVELOPMENT
PROJECT

MARK TWAIN
NATIONAL FOREST

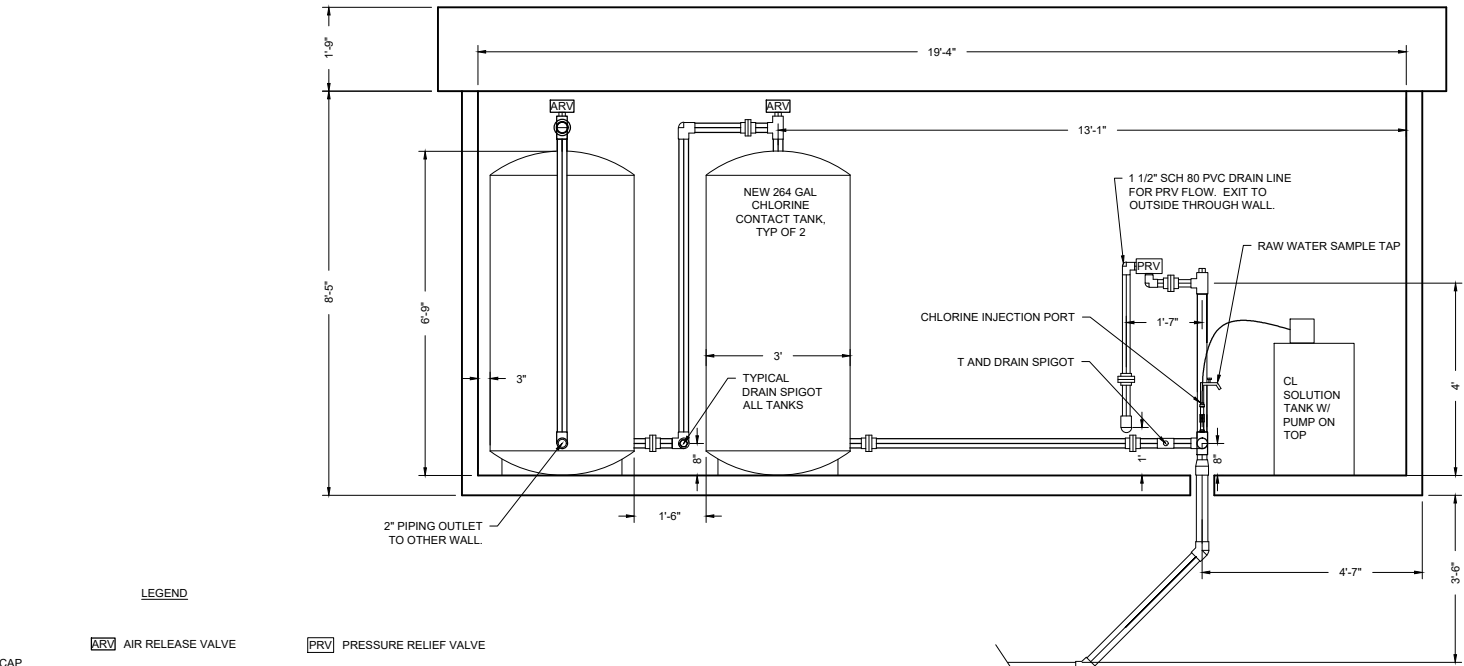
HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

WATER UTILITY
WELL HOUSE
PLUMBING LAYOUT
WITH CHLORINE TANKS

DATE 05/13/21	ARCHIVE NO. 090500-ABL2021-0094D_P4	DRAWING SHEET NO. CU-11
DESIGNER D.MATTEI		
DRAWN D.MATTEI		
CHECKED R.SUTTON		
PROJECT NO. 2021-0094		SHEET 22 OF 26

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WELL HOUSE SECTION B-B
SHOWING BID OPTION FOR CHLORINE CONTACT
TANKS

SCALE: 1/2" = 1'

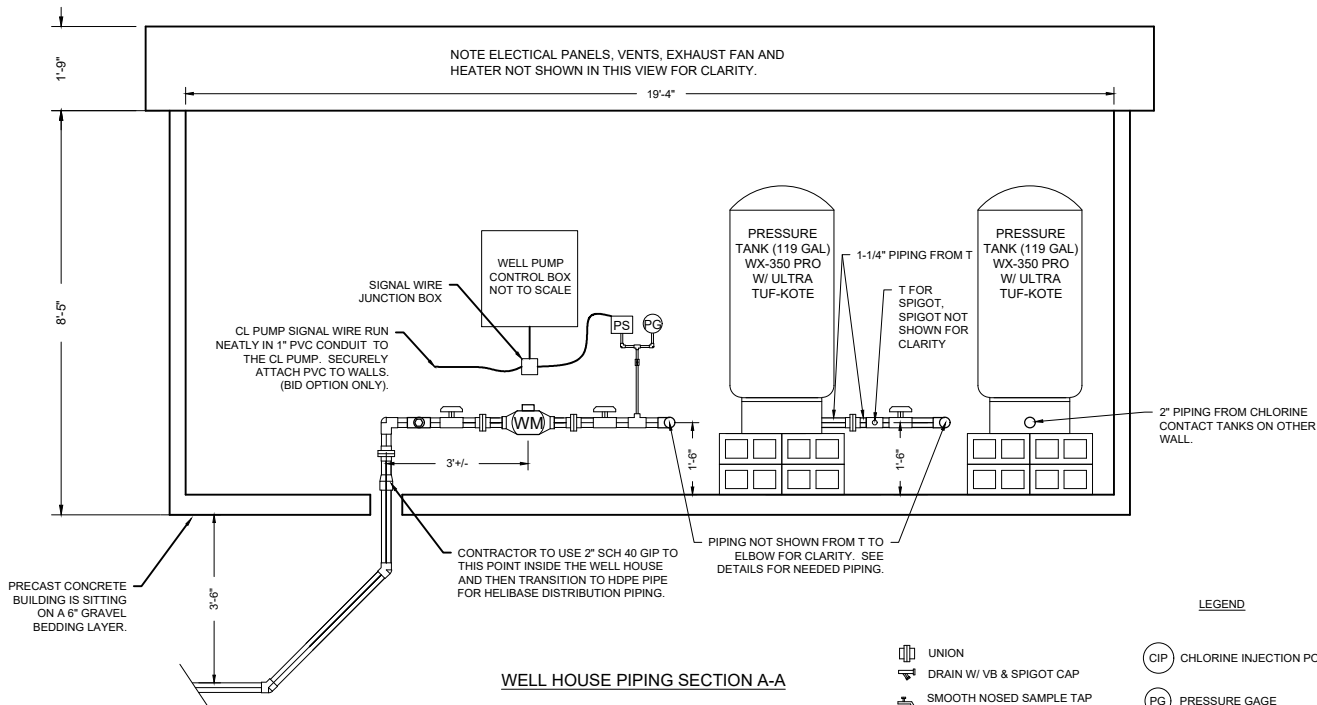
- LEGEND
- | | | | | | |
|--|---|--|-------------------------|--|-----------------------|
| | UNION | | AIR RELEASE VALVE | | PRESSURE RELIEF VALVE |
| | DRAIN W/ VB & SPIGOT CAP | | CHLORINE INJECTION PORT | | PROPER PIPE SUPPORT |
| | SMOOTH NOSED SAMPLE TAP
(MUST BE INSTALLED
MINIMUM 24" ABOVE FLOOR) | | PRESSURE GAGE | | WATER METER |
| | BALL VALVE | | | | |

- BUSHING TO ACCEPT CL
PUMP QUILL W/ PLUG
2" LONG 1/2" SCH 40 GIP,
ABOVE & BELOW BALL VALVE
1/2" LEAD FREE BRASS BALL VALVE
1/2" REDUCING BUSHING
2X2X2 SIDE OUTLET ELBOW
SYSTEM PIPING 2"
SCH 40 GIP

CHLORINATION PORT

- 1/2" LEAD FREE
BRASS TAP
POSITIONED
PERPENDICULAR
TO SYSTEM
PIPING.
- 1/2" LEAD FREE BRASS BALL VALVE
2X2X1/2 T
SYSTEM PIPING 2"
SCH 40 GIP
THREADED 90° ELBOW
1/2" SCH 40 GIP

SMOOTH NOSED
SAMPLE TAP



WELL HOUSE PIPING SECTION A-A

SCALE: 1/2" = 1'

- LEGEND
- | | | | | | |
|--|---|--|-------------------------|--|-----------------------|
| | UNION | | CHLORINE INJECTION PORT | | PRESSURE RELIEF VALVE |
| | DRAIN W/ VB & SPIGOT CAP | | PRESSURE GAGE | | PRESSURE SWITCH |
| | SMOOTH NOSED SAMPLE TAP
(MUST BE INSTALLED
MINIMUM 24" ABOVE FLOOR) | | PROPER PIPE SUPPORT | | WATER METER |
| | BALL VALVE | | | | |

- 1/4" SCH 40 GALVANIZED
IRON PIPE & FITTINGS
2X2X1/2 W/ 1/4" BUSHING
SYSTEM PIPING 2"
SCH 40 GIP
- TYPICAL 3" NIPPLES OR
AS NEEDED TO PROVIDE
ADEQUATE CLEARANCES.
1/4" LEAD FREE
BRASS BALL VALVE

PRESSURE GAGE &
PRESSURE SWITCH



United States Department of Agriculture
Forest Service

(R09)
EASTERN REGION

STAMPS, LOGOS, AND SEALS

4		
3		
2		
1		
NO.	REVISION / ISSUE	DATE

PROJECT NAME

HELIBASE
DEVELOPMENT
PROJECT

MARK TWAIN
NATIONAL FOREST

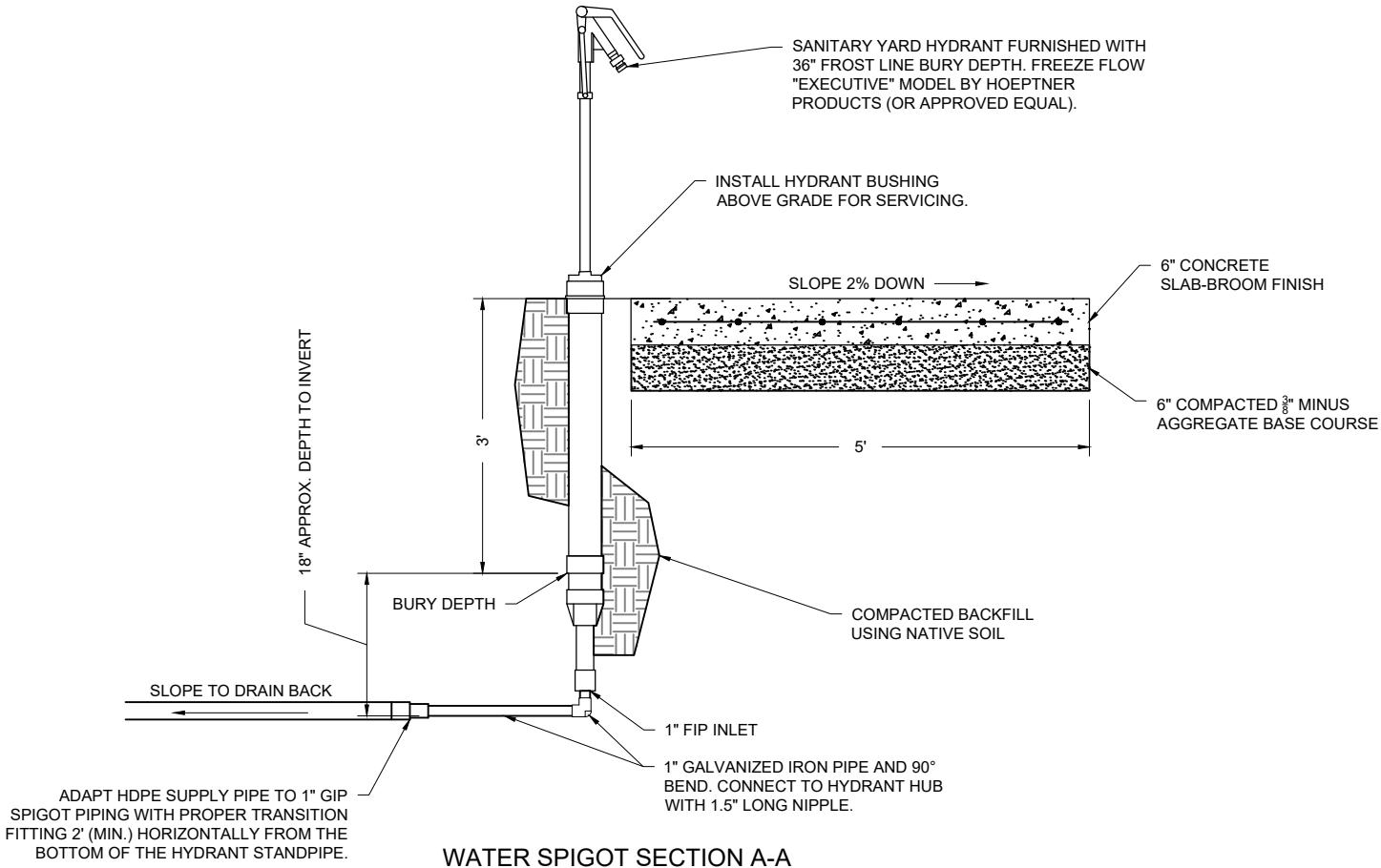
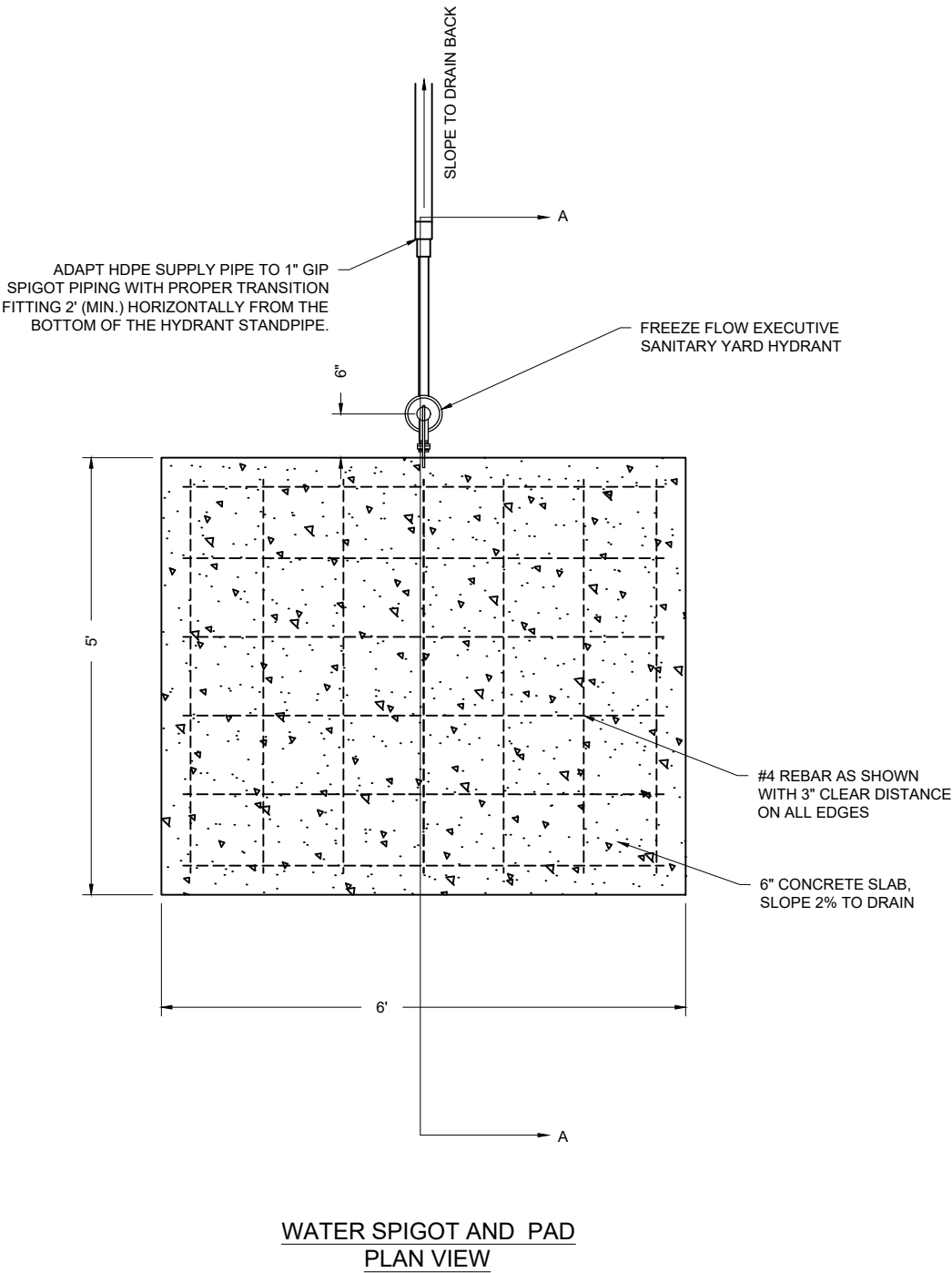
HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

WATER UTILITY
WELL HOUSE
PLUMBING LAYOUT
SECTIONS A-A & B-B

DATE 05/13/21	ARCHIVE NO. 090500-ABL2021-0094D_P3	DRAWING SHEET NO. CU-12
DESIGNER D.MATTEI		
DRAWN D.MATTEI		
CHECKED R.SUTTON		
PROJECT NO. 2021-0094	SHEET 23 OF 26	

6/10/21 14:21 KENNETHKEELEY\DOXR09 ENG PROJECTS\R09 MT\MULTIPLE DISCIPLINE ASSETS\HELIBASE\CU01-WATER-UTIL PLAN-DET.DWG;



WATER SPIGOT AND PAD
SCALE: 1" = 1'

- GENERAL SPIGOT NOTES:
- 1) SPIGOT LOCATIONS ARE TO BE STAKED IN THE FIELD BY CONTRACTOR SUBJECT TO FINAL APPROVAL BY THE COR. LOCATIONS ON THE DRAWINGS ARE APPROXIMATE. MINOR ADJUSTMENTS TO PIPING ARE INCIDENTAL TO THE CONTRACT.
 - 2) SPIGOTS INSTALLED ADJACENT TO ROADS, WALKWAYS, ETC. SHALL BE INSTALLED PERPENDICULAR TO THE CENTERLINE.
 - 3) SHUT-OFF VALVES ARE TYPICALLY PLACED 5' FROM THE SPIGOT STANDPIPE. SEE SITE PLAN FOR VALVE AND DRAIN LOCATIONS.



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DEVELOPMENT
PROJECT

MARK TWAIN
NATIONAL FOREST

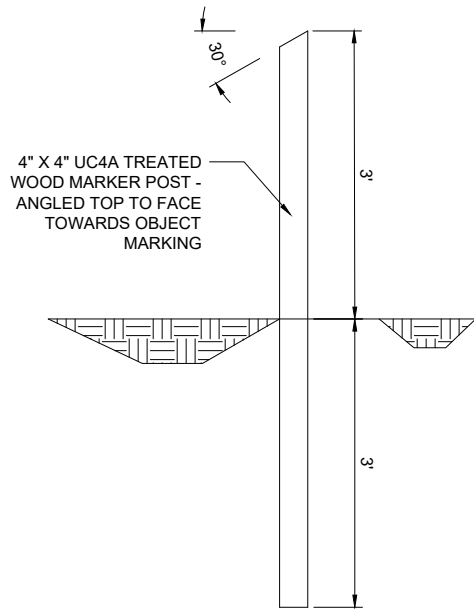
HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

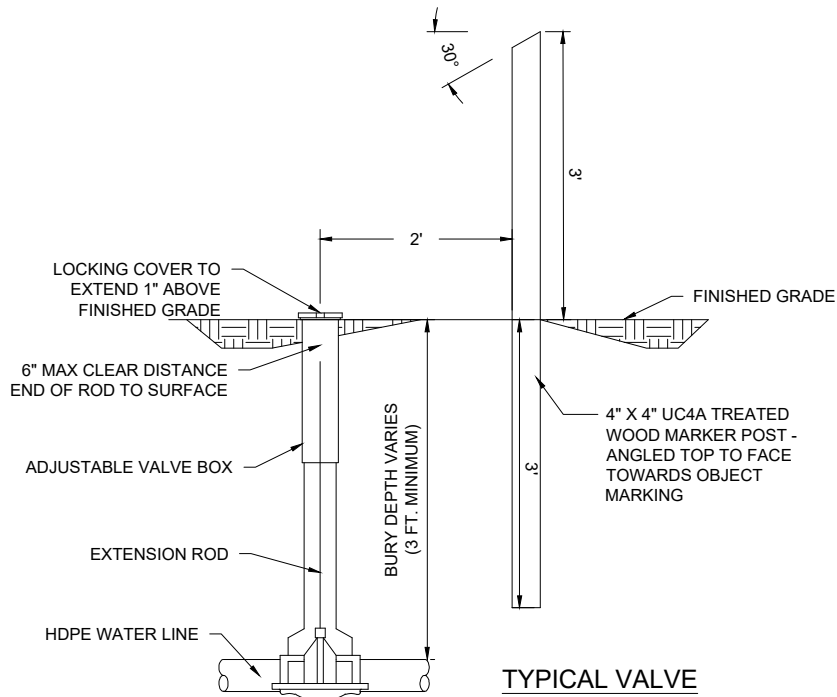
WATER UTILITY
WATER HYDRANT
DETAIL

DATE 05/13/21	ARCHIVE NO. 090500-ABL2021-0094D_P5	DRAWING SHEET NO. CU-13
DESIGNER D.MATTEI	SHEET 24 OF 26	
DRAWN D.MATTEI		
CHECKED R.SUTTON		
PROJECT NO. 2021-0094		

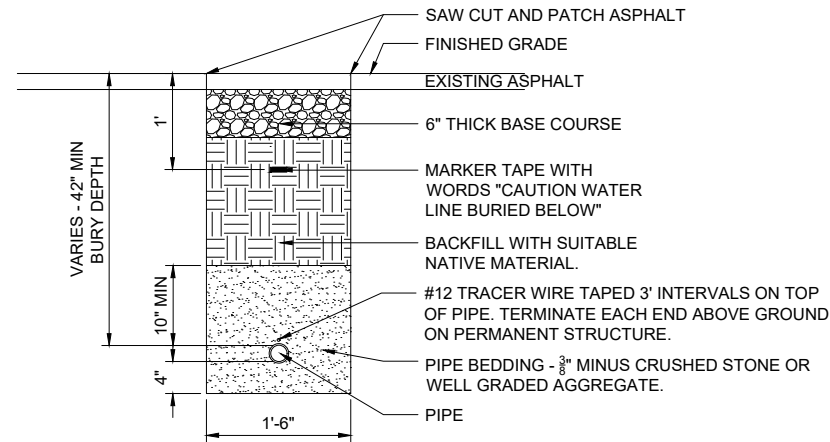
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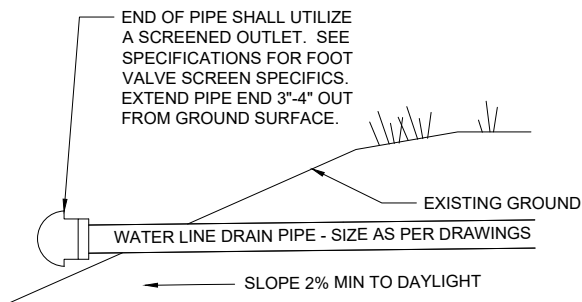
4X4 WOOD MARKER POST



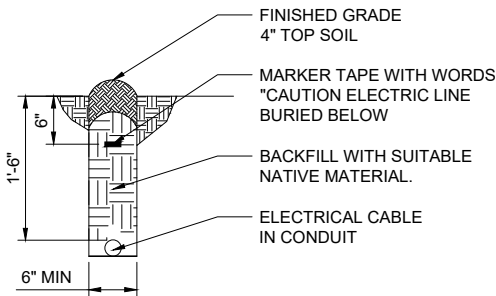
TYPICAL VALVE BOX DETAIL WITH MARKER POST



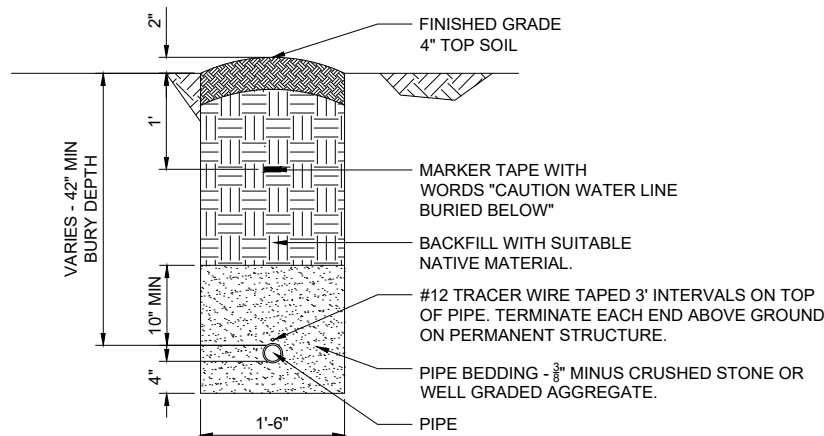
TYPICAL TRENCH - WATER LINE IN PAVED ROAD



SCREENED END FOR DRAIN LINE



ELECTRICAL TRENCH DETAIL



TYPICAL TRENCH - WATER LINE



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STAMPS, LOGOS, AND SEALS

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PROJECT

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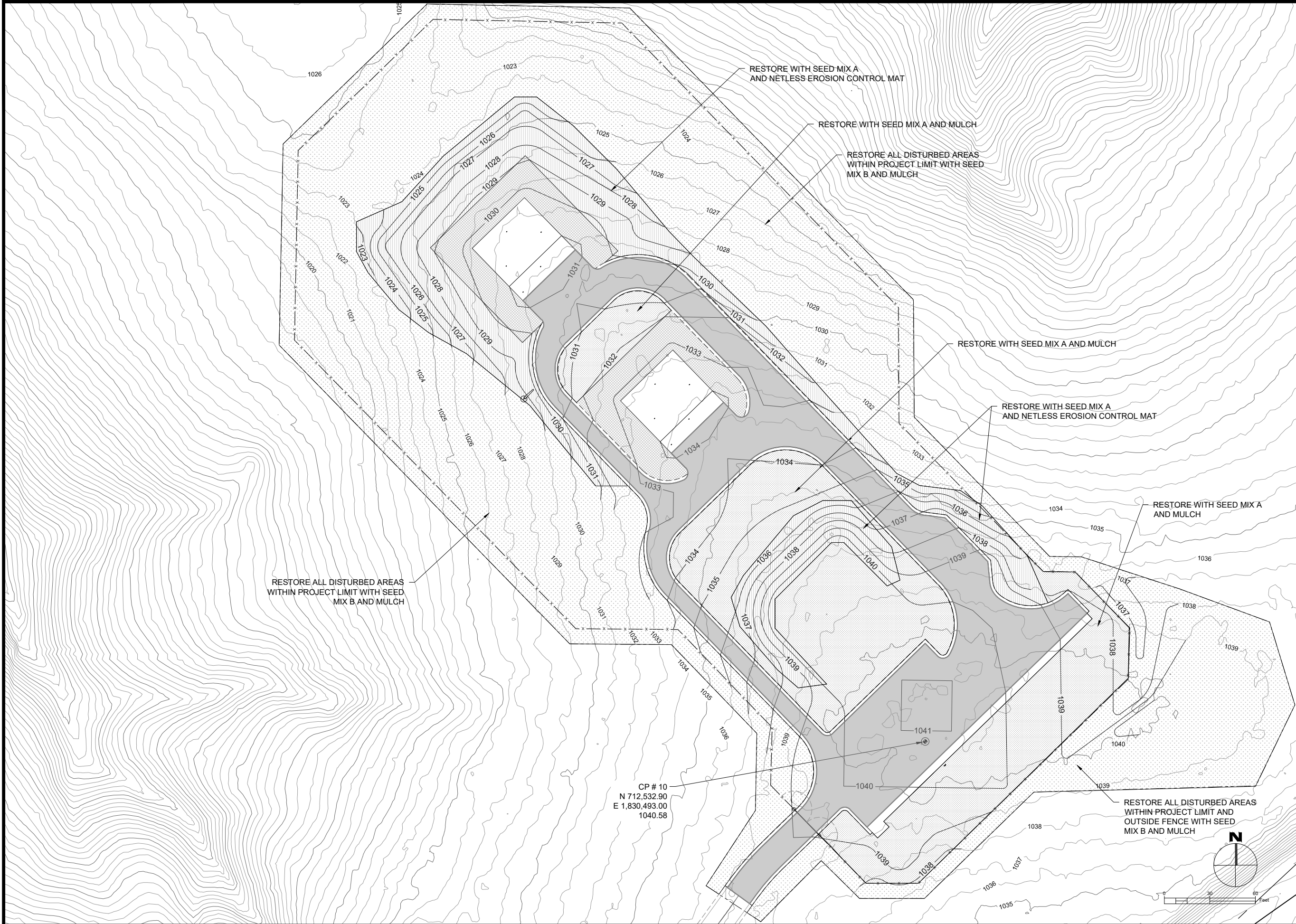
HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

WATER UTILITY
STANDARD DETAILS

DATE 05/13/21	ARCHIVE NO. 090500-ABL2021-0094D_P5	DRAWING SHEET NO.
DESIGNER D.MATTEI		CU-14
DRAWN D.MATTEI		
CHECKED R.SUTTON		
PROJECT NO. 2021-0094		SHEET 25 OF 26

6/7/21 15:02 KENNETHKEELY\BOXR08 ENG PROJECTSR09 MT\MULTIPLE DISCIPLINE ASSETS\HELIBASE\DESIGN DEVELOP\CD\2021-05-17-MTNF-HELIBASE-L-1-RESTORE.DWG;





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STAMPS, LOGOS, AND SEALS

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1		
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PROJECT NAME

**HELIBASE
DEVELOPMENT
PROJECT**

**MARK TWAIN
NATIONAL FOREST**

HOUSTON - ROLLA - CEDAR CREEK
RANGER DISTRICT

DRAWING TITLE

**SITE RESTORATION
PLAN**

DATE 05/17/2021	ARCHIVE NO. 090500-ABL2021-0094D_L0001
DESIGNER K.KEELEY	DRAWING SHEET NO. L-01
DRAWN K.KEELEY	
CHECKED A.WILSON	
PROJECT NO. 2021-0094D	SHEET 26 OF 26