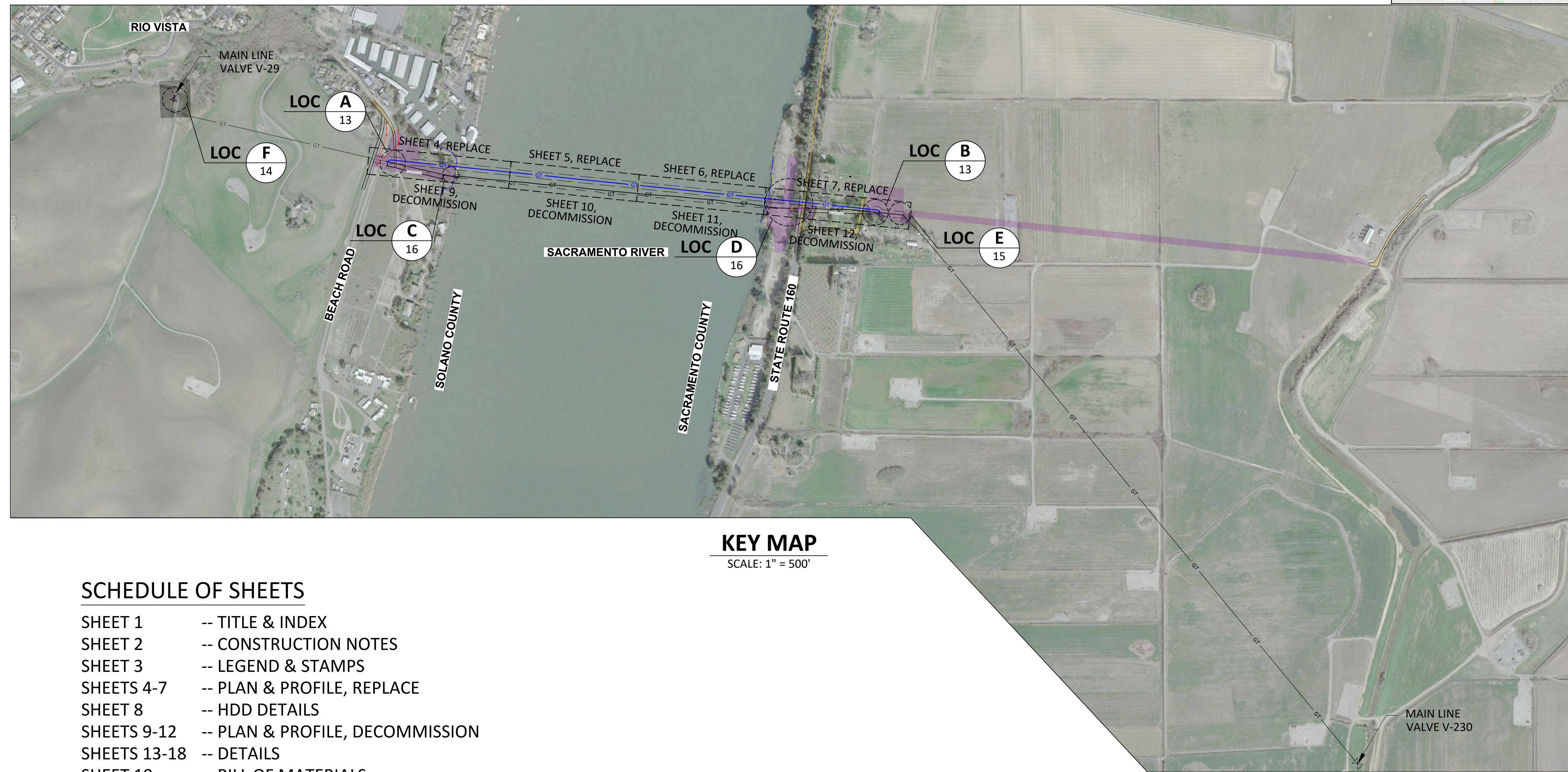
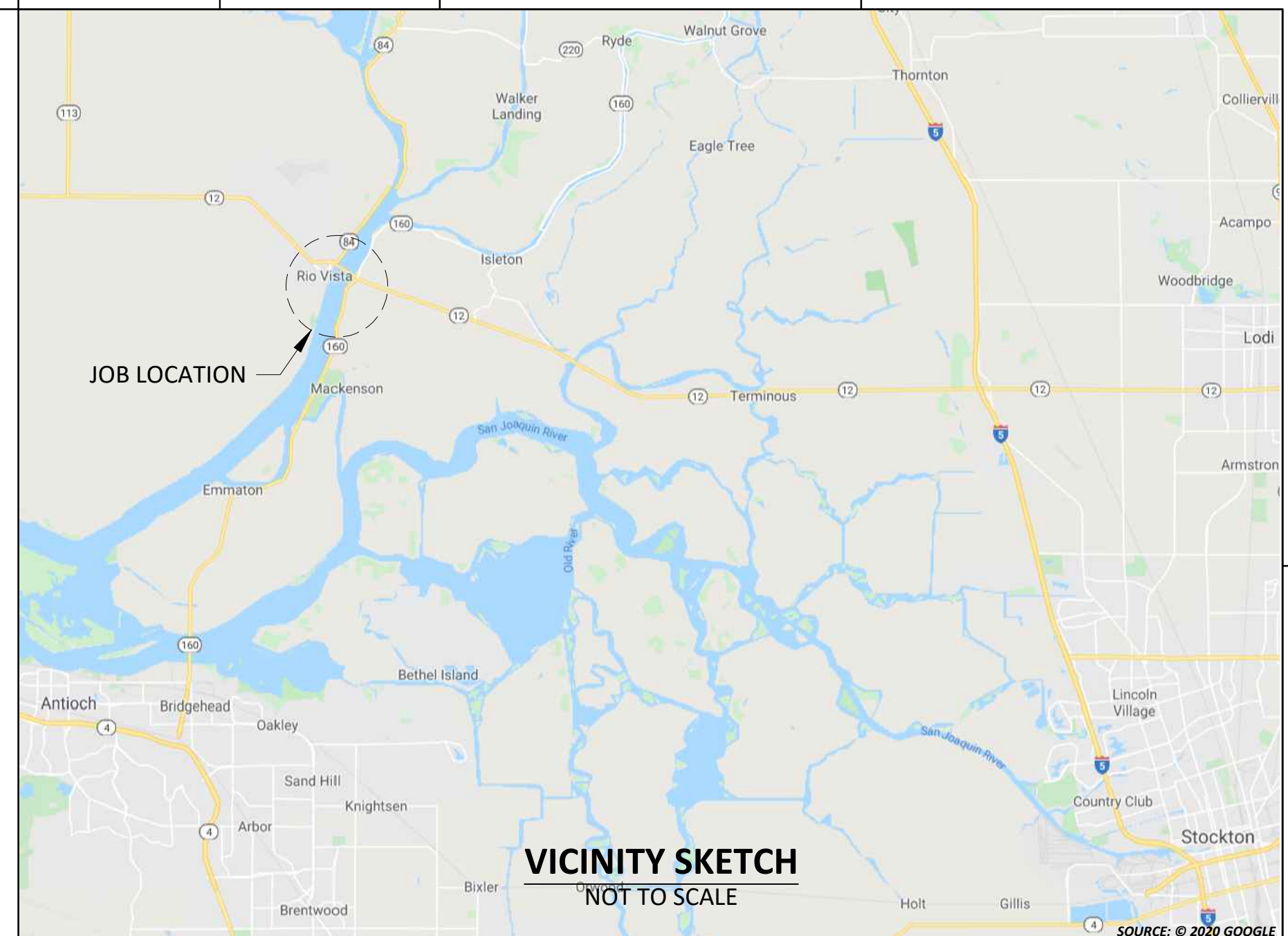


# L-130 MP 0 - 0.5, L-195-1 MP 0 - 0.125, L-200A-3 MP 1.05 - 1.13 REPLACE 10" & 12" PIPE RIO VISTA, SOLANO COUNTY



### SCHEDULE OF SHEETS

- SHEET 1 -- TITLE & INDEX
- SHEET 2 -- CONSTRUCTION NOTES
- SHEET 3 -- LEGEND & STAMPS
- SHEETS 4-7 -- PLAN & PROFILE, REPLACE
- SHEET 8 -- HDD DETAILS
- SHEETS 9-12 -- PLAN & PROFILE, DECOMMISSION
- SHEETS 13-18 -- DETAILS
- SHEET 19 -- BILL OF MATERIALS

**LONGITUDE 123, INC.**  
California Marine Project Planning, Permitting and Performance  
570 POLI STREET, VENTURA, CA 93001  
(805) 649-9364 WWW.LONGITUDE123.NET  
CA LICENSE: CSLB 8-1026719

REGISTERED PROFESSIONAL ENGINEER  
MARINE ENGINEER  
C 75674  
EXP. 06/30/2022  
SIGNED: 06/10/21  
ISSUED FOR PERMIT  
NOT FOR CONSTRUCTION

REV.	DATE	DESCRIPTION	ORDER	DWN	ADE	ENG	ENG APVD
F	11-04-21	ADDED CLSM OPTION FOR LEVEE BACKFILL	74029147	EAR	GDO	D2LM	
E	09-10-21	ADDED CASING REMOVAL	74029147	EAR	GDO	D2LM	
D	07-27-21	REVISED UNDERWATER EXCAVATION AREA	74029147	EAR	GDO	D2LM	
C	07-22-21	ISSUED FOR PERMIT - NOT FOR CONSTRUCTION	74029147	EAR	GDO	D2LM	
B	04-05-21	60% DESIGN	74029147	DLP	GDO	D2LM	
A	01-13-21	PRELIMINARY - 30% DESIGN	74029147	DLP	GDO	D2LM	

PIPELINE - TITLE & INDEX  
R-1402, L-130, MP 0.0 - MP 0.5  
REPLACE 10" PIPE, SACRAMENTO RIVER CROSSING  
RIO VISTA, SOLANO COUNTY  
GAS TRANSMISSION & DISTRIBUTION  
PACIFIC GAS AND ELECTRIC COMPANY  
SAN FRANCISCO, CALIFORNIA

BILL OF MATL SHEET 19  
JOB ID R-1402  
SHEET NO. 1 OF 19 SHEETS  
74029147 F





DIRECT BURIAL COATING SELECTIONS	
MAIN LINE COATING	FBE (E-35.4)
MINOR REPAIRS	LIQUID EPOXY (E-35.3) OR FBE PATCH STICK (E-35.4)
TIE-IN WELDS	LIQUID EPOXY (E-35.1)
GIRTH WELDS	LIQUID EPOXY (E-35.1)
BUTT WELDED FITTINGS	LIQUID EPOXY (E-35.1)
VALVE ASSEMBLIES	LIQUID EPOXY (E-35.7), WAX TAPE (E-35.7)
SHORT SEGMENTS OF PIPE	LIQUID EPOXY (E-35.1)
AIR-TO-SOIL TRANSITIONS	LIQUID EPOXY/PSX 700 (E-35.8)
PRESSURE CONTROL FITTINGS	LIQUID EPOXY (E-35.7), WAX TAPE (E-35.7)
TIE-INS/COATING TRANSITIONS	LIQUID EPOXY (E-35.3)

BORED COATING SELECTIONS	
MAIN LINE COATING	ARO APPLIED OVER FBE (E-35.4)
MINOR REPAIRS	LIQUID EPOXIES (E-35.2)
TIE-IN WELDS	LIQUID EPOXIES (E-35.2)

**NOTES:**  
1) REFERENCE CONSTRUCTION NOTE 10, COATING REQUIREMENTS.

INTERNAL CORROSION (IC) DESIGN & CONSTRUCTION REVIEW		
IC THREAT (PER TD-4810P-16)	YES	NO
IC REVIEW COMPLETED BY (CORROSION ENGINEER OR DESIGNATE)	LAN ID	DATE
CORROSION ENGINEERING HAS REVIEWED THIS DESIGN AND INCORPORATED ANY NECESSARY IC DESIGN AND CONSTRUCTION CONSIDERATIONS. DOCUMENTATION OF THE REVIEW AND ACTIONS TAKEN ARE IN THE JOB PACKAGE AND INCORPORATED IN THIS DESIGN.		
EDRS ROUTING NUMBER:		-

INSTALLATION TESTED OR INSPECTED AND NOTED ON DRAWING. ALL CORROSION LEVELS SATISFACTORY PER PG&E GAS UTILITY STANDARD TD-4181S.

QUALIFIED EMPLOYEE	DATE
CORROSION MECHANIC'S SIGNATURE IS REQUIRED WHEN A CPA BOUNDARY IS WITHIN THE SCOPE OF THE PROJECT.	

**LEGEND:**

- GT — GAS TRANSMISSION LINE (PROPOSED)
- GT — GAS TRANSMISSION LINE (EXISTING)
- GD — GAS DISTRIBUTION LINE (EXISTING)
- GS — GAS SERVICE LINE (EXISTING)
- GT — GAS TRANSMISSION LINE (RETIRED)
- GD — GAS DISTRIBUTION LINE (RETIRED)
- GS — GAS SERVICE LINE (RETIRED)
- FOREIGN GAS LINE
- JT — JOINT TRENCH
- ET — ELECTRIC TRANSMISSION LINE
- ED — ELECTRIC DISTRIBUTION LINE
- ES — ELECTRIC SERVICE LINE
- ETOH — ELECTRIC TRANSMISSION OVERHEAD
- EDOH — ELECTRIC DISTRIBUTION OVERHEAD
- T — TELEPHONE LINE
- FO — FIBER OPTIC LINE
- TV — CABLE TV LINE
- SD — STORM DRAIN LINE
- SS — SEWER LINE
- W — WATER LINE
- UNK — UNKNOWN UTILITIES
- CASING
- PROPERTY BOUNDARY
- PG&E EASEMENT
- TEMPORARY EASEMENT
- FOREIGN RIGHT-OF-WAY
- WATER LEVEL
- FENCE
- WALLTYPE
- WALL
- BARRIER
- TEMPORARY BARRIER (TYPE K)
- GUARD RAIL
- TOE OF SLOPE
- TOP OF SLOPE
- EP
- EDGE OF PAVEMENT
- FC
- FACE OF CURB
- BW
- BACK OF WALK
- DASHED PAVEMENT MARKINGS
- UNPAVED ROAD
- RAILROAD
- INGRESS / EGRESS ROAD
- LAYDOWN / STAGING / CONSTRUCTION IMPACT AREA
- EXCAVATION / BELL HOLE
- EXCAVATION / UNDERWATER
- SAFETY ZONE LIMITS
- ENVIRONMENTALLY SENSITIVE AREAS

- GAS LINE MARKER (OTHER)
- INSULATION JOINT
- PRESSURE CONTROL FITTING
- GAS BOX
- GAS HIGH PRESSURE REGULATOR
- GAS METER
- GAS DISTRICT REGULATOR
- PG&E GAS MANHOLE
- GAS VAULT
- GAS VENT
- GAS VALVE
- PG&E ELECTRIC MANHOLE
- ELECTRIC VAULT
- UTILITY POLE (ELECTRIC)
- UTILITY POLE (OTHER)
- JOINT POLE
- EXISTING ELECTRIC TOWER
- STORM DRAIN INLET
- UTILITY MANHOLE
- WATER METER
- WATER VALVE
- CABLE TV BOX
- TELECOMM BOX
- TELECOMM VAULT
- STREET LIGHT BOX
- TREE
- ANODE
- DEEPWELL ANODE
- COMPUTER AUTOMATED TEST STATION
- COUPON TEST STATION
- ELECTROLYSIS TEST STATION
- POLE-MOUNTED RECTIFIER
- DCI MITIGATION CABINET
- POT HOLE
- CITY/COUNTY MONUMENT
- MONUMENT, SEE DESCRIPTION
- SURVEY CONTROL POINT
- CENTERLINE
- SETTLEMENT MONITORING POINT

**DETAIL LEGEND:**

- PROPOSED GAS TRANSMISSION LINE
- EXISTING GAS TRANSMISSION LINE
- TEMPORARY GAS TRANSMISSION LINE (OWNED BY PG&E)
- TEMPORARY GAS TRANSMISSION LINE (OWNED BY OTHERS)
- RETIRED GAS TRANSMISSION LINE
- GAS TRANSMISSION LINE (TO BE REMOVED)
- CUT LINE (TO BE REMOVED)
- EXISTING GAS DISTRIBUTION LINE
- ORIGINAL GROUND
- GAS VALVE
- PIPE END CUT (SIDE)
- PIPE END CUT
- FLOW ARROW
- TIE-IN WELD
- MATERIAL OF RECORD ASSET
- BILL OF MATERIALS ASSET

Acronym	Definition	Acronym	Definition	Acronym	Definition	Acronym	Definition	Acronym	Definition
(E)	Existing	DEG	Degree	HFHW	High Frequency Weld	PKWY	Parkway	TEMP	Temporary
(P)	Proposed	DET	Detail	HPR	High Pressure Regulator	PL	Plastic	TG	Top of Grade
AB	Aggregate Base	DFM	Distribution Feeder Main	HWY	Highway	PLC	Programmable Logic Controllers	TT	Top Tap
ABN	Abandon	DI	Drainage Inlet	ID	Inside Diameter	PRUPF	Procedure for the Resolution of Unknown Pipeline Features	TSP	Transmission System Planning
AC	Asphalt Concrete	ILI	In-Line Inspection	INV	Invert	PSI	Pounds per Square Inch	TYP	Typical
API	American Petroleum Institute	DIST	Distribution	IRR	Irrigation	PV	Plug Valve	UG	Underground
APN	Assessor's Parcel Number	DPV	Damage Prevention Volume	JN	Job Number	PVMT	Pavement	USA	Underground Service Alert
APPROX	Approximate	DR	District Regulator	JP	Joint Pole	QTY	Quantity	UT	Ultra-Sonic Test
AVE	Avenue	DSAW	Double Submerged Arc-Welded	JT	Joint Trench	R	Radius	V	Valve
ARC	Abrasion Resistant Coating	DWA	Deep Well Anode	L	Line Number	RCP	Reinforced Concrete Pipe	VIF	Verify in Field
ASME	American Society of Mechanical Engineers	DWY	Driveway	LAT	Latitude	RD	Road	VOL	Volume
ASTM	American Society for Testing Materials	E	East	LN	Lane	RDWY	Roadway	W	Water
BBCL	Bell Bell Chill Ring	EASE	Easement	LNG	Liquid Natural Gas	REG	Regulator	WT	Wall Thickness
BC	Begin Curve	EC	End Curve	LOC	Location	REL	Relocate	WV	Water Valve
BD	Blowdown	EL	Elbow	LONG	Longitude	REPL	Replace	W/O	Without
BEG	Begin	ELECT	Electric	LT	Left	REV	Revision	WP	Work Procedure
BKF	Backfill	ELEV	Elevation	M	Monitor	RR	Railroad	MHW	Mean High Water
BLDG	Building	EM	Electronic Marker	MAOP	Maximum Allowable Operating Pressure	RT	Right	MLLW	Mean Low Low Water
BLVD	Boulevard	EMS	Engineering Material Specification	MAX	Maximum	RTE	Route		
BM	Bench Mark	ENGR	Engineer	MH	Manhole	R/W	Right of Way		
BMP	Best Management Practice	EP	Edge of Pavement	MIN	Minimum	S	South		
BOM	Bill of Materials	EQ	Equation	MISC	Miscellaneous	SAWH	Submerged Arc-Welded Helical		
BR	Bridge	ERW	Electric Resistance Welded	MLV	Main Line Valve	SAWL	Submerged Arc-Welded Longitudinal		
BTU	British Thermal Units	ESA	Environmentally Sensitive Area	MOI	Method of Installation	SCADA	Supervisory Control and Data Acquisition		
BV	Ball Valve	ETS	Electrolysis Test Station	MON	Monument	SD	Storm Drain		
BW	Back of Walk	ETW	Edge of Traveled Way	MOP	Maximum Operating Pressure	SG	Subgrade		
CATS	Computer Automated Test Station	F	Filter	MP	Mile Point	SHT	Sheet		
CCV	Corrosion Control Volume	F & C	Frame and Cover	MSP	Maximum Stopping Pressure	SMLS	Seamless		
CI	Cast Iron	FBE	Fusion Bonded Epoxy	MTR	Meter	SMYS	Specified Minimum Yield Strength		
CL	Centerline	FC	Face of Curb	MW	Working Monitor	SPEC	Specification		
CMP	Corrugated Metal Pipe	FDP	Future Design Pressure	MWP	Maximum Working Pressure	SS	Sanitary Sewer		
CNG	Compressed Natural Gas	FG	Finished Grade	N	North	SSAW	Single Submerged Arc-Welded		
CO	County	FH	Fire Hydrant	NDE	Non-Destructive Examination	ST	Street		
CONC	Concrete	FIG	Figure	NOP	Normal Operating Pressure	STA	Station		
COND	Conduit	FL	Flow Line	NPC	Non-Protected/Native Coupon	STD	Standard		
CP	Cathodic Protection	FLG	Flange	NTS	Not to Scale	STL	Steel		
CPT	Catch Point	FWY	Freeway	OD	Outside Pipe Diameter	STPR	Strength Test Pressure Report		
CROP	Conditional Reduction of Pressure	GS	Natural Gas Service	OG	Original Ground	T	Tied (Connected to System)		
CTS	Coupon Test Station	GS&S	Gas Standards and Specifications	OH	Overhead	TCE	Temporary Construction Easement		
CU	Copper	GV	Gate Valve	P	Pipeline	TCP	Traffic Control Plan		
CULV	Culvert	GW	Natural Gas Well	P/L	Property Line	TD	Technical Document		
D	Depth	H	Horizontal	PC	Point of Curvature	TDW	T. D. Williamson		
DE	Dead End	HDD	Horizontal Directional Drill	PCF	Pressure Control Fitting	TEL	Telephone		
DCUST	Distribution Customer								



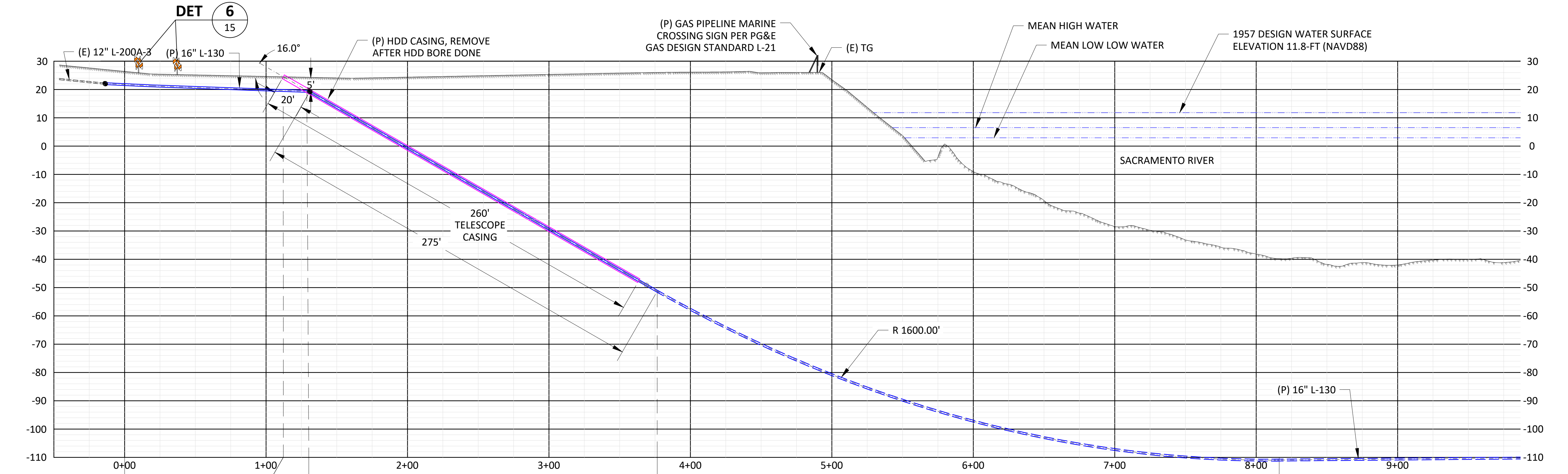
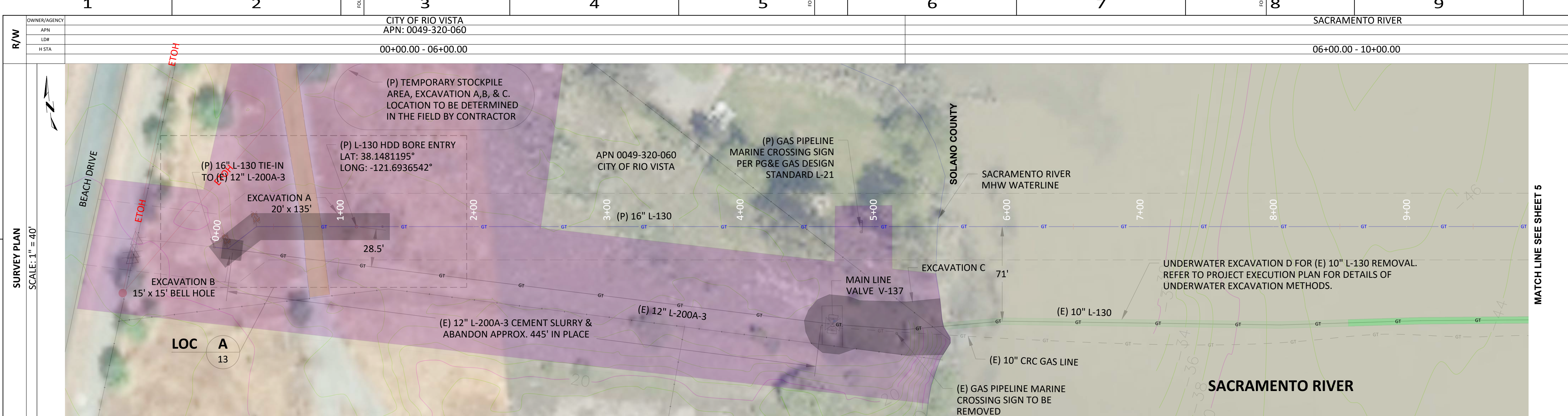
REV.	DATE	DESCRIPTION	ORDER	DWN	ADE	ENG	ENG APVD
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D	07-27-21	REVISED UNDERWATER EXCAVATION AREA	74029147	EAR	GDO	D2LM	
C	07-22-21	ISSUED FOR PERMIT - NOT FOR CONSTRUCTION	74029147	EAR	GDO	D2LM	
B	04-05-21	60% DESIGN	74029147	DLP	GDO	D2LM	
A	01-13-21	PRELIMINARY - 30% DESIGN	74029147	DLP	GDO	D2LM	

PIPELINE - LEGEND & STAMPS  
R-1402, L-130, MP 0.0 - MP 0.5  
REPLACE 10" PIPE, SACRAMENTO RIVER CROSSING  
RIO VISTA, SOLANO COUNTY

GAS TRANSMISSION & DISTRIBUTION  
PACIFIC GAS AND ELECTRIC COMPANY  
SAN FRANCISCO, CALIFORNIA



BILL OF MATL SHEET 19
JOB ID R-1402
SHEET NO. 3 OF 19 SHEETS
74029147 F



PIPELINE STATIONING (P) L-130	MOI
TIE INTO (E) 12" L-200A-3 H STA 00+00.00 P STA 00+00.00	8 6 7 1 2 1
HDD BORE ENTRY H STA 01+12.17	2 1
TIE-IN POINT ELL LT 165° BEND (VIF) H STA 01+30.24 P STA 01+30.29	3 4 5
BEG RADIUS H STA 03+76.55 P STA 04+86.47	1
END RADIUS H STA 08+16.22 P STA 08+31.63	1

EXCAVATION AREA - A			
ID	AREA	VOLUME	DEPTH
A	2,695 SQ FT	275 CU YD	5.5' - 6'



REV.	DATE	DESCRIPTION	ORDER	DWN	ADE	ENG	ENG APVD
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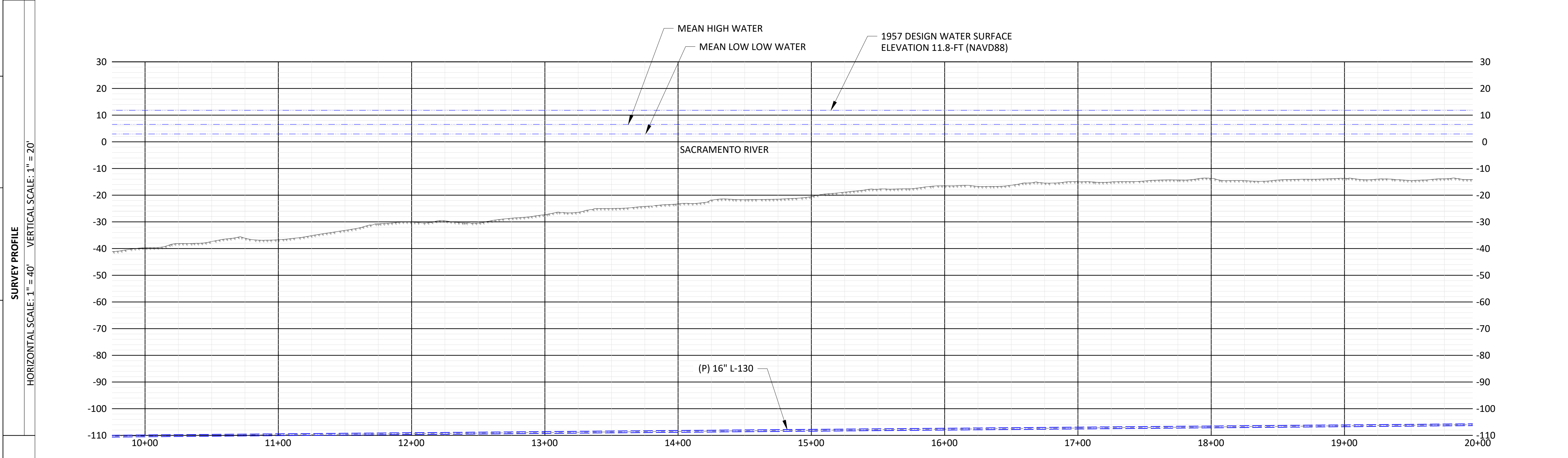
PIPELINE - PLAN AND PROFILE, REPLACE R-1402, L-130, MP 0.0 - MP 0.5  
 REPLACE 10" PIPE, SACRAMENTO RIVER CROSSING RIO VISTA, SOLANO COUNTY  
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**REGISTERED PROFESSIONAL ENGINEER**  
 TRAVIS DEAN LARSEN  
 C 75674  
 EXP. 06/30/2022  
 CIVIL  
 STATE OF CALIFORNIA

SIGNED: 06/10/21  
 ISSUED FOR PERMIT  
 NOT FOR CONSTRUCTION

BILL OF MATL SHEET 19
JOB ID R-1402
SHEET NO. 4 OF 19 SHEETS
74029147 F



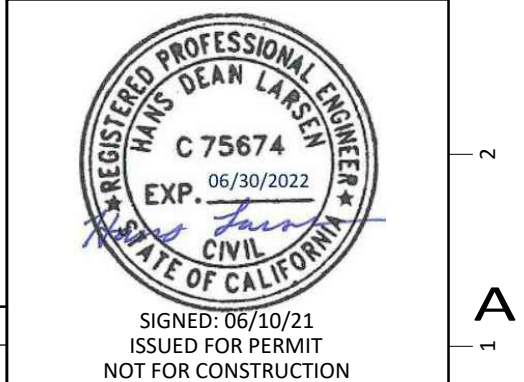
PIPELINE STATIONING (P) L-130

BOM# MOI

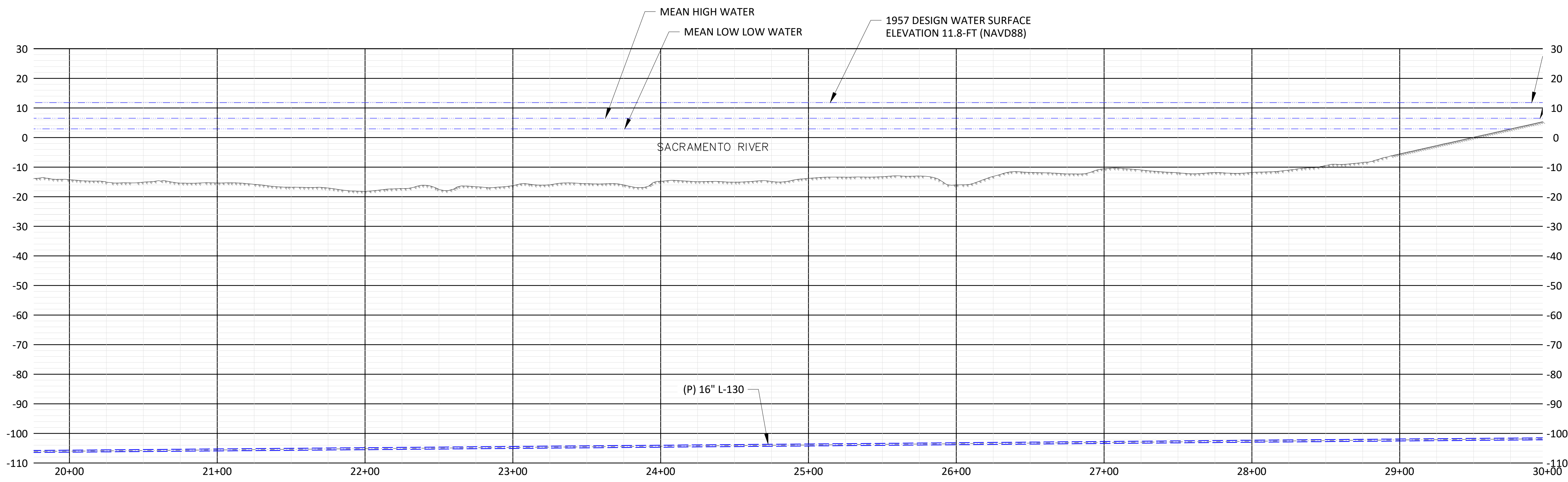
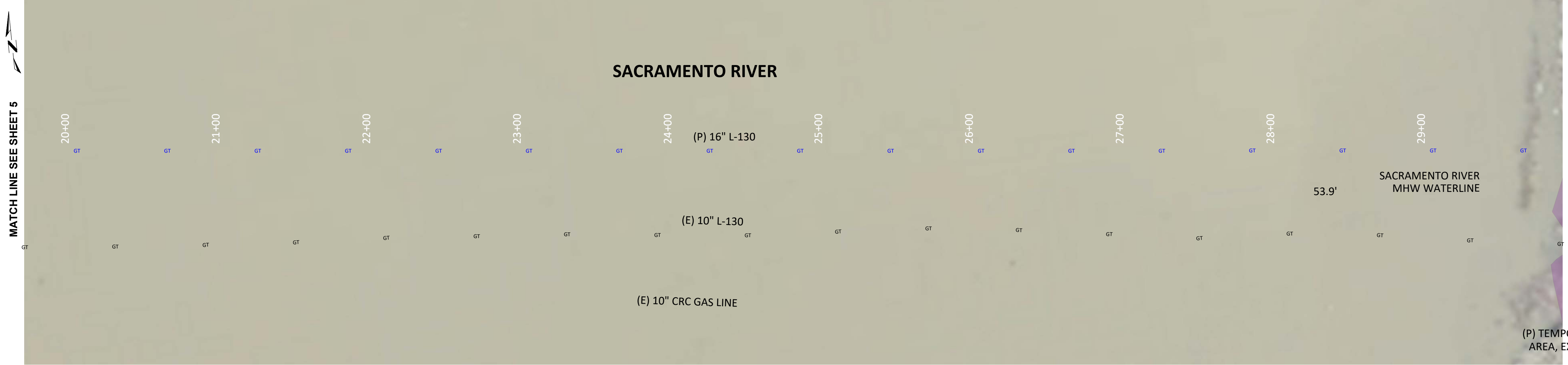


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PIPELINE - PLAN AND PROFILE, REPLACE R-1402, L-130, MP 0.0 - MP 0.5  
 REPLACE 10" PIPE, SACRAMENTO RIVER CROSSING RIO VISTA, SOLANO COUNTY  
 GAS TRANSMISSION & DISTRIBUTION  
 PACIFIC GAS AND ELECTRIC COMPANY  
 SAN FRANCISCO, CALIFORNIA



BILL OF MATL SHEET 19
JOB ID: R-1402
SHEET NO. 5 OF 19 SHEETS
74029147 F



**SURVEY PLAN**  
 SCALE: 1" = 40'

**SURVEY PROFILE**  
 HORIZONTAL SCALE: 1" = 40'  
 VERTICAL SCALE: 1" = 20'

**PIPELINE STATIONING**  
 (P) L-130

**BOM#**  
**MOI**



REV.	DATE	DESCRIPTION	ORDER	DWN	ADE	ENG	ENG APVD
F	11-04-21	ADDED CLSM OPTION FOR LEVEE BACKFILL	74029147	EAR	GDO	D2LM	
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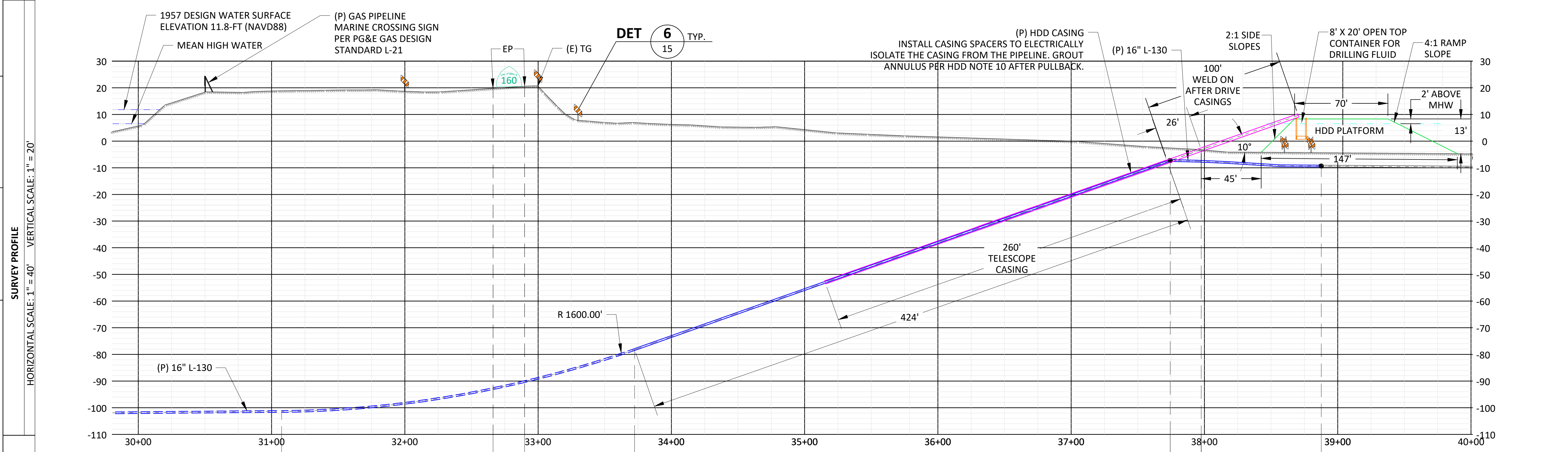
PIPELINE - PLAN AND PROFILE, REPLACE R-1402, L-130, MP 0.0 - MP 0.5  
 REPLACE 10" PIPE, SACRAMENTO RIVER CROSSING RIO VISTA, SOLANO COUNTY  
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BILL OF MATL SHEET 19  
 JOB ID: R-1402  
 SHEET NO. 6 OF 19 SHEETS  
 74029147 F

1	2	3	4	5	6	7	8	9	10	
OWNER/AGENCY	STATE OF CALIFORNIA 157-0110-029-0000		RUPORT 157-0110-029-0000	CALTRANS	RUPORT 157-0110-058-0000					
APN	157-0110-029-0000		31+10.00 - 32+10	32+00 - 33+50	30+00.00 - 40+00.00					
LDR										
H STA										



PIPELINE STATIONING (P) L-130	END RADIUS H STA 31+07.56 P STA 31+22.99	STATE HWY 160 EDGE H STA 32+66.22 STATE HWY 160 EDGE H STA 32+89.87	BEG RADIUS H STA 33+74.25 P STA 33+89.00	TIE-IN POINT EL RT 169° BEND (VIF) H STA 37+74.31 P STA 37+97.27	HDD BORE ENTRY H STA 37+97.59	(P) 16\"/>
						(P) 16\"/>

BOM#	1	3	4	5	2	1	2
MOI	HDD				OPEN TRENCH		

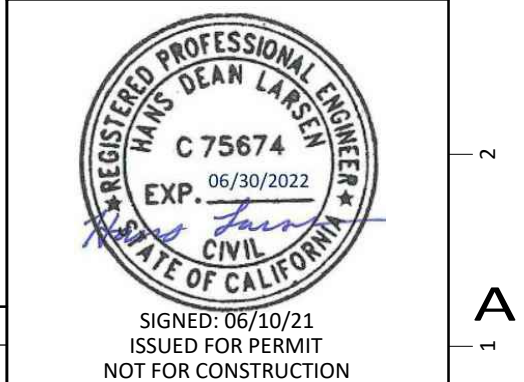
ID	AREA	VOLUME	DEPTH
G	2052 SQ FT	210 CU YD	5.5' - 6'



REV.	DATE	DESCRIPTION	ORDER	DWN	ADE	ENG	ENG APVD
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 REPLACE 10" PIPE, SACRAMENTO RIVER CROSSING RIO VISTA, SOLANO COUNTY  
 GAS TRANSMISSION & DISTRIBUTION  
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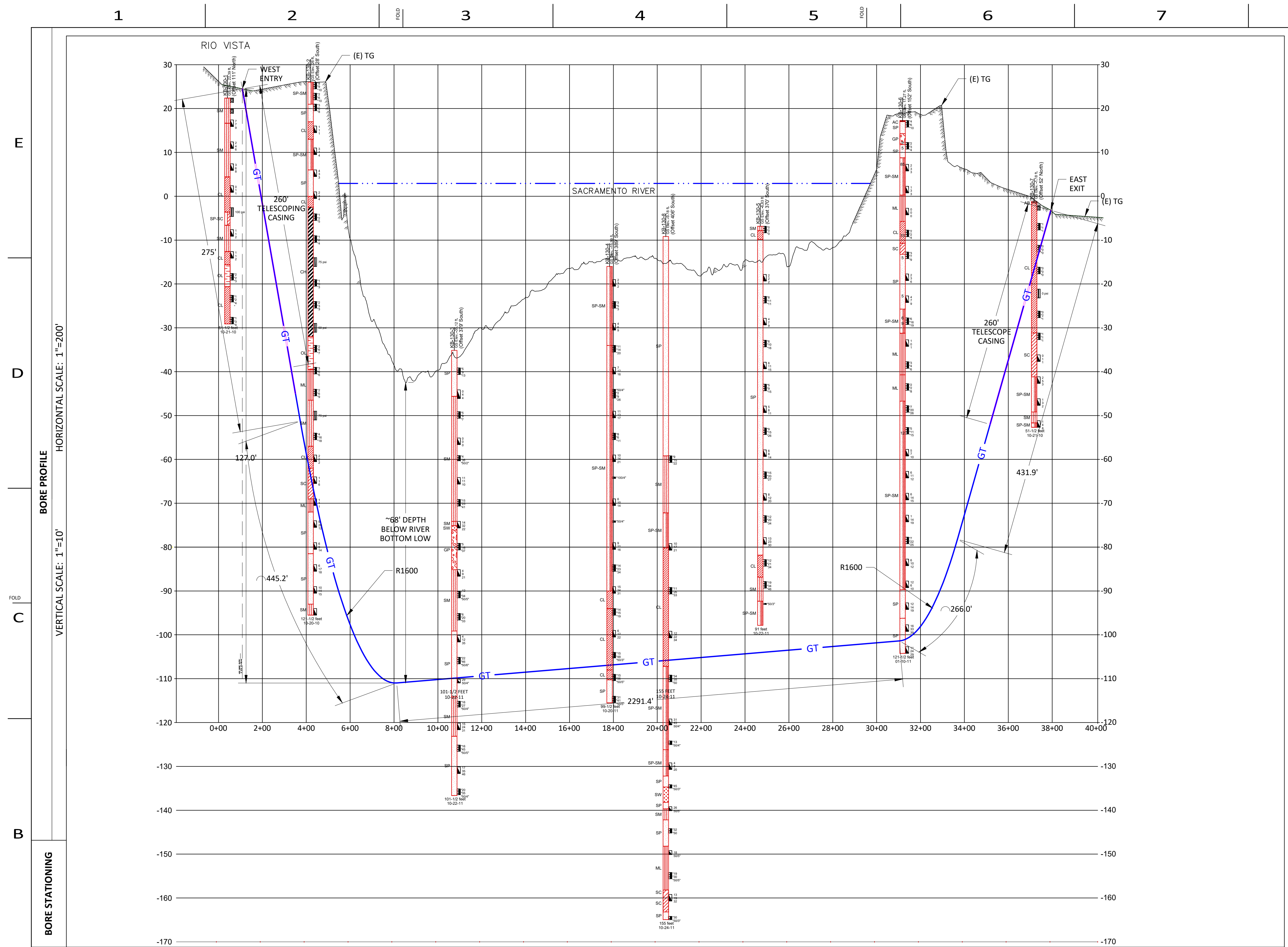
SIGNED: 06/10/21  
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BILL OF MATL SHEET 19

JOB ID: R-1402

SHEET NO. 7 OF 19 SHEETS

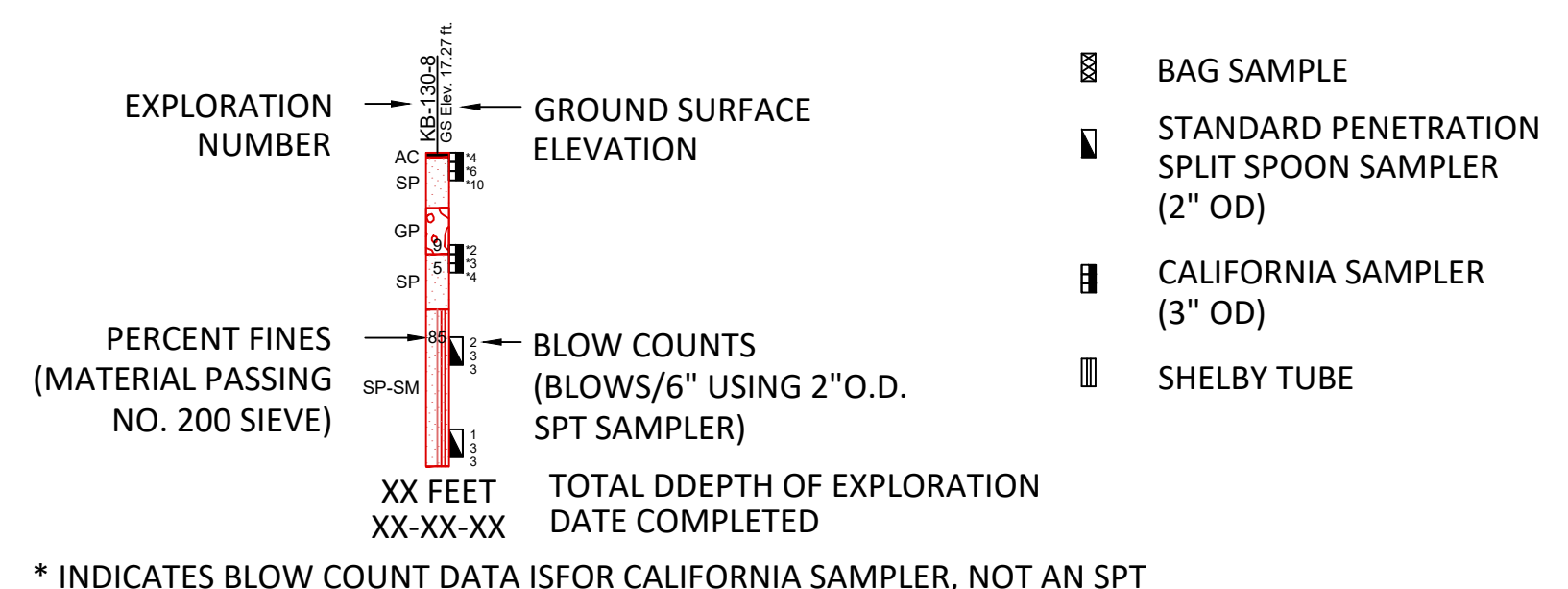
74029147 F



**BORING SOIL PROFILE LEGEND  
BASED ON UNIFIED SOIL CLASSIFICATION  
SYSTEM (ASTM D 2487)**

GW	WELL-GRADED GRAVEL WITH ABOUT 0 TO 4% FINES
GP	POORLY-GRADED GRAVEL WITH ABOUT 0 TO 4% FINES
GW-GM	WELL-GRADED GRAVEL WITH ABOUT 5 TO 12% SILT
GW-GC	WELL-GRADED GRAVEL WITH ABOUT 5 TO 12% CLAY
GP-GM	POORLY-GRADED GRAVEL WITH ABOUT 5 TO 12% SILT
GP-GC	POORLY-GRADED GRAVEL WITH ABOUT 5 TO 12% CLAY
GM	SILTY GRAVEL WITH ABOUT 13 TO 49% SILT
GC	CLAYEY GRAVEL WITH ABOUT 13 TO 49% CLAY
GC-GM	CLAYEY GRAVEL/SILTY GRAVEL WITH ABOUT 13 TO 49% SILT/CLAY
SW-SP	WELL-GRADED SAND/POORLY GRADED SAND WITH ABOUT 3 TO 4% CLAY
SW	WELL-GRADED SAND WITH ABOUT 0 TO 2% CLAY 0 TO 4% SILT
SP	POORLY-GRADED SAND WITH ABOUT 0 TO 2% CLAY 0 TO 4% SILT
SW-SM	WELL-GRADED SAND WITH ABOUT 5 TO 12% SILT
SW-SC	WELL-GRADED SAND WITH ABOUT 5 TO 12% CLAY
SP-SM	POORLY-GRADED SAND WITH ABOUT 5 TO 12% SILT
SP-SC	POORLY-GRADED SAND WITH ABOUT 5 TO 12% CLAY
SM	SILTY SAND WITH ABOUT 13 TO 49% SILT
SC	CLAYEY SAND WITH ABOUT 13 TO 49% CLAY
SC-SM	SAND WITH ABOUT 13 TO 49% LOW PLASTIC FINES THAT CLASSIFY AS CL-ML
ML	INORGANIC SILTS AND FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
CL-ML	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM TO HIGH PLASTICITY

**LEGEND:**



\* INDICATES BLOW COUNT DATA IS FOR CALIFORNIA SAMPLER, NOT AN SPT

**PRE-INSTALLATION TEST OF BORE PIPE**  
 PIPE SIZE \_\_\_\_\_ W.T. \_\_\_\_\_  
 PIPE SPEC. \_\_\_\_\_  
 PRESENT MAOP \_\_\_\_\_  
 STRENGTH TEST PRESSURE  
 MIN. \_\_\_\_\_ PSIG \_\_\_\_\_ % SMYS  
 MAX. \_\_\_\_\_ PSIG \_\_\_\_\_ % SMYS  
 TEST MEDIUM \_\_\_\_\_ PSIG=90% SMYS  
 DURATION OF TEST \_\_\_\_\_  
 SEE APPROVED STR FOR TEST INFO.  
 INCLUDE COPY OF TEST CHART WITH AS-BUILT  
 NOTE: THIS HYDRO TEST IS NOT INTENDED TO COMPLY WITH FEDERAL REQUIREMENTS AND IS BEING PERFORMED AS A STRENGTH AND INTEGRITY TEST. PIPE SECTION WILL BE HYDROTESTED PER STATE AND FEDERAL REQUIREMENTS ONCE INSTALLATION IS COMPLETE.

**HDD ENTRY DATA**

ENTRY ANGLE = 15 DEG
STATION = H STA 01+46.69
ELEVATION = 24.51'
P.C. (BC) STA = H STA 3+96.38
P.C. (BC) ELEV = 48.97'
RADIUS = 1600.00'
GPS COORDINATES
X= _____
Y= _____

**HDD EXIT DATA**

ENTRY ANGLE = 10 DEG
STATION = H STA 38+11.31
ELEVATION = 4.88'
P.C. (BC) STA = H STA 33+86.11
P.C. (BC) ELEV = 78.18'
RADIUS = 1600.00'
GPS COORDINATES
X= _____
Y= _____

**DESIGN DATA: HDD**

CROSSING HORIZONTAL LENGTH: \_\_\_\_\_  
 BORE LENGTH: \_\_\_\_\_  
 DESIGN RADIUS, 3-JOINT: \_\_\_\_\_

**BORED SECTIONS**

MAIN LINE COATING: \_\_\_\_\_  
 GIRTH WELD COATING: \_\_\_\_\_  
 FITTINGS COATING: \_\_\_\_\_  
 MINOR REPAIRS: \_\_\_\_\_

REV.	DATE	DESCRIPTION	ORDER	DWN	ADE	ENG	ENG APVD
F	11-04-21	ADDED CLSM OPTION FOR LEVEE BACKFILL	74029147	EAR	GDO	D2LM	
E	09-10-21	ADDED CASING REMOVAL	74029147	EAR	GDO	D2LM	
D	07-27-21	REVISED UNDERWATER EXCAVATION AREA	74029147	EAR	GDO	D2LM	
C	07-22-21	ISSUED FOR PERMIT - NOT FOR CONSTRUCTION	74029147	EAR	GDO	D2LM	
B	04-05-21	60% DESIGN	74029147	DLP	GDO	D2LM	
A	01-13-21	PRELIMINARY - 30% DESIGN	74029147	DLP	GDO	D2LM	

SEE SHEET 2 FOR HORIZONTAL DIRECTIONAL DRILLING (HDD) NOTES

PIPELINE - HDD DETAILS  
 R-1402, L-130, MP 0.0 - MP 0.5  
 REPLACE 10" PIPE, SACRAMENTO RIVER CROSSING  
 RIO VISTA, SOLANO COUNTY

GAS TRANSMISSION & DISTRIBUTION  
 PACIFIC GAS AND ELECTRIC COMPANY  
 SAN FRANCISCO, CALIFORNIA

**LONGITUDE 123, INC.**  
 California Marine Project Planning, Permitting and Performance  
 570 POLI STREET, VENTURA, CA 93001  
 (805) 649-9364 WWW.LONGITUDE123.NET  
 CA LICENSE: CSLB A-1026719



SIGNED: 06/10/21  
 ISSUED FOR PERMIT  
 NOT FOR CONSTRUCTION

BILL OF MATL SHEET 19

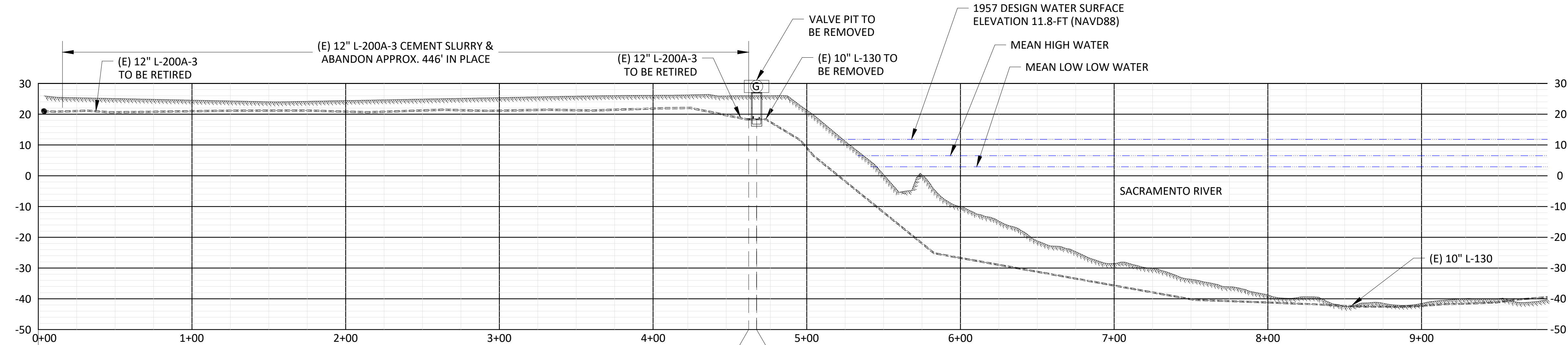
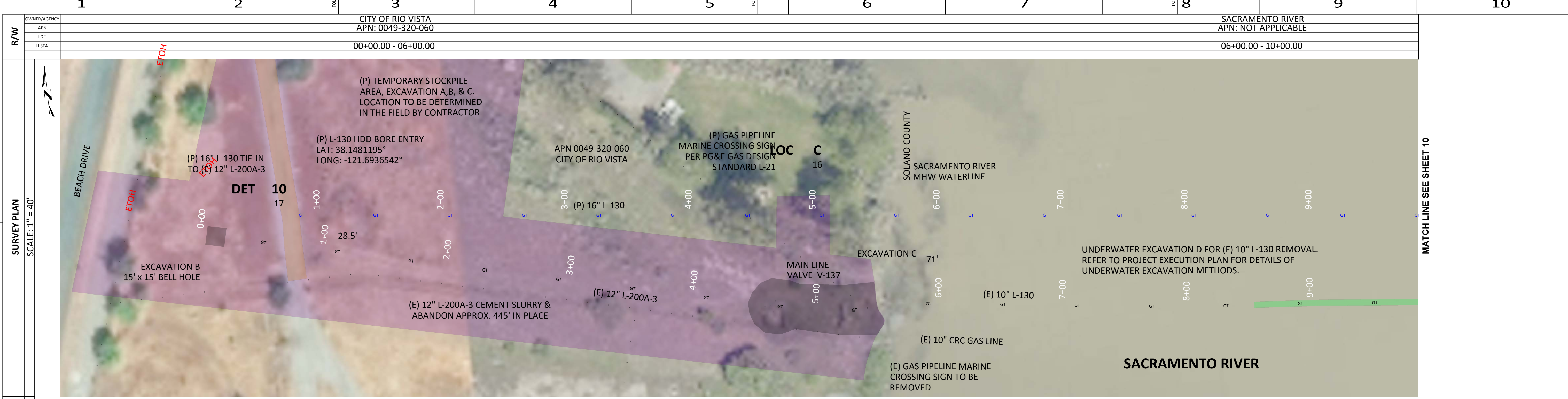
JOB ID **R-1402**

SHEET NO. 8 OF 19 SHEETS

**74029147 F**







EXCAVATION AREA - B			
ID	AREA	VOLUME	DEPTH
B	225 SQ FT	14 CU YD	5'

EXCAVATION AREA - C			
ID	AREA	VOLUME	DEPTH
C	4063 SQ FT	900 CU YD	8.5' - 13'

EXCAVATION AREA - UNDERWATER TRENCH			
ID	AREA	VOLUME	DEPTH
D	12240 SQ. FT.	3500 CU. YD.	0' - 17'



REV.	DATE	DESCRIPTION	ORDER	DWN	ADE	ENG	ENG APVD
F	11-04-21	ADDED CLSM OPTION FOR LEVEE BACKFILL	74029147	EAR	GDO	D2LM	
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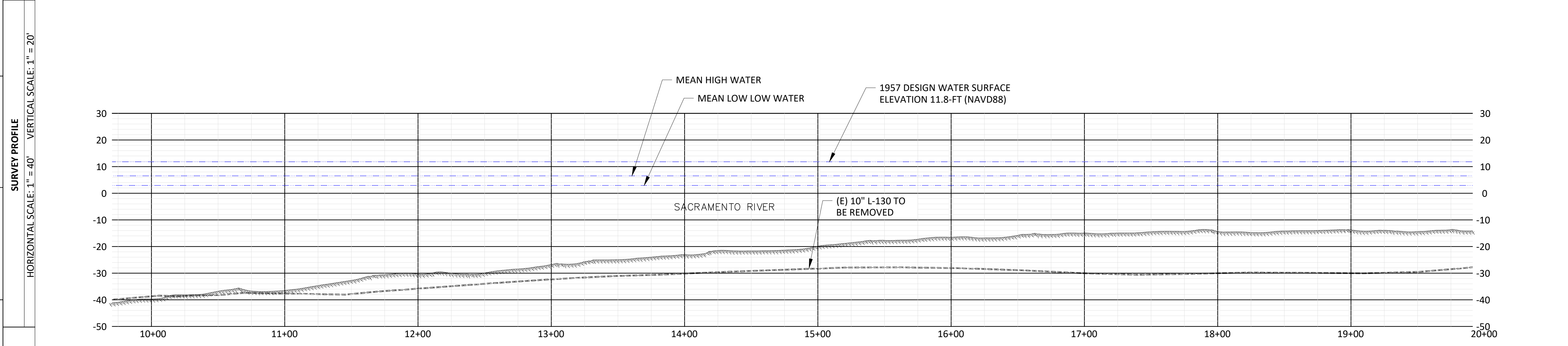
PIPELINE - PLAN AND PROFILE, DECOMMISSION R-1402, L-130, MP 0.0 - MP 0.5  
 REPLACE 10" PIPE, SACRAMENTO RIVER CROSSING RIO VISTA, SOLANO COUNTY  
 GAS TRANSMISSION & DISTRIBUTION  
 PACIFIC GAS AND ELECTRIC COMPANY  
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 (805) 649-9364 WWW.LONGITUDE123.NET  
 CA LICENSE: CSLB A-1026719

**REGISTERED PROFESSIONAL ENGINEER**  
 LONGITUDINAL ENGINEERING  
 C 75674  
 EXP. 06/30/2022  
 CIVIL  
 STATE OF CALIFORNIA  
 SIGNED: 06/10/21  
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BILL OF MATL SHEET 19  
 JOB ID: R-1402  
 SHEET NO. 9 OF 19 SHEETS  
 74029147 F

MATCH LINE SEE SHEET 10



**PIPELINE STATIONING (E) L-130**

**LONGITUDE 123, INC.**  
 California Marine Project Planning, Permitting and Performance  
 570 POLI STREET, VENTURA, CA 93001  
 (805) 649-9364 WWW.LONGITUDE123.NET  
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**REGISTERED PROFESSIONAL ENGINEER**  
 TRAVIS DEAN LARSEN  
 C 75674  
 EXP. 06/30/2022  
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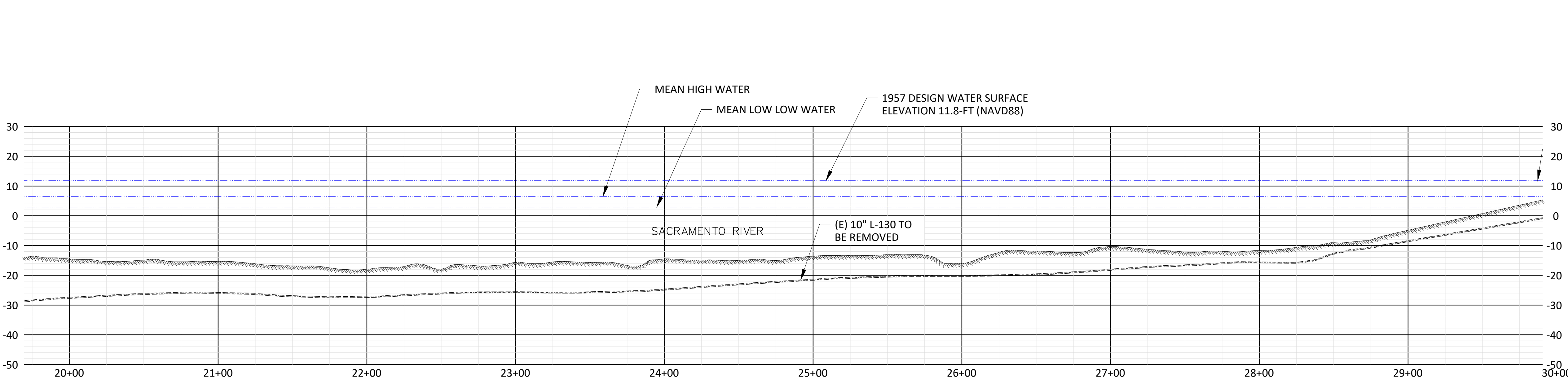
REV.	DATE	DESCRIPTION	ORDER	DWN	ADE	ENG	ENG APVD
F	11-04-21	ADDED CLSM OPTION FOR LEVEE BACKFILL	74029147	EAR	GDO	D2LM	
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**REVISIONS**

PIPELINE - PLAN AND PROFILE, DECOMMISSION R-1402, L-130, MP 0.0 - MP 0.5  
 REPLACE 10" PIPE, SACRAMENTO RIVER CROSSING RIO VISTA, SOLANO COUNTY  
 GAS TRANSMISSION & DISTRIBUTION  
 PACIFIC GAS AND ELECTRIC COMPANY  
 SAN FRANCISCO, CALIFORNIA

BILL OF MATL SHEET 19  
 JOB ID: R-1402  
 SHEET NO. 10 OF 19 SHEETS  
 74029147 F





**PIPELINE STATIONING (E) L-130**

**SURVEY PLAN SCALE: 1" = 40'**

**SURVEY PROFILE HORIZONTAL SCALE: 1" = 40' VERTICAL SCALE: 1" = 20'**

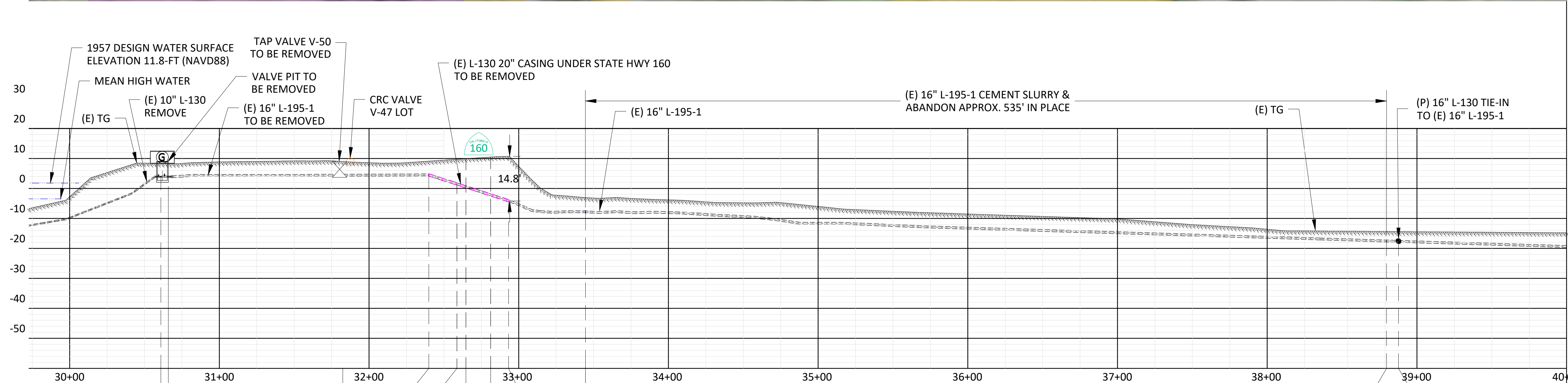
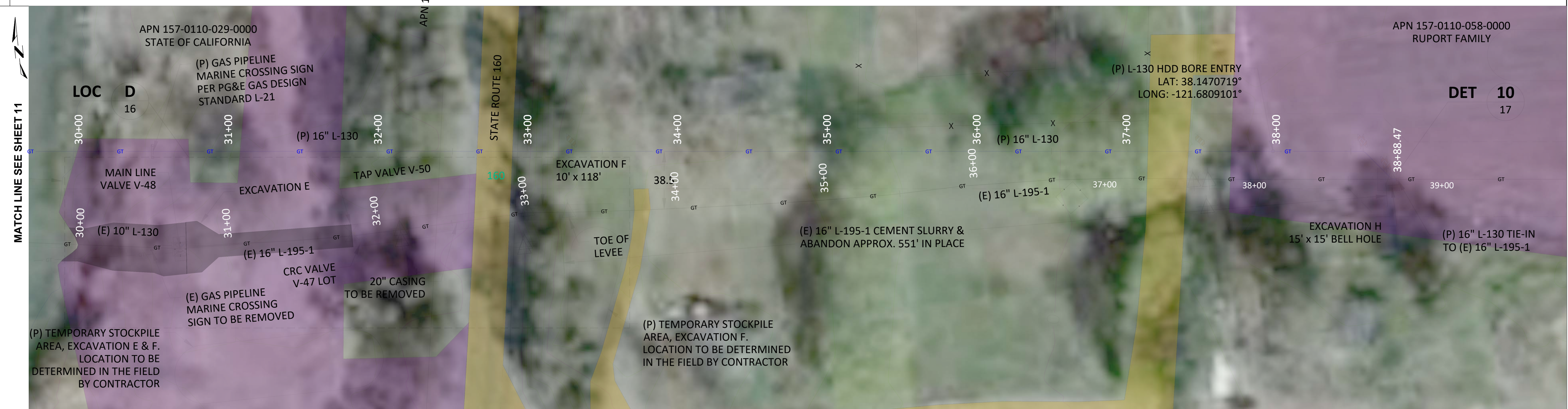


REV.	DATE	DESCRIPTION	ORDER	DWN	ADE	ENG	ENG APVD
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PIPELINE - PLAN AND PROFILE, DECOMMISSION R-1402, L-130, MP 0.0 - MP 0.5  
 REPLACE 10" PIPE, SACRAMENTO RIVER CROSSING RIO VISTA, SOLANO COUNTY  
 GAS TRANSMISSION & DISTRIBUTION  
 PACIFIC GAS AND ELECTRIC COMPANY  
 SAN FRANCISCO, CALIFORNIA



BILL OF MATL SHEET 19  
 JOB ID: R-1402  
 SHEET NO. 11 OF 19 SHEETS  
 74029147 F



PIPELINE STATIONING (E) L-130

MAIN LINE V-48 H STA 30+60.93 P STA 30+73.85	TAP VALVE V-50 H STA 31+83.04 P STA 31+995.38	(E) 20" CASING END H STA 32+39.95 CUT/CAP CASING H STA 32+58.73	STATE HWY 160 EDGE H STA 32+64.73	STATE HWY 160 EDGE H STA 32+81.29	(E) 20" CASING CAP END H STA 32+93.22	(E) 16" L-195-1H CAP END H STA 33+44.56 P STA 33+58.55	(E) 16" L-195-1 PIPE TO BE REMOVED	(E) 16" L-195-1H CAP END H STA 38+74.87 P STA 38+89.04	(P) 16" L-130 TIE INTO (E) 16" L-195-1 H STA 38+82.87 P STA 38+97.04
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ID	AREA	VOLUME	DEPTH
E	5,240 SQ. FT.	592 CU. YD.	6' - 8'

ID	AREA	VOLUME	DEPTH
F	1,189 SQ. FT.	378 CU. YD.	8' - 15'

ID	AREA	VOLUME	DEPTH
H	225 SQ. FT.	14 CU. YD.	4.5' - 5'

ID	AREA	VOLUME	DEPTH
J	225 SQ. FT.	14 CU. YD.	4.5' - 5'



REV.	DATE	DESCRIPTION	ORDER	DWN	ADE	ENG	ENG APVD
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PIPELINE - PLAN AND PROFILE, DECOMMISSION R-1402, L-130, MP 0.0 - MP 0.5  
 REPLACE 10" PIPE, SACRAMENTO RIVER CROSSING RIO VISTA, SOLANO COUNTY  
 GAS TRANSMISSION & DISTRIBUTION  
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 SAN FRANCISCO, CALIFORNIA

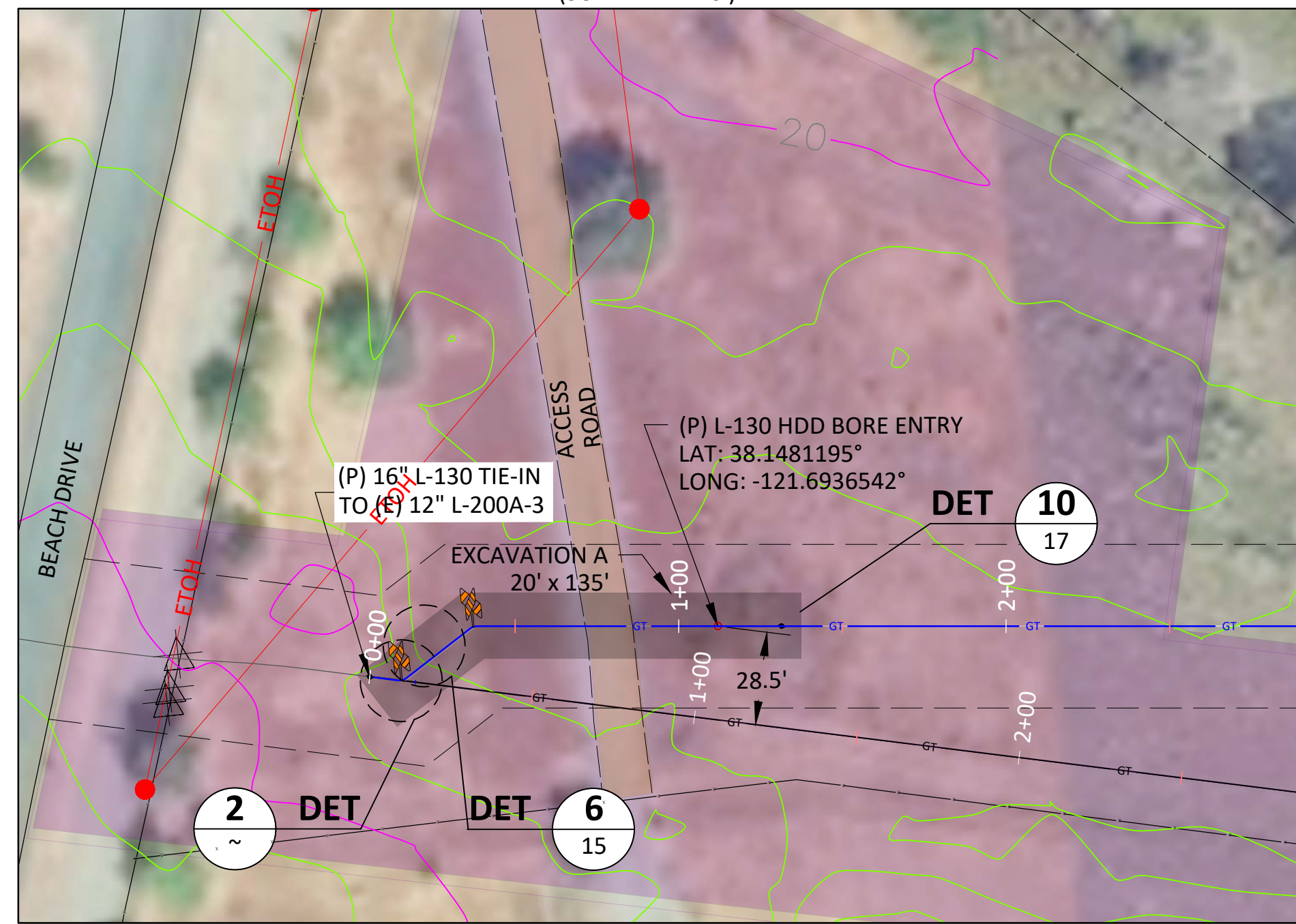
**LONGITUDE 123, INC.**  
 California Marine Project Planning, Permitting and Performance  
 570 POLI STREET, VENTURA, CA 93001  
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 C 75674  
 EXP. 06/30/2022  
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 STATE OF CALIFORNIA  
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BILL OF MATL SHEET 19
JOB ID R-1402
SHEET NO. 12 OF 19 SHEETS
74029147 F

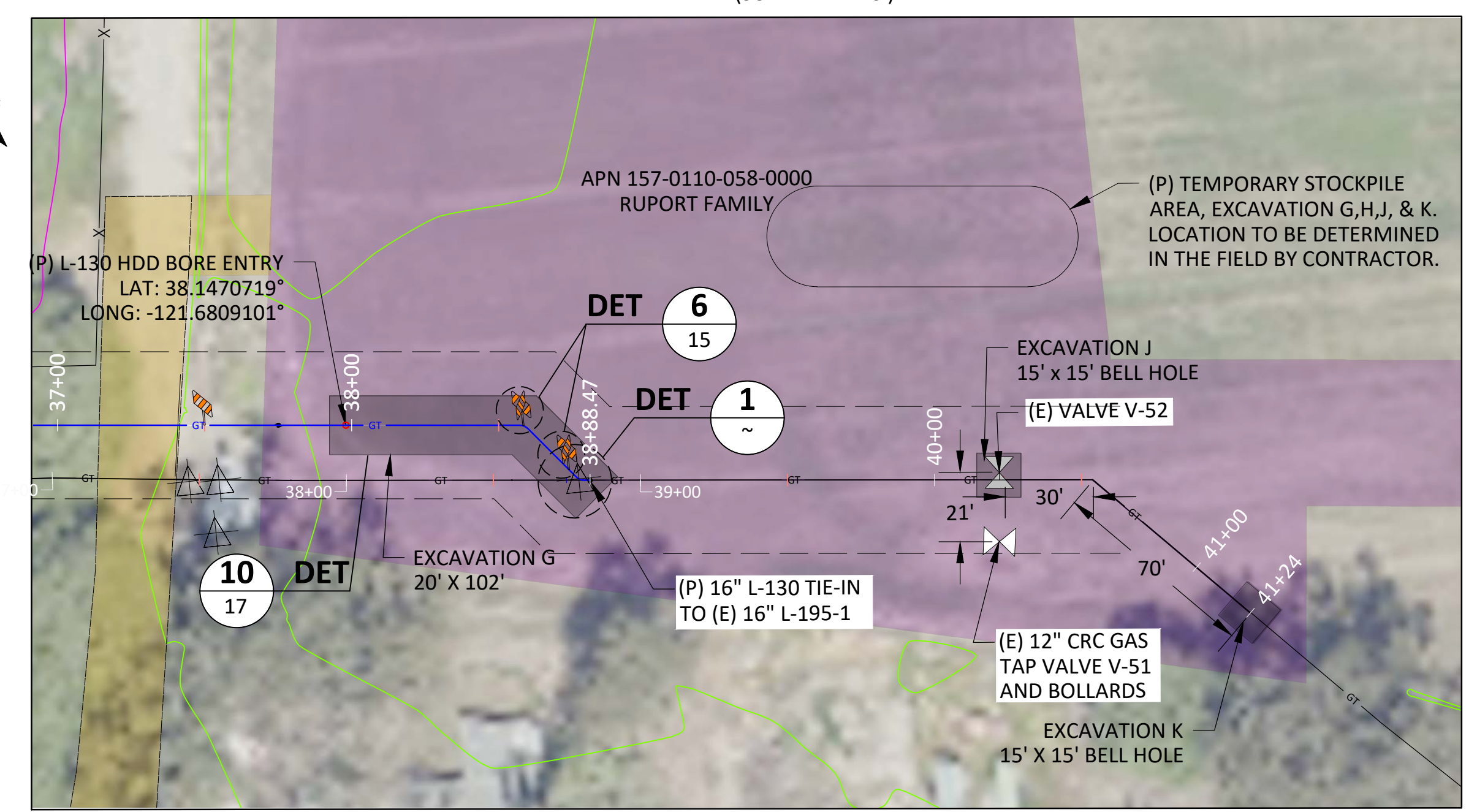
**LOCATION A**

WALL MAP - 2851; PLAT - G3; L-200A-3; MP 1.05  
(SCALE: 1" = 40')



**LOCATION B**

WALL MAP - N/A; PLAT - N/A; L-195-1; MP 0.125  
(SCALE: 1" = 40')



**WELDING INSPECTED PER PG&E WELDING MANUAL TD-4160M**

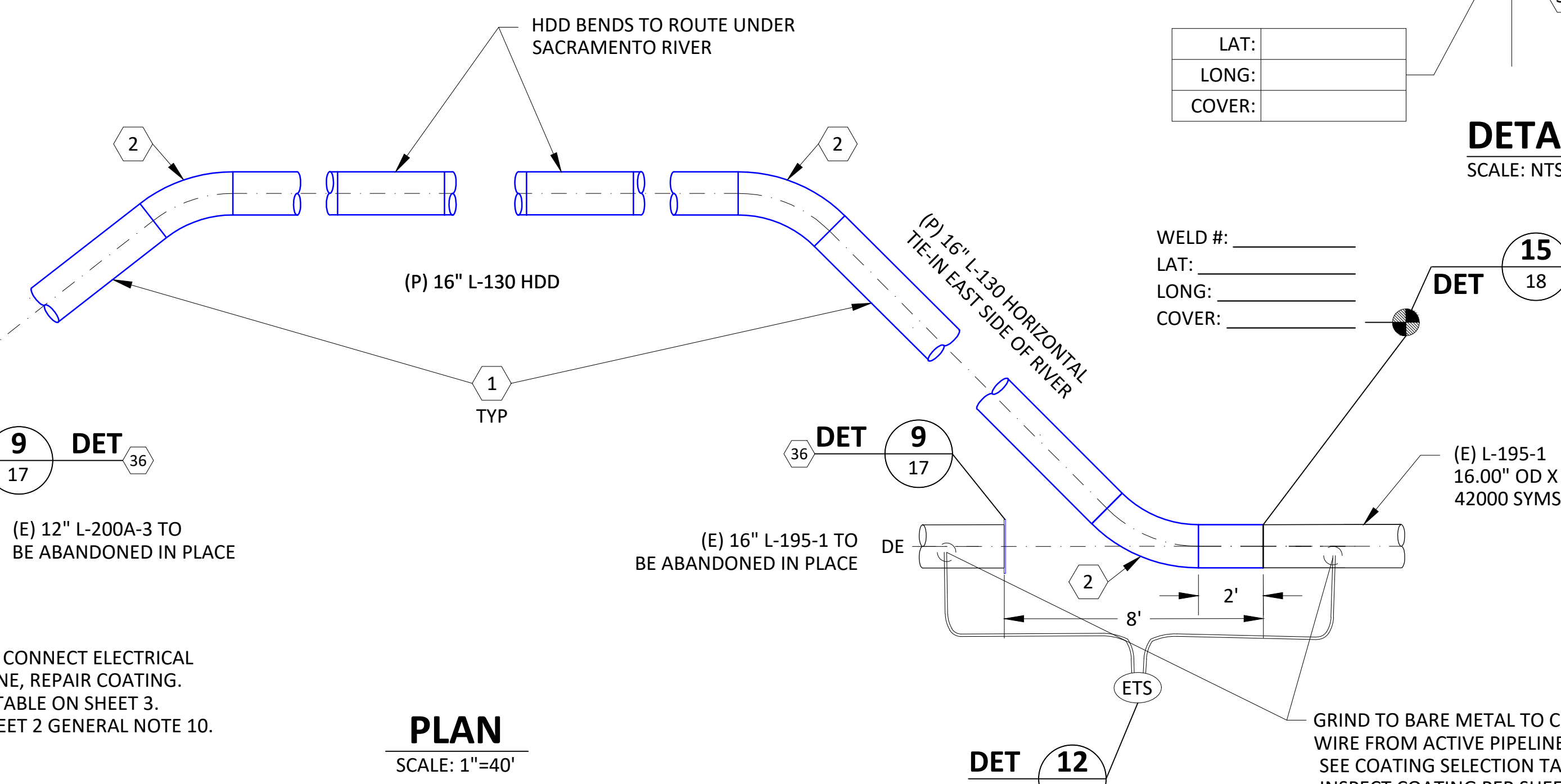
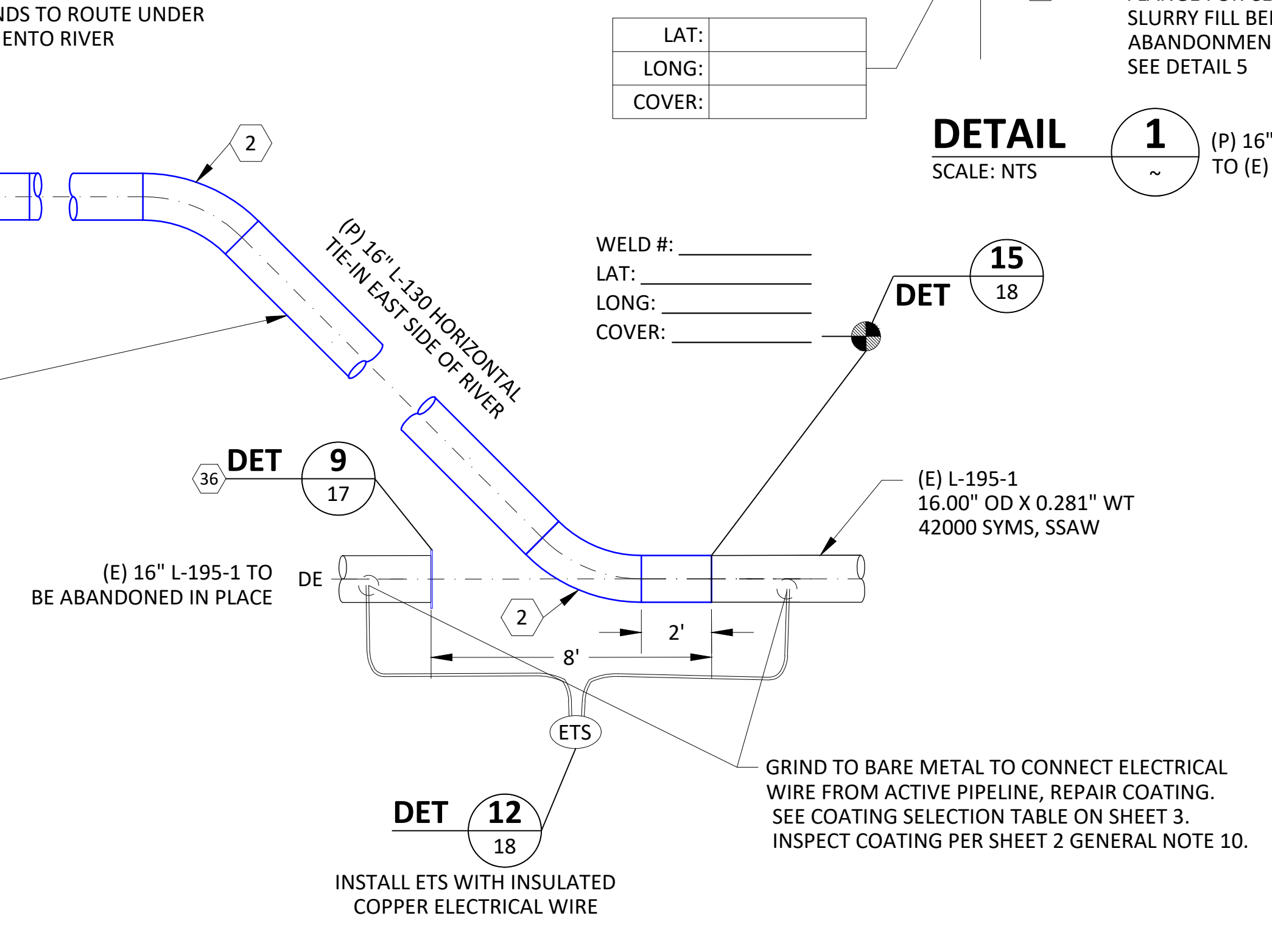
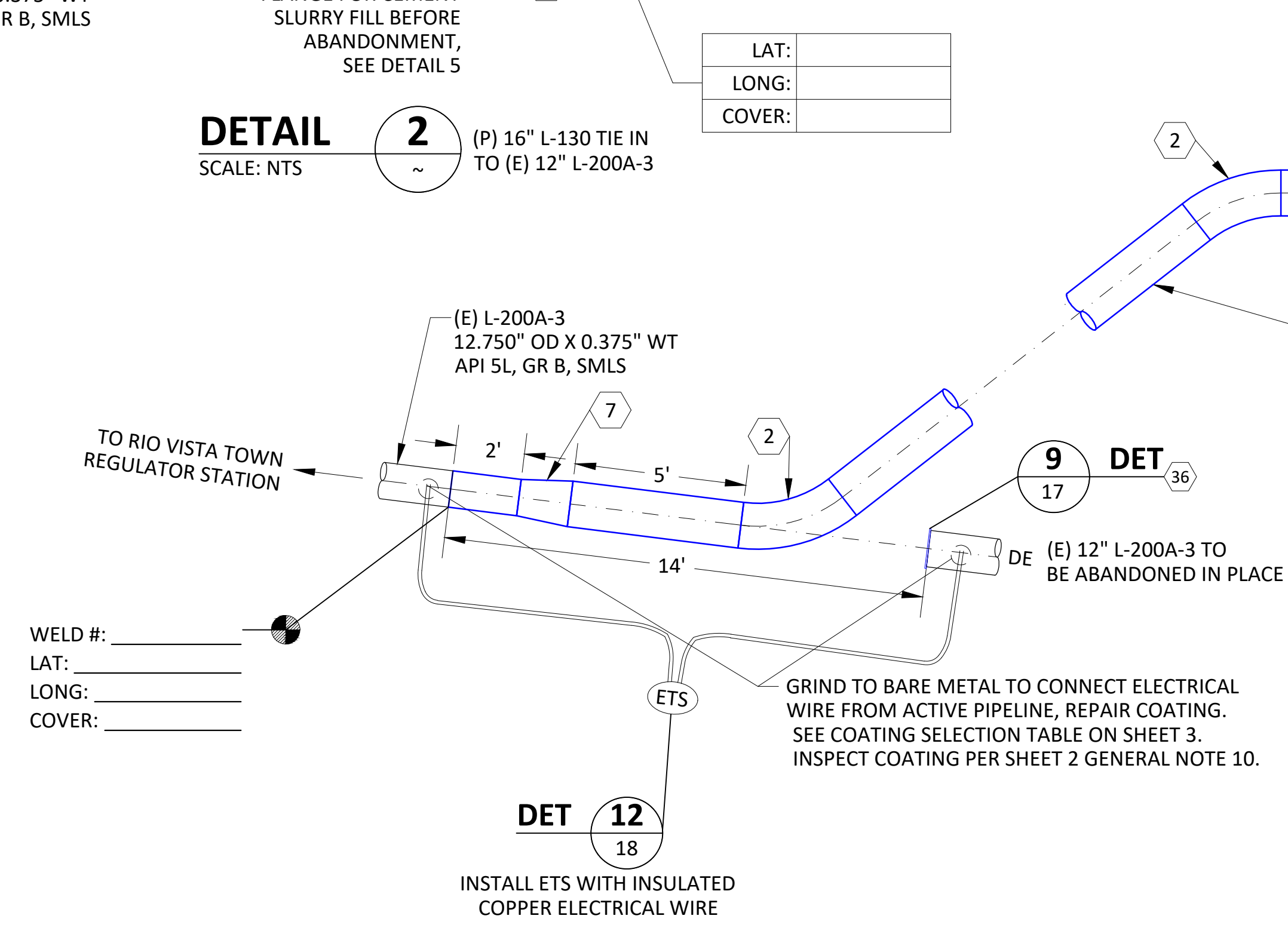
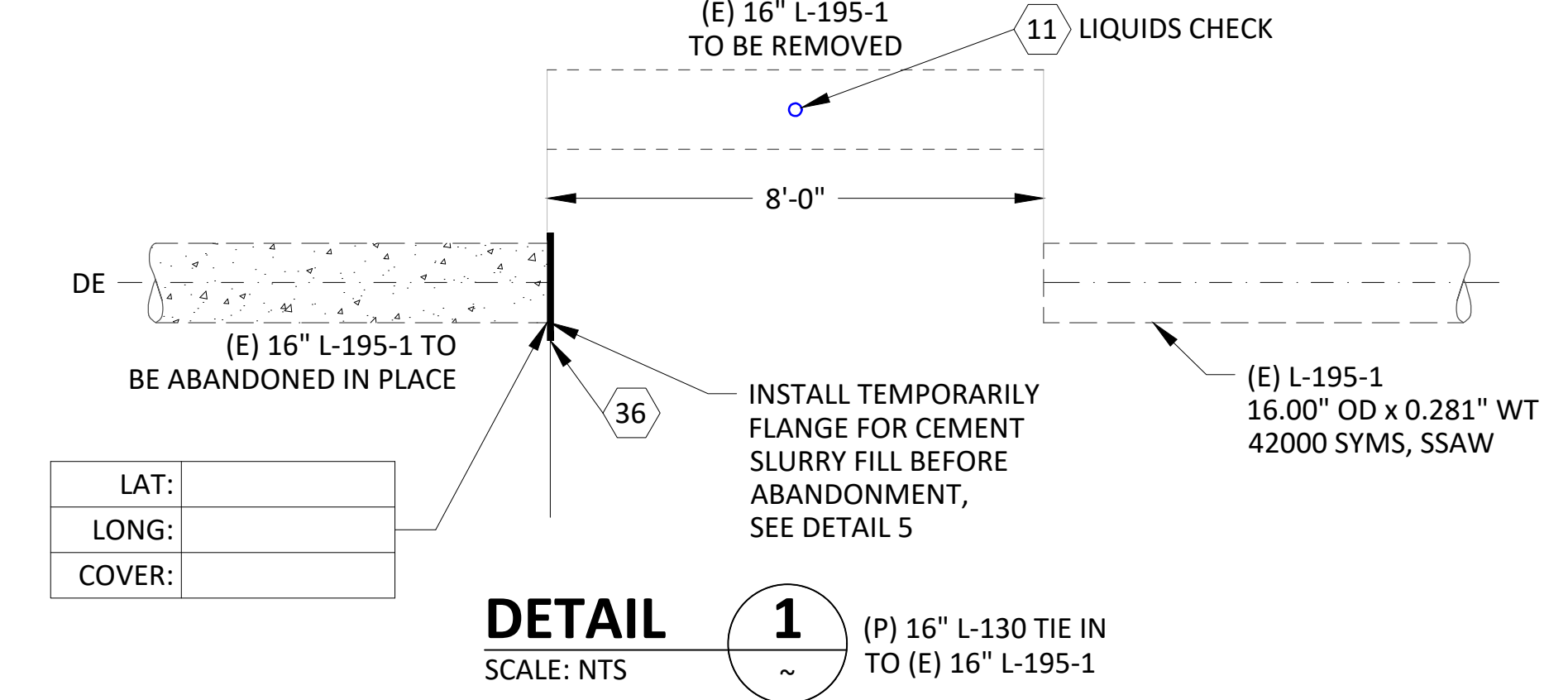
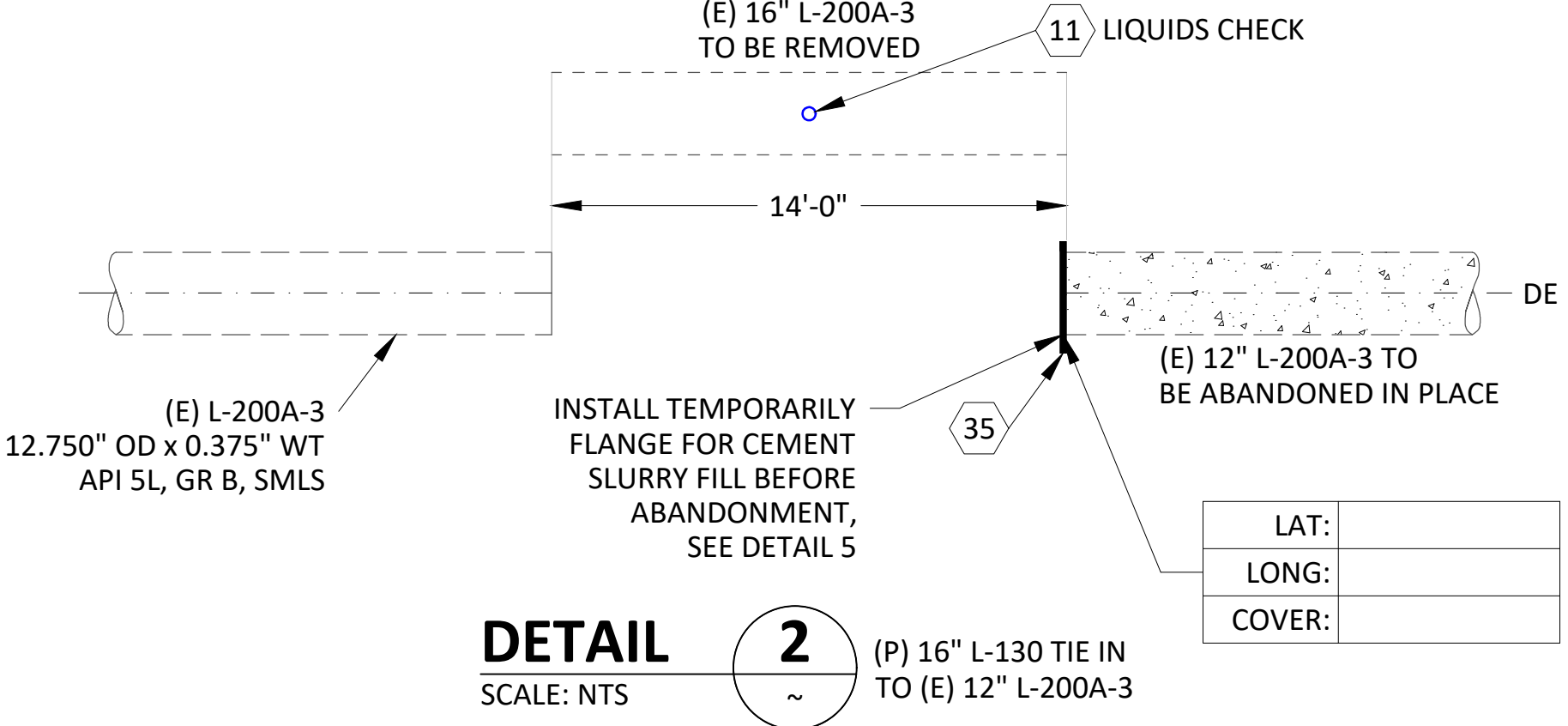
VISUAL

RADIOGRAPHIC

MAGNETIC PARTICLE

INSPECTOR \_\_\_\_\_

DATE \_\_\_\_\_



REV.	DATE	DESCRIPTION	ORDER	DWN	ADE	ENG	ENG APVD
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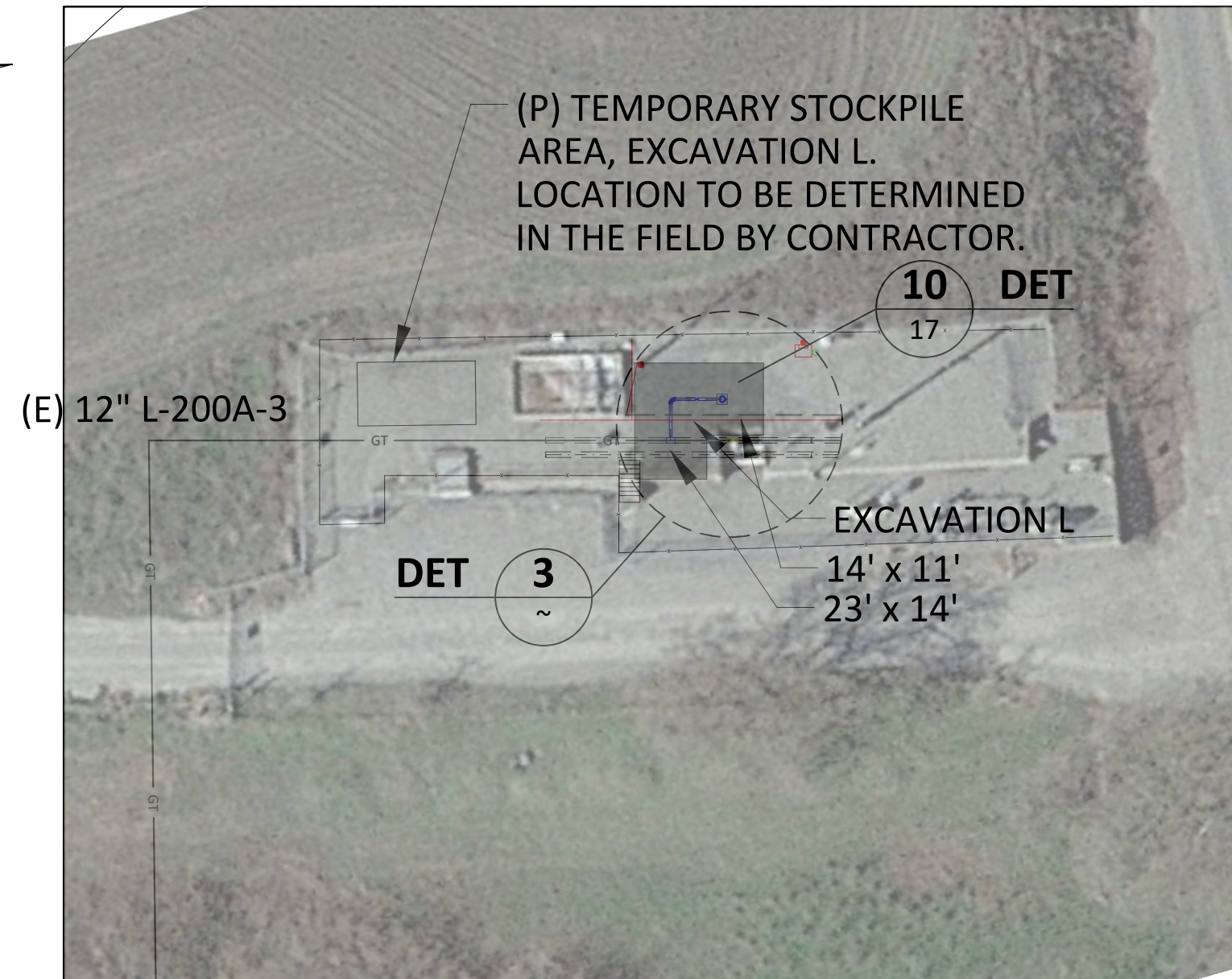
PIPELINE - DETAILS  
R-1402, L-130, MP 0.0 - MP 0.5  
REPLACE 10" PIPE, SACRAMENTO RIVER CROSSING  
RIO VISTA, SOLANO COUNTY

GAS TRANSMISSION & DISTRIBUTION  
PACIFIC GAS AND ELECTRIC COMPANY  
SAN FRANCISCO, CALIFORNIA



BILL OF MATL SHEET 19  
JOB ID R-1402  
SHEET NO. 13 OF 19 SHEETS  
74029147 F

**LOCATION F**  
 RIO VISTA TOWN REGULATOR STATION  
 WALL MAP - 2851; PLAT - F2; L-200A-3; MP 0.8  
 (SCALE: 1" = 30')



EXCAVATION AREA, INSTALL L-200A-3 BD			
ID	AREA	VOLUME	DEPTH
L	470 SQ FT	30 CU YD	4' - 4.5'

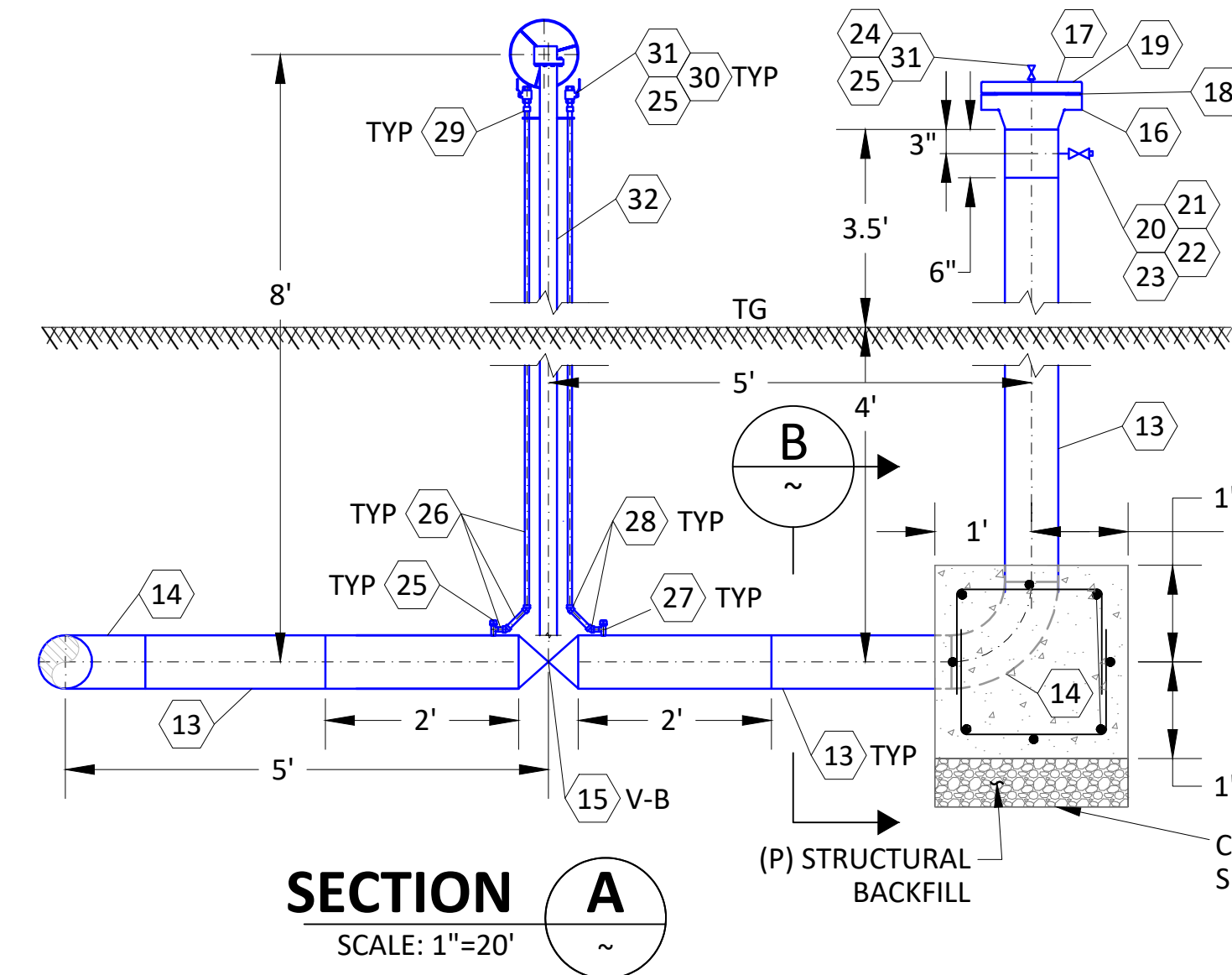
**VALVE DATA STAMP**

BOM# 15 VALVE SIZE 6"  
 TECH ID (VALVE #) V-A  
 VALVE TYPE BALL, ANSI 600, WELD END  
 MANUFACTURER \_\_\_\_\_  
 MODEL/FIGURE # \_\_\_\_\_  
 SERIAL# \_\_\_\_\_  
 CRITICAL VALVE  YES  NO  
 CRITICAL VALVES ARE TO BE COMMISSIONED PER TD-4520P-01

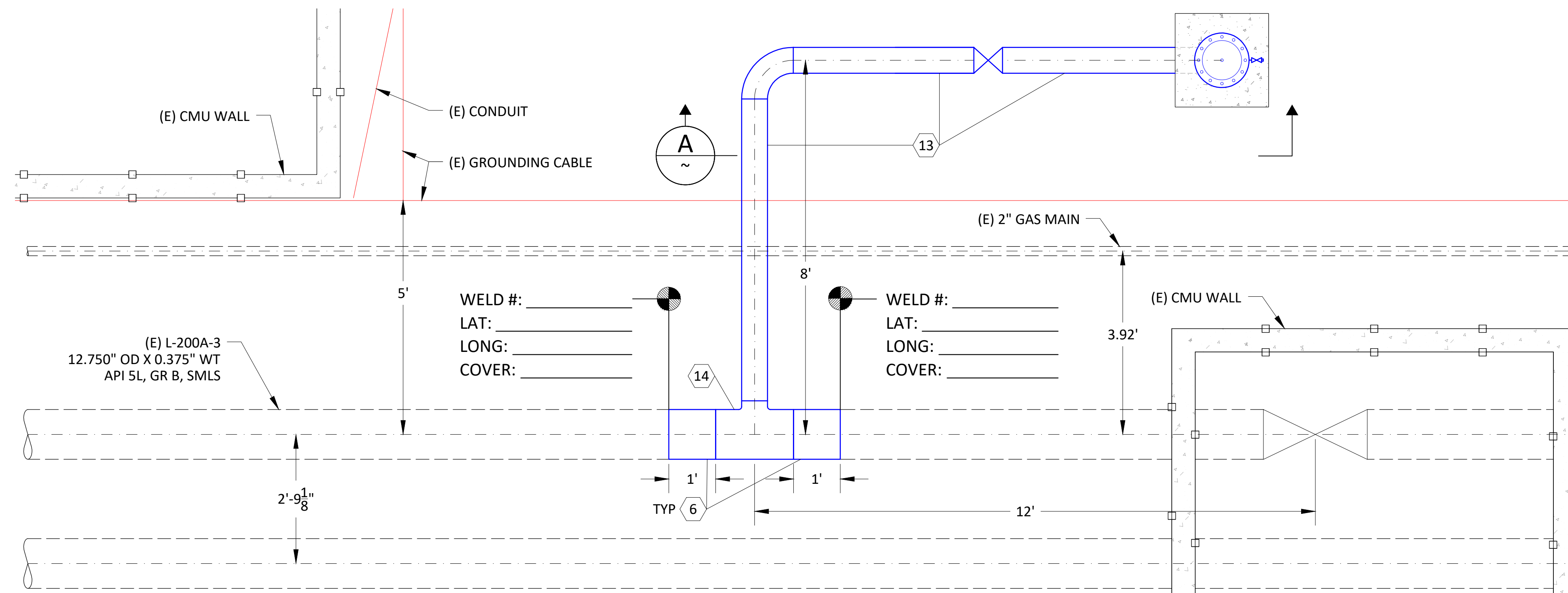
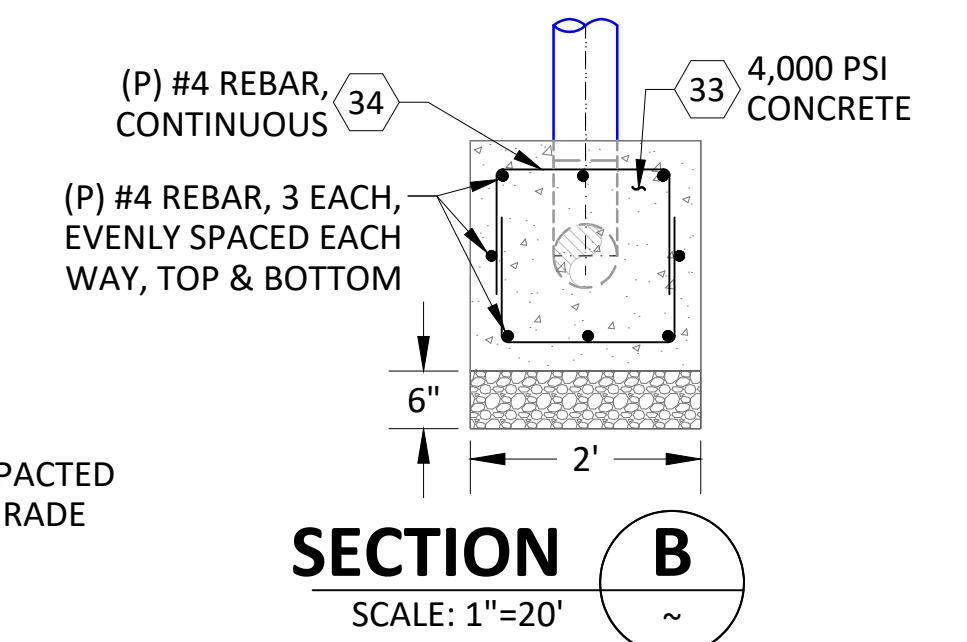
COMMISSIONING  
 VALVE TO BE COMMISSIONED BY GAS PIPELINE OPERATION & MAINTENANCE (GPO&M) AND DIVISION OR DISTRICT PERSONNEL PRIOR TO PLACING VALVE IN SERVICE.

COMMISSIONED BY: \_\_\_\_\_

LAN ID \_\_\_\_\_  
 DATE \_\_\_\_\_  
 NUMBER OF TURNS OF HANDWHEEL (IF APPROPRIATE) \_\_\_\_\_



**THRUST BLOCK NOTE:**  
 FOR ALL CONCRETE RELATED WORK, "PG&E GENERAL GUIDELINES FOR CONCRETE WORK" SHALL BE FOLLOWED.



**WELDING INSPECTED PER PG&E WELDING MANUAL TD-4160M**

VISUAL   
 RADIOGRAPHIC   
 MAGNETIC PARTICLE   
 INSPECTOR \_\_\_\_\_  
 DATE \_\_\_\_\_

**DETAIL 3** (P) L-200A-3 BLOW DOWN SYSTEM INSTALL  
 SCALE: 1"=20'



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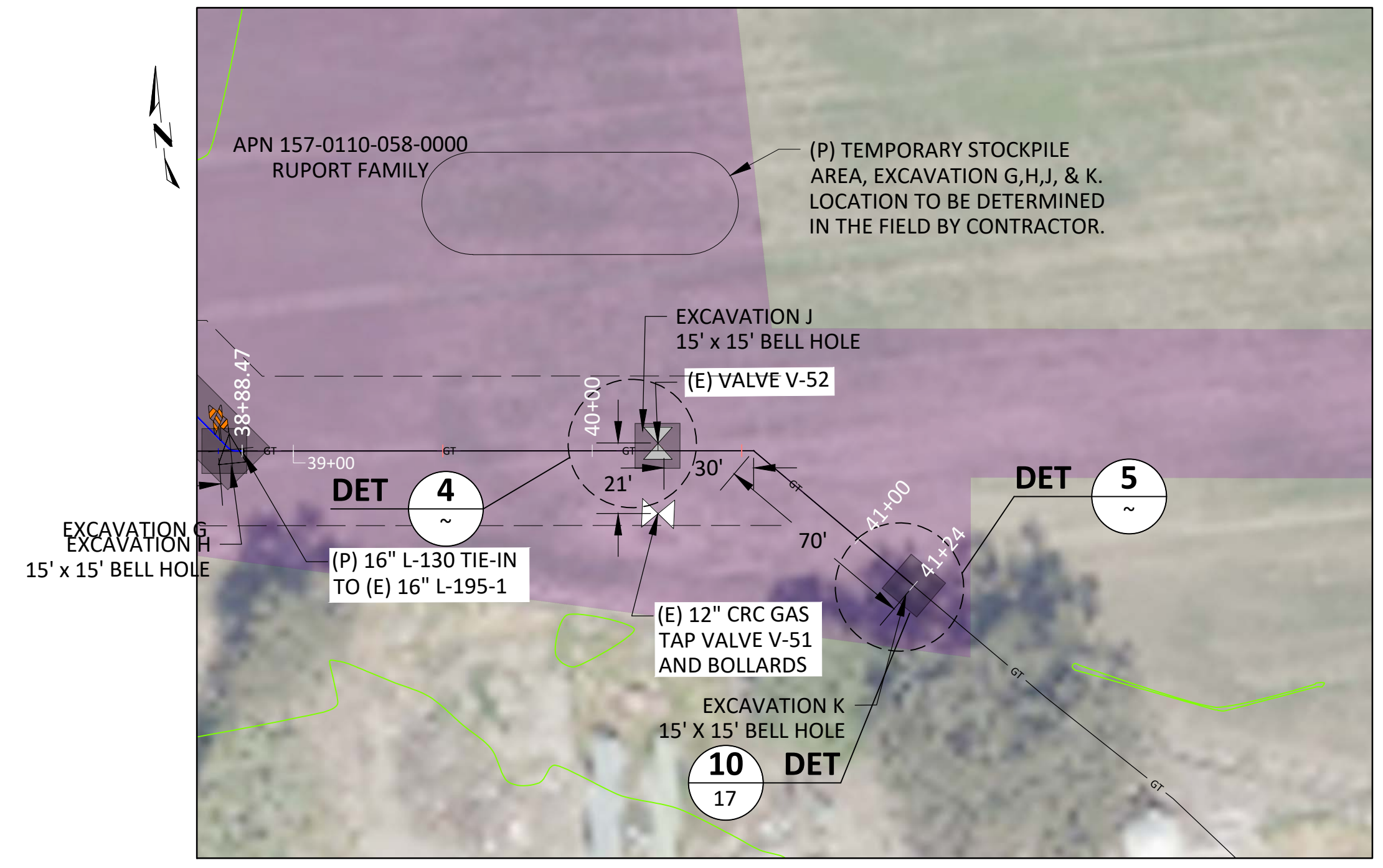
PIPELINE - DETAILS  
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 RIO VISTA, SOLANO COUNTY  
 GAS TRANSMISSION & DISTRIBUTION  
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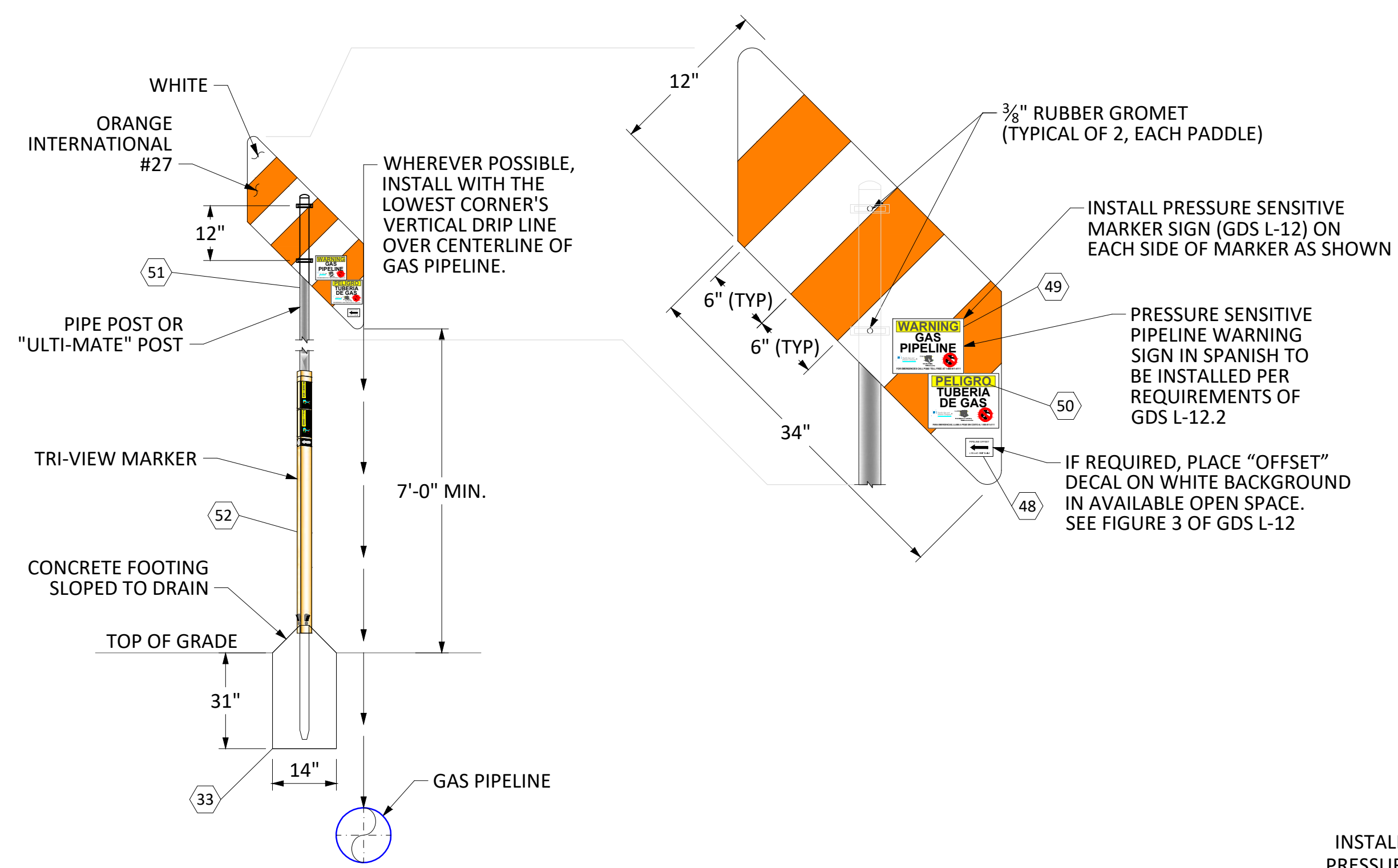
BILL OF MATL SHEET 19  
 JOB ID R-1402  
 SHEET NO. 14 OF 19 SHEETS  
 74029147 F

**LOCATION E**  
 WALL MAP - N/A; PLAT - N/A; L-195-1; MP 0.175  
 (SCALE: 1" = 40')

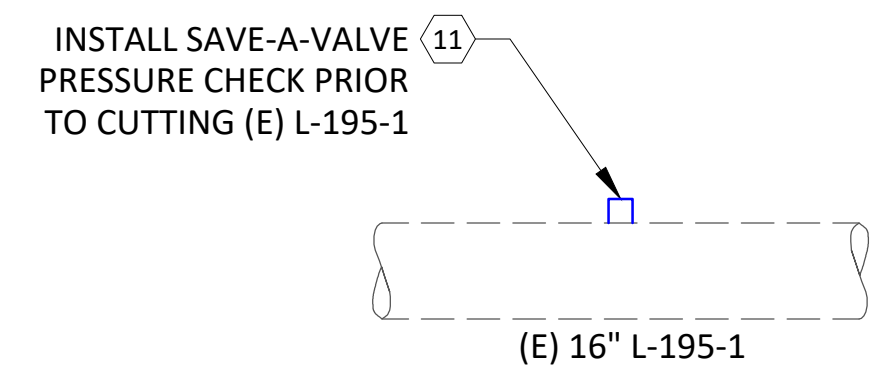


EXCAVATION AREA, 4" TAP V-52 REMOVE			
ID	AREA	VOLUME	DEPTH
J	225 SQ FT	14 CU YD	5'

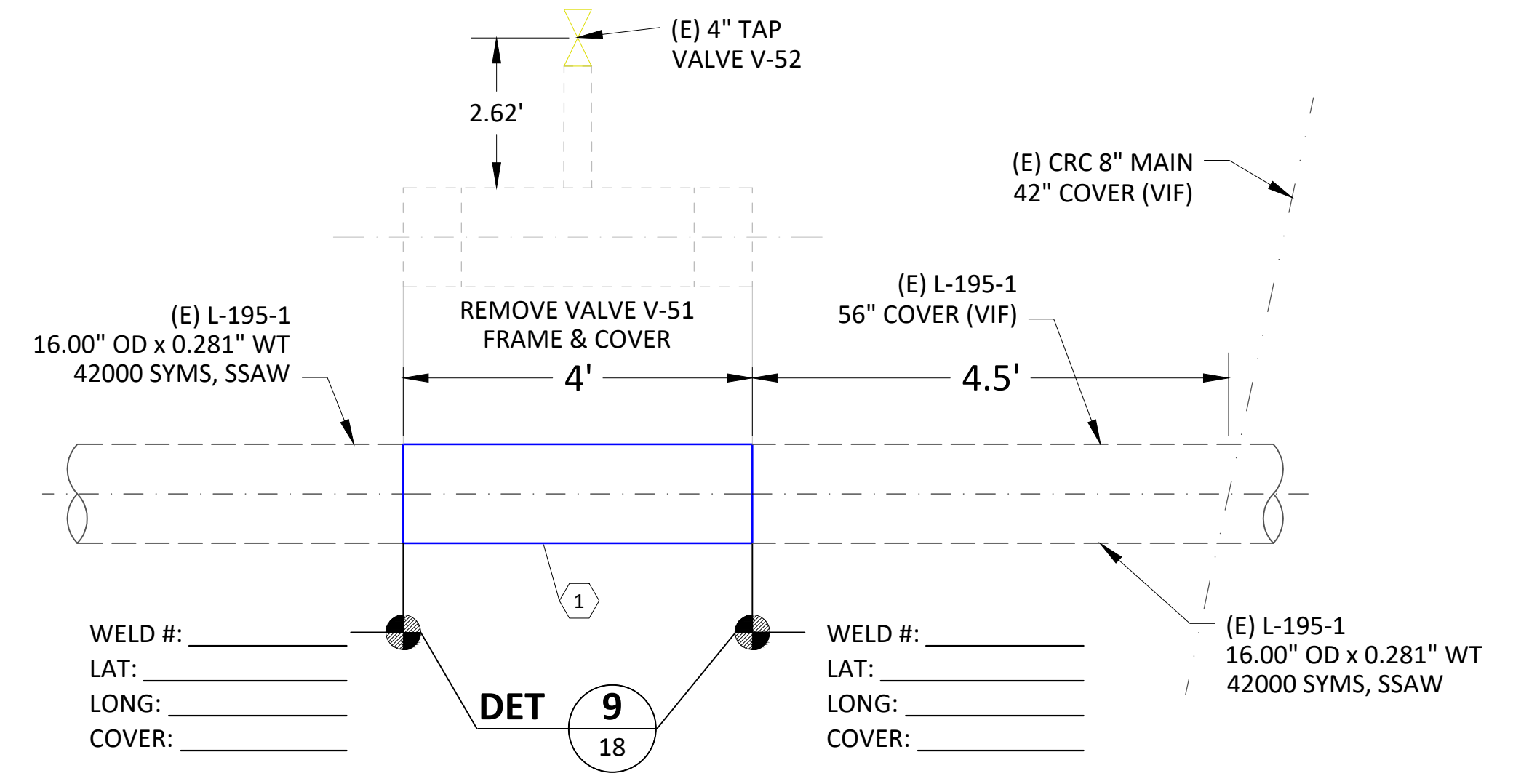
EXCAVATION AREA, SNIFF INSTALL			
ID	AREA	VOLUME	DEPTH
K	225 SQ FT	14 CU YD	5'



**DETAIL 6**  
 SCALE: NTS  
 PIPELINE PADDLE MARKER  
 INSTALL PER GDS L-11.1  
 AND TD-4412P-09



**DETAIL 5**  
 SCALE: NTS  
 SNIFF CHECK



**DETAIL 4**  
 SCALE: NTS  
 (E) TAP VALVE V-52  
 REMOVAL

**WELDING INSPECTED PER PG&E WELDING MANUAL TD-4160M**

VISUAL

RADIOGRAPHIC

MAGNETIC PARTICLE

INSPECTOR \_\_\_\_\_

DATE \_\_\_\_\_



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PIPELINE - DETAILS  
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 RIO VISTA, SOLANO COUNTY

GAS TRANSMISSION & DISTRIBUTION  
 PACIFIC GAS AND ELECTRIC COMPANY  
 SAN FRANCISCO, CALIFORNIA

**LONGITUDE 123, INC.**  
 California Marine Project Planning,  
 Permitting and Performance

570 POLI STREET, VENTURA, CA 93001  
 (805) 649-9364 WWW.LONGITUDE123.NET  
 CA LICENSE: CSLB A-1026719

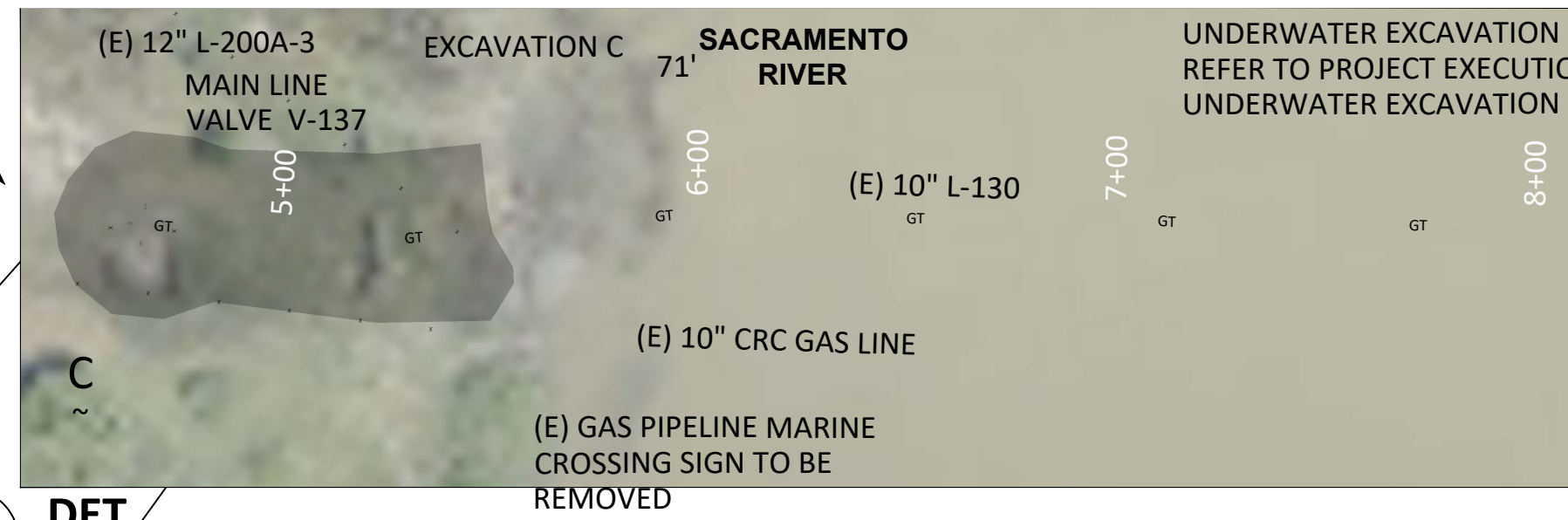
**REGISTERED PROFESSIONAL ENGINEER**  
 MANS DEAN LARSEN  
 C 75674  
 EXP. 06/30/2022  
 CIVIL  
 STATE OF CALIFORNIA

SIGNED: 06/10/21  
 ISSUED FOR PERMIT  
 NOT FOR CONSTRUCTION

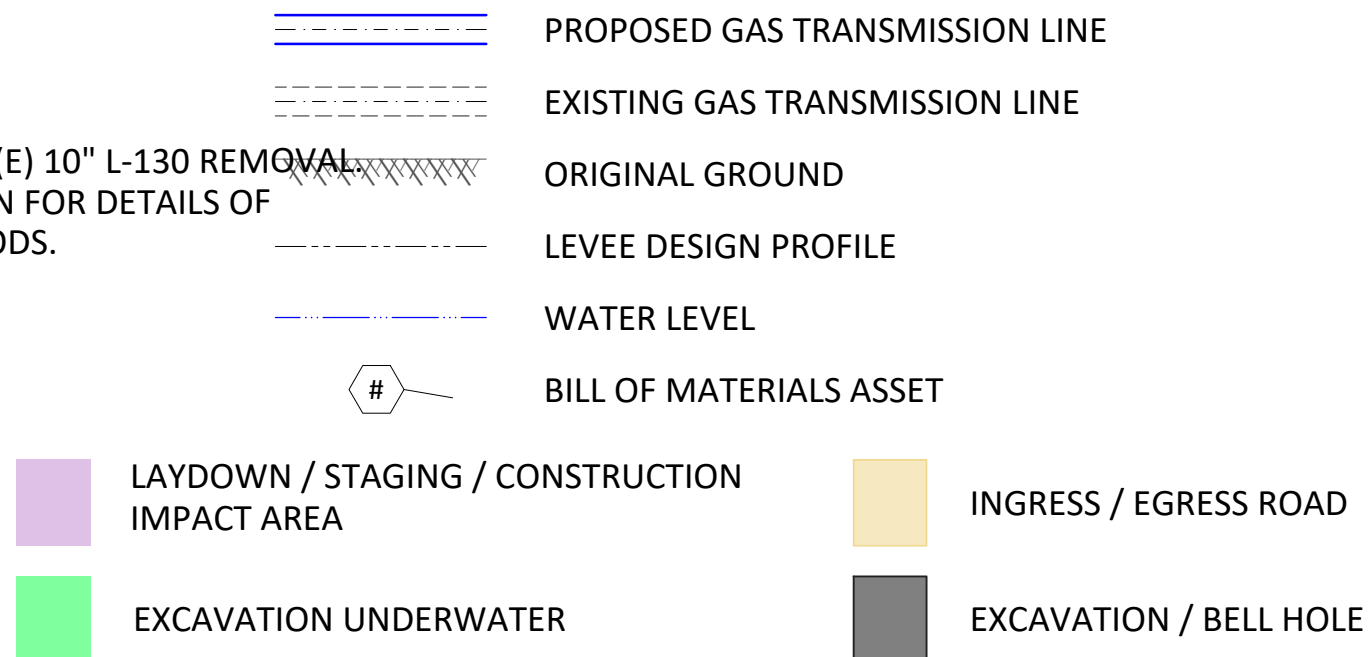
BILL OF MATL SHEET 19  
 JOB ID **R-1402**  
 SHEET NO. 15 OF 19 SHEETS  
**74029147 F**

**LOCATION C**

WALL MAP - 2851; PLAT - G3; L-200A-3; MP 1.05  
(SCALE: 1" = NTS)

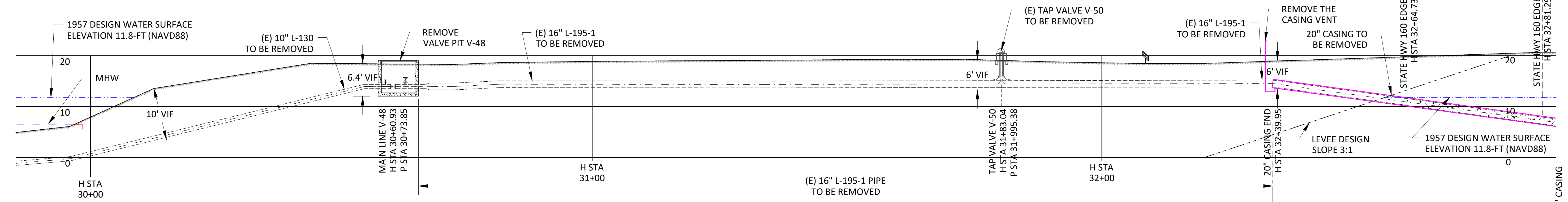
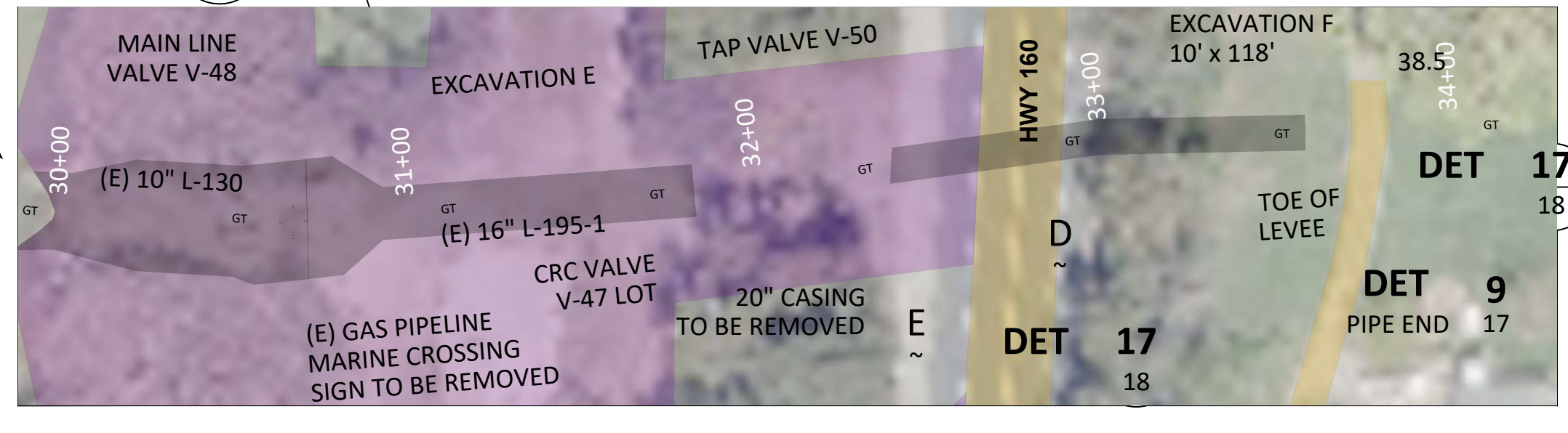


**DETAIL LEGEND:**

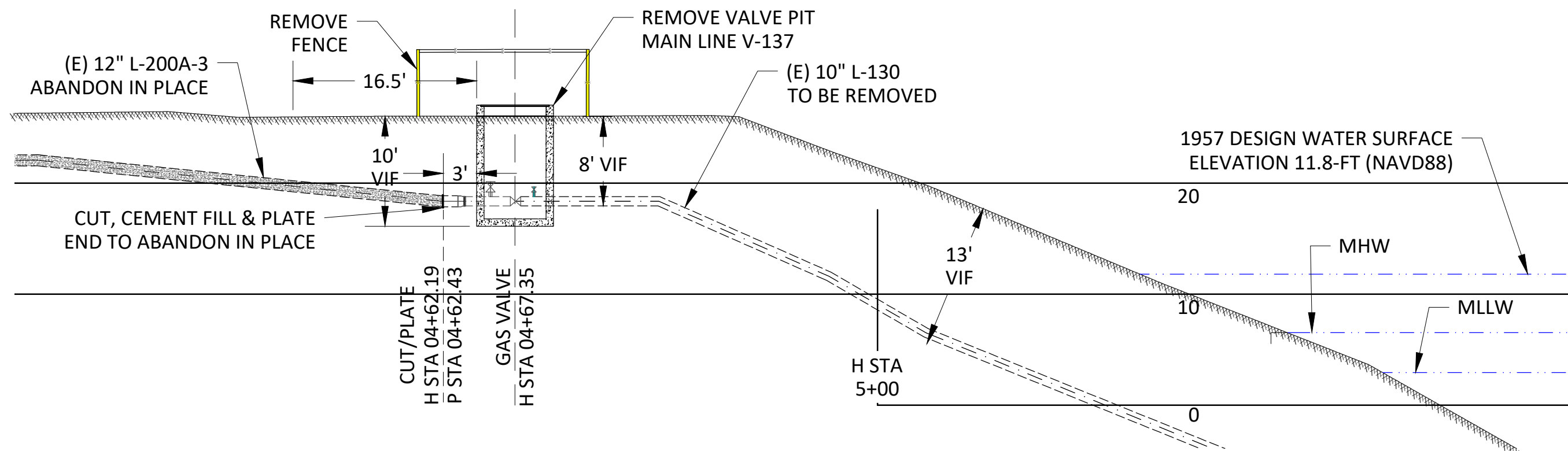


**LOCATION D**

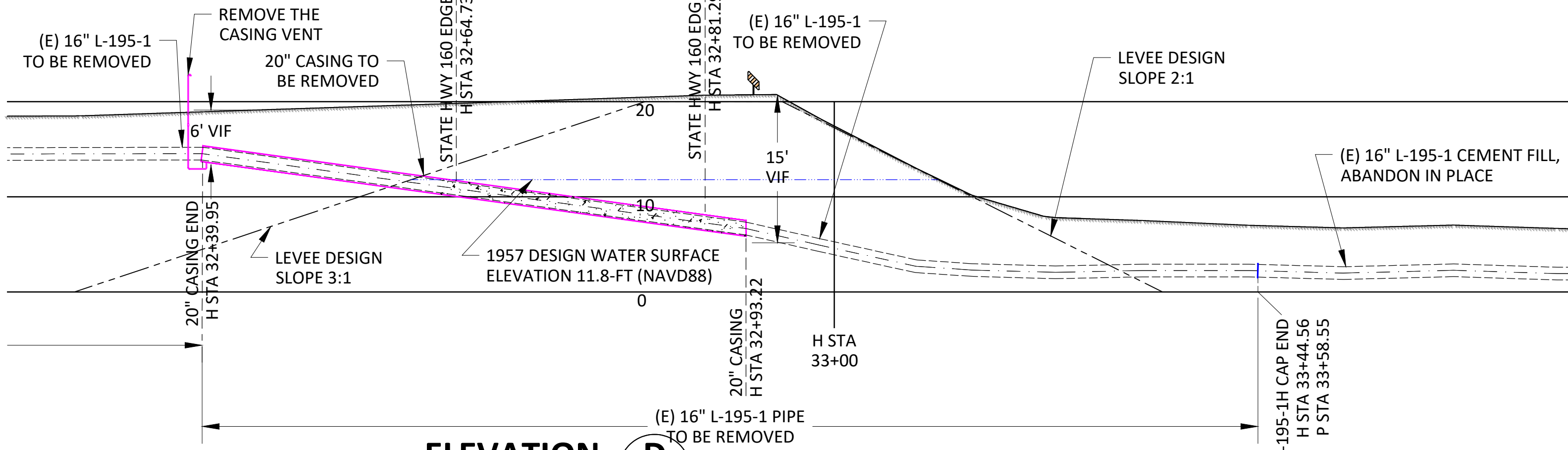
WALL MAP - N/A; PLAT - N/A; L-195-1; MP 0.125  
(SCALE: 1" = NTS)



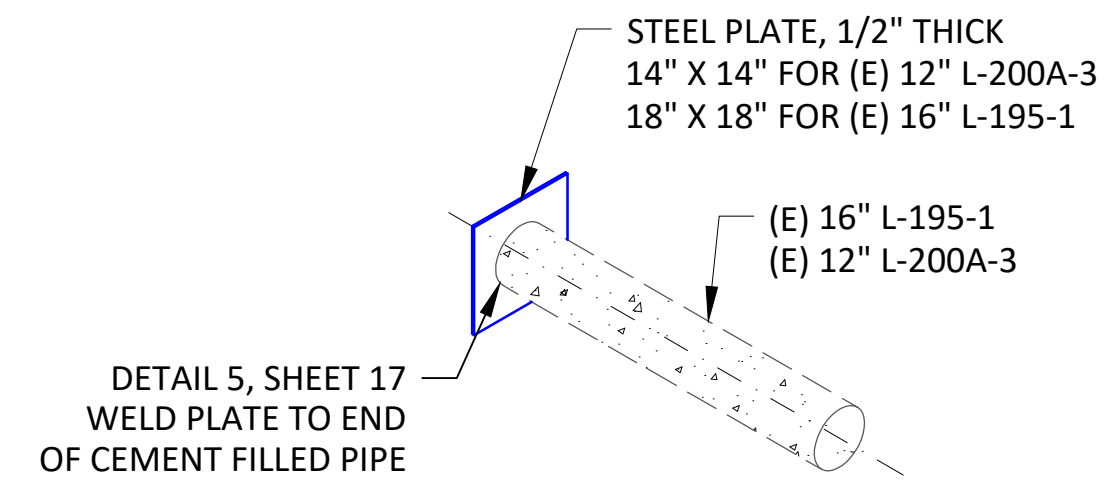
**ELEVATION E**  
SCALE: 1" = 10'  
VALVE PIT REMOVAL AND DECOMMISSION OF (E) 10" L-130 & (E) 12" L-195-1 TO HWY 160



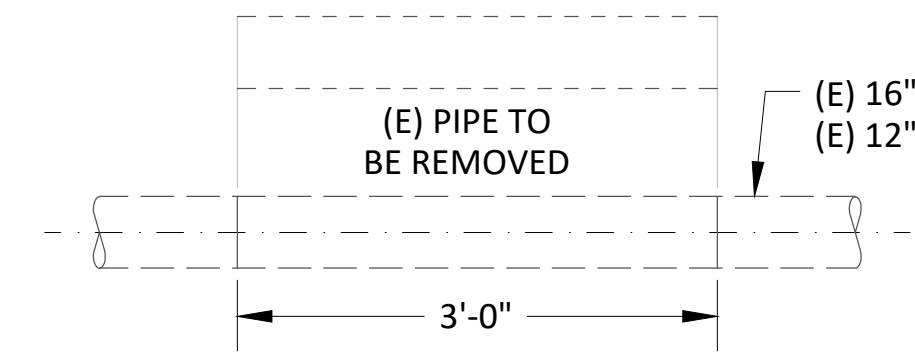
**ELEVATION C**  
SCALE: 1" = 10'  
VALVE PIT REMOVAL AND DECOMMISSION OF (E) 10" L-130 & (E) 12" L-200A-3



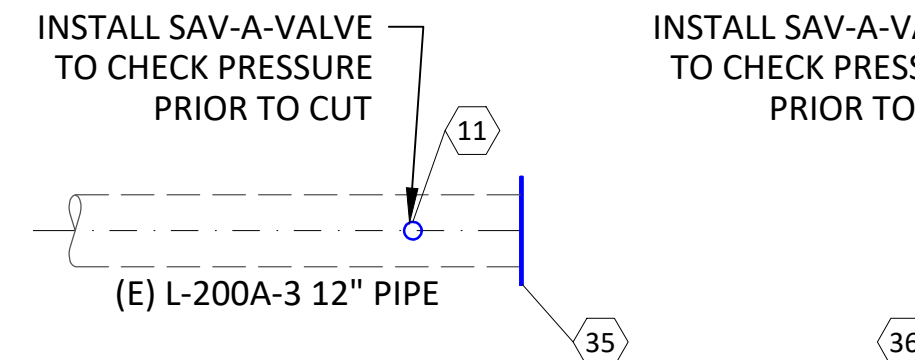
**ELEVATION D**  
SCALE: 1" = 10'  
(E) 16" L-195-1 REMOVAL UNDER HWY 160 LEVEE



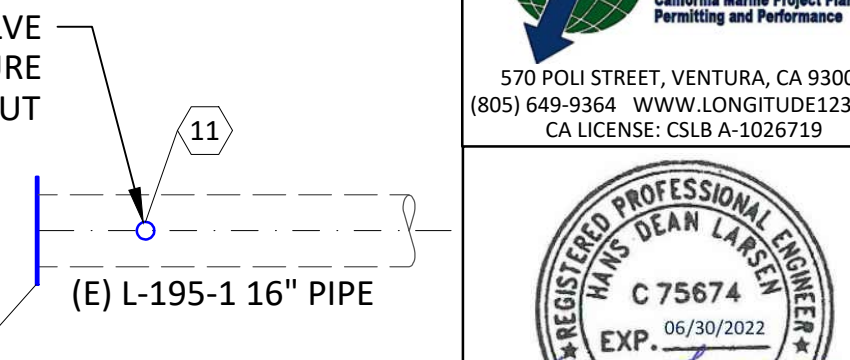
**ISOMETRIC VIEW**  
SCALE: NOT TO SCALE



**DETAIL TYP**  
SCALE: NONE  
PIPE ABANDONMENT END



**PLAN VIEW**  
SCALE: NOT TO SCALE



**PLAN VIEW**  
SCALE: NOT TO SCALE

**DEACTIVATION PROCEDURE FOR EXISTING PIPE:**

- GT&D UTILITY WORK PROCEDURE TD 9500P-16, "DEACTIVATION AND/OR RETIREMENT OF UNDERGROUND GAS FACILITIES," SHALL BE FOLLOWED.
- THE EXISTING PIPE SECTIONS SHALL HAVE FREE LIQUIDS REMOVED AND BE 100% PURGED PER GAS DESIGN STANDARD A-38, "PROCEDURES FOR PURGING GAS FACILITIES."
- THE PIPE SHALL BE SECTIONALIZED AT INTERVALS AS SPECIFIED IN THE RETIREMENT PLAN. THE LOCATIONS CALLED OUT ARE APPROXIMATE AND ARE SUBJECT TO FIELD VERIFICATION TO IDENTIFY THE MOST OPTIMUM LOCATION IN THAT VICINITY. ACCURATE SURVEY DATA MAY NOT BE AVAILABLE FOR THESE LOCATIONS SO USE CAUTION DURING EXCAVATION AND WHEN IDENTIFYING THE PIPELINE TO BE RETIRED. OTHER ACTIVE PIPELINES MAY BE IN THE AREA.
- AT EACH SUCH LOCATION NOTED ABOVE, A PIECE OF PIPE AT LEAST 24" LONG SHALL BE REMOVED. INSTALL A 1" HIGH PRESSURE SAVE-A-VALVE (H-17491, M022287) TO CHECK FOR PRODUCT AND PRESSURE PRIOR TO CUTTING INTO THE PIPELINE. THE OPEN ENDS OF THE RETIRED PIPE SHALL BE SEALED BY THE MOST APPROPRIATE METHOD OUTLINED IN GT&D UTILITY WORK PROCEDURE TD-9500P-16. BACKFILL MUST BE THOROUGHLY COMPACTED IN PLACE OF THE REMOVED SECTION OF PIPE.



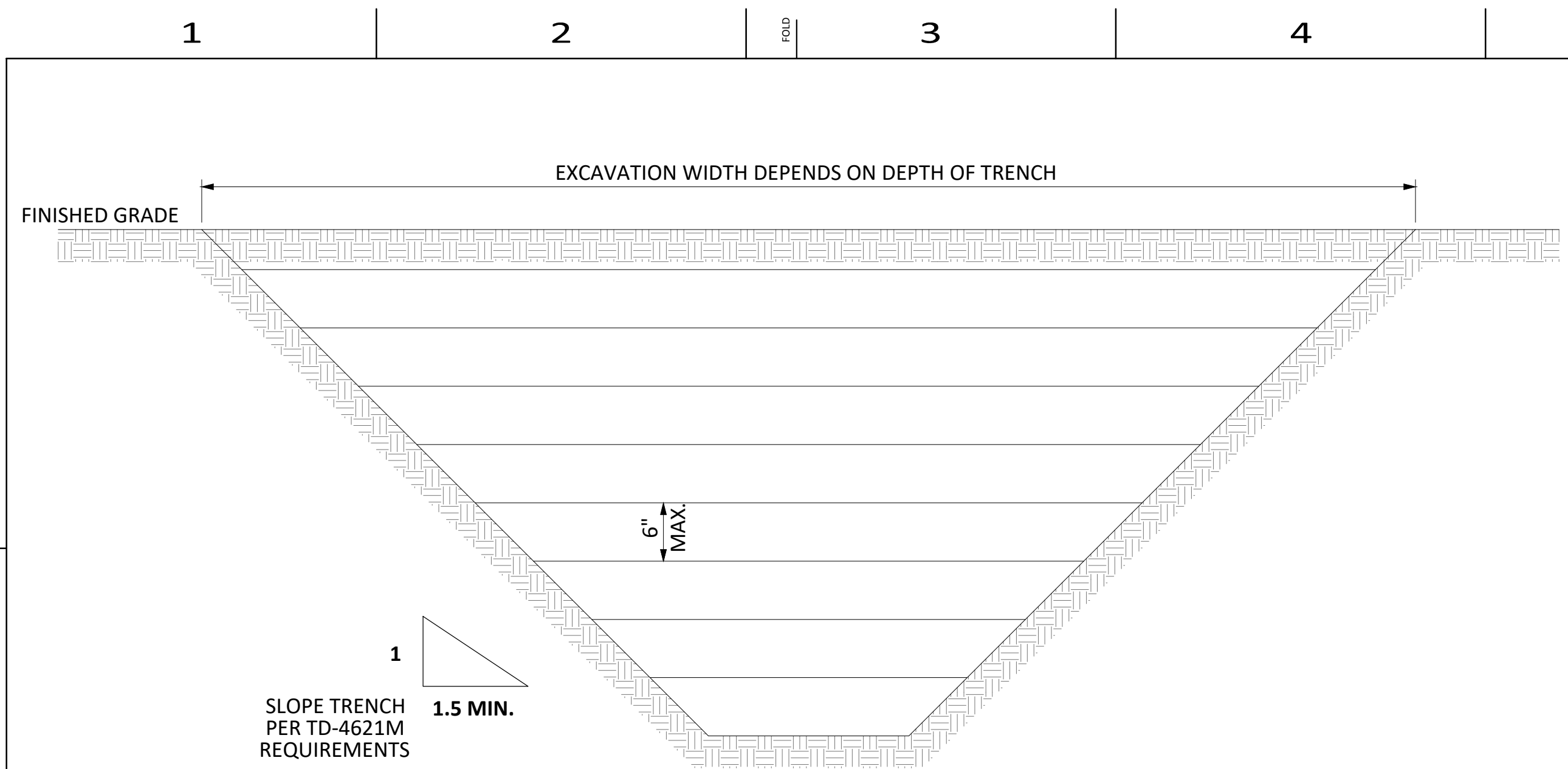
REV.	DATE	DESCRIPTION	ORDER	DWN	ADE	ENG	ENG APVD
F	11-04-21	ADDED CLSM OPTION FOR LEVEE BACKFILL	74029147	EAR	GDO	D2LM	
E	09-10-21	ADDED CASING REMOVAL	74029147	EAR	GDO	D2LM	
D	07-27-21	REVISED UNDERWATER EXCAVATION AREA	74029147	EAR	GDO	D2LM	
C	07-22-21	ISSUED FOR PERMIT - NOT FOR CONSTRUCTION	74029147	EAR	GDO	D2LM	
B	04-05-21	60% DESIGN	74029147	DLP	GDO	D2LM	
A	01-13-21	PRELIMINARY - 30% DESIGN	74029147	DLP	GDO	D2LM	

PIPELINE - DETAILS  
R-1402, L-130, MP 0.0 - MP 0.5  
REPLACE 10" PIPE, SACRAMENTO RIVER CROSSING  
RIO VISTA, SOLANO COUNTY  
GAS TRANSMISSION & DISTRIBUTION  
PACIFIC GAS AND ELECTRIC COMPANY  
SAN FRANCISCO, CALIFORNIA



BILL OF MATL SHEET 19  
JOB ID R-1402  
SHEET NO. 16 OF 19 SHEETS  
74029147 F  
9/10/2021 8:52 AM

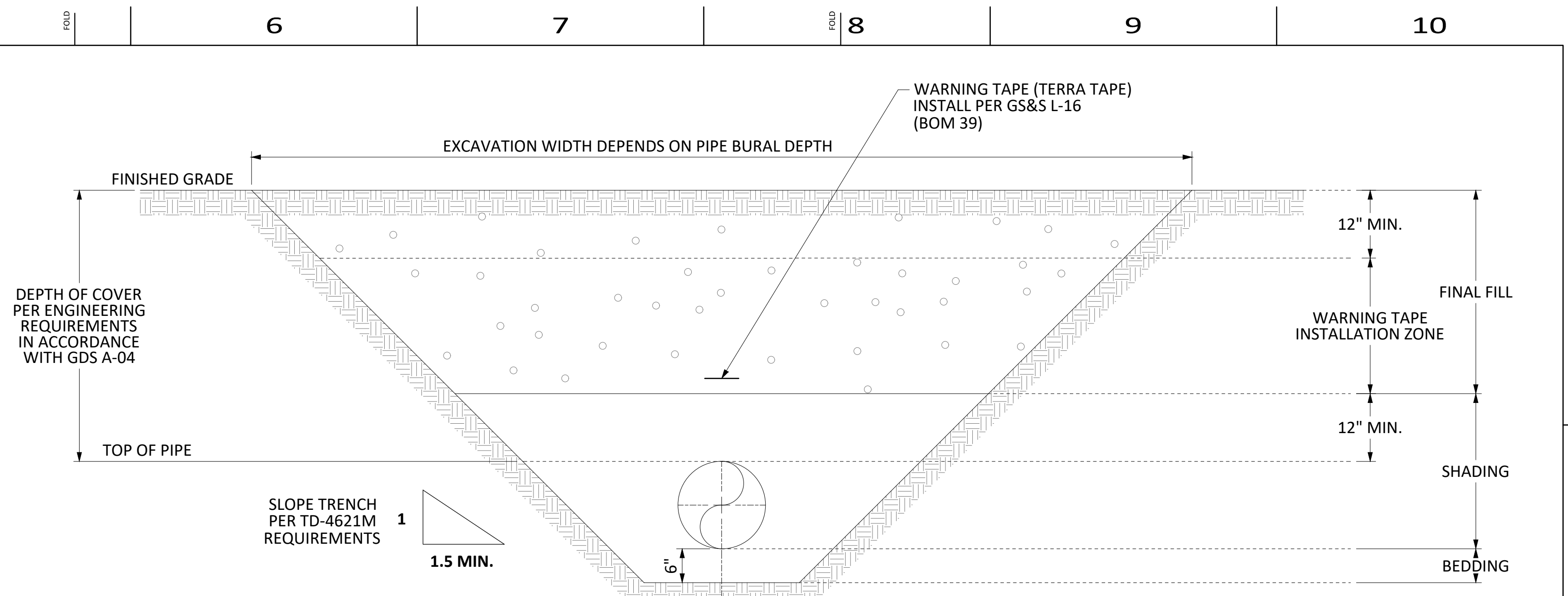




**ACOEE LEVEE BACKFILL REQUIREMENTS:**  
 BACKFILL IN ACCORDANCE WITH ONE OF THE FOLLOWING:

- BACKFILL USING CONTROLLED LOW STRENGTH MATERIAL (CLSM) WITH A COMPRESSIVE STRENGTH OF 200 PSI OR LESS. OR;
- BACKFILL USING MATERIAL PREVIOUSLY EXCAVATED FROM THE LEVEE SECTION OR IMPORTED IMPERVIOUS MATERIAL WITH 20% OR MORE PASSING THE NO. 200 SIEVE, A PLASTICITY INDEX OF 8 OR MORE, AND A LIQUID LIMIT OF OF LESS THAN 50 AND FREE OF LUMPS OR STONES EXCEEDING 3" IN GREATEST DIMENSION, VEGETATIVE MATTER, OR OTHER UNSATISFACTORY MATERIAL. FILL MATERIAL SHALL BE COMPACTED IN 4-6 INCH LAYERS TO A MINIMUM OF 90% RELATIVE COMPACTION AS MEASURED BY THE CURRENT ASTM D1557 STANDARD AND ABOVE OPTIMUM MOISTURE CONTENT.

**DETAIL 11**  
 SCALE: NONE  
 VEE TRENCH ON LEVEE  
 BACKFILL AND COMPACTION

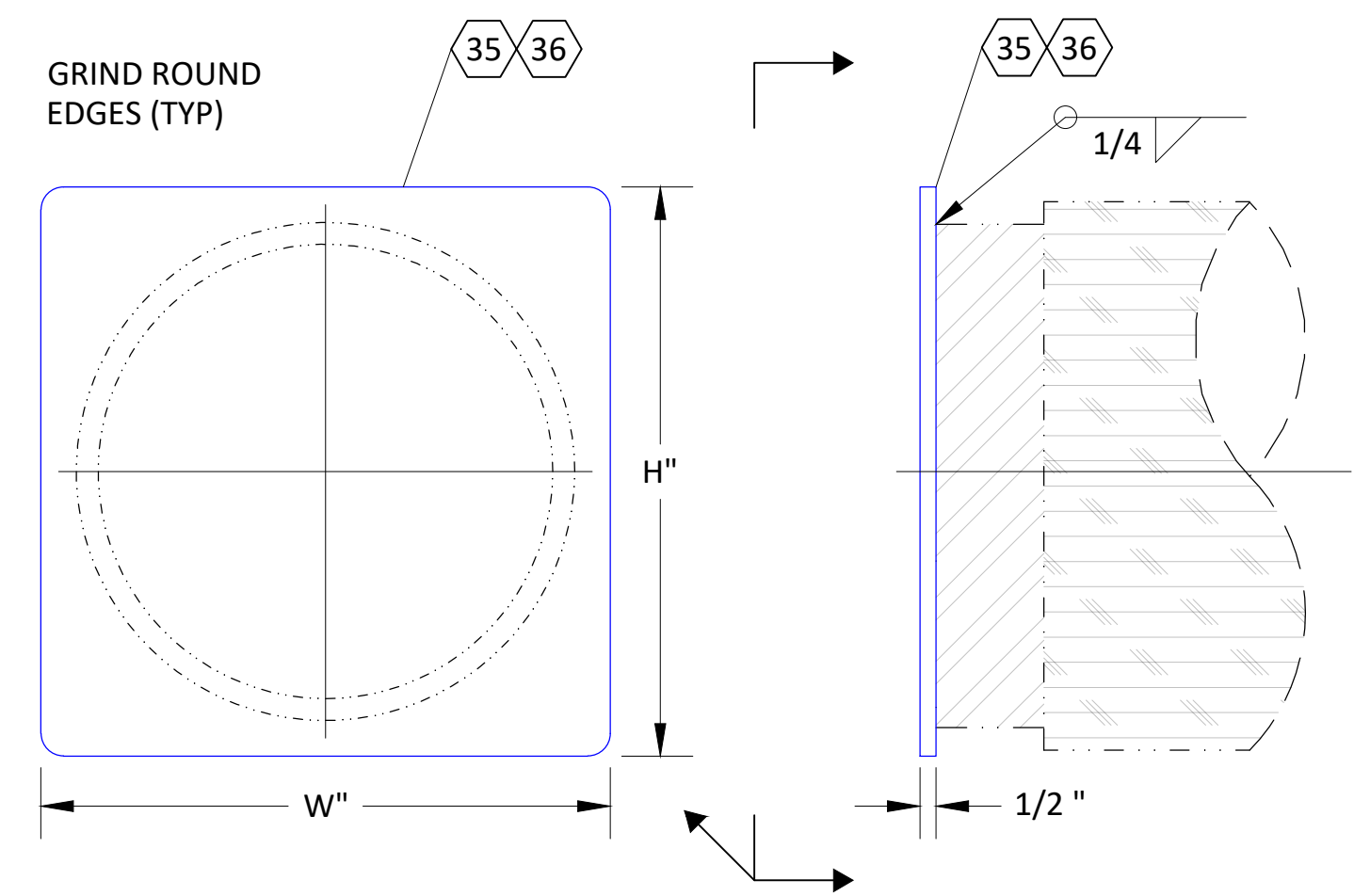


**GAS PIPELINES:**  
 10" L-130, 16" L-195-1, & 12" L-200A-3

**BACKFILL NOTES:**

- BACKFILL EXCAVATION WITH NATIVE SPOILS AND IMPORT ADDITIONAL FILL PER GDS A-03 REQUIREMENTS AS NEEDED.
- COMPACT BACKFILL IN 4-6 INCH LAYERS TO A MINIMUM OF 90% RELATIVE COMPACTION AS MEASURED BY ASTM D1557.
- FOR EXCAVATION L WITHIN THE EXISTING RIO VISTA TOWN REGULATOR STATION ONLY, BACKFILL TOP 2 FT OF EXCAVATION WITH CLASS II ROAD BASE.

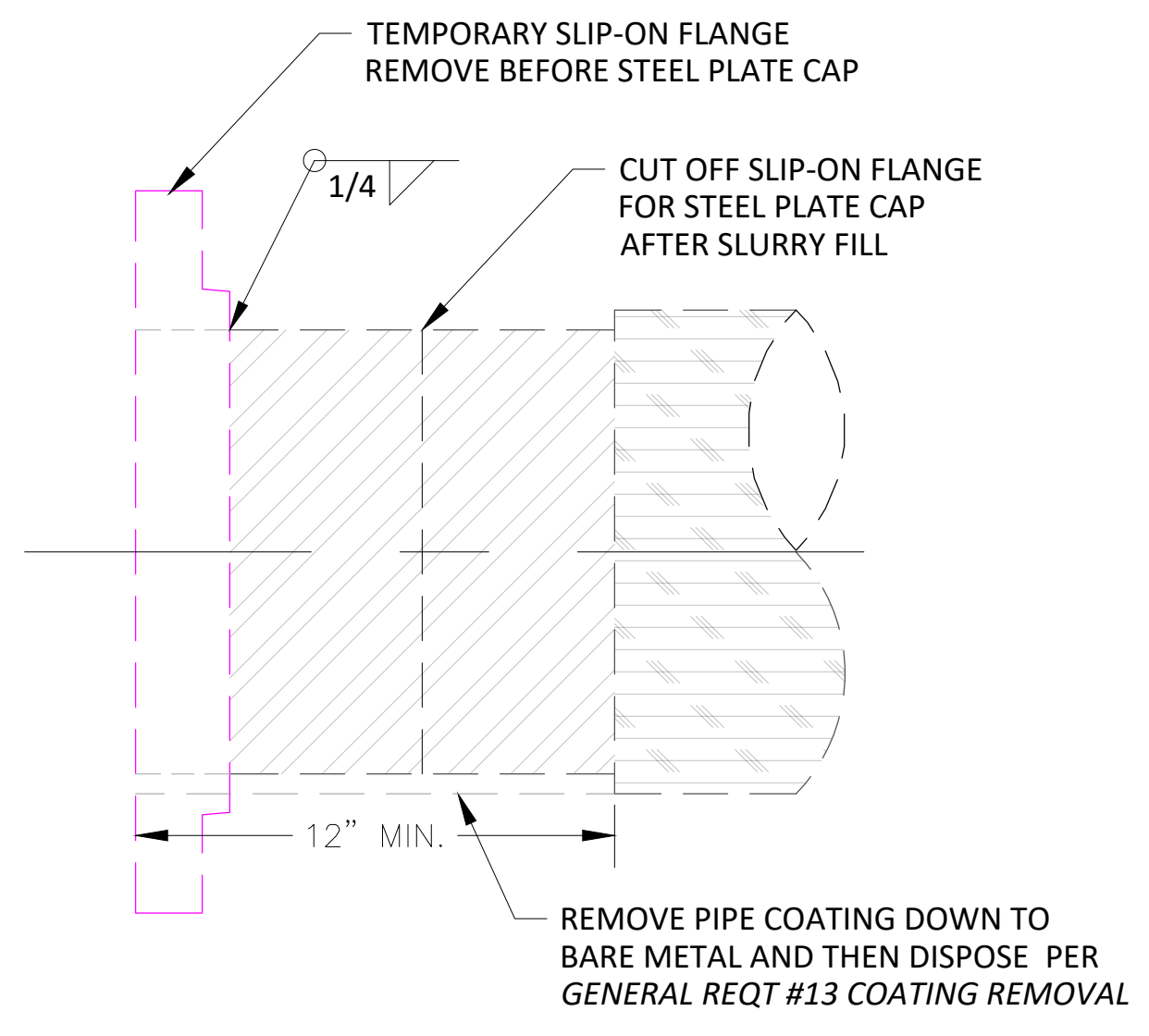
**DETAIL 10**  
 SCALE: NONE  
 VEE TRENCH OPEN FIELD  
 BACKFILL AND COMPACTION



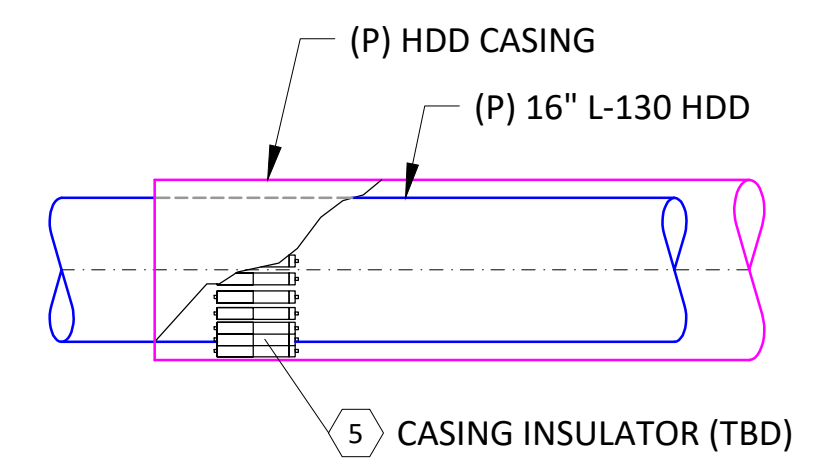
**PIPE PLATE CAP NOTES:**

- STEEL PLATE, 1/2" THICK, ASTM A-36, TO BE WELDED TO EACH PIPE END ABANDONED-IN-PLACE.
- SQUARE: 14" x 14" FOR L-200A-3, 18" x 18" FOR L-195-1
- REMOVE ALL ROUGH EDGES AND CORNERS ON ALL STEEL FABRICATION PRODUCTS.
- WELDING FOR SHALL CONFORM TO THE STRUCTURAL WELDING CODE AWS D1.1.
- USE AN E60 STRENGTH FILLER METAL THAT CONFORMS TO ONE OF THE FOLLOWING AWS FILLER METAL SPECIFICATIONS: AWS A5.1 OR A5.5.

**DETAIL 9**  
 SCALE: NONE  
 PIPE TERMINATION CAP PLATE



**DETAIL 8**  
 SCALE: NTS  
 SLIP-ON FLANGE WELD DETAIL (TYP)



**DETAIL 7**  
 SCALE: NONE  
 HDD CASING END DETAIL  
 INSULATOR INSTALL, CEMENT FILL

**DETAIL LEGEND:**

	PROPOSED GAS TRANSMISSION LINE
	EXISTING GAS TRANSMISSION LINE
	ORIGINAL GROUND
	BILL OF MATERIALS ASSET



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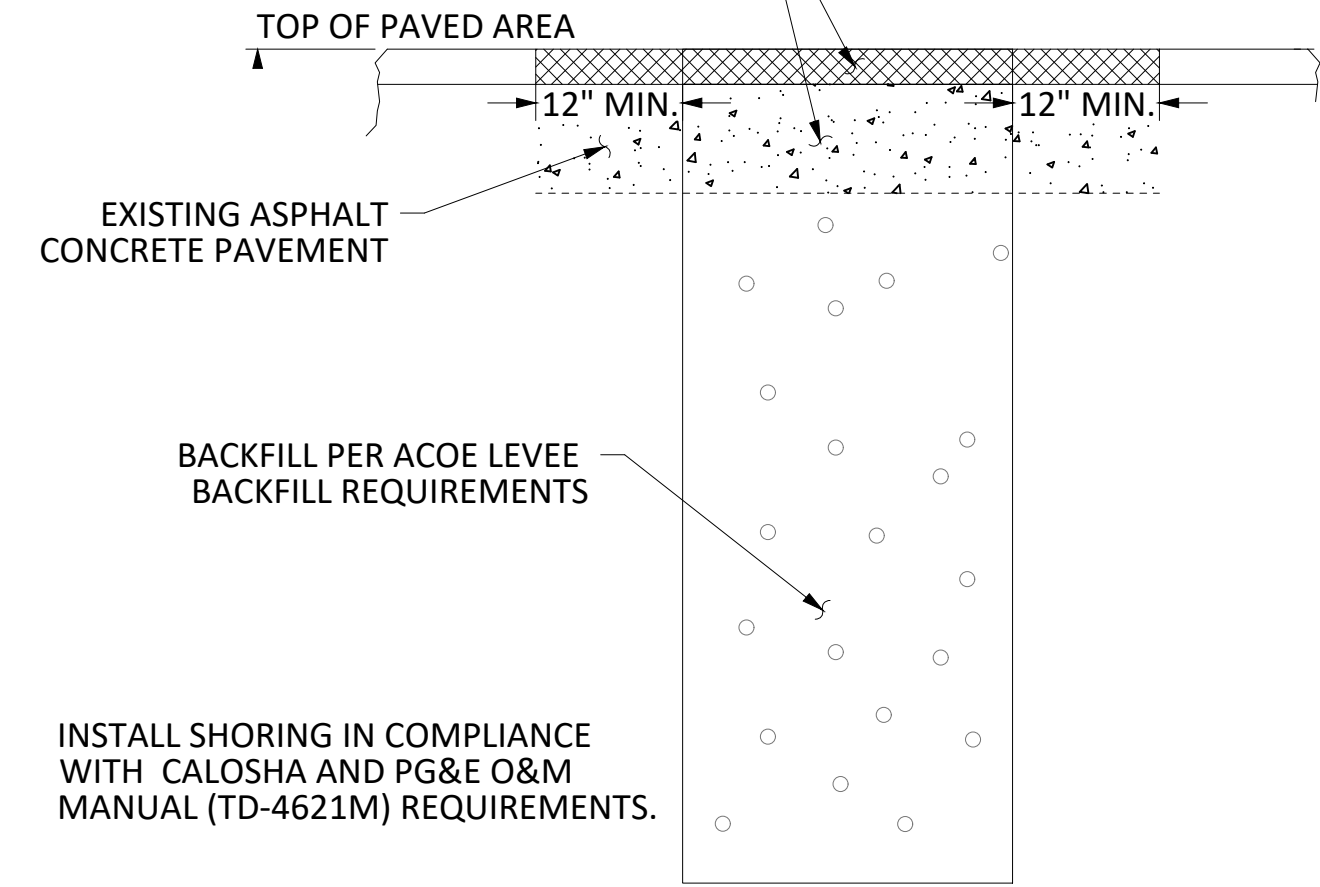
PIPELINE - DETAILS  
 R-1402, L-130, MP 0.0 - MP 0.5  
 REPLACE 10" PIPE, SACRAMENTO RIVER CROSSING  
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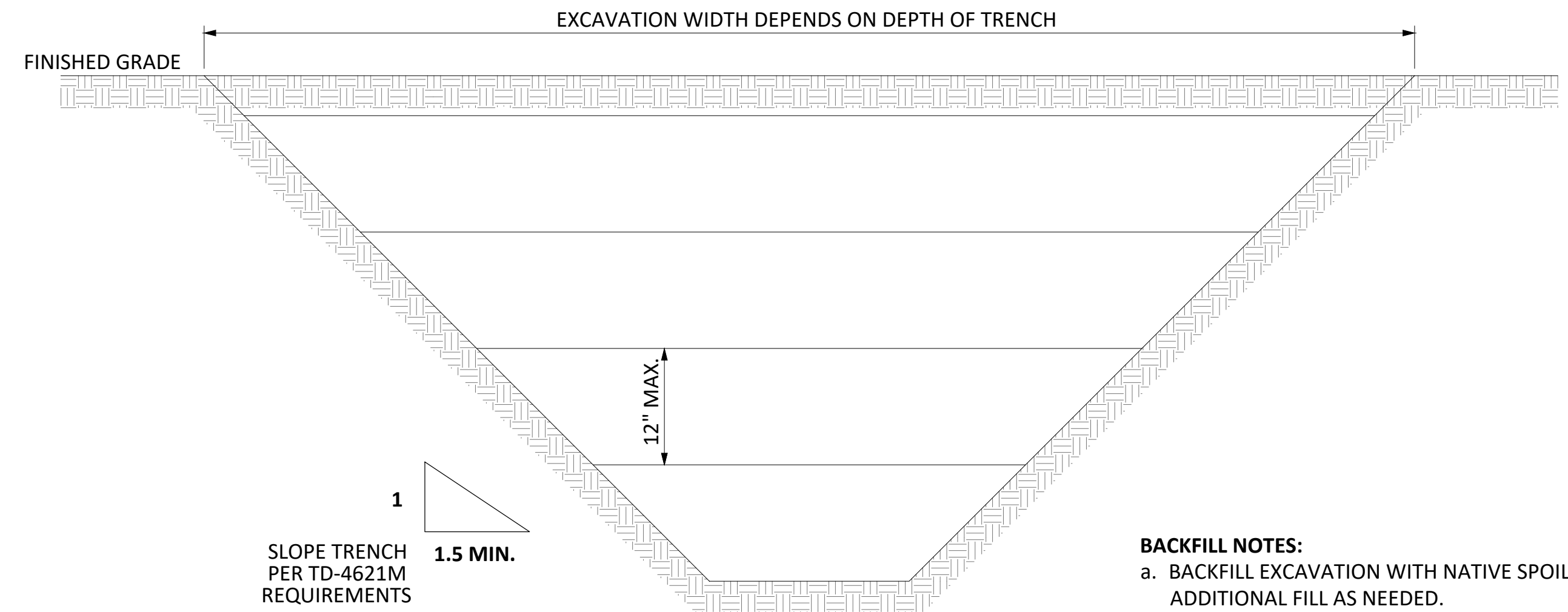
RESTORE PAVEMENT AND STRIPING IN ACCORDANCE WITH ENCROACHMENT PERMIT REQUIREMENTS



**ACOE LEVEE BACKFILL REQUIREMENTS:**

EXCEPT FOR WHERE PAVEMENT AND ROAD BASE ARE REPLACED, BACKFILL IN ACCORDANCE WITH ONE OF THE FOLLOWING:

1. BACKFILL USING CONTROLLED LOW STRENGTH MATERIAL (CLSM) WITH A COMPRESSIVE STRENGTH OF 200 PSI OR LESS. OR;
2. BACKFILL USING MATERIAL PREVIOUSLY EXCAVATED FROM THE LEVEE SECTION OR IMPORTED IMPERVIOUS MATERIAL WITH 20% OR MORE PASSING THE NO. 200 SIEVE, A PLASTICITY INDEX OF 8 OR MORE, AND A LIQUID LIMIT OF OF LESS THAN 50 AND FREE OF LUMPS OR STONES EXCEEDING 3" IN GREATEST DIMENSION, VEGETATIVE MATTER, OR OTHER UNSATISFACTORY MATERIAL. FILL MATERIAL SHALL BE COMPACTED IN 4-6 INCH LAYERS TO A MINIMUM OF 90% RELATIVE COMPACTION AS MEASURED BY THE CURRENT ASTM D1557 STANDARD AND ABOVE OPTIMUM MOISTURE CONTENT.

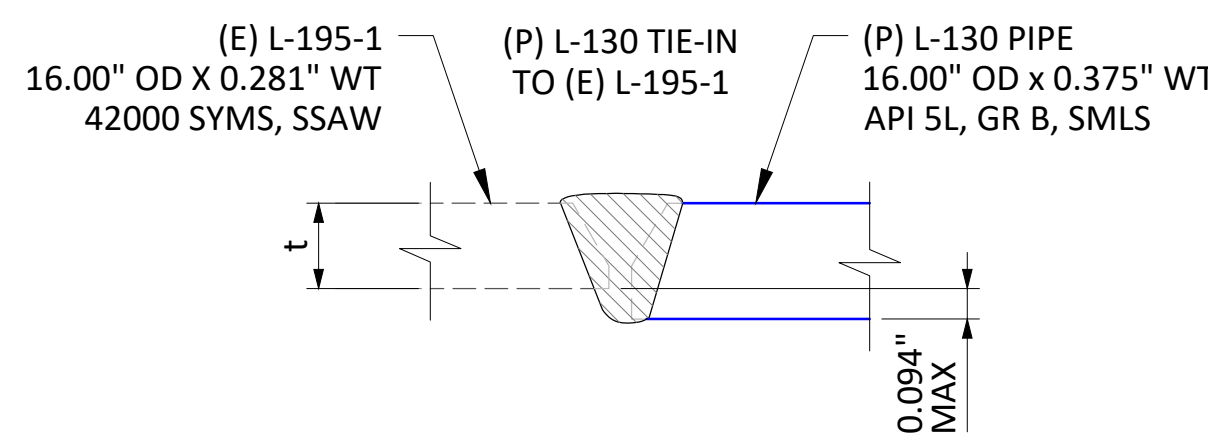


**BACKFILL NOTES:**

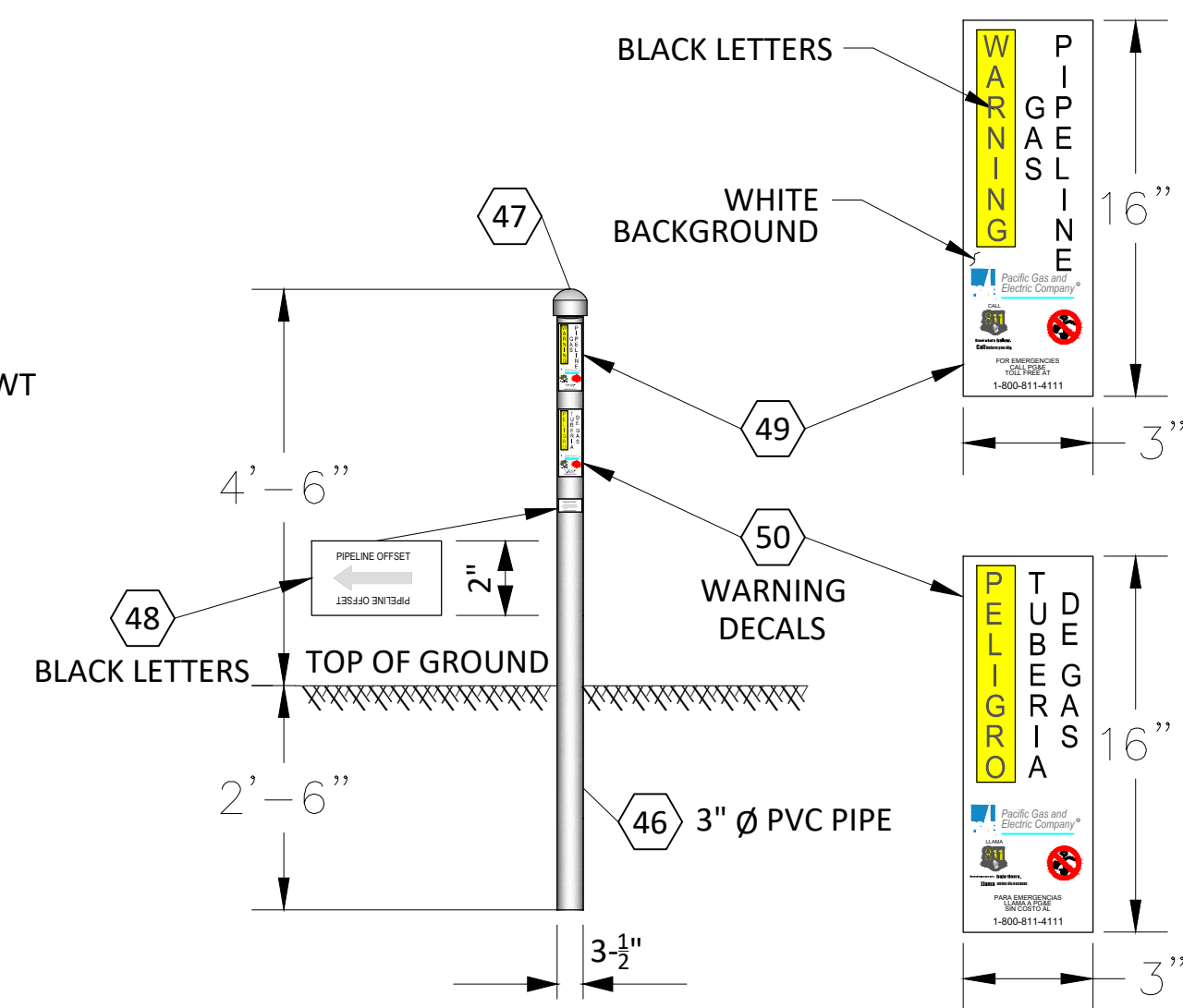
- a. BACKFILL EXCAVATION WITH NATIVE SPOILS AND IMPORT ADDITIONAL FILL AS NEEDED.
- b. COMPACT BACKFILL IN 4-12 INCH LAYERS TO A MINIMUM OF 90% RELATIVE COMPACTION AS MEASURED BY ASTM D1557.

**DETAIL 16** VEE DITCH WITHOUT PIPELINE  
SCALE: NONE BACKFILL AND COMPACTION

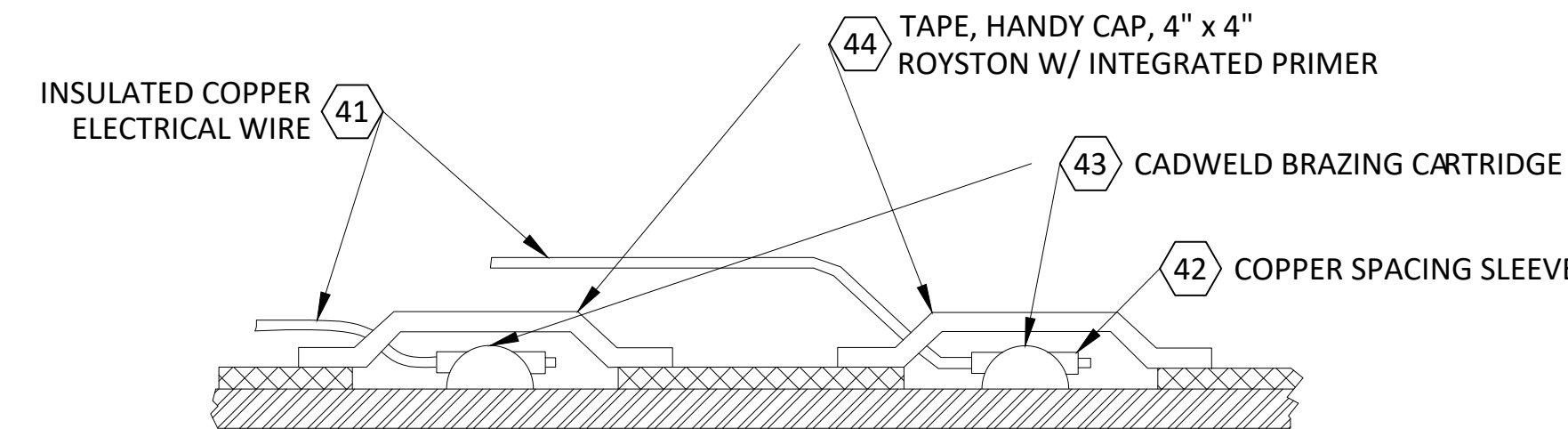
**DETAIL 17** TRENCH ON LEVEE  
SCALE: NONE BACKFILL AND COMPACTION



**DETAIL 15** WELD (TD-4160P-20)  
SCALE: NTS FIGURE 1



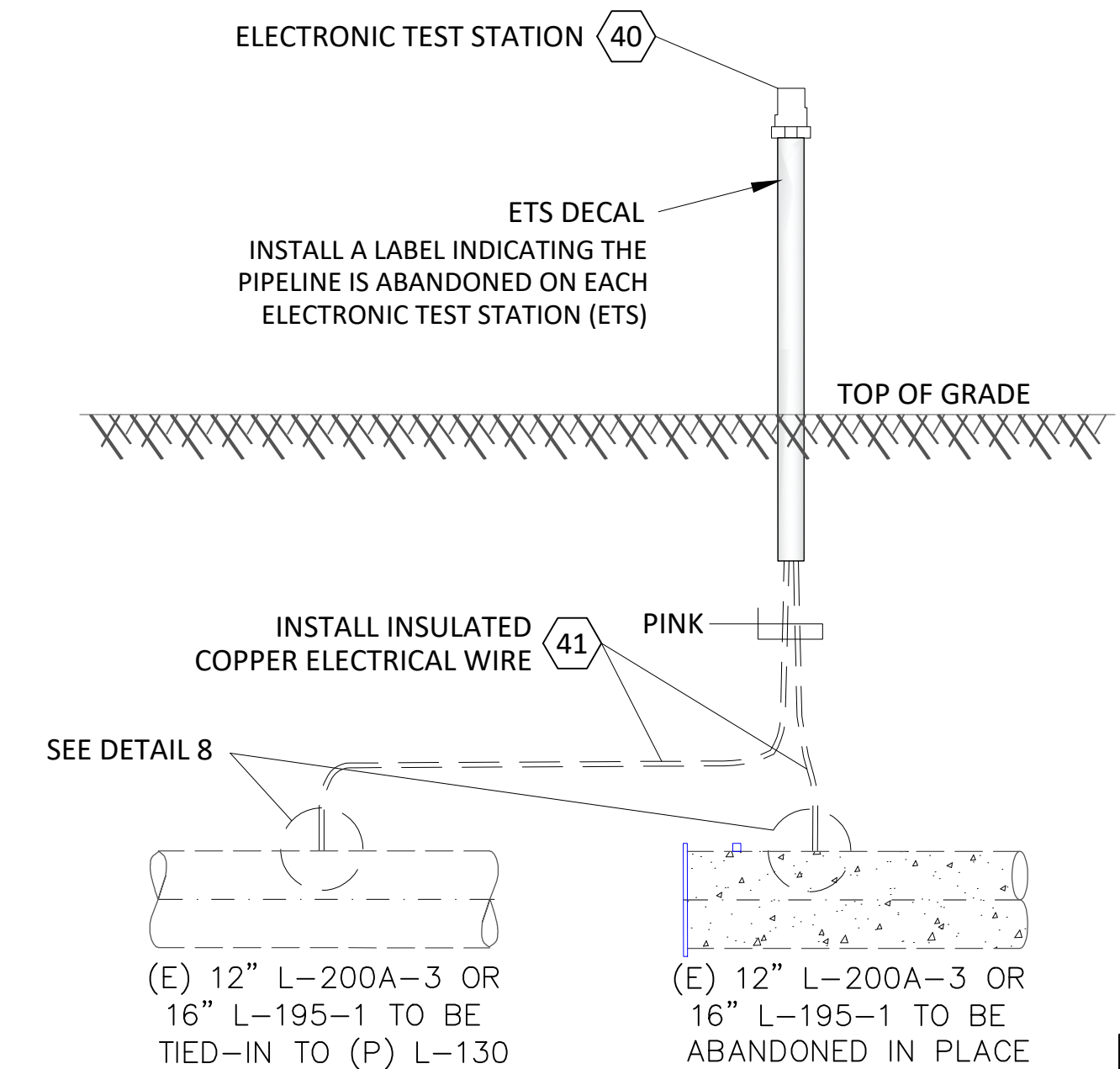
**DETAIL 14** PLASTIC POST PIPELINE MARKER  
SCALE: NTS INSTALL PER DPV L-10



**DETAIL 13** ATTACHING THE WIRE TO THE GAS MAIN  
SCALE: NTS CCV 0-10 FIGURE 1

**NOTE:**

1. CADWELD CONNECTIONS SHOULD BE MADE IN THE BURIED SECTION OF THE AIR-TO-SOIL TRANSITION, 6" MINIMUM FROM THE TRANSITION OF EXISTING TO NEW COATING.
2. INSTALL WIRES PER O-10 AND E-27.



**DETAIL 12** ETS TYPE A CCV 0-10  
SCALE: NTS



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PIPELINE - DETAILS  
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REPLACE 10" PIPE, SACRAMENTO RIVER CROSSING  
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BILL OF MATL SHEET 19  
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SHEET NO. 18 OF 19 SHEETS  
74029147 F

**BILL OF MATERIALS (CAPITAL ORDER # 74029147)**

BOM #	MATERIAL DESCRIPTION	MATERIAL CODE #	QTY	UNIT	STANDARD	NOTES
1	PIPE, STEEL, 16", 0.375" WT, API 5L, GRADE B, SEAMLESS, FBE + ARC	M010855	4,000	FT	GS&S A-15	(P) L-130 HDD
2	ELBOW, 16", 45 DEG, 0.375" WT, LR, BUTT WELD, CARBON STEEL, SCH 40, ASTM A234, GRADE B	M022148	4	EA	GS&S B-20	(P) L-130 HDD
3	PIPE, CASING, (TBD BY HDD CONTRACTOR)		300	FT		HDD CASING OUTER
4	PIPE, CASING, (TBD BY HDD CONTRACTOR)		525	FT		HDD CASING INNER
5	PIPE-CASING CP INSULATOR IN ANNULUS, (TBD BY HDD CONTRACTOR)			TDB	EA	HDD, FPVC PIPE OR SPACERS
6	PIPE, STEEL, 12", 0.375" WT, API 5L, GRADE X42, SEAMLESS, FBE	M010037	10	FT	GS&S A-15	L-200A-3 BD & V-52 REPLACE
7	REDUCER, CONCENTRIC BELL, 16.000" X 12.750" OD, 0.375" X 0.375" WT, Y-52, 14" LONG	M025133	1	EA	GS&S B-20	L-200A-3 TIE-IN
8	ELBOW, 12", 45 DEG, 0.375" WT, LR, BUTT WELD, CARBON STEEL, SCH 40, ASTM A-234, GRADE B	M022009	2	EA	GS&S B-20	L-200A-3 TIE-IN
9	CAP, CARBON STEEL, 16", BUTT WELD, 0.375" WT, ASTM A-234, GRADE B	M023795	6	EA	GS&S B-20	FOR HYDROTEST
10	CAP, CARBON STEEL, 12", BUTT WELD, 0.375" WT, ASTM A-234, GRADE B	M022081	2	EA	GS&S B-20	FOR HYDROTEST
11	SAVE-A-VALVE, 1", WELD, MUELLER # H-17491, STEEL CAP, DRILLING 1200 PSI MAX, 1440 PSI MAX	M022287	2	EA	GS&S C-14	INSTALL FOR PRESSURE CHECK
12	TEE, REDUCING, 12.750" X 6.625" OD, 0.375" X 0.280" WT, GR-B, BARRED	M022397	1	EA	GS&S B-20.3	L-200A-3 BD
13	PIPE, STEEL, 6", 0.280" WT, API 5L, GRADE B, SEAMLESS, FBE	M010014	22	FT	GS&S A-15	L-200A-3 BD
14	ELBOW, 6", 90 DEG, 0.280" WT, GR B, LONG RADIUS, BUTT WELD, CARBON STEEL, ASTM A234	M022091	2	EA	GS&S B-20	L-200A-3 BD
15	VALVE, BALL, 6", ANSI 600, WELD END, 2' PUPS, 0.280" WT, X-42, FIGURE 1, A = 96"	M031042	1	EA	GS&S F-21.1	L-200A-3 BD
16	FLANGE, WELD NECK, 6", ANSI CLASS 600, FORGED STEEL, 1/4" RAISED FACE, ID TO BE SPECIFIED	M025298	1	EA	GS&S B-43	L-200A-3 BD
17	FLANGE, BLIND, 6", ANSI CLASS 600, FORGED STEEL, 1/4" RAISED FACE, TAP FOR 1/2" NPT	M020885	1	EA	GS&S B-43.2	L-200A-3 BD
18	GASKET, PYROX, ANSI CLASS 600, 6", PSI LINEBACKER, TYPE F, NITRILE SEALING ELEMENT	M016671	2	EA	GS&S B-45.1	L-200A-3 BD
19	BOLT, STUD, STEEL, ALL THREAD, 1" x 6-3/4", WITH 2 NUTS, ASTM A193-B7 HEX NUTS, A194-2H	M192700	12	EA	GS&S B-46	L-200A-3 BD
20	VALVE, BALL, 1-1/2", CARBON STEEL, WKM # B136-CS-03-CS, 2500 PSI, DELRIN OR HYDRIN SEAT, FPT, WITH LOCKING DEVICE	M034456	EA	1	GS&S F-20	L-200A-3 BD
21	THREADOLET, 1-1/2", BONNEY FORGE, USE ON 8" - 12" PIPE, 3000 PSI, CARBON STEEL, ASTM A105	M014813	EA	1	GS&S B-23	L-200A-3 BD
22	NIPPLE, 1-1/2" X 6", THREADED, BLACK STEEL, SEAMLESS, EXTRA HEAVY	M020718	EA	2	GS&S B-13.1	L-200A-3 BD
23	PLUG, 1-1/2", HEX HEAD, VOGT# 2580 OR EQUAL, THREADED, FORGED STEEL, 6000 PSI	M021265	EA	1	GS&S B-10.1	L-200A-3 BD
24	NIPPLE, 1/2" X 4", THREADED, BLACK STEEL, SEAMLESS, EXTRA HEAVY	M020681	2	EA	GS&S B-13.1	L-200A-3 BD
25	PLUG, 1/2", HEX HEAD, VOGT # 2580 OR EQUAL, THREADED, FORGED STEEL, 6000 PSI	M021249	5	EA	GS&S B-10.1	L-200A-3 BD
26	PIPE, STEEL, 3/4", 0.154" WT, API 5L, GRADE B, SEAMLESS, PLAIN ENDS, BARE	M011951	20	FT	GS&S A-15	L-200A-3 BD
27	VALVE TEE, WELDING INLET, 1", MUELLER# H-17656, 1440 PSI	M022445	2	EA	GS&S C-11	L-200A-3 BD
28	ELBOW, SOCKET WELD, VOGT# SW-2000 OR EQUAL, FORGED STEEL, 3/4", 45 DEG, 3000 PSI	M022587	4	EA	GS&S B-21	L-200A-3 BD
29	COUPLING, FORGED STEEL, SOCKET WELD, VOGT# SW-2324 OR EQUAL, 3/4", 3000 PSI	M022553	2	EA	GS&S B-21	L-200A-3 BD
30	NIPPLE, CONCENTRIC, 3/4" X 1/2", BUTT WELD X THREAD, EXTRA HEAVY, BLACK, FORGED STEEL, 2160 PSI, ASTM A234, GRADE WPB	M022616	4	EA	GS&S B-13.3	L-200A-3 BD
31	VALVE, BALL, 1/2", CARBON STEEL, APOLLO# 72-103-19P, 1000 PSI, TEFLON SEAL/SEAT, FPT ENDS, WITH LOCKING DEVICE	M034638	3	EA	GS&S F-20	L-200A-3 BD
32	POST PIPE, GALV. STEEL, 4" x 80" WITH 5" x 3" GALV. SLEEVE, WITH CAP 15-5120, ES 051122 TBL		1	EA		L-200A-3 BD
33	CONCRETE, 4000 PSIG	N/A	1.1	CU-YD	5.72	L-200A-3 BD THRUST BLOCK
34	REBAR, #4	N/A	34	FT		L-200A-3 BD THRUST BLOCK
35	PLATE, 1/2" x 14" x 14", MILD STEEL	N/A	2	EA	ASTM A-36	ABANDON PIPE CAP
36	PLATE, 1/2" x 18" x 18", MILD STEEL	N/A	2	EA	ASTM A-36	ABANDON PIPE CAP
38	PIPELINE MILE POINT DECAL	N/A	4	EA		CONTRACTOR SUPPLIED
39	TAPE, WARNING, PIPELINE, GAS UNDERGROUND, REEF INDUSTRIES# 42-0084, YELLOW WITH BLACK WRITING, "CAUTION GAS LINE BURIED BELOW", 8 MILS THICK, 6" WIDE X 1000' LONG	M379947	1	EA	GS&S L-16	USED FOR HDD HORIZONTAL TIE-IN
40	STATION, TEST COUPON, CC TECHNOLOGIES #CS3100, SMALL PLASTIC CONDUIT AND TERMINAL TEST HEAD CONSTRUCTION, 3" OD x 10' LONG	M560691	2	EA	CCVO-10.2	ETS, PLACE AT (P) L-130 TIE-IN LOCATIONS TO L-195-1 & L-
41	WIRE ELECTRICAL, INSULATED, COPPER, 10 AWG, 600 V, 47MIL PVC, SOLID 1 CONDUCTOR, PINK		100	FT	CCV 0-10	ETS COMPONENT
42	SLEEVE, COPPER SPACING, #14 TO #10 CADWELD # CAB-133-1H, THERMOWELD # A-200	M303755	4	EA	CCV 0-10	ETS COMPONENT
43	CARTRIDGE, BRAZING, CADWELD # CA-15, THERMOWELD # 15P	M159260	4	EA	CCV 0-10	ETS COMPONENT
44	TAPE, HANDY CAP, 4" x 4", ROYSTON W/ INTEGRATED PRIMER	M294991	4	EA	CCV 0-10	ETS COMPONENT
45	DECAL, "PG&E ETS", SELF-ADHESIVE		2	EA	GS&S L-12	ETS DECAL
46	PIPE, PVC, 3" IPS, 0.300" WT, SCH 80	M016071	10	FT		MARKER, PLACE AT (P) L-130 HDD
47	PIPE, PVC, 3"		1	EA		MARKER POLE CAP
48	DECAL, OFFSET ARROW, PRESSURE SENSITIVE, SELF-ADHESIVE	M379960	10	EA	GS&S L-12	GAS MARKER DECAL
49	SIGN, "WARNING GAS PIPELINE", IN SPANISH, (800) 811-4111, SELF-ADHESIVE DECAL STYLE	M379961	10	EA	GS&S L-12	GAS MARKER DECAL
50	SIGN, "WARNING GAS PIPELINE", IN ENGLISH, (800) 811-4111, SELF-ADHESIVE, DECAL STYLE	M379962	10	EA	GS&S L-12	GAS MARKER DECAL
51	MARKER, SIGN, PIPELINE, COMPLETE ASSEMBLY, ULTI-MATE ASSEMBLY, COMES WITH:M018294 COATED ALUMINUM MARKER SIGN M376892 ULTI-MATE SQ. POST # 8UM2002204HG4 10' LONG M376893 PENETRATOR ANCHOR # 8UM225-30250-12 WITH FOUR UM-38A RIVETS AND ONE CORNER BOLT UM-SQCBL	M377179	8	EA	GS&S L-11.1	
52	MARKER,TRIVIEW, 6'X3"	M379965	8	EA	GS&S L-10	

DESIGN CRITERIA										
BOM #	OD (IN)	WT (IN)	SMYS (PSI)	CURRENT CLASS LOCATION	DESIGN FACTOR	FDP		MAOP		PSIG @ 90% SMYS
						(PSIG)	(% SMYS)	(PSIG)	(% SMYS)	
1	16.000	0.375	42000	3	0.50	800	40.63	800	40.63	1772
6	12.750	0.375	42000	3	0.50	800	32.38	800	32.38	2224
13	6.625	0.280	35000	3	0.50	800	27.04	800	27.04	2663
26	1.050	0.154	35000	3	0.50	800	7.79	800	7.79	9240



REV.	DATE	DESCRIPTION	ORDER	DWN	ADE	ENG	ENG APVD
F	11-04-21	ADDED CLSM OPTION FOR LEVEE BACKFILL	74029147	EAR	GDO	D2LM	
E	09-10-21	ADDED CASING REMOVAL	74029147	EAR	GDO	D2LM	
D	07-27-21	REVISED UNDERWATER EXCAVATION AREA	74029147	EAR	GDO	D2LM	
C	07-22-21	ISSUED FOR PERMIT - NOT FOR CONSTRUCTION	74029147	EAR	GDO	D2LM	
B	04-05-21	60% DESIGN	74029147	DLP	GDO	D2LM	
A	01-13-21	PRELIMINARY - 30% DESIGN	74029147	DLP	GDO	D2LM	

PIPELINE - BILL OF MATERIALS  
R-1402, L-130, MP 0.0 - MP 0.5  
REPLACE 10" PIPE, SACRAMENTO RIVER CROSSING  
RIO VISTA, SOLANO COUNTY  
GAS TRANSMISSION & DISTRIBUTION  
PACIFIC GAS AND ELECTRIC COMPANY  
SAN FRANCISCO, CALIFORNIA



BILL OF MATL SHEET 19  
JOB ID **R-1402**  
SHEET NO. 19 OF 19 SHEETS  
**74029147** F