APPENDIX B

COMPRESSOR STATION, METER FACILITY, AND PIPELINE DESIGN DETAILS

Table A-1. Preliminary Compressor Station Equipment List

TAG NO	QTY	DESCRIPTION	Size	PFD DWG. NO.
	1	Pig Launcher/ Receiver	36" Barrel, 1.25" Wall, 17'-10" Long	12361-1100-010
	2	Pig Receiver	16" Barrel, 0.938" Wall, 8'-8" Long	12361-1100-010
	1	Plant Flow Meter	20" OD x 72' Long	12361-1100-010
V-100	2	Slug Catcher (2 pieces)	32'-10" x 5'-4" & 29' x 5'-4"	12361-1100-010
	2	ESD Valves	30" 600lb rating	12361-1100-010
	1	Actuated Valves	30" 600lb rating	12361-1100-010
C-300(A, B,C, D, E)	5	Compressor 9000 hp EMD/Ariel KVB Frame	Skid 75' x 14'	12361-1100-011
	5	Gas Aftercooler (2 50 hp motor drive fans)	15' x 51' - 30mm btu/hr	12361-1100-011
	5	Coalescing Filter Separator 1415 psig @ -20/150 °F	Size TBD	12361-1100-011
F-300	1	Vortex Separator 1415 psig @ -20/150 °F	Size TBD	12361-1100-011
H-100	1	Heater (TBD)	Size TBD	12361-1100-011
	4	Actuated Valve (Monitor Regulators)	Size TBD	12361-1100-011
	9	Control Valve	16" - 1500lb rating	12361-1100-011
	1	Fixed Position Back Pressure Valve	16" - 1500lb rating	12361-1100-011
F-400	11	Filter Coalescer	Size TBD	12361-1100-011
V-400 (A, B)	2	Dehydration Regen skid	13' x 40' x 12' H	12361-1100-011
	2	Overhead Cooler Skid	12' x 25' x 12' H	Vendor
	2	TEG Reboiler	72" O.D. x 24'	Vendor
	2	TEG Contactor	78" ID x 28' S/S	Vendor
	2	Stahl Column	20" O.D. x 10'	Vendor
	2	Still/Reflux condenser	30" O.D. x 20'	Vendor
	2	TEG Surge Tank	54" O.D. x 24'	Vendor
	1	Pig Launcher/Receiver	16" Barrel, 0.938" Wall, 8'-8" Long	12361-1100-012
	6	Wellhead Flow meter Single Pass 1500lb rating	Size TBD	12361-1100-012
V-600 (A,B,C,D)	3	Wellhead Separator 3540 psig @ -20/150°F	24" O.D. x 96" Long	12361-1100-012
	1	Chemical Injection skid	10' x 10'	12361-1100-012
	1	Corrosion Inhibitor/Methanol Tank	Size TBD	12361-1100-012
	3	Control Valves	6" - 1500lb rating	12361-1100-012
	6	Actuated Valve	10" - 1500lb rating	12361-1100-012
	3	ESD Valve	10" - 1500lb rating	12361-1100-012
	2	Pig Launcher/Receiver	16" Barrel, 0.938" Wall, 8'-8" Long	12361-1100-013
	6	Wellhead Flow meter Single Pass 1500lb rating	Size TBD	12361-1100-013

Table A-1. Preliminary Compressor Station Equipment List

TAG NO	QTY	DESCRIPTION	Size	PFD DWG. NO.
V-700 (A,B,C)	3	Wellhead Separator 3540 psig @ -20/150°F	24” O.D. x 96” Long	12361-1100-013
	1	Chemical Injection skid	10' x 10'	12361-1100-013
	1	Corrosion Inhibitor/Methanol Tank	Size TBD	12361-1100-013
	3	Control Valves	6" - 1500lb rating	12361-1100-013
	6	Actuated Valve	10" - 1500lb rating	12361-1100-013
	3	ESD Valve	10" - 1500lb rating	12361-1100-013
`	2	Pig Launcher/Receiver	20" Barrel, 0.938" Wall, 9’-7” Long	12361-1100-014
	6	Wellhead Flow meter Single Pass 1500lb rating	Size TBD	12361-1100-014
V-800 (A,B,C)	3	Wellhead Separator 3540 psig @ -20/150°F	24” O.D. x 96” Long	12361-1100-014
	1	Chemical Injection skid	10' x 10'	12361-1100-014
	1	Corrosion Inhibitor/Methanol Tank	Size TBD	12361-1100-014
	3	Control Valves	6" - 1500lb rating	12361-1100-014
	6	Actuated Valve	10" - 1500lb rating	12361-1100-014
	3	ESD Valve	10" - 1500lb rating	12361-1100-014
`	1	Pig Launcher/Receiver	20" Barrel, 0.938" Wall, 9’-7” Long	12361-1100-015
	6	Wellhead Flow meter Single Pass 1500lb rating	Size TBD	12361-1100-015
V-800 (A,B,C)	3	Wellhead Separator 3540 psig @ -20/150°F	24” O.D. x 96” Long	12361-1100-015
	1	Chemical Injection skid	10' x 10'	12361-1100-015
	1	Corrosion Inhibitor/Methanol Tank	Size TBD	12361-1100-015
	3	Control Valves	6" - 1500lb rating	12361-1100-015
	6	Actuated Valve	10" - 1500lb rating	12361-1100-015
	3	ESD Valve	10" - 1500lb rating	12361-1100-015
T-500	3	Produced Water Storage Tank (750 Bbl API-12F)	15'-6" O.D. x 24" High	12361-1100-016
P-500	1	Produced Water Disposal Pump TBD	Size TBD	12361-1100-016
	5	VFD's (1400.13kv-6kv 380fla)	10' x 35'	Electrical Drawings
	1	Transformer 1000.115kvD-13.8kvY	12' x 20'	Electrical Drawings
	2	MCC (1010.480V 1600aH 800aV 65kaI)	10' x 40'	Electrical Drawings
	1	13kv Switch gear	TBD	Electrical Drawings
	1	Transformer 1001. 13kvD-480vY	12' x 20'	Electrical Drawings
	3	Manual 115Kv1200a No Load Switch	TBD	Electrical Drawings
	3	BusMtd 115Kv74kMCOV Arrestor	TBD	Electrical

Table A-1. Preliminary Compressor Station Equipment List

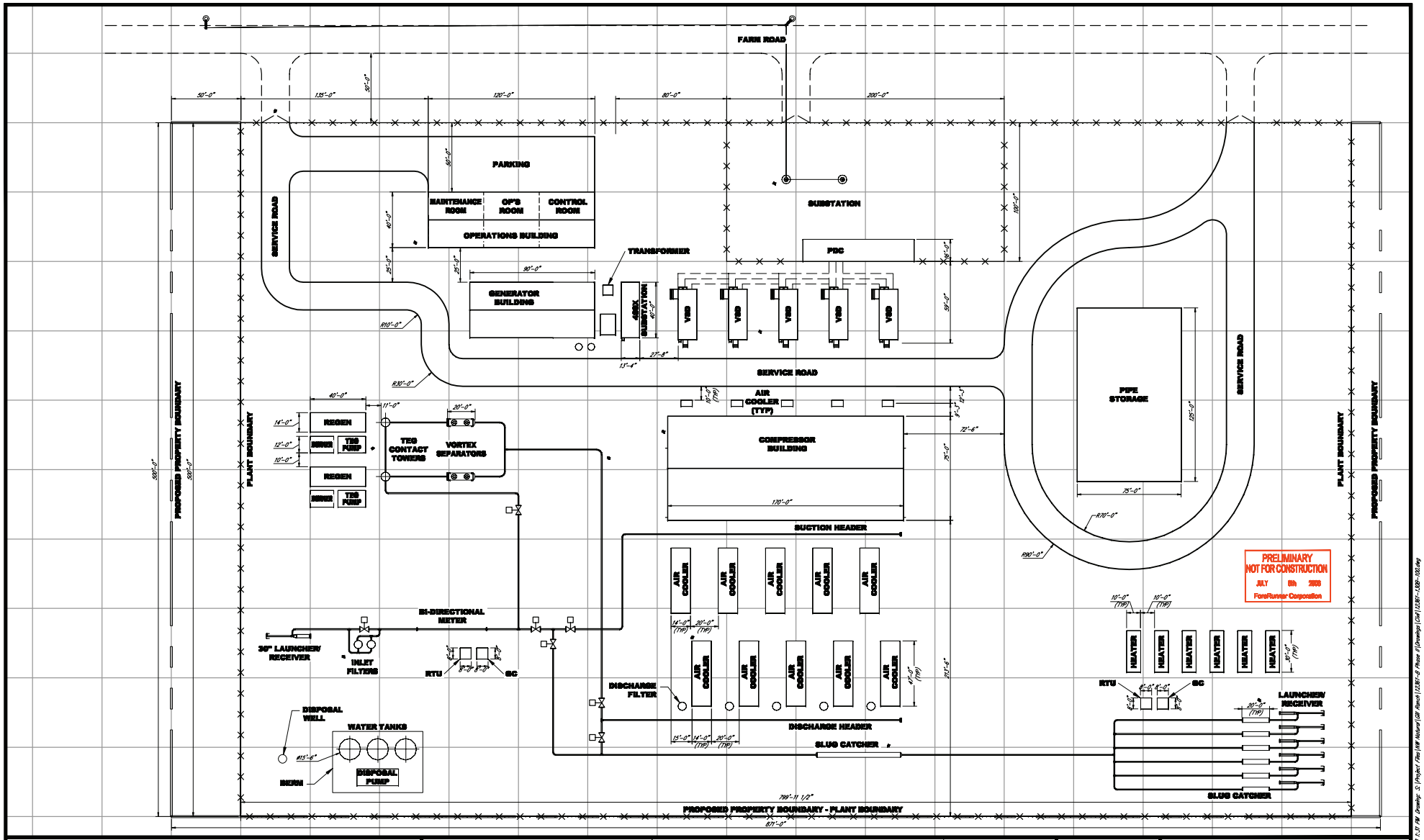
TAG NO	QTY	DESCRIPTION	Size	PFD DWG. NO.
				Drawings
	3	BusMtd Combo Current Voltage Transformer	TBD	Electrical Drawings
	1	Revenue Meter	TBD	Electrical Drawings
	1	GFC Switch 115Kv1200a	TBD	Electrical Drawings
	2	Communication Tower	Apprx 100'	Electrical Drawings

Table A-2. Compressor Station Estimated Surface Area of Impervious Surfaces

Description	Length	Width	Number	Total SA
Compressor Bldg	165	65	1	7507.5
Air Coolers	15	49	5	3675
Water Tank & Containment	65	50	1	3250
Main Transformer Pad	12	20	1	240
Protective Relay Enclosure	8	8	1	64
PDC	80	16	1	1280
Generator Bldg	75	50	1	3750
420V MCC	10	40	1	400
480V Transformer	10	10	1	100
Operations Bldg	150	50	1	7500
Dehy Regen Skids	14	40	2	1120
Dehy Towers	15	15	2	450
Compressor VFD's	10	35	5	1750
Service Road E	1131	20	1	22620
Service Road W	325	20	1	6500
Estimate surface area with 20% extra factor			**72247.8**	**sq ft**

Table A-2. Compressor Station Estimated Surface Area of Impervious Surfaces

Description	Length	Width	Number	Total SA
Compressor Bldg	165	65	1	7507.5
Air Coolers	15	49	5	3675
Water Tank & Containment	65	50	1	3250
Main Transformer Pad	12	20	1	240
Protective Relay Enclosure	8	8	1	64
PDC	80	16	1	1280
Generator Bldg	75	50	1	3750
420V MCC	10	40	1	400
480V Transformer	10	10	1	100
Operations Bldg	150	50	1	7500
Dehy Regen Skids	14	40	2	1120
Dehy Towers	15	15	2	450
Compressor VFD's	10	35	5	1750
Service Road E	1131	20	1	22620
Service Road W	325	20	1	6500
Estimate surface area with 20% extra factor			**72247.8**	**sq ft**



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P6	ISSUED PRELIMINARY	SJB	5/29/08				
P5	RESIZED COMP BLD, ADDED COOLERS & PWR LINES	MCW	05/13/08				
P4	REVISED EQUIPMENT LAYOUT & RENAMED DWG NUM	MCW	04/02/08				
P3	REVISED SUBSTATION SIZE	NBH	03/5/08				
P2	REVISED COMPRESSOR/ELECTRICAL LAYOUT	NBH	02/20/08				
P1	PRELIMINARY FOR CLIENT REVIEW	GAN	10/18/07				
REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE

ENGINEERING RECORD		
DRAWN	G.NELSON	10/16/07
CHECKED		
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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FORERUNNER CORPORATION
2000 S. Yellowstone Drive, #100
Longmont, CO 80501
303-651-1033

GILL RANCH STORAGE

GILL RANCH
SITE PLAN

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
1"=30'	12361-B		12361-130B-100	P7

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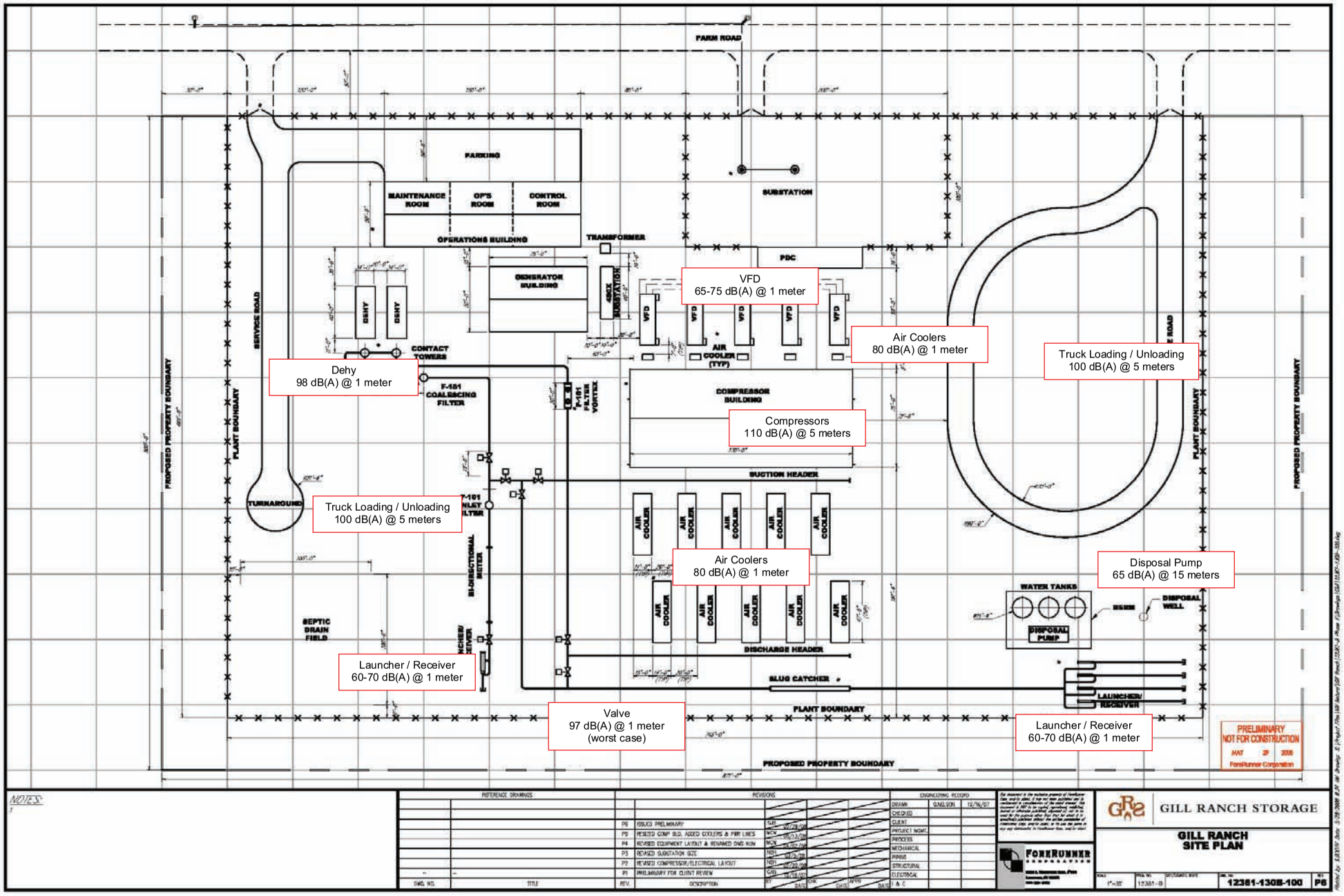
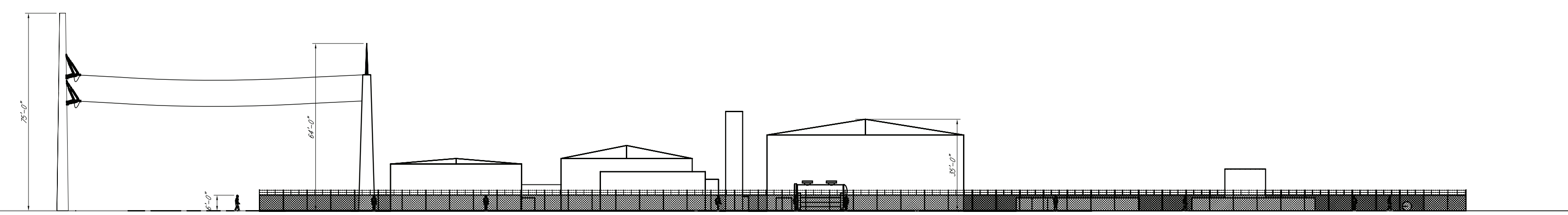

FARM ROAD
PARKING
MAINTENANCE ROOM
OP'S ROOM
CONTROL ROOM
OPERATIONS BUILDING
TRANSFORMER
SUBSTATION
PDC
GENERATOR BUILDING
480X SUBSTATION
DEHY
DEHY
CONTACT TOWERS
SERVICE ROAD
PROPOSED PROPERTY BOUNDARY
PLANT BOUNDARY
TURNAROUND
F-101 COALESCING FILTER
F-101 FILTER VORTEX
VFD
VFD
VFD
VFD
VFD
AIR COOLER (TYP)
COMPRESSOR BUILDING
SUCTION HEADER
AIR COOLER
AIR COOLER
AIR COOLER
AIR COOLER
AIR COOLER
AIR COOLER
AIR COOLER
AIR COOLER
AIR COOLER
AIR COOLER
BI-DIRECTIONAL METER
SEPTIC DRAIN FIELD
DISCHARGE HEADER
SLUG CATCHER
WATER TANKS
DISPOSAL PUMP
DISPOSAL WELL
LAUNCHER/ RECEIVER
PLANT BOUNDARY
PROPOSED PROPERTY BOUNDARY
VFD
65-75 dB(A) @ 1 meter
Air Coolers
80 dB(A) @ 1 meter
Truck Loading / Unloading
100 dB(A) @ 5 meters
Dehy
98 dB(A) @ 1 meter
Compressors
110 dB(A) @ 5 meters
Truck Loading / Unloading
100 dB(A) @ 5 meters
Air Coolers
80 dB(A) @ 1 meter
Disposal Pump
65 dB(A) @ 15 meters
Launcher / Receiver
60-70 dB(A) @ 1 meter
Valve
97 dB(A) @ 1 meter
(worst case)
Launcher / Receiver
60-70 dB(A) @ 1 meter
PRELIMINARY
NOT FOR CONSTRUCTION
MAY 29 2008
ForeRunner Corporation
NOTES:
REFERENCE DRAWINGS
REVISIONS
P6 ISSUED PRELIMINARY
P5 RESIZED COMP BLD, ADDED COOLERS & PIPE LINES
P4 REVISED EQUIPMENT LAYOUT & RENAMED DWG RUN
P3 REVISED SUBSTATION SIZE
P2 REVISED COMPRESSOR/ELECTRICAL LAYOUT
P1 PRELIMINARY FOR CLIENT REVIEW
ENGINEERING RECORD
DRAWN
CHECKED
CLIENT
PROJECT NGMT.
PROCESS
MECHANICAL
PIPING
STRUCTURAL
ELECTRICAL
I & C
ForeRunner Corporation
GILL RANCH STORAGE
GILL RANCH
SITE PLAN
1"=30'
12361-B
12361-130B-100
P6



ELEVATION LOOKING EAST

SCALE: NONE
APROX. VIEWING DISTANCE 500ft

PRELIMINARY
NOT FOR CONSTRUCTION
MAY 29 2008
ForeRunner Corporation

NOTES:
1.

REFERENCE DRAWINGS

DWG. NO.	TITLE

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
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P2	RESIZED COMP BLD, ADDED COOLERS & PWR LINES	MCW	05/13/08				
P1	PRELIMINARY FOR CLIENT REVIEW	MCW	04/11/08				

ENGINEERING RECORD

DRAWN	G.NELSON	10/16/07
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CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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3900 S. Wadsworth Blvd. #600
Lakewood, CO 80235
303-969-0223

GILL RANCH STORAGE

GILL RANCH
ELEVATION LOOKING EAST

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
NONE	12361-B		12361-130B-100B	P4

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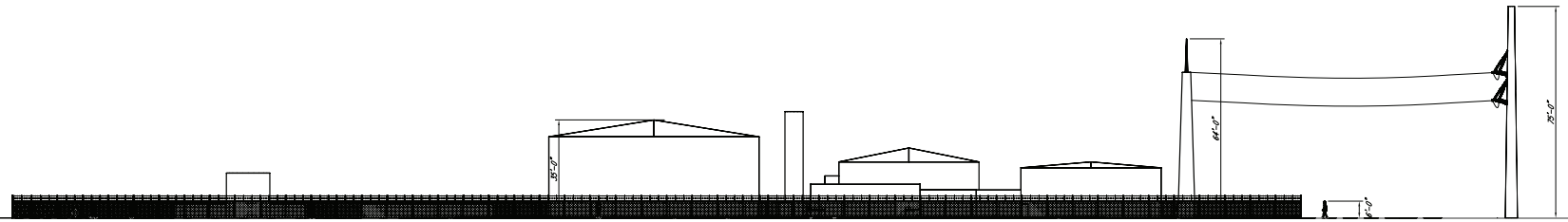

ELEVATION LOOKING WEST

SCALE: NONE
APROX. VIEWING DISTANCE 500ft

PRELIMINARY
NOT FOR CONSTRUCTION
MAY 29 2008
ForeRunner Corporation

NOTES:
1.

REFERENCE DRAWINGS	
DWG. NO.	TITLE

REVISIONS					
REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
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P1	PRELIMINARY FOR CLIENT REVIEW	MCW	04/10/08				

ENGINEERING RECORD		
DRAWN	G.NELSON	10/16/07
CHECKED		
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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FORERUNNER CORPORATION
2000 S. TEMPLETON BLVD. #100
LAGUNA NIGUEL, CA 92677
949-496-0600

GILL RANCH STORAGE

GILL RANCH
ELEVATION LOOKING WEST

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
NONE	12361-B		12361-130B-100C	P4

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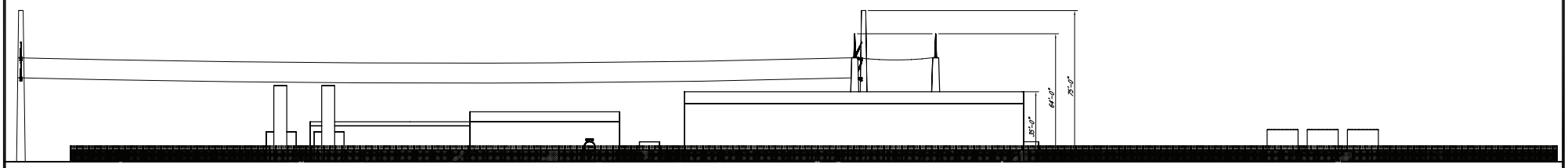

ELEVATION LOOKING NORTH

SCALE: NONE
APROX. VIEWING DISTANCE 500ft

PRELIMINARY
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MAY 29 2008
ForeRunner Corporation

NOTES:
1.

REFERENCE DRAWINGS	
DWG. NO.	TITLE

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P2	RESIZED COMP BLD, ADDED COOLERS & PWR LINES	MCW	05/13/08				
P1	PRELIMINARY FOR CLIENT REVIEW	MCW	04/11/08				

ENGINEERING RECORD		
DRAWN	G.NELSON	10/16/07
CHECKED		
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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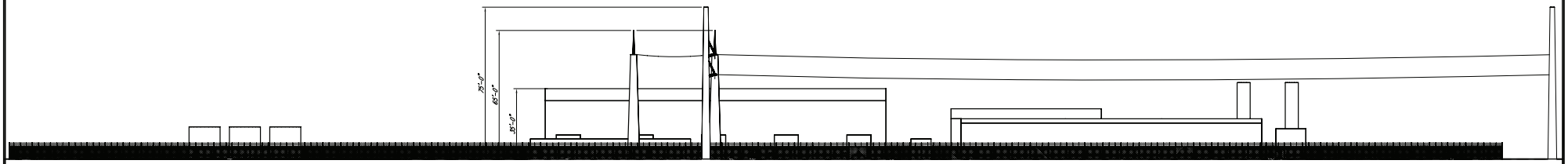
FORERUNNER CORPORATION
2000 S. TEMPLETON BLVD. #100
LAGRANGE, OH 44050
216-355-4000

GILL RANCH STORAGE

GILL RANCH
ELEVATION LOOKING NORTH

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
NONE	12361-B		12361-130B-100D	P4

Plotted by: SJB2078 Date: 5/29/2008 8:38 AM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-B Phase I\Drawings\Cad\12361-130B-100.dwg



ELEVATION LOOKING SOUTH

SCALE: NONE
APROX. VIEWING DISTANCE 500ft

PRELIMINARY
NOT FOR CONSTRUCTION
MAY 29 2008
ForeRunner Corporation

NOTES:
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REFERENCE DRAWINGS							
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		P1	PRELIMINARY FOR CLIENT REVIEW	MCW	04/11/08				

ENGINEERING RECORD		
DRAWN	G.NELSON	10/16/07
CHECKED		
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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2000 S. TEMPLETON BLVD. #100
LAKEWOOD, CO 80227
303-986-0333

GILL RANCH STORAGE

GILL RANCH
ELEVATION LOOKING SOUTH

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
NONE	12361-B		12361-130B-100E	P4

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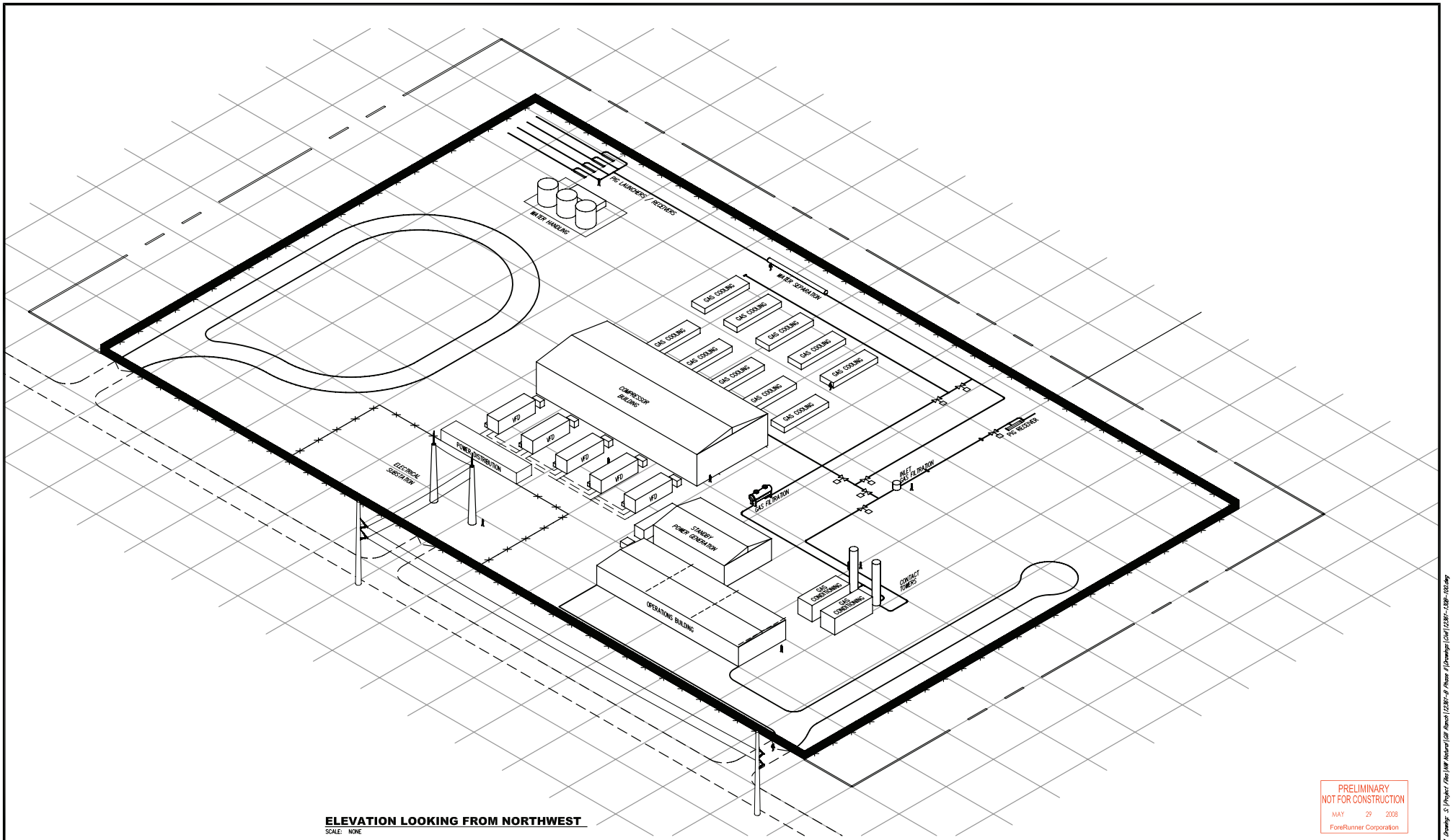

PRELIMINARY
NOT FOR CONSTRUCTION
MAY 29 2008
ForeRunner Corporation

ELEVATION LOOKING FROM NORTHWEST

SCALE: NONE

NOTES:
1.

REFERENCE DRAWINGS		REVISIONS							ENGINEERING RECORD		
									DRAWN	G.NELSON	10/16/07
									CHECKED		
									CLIENT		
									PROJECT MGMT.		
									PROCESS		
									MECHANICAL		
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		P2	ADDED TEXT	DRO	05/22/08				STRUCTURAL		
		P1	PRELIMINARY FOR CLIENT REVIEW	MCW	05/13/08				ELECTRICAL		
DWG. NO.	TITLE	REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR DATE	I & C		

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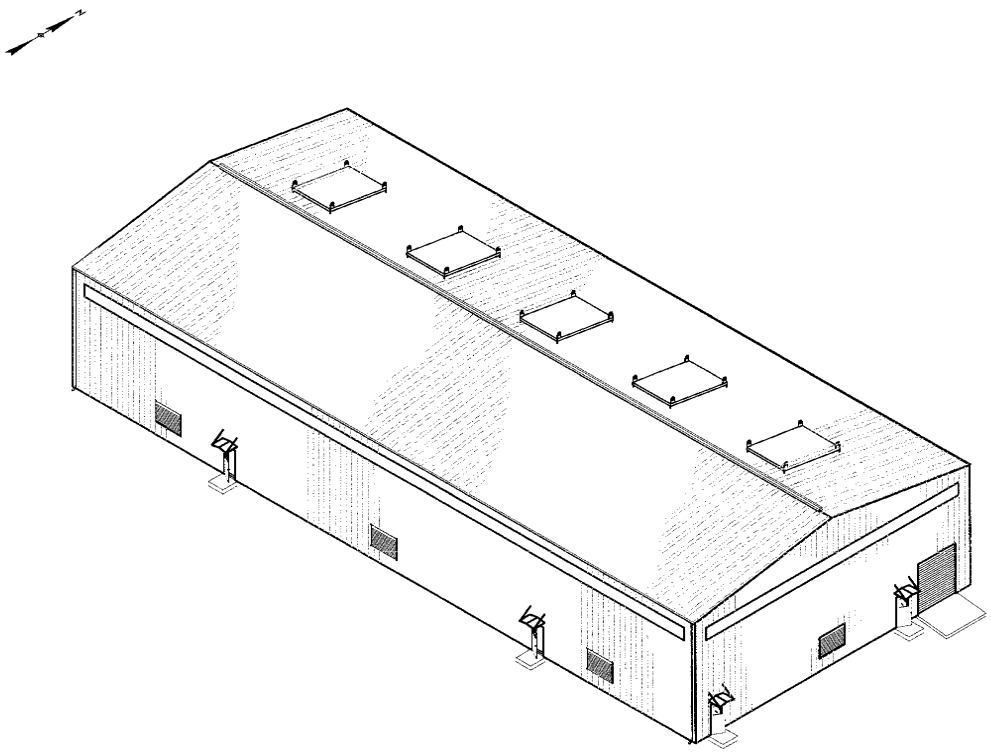
FORERUNNER CORPORATION
2000 S. TEMPLETON BLVD. #100
LAKEWOOD, CO 80227
303-986-9000

GILL RANCH STORAGE

GILL RANCH
ELEVATION LOOKING FROM NORTHWEST

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
NONE	12361-B		12361-130B-100F	P3

Plotted by: SJB2078 Date: 5/29/2008 8:38 AM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-B Phase A\Drawings\Cad\12361-130B-100.dwg



DESIGN CRITERIA & LOADS

DESIGN CODE LOCAL ORDINANCES	CBC-2007 (ADAPTATION OF IBC-2006 ASCE 7-05) VALDEZ-RA COUNTY, CA
DEAD LOAD SNOW WIND SEISMIC	WEIGHT OF ALL STRUCTURAL MATERIALS N/A, ROOF LL = 20 PSF 90 MPH, EXPOSURE "C" Iw = 1.0 SDC = D, OCCUPANCY CATEGORY II, Ie = 1.0 Ss = 0.48, S1 = 0.27
BRIDGE CRANE	7.5 T ELECTRICAL (VENTILL MOVEMENTS) REMOTE-CONTROLLED W/ ACCESS LADDER AT THE END OF THE BUILDING, WITH PLATFORM AND HANDRAILS OVER THE GIRDER (S.W. SPARK-FREE FEATURES
COLLATERAL LOADS	10 PSF ROOF LOAD (MECHANICAL + ELECTRICAL) ROOF CONSTRUCTION LOAD POINT LOAD 250 LB.
CONTINGENCY LOADS AT FRAMES, RAFTERS	2 KIPS VERTICAL LOAD APPLIED AT ANY LOCATION 2 KIPS AT ANY POINT 2 FEET FROM THE COLUMN
SPECIAL LOADS	CABLE TRAYS & OTHER LOADS AS SHOWN & SPECIFIED
LATERAL DEFLECTION	AS PER TABLE 1604.3 IBC-2006
LOAD COMBINATIONS	AS RECOMMENDED BY ASCE 7-05
STRUCTURAL CONNECTIONS	ASTM A325 BOLTS

BUILDING SHOP DRAWINGS SHALL BE RE-STAMPED AND SUBMITTED FOR APPROVAL PRIOR TO FABRICATION.

ROOF, WALL PANELS & TRIM

BUILDING SHALL BE WEATHER TIGHT (NOT PRESSURIZED)
ROOF SHALL BE WATERTIGHT.

EXTERIOR ROOF PANELS	24 GAUGE MINIMUM, 15 YEARS PAINT WARRANTY
EXTERIOR WALL PANELS	24 GAUGE MINIMUM
INTERIOR ROOF LINER PANELS	26 GA PERFORATED LINER FOR SOUND CONTROL
INTERIOR WALL LINER PANELS	26 GA FULL HEIGHT PERFORATED FOR SOUND CONTROL
EXTERIOR TRIM, FLASHING, GUTTERS AND DOWN SPOUTS	26 GAUGE MINIMUM

CADMIUM-PLATED CARBON STEEL SELF-DRILLING FASTENERS WITH LOOSE STEEL AND NEOPRENE WASHER, PAINTED TO COMPLEMENT ADJACENT PANELS, SHALL BE USED TO ATTACH THE PANELS TO THE SECONDARY MEMBERS.

CLOSED CELL, PRE-FORMED CLOSURE STRIPS HAVING A PROFILE MATCHING THE PANEL CONFIGURATION SHALL BE PROVIDED AT THE EAVE, RAKE AND RIDGE.

ALL EXTERIOR, INTERIOR PANELS AND TRIM SHALL BE PAINTED PER SCHEDULE (SEE BELOW).

INSULATION

THERMAL INSULATION SHALL HAVE MINIMUM VALUES AS FOLLOWS
R-19 FOR ROOF
R-11 FOR WALLS
R-11 FOR DOORS

ACOUSTIC INSULATION N/A

DOORS

PERSONNEL DOORS

ALL PERSONNEL DOORS SHALL BE EQUIPPED WITH THE FOLLOWING:
- RAIN CANOPIES W/BRACING
- INSULATED STEEL (16ga MIN.) (3) STEEL TEMPLATE HINGES
- DOOR CYLINDER, LOCK, LATCH, CLOSURE & BRACKET
- THRESHOLD, WEATHER STRIPPING
- TEMPERED INSULATED SAFETY GLASS
- KEYED ALIKE
- PANIC HARDWARE
- PAINTED PER SCHEDULE (SEE BELOW)

(A) SINGLE PERSONNEL DOORS 3070 NOMINAL SIZE
DOUBLE PERSONNEL DOORS 5070 NOMINAL SIZE N/A

OVERHEAD DOORS

ALL ROLL-UP OVERHEAD DOORS SHALL BE
- EQUIPPED WITH DRUM
- MANUAL CHAIN OPERATED
- INSULATED

(B) (2) 15' W X 12' H NOMINAL SIZE

WINDOWS & TRANSLUCENT PANELS

STANDARD BUILDING VENDOR ITEMS

(C) 3-HIGH "TRANSLUCENT" PANELS AS SHOWN, INTERIOR & EXTERIOR FOR SOUND CONTROL
4 X 4' DOUBLE - GLAZED WINDOWS N/A

HEATING, VENTILATION & A/C

HEATING
SPACE HEATERS TBD
DESIGN TEMPERATURE RANGES 60F MIN. DURING THE COLDEST AMBIENT

VENTILATION
NATURAL DRAFT VENTILATION SYSTEM WITH FORCED PURGE/EXHAUST
PROVIDE MINIMUM OF 10 ACPH (AIR CHANGES PER HOUR) NORMALLY, 12 ACPH FOR EMERGENCY PURGE
SYSTEM COMPONENTS
(D)
- RIDGE VENTS OR ROOFTOP VENTILATION UNITS FOR EXHAUST
- EXHAUST FANS
(E)
- INTAKE LOUVERS

DESIGN TEMPERATURE RANGES 85F MAX. DURING THE HOTTEST AMBIENT

A/C N/A

FRAMED OPENINGS

ROOF FRAMED OPENINGS (CURB CONSTRUCTION W/REMOVABLE COVER) FOR MOTOR REMOVAL - 10 X 15
WALL FRAMED OPENINGS FOR PIPE PENETRATIONS AS SHOWN
WALL FRAMED OPENINGS FOR CABLE TRAYS ENTRY

VENDOR SHALL SUPPLY EXTRA SIDING, INSULATION, FLASHING, CAULKING MATERIALS TO CLOSE THE GAPS AROUND THE WALL/ROOF PENETRATIONS & FRAMED OPENINGS

MISCELLANEOUS ACCESSORIES

LATER

ELECTRICAL

SEE ELECTRICAL DRAWINGS FOR WIRING, LIGHTING, LIGHTNING PROTECTION, GROUNDING, ETC.
ELECTRIC AREA CLASSIFICATION INSIDE THE BUILDING SHALL BE **CLASS 1, DIV. 2**

COLOR / FINISH SCHEDULE:

PRIMARY STRUCTURAL MEMBERS:	RED OXIDE PRIMED
SECONDARY STRUCTURAL MEMBERS:	PRE-PRIMED
ROOF PANELS	
WALL PANELS	
RAKE TRIM	
DOWNSPOUTS	
EXTERIOR WALL TRIM:	
PERSONNEL DOORS:	MANUFACTURER'S STANDARD PRIMER FINISH PAINTED TO MATCH WALL COLOR
ROLL-UP DOOR	MANUFACTURER'S STANDARD PRIMER FINISH PAINTED TO MATCH WALL COLOR
ROOF HOODS: (EXTERIOR ONLY)	
WALL FANS: (EXTERIOR ONLY)	
DETENSION CANOPY	

NOTES:

DWG. NO.	TITLE

REFERENCE DRAWINGS

REV.	DESCRIPTION	DRAWN	CHECK	APPROV	DATE
B	ISSUED FOR CLIENT'S REVIEW	SJB			10/29/08
A	ISSUED FOR REVIEW	KJT			9/17/08

REVISIONS

ENGINEERING RECORD

DRAWN	KJT	8/27/08
CHECKED		
CLIENT		
PROJECT MGMT		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
A & C		

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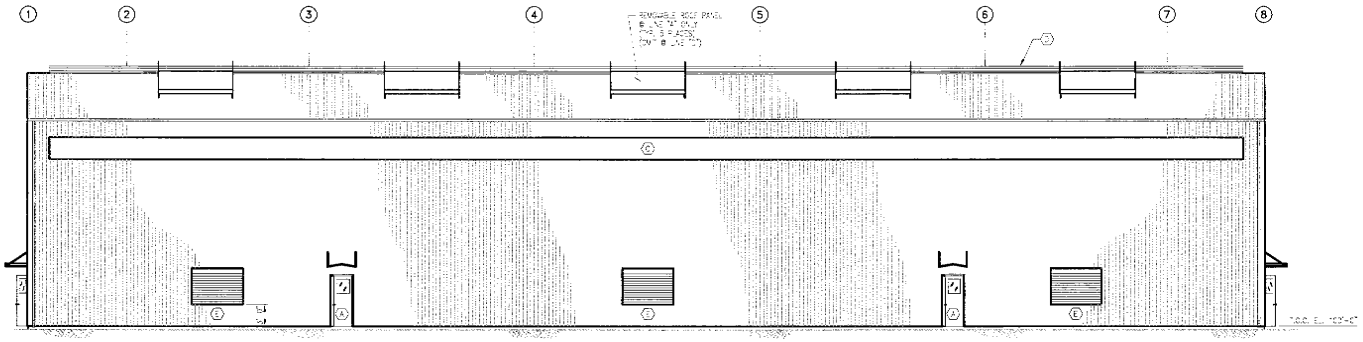
GILL RANCH STORAGE

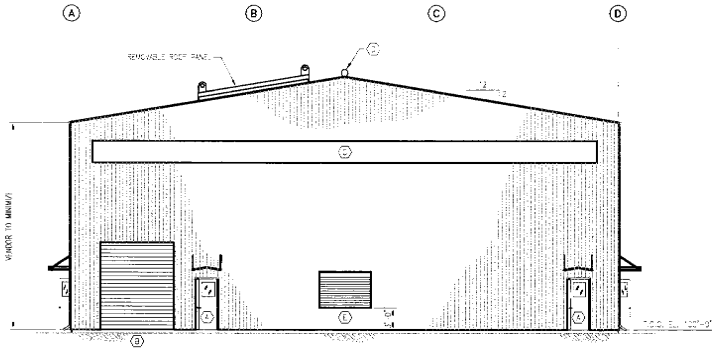
GILL RANCH STORAGE
ARCHITECTURAL
COMPRESSOR BUILDING

SCALE AS NOTED | REF. NO. 12361-B | SYSTEMS DATE | DWG. NO. **12361-160B-100** | REV. **B**

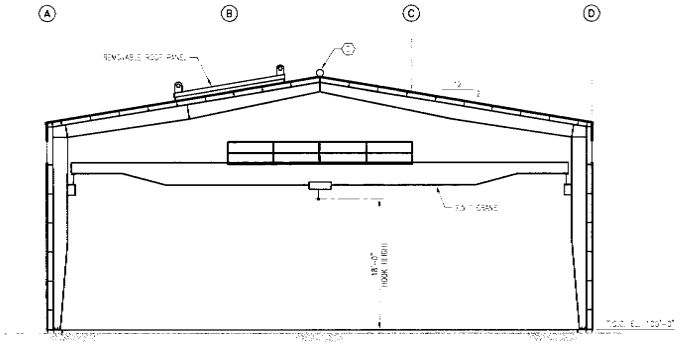
Plotted by: STEVE D Date: 7/25/2008 9:47 AM Drawing: S:\Project Files\GRR Natural\Gill Ranch\12361-B\Dwg\Architectural\12361-160B-100.dwg



ELEVATION @ LINES D & A (O.H.)
SCALE: 1/8"=1'-0"



ELEVATION @ LINES 1 & 8 (O.H.)
SCALE: 1/8"=1'-0"



TYPICAL BUILDING SECTION
SCALE: 1/8"=1'-0"

NOTES:
1.

REFERENCE DRAWINGS	
DWG. NO.	TITLE

REVISIONS				
REV.	DESCRIPTION	BY	CHK	APPR
B	ISSUED FOR CLIENTS REVIEW	BJB		
A	ISSUED FOR REVIEW	KJT		
		DATE	DATE	DATE

ENGINEERING RECORD		
DRAWN	KJT	6/12/08
CHECKED		
CLIENT		
PROJECT MGR		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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303-986-0007

GILL RANCH STORAGE

GILL RANCH STORAGE
ARCHITECTURAL
COMPRESSOR BUILDING
ELEVATIONS & SECTION

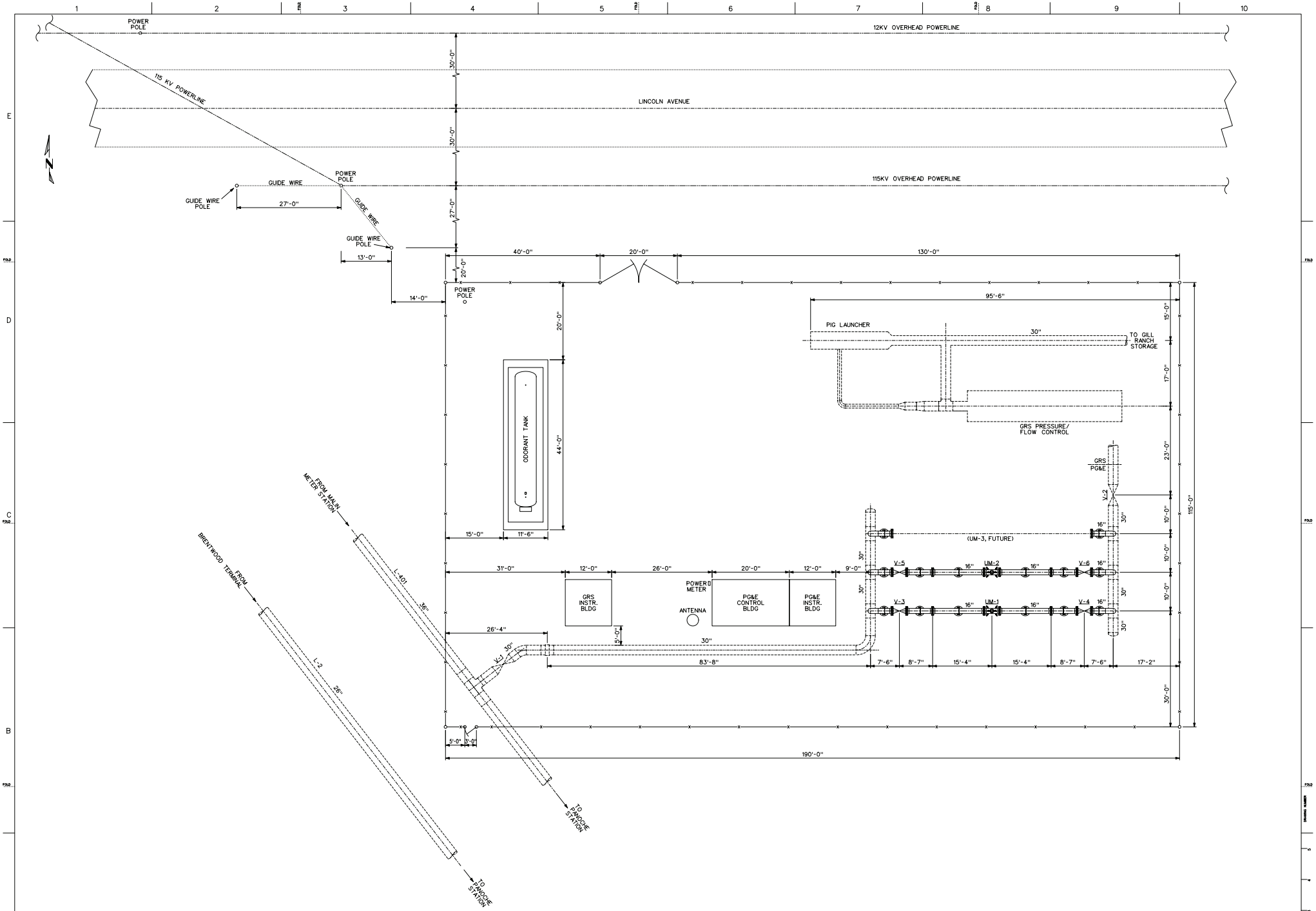
SCALE	PROJ. NO.	DRAWING TYPE	DWG. NO.	REV.
AS NOTED	12361-B		12361-160B-102	B

Plotted by: KHUM Date: 7/31/2008 10:39 AM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-B Phase 1\Drawings\Structural\12361-160B-102.dwg

Table A-3. Storage Tap Facility Equipment List

TAG NO	QTY	ForeRunner Equipment	Size	PFD DWG. NO.
	1	Pig Launcher	36” Barrel 1.25” Wall 17’ -10” Long	TBD
	1	Block Valve	30” –600lb rating	TBD
	2	Blow Down Valve	4” – 600lb rating	TBD
		PLC	TBD	TBD
		Radio Tower	Apprx. 40'-100’	TBD

TAG NO	QTY	PG&E Equipment	Size	PFD DWG. NO.
TBD	TBD	Pressure Relief	Size TBD	TBD
TBD	TBD	ESD Valve	Size TBD	TBD
TBD	TBD	All other Equip TBD	Size TBD	TBD



NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY

REVISIONS

NO.	DATE	DESCRIPTION	GM/SPEC	DWN	CHKD	SUPV	APVD BY
1	- - -	ISSUED FOR CONSTRUCTION	30604380	RC			

REVISIONS

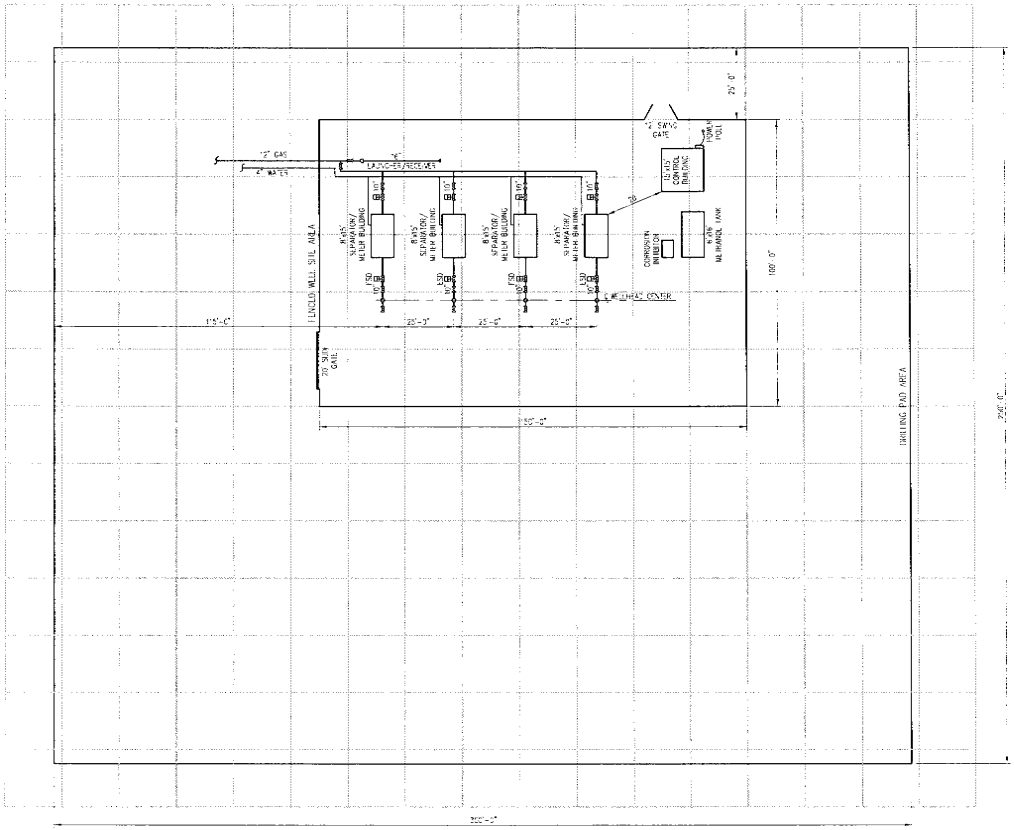
APPROVED BY: SO 30604380
SUPV J.SHAH
DSGN S.LAU
DWN R.CHOW
CHKD
OK
DATE
SCALE 1/8"=1'-0"

PIPING - PLAN
MAIN GAS, YARD
GILL RANCH STATION

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

MICROFILM
BILL OF MATL
DWG LIST
SUPSDS
SUPSD BY
SHEET NO. OF SHEETS
DRAWING NUMBER 4800830
REV 1

FILENAME: 4800830.DGN 5-26-09 RC



NOTES:

REFERENCE DRAWINGS			REVISIONS					ENGINEERING RECORD		
								DRAWN	S.SOUTH	2/7/08
								CHECKED		
								D. ENT		
								PROJECT MGMT		
		P4	REVISED PRELIMINARY	S.S	2/7/08			PROCESS		
		P3	REVISED LAYOUT	S.S	10/16/07			MECHANICAL		
		P2	REVISED DRAWING NUMBER	MDK	10/12/07			PIPING		
–	–	P1	PRELIMINARY	DAV	10/08/07			STRUCTURAL		
								ELECTRICAL		
DWG. NO.	TITLE	REV.	DESCRIPTION	BY	CHK	APPR	DATE	I & C		

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GILL RANCH STORAGE

GILL RANCH STORAGE
TYPICAL WELL PAD SITE LAYOUT

DATE	SCALE	PROJECT MGMT	DWG. NO.	REV.
11-23	1"=23'		12361-130D-200	P4

Plotted by: SSOUTH Date: 2/7/2008 7:20 AM drawing: S:\Projects\Active Models\Gill Ranch\12361-130D-200.dwg

Electric and Magnetic Fields

The California Public Utilities Commission (CPUC) and the California Department of Health Services (CDHS) have not concluded that exposure to magnetic fields from utility electric facilities is a health hazard. Many reports have concluded that the potential for health effects associated with electric and magnetic field (EMF) exposure is too speculative to allow the evaluation of impacts or the preparation of mitigation measures.

EMF is a term used to describe electric and magnetic fields that are created by electric voltage (electric field) and electric current (magnetic field). Power frequency EMF is a natural consequence of electrical circuits, and can be either directly measured using the appropriate measuring instruments or calculated using appropriate information.

Electric Fields

Electric fields are present whenever voltage exists on a wire, and are not dependent on current. The magnitude of the electric field is primarily a function of the configuration and operating voltage of the line and decreases with the distance from the source (line). The electric field can be shielded (i.e., the strength can be reduced) by any conducting surface, such as trees, fences, walls, buildings, and most types of structures. The strength of an electric field is measured in volts per meter (V/m) or kilovolts per meter (kV/m).

Magnetic Fields

Magnetic fields are present whenever current flows in a conductor, and are not dependent on the voltage present on the conductor. The strength of these fields also decreases with distance from the source. However, unlike electric fields, most common materials have little shielding effect on magnetic fields.

The magnetic field strength is a function of both the current on the conductor and the design of the system. Magnetic fields are measured in units called Gauss. However, for the low levels normally encountered near power systems, the field strength is expressed in a much smaller unit, the milligauss (mG), which is one thousandth of a Gauss.

Power frequency EMF is present where electricity is used. This includes not only utility transmission lines, distribution lines, and substations, but also the building wiring in homes, offices, and schools, and in the appliances and machinery used in these locations. Typical magnetic fields from these sources can range from below 1 mG to above 1,000 mG (1 Gauss).

Magnetic field strengths diminish with distance. Fields from compact sources (i.e., those containing coils such as small appliances and transformers) decrease in inverse proportion to the distance from the source cubed. For three-phase power lines with balanced currents, the

magnetic field strength drops off inversely proportional to the distance from the line squared. Fields from unbalanced currents, which flow in paths such as neutral or ground conductors, fall off inversely proportional to the distance from the source. Conductor spacing and configuration also affect the rate at which the magnetic field strength decreases.

The magnetic field levels of PG&E's overhead and underground transmission lines will vary depending upon customer power usage. Magnetic field strengths for typical PG&E transmission line loadings at the edge of rights-of-way are approximately 10 to 90 mG. Under peak load conditions, the magnetic fields at the edge of the right-of-way would not likely exceed 150 mG. There are no long-term, health-based state or federal government EMF exposure standards. State regulations for magnetic fields have been developed in New York and Florida (150 mG and 200 mG at the edge of the right-of-way). However, these are based on limiting exposure from new facilities to levels no greater than existing facilities.

The strongest magnetic fields around the outside of a substation come from the power lines entering and leaving the station. The strength of the magnetic fields from transformers and other equipment decreases quickly with distance. Beyond the substation fence, the magnetic fields produced by the equipment within the station are typically indistinguishable from background levels.

Possible Health Effects

The possible effects of EMF on human health have come under scientific scrutiny. Concern about EMF originally focused on electric fields; however, much of the recent research has focused on magnetic fields. Uncertainty exists as to what characteristics of magnetic field exposure need to be considered to assess human exposure effects. Among the characteristics considered are field intensity, transients, harmonics, and changes in intensity over time. These characteristics may vary from power lines to appliances to home wiring, and this may create different types of exposures. The exposure most often considered is intensity or magnitude of the field.

There is a consensus among the medical and scientific communities that there is insufficient evidence to conclude that EMF causes adverse health effects. Neither the medical nor scientific communities have been able to provide any foundation upon which regulatory bodies could establish a standard or level of exposure that is known to be either safe or harmful. Laboratory experiments have shown that magnetic fields can cause biologic changes in living cells, but scientists are not sure whether any risk to human health can be associated with them. Some studies have suggested an association between surrogate measures of magnetic fields and certain cancers while others have not.

California Public Utilities Commission Decision Summary

Background

On January 15, 1991, the CPUC initiated an investigation to consider its role in mitigating the health effects, if any, of electric and magnetic fields from utility facilities and power lines. A working group of interested parties, called the California EMF Consensus Group, was created by the CPUC to advise it on this issue. It consisted of 17 stakeholders representing citizens groups, consumer groups, environmental groups, state agencies, unions, and utilities. The Consensus Group's fact-finding process was open to the public, and its report incorporated concerns expressed by the public. Its recommendations were filed with the Commission in March 1992.

In August 2004 the CPUC began a proceeding known as a "rulemaking" (R.04-08-020) to explore whether changes should be made to existing CPUC policies and rules concerning EMF from electric transmission lines and other utility facilities.

Through a series of hearings and conferences, the Commission evaluated the results of its existing EMF mitigation policies and addressed possible improvements in implementation of these policies. The CPUC also explored whether new policies are warranted in light of recent scientific findings on the possible health effects of EMF exposure.

The CPUC completed the EMF rulemaking in January 2006 and presented these conclusions in Decision D.06-01-042:

- The CPUC affirmed its existing policy of requiring no-cost and low-cost mitigation measures to reduce EMF levels from new utility transmission lines and substation projects.

- The CPUC adopted rules and policies to improve utility design guidelines for reducing EMF, and provides for a utility workshop to implement these policies and standardize design guidelines.

- Despite numerous studies, including one ordered by the Commission and conducted by the California Department of Health Services, the CPUC stated "we are unable to determine whether there is a significant scientifically verifiable relationship between EMF exposure and negative health consequences."

- The CPUC said it will "remain vigilant" regarding new scientific studies on EMF, and if these studies indicate negative EMF health impacts, the Commission will reconsider its EMF policies and open a new rulemaking if necessary.

In response to a situation of scientific uncertainty and public concern, the decision specifically requires PG&E to consider "no-cost" and "low-cost" measures, where feasible, to reduce exposure from new or upgraded utility facilities. It directs that no-cost mitigation measures be undertaken, and that low-cost options, when they meet certain guidelines for field reduction and cost, be adopted through the project certification process. PG&E was directed to develop, submit and follow EMF guidelines to implement the CPUC decision. Four percent of total project budgeted cost is the benchmark in implementing EMF mitigation, and mitigation measures should achieve incremental magnetic field reductions of at least 15%.

Reviews of EMF Studies

Hundreds of EMF studies have been conducted over the last 20 years in the areas of epidemiology, animal research, cellular studies, and exposure assessment. A number of nationally recognized multi-discipline panels have performed comprehensive reviews of the body of scientific knowledge on EMF. These panels' ability to bring experts from a variety of disciplines together to review the research gives their reports recognized credibility. It is standard practice in risk assessment and policymaking to rely on the findings and consensus opinions of these distinguished panels. None of these groups have concluded that EMF causes adverse health effects or that the development of standards were appropriate or would have a scientific basis.

Reports by the National Research Council/National Academy of Sciences, American Medical Association, American Cancer Society, National Institute of Environmental Health Sciences, World Health Organization, International Agency for Research on Cancer, and California Department of Health Services conclude that insufficient scientific evidence exists to warrant the adoption of specific health-based EMF mitigation measures. The potential for adverse health effects associated with EMF exposure is too speculative to allow the evaluation of impacts or the preparation of mitigation measures.

National Institute of Environmental Health Sciences

In June of 1999, the federal government completed a $60-million EMF research program managed by the National Institute of Environmental Health Sciences (NIEHS) and the Department of Energy (DOE). Known as the EMF RAPID (Research And Public Information Dissemination) Program. In their report to the U.S. Congress, the NIEHS concluded that:

> The NIEHS believes that the probability that ELF-EMF exposure is truly a health hazard is currently small. The weak epidemiological associations and lack of any laboratory support for these associations provide only marginal, scientific support that exposure to this agent is causing any degree of harm.

The NIEHS report also included the following conclusions:

> The National Toxicology Program routinely examines environmental exposures to determine the degree to which they constitute a human cancer risk and produces the 'Report on Carcinogens' listing agents that are 'known human carcinogens' or 'reasonably anticipated to be human carcinogens.' It is our opinion that based on evidence to date, ELF-EMF exposure would not be listed in the 'Report on Carcinogens' as an agent 'reasonably anticipated to be a human carcinogen.' This is based on the limited epidemiological evidence and the findings from the EMF-RAPID Program that did not indicate an effect of ELF-EMF exposure in experimental animals or a mechanistic basis for carcinogenicity.
>
> The NIEHS agrees that the associations reported for childhood leukemia and adult chronic lymphocytic leukemia cannot be dismissed easily as random or negative findings. The lack of positive findings in animals or in mechanistic studies weakens the belief that this association is actually due to ELF-EMF, but cannot completely discount the finding. The NIEHS also agrees with the conclusion that no other cancers or non-cancer health outcomes provide sufficient evidence of a risk to warrant concern.
>
> Epidemiological studies have serious limitations in their ability to demonstrate a cause and effect relationship whereas laboratory studies, by design, can clearly show that cause and effect are possible. Virtually all of the laboratory evidence in animals and humans and most of the mechanistic work done in cells fail to support a causal relationship between exposure to ELF-EMF at environmental levels and changes in biological function or disease status. The lack of consistent, positive findings in animal or mechanistic studies weakens the belief that this association is actually due to ELF-EMF, but it cannot completely discount the epidemiological findings.
>
> The NIEHS suggests that the level and strength of evidence supporting ELF-EMF exposure as a human health hazard are insufficient to warrant aggressive regulatory actions; thus, we do not recommend actions such as stringent standards on electric appliances and a national program to bury all transmission and distribution lines. Instead, the evidence suggests passive measures such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. NIEHS suggests that the power industry continue its current practice of siting power lines to reduce exposures and continue to explore ways to reduce the creation of magnetic fields around transmission and distribution lines without creating new hazards. We also encourage technologies that lower exposures from neighborhood distribution lines provided that they do not increase other risks, such as those from accidental electrocution or fire.

U.S. National Research Council/ National Academy of Sciences

In May 1999, the National Research Council/ National Academy of Sciences, an independent scientific agency responsible for advising the federal government on science, technology, and medicine, released its evaluation of the scientific and technical content of research projects conducted under the U.S. EMF RAPID Program, concluding that:

> The results of the EMF-RAPID program do not support the contention that the use of electricity poses a major unrecognized public-health danger. Basic research on the effects of power-frequency magnetic fields on cells and animals should continue, but a special research-funding effort is not required. Investigators should compete for funding through traditional research-funding mechanisms. If future research on this subject is funded through such mechanisms, it should be limited to tests of well-defined mechanistic hypotheses or replications of reported positive effects. If carefully performed, such experiments will have value even if their results are negative. Special efforts should be made to communicate the conclusions of this effort to the general public effectively.

The following specific recommendations are made by the committee:

1. The committee recommends that no further special research program focused on possible health effects of power-frequency magnetic fields be funded. Basic research on the effects of power-frequency magnetic fields on cells and animals should continue but investigators should compete for funding through traditional research funding mechanisms.
2. If, however, Congress determines that another time-limited, focused research program on the health effects of power-frequency magnetic fields is warranted, the committee recommends that emphasis be placed on replications of studies that have yielded scientifically promising claims of effects and that have been reported in peer-reviewed journals. Such a program would benefit from the use of a contract-funding mechanism with a requirement for complete reports and/or peer-reviewed publications at program's end.
3. The engineering studies were initiated without the guidance of a clearly established biologic effect. The committee recommends that no further engineering studies be funded unless a biologic effect that can be used to plan the engineering studies has been determined.
4. Much of the information from the EMF-RAPID biology program has not been published in peer-reviewed journals. NIEHS should collect all future peer-reviewed information resulting from the EMF-RAPID biology projects and publish a summary report of such information periodically on the NIEHS Web site.
5. The communication effort initiated by EMF-RAPID is reasonable. The two booklets and the telephone information line are useful, as is the EMF-RAPID Internet site. There are two limitations to the effort. First, it is largely passive, responding to inquiries and providing information, rather than being active. Second, much of the information

produced is in a scientific format not readily understandable by the public. The committee recommends that further material produced to disseminate information on power-frequency magnetic fields be written for the general public in a clear fashion. The Web site should be made more user-friendly. The booklet *Questions and Answers about EMF* should be updated periodically and made available to the public.

World Health Organization

The World Health Organization (WHO) established the International EMF Project in 1996 to investigate potential health risks associated with exposure to electric and magnetic fields (EMF). A WHO Task Group recently concluded a review of the health implications of extremely low frequency (ELF) EMF.

A Task Group of scientific experts was convened in 2005 to assess any risks to health that might exist from exposure to ELF electric and magnetic fields. Previously in 2002, the International Agency for Research on Cancer (IARC) examined the evidence regarding cancer; this Task Group reviewed evidence for a number of health effects, and updated the evidence regarding cancer. The conclusions and recommendations of the Task Group are presented in a WHO report titled: "Extremely Low Frequency Fields Environmental Health Criteria Monograph No.238" and Factsheet No 322.

> "New human, animal and in vitro studies, published since the 2002 IARC monograph, do not change the overall classification of ELF magnetic fields as a possible human carcinogen."
>
> "A number of other diseases have been investigated for possible association with ELF magnetic field exposure. These include cancers in both children and adults, depression, suicide, reproductive dysfunction, developmental disorders, immunological modifications and neurological disease. The scientific evidence supporting a linkage between ELF magnetic fields and any of these diseases is much weaker than for childhood leukaemia and in some cases (for example, for cardiovascular disease or breast cancer) the evidence is sufficient to give confidence that magnetic fields do not cause the disease."
>
> "the epidemiological evidence is weakened by methodological problems, such as potential selection bias. In addition, there are no accepted biophysical mechanisms that would suggest that low-level exposures are involved in cancer development. Thus, if there were any effects from exposures to these low-level fields, it would have to be through a biological mechanism that is as yet unknown. Additionally, animal studies have been largely negative. Thus, on balance, the evidence related to childhood leukaemia is not strong enough to be considered causal."
>
> "Policy-makers should establish an ELF EMF protection programme that includes measurements of fields from all sources to ensure that the exposure limits are not exceeded either for the general public or workers."

> "Government and industry should monitor science and promote research programmes to further reduce the uncertainty of the scientific evidence on the health effects of ELF field exposure."
>
> "Policy-makers, community planners and manufacturers should implement very low-cost measures when constructing new facilities and designing new equipment including appliances."
>
> "Changes to engineering practice to reduce ELF exposure from equipment or devices should be considered, provided that they yield other additional benefits, such as greater safety, or little or no cost."
>
> "When changes to existing ELF sources are contemplated, ELF field reduction should be considered alongside safety, reliability and economic aspects."

International Agency for Research on Cancer

In June of 2001, the International Agency for Research on Cancer (IARC), a branch of the World Health Organization (WHO), evaluated the carcinogenic risk to humans of static and extremely low-frequency EMF. In October of 2001, the WHO published a Fact Sheet that summarized the IARC findings. Below is an excerpt from the fact sheet:

> In June 2001, an expert scientific working group of IARC reviewed studies related to the carcinogenicity of static and ELF electric and magnetic fields. Using the standard IARC classification that weighs human, animal and laboratory evidence, ELF magnetic fields were classified as possibly carcinogenic to humans based on epidemiological studies of childhood leukaemia. Evidence for all other cancers in children and adults, as well as other types of exposures (i.e. static fields and ELF electric fields) was considered not classifiable either due to insufficient or inconsistent scientific information.
>
> "Possibly carcinogenic to humans" is a classification used to denote an agent for which there is limited evidence of carcinogenicity in humans and less than sufficient evidence for carcinogenicity in experimental animals.
>
> This classification is the weakest of three categories ("is carcinogenic to humans", "probably carcinogenic to humans" and "possibly carcinogenic to humans") used by IARC to classify potential carcinogens based on published scientific evidence. Some examples of well-known agents that have been classified by IARC are listed below:

Classification	Examples of Agents
Carcinogenic to humans (usually based on strong evidence of carcinogenicity in humans)	Asbestos Mustard gas Tobacco (smoked and smokeless) Gamma radiation
Probably carcinogenic to humans (usually based on strong evidence of carcinogenicity in animals)	Diesel engine exhaust Sun lamps UV radiation Formaldehyde
Possibly carcinogenic to humans (usually based on evidence in humans which is considered credible, but for which other explanations could not be ruled out)	Coffee Styrene Gasoline engine exhaust Pickled Vegetables ELF magnetic fields

DO ELF FIELDS CAUSE CANCER?

ELF fields are known to interact with tissues by inducing electric fields and currents in them. This is the only established mechanism of action of these fields. However, the electric currents induced by ELF fields commonly found in our environment are normally much lower than the strongest electric currents naturally occurring in the body such as those that control the beating of the heart.

Since 1979 when epidemiological studies first raised a concern about exposures to power line frequency magnetic fields and childhood cancer, a large number of studies have been conducted to determine if measured ELF exposure can influence cancer development, especially leukaemia in children.

There is no consistent evidence that exposure to ELF fields experienced in our living environment causes direct damage to biological molecules, including DNA. Since it seems unlikely that ELF fields could initiate cancer, a large number of investigations have been conducted to determine if ELF exposure can influence cancer promotion or co-promotion. Results from animal studies conducted so far suggest that ELF fields do not initiate or promote cancer.

However, two recent pooled analyses of epidemiological studies provide insight into the epidemiological evidence that played a pivotal role in the IARC evaluation. These studies suggest that, in a population exposed to average magnetic fields in excess of 0.3 to 0.4 μT, twice as many children might develop leukaemia compared to a population with lower exposures. In spite of the large number data base, some uncertainty remains as to whether magnetic field exposure or some other factor(s) might have accounted for the increased leukaemia incidence.

Childhood leukaemia is a rare disease with 4 out of 100,000 children between the age of 0 to 14 diagnosed every year. Also average magnetic field exposures above 0.3 or

0.4 μT in residences are rare. It can be estimated from the epidemiological study results that less than 1% of populations using 240 volt power supplies are exposed to these levels, although this may be higher in countries using 120 volt supplies.

The IARC review addresses the issue of whether it is feasible that ELF-EMF pose a cancer risk. The next step in the process is to estimate the likelihood of cancers in the general population from the usual exposures and to evaluate evidence for other (non-cancer) diseases. This part of the risk assessment should be finished by WHO in the next 18 months.

American Cancer Society

In the journal, *A Cancer Journal for Clinicians*, the American Cancer Society (ACS) reviewed EMF residential and occupational epidemiologic research in an article written by Dr. Clark W. Heath, Jr., ACS's vice president of epidemiology and surveillance research. Dr. Heath reviews 13 residential epidemiologic studies of adult and childhood cancer. Dr. Heath wrote:

> Evidence suggesting that exposure to EMF may or may not promote human carcinogenesis is mostly based on...epidemiologic observations.... While those observations may suggest such a relationship for leukemia and brain cancer in particular, the findings are weak, inconsistent, and inconclusive.... The weakness and inconsistent nature of epidemiologic data, combined with the continued dearth of coherent and reproducible findings from experimental laboratory research, leave one uncertain and rather doubtful that any real biologic link exists between EMF exposure and carcinogenicity.

American Medical Association

The AMA adopted recommendations of its Council on Scientific Affairs (CSA) regarding EMF health effects. The report was prepared as a result of a resolution passed by AMA's membership at its 1993 annual meeting. The following recommendations are based on the CSA's review of EMF epidemiologic and laboratory studies to date, as well as on several major literature reviews:

- Although no scientifically documented health risk has been associated with the usually occurring levels of electromagnetic fields, the AMA should continue to monitor developments and issues related to the subject.

- The AMA should encourage research efforts sponsored by agencies such as the National Institutes of Health, the U.S. Department of Energy, and the National Science Foundation. Continuing research should include study of exposures to EMF and its effects, average public exposures, occupational exposures, and the effects of field surges and harmonics.

- The AMA should support the meeting of an authoritative, multidisciplinary committee under the auspices of the National Academy of Sciences or the

National Council on Radiation Protection and Measurements to make recommendations about exposure levels of the public and workers to EMF and radiation.

References

American Cancer Society. 1996. "Electromagnetic Field Exposure and Cancer: a Review of Epidemiologic Evidence." *A Cancer Journal for Clinicians*, the American Cancer Society. January/February.

American Medical Association. 1994. *Effects of Electric and Magnetic Fields*. Report of the Council on Scientific Affairs to the American Medical Association. December.

California Public Utilities Commission. 1993. Order instituting investigation on the Commission's own motion to develop policies and procedures for addressing the potential health effects of electric and magnetic fields of utility facilities. Decision 93-11-013. November 2.

California Public Utilities Commission. 2006. Order Instituting Rulemaking to update the Commission's policies and procedures related to electromagnetic fields emanating from regulated utility facilities. Decision 06-01-042 January 26, 2006

National Institute of Environmental Health Sciences, National Institutes of Health. 1999. *NIEHS Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields. Prepared in Response to the 1992 Energy Policy Act.* June

National Research Council/ National Academy of Sciences. 1999. Research on Power-Frequency Fields Completed Under the Energy Policy Act of 1992 [Final Report, 1999]. May.

World Health Organization International EMF Project, 2001. Fact Sheet N° 263, ELECTROMAGNETIC FIELDS AND PUBLIC HEALTH Extremely low frequency fields and cancer. October.

World Health Organization. 2007 *Extremely low frequency (ELF) fields. Environmental Health Criteria, Vol. 238.*

World Health Organization. 2007 *Electromagnetic Fields and Public Health: Exposure to extremely low frequency fields.* Fact Sheet Number 322.

Pacific Gas & Electric Company. 2006. EMF Design Guidelines for Electrical Facilities.

APPENDIX A.2

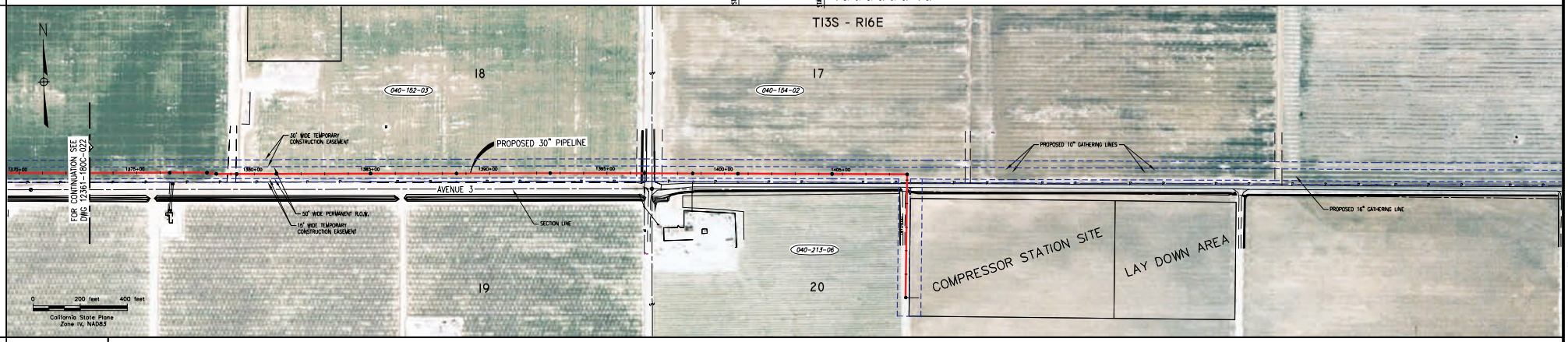
GAS PIPELINE ALIGNMENT SHEETS

OWNERSHIP	STA 1373+00.0	(040-152-03) CALIFORNIA VALLEY LAND COMPANY 2391.1 FEET/ 144.9 RODS	STA 1396+91.1	(040-154-02) NILUFARM LLC 1157.6 FEET/ 70.1 RODS	STA 1408+48.7	(040-213-06) SULLIVAN 459.0 FEET/ 27.8 RODS	STA 1413+07.7
P/L DEPTH		PIPELINE DEPTH 5' TO T.O.P.					
ENVIRONMENTAL		SENSITIVE CULTURAL RESOURCES ARE IDENTIFIED IN THIS AREA. DETAILS ARE AVAILABLE TO QUALIFIED PERSONNEL UNDER SEPARATE COVER."					

STATIONING

STA. 1373+00.0	MATCH LINE		
STA. 1376+40.5	POINT OF INTERSECTION	00°21'53" RT	638
STA. 1377+98.6	POINT OF INTERSECTION	07°10'54" RT	639
STA. 1378+38.6	POINT OF INTERSECTION	07°10'54" LT	640
STA. 1378+76.1	EXIT CROPS		641
STA. 1378+86.6	EDGE OF ROAD		642
STA. 1378+97.3	PUMP HEAD, 2.0' RT.		643
STA. 1379+22.2	EDGE OF ROAD		644
STA. 1379+25.3	POINT OF INTERSECTION	00°20'38" LT	645
STA. 1380+93.8	POINT OF INTERSECTION	00°00'51" LT	646
STA. 1384+94.4	POINT OF INTERSECTION	00°11'08" RT	647
STA. 1388+59.8	POINT OF INTERSECTION	00°10'46" LT	648
STA. 1392+58.2	POINT OF INTERSECTION	00°14'34" RT	649
STA. 1396+23.2	EXIT CROPS		650
STA. 1396+25.3	EDGE OF ROAD		651
STA. 1396+44.5	TOP OF SLOPE		652
STA. 1396+47.5	TOE OF SLOPE		653
STA. 1396+48.6	TOE OF SLOPE		654
STA. 1396+51.8	TOP OF SLOPE		655
STA. 1396+59.8	ON POWER LINE		656
STA. 1396+60.1	POINT OF INTERSECTION	00°17'24" RT	657
STA. 1396+67.4	EDGE OF ROAD		658
STA. 1396+91.1	SECTION LINE/ PROPERTY LINE		659
STA. 1397+00.4	TOP OF SLOPE		660
STA. 1397+04.0	TOE OF SLOPE		661
STA. 1397+33.8	EDGE OF ROAD		662
STA. 1397+35.7	ENTER CROPS		663
STA. 1398+94.1	POINT OF INTERSECTION	00°02'30" RT	664
STA. 1400+96.2	POINT OF INTERSECTION	00°04'08" LT	665
STA. 1404+56.7	POINT OF INTERSECTION	00°00'20" RT	666
STA. 1407+75.5	POINT OF INTERSECTION	90°24'37" RT	667
STA. 1407+90.0	VEGETATION CHANGE		668
STA. 1408+10.5	ON POWER LINE		669
STA. 1408+15.1	EDGE OF PAVEMENT		670
STA. 1408+31.5	EDGE OF PAVEMENT		671
STA. 1408+44.7	EDGE OF ROAD		672
STA. 1408+48.7	SECTION LINE/ PROPERTY LINE		673
STA. 1412+99.7	POINT OF INTERSECTION	89°59'52" LT	674
STA. 1413+07.7	END SURVEY		675

ALIGNMENT



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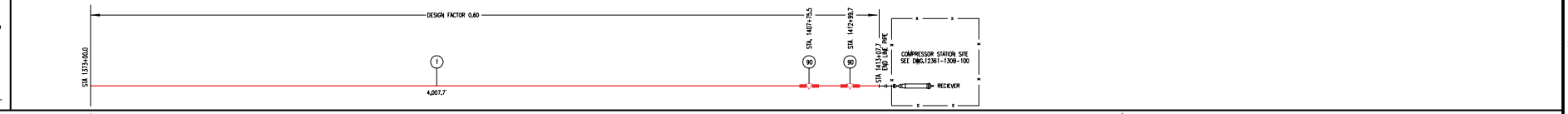

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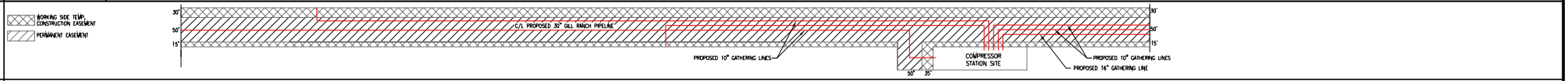

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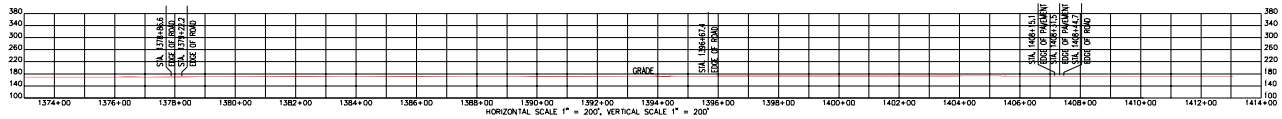

ISSUED FOR REVIEW
MAY 29 2009
ForeRunner Corporation

SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.500" W.T., API 5L X70, W/ 14-16 WLS FBE	4,007.7'
90	90° ELBOW, 3R (0.500" W.T.), CS, WSS SP-75, WPHY70	2
	TOTAL	4,007.7'

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-130B-100	COMPRESSOR FACILITY SITE PLAN
12361-180C-023	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	RS	5/29/09	CFE	5/29/09		
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY	SL	4/20/09				
P6	DRAWING NOT ISSUED						
P5	DRAWING NOT ISSUED						
P4	DRAWING NOT ISSUED						
P3	DRAWING NOT ISSUED						
P2	DRAWING NOT ISSUED						

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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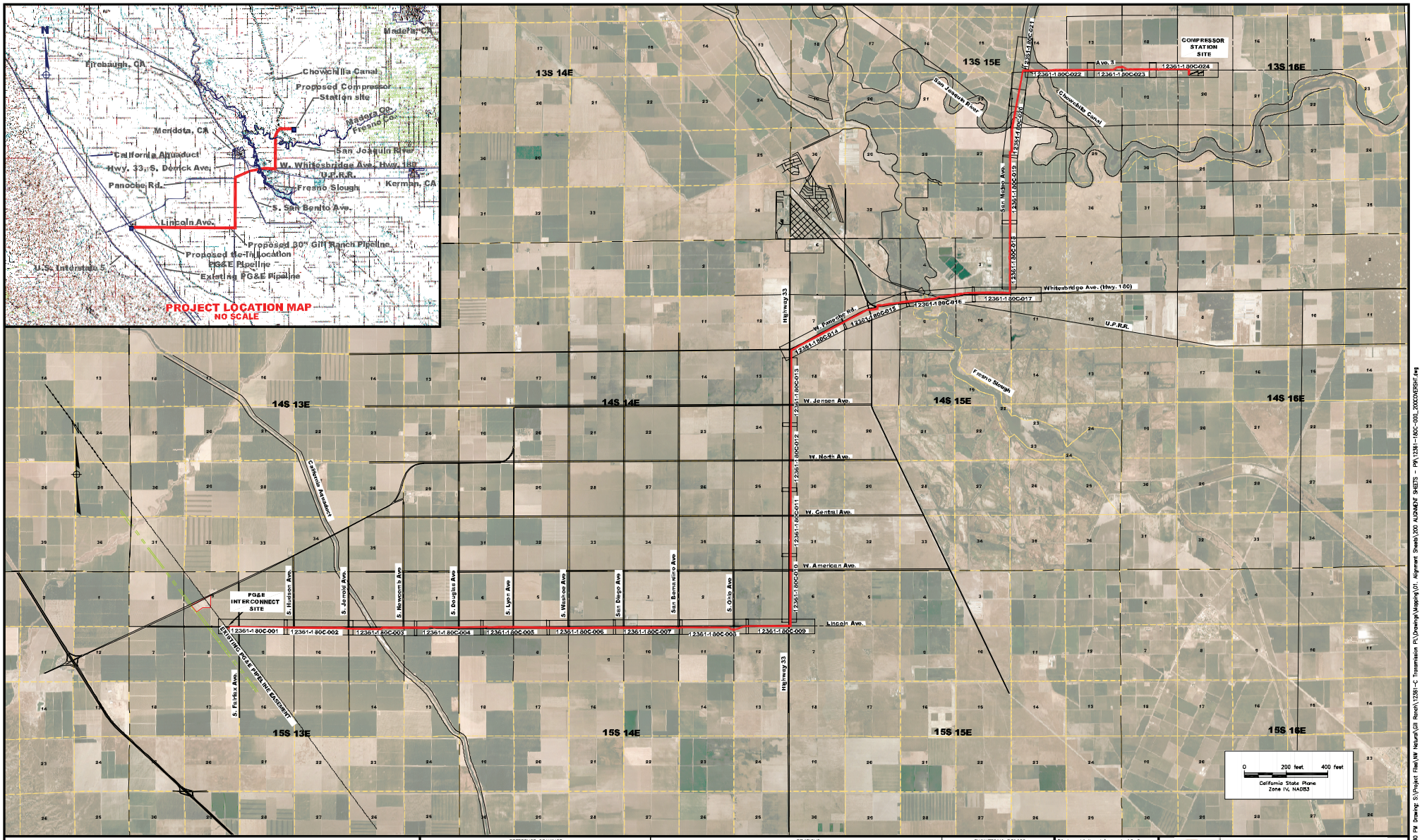
ForeRunner corporation
Denver Headquarters
Livermore, CO 80536
970-686-5600

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
STA 1373+00.0 TO 1413+07.7

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Madera Co., CA	12361-180C-024	P9

Plotted by: R.SUMRALD Date: 5/29/2009 4:01 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - PW\12361-180C-024_200.dwg



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DWG. NO.	TITLE	REV.

REVISIONS						
P6	RE-DRAWN – ISSUED FOR REVIEW	CFE	5/29/09	CFE	5/29/09	
P5	ISSUED FOR PERMIT	PJD	5/27/08	CFE	5/27/08	
P4	PRELIMINARY	PJD	4/11/08	CFE	4/11/08	
P3	PRELIMINARY	PJD	4/1/08	CFE	4/1/08	
P2	PRELIMINARY	CFE	2/27/08	CFE	2/27/08	
P1	PRELIMINARY	PJD	2/18/08	CFE	2/18/08	
		BY	DATE	CHK	DATE	APPR DATE

ENGINEERING RECORD		
DRAWN	PJD	2/18/08
CHECKED		
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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ForeRunner Corporation
Seattle, Washington Office
Lakeland, Florida Office
206-623-4444

GILL RANCH STORAGE

GILL RANCH 30" PIPELINE ALIGNMENT COVER SHEET AND ALIGNMENT DRAWING INDEX

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
1"=4000'	12361-C	Fresno & Madera Co. CA	12361-180C-00A	P6

Plotted by: SJAURA Date: 5/29/2009 4:40 PW Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawing\Mapping\01. Alignment Sheets\X00 ALIGNMENT SHEETS - PP\12361-180C-00L_2000COVERSHT.dwg

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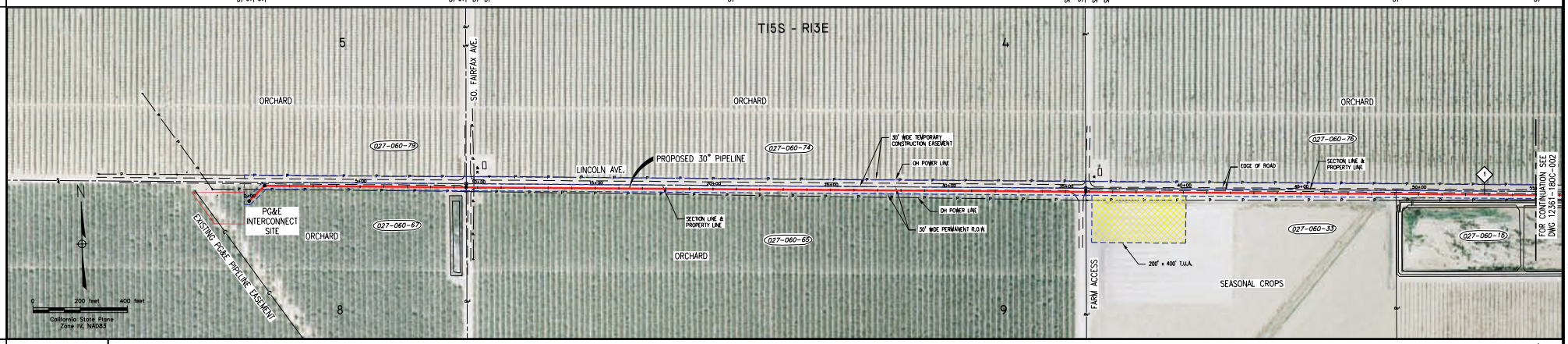
P/L DEPTH	PIPELINE DEPTH 5' TO T.O.P.								
ENVIRONMENTAL									

STATIONING

STA 0+00.0	BEGIN SURVEY	1	
STA 0+01.6	POINT OF INTERSECTION	2	45°00'47" LT
STA 0+94.0	POINT OF INTERSECTION	3	45°01'05" RT
STA 9+42.4	EDGE OF ROAD	4	
STA 9+51.0	POINT OF INTERSECTION	5	00°00'09" LT
STA 9+51.3	SECTION LINE, PROPERTY LINE	6	
STA 9+55.5	OH POWER LINE	7	
STA 20+73.3	EDGE OF ROAD	8	
STA 35+17.1	EDGE OF ROAD	9	
STA 35+85.0	POINT OF INTERSECTION	10	00°00'14" RT
STA 35+85.3	PROPERTY LINE	11	
STA 35+87.3	EDGE OF ROAD	12	
STA 49+05.3	PROPERTY LINE	13	
STA 55+00.0	MATCH LINE		

ALIGNMENT



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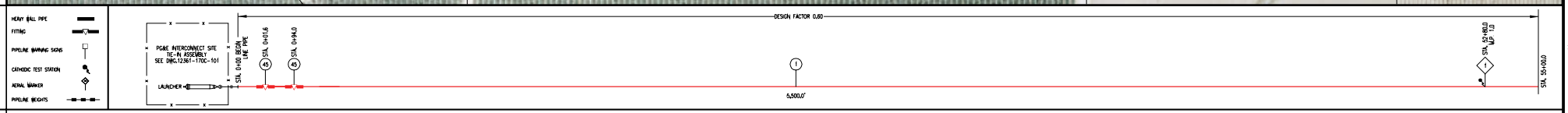

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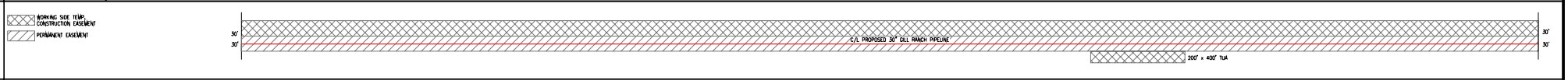

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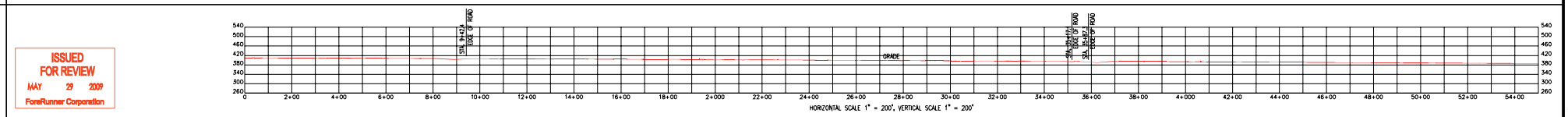

ISSUED FOR REVIEW
MAY 29 2009
ForeRunner Corporation

SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.500" W.T., API 5L X70, W/ 14-16 WALS FBE	5,500.0'
45	45° ELBOW, 3R (0.500" N.T.), CS, MSS SP-75, WPHY70	2
	CATHODIC TEST STATION	1

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-111	PG&E INTERCONNECT SITE - PLOT PLAN
12361-170C-101	PG&E TIE-IN ASSEMBLY PIPING DETAIL
12361-180C-002	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	RS	5/29/09	CFE	5/29/09		
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY / NEW SCALE	SL	4/20/09				
P6	ISSUE FOR PERMIT	MSP	7/8/08	CFE	7/8/08		
P5	ISSUE FOR PERMIT	PJD	5/27/08	CFE	5/27/08		
P4	PRELIMINARY	PJD	4/11/08	CFE	4/11/08		
P3	PRELIMINARY	PJD	4/1/08	CFE	4/1/08		
P2	PRELIMINARY	RC	2/27/08	CFE	2/27/08		

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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ForeRunner corporation
Fresno Headquarters P.O. Box
Lemoore, CA 93245
559-924-6000

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
STA 0+00.0 TO 55+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Fresno Co., CA	12361-180C-001	P9

Plotted by: R.SUMRALD Date: 5/29/2009 3:07 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - PRV\12361-180C-001_200.dwg

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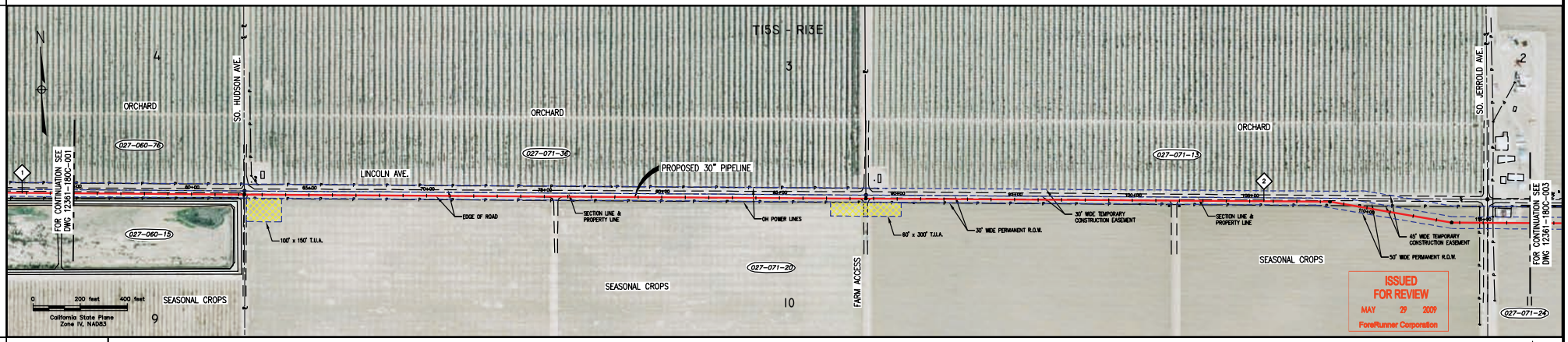
P/L DEPTH		PIPELINE DEPTH 5' TO T.O.P.					
ENVIRONMENTAL							

STATIONING

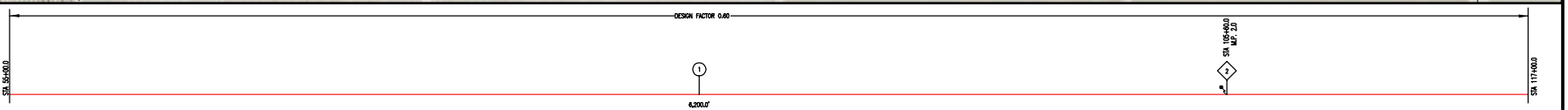
STA. 55+00.0	MATCH LINE			STA. 62+18.0	EDGE OF ROAD	14				STA. 75+77.9	EDGE OF ROAD	18		STA. 86+47.9	POINT OF INTERSECTION	19		STA. 101+56.8	EDGE OF ROAD	21		STA. 108+40.8	POINT OF INTERSECTION	23		STA. 113+65.5	POINT OF INTERSECTION	26	
				STA. 62+25.3	POINT OF INTERSECTION	15									00°00'25" RT			STA. 101+85.9	EDGE OF ROAD				09°19'20" RT				09°19'50" LT	27	
				STA. 62+25.4	SECTION LINE	16	00°02'42" LT							STA. 86+89.6	EDGE OF ROAD	20						STA. 109+44.2	OH POWER LINE	24		STA. 114+75.5	EXIT CROPS	28	
				STA. 62+49.4	EDGE OF ROAD	17																STA. 109+92.3	ENTER CROPS	25		STA. 114+94.5	OH POWER LINE	29	
																										STA. 115+42.0	EDGE OF ROAD	29	
																										STA. 115+18.1	SECTION LINE / PROPERTY LINE	30	
																										STA. 115+20.6	EDGE OF ROAD	31	
																										STA. 115+41.5	OH POWER LINE	32	
																										STA. 115+57.2	ENTER CROPS	33	
																										STA. 117+00.0	MATCH LINE		

ALIGNMENT



PIPELINE DATA

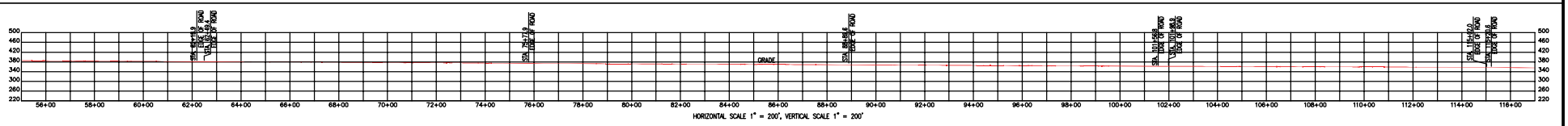
HEAVY WALL PIPE
FITTING
PIPELINE WARNING SIGNS
CATHODIC TEST STATION
AERIAL MARKER
PIPELINE WEIGHTS



EASEMENT

WORKING SIDE TEMP. CONSTRUCTION EASEMENT
PERMANENT EASEMENT

PROFILE



SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.500" W.T., API 5L X70, W/ 14-16 MILS FBE	6,200.0'
	CATHODIC TEST STATION	1

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-001	30" PIPELINE ALIGNMENT
12361-180C-003	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	RS	5/29/09				
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY / NEW SCALE	SL	4/20/09				
P6	ISSUE FOR PERMIT	MSP	7/8/08	CFE	7/8/08		
P5	ISSUE FOR PERMIT	PJD	5/27/08	CFE	5/27/08		
P4	PRELIMINARY	PJD	4/11/08	CFE	4/11/08		
P3	PRELIMINARY	PJD	4/1/08	CFE	4/1/08		
P2	PRELIMINARY	RC	2/27/08	CFE	2/27/08		

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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ForeRunner Corporation
Pipeline Transmission Group
Lawrence, KS 66046
913-492-0000

GILL RANCH STORAGE

GILL RANCH 30" PIPELINE ALIGNMENT STA 55+00.0 TO 117+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Fresno Co., CA	12361-180C-002	P9

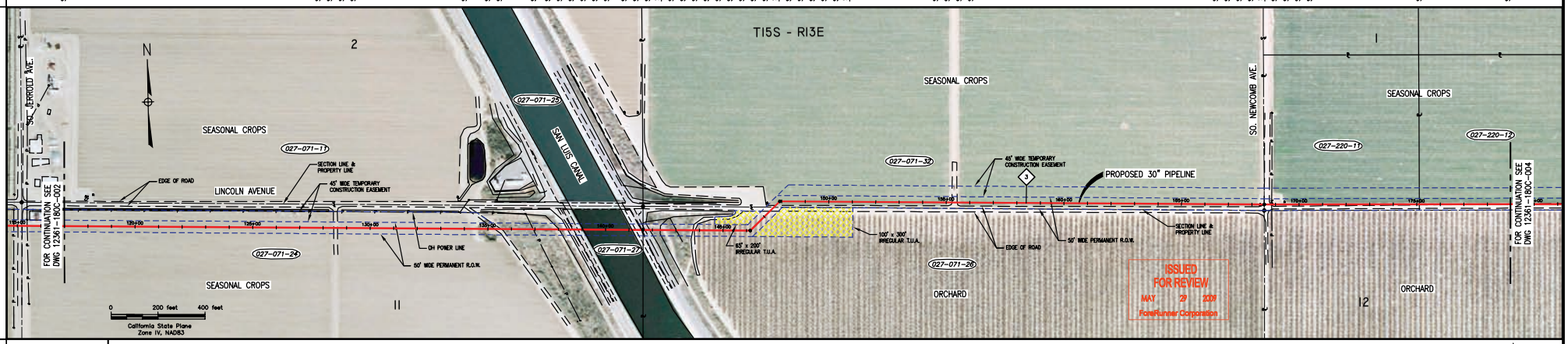
Plotted by: S.LAURA Date: 5/29/2009 3:08 PM Drawing: S:\Project Files\WR Natural\Gill Ranch\12361-C Transmission P/L\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - P9\12361-180C-002_200.dwg

OWNERSHIP	STA 117+00.0	027-071-24 DEMETRIOS S. KARABINIS 2163.9 FEET/ 131.1 RODS	STA 139+43.9	027-071-28 USA SAN LUIS CANAL 295.8 FEET/ 17.9 RODS	STA 141+99.7	027-071-26 SCHMITZ, MARY 597.2 FEET/ 36.1 RODS	STA 147+96.9	027-071-32 O'MARA, JOHN W. & ELAINE O'MARA, TRUSTEES OF THE O'MARA FAMILY TRUST 2094.8 FEET/ 126.9 RODS	STA 168+61.7	027-220-11 GRAMIS, EVAN 660.0 FEET/ 40.0 RODS (559)439-0502	STA 175+11.7	027-220-12 GRAMIS, EVAN 388.3 FEET/ 23.5 RODS (559)439-0502	STA 179+00.0
P/L DEPTH	PIPELINE DEPTH 5' TO T.O.P.												
ENVIRONMENTAL													

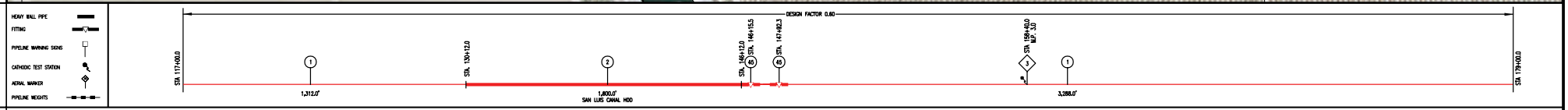
STATIONING

Station	Description
STA 117+00.0	MATCH LINE
STA 128+26.1	EXIT CROPS
STA 128+44.1	EDGE OF ROAD
STA 128+60.9	EDGE OF ROAD
STA 129+71.2	ENTER CROPS
STA 134+26.3	EXIT CROPS
STA 135+27.4	EDGE OF ROAD
STA 135+54.9	EDGE OF ROAD
STA 139+92.8	OH POWER LINE
STA 139+04.1	TOE OF SLOPE
STA 139+30.3	TOP OF SLOPE
STA 139+48.9	EDGE OF ROAD
STA 139+61.1	EDGE OF ROAD
STA 139+63.9	HIGH BANK OF CANAL, PROPERTY LINE (APPROX.)
STA 139+82.8	LOW BANK OF CANAL
STA 141+28.7	LOW BANK OF CANAL
STA 141+52.0	HIGH BANK OF CANAL
STA 141+55.4	EDGE OF ROAD
STA 141+56.9	POINT OF INTERSECTION 00°00'16" RT
STA 141+59.7	PROPERTY LINE
STA 141+67.7	EDGE OF ROAD
STA 141+87.7	TOP OF SLOPE
STA 142+32.7	TOE OF SLOPE
STA 143+01.4	C/L OF FENCE
STA 143+10.0	WELL HEAD, 14.6' LT.
STA 143+71.6	EDGE OF ROAD
STA 143+80.7	EDGE OF ROAD
STA 143+95.0	ENTER ORCHARD
STA 146+15.5	POINT OF INTERSECTION 44°59'59" LT
STA 146+43.9	EXIT ORCHARD
STA 147+32.9	EDGE OF ROAD
STA 147+56.9	SECTION LINE / PROPERTY LINE
STA 147+67.2	EDGE OF ROAD
STA 147+74.4	ENTER CROPS
STA 147+92.3	POINT OF INTERSECTION 44°59'59" RT
STA 155+12.4	EXIT CROPS
STA 155+24.0	EDGE OF ROAD
STA 155+46.1	EDGE OF ROAD
STA 155+53.1	ENTER CROPS
STA 168+34.6	WATER VALVE, 2.1' RT.
STA 168+35.9	EXIT CROPS
STA 168+46.7	EDGE OF ROAD
STA 168+51.7	PROPERTY LINE
STA 168+51.9	POINT OF INTERSECTION 00°28'59" LT
STA 168+78.7	EDGE OF ROAD
STA 168+83.9	POWER POLE, 6.9' LT.
STA 168+84.0	OH POWER LINE
STA 168+88.1	WATER VALVE, 9.9' LT.
STA 175+11.7	PROPERTY LINE
STA 179+00.0	MATCH LINE

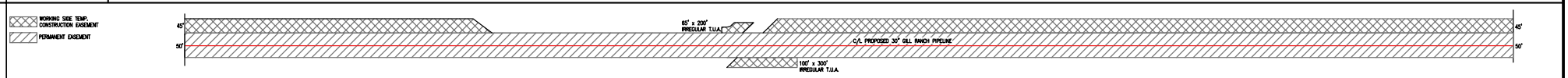
ALIGNMENT



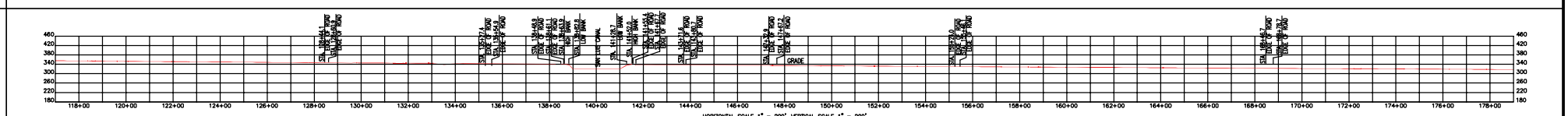
PIPELINE DATA



EASEMENT



PROFILE



SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 MILS FBE	4,600.0'
2	30" O.D. LINE PIPE x 0.607" W.T., API 5L X70, W/ 40 MILS ARO OVER 14/16 MILS FBE	1,800.0'
45	45° ELBOW, 3R (0.506" W.T.), CS, MSS SP-75, WPHY70	2
	CATHODIC TEST STATION	1
	TOTAL	6,200.0'

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-101	CALIFORNIA AQUEDUCT HDD DETAIL
12361-180C-002	30" PIPELINE ALIGNMENT
12361-180C-004	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	RS	5/29/09				
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY / NEW SCALE	SL	4/20/09				
P6	ISSUE FOR PERMIT	MSP	7/8/08	CFE	7/8/08		
P5	ISSUE FOR PERMIT	PJD	5/27/08	CFE	5/27/08		
P4	PRELIMINARY	PJD	4/11/08	CFE	4/11/08		
P3	PRELIMINARY	PJD	4/1/08	CFE	4/1/08		
P2	PRELIMINARY	RC	2/27/08	CFE	2/27/08		

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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ForeRunner Corporation
Energy Transportation Group
Lawrence, KS 66046
800-400-4000

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
STA 117+00.0 TO 179+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Fresno Co., CA	12361-180C-003	P9

Plotted by: S.LAURA Date: 5/29/2009 3:12 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission P&L\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - P9\12361-180C-003_200.dwg

OWNERSHIP

STA 179+00.0	
027-220-12	GRAMS, EVAN — 271.7 FEET/ 16.5 RODS (559)439-0502
STA 181+71.7	
027-220-13	GRAMS, EVAN — 1339.2 FEET/ 81.2 RODS (559)439-0502
STA 195+10.9	
027-220-30	GRAMS, EVAN — 996.9 FEET/ 60.4 RODS (559)439-0502
STA 205+07.8	
027-220-31	GRAMS, EVAN — 330.0 FEET/ 20.0 RODS (559)439-0502
STA 208+37.8	
027-220-32	CHRISTOPHER SPERO STEFANOPOULOS & ELENA STEFANOPOULOS, TRUSTEES OF THE AVA JEANNE STEFANOPOULOS TRUST — 1318.8 FEET/ 79.9 RODS
STA 221+56.6	
028-020-42	GRAMS, EVAN — 1943.4 FEET/ 117.8 RODS (559)439-0502
STA 241+00.0	

P/L DEPTH

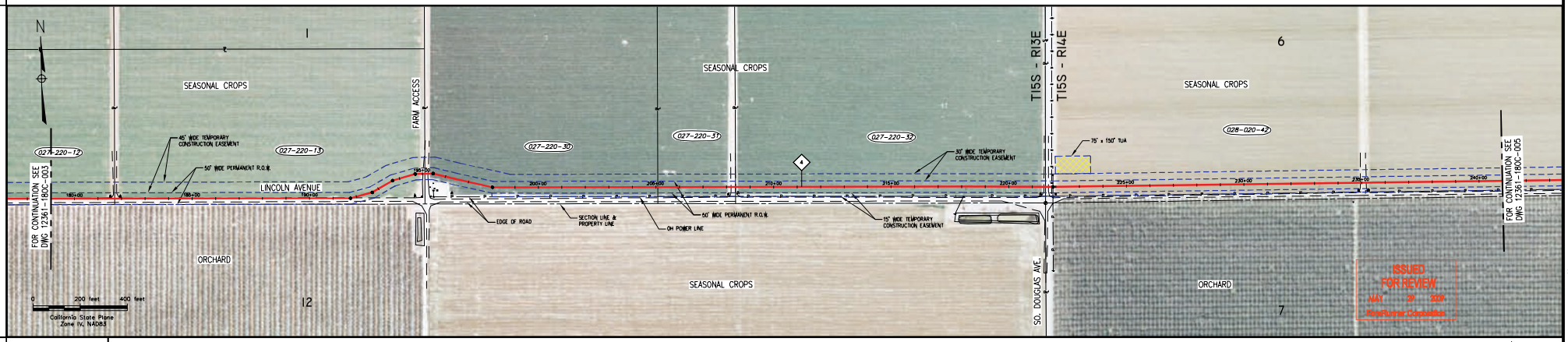
PIPELINE DEPTH 5' TO T.O.P.

ENVIRONMENTAL

STATIONING

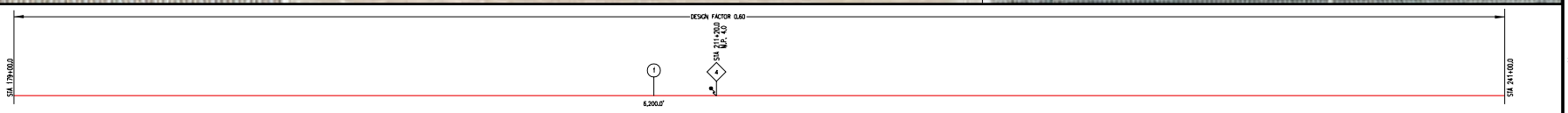
STA 179+00.0	MATCH LINE	
STA 181+53.0	WATER VALVE, 9.0" LT.	82
STA 181+71.7	PROPERTY LINE	83
STA 181+95.3	WATER VALVE, 8.4" LT.	84
STA 191+73.5	POINT OF INTERSECTION 14°59'58" LT	85
STA 191+80.4	EDGE OF ROAD	86
STA 191+92.6	ENTER CROPS	87
STA 192+89.8	POINT OF INTERSECTION 15°00'01" LT	88
STA 193+69.8	POINT OF INTERSECTION 13°49'57" RT	89
STA 194+69.8	POINT OF INTERSECTION 00°00'00" LT	90
STA 194+97.6	EXIT CROPS	91
STA 195+03.1	EDGE OF ROAD	92
STA 195+10.9	PROPERTY LINE	93
STA 195+24.7	EDGE OF ROAD	94
STA 195+39.8	ENTER CROPS	95
STA 195+45.9	POINT OF INTERSECTION 147°16'06" RT	96
STA 198+05.2	POINT OF INTERSECTION 13°03'04" LT	97
STA 205+07.8	PROPERTY LINE	98
STA 208+09.7	EXIT CROPS	99
STA 208+16.8	EDGE OF ROAD	100
STA 208+37.8	PROPERTY LINE	101
STA 208+38.4	EDGE OF ROAD	102
STA 208+47.4	ENTER CROPS	103
STA 221+26.0	EXIT CROPS	104
STA 221+49.6	EDGE OF ROAD	105
STA 221+56.6	RANGE, SECTION & PROPERTY LINE	106
STA 221+68.1	EDGE OF ROAD	107
STA 221+82.5	WATER LINE	108
STA 221+87.7	OH POWER LINE	109
STA 221+88.1	POINT OF INTERSECTION 00°49'24" LT	110
STA 221+96.6	ENTER CROPS	111
STA 234+87.4	EXIT CROPS	112
STA 234+95.0	EDGE OF ROAD	113
STA 235+19.8	EDGE OF ROAD	114
STA 241+00.0	MATCH LINE	

ALIGNMENT



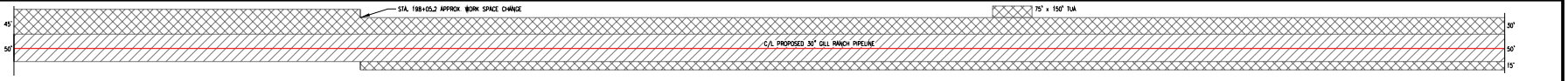
PIPELINE DATA

HEAVY WALL PIPE
FITTING
PIPELINE WARNING SIGNS
CATHODIC TEST STATION
AERIAL MARKER
PIPELINE HEIGHTS

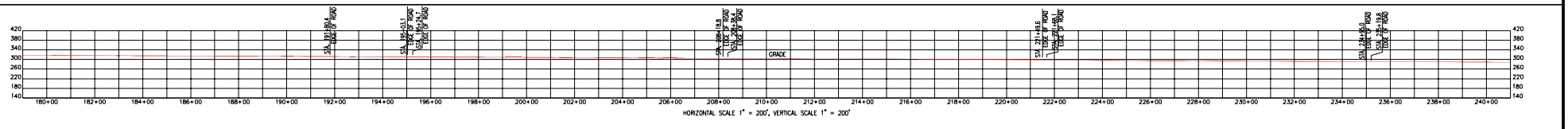


EASEMENT

WORKING SIDE TEMP. CONSTRUCTION EASEMENT
PERMANENT EASEMENT



PROFILE



SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.500" W.T., API 5L X70, W/ 14-16 WALS FBE	6,200.0'
	CATHODIC TEST STATION	1

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-003	30" PIPELINE ALIGNMENT
12361-180C-005	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	RS	5/29/09				
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY / NEW SCALE	SL	4/20/09				
P6	ISSUE FOR PERMIT	MSP	7/8/08	CFE	7/8/08		
P5	ISSUE FOR PERMIT	PJD	5/27/08	CFE	5/27/08		
P4	PRELIMINARY	PJD	4/11/08	CFE	4/11/08		
P3	PRELIMINARY	PJD	4/1/08	CFE	4/1/08		
P2	PRELIMINARY	RG	2/27/08	CFE	2/27/08		

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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ForeRunner corporation
Fresno Headquarters
Livermore, CA
800-800-0000

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
STA 179+00.0 TO 241+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Fresno Co., CA	12361-180C-004	P9

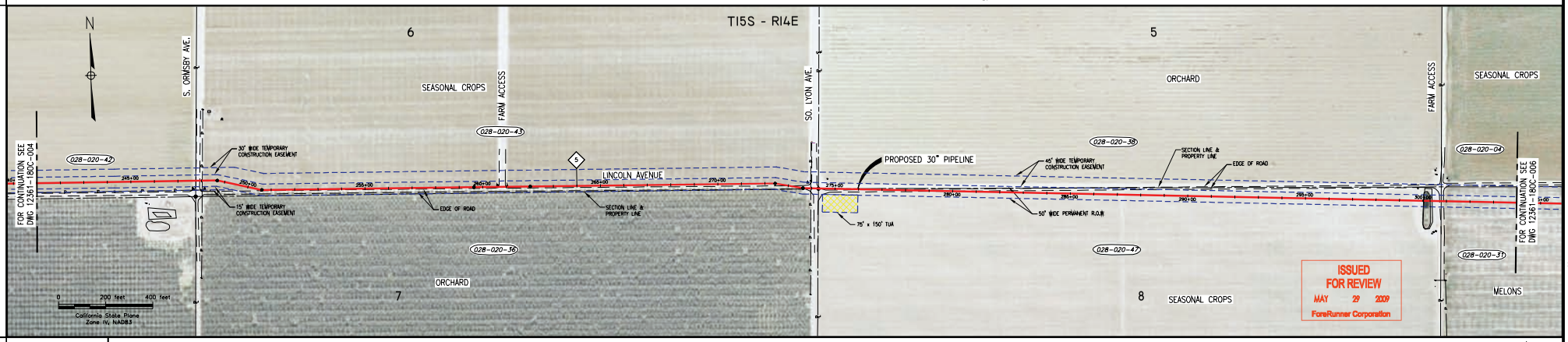
Plotted by: SLAGRA Date: 5/29/2009 3:15 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - P9\12361-180C-004_200.dwg

OWNERSHIP	STA 241+00.0	(028-020-42) GRAMS, EVAN 675.6 FEET/ 40.9 RODS (559)439-0502	STA 247+75.6	(028-020-43) GRAMS, EVAN 265.4 FEET/ 16.0 RODS (559)439-0502	STA 274+29.0	(028-020-38) GOMENS, NICOLE 96.1 FEET/ 5.4 RODS (559)659-3254	STA 275+95.1	(028-020-47) PAPPAS FARMING CO. 2892.0 FEET/ 175.1 RODS (559)659-3254	STA 300+77.1	(028-020-31) PAPPAS FARMING CO. 322.9 FEET/ 19.6 RODS	STA 304+00.0
P/L DEPTH	PIPELINE DEPTH 5' TO T.O.P.										
ENVIRONMENTAL											

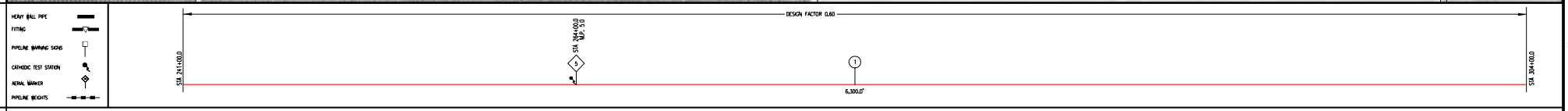
STATIONING

STA	DESCRIPTION	ITEM
STA 241+00.0	MATCH LINE	
STA 247+65.6	EXIT CROPS	116
STA 247+75.6	PROPERTY LINE	117
STA 247+76.9	EDGE OF ROAD	118
STA 247+92.6	EDGE OF ROAD	119
STA 248+03.1	OH POWER LINE	120
STA 248+12.5	ENTER CROPS	121
STA 248+66.8	POINT OF INTERSECTION 12°42'45" RT	122
STA 259+55.8	EXIT CROPS	123
STA 259+60.9	POINT OF INTERSECTION 12°38'20" LT	124
STA 259+63.0	POINT OF INTERSECTION 00°00'00" RT	125
STA 260+62.3	WATER VALVE, 6.5' LT.	126
STA 260+67.3	EDGE OF ROAD	127
STA 260+97.8	EDGE OF ROAD	128
STA 261+04.0	WATER VALVE, 6.2' LT.	129
STA 261+65.3	ENTER CROPS	130
STA 262+62.3	POINT OF INTERSECTION 00°00'00" LT	131
STA 272+43.2	POINT OF INTERSECTION 10°00'09" RT	132
STA 272+60.9	EXIT CROPS	133
STA 273+02.4	EDGE OF ROAD	134
STA 273+63.2	POINT OF INTERSECTION 08°26'58" LT	135
STA 273+96.7	OH POWER LINE	136
STA 274+29.0	SECTION LINE, PROPERTY LINE	137
STA 274+37.8	EDGE OF ROAD	138
STA 274+85.1	SECTION LINE, PROPERTY LINE	139
STA 276+80.0	EDGE OF ROAD	140
STA 280+03.1	EDGE OF ROAD	141
STA 280+05.1	ENTER CROPS	142
STA 299+63.8	EXIT CROPS	143
STA 300+05.1	TOP OF SLOPE	144
STA 300+39.0	TOP OF SLOPE	145
STA 300+71.0	EDGE OF ROAD	146
STA 300+77.1	PROPERTY LINE	147
STA 300+87.8	EDGE OF ROAD	
STA 301+01.0	ENTER CROPS	
STA 304+00.0	MATCH LINE	

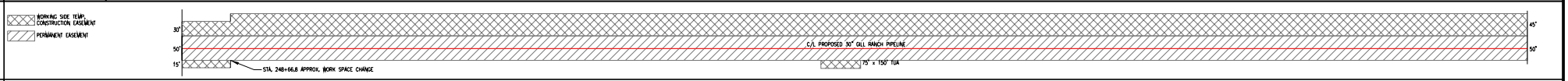
ALIGNMENT



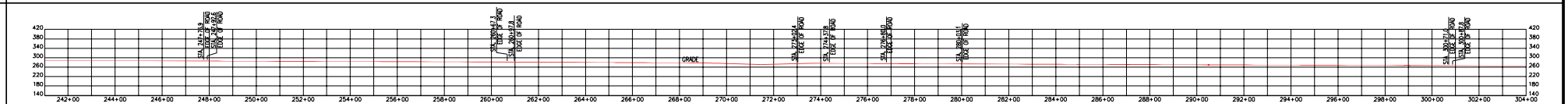
PIPELINE DATA



EASEMENT



PROFILE



SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.500" W.T., API 5L X70, W/ 14-16 WLS FBE	6,300.0'
	CATHODIC TEST STATION	1

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-004	30" PIPELINE ALIGNMENT
12361-180C-006	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	RS	5/29/09	CFE	5/29/09		
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY / NEW SCALE	SL	4/20/09				
P6	ISSUE FOR PERMIT	MSP	7/8/08	CFE	7/8/08		
P5	ISSUE FOR PERMIT	PJD	5/27/08	CFE	5/27/08		
P4	PRELIMINARY	PJD	4/11/08	CFE	4/11/08		
P3	PRELIMINARY	PJD	4/1/08	CFE	4/1/08		
P2	PRELIMINARY	RC	3/27/08	CFE	3/27/08		

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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ForeRunner corporation
Fresno Sacramento Bay Area
Livermore, 925-960-0000
800-400-0000

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
STA 241+00.0 TO 304+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Fresno Co., CA	12361-180C-005	P9

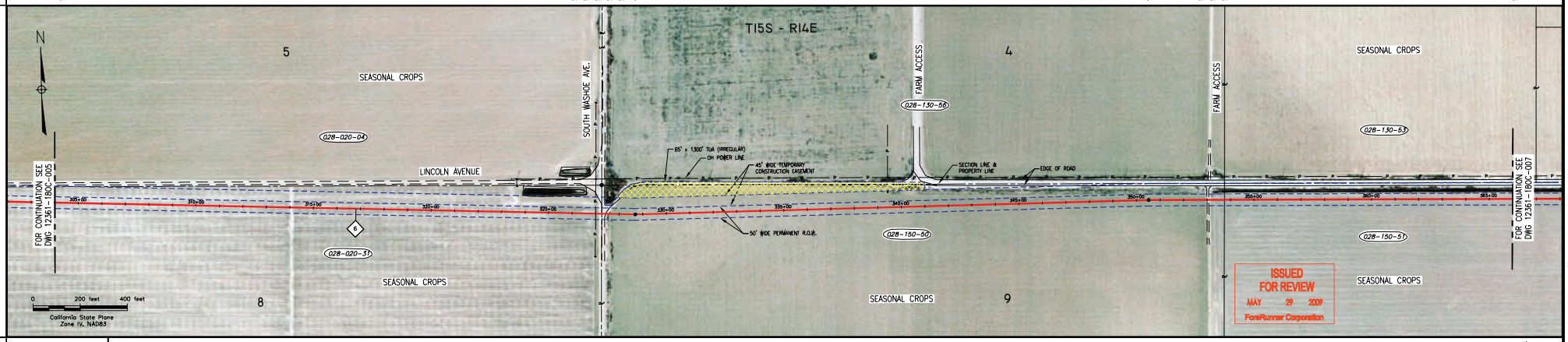
Plotted by: R.SUMRALD Date: 5/29/2009 3:18 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission Pl\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - PN\12361-180C-005_200.dwg

OWNERSHIP	STA 304+00.0	(028-020-31) PAPPAS FARMING CO. 2,297.9 FEET/ 139.3 RODS	STA 326+97.9	(028-150-50) WESTLANDS WATER DIST. 2,676.6 FEET/ 162.2 RODS	STA 353+74.5	(028-150-51) WESTLANDS WATER DIST 1,226.0 FEET/ 74.3 RODS (559)241-6233	STA 366+00.0
P/L DEPTH		PIPELINE DEPTH 5' TO T.O.P.					
ENVIRONMENTAL							

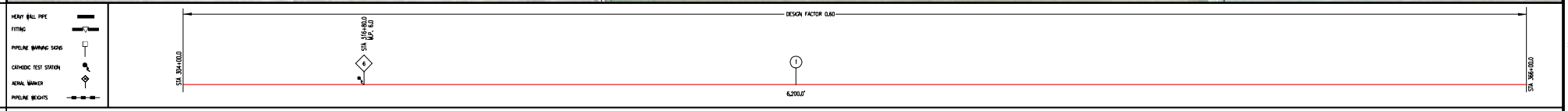
STATIONING

STA		
STA 304+00.0	MATCH LINE	
STA 326+98.0	EXIT CROP	148
STA 326+99.6	OH POWER LINE	149
STA 327+25.3	SECTION LINE, PROPERTY LINE	150
STA 327+26.2	EDGE OF ROAD	151
STA 327+43.0	EDGE OF ROAD	152
STA 329+68.5	POINT OF INTERSECTION 02°40'58" LT	153
STA 350+52.1	POINT OF INTERSECTION 01°26'35" RT	154
STA 352+99.8	EDGE OF ROAD	155
STA 353+07.4	EDGE OF ROAD	156
STA 353+74.5	PROPERTY LINE	157
STA 366+00.0	MATCH LINE	

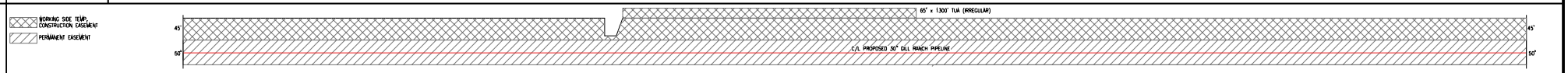
ALIGNMENT



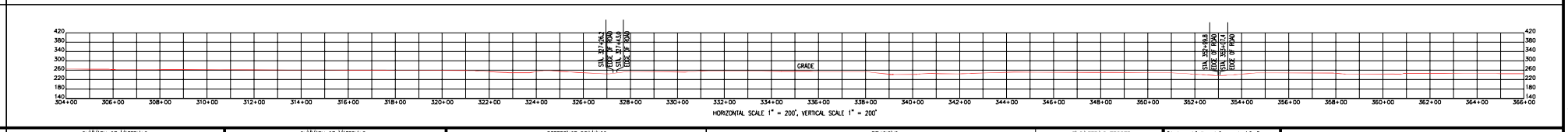
PIPELINE DATA



EASEMENT



PROFILE



SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.500" W.T., API 5L X70, W/ 14-16 WALS FBE	6,200.0'
	CATHODIC TEST STATION	1

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-005	30" PIPELINE ALIGNMENT
12361-180C-007	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	RS	5/29/09	CFE	5/29/09		
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY / NEW SCALE	SL	4/30/09				
P6	ISSUE FOR PERMIT	MSP	7/8/08	CFE	7/8/08		
P5	ISSUE FOR PERMIT	PJD	5/27/08	CFE	5/27/08		
P4	PRELIMINARY	PJD	4/11/08	CFE	4/11/08		
P3	PRELIMINARY	PJD	4/1/08	CFE	4/1/08		
P2	PRELIMINARY	RC	2/27/08	CFE	2/27/08		

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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ForeRunner corporation
Fresno Headquarters: 5175 E. Pacific Ave.
Livermore, CA 94550
925-606-8888

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
STA 304+00.0 TO 366+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Fresno Co., CA	12361-180C-006	P9

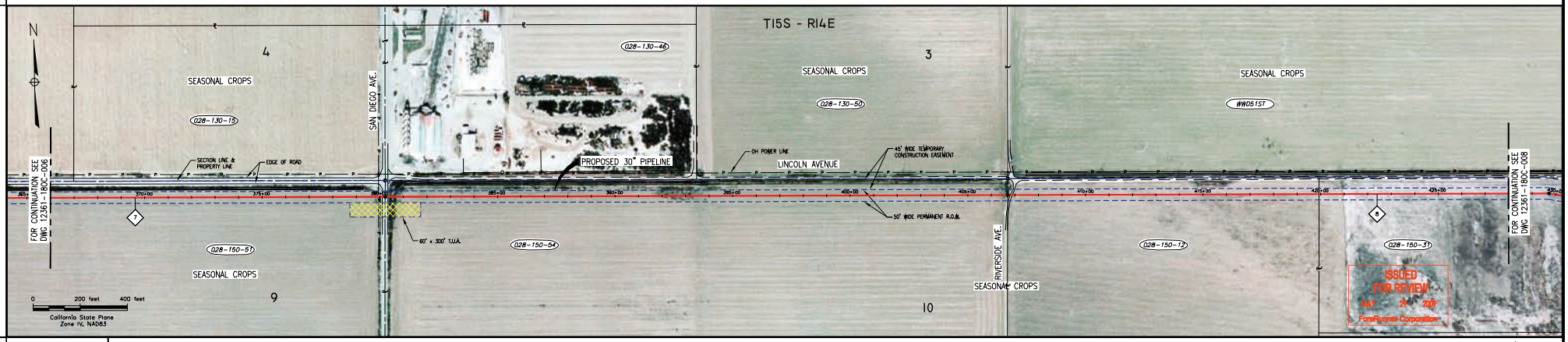
Plotted by: R.SUMRULD Date: 5/29/2009 3:21 PM Drawing: S:\Project Files\NW Network\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - PW\12361-180C-006_200.dwg

OWNERSHIP	STA 366+00.0	(028-180-01) WESTLANDS WATER DIST 1,422.7 FEET/ 86.2 RODS (559)241-6233	STA 380+22.7	(028-180-04) WESTLANDS WATER DIST 2,647.2 FEET/ 160.4 RODS (559)241-6233	STA 406+69.9	(028-180-12) WESTLANDS WATER DIST 1,323.5 FEET/ 80.2 RODS (559)241-6233	STA 419+93.2	(028-180-31) WESTLANDS WATER DIST 806.8 FEET/ 48.9 RODS (559)241-6233	STA 428+00.0
P/L DEPTH	PIPELINE DEPTH 5' TO T.O.P.								
ENVIRONMENTAL									

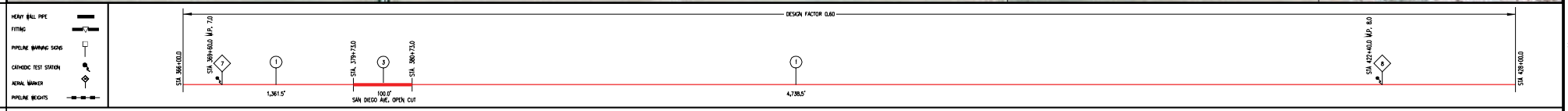
STATIONING

Station	Item
STA. 366+00.0	MATCH LINE
STA. 379+94.8	OH POWER LINE
STA. 380+11.5	EDGE OF ROAD
STA. 380+22.7	SECTION LINE, PROPERTY LINE
STA. 380+23.0	POINT OF INTERSECTION
STA. 380+34.5	EDGE OF ROAD
STA. 380+56.2	TELEPHONE RISER - 1"-4" INT
STA. 406+69.9	PROPERTY LINE
STA. 406+70.2	POINT OF INTERSECTION
STA. 406+80.1	EDGE OF ROAD
STA. 406+88.8	EDGE OF ROAD
STA. 419+93.2	PROPERTY LINE
STA. 428+00.0	MATCH LINE

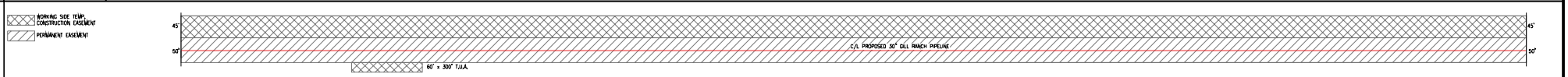
ALIGNMENT



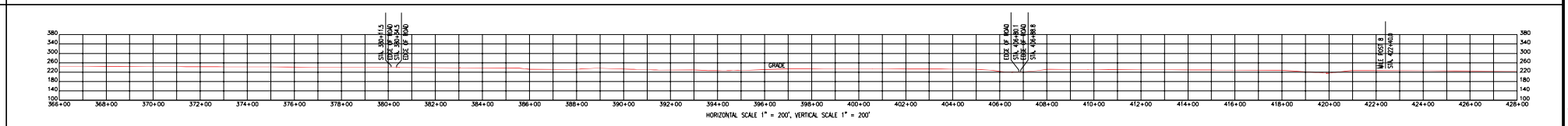
PIPELINE DATA



EASEMENT



PROFILE



SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.500" W.T., API 5L X70, W/ 14-16 WALS FBE	6,100.0'
3	30" O.D. BORE PIPE x 0.607" W.T., API 5L X70, W/ 40 WALS AND OVER 14-16 WALS FBE	100.0'
	CATHODIC TEST STATION	2
	TOTAL	6,200.0'

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-006	30" PIPELINE ALIGNMENT
12361-180C-008	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	RS	5/29/09	CFE	5/29/09		
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY / NEW SCALE	SL	4/20/09				
P6	ISSUE FOR PERMIT	MSP	7/8/08	CFE	7/8/08		
P5	ISSUE FOR PERMIT	PJD	5/27/08	CFE	5/27/08		
P4	PRELIMINARY	PJD	4/11/08	CFE	4/11/08		
P3	PRELIMINARY	PJD	4/1/08	CFE	4/1/08		
P2	PRELIMINARY	RC	2/27/08	CFE	2/27/08		

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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FORDRUNNER corporation
Energy Management Group / Pipe
Livermore, CA 94550
925-373-3000

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
STA 366+00.0 TO 428+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Fresno Co., CA	12361-180C-007	P9

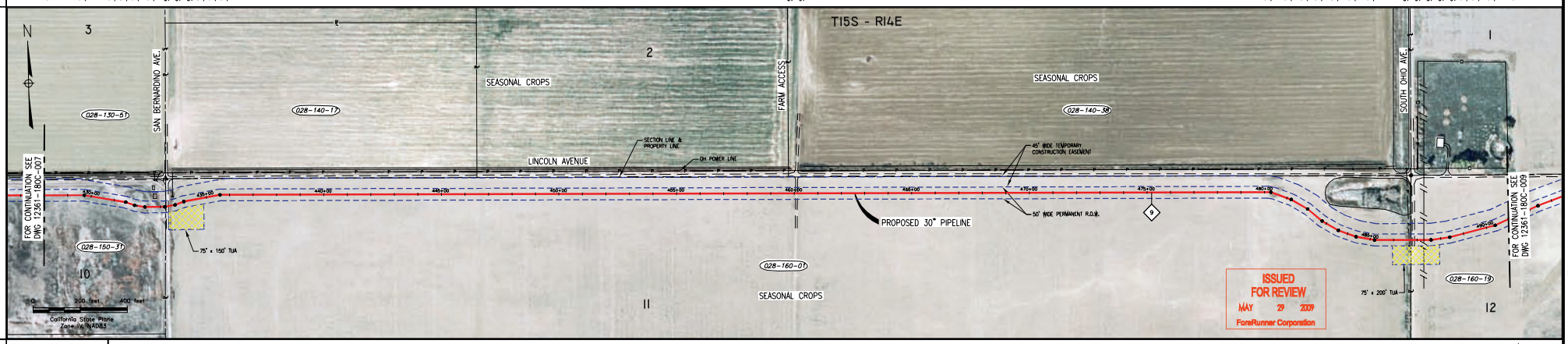
Plotted by: R.SUMRALD Date: 5/28/2009 3:23 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - PW\12361-180C-007_200.dwg

OWNERSHIP	STA 428+00.0	(028-150-37) WESTLANDS WATER DIST 521.7 FEET/ 31.6 RODS (559)241-6233	STA 435+21.7	(028-160-01) WARDEN, RONALD E. 6,351.5 FEET/ 524.5 RODS	STA 486+73.2	(028-160-19) WESTLANDS WATER DIST 426.8 FEET/ 28.9 RODS (559)241-6233	STA 491+00.0
P/L DEPTH		PIPELINE DEPTH 5' TO T.O.P.					
ENVIRONMENTAL							

STATIONING

STA 428+00.0	MATCH LINE		
STA 429+70.7	POINT OF INTERSECTION	09°37'39" RT	169
STA 431+49.2	POINT OF INTERSECTION	09°59'54" RT	170
STA 431+89.2	POINT OF INTERSECTION	09°59'54" RT	171
STA 432+31.6	POINT OF INTERSECTION	09°59'55" LT	172
STA 433+18.0	POINT OF INTERSECTION	10°00'04" LT	173
STA 433+21.7	SECTION LINE, PROPERTY LINE	09°59'56" LT	174
STA 433+23.5	EDGE OF ROAD		175
STA 433+33.9	EDGE OF ROAD		176
STA 433+42.4	POINT OF INTERSECTION	10°00'03" LT	177
STA 434+02.4	POINT OF INTERSECTION	10°00'03" RT	178
STA 435+58.7	POINT OF INTERSECTION	10°23'53" RT	179
STA 460+05.8	EDGE OF ROAD		180
STA 460+13.8	EDGE OF ROAD		181
STA 480+26.5	POINT OF INTERSECTION	20°00'00" RT	182
STA 481+18.9	POINT OF INTERSECTION	09°59'59" RT	183
STA 481+66.9	POINT OF INTERSECTION	10°00'01" RT	184
STA 482+78.9	POINT OF INTERSECTION	10°00'02" LT	185
STA 483+58.9	POINT OF INTERSECTION	09°59'57" LT	186
STA 484+38.9	POINT OF INTERSECTION	10°00'04" LT	187
STA 485+18.9	POINT OF INTERSECTION	09°59'57" LT	188
STA 486+65.3	OH POWER LINE		189
STA 486+73.2	SECTION LINE, PROPERTY LINE		190
STA 486+88.8	EDGE OF ROAD		191
STA 487+28.4	PIPELINE CROSSING (APPROX.)		192
STA 487+68.9	POINT OF INTERSECTION	07°59'58" LT	193
STA 488+38.9	POINT OF INTERSECTION	08°30'00" LT	194
STA 489+38.9	POINT OF INTERSECTION	09°59'59" LT	195
STA 491+00.0	MATCH LINE		

ALIGNMENT



PIPELINE DATA

HEAVY WALL PIPE
FITTING
PIPELINE WARNING SIGNS
CATHODIC TEST STATION
AERIAL MARKER
PIPELINE WEIGHTS

DESIGN FACTOR 0.60

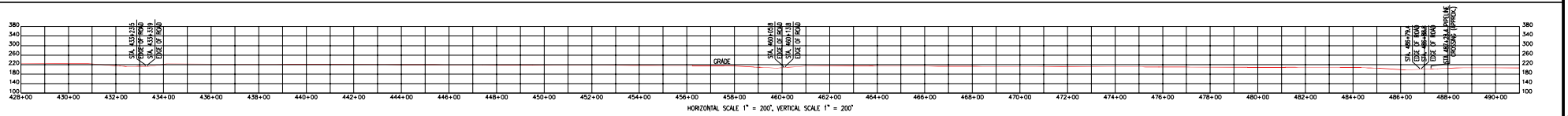
STA 428+00.0 — (1) 5,820.0' — STA 475+20.0 MP. 9.0 — (9) — STA 486+70.0 — (3) 100.0' SOUTH OHIO AVE. OPEN CUT — STA 487+20.0 — STA 487+28.4 PIPELINE CROSSING (APPROX.) — (1) 380.0' — STA 491+00.0

EASEMENT

WORKING SIDE TEMP. CONSTRUCTION EASEMENT
PERMANENT EASEMENT

45' / 50' — C/L PROPOSED 30" GILL RANCH PIPELINE — 75' x 150' TUA — 75' x 200' TUA

PROFILE



HORIZONTAL SCALE 1" = 200', VERTICAL SCALE 1" = 200'

SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 WLS FBE	6,200.0'
3	30" O.D. BORE PIPE x 0.607" W.T., API 5L X70, W/ 40 WLS ARO	100.0'
	CATHODIC TEST STATION	2
	TOTAL	6,300.0'

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-007	30" PIPELINE ALIGNMENT
12361-180C-009	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	RS	5/29/09	CFE	5/29/09		
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY / NEW SCALE	SL	4/20/09				
P6	ISSUE FOR PERMIT	MSP	7/8/08	CFE	7/8/08		
P5	ISSUE FOR PERMIT	PJD	5/27/08	CFE	5/27/08		
P4	PRELIMINARY	PJD	4/11/08	CFE	4/11/08		
P3	PRELIMINARY	PJD	4/1/08	CFE	4/1/08		
P2	PRELIMINARY	RC	2/27/08	CFE	2/27/08		

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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ForeRunner corporation
Fresno Headquarters/Office
Livermore, CA 94550
925-606-8888

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
STA 428+00.0 TO 491+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Fresno Co., CA	12361-180C-008	P9

Plotted by: SLAGRA Date: 5/29/2009 3:32 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission P&L\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - P9\12361-180C-008_200.dwg

OWNERSHIP

Station	Parcel	Owner	Length
STA 491+00.0	028-160-19	WESTLANDS WATER DIST (559)241-6233	576.8 FEET/ 35.0 RODS
STA 496+76.8	028-140-37	WESTLANDS WATER DIST (559)241-6233	1,695.7 FEET/ 102.8 RODS
STA 513+72.5	028-140-23	WESTLANDS WATER DIST (559)241-6233	2,617.2 FEET/ 158.6 RODS
STA 539+89.7	CDOT	ST HWY 33	100.0 FEET/ 6.1 RODS
STA 540+89.7	028-030-01	WESTLANDS WATER DIST (559)241-6233	410.3 FEET/ 24.9 RODS
STA 545+00.0			

P/L DEPTH

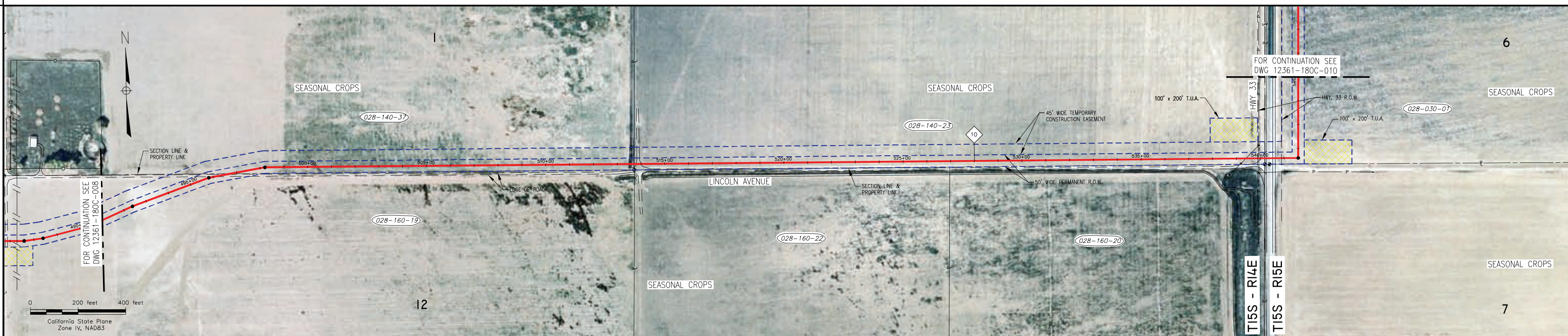
PIPELINE DEPTH 5' TO T.O.P.

ENVIRONMENTAL

STATIONING

Station	Description	No.
STA. 491+00.0	MATCH LINE	
STA. 492+38.9	POINT OF INTERSECTION 04°07'22" RT	196
STA. 495+81.3	POINT OF INTERSECTION 10°00'00" RT	197
STA. 496+07.4	EDGE OF ROAD	198
STA. 496+59.3	EDGE OF ROAD	199
STA. 496+76.8	SECTION LINE, PROPERTY LINE	200
STA. 498+20.8	POINT OF INTERSECTION 10°00'09" RT	201
STA. 513+50.8	TOP OF SLOPE	202
STA. 513+60.1	TOE OF SLOPE	203
STA. 513+68.4	TOP OF SLOPE	204
STA. 513+72.5	PROPERTY LINE	205
STA. 513+79.6	EDGE OF ROAD	206
STA. 514+00.7	EDGE OF ROAD	207
STA. 539+40.0	OH POWER LINE	208
STA. 539+89.7	RIGHT OF WAY	209
STA. 539+94.3	OH POWER LINE	210
STA. 540+19.7	SECTION LINE	211
STA. 540+26.8	EDGE OF PAVEMENT	212
STA. 540+52.3	EDGE OF PAVEMENT	213
STA. 540+63.5	TOE OF SLOPE	214
STA. 540+66.1	ENTER CROPS	215
STA. 540+89.7	RIGHT OF WAY	216
STA. 541+59.7	POINT OF INTERSECTION 89°27'40" LT	217
STA. 545+00.0	MATCH LINE	

ALIGNMENT



PIPELINE DATA

Legend: HEAVY WALL PIPE; FITTING; PIPELINE WARNING SIGNS; CATHODIC TEST STATION; AERIAL MARKER; PIPELINE WEIGHTS

DESIGN FACTOR 0.60

STA 491+00.0 — (1) 4,830.0' — STA 528+00.0 M.P. 10.0 (10) — STA. 539+30.0 (3) 170.0' — STA. 541+00.0 — STA. 541+59.7 (90) — (1) 400.0' — STA 545+00.0

EASEMENT

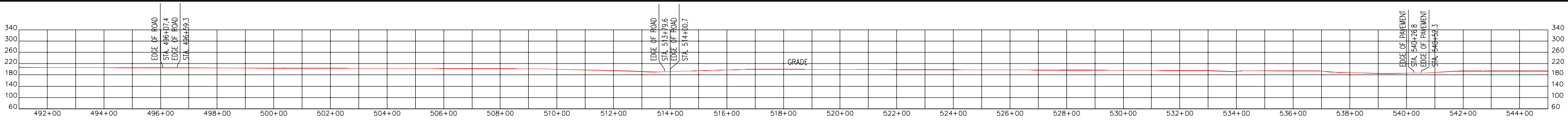
Legend: WORKING SIDE TEMP. CONSTRUCTION EASEMENT; PERMANENT EASEMENT

45' — C/L PROPOSED 30" GILL RANCH PIPELINE — 50'

100' x 200' T.U.A.

100' x 200' T.U.A.

PROFILE



HORIZONTAL SCALE 1" = 200', VERTICAL SCALE 1" = 200'

ISSUED FOR REVIEW
MAY 29 2009
ForeRunner Corporation

SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 MILS FBE	5,230.0'
3	30" O.D. BORE PIPE x 0.607" W.T., API 5L X70, W/ 40 MILS ARO	
	OVER 14/16 MILS FBE	170.0'
90	90° ELBOW, 3R, (0.506" W.T.), CS, MSS SP-75, WPHY70	2
	CATHODIC TEST STATION	1
	TOTAL	5,400.0'

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-008	30" PIPELINE ALIGNMENT
12361-180C-010	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	RS	5/29/09	CFE	5/29/09		
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY / NEW SCALE	SL	4/20/09				
P6	ISSUE FOR PERMIT	MSP	7/8/08	CFE	7/8/08		
P5	ISSUE FOR PERMIT	PJD	5/27/08	CFE	5/27/08		
P4	PRELIMINARY	PJD	4/11/08	CFE	4/11/08		
P3	PRELIMINARY	PJD	4/1/08	CFE	4/1/08		
P2	PRELIMINARY	RC	2/27/08	CFE	2/27/08		

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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FORERUNNER CORPORATION
3900 S. WADSWORTH BLVD. #500
LAKEWOOD, CO 80235
303-989-0323

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
STA 491+00.0 TO 545+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Fresno Co., CA	**12361-180C-009**	**P9**

Plotted by: R.SUMRULD Date: 5/28/2009 3:28 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - P9\12361-180C-009_200.dwg

OWNERSHIP	STA 545+00.0	(028-030-01) WESTLANDS WATER DIST 4938.3 FEET/ 299.3 RODS (559)241-6233	STA 594+38.3	(019-180-31) WESTLANDS WATER DIST 1461.7 FEET/ 88.6 RODS (559)241-6233	STA 609+00.0
P/L DEPTH		PIPELINE DEPTH 5' TO T.O.P.			
ENVIRONMENTAL					

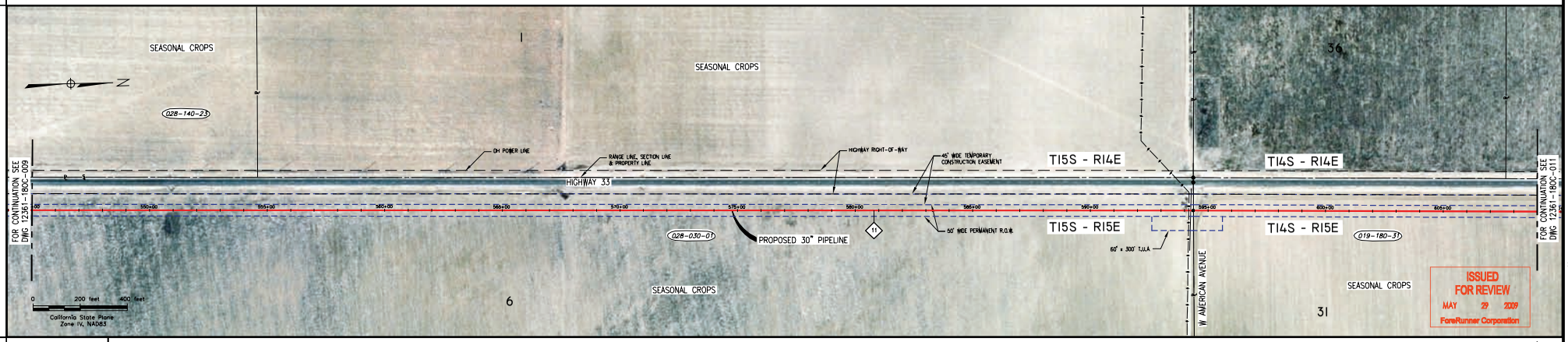
STATIONING

STA 545+00.0 MATCH LINE

STA 593+08.2 EXIT CROPS 218
STA 594+06.6 ON POWER LINE 219
STA 594+13.6 WATER LINE 220
STA 594+25.7 C/L OF ROAD (W. AMERICAN AVE.) 221
STA 594+37.2 POINT OF INTERSECTION 057°01'00" RT. 222
STA 594+38.3 TOWNSHIP, SECTION & PROPERTY LINE 223
STA 594+60.5 ENTER CROPS

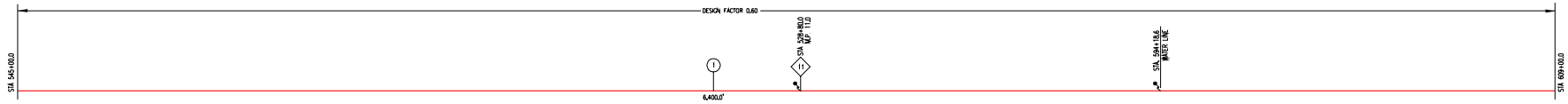
STA 609+00.0 MATCH LINE

ALIGNMENT



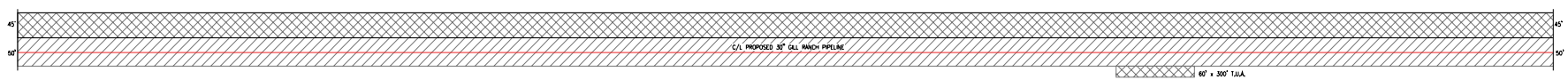
PIPELINE DATA

HEAVY WALL PIPE
FITTING
PIPELINE WARNING SIGNS
CATHODIC TEST STATION
AERIAL MARKER
PIPELINE WEIGHTS

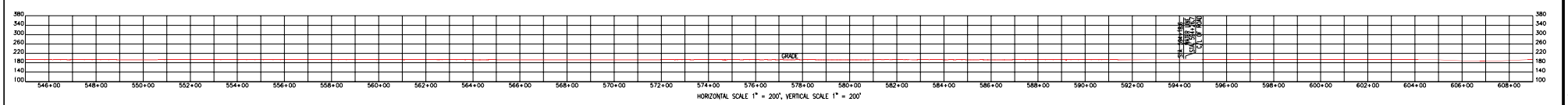


EASEMENT

WORKING SIDE TEMP. CONSTRUCTION EASEMENT
PERMANENT EASEMENT



PROFILE



SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 WALS FBE	6,400.0'
	CATHODIC TEST STATION	2

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-009	30" PIPELINE ALIGNMENT
12361-180C-011	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	RS	5/29/09	CFE	5/29/09		
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY / NEW SCALE	SL	4/30/09				
P6	ISSUE FOR PERMIT	MSP	7/8/08	CFE	7/8/08		
P5	ISSUE FOR PERMIT	PJD	5/27/08	CFE	5/27/08		
P4	PRELIMINARY	PJD	4/11/08	CFE	4/11/08		
P3	PRELIMINARY	PJD	4/1/08	CFE	4/1/08		
P2	PRELIMINARY	RC	2/27/08	CFE	2/27/08		

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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ForeRunner corporation
Pipeline Engineering & Mgmt.
Livermore, CA 94550
925-606-8888

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
STA 545+00.0 TO 609+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Fresno Co., CA	12361-180C-010	P9

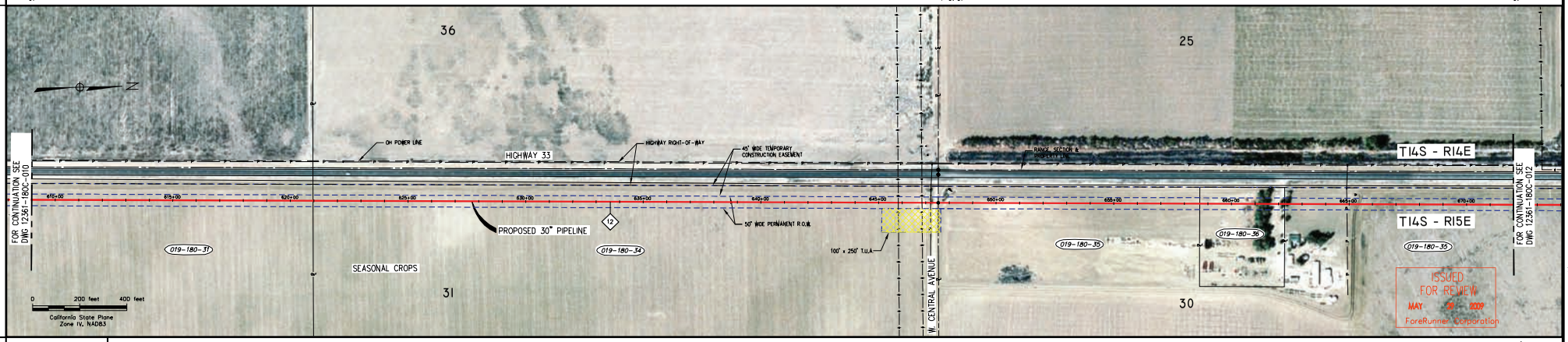
Plotted by: R.SUMRALD Date: 5/29/2009 3:20 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - PN\12361-180C-010_200.dwg

OWNERSHIP	STA 609+00.0	(019-180-31) WESTLANDS WATER DIST 1196.3 FEET/ 72.6 RODS (559)241-6233	STA 620+96.3	(019-180-34) WESTLANDS WATER DIST 2688.1 FEET/ 163.1 RODS (559)241-6233	STA 647+54.4	(019-180-35) WESTLANDS WATER DIST 1110.6 FEET/ 67.3 RODS (559)241-6233	STA 658+65.0	(019-180-36) KRESANT OPERATING CO., INC CARL KRESANT 361.8 FEET/ 21.9 RODS (714)970-6412	STA 662+26.8	(019-180-35) WESTLANDS WATER DIST 973.2 FEET/ 59.0 RODS (559)241-6233	STA 672+00.0
P/L DEPTH		PIPELINE DEPTH 5' TO T.O.P.									
ENVIRONMENTAL											

STATIONING

STA 609+00.0 MATCH LINE
STA 620+96.3 PROPERTY LINE 224
STA 645+84.1 WATER LINE 225
STA 646+84.9 WATER LINE 226
STA 647+07.1 DIT CROPS 227
STA 647+21.8 POWER POLE, 0.7' LT. 228
STA 647+21.8 OH POWER LINE 229
STA 647+37.7 C/L OF ROAD (W. CENTRAL AVE.) 230
STA 647+53.8 POINT OF INTERSECTION (07°07'18" RT.) 231
STA 647+54.4 SECTION LINE, PROPERTY LINE 232
STA 647+60.0 ENTER CROPS
STA 658+65.0 PROPERTY LINE (APPROX.)
STA 660+34.3 DIT CROPS 233
STA 662+26.8 PROPERTY LINE (APPROX.)
STA 664+90.8 OH POWER LINE 234
STA 665+50.6 ENTER CROPS 235
STA 672+00.0 MATCH LINE

ALIGNMENT



PIPELINE DATA

HEAVY WALL PIPE
FITTING
PIPELINE WARNING SIGNS
CATHODIC TEST STATION
AERIAL MARKER
PIPELINE WEIGHTS

DESIGN FACTOR 0.60

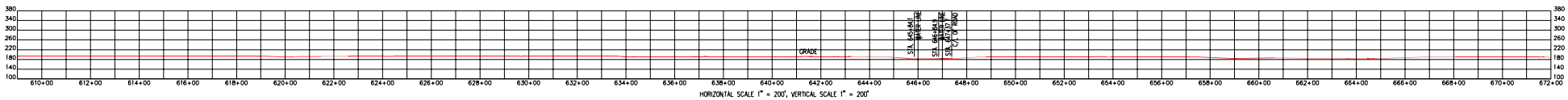
STA 609+00.0
STA 631+60.0 W.P. 12.0 — 12
1 — 6,300.0'
STA 645+84.1 WATER LINE
STA 646+84.9 WATER LINE
STA 672+00.0

EASEMENT

WORKING SIDE TEMP. CONSTRUCTION EASEMENT
PERMANENT EASEMENT

45' — 45'
C/L PROPOSED 30" GILL RANCH PIPELINE
50' — 50'
100' x 250' T.U.A.

PROFILE



SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 WALS FBE	6,300.0'
	CATHODIC TEST STATION	3

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-010	30" PIPELINE ALIGNMENT
12361-180C-012	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK.	DATE	APPR.	DATE
P9	ISSUED FOR REVIEW	RS	5/29/09	CFE	5/29/09		
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY / NEW SCALE	SL	4/20/09				
P6	ISSUE FOR PERMIT	MSP	7/8/08	CFE	7/8/08		
P5	ISSUE FOR PERMIT	PJD	5/27/08	CFE	5/27/08		
P4	PRELIMINARY	PJD	4/11/08	CFE	4/11/08		
P3	PRELIMINARY	PJD	4/1/08	CFE	4/1/08		
P2	PRELIMINARY	RC	2/27/08	CFE	2/27/08		

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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ForeRunner corporation
3000 Westerlayne, Ave
Lemoore, CA 93245
559-924-9500

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
STA 609+00.0 TO 672+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG NO.	REV
AS NOTED	12361-C	Fresno Co., CA	12361-180C-011	P9

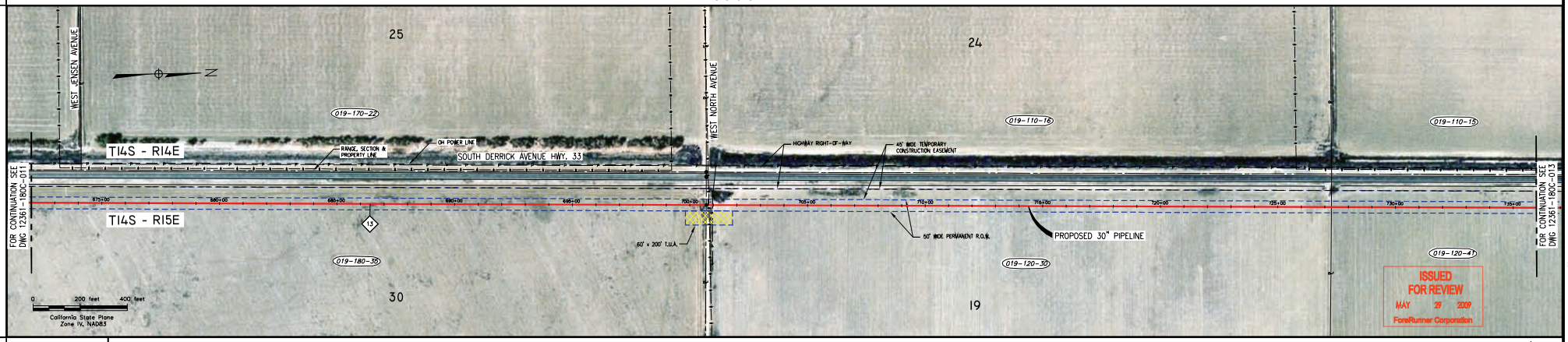
Plotted by: SLAURA Date: 5/28/2009 3:33 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - P9\12361-180C-011_200.dwg

OWNERSHIP	STA 672+00.0	(019-180-35) WESTLAND WATER DIST 2869.5 FEET/ 173.9 RODS (559)241-6233	STA 700+69.3
	STA 700+69.3	(019-120-30) WESTLANDS WATER DIST 2606.0 FEET/ 161.1 RODS (559)992-3112 (JAMES HANSEN)	STA 727+27.3
	STA 727+27.3	(019-120-41) WESTLANDS WATER DIST 872.7 FEET/ 52.9 RODS (559)992-3112 (JAMES HANSEN)	STA 736+00.0
P/L DEPTH		PIPELINE DEPTH 5' TO T.O.P.	
ENVIRONMENTAL			

STATIONING

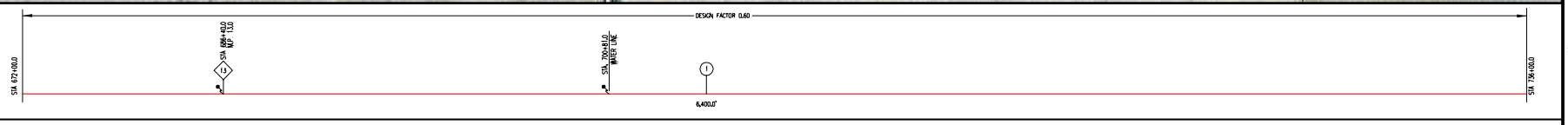
STA 672+00.0 MATCH LINE
STA 700+27.3 EXIT CROPS 236
STA 700+69.3 SECTION LINE, PROPERTY LINE 237
STA 700+69.7 POINT OF INTERSECTION (0°00'40" T) 238
STA 700+76.0 C/L OF ROAD (N. NORTH AVE.) 239
STA 700+81.0 WATER LINE 239
STA 700+96.7 OH POWER LINE 240
STA 701+32.5 ENTER CROPS 241
STA 721+04.4 EXIT CROPS 242
STA 727+27.3 PROPERTY LINE 243
STA 727+34.5 ENTER CROPS 244
STA 736+00.0 MATCH LINE

ALIGNMENT



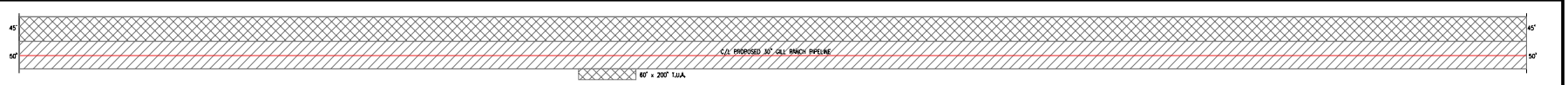
PIPELINE DATA

HEAVY WALL PIPE
FITTING
PIPELINE WARNING SIGNS
CATHODIC TEST STATION
AERIAL MARKER
PIPELINE WEIGHTS

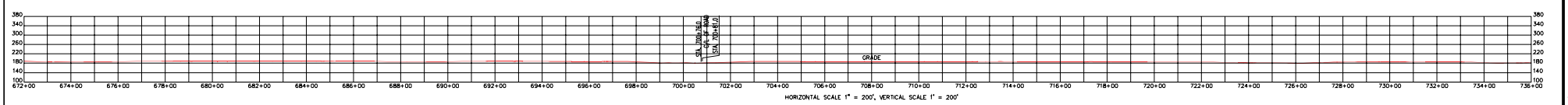


EASEMENT

WORKING SIDE TEMP. CONSTRUCTION EASEMENT
PERMANENT EASEMENT



PROFILE



SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.500" W.T., API 5L X70, W/ 14-16 WALS FBE	6,400.0'
	CATHODIC TEST STATION	2

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-011	30" PIPELINE ALIGNMENT
12361-180C-013	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	RS	5/29/09	CFE	5/29/09		
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY	SL	4/20/09				
P6	DRAWING NOT ISSUED						
P5	DRAWING NOT ISSUED						
P4	DRAWING NOT ISSUED						
P3	DRAWING NOT ISSUED						
P2	DRAWING NOT ISSUED						

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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FORERUNNER CORPORATION
Fresno Headquarters
Livermore, 925-960-9000
559-435-1000

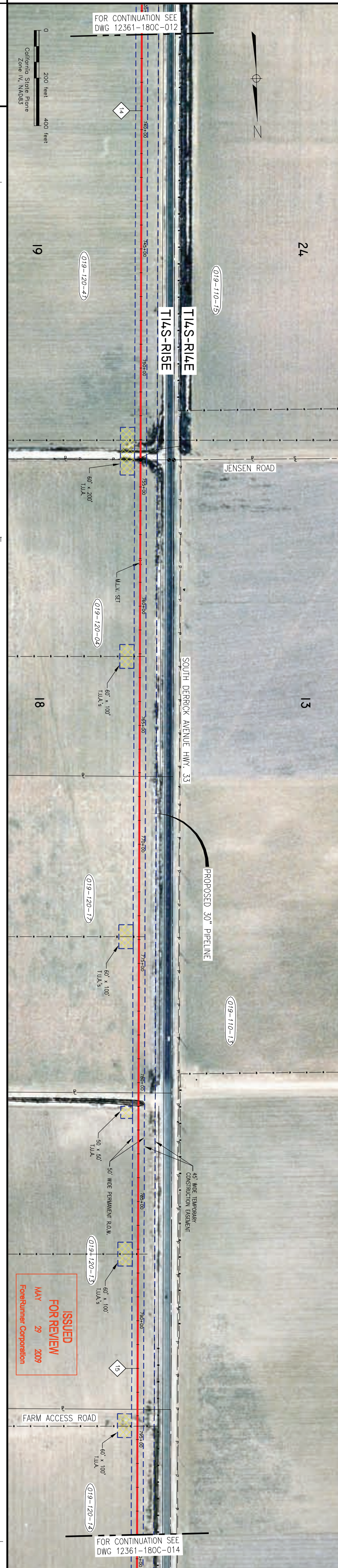
GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
STA 672+00.0 TO 736+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Fresno Co., CA	12361-180C-012	P9

Plotted by: R.SUMRULD Date: 5/29/2009 3:36 PM Drawing: S:\Project Files\NW Network\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - PN\12361-180C-012_200.dwg

SUMMARY	PROFILE	EASEMENT	PIPELINE DATA	ALIGNMENT	STATIONING	ENVIRONMENTAL	P/L DEPTH	OWNERSHIP



STATIONING

Station	Description	No.
STA. 736+00.0	MATCH LINE	
STA. 753+03.4	WATER LINE	245
STA. 753+27.9	EXIT CROPS	246
STA. 753+67.7	C/L OF ROAD (JENSEN ROAD)	
STA. 753+77.6	OH POWER LINE	247
STA. 753+83.5	P.P., 11.6' RT & GUY WIRE ANCHOR, 17.7' LT.	248
STA. 753+85.2	SECTION LINE, PROPERTY LINE	249
STA. 753+85.9	POINT OF INTERSECTION 00°00'07" RT	250
STA. 754+20.0	ENTER CROPS	251
STA. 758+16.4	C/L MAIN LINE VALVE SET	252
STA. 762+10.8	WATER LINE	253
STA. 767+14.4	PROPERTY LINE	254
STA. 773+88.3	WATER LINE	255
STA. 780+43.4	EXIT CROPS	256
STA. 780+43.5	PROPERTY LINE	257
STA. 780+76.3	TOP OF BANK	258
STA. 780+87.5	TOE OF SLOPE	259
STA. 780+95.9	TOP OF BANK	260
STA. 781+06.3	ENTER CROPS	261
STA. 787+20.5	WATER LINE	262
STA. 793+72.5	PROPERTY LINE	263
STA. 794+43.0	WATER LINE	264
STA. 799+00.0	MATCH LINE	

PIPELINE DATA

HEAVY WALL PIPE; FITTING; PIPELINE WARNING SIGNS; CATHODIC TEST STATION; AERIAL MARKER; PIPELINE WEIGHTS

STA 736+00.0
STA 739+20.0 M.P. 14.0
STA. 753+03.4 WATER LINE
STA 758+16.4 M.L.V. SET
STA. 762+10.8 WATER LINE
6,300.0'
DESIGN FACTOR 0.60
STA. 773+88.3 WATER LINE
STA. 787+20.5 WATER LINE
STA 792+00.0 M.P. 15.0
STA. 794+43.0 WATER LINE
STA 799+00.0

EASEMENT

WORKING SIDE TEMP. CONSTRUCTION EASEMENT
PERMANENT EASEMENT
50' 45'
60' x 200' T.U.A.
60' x 100' T.U.A.
C/L PROPOSED 30" GILL RANCH PIPELINE
60' x 100' T.U.A.
50' x 50' T.U.A.
60' x 100' T.U.A.
60' x 100' T.U.A.

PROFILE

380 340 300 260 220 180 140 100
STA. 739+20.0 MILE POST 14
STA. 753+03.4 WATER LINE
STA. 753+67.7 C/L OF ROAD
STA. 762+10.8 WATER LINE
GRADE
STA. 773+88.3 WATER LINE
STA. 787+20.5 WATER LINE
STA. 794+43.0 WATER LINE
736+00 738+00 740+00 742+00 744+00 746+00 748+00 750+00 752+00 754+00 756+00 758+00 760+00 762+00 764+00 766+00 768+00 770+00 772+00 774+00 776+00 778+00 780+00 782+00 784+00 786+00 788+00 790+00 792+00 794+00 796+00 798+00

HORIZONTAL SCALE 1" = 200', VERTICAL SCALE 1" = 200'

ENVIRONMENTAL

SENSITIVE CULTURAL RESOURCES ARE IDENTIFIED IN THIS AREA. DETAILS ARE AVAILABLE TO QUALIFIED PERSONNEL UNDER SEPARATE COVER.*

P/L DEPTH

PIPELINE DEPTH 5' TO T.O.P.

OWNERSHIP

Station	Ownership
STA 736+00.0	019-120-41 WESTLANDS WATER DIST 1,785.2 FEET/ 108.2 RODS (559)992-5112 (JAMES HANSEN)
STA 753+85.2	019-120-04 WESTLANDS WATER DIST 1,329.2 FEET/ 80.6 RODS (559)992-5112 (JAMES HANSEN)
STA 767+14.4	019-120-17 WESTLANDS WATER DIST 1,329.1 FEET/ 80.6 RODS (559)992-5112 (JAMES HANSEN)
STA 780+43.5	019-120-13 WESTLANDS WATER DIST 1,329.0 FEET/ 80.5 RODS (559)992-5112 (JAMES HANSEN)
STA 793+72.5	019-120-14 WESTLANDS WATER DIST 527.5 FEET/ 32.0 RODS (559)992-5112 (JAMES HANSEN)
STA 799+00.0	

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.506" W.T. API 5L X70, W/ 14-16 MILS FBE	6,300'
4	MAIN LINE VALVE SET	1
	CATHODIC TEST STATION	7

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-170C-100	M.L.V. PIPING DETAILS
12361-180C-012	30" PIPELINE ALIGNMENT
12361-180C-014	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	SL	5/29/09	CFE	5/29/09		
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY	SL	4/20/09				
P6	DRAWING NOT ISSUED						
P5	DRAWING NOT ISSUED						
P4	DRAWING NOT ISSUED						
P3	DRAWING NOT ISSUED						
P2	DRAWING NOT ISSUED						

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

FORERUNNER CORPORATION

GILL RANCH STORAGE

GILL RANCH 30" PIPELINE ALIGNMENT STA 736+00.0 TO 799+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Fresno Co., CA	12361-180C-013	P9

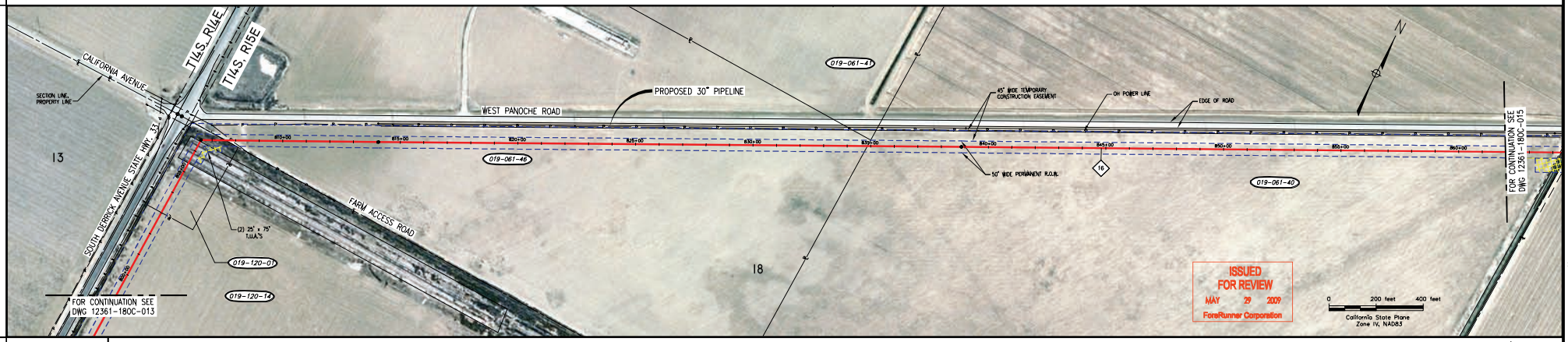
Plotted by: R.SUMRULD Date: 5/28/2009 3:03 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - P9\12361-180C-013_200.dwg

OWNERSHIP	STA 799+00.0	019-120-14 WESTLANDS WATER DIST 456.5 FEET/ 27.6 RODS (559)992-3112 (JAMES HANSEN)	STA 803+56.5	019-120-01 WESTLANDS WATER DIST 400.0 FEET/ 24.2 RODS (559)992-3112 (JAMES HANSEN)	STA 807+56.5	019-061-46 DOUBLE J FARMS 2,729.3 FEET/ 165.4 RODS (559)992-3112 (JAMES HANSEN)	STA 834+85.8	019-061-40 DOUBLE J FARMS 2,714.2 FEET/ 164.5 RODS (559)992-3112 (JAMES HANSEN)	STA 862+00.0
P/L DEPTH	PIPELINE DEPTH 5' TO T.O.P.								
ENVIRONMENTAL	SENSITIVE CULTURAL RESOURCES ARE IDENTIFIED IN THIS AREA. DETAILS ARE AVAILABLE TO QUALIFIED PERSONNEL UNDER SEPARATE COVER."								

STATIONING

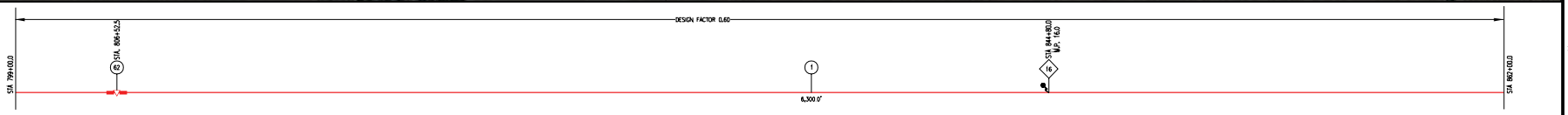
STA		
STA 799+00.0	MATCH LINE	
STA 803+56.5	PROPERTY LINE	265
STA 805+32.2	EXIT CROPS	266
STA 806+46.3	ENTER CROPS	267
STA 806+52.5	POINT OF INTERSECTION	268 02°02'38" RT
STA 807+56.5	SECTION LINE, PROPERTY LINE	269
STA 807+63.1	OH POWER LINE	270
STA 814+06.9	POINT OF INTERSECTION	271 007°10'01" LT
STA 834+85.8	PROPERTY LINE	272
STA 839+85.4	POINT OF INTERSECTION	273 007°03'33" RT
STA 862+00.0	MATCH LINE	

ALIGNMENT



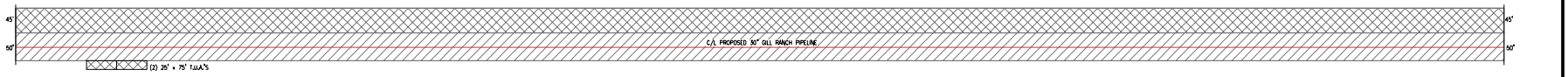
PIPELINE DATA

HEAVY WALL PIPE
FITTING
PIPELINE WARNING SIGNS
CATHODIC TEST STATION
AERIAL MARKER
PIPELINE HEIGHTS

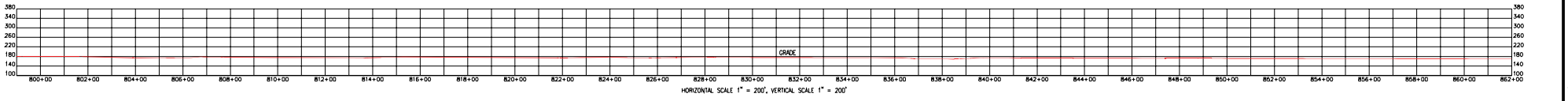


EASEMENT

WORKING SIDE TEMP. CONSTRUCTION EASEMENT
PERMANENT EASEMENT



PROFILE



SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.500" W.T., API 5L X70, W/ 14-16 WALS FBE	6,292.1'
	CATHODIC TEST STATION	1
62	90° ELBOW, (SEAMLESS/WELD, TRIM TO FIT) (0.500" W.T.), CS, MSS SP-75, W/HYT70	1
	CS, MSS-SP-75, W/HYT 70 (TRIM TO 62")	1

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-013	30" PIPELINE ALIGNMENT
12361-180C-015	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	SL	5/29/09	CFE	5/29/09		
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY	SL	4/20/09				
P6	DRAWING NOT ISSUED						
P5	DRAWING NOT ISSUED						
P4	DRAWING NOT ISSUED						
P3	DRAWING NOT ISSUED						
P2	DRAWING NOT ISSUED						

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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ForeRunner corporation
Pleasanton, CA 94588
925-426-6000

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
STA 799+00.0 TO 862+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Fresno Co., CA	12361-180C-014	P9

Plotted by: R.SCARVALLO Date: 5/29/2009 3:39 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - PPV\12361-180C-014_200.dwg

SUMMARY	PROFILE	EASEMENT	PIPELINE DATA	ALIGNMENT	STATIONING	ENVIRONMENTAL	P/L DEPTH	OWNERSHIP

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 MILS FBE	6,030.0'
3	30" O.D. BORE PIPE x 0.607" W.T., API 5L X70, W/ 40 MILS ARO OVER 14/16 MILS FBE	570.0'
22	45° ELBOW, (SEGMENTABLE, TRIM TO FIT)	1
80	90° ELBOW, (SEGMENTABLE, TRIM TO FIT) (0.506" W.T.), CS, MSS SP-75, WPHY70	1
83	90° ELBOW, (SEGMENTABLE, TRIM TO FIT) (0.506" W.T.), CS, MSS SP-75, WPHY70	1
	CATHODIC TEST STATION	1

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-014	30" PIPELINE ALIGNMENT
12361-180C-016	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	RS	5/29/09				
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY	SL	4/20/09				
P6	DRAWING NOT ISSUED						
P5	DRAWING NOT ISSUED						
P4	DRAWING NOT ISSUED						
P3	DRAWING NOT ISSUED						
P2	DRAWING NOT ISSUED						

ENGINEERING RECORD

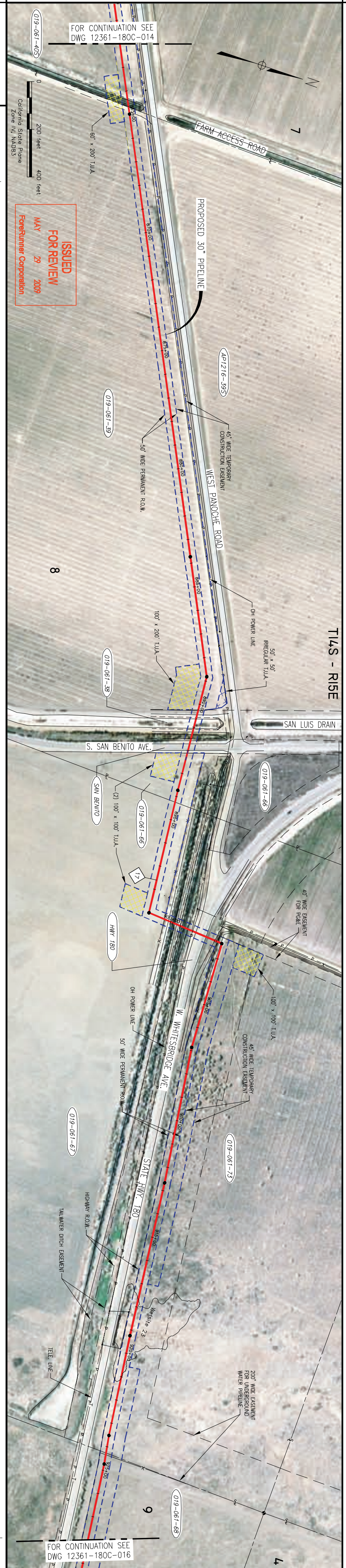
DRAWN	SL	5/28/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

HORIZONTAL SCALE 1" = 200', VERTICAL SCALE 1" = 200'

PROFILE: STA. 864+87.8 EDGE OF ROAD; STA. 891+71.8 EDGE OF PAVEMENT; STA. 892+00.7 EDGE OF PAVEMENT; GRADE; STA. 901+14.6 EDGE OF PAVEMENT; STA. 901+61.3 EDGE OF PAVEMENT

EASEMENT: PERMANENT EASEMENT; WORKING SIDE TEMP. CONSTRUCTION EASEMENT; 45'; 50'; 60' x 200' T.U.A.; 100' x 200' T.U.A.; 50' x 50' IRREGULAR T.U.A.; S. SAN BENITO AVE.; 100' x 100' T.U.A.; CA. PROPOSED 30" GILL RANCH PIPELINE; W. WHITESBRIDGE AVE. (STATE HWY. 180); WETSITE 23

PIPELINE DATA: HEAVY WALL PIPE; FITTING; PIPELINE MARKING SIGNS; CATHODIC TEST STATION; AERIAL MARKER; PIPELINE WEIGHTS; STA 862+00.0; 2,790.0'; STA. 888+80.8 (22); STA. 889+90.0; 250.0'; STA. 892+40.0; 670.0'; STA. 897+60.0 M.P. 17.0; STA. 899+00.7 (80); STA. 899+10.0; 320.0'; STA. 902+30.0; STA. 902+32.8 (83); 2,570.0'; DESIGN FACTOR 0.60; STA 928+00.0



STA. 862+00.0 MATCH LINE

STATION	DESCRIPTION	NO.
STA. 864+31.0	TOP OF BANK	274
STA. 864+49.1	TOE OF SLOPE	275
STA. 864+66.5	TOP OF BANK	276
STA. 864+68.3	SECTION LINE	277
STA. 864+87.8	EDGE OF ROAD	278
STA. 864+97.6	POINT OF INTERSECTION 00°02'29" LT	279
STA. 865+04.1	ENTER ORCHARD	280
STA. 890+24.6	PROPERTY LINE	
STA. 883+72.9	POINT OF INTERSECTION 00°02'07" LT	281
STA. 888+80.8	POINT OF INTERSECTION 22°10'54" RT	282
STA. 889+91.4	ENTER ORCHARD	283
STA. 890+24.6	ENTER EASEMENT	
STA. 890+27.5	TOE OF SLOPE	284
STA. 890+45.4	TOP OF SLOPE	285
STA. 890+57.4	TOP BANK OF CANAL	286
STA. 891+08.9	TOP BANK OF CANAL	287
STA. 891+21.0	TOP OF SLOPE	288
STA. 891+32.2	TOE OF SLOPE	289
STA. 891+49.8	RIGHT OF WAY, EXIT EASEMENT	
STA. 891+58.3	TOE OF SLOPE	290
STA. 891+71.8	EDGE OF PAVEMENT	291
STA. 892+00.7	EDGE OF PAVEMENT	292
STA. 892+11.5	RIGHT OF WAY	
STA. 893+73.2	POINT OF INTERSECTION 01°02'12" LT	293
STA. 894+23.1	SECTION LINE	294
STA. 899+00.7	POINT OF INTERSECTION 80°22'26" LT	295
STA. 899+71.6	FENCE	296
STA. 899+88.7	TOP OF SLOPE	297
STA. 899+98.4	TOP BANK OF CANAL	298
STA. 900+17.1	TOE OF SLOPE	299
STA. 900+26.1	TOE OF SLOPE	300
STA. 900+42.1	TOP BANK OF CANAL	301
STA. 900+52.6	TOP BANK OF CANAL	302
STA. 900+61.9	TOE OF SLOPE	303
STA. 900+66.6	TOE OF SLOPE	304
STA. 900+76.2	TOP BANK OF CANAL	305
STA. 900+79.7	RIGHT OF WAY	306
STA. 900+97.2	OH POWER LINE	307
STA. 900+99.6	TOE OF SLOPE	308
STA. 901+14.6	EDGE OF PAVEMENT	309
STA. 901+61.3	EDGE OF PAVEMENT	310
STA. 902+00.8	TOP OF SLOPE	311
STA. 902+07.7	RIGHT OF WAY	312
STA. 902+13.6	TOP OF SLOPE	313
STA. 902+13.6	FENCE	314
STA. 902+28.9	TOP OF SLOPE	315
STA. 902+32.8	POINT OF INTERSECTION 83°15'00" RT	316
STA. 906+87.0	POINT OF INTERSECTION 04°51'38" LT	317
STA. 912+66.5	POINT OF INTERSECTION 01°27'32" RT	318
STA. 917+67.2	BEGIN WETLAND	319
STA. 919+23.9	POINT OF INTERSECTION 00°49'06" LT	320
STA. 921+10.7	END WETLAND	321
STA. 923+52.0	POINT OF INTERSECTION 02°38'09" LT	323
STA. 924+27.3	SECTION LINE / PROPERTY LINE	324
STA. 924+34.1	FENCE	325
STA. 924+35.9	EXIT WATER PIPELINE EASEMENT	326
STA. 924+73.7	POINT OF INTERSECTION 02°53'18" RT	327

STA. 928+00.0 MATCH LINE

ENVIRONMENTAL: SENSITIVE CULTURAL RESOURCES ARE IDENTIFIED IN THIS AREA. DETAILS ARE AVAILABLE TO QUALIFIED PERSONNEL UNDER SEPARATE COVER.*

P/L DEPTH: PIPELINE DEPTH 5' TO T.O.P.

OWNERSHIP:
- STA 862+00.0 – STA 864+68.3: 019-061-40, DOUBLE J FARMS, 268.3 FEET/ 16.3 RODS, (559)992-3112 (JAMES HANSEN)
- STA 864+68.3 – STA 890+24.6: 019-061-39S, DOUBLE J FARMS, 2556.3 FEET/ 154.9 RODS, (559)992-3112 (JAMES HANSEN)
- STA 890+24.6 – STA 891+49.8: 019-061-28, US DEPT OF THE INTERIOR, 125.2 FEET/ 7.6 RODS
- STA 891+49.8 – STA 892+11.5: SAN BENITO, FRESNO CO. DEPT OF PUBLIC WORKS, 61.7 FEET/ 3.7 RODS, (559)262-4078
- STA 892+11.5 – STA 894+23.1: 019-061-66, MEYERS FARMING, 211.6 FEET/ 12.8 RODS, (559)431-7726
- STA 894+23.1 – STA 900+79.7: 019-061-67, MEYERS, MARVIN & PAT, 656.6 FEET/ 39.7 RODS
- STA 900+79.7 – STA 902+07.7: HWY. 180, FRESNO CO. DEPT OF PUBLIC WORKS, 128.0 FEET/ 7.8 RODS, (559)262-4078
- STA 902+07.7 – STA 924+27.3: 019-061-73, MEYERS, MARVIN & PAT, 2,219.6 FEET/ 134.5 RODS, (559)229-1323
- STA 924+27.3 – STA 928+00.0: 019-061-68, APPLEWHITE, COY ARLENE, 372.7 FEET/ 22.6 RODS, (559)262-4078

FORERUNNER CORPORATION

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
STA 862+00.0 TO 928+00.0

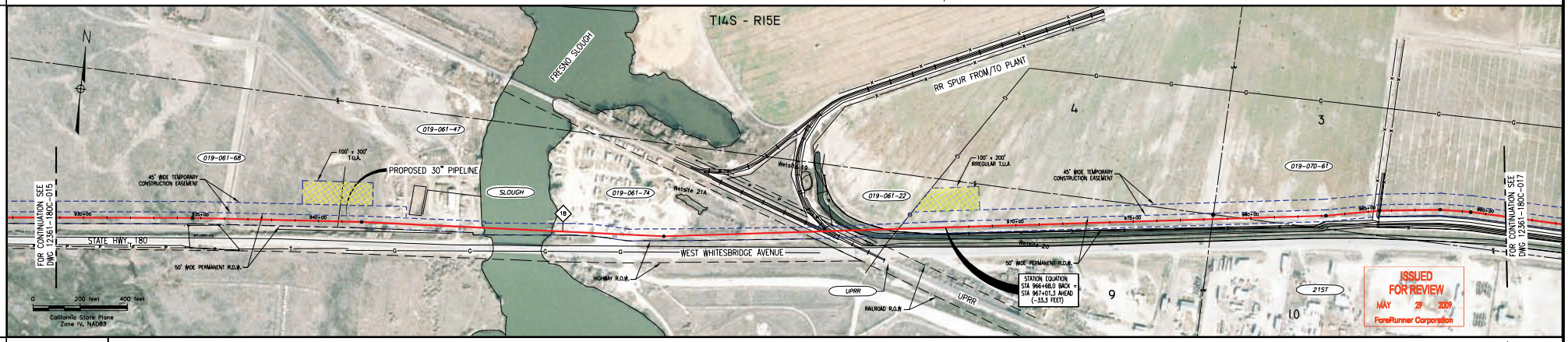
SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV.
AS NOTED	12361-C	Fresno Co., CA	12361-180C-015	P9

OWNERSHIP	STA 928+00.0	019-061-68 APPLEWHITE, LOIS ARLENE 1,284.6 FEET/ 77.9 RODS (559)229-1323	STA 940+84.6	019-061-47 APPLEWHITE, LOIS ARLENE 618.3 FEET/ 37.5 RODS (559)229-1323	STA 947+02.9	SLOUGH FRESNO SLOUGH STATE OF CALIFORNIA 289.8 FEET/ 17.6 RODS	STA 949+92.7	019-061-74 ALI ADEL, MOHAMMED 1058.1 FEET/ 64.1 RODS (209)722-6064	STA 960+50.8	UPRR U.P.R.R. 218.6 FEET/ 13.2 RODS	STA 962+69.4	019-061-22 MEYERS, MARVIN & PAT 1,554.9 FEET/ 93.0 RODS (559)431-7726	STA 978+37.6	019-070-61 SPRECKEL SUGAR (HOLLY SUGAR CO. INC) 1162.4 FEET/ 70.4 RODS (559)655-4961, EXT.273	STA 990+00.0
P/L DEPTH	PIPELINE DEPTH 5' TO T.O.P.															
ENVIRONMENTAL	SENSITIVE CULTURAL RESOURCES ARE IDENTIFIED IN THIS AREA. DETAILS ARE AVAILABLE TO QUALIFIED PERSONNEL UNDER SEPARATE COVER."															

STATIONING

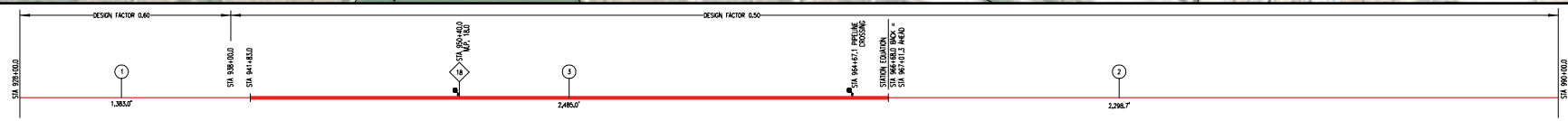
STA. 928+00.0	MATCH LINE
STA. 934+64.9	POINT OF INTERSECTION 01°15'26" RT
STA. 940+84.6	FENCE
STA. 941+83.0	POINT OF INTERSECTION 01°20'32" RT
STA. 947+02.9	TOP BANK OF SLOUGH PROPERTY LINE (APPROX.)
STA. 949+92.7	TOP BANK OF SLOUGH PROPERTY LINE (APPROX.)
STA. 954+69.5	POINT OF INTERSECTION 04°52'27" LT
STA. 960+50.8	RAILROAD RIGHT OF WAY
STA. 961+05.4	TOE OF SLOPE
STA. 961+30.0	TOP OF SLOPE
STA. 961+46.6	TOP OF RAIL
STA. 961+57.2	TOP OF RAIL
STA. 961+68.0	TOP OF RAIL
STA. 961+77.1	TOP OF RAIL
STA. 961+87.8	TOP OF SLOPE
STA. 962+03.9	TOE OF SLOPE
STA. 962+36.8	OH POWER LINE
STA. 962+69.4	RAILROAD RIGHT OF WAY
STA. 962+70.2	TOP OF BANK
STA. 962+72.7	TOP OF SLOPE
STA. 963+16.7	TOP OF BANK
STA. 964+09.2	TOP OF SLOPE
STA. 964+17.3	FENCE
STA. 964+67.1	PIPELINE CROSSING
STATION EQUATION: STA 966+68.0 BACK = STA 967+01.3 AHEAD	
STA. 978+37.6	SECTION LINE, PROPERTY LINE
STA. 979+61.4	SECTION LINE
STA. 983+19.0	POINT OF INTERSECTION 07°18'53" LT
STA. 985+22.1	FENCE
STA. 985+38.5	TOP OF SLOPE
STA. 985+45.7	TOE OF SLOPE
STA. 985+48.4	POINT OF INTERSECTION 04°58'53" RT
STA. 985+50.5	TOP OF SLOPE, FENCE
STA. 988+06.5	POINT OF INTERSECTION 05°17'43" RT
STA. 989+36.0	POINT OF INTERSECTION 03°11'37" RT
STA. 990+00.0	MATCH LINE

ALIGNMENT



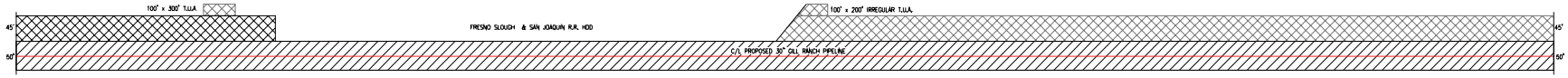
PIPELINE DATA

HEAVY WALL PIPE
FITTING
PIPELINE WARNING SIGNS
CATHODIC TEST STATION
AERIAL MARKER
PIPELINE HEIGHTS

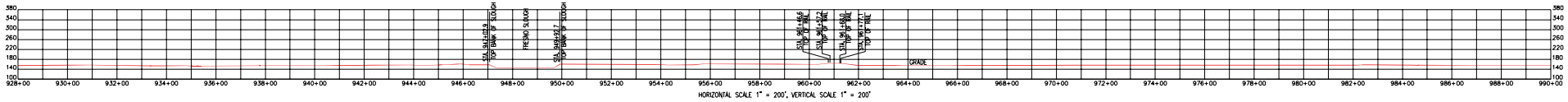


EASEMENT

WORKING SIDE TEMP. CONSTRUCTION EASEMENT
PERMANENT EASEMENT



PROFILE



SUMMARY

1	30" O.D. LINE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 WLS FBE	1,383.0'
2	30" O.D. LINE PIPE x 0.601" W.T., API 5L X70, W/ 14-16 WLS FBE	2,298.7'
3	30" O.D. BORE PIPE x 0.601" W.T., API 5L X70, W/ 40 WLS ARO OVER 14-16 WLS FBE	2,485.0'
	CATHODIC TEST STATION	1
	TOTAL	6,166.7'

		P9	ISSUED FOR REVIEW
		P8	ISSUED FOR REVIEW
		P7	PRELIMINARY
		P6	DRAWING NOT ISSUED
		P5	DRAWING NOT ISSUED
		P4	DRAWING NOT ISSUED
12361-180C-015	30" PIPELINE ALIGNMENT	P3	DRAWING NOT ISSUED
12361-180C-017	30" PIPELINE ALIGNMENT	P2	DRAWING NOT ISSUED

SL	5/28/09	
SL	5/06/09	
SL	4/20/09	

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
STA 928+00.0 TO 990+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Fresno Co., CA	12361-180C-016	P9

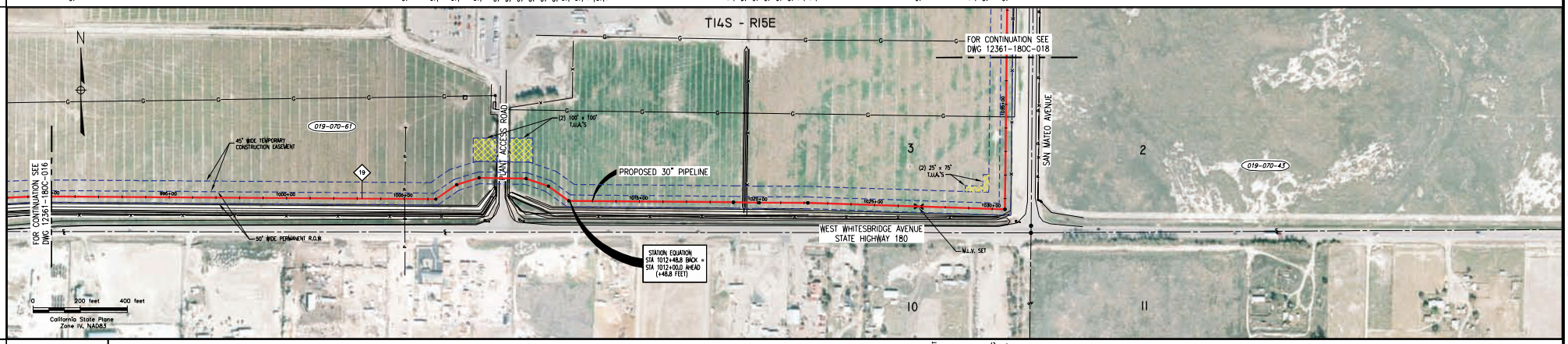
Plotted by: SLAGRA Date: 5/28/2009 3:46 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - P9\12361-180C-016_200.dwg

OWNERSHIP	STA 990+00.0	(019-070-61) SPRECKEL SUGAR (HOLLY SUGAR CO. INC 4,748.8 FEET/ 287.8 RODS (559)655-4961, EXT.273 — STA 1037+00.0
P/L DEPTH		PIPELINE DEPTH 5' TO T.O.P.
ENVIRONMENTAL		SENSITIVE CULTURAL RESOURCES ARE IDENTIFIED IN THIS AREA. DETAILS ARE AVAILABLE TO QUALIFIED PERSONNEL UNDER SEPARATE COVER."

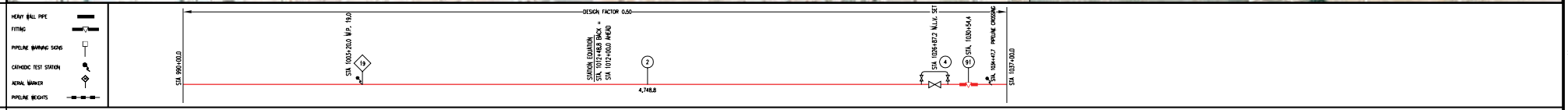
STATIONING

STA	DESCRIPTION		
STA 990+00.0	MATCH LINE		
STA 1005+02.4	ON POWER LINE	370	
STA 1006+13.9	POINT OF INTERSECTION	373	35°56'42" RT
STA 1007+41.5	POINT OF INTERSECTION	374	17°30'00" RT
STA 1008+41.5	POINT OF INTERSECTION	375	17°5'03" RT
STA 1009+16.1	C/L OF FENCE	376	
STA 1009+27.3	TOP OF SLOPE	378	
STA 1009+27.9	EDGE OF PAVEMENT	379	
STA 1009+52.2	EDGE OF PAVEMENT	380	
STA 1009+54.1	TOP OF SLOPE	382	
STA 1009+69.8	C/L OF FENCE	383	
STA 1010+41.5	POINT OF INTERSECTION	384	
STA 1011+41.5	POINT OF INTERSECTION	385	17°5'03" RT
STA 1012+48.8	STATION EQUATION BACK = POINT OF INTERSECTION	386	16°41'09" RT
STA 1012+00.0	AHEAD		35°09'36" LT
STA 1018+99.2	POINT OF INTERSECTION	393	
STA 1019+37.8	TOP OF SLOPE	394	00°25'11" RT
STA 1019+42.3	TOE OF SLOPE	395	
STA 1019+47.2	TOE OF SLOPE	396	
STA 1019+51.7	TOP OF SLOPE	397	
STA 1019+56.8	FENCE	398	
STA 1020+09.2	POINT OF INTERSECTION	399	09°41'05" LT
STA 1022+15.6	POINT OF INTERSECTION	400	01°40'20" RT
STA 1026+87.2	M.L.V. SET	401	
STA 1030+54.4	POINT OF INTERSECTION	402	91°14'19" LT
STA 1034+47.7	PIPELINE	403	
STA 1037+00.0	MATCH LINE		

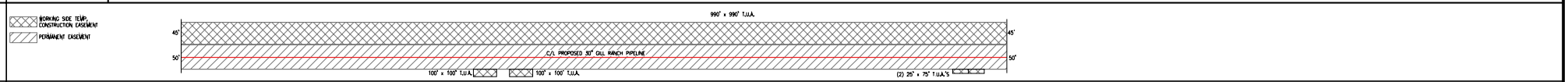
ALIGNMENT



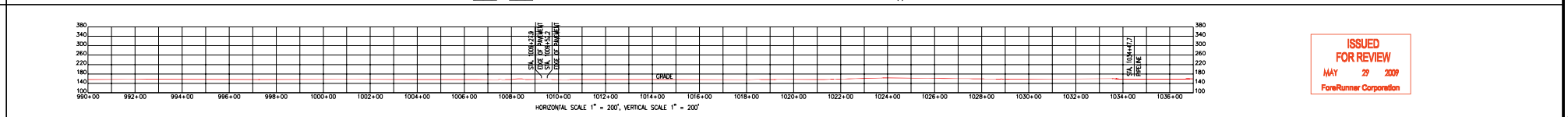
PIPELINE DATA



EASEMENT



PROFILE



ISSUED FOR REVIEW
MAY 29 2009
ForeRunner Corporation

SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.500" W.T., API 5L X70, W/ 14-16 WALS FBE	0.0'
2	30" O.D. LINE PIPE x 0.607" W.T., API 5L X70, W/ 14-16 WALS FBE	4,748.8'
91	90° ELBOW, SR (0.500" W.T.), CS, MSS SP-75, WPHY70	1
4	MAIN LINE VALVE SET	1
	CATHODIC TEST STATIONS	2
	TOTAL	4,748.8

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-016	30" PIPELINE ALIGNMENT
12361-180C-018	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	SL	5/29/09	CFE	5/29/09		
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY	SL	4/20/09				
P6	DRAWING NOT ISSUED						
P5	DRAWING NOT ISSUED						
P4	DRAWING NOT ISSUED						
P3	DRAWING NOT ISSUED						
P2	DRAWING NOT ISSUED						

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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ForeRunner corporation
Pleasanton, CA 94566
925-426-6000

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
STA 990+00.0 TO 1037+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Fresno Co., CA	12361-180C-017	P9

Plotted by: SLAURA Date: 5/29/2009 4:04 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission P&L\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - P9\12361-180C-017_200.dwg

OWNERSHIP

STA 1037+00.0 — STA 1085+62.9: (019-070-61) SPRECKEL SUGAR (HOLLY SUGAR CO, INC.) 4662.9 TEST/ 283.6 RODS (505)555-7588 (JANE DOE)

STA 1085+62.9 — STA 1100+00.0: (013-030-17) SPRECKEL SUGAR (HOLLY SUGAR CO. INC.) 1637.17TEST/ 99.7 RODS (505)555-7588 (JANE DOE)

P/L DEPTH

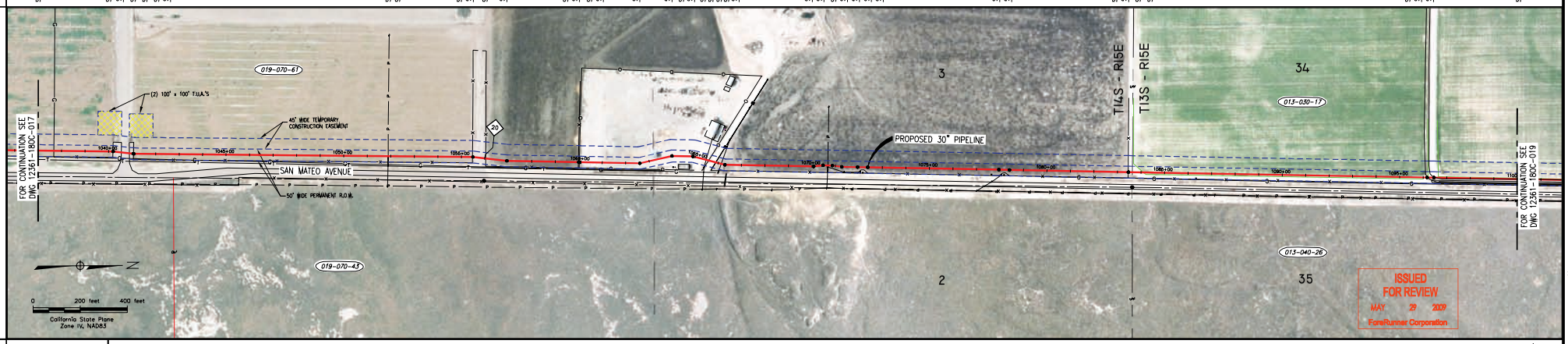
PIPELINE DEPTH 5' TO T.O.P.

ENVIRONMENTAL

STATIONING

STA 1037+00.0	MATCH LINE	
STA 1040+17.9	FENCE	405
STA 1040+15.1	POINT OF INTERSECTION	406
STA 1040+53.8	EDGE OF PAVEMENT	407
STA 1040+68.4	EDGE OF PAVEMENT	408
STA 1041+05.1	FENCE	409
STA 1041+07.1	POINT OF INTERSECTION	410
		06°08'19" LT
STA 1051+68.7	OH POWER LINE	411
STA 1051+68.7	POWER POLE, 6.4' RT.	412
STA 1055+47.7	FENCE	413
STA 1055+49.2	POINT OF INTERSECTION	414
		06°00'09" RT
STA 1056+04.0	FENCE	418
STA 1056+94.0	POINT OF INTERSECTION	419
		05°35'18" LT
STA 1059+98.6	FENCE	420
STA 1059+99.7	POINT OF INTERSECTION	421
		06°04'37" RT
STA 1060+03.9	FENCE	422
STA 1060+04.4	POINT OF INTERSECTION	423
		05°57'48" LT
STA 1062+59.9	POINT OF INTERSECTION	424
		13°45'54" LT
STA 1063+99.9	POINT OF INTERSECTION	415
STA 1064+28.5	BUILDING CORNER, 35.0' RT.	416
STA 1064+88.5	POINT OF INTERSECTION	417
		13°40'16" RT
STA 1065+47.0	OH POWER LINE	
STA 1065+57.9	FENCE	
STA 1066+13.1	FENCE	
STA 1066+13.4	OH POWER LINE	
STA 1066+29.5	POINT OF INTERSECTION	425
		13°49'00" LT
STA 1070+07.2	POINT OF INTERSECTION	429
		07°10'53" LT
STA 1070+47.2	POINT OF INTERSECTION	426
		07°10'52" RT
STA 1070+67.2	OH POWER LINE	427
STA 1070+87.2	POINT OF INTERSECTION	428
		07°10'47" RT
STA 1071+27.2	POINT OF INTERSECTION	430
		07°10'45" LT
STA 1071+94.7	POINT OF INTERSECTION	431
		07°10'45" LT
STA 1072+57.9	POINT OF INTERSECTION	432
		00°06'20" RT
STA 1077+95.4	POINT OF INTERSECTION	433
		00°17'37" RT
STA 1078+40.5	POINT OF INTERSECTION	434
		00°16'34" LT
STA 1083+45.8	FENCE	435
STA 1083+46.1	POINT OF INTERSECTION	436
		00°01'38" LT
STA 1083+62.9	SECTION LINE / PROPERTY LINE	437
STA 1084+09.4	ENTER CROPS	438
STA 1096+09.6	OUT CROPS	439
STA 1096+15.6	POINT OF INTERSECTION	440
		00°07'16" RT
STA 1096+45.3	POINT OF INTERSECTION	441
		00°06'09" LT
STA 1100+00.0	MATCH LINE	

ALIGNMENT



PIPELINE DATA

HEAVY WALL PIPE
FITTING
PIPELINE WARNING SIGNS
CATHODIC TEST STATION
AERIAL MARKER
PIPELINE WEIGHTS

DESIGN FACTOR 0.50 — DESIGN FACTOR 0.60

STA 1037+00.0 — (2) 3,540.0' — STA 1056+00.0 MP. 20.0 (20) — STA 1071+40.0 — (1) 2,760.0' — STA 1100+00.0

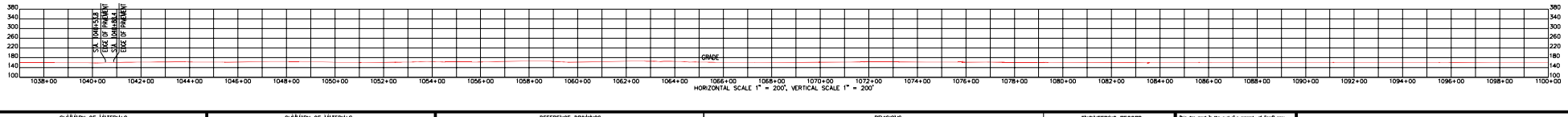
EASEMENT

WORKING SIDE TEMP. CONSTRUCTION EASEMENT
PERMANENT EASEMENT

45' — 60' — C/L PROPOSED 30" GILL RANCH PIPELINE — 45' — 60'

100' x 100' T.U.A. — 100' x 100' T.U.A.

PROFILE



SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.500" W.T., API 5L X70, W/ 14-16 WALS FBE	2,760.0'
2	30" O.D. LINE PIPE x 0.600" W.T., API 5L X70, W/ 14-16 WALS FBE	3,540.0'
	CATHODIC TEST STATION	1
	TOTAL	6,300.0'

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-017	30" PIPELINE ALIGNMENT
12361-180C-019	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	RS	5/29/09				
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY	SL	4/20/09				
P6	DRAWING NOT ISSUED						
P5	DRAWING NOT ISSUED						
P4	DRAWING NOT ISSUED						
P3	DRAWING NOT ISSUED						
P2	DRAWING NOT ISSUED						

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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ForeRunner corporation
Pipeline Management Group, Inc.
Livermore, CA 94550
925-373-1000

GILL RANCH STORAGE

GILL RANCH 30" PIPELINE ALIGNMENT STA 1037+00.0 TO 1100+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Fresno Co., CA	12361-180C-018	P9

Plotted by: S.LAGRA Date: 5/29/2009 4:06 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission P&L\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - P9\12361-180C-018_200.dwg

OWNERSHIP

STA 1100+00.0	
013-030-17 SPRECKEL SUGAR (HOLY SUGAR CO. INC) 990.4 FEET/ 60.0 RODS (505)555-7588 (JANE DOE)	STA 1109+90.4
013-030-33 BOREL BANK & TRUST 2637.6 FEET/ 159.8 RODS	STA 1135+28.0
013-030-38 ADOLPH, MICHAEL 350.0 FEET/ 21.2 RODS	STA 1139+78.0
013-030-36 ADOLPH, MICHAEL 350.0 FEET/ 21.2 RODS	STA 1143+28.0
013-030-43 ADOLPH, MICHAEL 350.0 FEET/ 21.2 RODS	STA 1146+78.0
013-030-44 ADOLPH, MICHAEL 350.0 FEET/ 21.2 RODS	STA 1150+28.0
013-030-45 ADOLPH, MICHAEL 946.0 FEET/ 57.3 RODS	STA 1159+74.0
013-030-39 ADOLPH, MICHAEL 526.0 FEET/ 19.7 RODS	STA 1163+00.0

P/L DEPTH

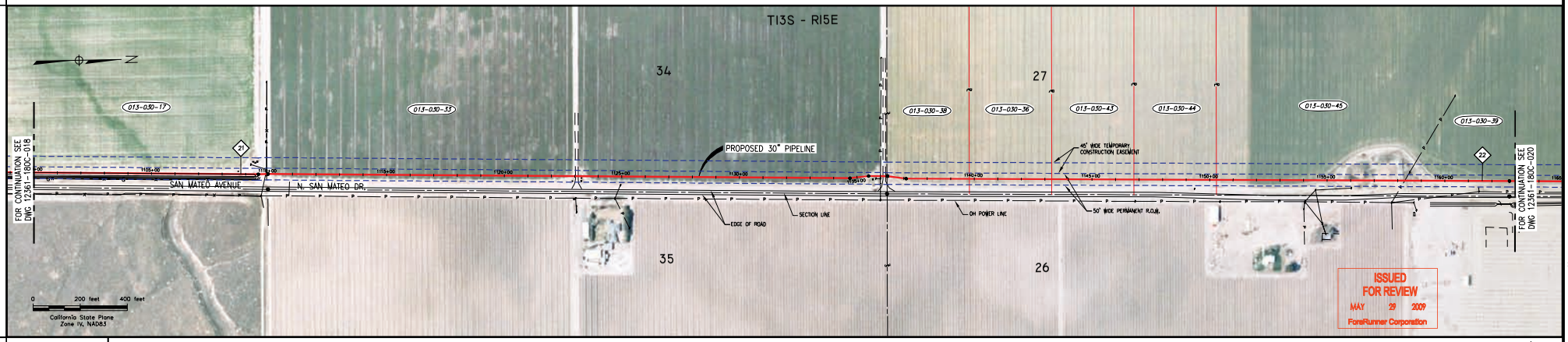
PIPELINE DEPTH 5' TO T.O.P.

ENVIRONMENTAL

STATIONING

STA 1100+00.0	MATCH LINE	
STA 1108+68.3	WELL HEAD, 11.2' LT.	442
STA 1109+54.6	POINT OF INTERSECTION	449
STA 1109+65.5	OH POWER LINE	02°13'53" LT
STA 1109+69.5	POWER POLE, 19.5' LT.	448
STA 1109+69.7	OH POWER LINE	447
STA 1109+90.2	GUY WIRE ANCHOR, 8.4' RT.	446
STA 1109+90.4	FENCE / PROPERTY LINE	445
STA 1109+95.3	POINT OF INTERSECTION	444
STA 1110+39.3	ENTER CROPS	02°12'46" RT
		443
		450
STA 1122+63.0	EXIT CROPS	451
STA 1123+02.8	EDGE OF ROAD	452
STA 1123+14.7	EDGE OF ROAD	453
STA 1123+28.5	STAND PIPE, 7.1' RT.	454
STA 1123+36.9	GATE VALVE, 9.4' RT.	455
STA 1123+46.2	ENTER CROPS	456
STA 1134+69.8	POINT OF INTERSECTION	468
STA 1135+49.8	POINT OF INTERSECTION	07°12'10" LT
STA 1135+52.2	EXIT CROPS	07°09'27" RT
STA 1135+67.5	WELL HEAD, 13.6' RT.	458
STA 1135+80.0	POWER POLE, 10.9' RT.	459
STA 1136+00.1	OH POWER LINE	460
STA 1136+00.1	POWER POLE, 9.9' RT.	461
STA 1136+11.2	EDGE OF ROAD	462
STA 1136+22.0	EDGE OF ROAD	463
STA 1136+28.0	SECTION LINE / PROPERTY LINE	464
STA 1136+28.8	POINT OF INTERSECTION	465
STA 1136+34.7	ENTER CROPS	07°06'49" RT
STA 1137+09.8	POINT OF INTERSECTION	467
STA 1139+78.0	PROPERTY LINE	07°14'43" LT
		469
STA 1145+28.0	PROPERTY LINE	
STA 1146+78.0	PROPERTY LINE	
STA 1150+28.0	PROPERTY LINE	
STA 1159+39.8	EXIT CROPS	470
STA 1159+76.5	TANK, 0.6' RT. (TO BE REMOVED)	471
STA 1159+93.0	OH POWER LINE	472
STA 1159+95.3	ENTER CROPS	473
STA 1162+74.9	POINT OF INTERSECTION	02°00'02" RT
		474
STA 1163+00.0	MATCH LINE	

ALIGNMENT



PIPELINE DATA

HEAVY WALL PIPE
FITTING
PIPELINE WARNING SIGNS
CATHODIC TEST STATION
AERIAL MARKER
PIPELINE WEIGHTS

DESIGN FACTOR 0.80

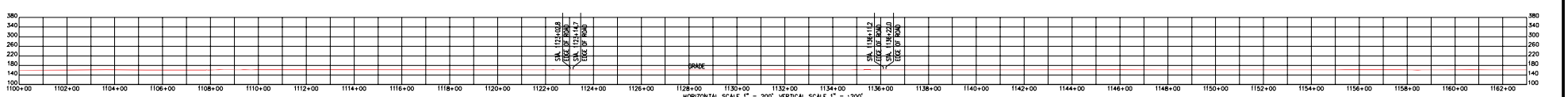
STA 1100+00.0 — STA 1108+80.0 (APP. 27.0) — 6,300.0' — STA 1161+60.0 (APP. 22.0) — STA 1163+00.0

EASEMENT

WORKING SIDE TEMP. CONSTRUCTION EASEMENT
PERMANENT EASEMENT

45' / 50' — C/L PROPOSED 30" GILL RANCH PIPELINE

PROFILE



SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.500" W.T., API 5L X70, W/ 14-16 WALS FBE	6,300.0'
	CATHODIC TEST STATION	2
	TOTAL	6,300.0'

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-018	30" PIPELINE ALIGNMENT
12361-180C-020	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	RS	5/29/09	CFE	5/29/09		
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY	SL	4/20/09				
P6	DRAWING NOT ISSUED						
P5	DRAWING NOT ISSUED						
P4	DRAWING NOT ISSUED						
P3	DRAWING NOT ISSUED						
P2	DRAWING NOT ISSUED						

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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ForeRunner corporation
Fresno Headquarters Office
Livermore, CA 94550
925-960-9000

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
STA 1100+00.0 TO 1163+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Fresno Co., CA	12361-180C-019	P9

Plotted by: R.SUMRALD Date: 5/29/2009 3:48 PM DrawPrep: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission Pl.\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - PW\12361-180C-019_200.dwg

OWNERSHIP

STA 1163+00.0	(013-030-39) ADOLPH, MICHAEL 375.8 FEET/ 22.7 RODS	STA 1166+75.8	(013-040-16) BAKER, BYRON & CHERYL xxx FEET/ xxx RODS	STA 1203+12.8	(RIVER) SAN JUAQUIN RIVER STATE OF CALIFORNIA 682.7 FEET/ 38.5 RODS	STA 1207+95.5	(042-270-01) PARAMOUNT ORCHARDS STATE OF CALIFORNIA 1204.5 FEET/ 73.0 RODS	STA 1220+00.0

P/L DEPTH

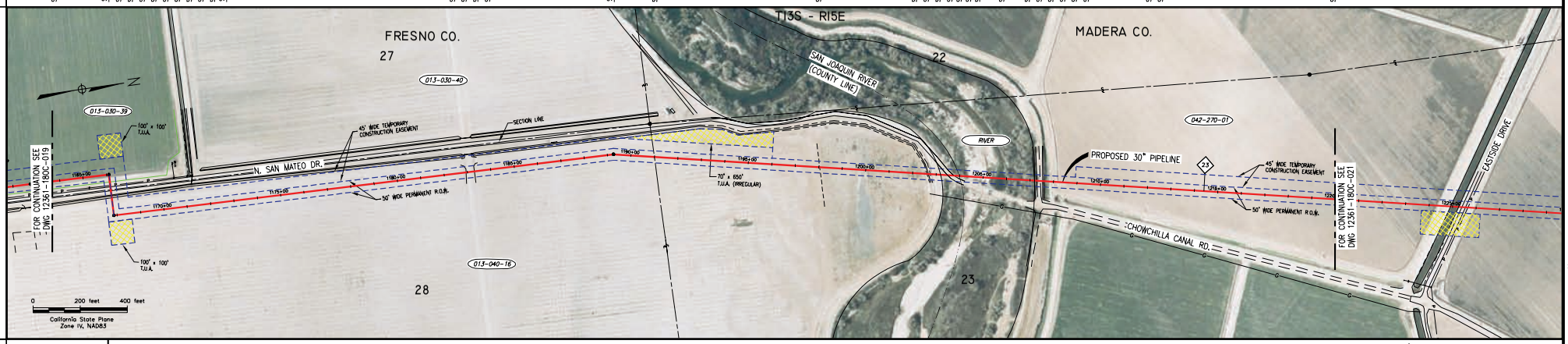
PIPELINE DEPTH 5' TO T.O.P.

ENVIRONMENTAL

STATIONING

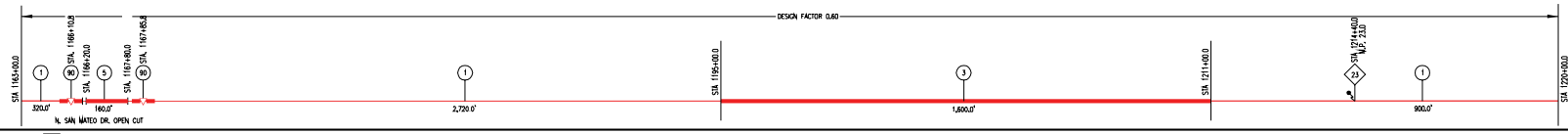
STA 1163+00.0	MATCH LINE	
STA 1166+10.8	POINT OF INTERSECTION	475
		89°59'58" RT
STA 1166+42.7	EXIT CROPS	476
STA 1166+57.5	ON POWER LINE	477
STA 1166+63.6	EDGE OF ROAD	478
STA 1166+75.8	SECTION LINE / PROPERTY LINE	479
STA 1166+80.8	EDGE OF ROAD	480
STA 1166+97.9	TOP OF SLOPE	481
STA 1167+02.4	TOE OF SLOPE	482
STA 1167+10.3	TOP OF SLOPE	483
STA 1167+54.4	ENTER CROPS	484
STA 1167+85.8	POINT OF INTERSECTION	485
		89°59'58" LT
STA 1182+75.9	EXIT CROPS	486
STA 1182+94.0	EDGE OF ROAD	487
STA 1183+29.8	EDGE OF ROAD	488
STA 1183+45.5	ENTER CROPS	489
STA 1189+25.3	POINT OF INTERSECTION	490
		12°51'54" RT
STA 1190+99.8	SECTION LINE	491
STA 1198+06.1	WATER LINE	492
STA 1202+12.8	EXIT CROPS	493
STA 1202+60.7	TOP BANK OF CANAL	494
STA 1202+68.7	C/L CANAL	495
STA 1203+75.1	TOP BANK OF CANAL	496
STA 1203+19.0	TOP BANK OF RIVER	
STA 1203+47.9	EDGE OF PAVEMENT	
STA 1203+76.1	EDGE OF PAVEMENT	
STA 1205+19.3	C/L SAN JOAQUIN RIVER	
STA 1207+19.5	EDGE OF ROAD & TOP BANK OF RIVER	497
STA 1207+43.8	EDGE OF ROAD	498
STA 1207+53.5	TOP OF SLOPE	499
STA 1207+58.1	TOE OF SLOPE	500
STA 1207+95.5	ENTER CROPS	501
STA 1208+95.3	BLOW OFF VALVE, 25' RT.	502
STA 1212+05.4	EXIT CROPS	503
STA 1212+50.4	ENTER CROPS	504
STA 1220+00.0	MATCH LINE	

ALIGNMENT



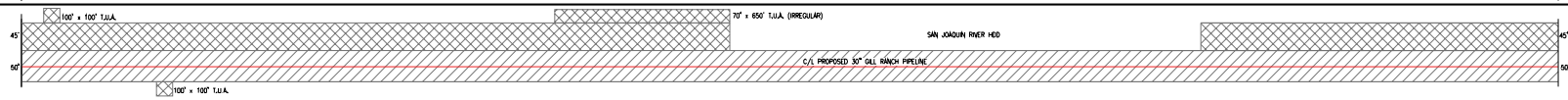
PIPELINE DATA

HEAVY WALL PIPE
FITTING
PIPELINE WARNING SIGNS
CATHODIC TEST STATION
AERIAL MARKER
PIPELINE WEIGHTS

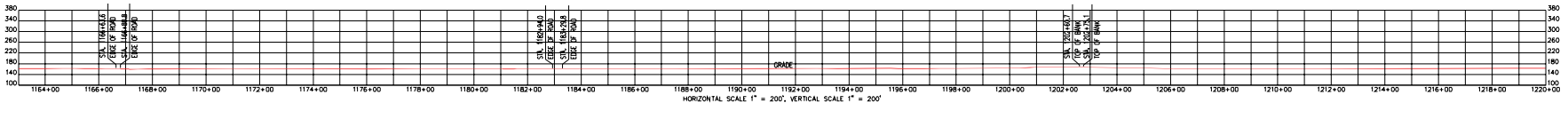


EASEMENT

WORKING SIDE TEMP. CONSTRUCTION EASEMENT
PERMANENT EASEMENT



PROFILE



ISSUED FOR REVIEW
MAY 29 2009
ForeRunner Corporation

SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 MILS FBE	3,940.0'
3	30" O.D. LINE PIPE x 0.601" W.T., API 5L X70, W/ 40 MILS ARO	1,600.0'
	OVER 14-16 MILS FBE	
5	30" O.D. LINE PIPE x 0.601" W.T., API 5L X70, W/ 14-16 MILS FBE	160.0'
90	90° ELBOW, 3R (0.506" W.T.), CS, MSS SP-75, WPHY70	2
	CATHODIC TEST STATION	1
	TOTAL	5,700.0'

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-019	30" PIPELINE ALIGNMENT
12361-180C-021	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	RS	5/29/09	CFE	5/29/09		
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY	SL	4/20/09				
P6	DRAWING NOT ISSUED						
P5	DRAWING NOT ISSUED						
P4	DRAWING NOT ISSUED						
P3	DRAWING NOT ISSUED						
P2	DRAWING NOT ISSUED						

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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ForeRunner corporation
Pleasanton, CA 94588
925-931-9000

GILL RANCH STORAGE

GILL RANCH 30" PIPELINE ALIGNMENT STA 1163+00.0 TO 1220+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Fresno/Madera Co., CA	12361-180C-020	P9

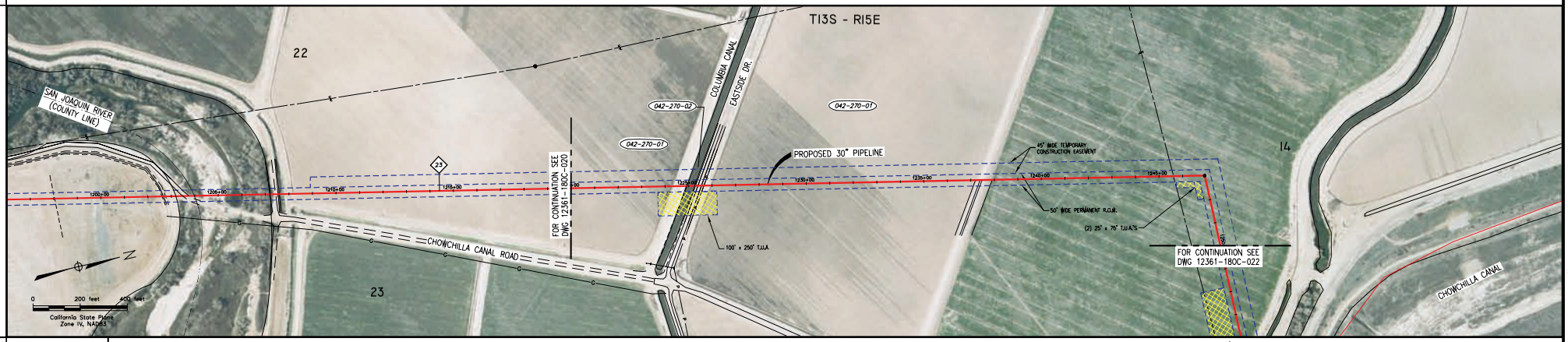
Plotted by: R.SUMRALD Date: 5/29/2009 3:50 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - PW\12361-180C-020_200.dwg

OWNERSHIP	STA 1220+00.0	042-270-01 PARAMOUNT ORCHARDS PARTNERS VIII, LLC 491.1 FEET/ 29.7 RODS	STA 1224+91.1 04-270-02 COLUMBIA CANAL COMPANY 38.4FEET/2.3 RODS STA 1225+29.5	042-270-01 PARAMOUNT ORCHARDS PARTNERS VIII, LLC 2470.8 FEET/149.7 RODS STA 1250+00.0
P/L DEPTH	PIPELINE DEPTH 5' TO T.O.P.			
ENVIRONMENTAL	SENSITIVE CULTURAL RESOURCES ARE IDENTIFIED IN THIS AREA. DETAILS ARE AVAILABLE TO QUALIFIED PERSONNEL UNDER SEPARATE COVER."			

STATIONING

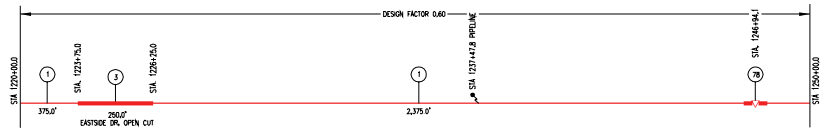
STA 1220+00.0	MATCH LINE	
STA 1224+30.1	EXIT CROPS	505
STA 1224+91.1	TOP BANK OF CANAL	506
STA 1225+29.5	TOP BANK OF CANAL	507
STA 1225+38.4	EDGE OF PAVEMENT	508
STA 1225+47.0	C/L OF EASTSIDE DR. (APPROX.)	509
STA 1225+54.5	EDGE OF PAVEMENT	510
STA 1225+65.3	OH POWER LINE	511
STA 1225+98.6	ENTER CROPS	512
STA 1237+19.6	EXIT CROPS	513
STA 1237+39.5	C/L OF FIELD ROAD	514
STA 1237+47.8	PIPELINE	515
STA 1237+91.0	ENTER CROPS	516
STA 1245+61.5	SECTION LINE	517
STA 1246+94.1	POINT OF INTERSECTION 78°31'37" RT	
STA 1250+00.0	MATCH LINE	

ALIGNMENT



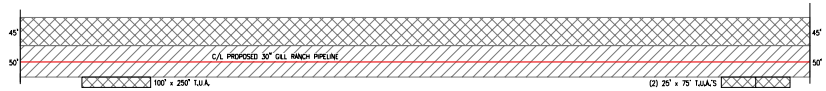
PIPELINE DATA

HEAVY WALL PIPE
FITTING
PIPELINE WARNING SIGNS
CATHODIC TEST STATION
AERIAL MARKER
PIPELINE WEIGHTS

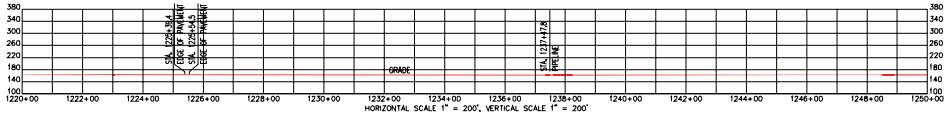


EASEMENT

WORKING SIDE TEMP. CONSTRUCTION EASEMENT
PERMANENT EASEMENT



PROFILE



ISSUED FOR REVIEW
MAY 29 2009
ForeRunner Corporation

SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.500" W.T., API 5L X70, W/ 14-16 MILS FBE	2,750.0'
	CATHODIC TEST STATION	1
3	30" O.D. BORE PIPE x 0.812" W.T., API 5L X70, W/ 40 MILS AND OVER 14/16 MILS FBE	250.0'
78	90° ELBOW, (SECONDARY, TRIM TO FIT) (0.500" W.T.), CS, MSS SP-75, (WPHY70)	1
	TOTAL	3,000.0'

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-020	30" PIPELINE ALIGNMENT
12361-180C-022	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	SL	5/29/09	CFE	5/29/09		
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY	SL	4/20/09				
P6	DRAWING NOT ISSUED						
P5	DRAWING NOT ISSUED						
P4	DRAWING NOT ISSUED						
P3	DRAWING NOT ISSUED						
P2	DRAWING NOT ISSUED						

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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ForeRunner corporation
Pipeline Engineering & Mgmt.
Livermore, CA 94550
925-606-8000

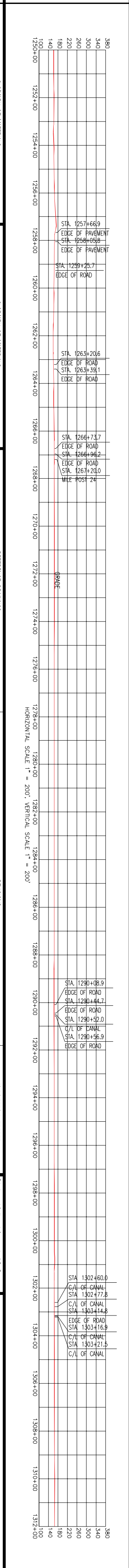
GILL RANCH STORAGE

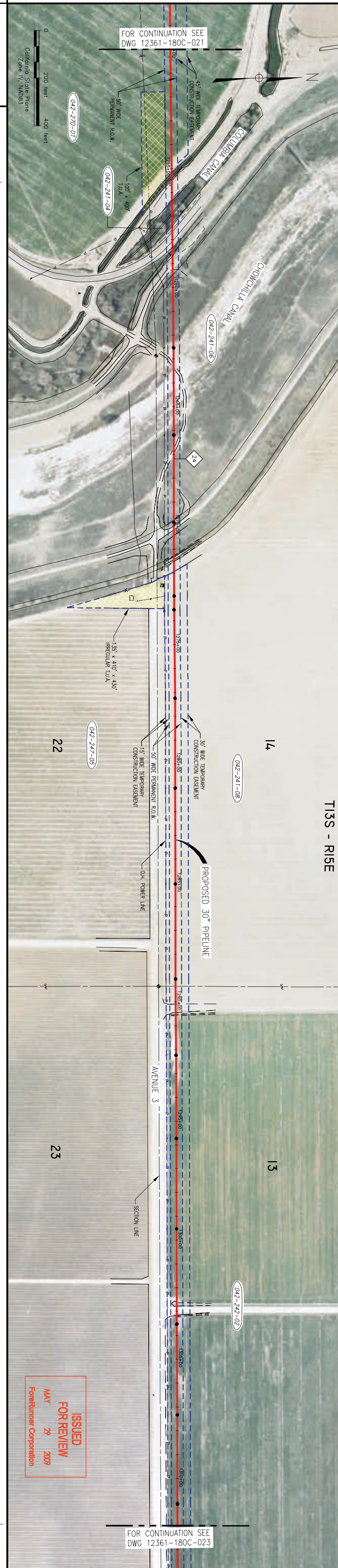
GILL RANCH 30" PIPELINE ALIGNMENT STA 1220+00.0 TO 1250+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Madera Co., CA	12361-180C-021	P9

Plotted by: SLAGRA Date: 5/29/2009 4:09 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission P/L\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - P9\12361-180C-021_200.dwg

SUMMARY | PROFILE | EASEMENT | PIPELINE DATA | ALIGNMENT | STATIONING | ENVIRONMENTAL | P/L DEPTH | OWNERSHIP





STATIONING

STA. 1250+00.0	MATCH LINE	
STA. 1254+76.1	EXIT CROPS	518
STA. 1254+81.0	PROPERTY LINE	
STA. 1255+20.5	TOP OF SLOPE	519
STA. 1255+33.4	TOE OF SLOPE	520
STA. 1255+41.0	TOE OF SLOPE	521
STA. 1255+51.5	TOP OF SLOPE	522
STA. 1255+55.8	OH POWER LINE	523
STA. 1256+29.5	TOP OF BANK	524
STA. 1256+85.6	TOE OF SLOPE	525
STA. 1256+95.2	TOE OF SLOPE	526
STA. 1257+55.5	TOP OF BANK	528
STA. 1257+66.9	EDGE OF PAVEMENT	529
STA. 1258+05.8	EDGE OF PAVEMENT	530
STA. 1258+41.4	FENCE/ PROPERTY LINE	531
STA. 1258+56.4	TOE OF SLOPE	532
STA. 1259+25.7	EDGE OF ROAD	533
STA. 1259+61.1	TOE OF SLOPE	534
STA. 1262+53.5	POINT OF INTERSECTION 00°30'47" RT	535
STA. 1263+20.6	EDGE OF ROAD	536
STA. 1263+39.1	EDGE OF ROAD	537
STA. 1266+19.8	POINT OF INTERSECTION 00°00'41" RT	538
STA. 1266+73.7	EDGE OF ROAD	539
STA. 1266+96.2	EDGE OF ROAD	540
STA. 1269+74.8	TOE OF SLOPE	541
STA. 1269+88.0	POINT OF INTERSECTION 00°02'59" LT	542
STA. 1270+00.7	TOP OF SLOPE	543
STA. 1270+17.3	TOP OF SLOPE	544
STA. 1270+41.6	TOE OF SLOPE	545
STA. 1271+25.9	TOP OF BANK	546
STA. 1271+31.3	TOE OF SLOPE	547
STA. 1271+41.9	TOE OF SLOPE	548
STA. 1271+51.0	TOP OF BANK	549
STA. 1271+92.7	FENCE/ PROPERTY LINE	550
STA. 1272+60.5	ENTER CROPS	551
STA. 1272+95.3	POINT OF INTERSECTION 00°45'25" RT	552
STA. 1273+53.0	POINT OF INTERSECTION 01°14'11" LT	553
STA. 1277+24.3	POINT OF INTERSECTION 00°32'49" RT	554
STA. 1281+02.2	POINT OF INTERSECTION 00°01'32" LT	555
STA. 1285+04.3	POINT OF INTERSECTION 00°02'18" RT	556
STA. 1289+03.8	POINT OF INTERSECTION 00°19'32" LT	557
STA. 1289+34.3	SECTION LINE/ PROPERTY LINE	558
STA. 1290+05.2	EXIT CROPS	559
STA. 1290+08.9	EDGE OF ROAD	560
STA. 1290+44.7	EDGE OF ROAD	561
STA. 1290+52.0	ENTER CANAL	562
STA. 1290+56.9	EXIT CANAL	563
STA. 1290+58.4	ENTER CROPS	564
STA. 1292+23.1	POINT OF INTERSECTION 00°08'13" RT	565
STA. 1295+73.2	POINT OF INTERSECTION 00°09'41" RT	566
STA. 1299+52.3	POINT OF INTERSECTION 00°01'15" LT	567
STA. 1302+53.2	EXIT CROPS	568
STA. 1302+60.0	ENTER CANAL	569
STA. 1302+77.8	EXIT CANAL	570
STA. 1303+14.8	EDGE OF ROAD	571
STA. 1303+16.9	ENTER CANAL	572
STA. 1303+21.5	EXIT CANAL	573
STA. 1303+26.5	ENTER CROPS	574
STA. 1303+52.5	POINT OF INTERSECTION 00°08'47" LT	575
STA. 1307+33.8	POINT OF INTERSECTION 00°08'48" RT	576
STA. 1311+08.1	POINT OF INTERSECTION 00°12'32" LT	577
STA. 1312+00.0	MATCH LINE	

GILL RANCH STORAGE

GILL RANCH 30" PIPELINE ALIGNMENT STA 1250+00.0 TO 1312+00.0

DWG. NO. 12361-180C-022 REV. P9

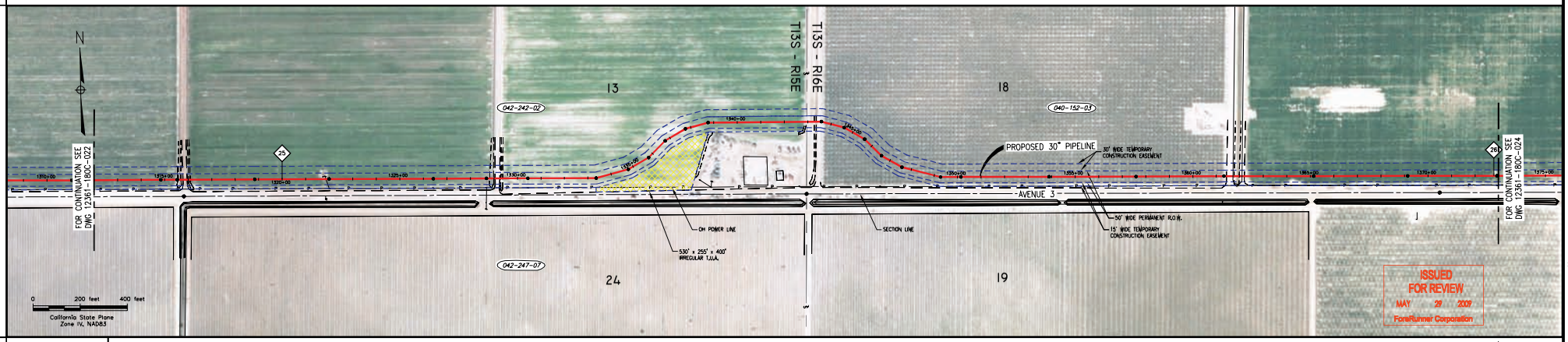
Plotted by: R.SUMRULD Date: 5/28/2009 3:53 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - P9\12361-180C-022_200.dwg

OWNERSHIP	STA 1312+00.0	(042-242-02) CALIFORNIA VALLEY LAND COMPANY 3090.3 FEET/ 187.5 RODS	STA 1342+96.3
	STA 1342+96.3	(040-152-03) CALIFORNIA VALLEY LAND COMPANY 3004.7 FEET/ 182.1 RODS	STA 1373+00.0
P/L DEPTH	PIPELINE DEPTH 5' TO T.O.P.		
ENVIRONMENTAL	SENSITIVE CULTURAL RESOURCES ARE IDENTIFIED IN THIS AREA. DETAILS ARE AVAILABLE TO QUALIFIED PERSONNEL UNDER SEPARATE COVER."		

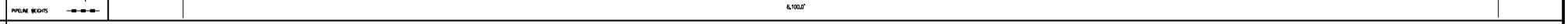
STATIONING

STA	DESCRIPTION	DIST.	TOTAL
STA 1312+00.0	MATCH LINE		
STA 1314+85.8	POINT OF INTERSECTION	00°18'20" RT	278
STA 1315+44.4	EXIT CROPS		579
STA 1315+53.6	POINT OF INTERSECTION	00°13'42" LT	580
STA 1315+53.6	OH POWER LINE		581
STA 1315+57.5	ENTER CANAL		582
STA 1315+68.3	EXIT CANAL		583
STA 1315+78.1	EDGE OF ROAD		584
STA 1315+95.5	EDGE OF ROAD		585
STA 1316+01.4	ENTER CANAL		586
STA 1316+08.5	EXIT CANAL		587
STA 1316+08.5	ENTER CROPS		588
STA 1316+85.4	POINT OF INTERSECTION	00°03'00" LT	589
STA 1321+81.8	POWER POLE, 10.5' I.T.		590
STA 1321+85.5	OH POWER LINE		591
STA 1321+98.4	POINT OF INTERSECTION	00°12'19" RT	592
STA 1326+42.4	POINT OF INTERSECTION	00°18'50" LT	593
STA 1326+68.2	POINT OF INTERSECTION	00°18'50" RT	594
STA 1326+76.5	EXIT CROPS		595
STA 1326+82.0	ENTER CANAL		596
STA 1326+89.2	EXIT CANAL		597
STA 1329+05.1	EDGE OF ROAD		598
STA 1329+24.3	EDGE OF ROAD		599
STA 1329+29.7	ENTER CANAL		600
STA 1329+37.3	EXIT CANAL		601
STA 1329+40.8	ENTER CROPS		602
STA 1330+44.0	POINT OF INTERSECTION	00°02'20" LT	603
STA 1333+34.6	POINT OF INTERSECTION	14°59'02" LT	604
STA 1334+78.4	POINT OF INTERSECTION	15°00'00" LT	605
STA 1335+76.4	POINT OF INTERSECTION	15°16'41" LT	606
STA 1336+76.4	POINT OF INTERSECTION	15°00'02" RT	607
STA 1337+76.4	POINT OF INTERSECTION	14°59'59" RT	608
STA 1338+76.4	POINT OF INTERSECTION	14°59'59" RT	609
STA 1339+76.4	POINT OF INTERSECTION	14°59'59" RT	610
STA 1342+95.3	RANGE, SECTION & PROPERTY LINE		612
STA 1343+28.0	ENTER CANAL		613
STA 1343+35.9	EXIT CANAL		614
STA 1343+58.5	POINT OF INTERSECTION		615
STA 1343+60.2	ENTER CROPS	15°00'00" RT	616
STA 1344+58.3	POINT OF INTERSECTION	14°59'58" RT	617
STA 1346+58.3	POINT OF INTERSECTION	15°00'04" RT	618
STA 1346+58.3	POINT OF INTERSECTION	15°16'43" LT	619
STA 1347+58.3	POINT OF INTERSECTION	14°59'59" LT	620
STA 1349+27.5	POINT OF INTERSECTION	14°27'06" LT	621
STA 1350+13.9	POINT OF INTERSECTION	00°05'49" RT	623
STA 1353+98.1	POINT OF INTERSECTION	00°02'49" LT	624
STA 1357+58.6	POINT OF INTERSECTION	00°11'16" LT	625
STA 1361+31.1	EXIT CROPS		627
STA 1361+32.7	POINT OF INTERSECTION	00°22'40" RT	628
STA 1361+43.4	EDGE OF ROAD		629
STA 1361+76.1	ENTER CANAL		630
STA 1361+97.6	EXIT CANAL		631
STA 1362+19.5	EDGE OF ROAD		633
STA 1362+34.1	ENTER CROPS		634
STA 1365+13.9	POINT OF INTERSECTION	00°14'08" LT	635
STA 1369+13.8	POINT OF INTERSECTION	00°07'35" RT	636
STA 1372+93.3	POINT OF INTERSECTION	00°11'40" LT	637
STA 1373+00.0	MATCH LINE		

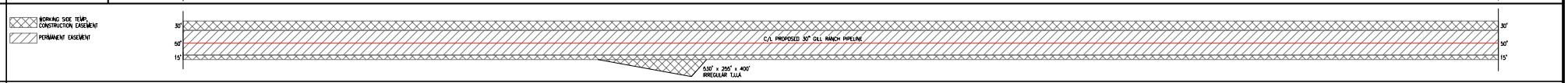
ALIGNMENT



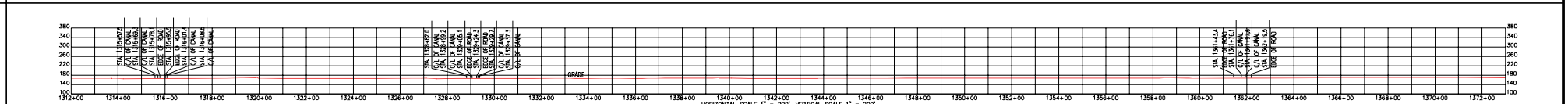
PIPELINE DATA



EASEMENT



PROFILE



SUMMARY

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 WALS FBE	6,100.0'
	CATHODIC TEST STATION	2
	TOTAL	6,100.0'

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-022	30" PIPELINE ALIGNMENT
12361-180C-024	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P9	ISSUED FOR REVIEW	SL	5/29/09	CFE	5/29/09		
P8	ISSUED FOR REVIEW	SL	5/06/09				
P7	PRELIMINARY	SL	4/20/09				
P6	DRAWING NOT ISSUED						
P5	DRAWING NOT ISSUED						
P4	DRAWING NOT ISSUED						
P3	DRAWING NOT ISSUED						
P2	DRAWING NOT ISSUED						

ENGINEERING RECORD

DRAWN	SL	5/06/09
CHECKED	CFE	5/06/09
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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ForeRunner corporation
Livermore, CA 94550

GILL RANCH STORAGE

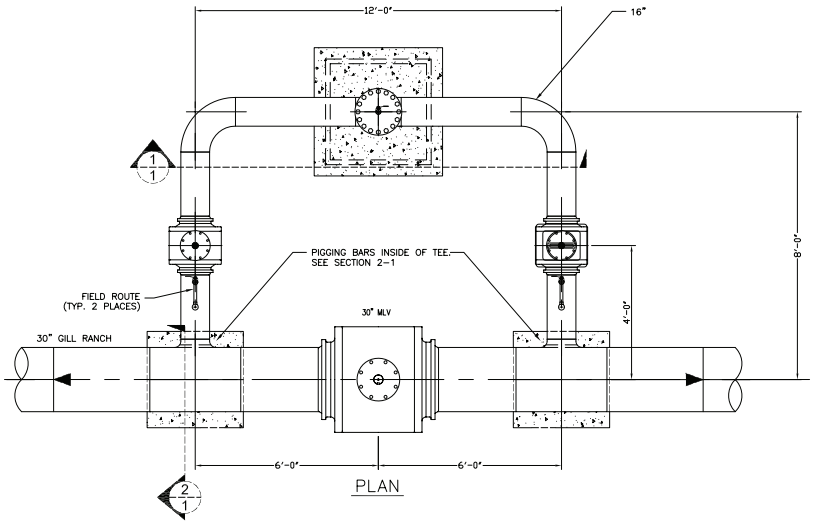
GILL RANCH
30" PIPELINE ALIGNMENT
STA 1312+00.0 TO 1373+00.0

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361-C	Modesto Co., CA	12361-180C-023	P9

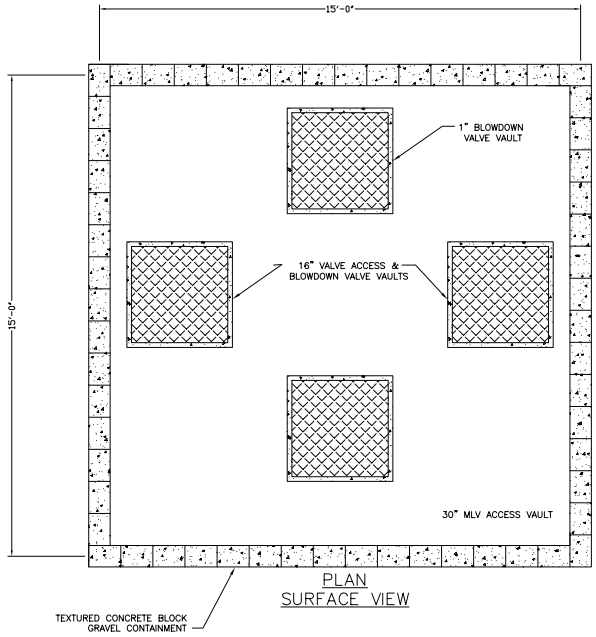
Plotted by: R.SUMPOLD Date: 5/29/2009 3:56 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\01. Alignment Sheets\200 ALIGNMENT SHEETS - PW\12361-180C-023_200.dwg

APPENDIX A.3

GAS PIPELINE SURFACE FACILITY DETAILS

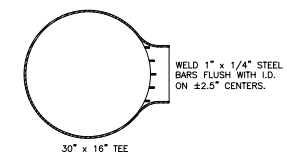


PLAN

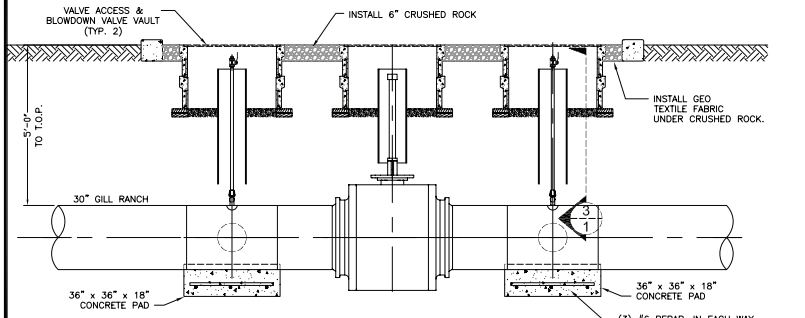


PLAN
SURFACE VIEW

NOTE:
CENTER VALVE EXTENSION IN VAULT
FIELD COAT ALL BARE SURFACES WITH 2 PART EPOXY COATING
POWERCRETE J 2.5 MIL MINIMUN



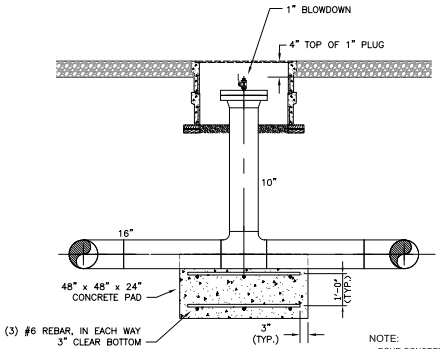
SECTION 2-1



NOTE:
POUR CONCRETE FOOTINGS
AGAINST UNDISTURBED SOIL.

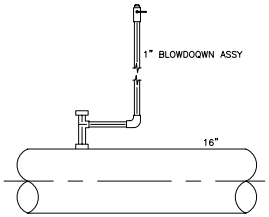
ELEVATION

NOTE:
POUR CONCRETE FOOTINGS
AGAINST UNDISTURBED SOIL.
WRAP PIPE WITH ROCK SHIELD IN
FOOTING AREA.



SECTION 1-1

NOTE:
POUR CONCRETE FOOTINGS
AGAINST UNDISTURBED SOIL.
WRAP PIPE WITH ROCK SHIELD IN
FOOTING AREA.



SECTION 3-1

PRELIMINARY
NOT FOR CONSTRUCTION
APRIL 11 2008
ForeRunner Corporation

REFERENCE DRAWINGS		REVISIONS					
		P2	PRELIMINARY	CFE 4/11/08	CG 4/11/08		
12361-180C-006	30" PIPELINE ALIGNMENT	P1	PRELIMINARY	CFE 2/27/08	CG 2/27/08		
DWG. NO.	TITLE	REV.	DESCRIPTION	BY DATE	CHK DATE	APPR DATE	

ENGINEERING RECORD		
DRAWN	CFE	2/8/08
CHECKED		
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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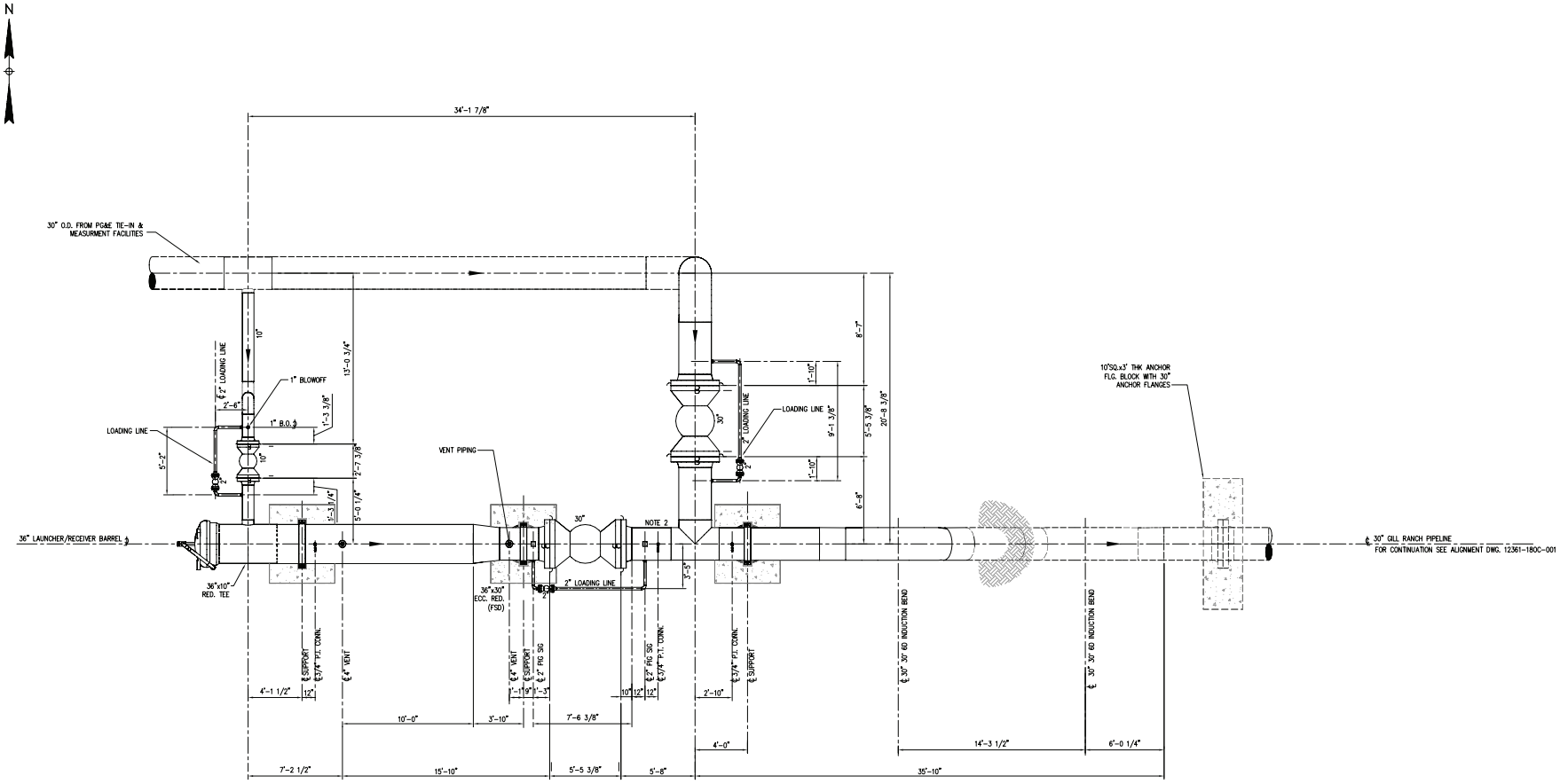
FORERUNNER CORPORATION

GILL RANCH STORAGE

GILL RANCH
30" MAIN LINE VALVE
PIPING PLAN, SECTIONS AND DETAILS

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS SHOWN	12361-B	Madera/Fresno Co. Calif.	12361-17OC-100	P2



PLAN
SCALE 1/4"=1'-0"

PRELIMINARY
NOT FOR CONSTRUCTION
APRIL 11 2008
ForeRunner Corporation

NOTES:

1. FIELD TO VERIFY ALL DIMENSIONS, ELEVATIONS AND VALVE ORIENTATIONS BEFORE FABRICATION.
2. CONTRACTOR IS TO INSTALL SCRAPER GUIDE BARS IN 30" TEE IN ACCORDANCE WITH DWG. 12361-1700-____.
3. TAPER BORE PIPELINE SIDE OF 30" SCH. 30 FABRICATION PIPING TO --- W.T. WELD TO 30" O.D., --- W.T., TRANSITION PIPE.

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-001	ALIGNMENT DRAWING

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P2	PRELIMINARY	PJD	4/11/08	CFE	4/11/08		
P1	PRELIMINARY	PJD	2/27/08	CFE	2/27/08		

ENGINEERING RECORD

DRAWN	N.NEW	08/13/07
CHECKED		
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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FORERUNNER CORPORATION

GILL RANCH STORAGE

GILL RANCH
30" LAUNCHER/RECEIVER
PIPING PLAN

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
1/4"=1'-0"	12361-B	Madera/Fresno Co. Calif.	12361-170C-101	P2

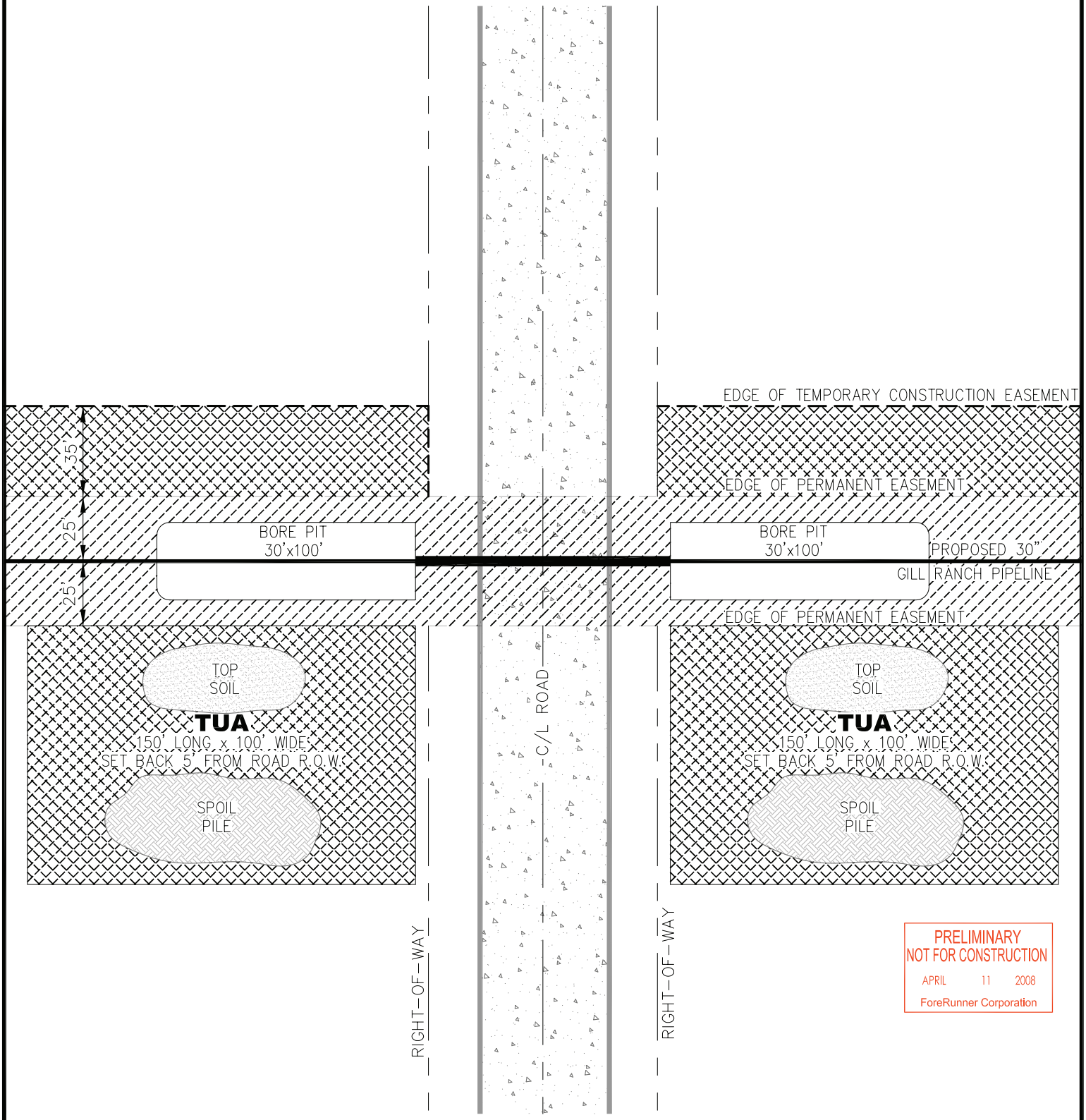
Plotted by: CJESCH Date: 4/11/2008 9:21 AM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\Ja. Details\12361-170C-101.dwg

APPENDIX A.4

GAS PIPELINE TYPICAL SPECIFICATIONS

Typical Uncased Road Crossing Plan

Document No.
12361-180C-603



PRELIMINARY
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APRIL 11 2008
ForeRunner Corporation

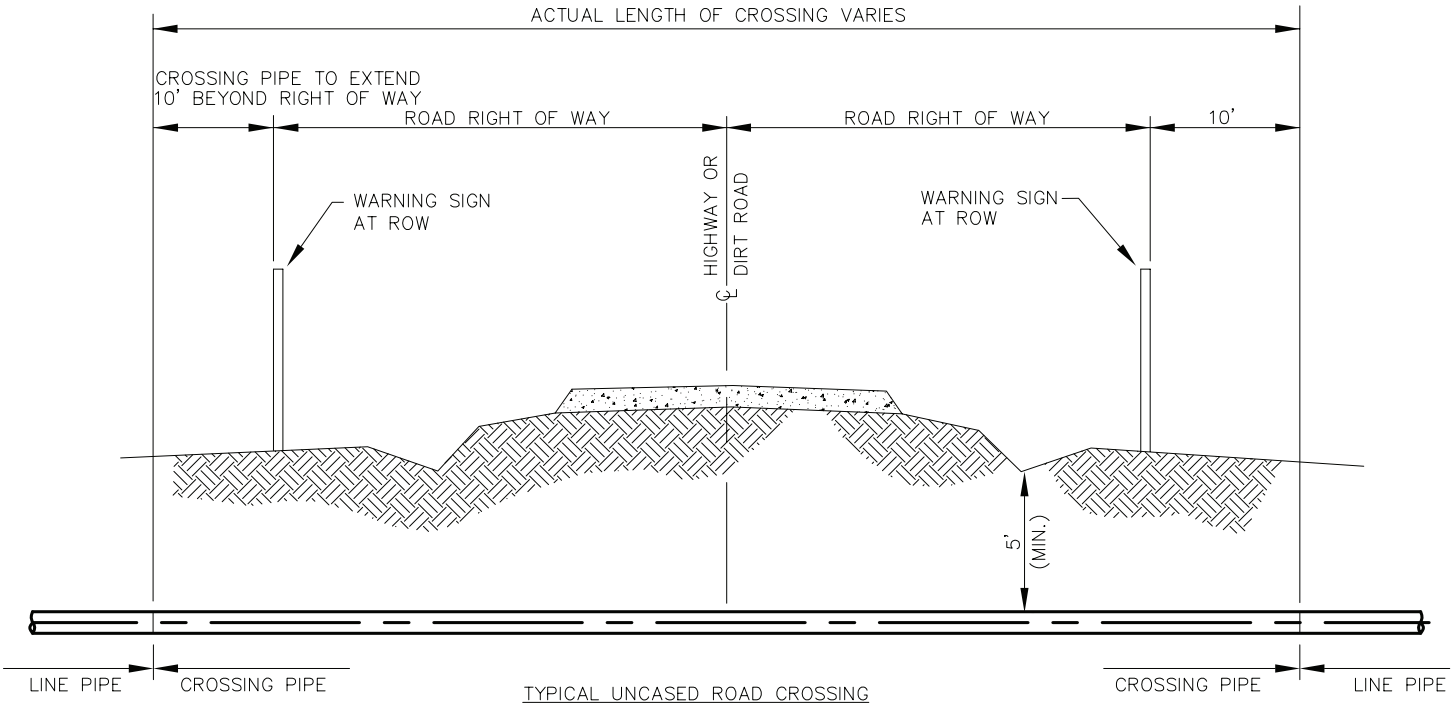
GILL RANCH STORAGE

FORERUNNER CORPORATION
3900 S. WADSWORTH BLVD. #600
LAKEWOOD, CO 80235
303-989-0223

NO.	DESCRIPTION		
P3	PRELIMINARY		4/11/08
CHECKED	DATE	APPROVED	DATE
R. STONE	01/15/08		

Typical Uncased Road Crossing Section

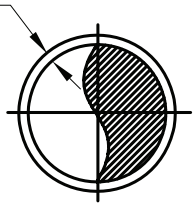
Document No.
12361-180C-604



TYPICAL UNCASED ROAD CROSSING
OPEN CUT OR BORE

NOTES:
1. CROSSING SHALL BE IN ACCORDANCE WITH APPLICABLE PERMIT.
2. ROAD CROSSING PIPE SHALL EXTEND TO A MINIMUM OF RIGHT OF WAY LINE PLUS 10' EACH SIDE.
3. THE TYPE AND MINIMUM REQUIRED LENGTH OF PIPE FOR CROSSING OF PUBLIC ROADS SHALL BE AS SPECIFIED ON MAPS ON ALIGNMENT SHEETS.
4. ALL BORED CROSSING PIPE SHALL HAVE 40 MILS OF POWERCRETE J PROTECTION DURING INSERTION. PIPE FOR OPEN CUT CROSSING DOES NOT REQUIRE EXTRA COATING.
5. CROSSING SHALL BE A MINIMUM OF 5' BELOW PAVED SURFACE FOR ALL STATE AND US HIGHWAYS.
6. OPPOSITE HAND ORIENTATION MAY BE VALID FOR A GIVEN CROSSING.

BORE ANNULUS TO BE NO LARGER THAN 1" GREATER THAN COATED LINE PIPE



PRELIMINARY
NOT FOR CONSTRUCTION
APRIL 11 2008
ForeRunner Corporation

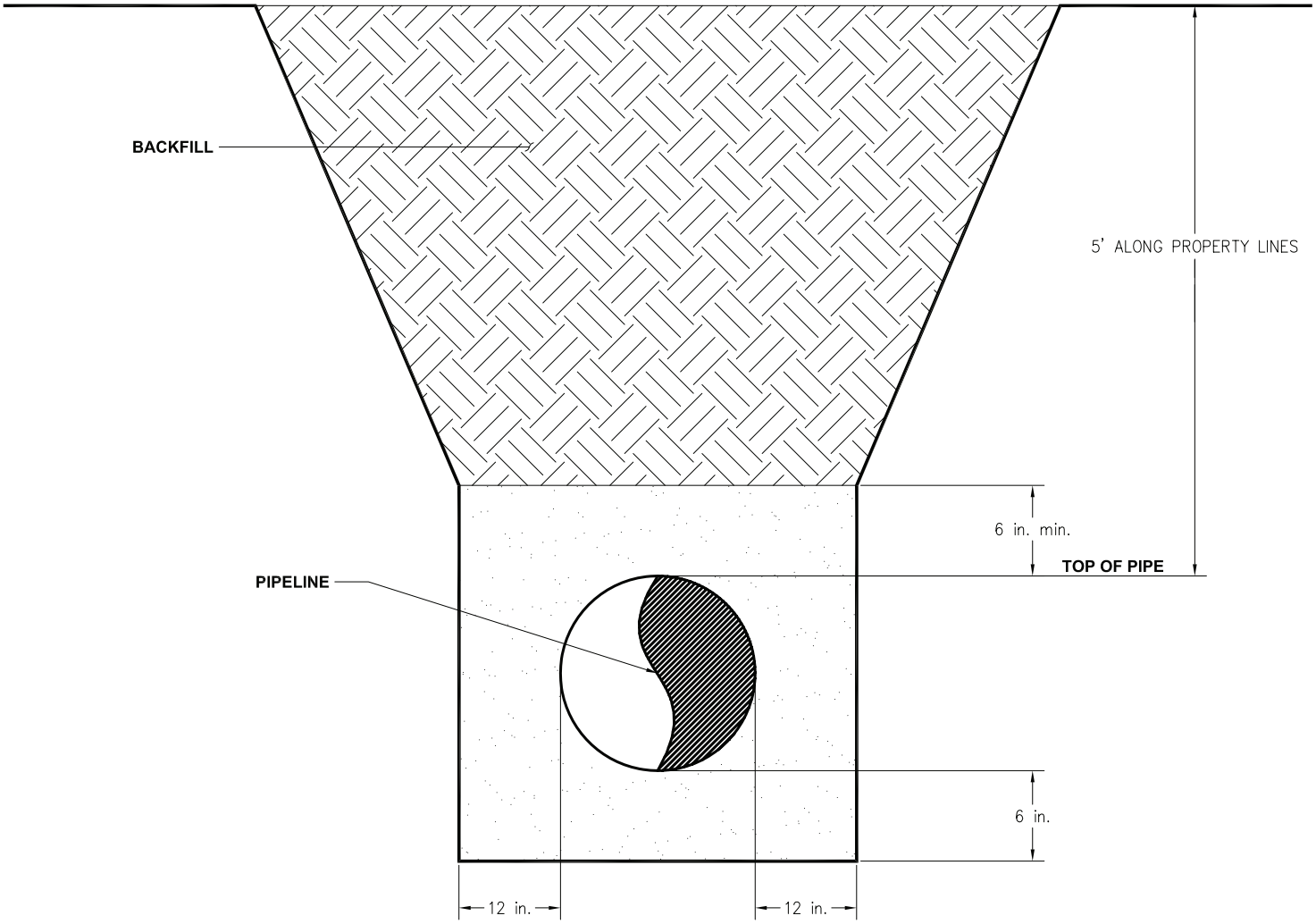
GILL RANCH STORAGE

FORERUNNER CORPORATION
2900 S. WADSWORTH BLVD. #500
LAKEWOOD, CO 80235
303-989-0223

NO.	DESCRIPTION		
P3	PRELIMINARY		4/11/08
CHECKED	DATE	APPROVED	DATE
R. STONE	01-15-08		

Typical Pipe Trench Cross Section

Document No.
12361-180C-605



TYPICAL CROSS SECTION

NOTE:
ALL FILL TO BE NATIVE SOIL UNLESS NATIVE SOIL IS NOT ACCEPTABLE FOR THE PORTION AROUND THE PIPE.
IF NATIVE SOIL IS FOUND NOT SUITABLE, SAND PADDING OR SELECTED FILL TO BE USED AS REQUIRED BY CODE.

NOT TO SCALE

PRELIMINARY
NOT FOR CONSTRUCTION
APRIL 11 2008
ForeRunner Corporation

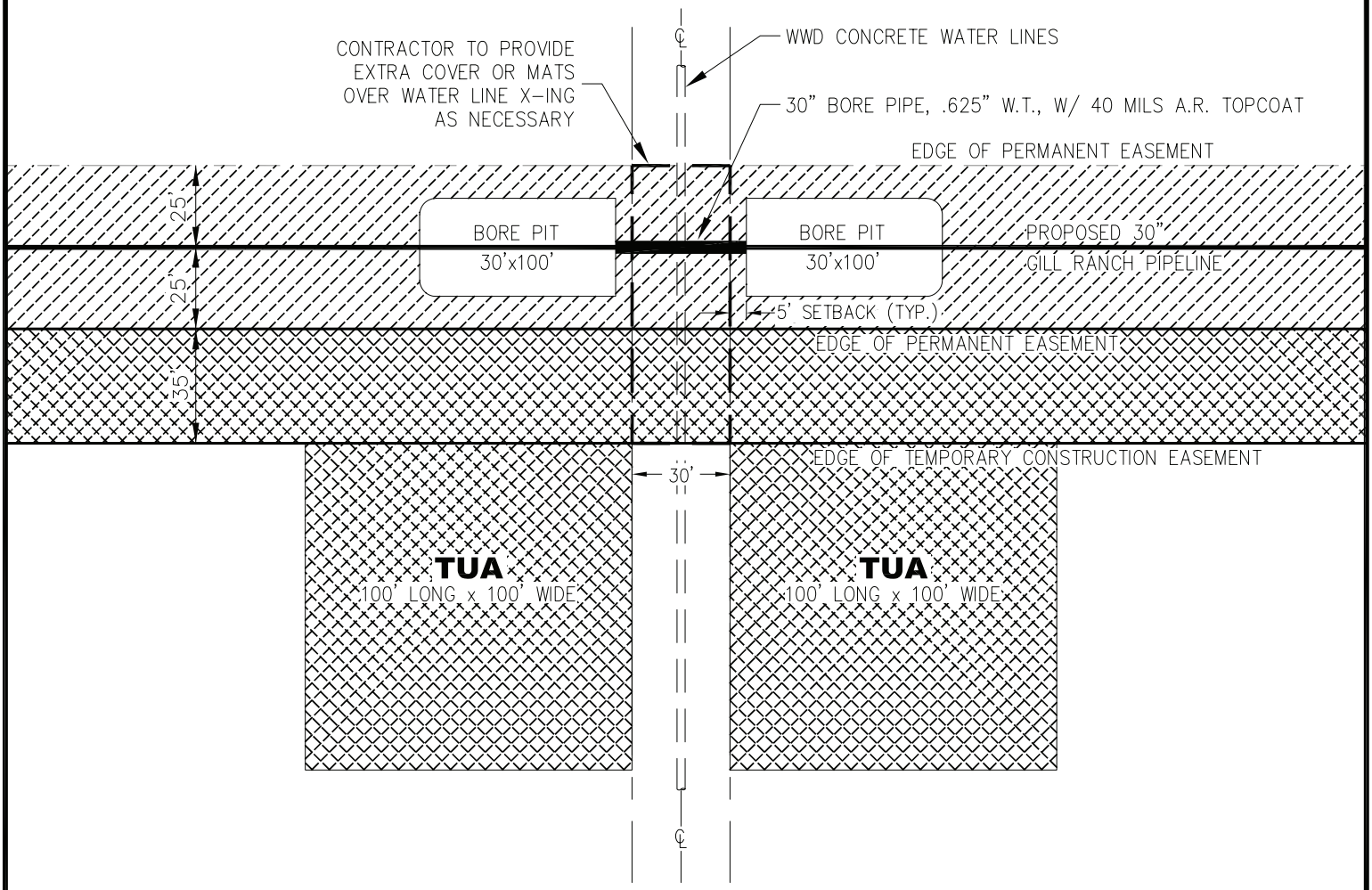
GILL RANCH STORAGE

FORERUNNER CORPORATION
2900 S. WADSWORTH BLVD. #500
LAKEWOOD, CO 80235
303-989-0223

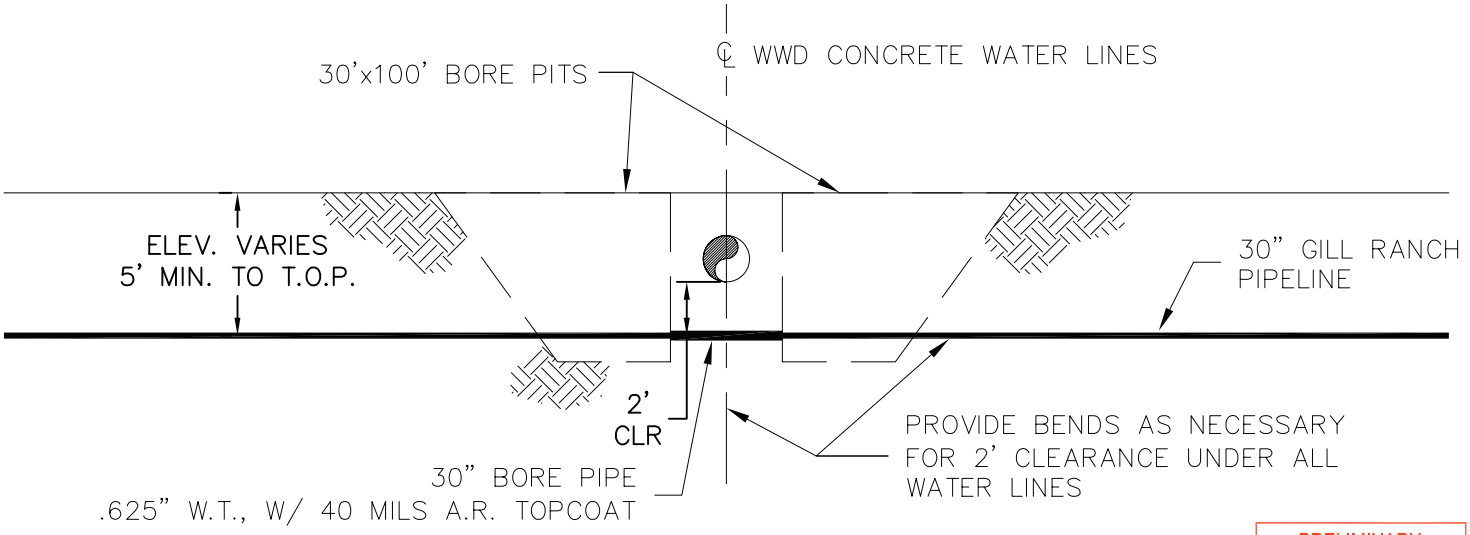
NO.	DESCRIPTION		
P4	PRELIMINARY		4/11/08
CHECKED	DATE	APPROVED	DATE
R. STONE	02/08/08		

Typ. WWD Conc. Water Line Crossing (Bored)

Document No.
12361-180C-606



PLAN



ELEVATION

PRELIMINARY
NOT FOR CONSTRUCTION
APRIL 11 2008
ForeRunner Corporation

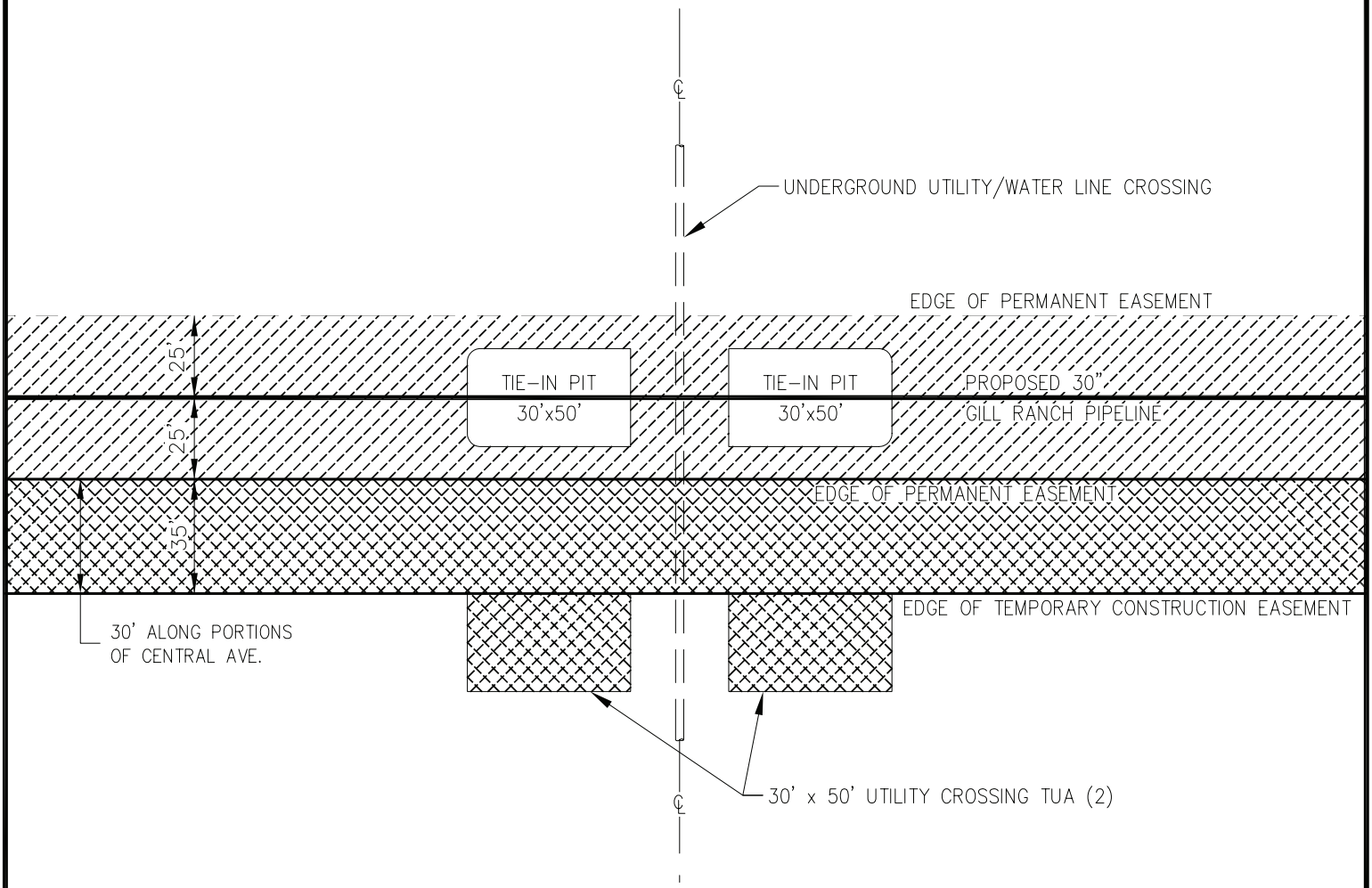
GILL RANCH STORAGE

FORERUNNER CORPORATION
3900 S. WADSWORTH BLVD. #600
LAKEWOOD, CO 80235
303-989-0222

NO.	DESCRIPTION		
P3	PRELIMINARY		4/11/08
CHECKED	DATE	APPROVED	DATE
R. STONE	01/15/08		

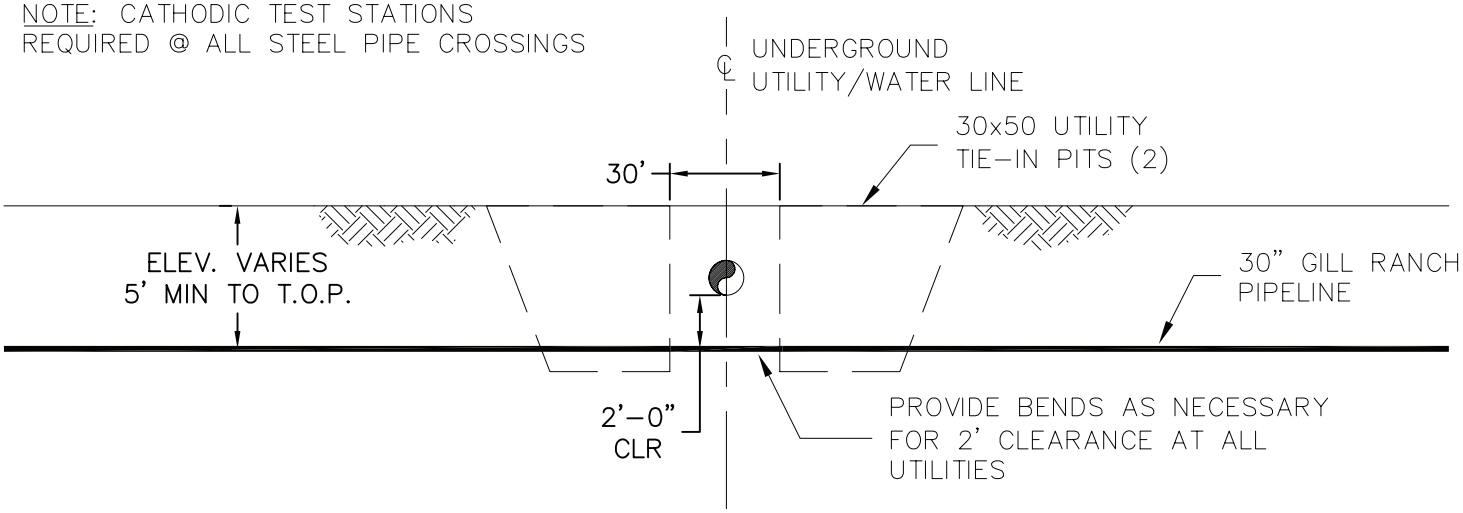
Typical Steel Water line/Utility Crossing

Document No.
12361-180C-607



PLAN

NOTE: CATHODIC TEST STATIONS
REQUIRED @ ALL STEEL PIPE CROSSINGS



SECTION

PRELIMINARY
NOT FOR CONSTRUCTION
APRIL 11 2008
ForeRunner Corporation

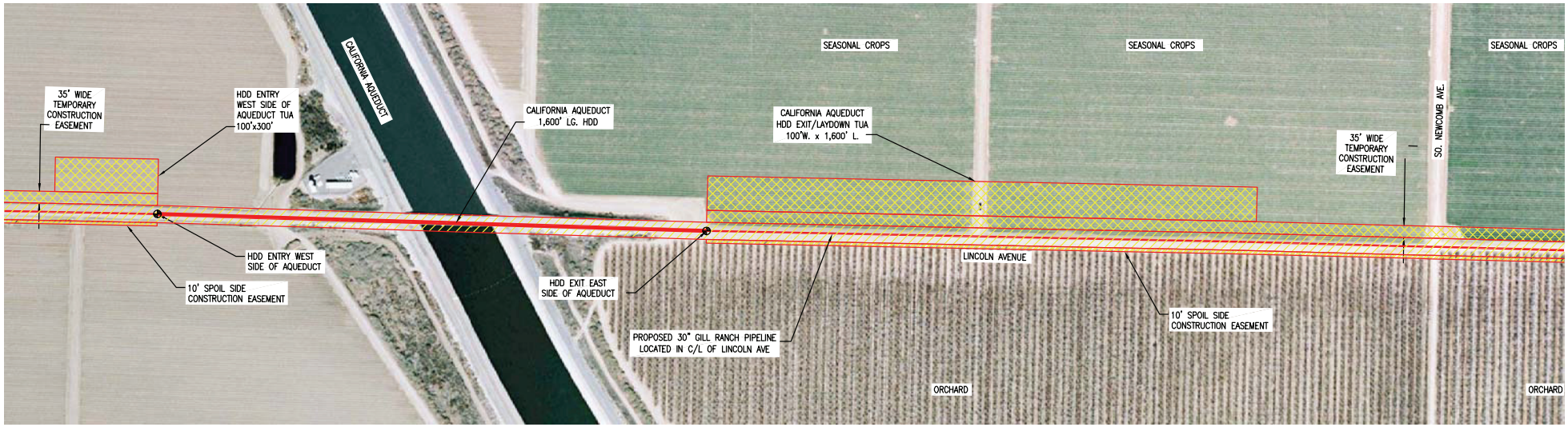
GILL RANCH STORAGE

FORERUNNER CORPORATION
3900 S. WADSWORTH BLVD. #600
LAKEWOOD, CO 80235
303-989-0222

NO.	DESCRIPTION		
P3	PRELIMINARY		4/11/08
CHECKED	DATE	APPROVED	DATE
R. STONE	01/15/08		

APPENDIX A.5

GAS PIPELINE CROSSING DETAILS



PLAN VIEW

SCALE 1" = 300' HORIZONTAL

REF. ALIGN. DWG. 12361-180C-002

SCALE 1"=300'

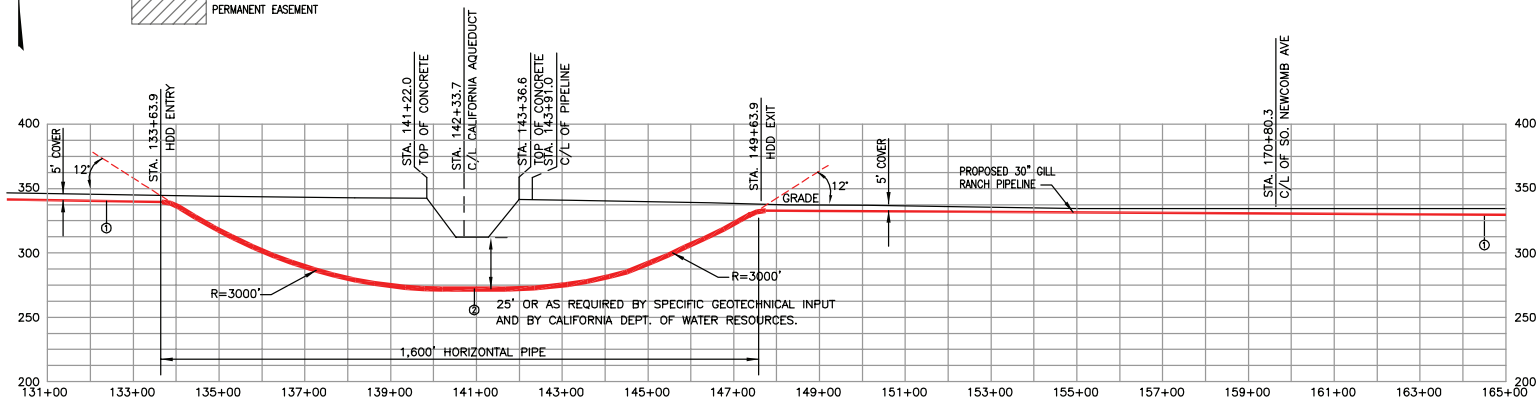
300 0 300 600 FEET

CA-ZONE IV, FEET NAD 83

N

TEMP. CONSTRUCTION EASEMENT

PERMANENT EASEMENT



PROFILE VIEW

HORIZONTAL SCALE 1" = 300',VERTICAL SCALE 1" = 100'

PRELIMINARY
NOT FOR CONSTRUCTION
JUNE 5 2008
ForeRunner Corporation

SUMMARY

SUMMARY OF MATERIALS		
1	30" O.D. LINE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 MILS FBE	-
2	30" O.D. BORE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 MILS FBE AND 40 MILS THICK ABRASION RESISTANT TOP COAT	1,600'
ITEM	DESCRIPTION	QUANTITY

SUMMARY OF MATERIALS		
ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS	
DWG. NO.	TITLE
12361-180C-002	30" PIPELINE ALIGNMENT

REVISIONS					
REV.	DESCRIPTION	BY	DATE	CHK	DATE
P4	ISSUE FOR PERMIT	PJD	6/3/08	CFE	6/4/08
P3	PRELIMINARY	PJD	4/11/08	CFE	4/11/08
P2	PRELIMINARY	CMC	2/27/08	CFE	2/27/08
P1	PRELIMINARY	SL	2/06/08	CFE	2/06/08

ENGINEERING RECORD		
DRAWN	PJD	6/3/08
CHECKED	CFE	6/4/08
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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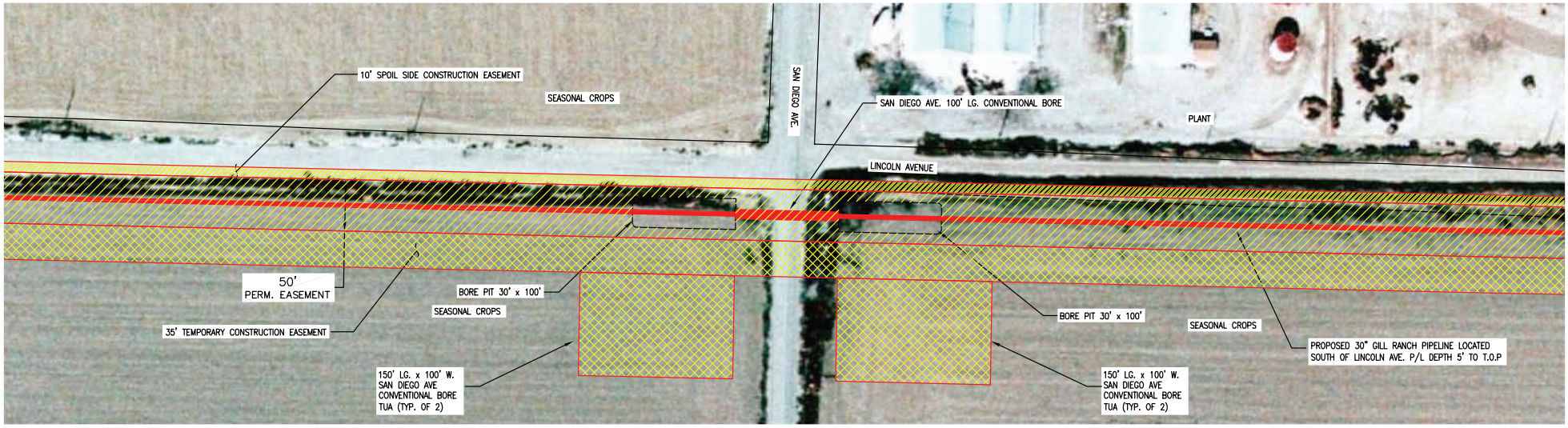
FORERUNNER CORPORATION
[illegible]

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
CALIFORNIA AQUEDUCT
HORIZONTAL DIRECTIONAL DRILL

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361C	Madera/Fresno Co., CA	12361-180C-101	P4

Plotted by: M.PROVINES Date: 7/7/2008 12:26 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\02. Crossings\12361-180C-101.dwg



PLAN VIEW

SCALE 1" = 100' HORIZONTAL
REF. ALIGN. DWG.
12361-180C-001

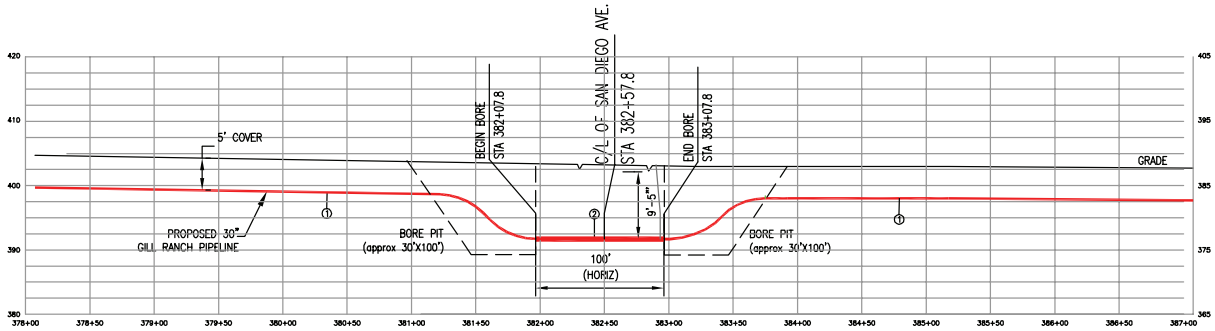
SCALE 1"=100'
50 0 50 100 FEET
CA-ZONE IV, FEET
NAD 83

N

WORKING SIDE TEMP. CONSTRUCTION EASEMENT

PERMANENT EASEMENT

SPOIL SIDE TEMP. CONSTRUCTION EASEMENT



PROFILE VIEW

HORIZONTAL SCALE 1" = 100',VERTICAL SCALE 1" = 20'

PRELIMINARY
NOT FOR CONSTRUCTION
JUNE 5 2008
ForeRunner Corporation

SUMMARY

SUMMARY OF MATERIALS		
1	30" O.D. LINE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 MILS FBE	
2	30" O.D. BORE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 MILS FBE	
	AND 40 MILS THICK ABRASION RESISTANT TOP COAT	100.0'
ITEM	DESCRIPTION	QUANTITY

SUMMARY OF MATERIALS		
ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS	
DWG. NO.	TITLE
12361-180C-003	30" PIPELINE ALIGNMENT

REVISIONS							
REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P2	ISSUE FOR PERMIT	PJD	6/4/08	CFE	6/4/08		
P1	PRELIMINARY	MP	4/11/08	CFE	4/11/08		

ENGINEERING RECORD		
DRAWN	PJD	6/4/08
CHECKED	CFE	6/4/08
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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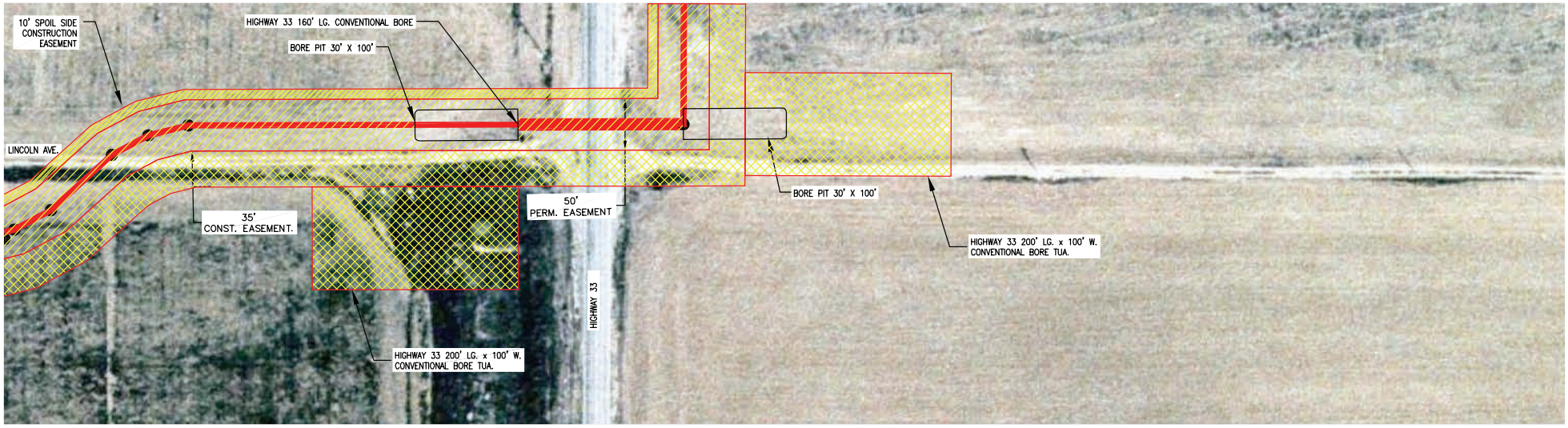
FORERUNNER CORPORATION
[illegible]

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
SAN DIEGO AVE
CONVENTIONAL BORE

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361C	Madera/Fresno Co., CA	12361-180C-102	P2

Plotted by: M.PROVINES Date: 7/7/2008 12:28 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\02. Crossings\12361-180C-102.dwg



PLAN VIEW

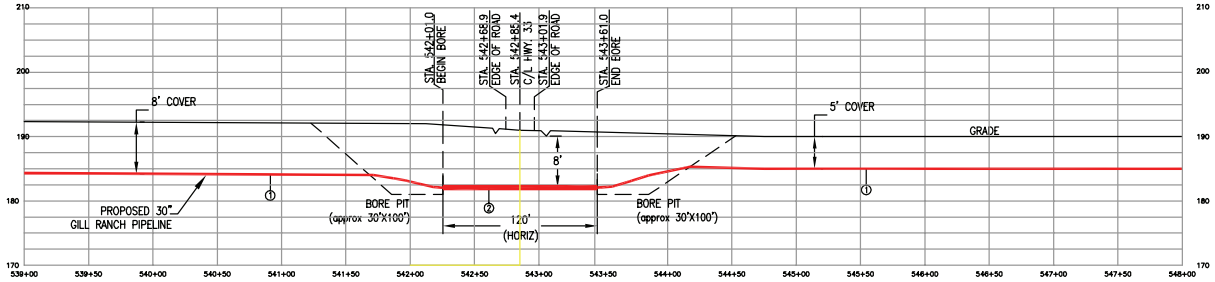
SCALE 1" = 100' HORIZONTAL
REF. ALIGN. DWG.
12361-180C-005

SCALE 1"=100'
50 0 50 100 FEET
CA-ZONE IV, FEET
NAD 83

N

TEMP. CONSTRUCTION EASEMENT

PERMANENT EASEMENT



PROFILE VIEW

HORIZONTAL SCALE 1" = 100',VERTICAL SCALE 1" = 20'

PRELIMINARY
NOT FOR CONSTRUCTION
JUNE 5 2008
ForeRunner Corporation

SUMMARY

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 MILS FBE	
2	30" O.D. BORE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 MILS FBE	
	AND 40 MILS THICK ABRASION RESISTANT TOP COAT	160.0'

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-180C-005	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P4	ISSUE FOR PERMIT	PJD	6/4/08	CFE	6/4/08		
P3	PRELIMINARY	PJD	4/11/08	CFE	4/11/08		
P2	PRELIMINARY	MP	2/27/08	CFE	2/27/08		
P1	PRELIMINARY	MP	1/30/08	CFE	2/8/08		

ENGINEERING RECORD

DRAWN	PJD	6/4/08
CHECKED	CFE	6/4/08
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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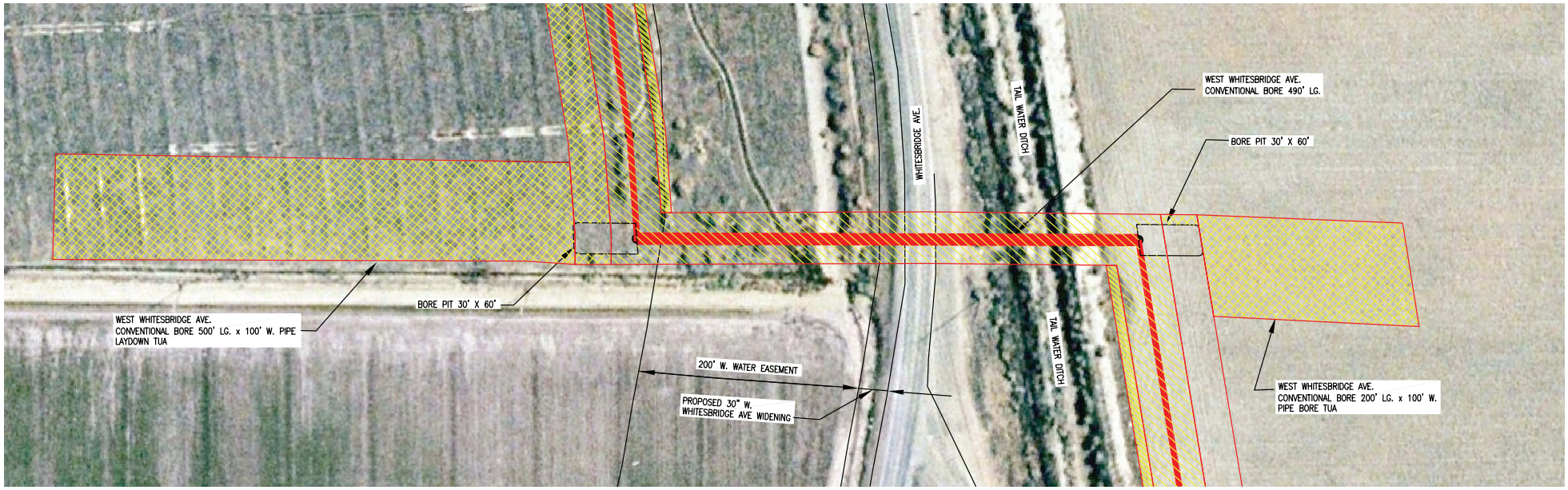
FORERUNNER CORPORATION

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
HIGHWAY 33
CONVENTIONAL BORE

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361C	Madera/Fresno Co., CA	12361-180C-103	P4

Plotted by: MCROWNES Date: 7/7/2008 12:31 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\02. Crossings\12361-180C-103.dwg



PLAN VIEW

SCALE 1" = 100' HORIZONTAL
REF. ALIGN. DWG.
12361-180C-007

N

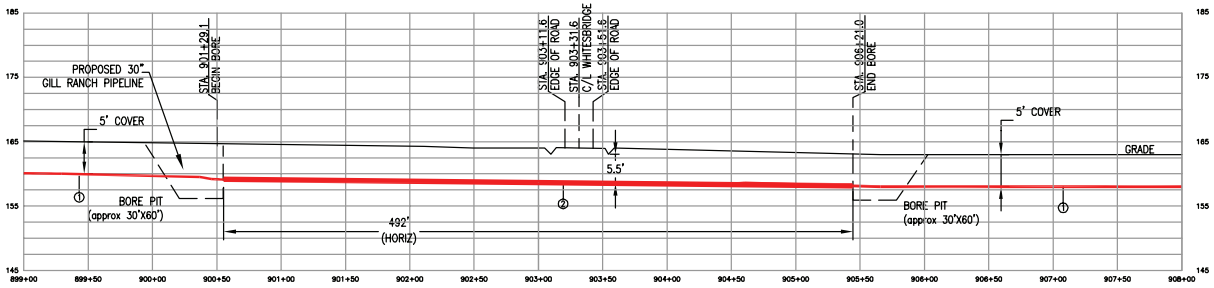
SCALE 1"=100'

50 0 50 100 FEET

CA-ZONE IV, FEET
NAD 83

TEMP. CONSTRUCTION EASEMENT

PERMANENT EASEMENT



PROFILE VIEW

HORIZONTAL SCALE 1" = 100',VERTICAL SCALE 1" = 20'

PRELIMINARY
NOT FOR CONSTRUCTION
JUNE 5 2008
ForeRunner Corporation

SUMMARY

SUMMARY OF MATERIALS		
1	30" O.D. LINE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 MILS FBE	
2	30" O.D. BORE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 MILS FBE	
	AND 40 MILS THICK ABRASION RESISTANT TOP COAT	490.0'
ITEM	DESCRIPTION	QUANTITY

SUMMARY OF MATERIALS		
ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS	
DWG. NO.	TITLE
12361-180C-007	30" PIPELINE ALIGNMENT

REVISIONS							
REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P3	ISSUE FOR PERMIT	PJD	6/4/08	CFE	6/4/08		
P2	PRELIMINARY	CFE	4/11/08	CFE	4/11/08		
P1	PRELIMINARY	MP	1/30/08	CFE	2/8/08		

ENGINEERING RECORD		
DRAWN	PJD	6/4/08
CHECKED	CFE	6/4/08
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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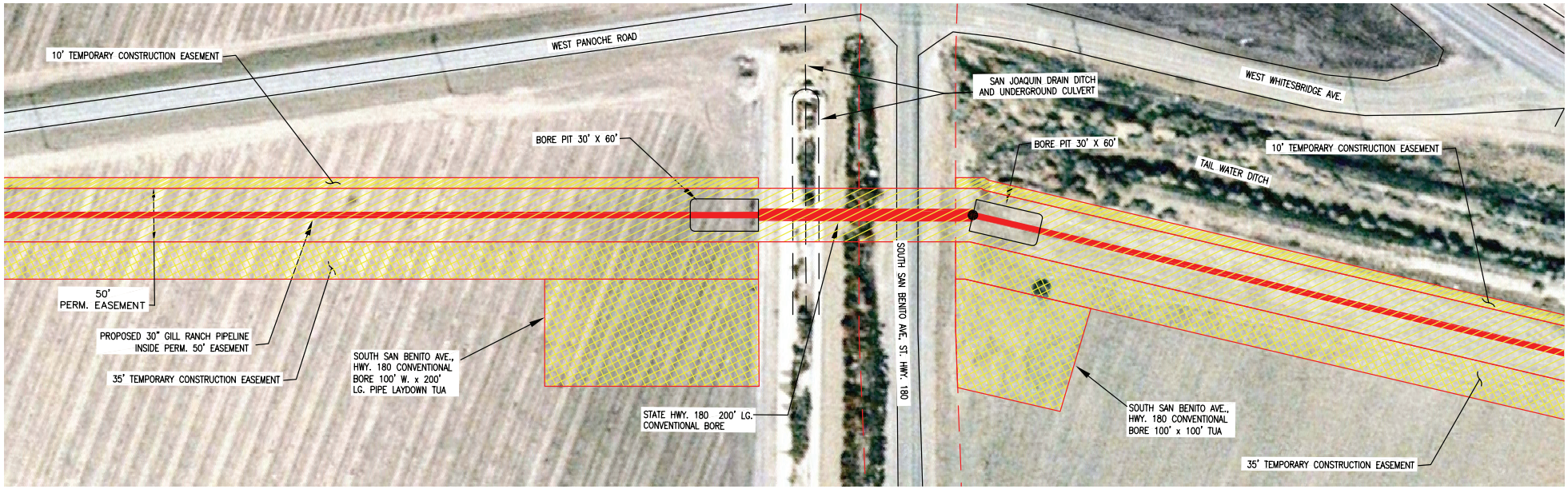
FORERUNNER CORPORATION
[illegible]

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
WHITESBRIDGE AVE.
CONVENTIONAL BORE

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361C	Madera/Fresno Co., CA	12361-180C-104	P3

Plotted by: M.PROVINES Date: 7/7/2008 12:34 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\02. Crossings\12361-180C-104.dwg



PLAN VIEW

SCALE 1" = 100' HORIZONTAL
REF. ALIGN. DWG.
12361-180C-007

N

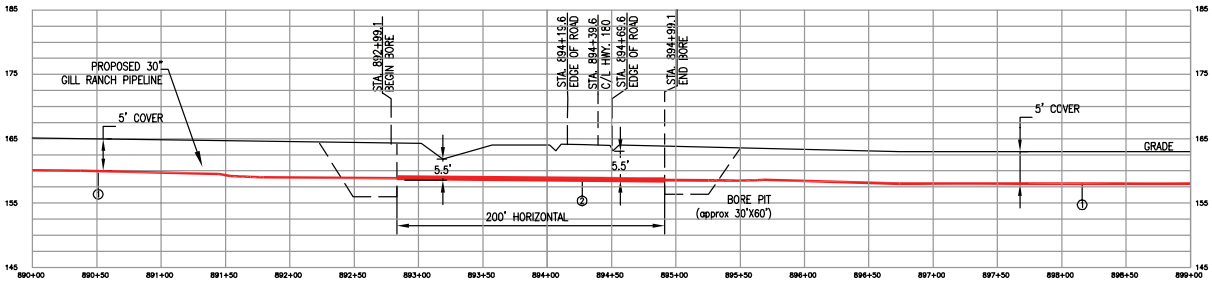
SCALE 1"=100'

50 0 50 100 FEET

CA-ZONE IV, FEET
NAD 83

TEMP. CONSTRUCTION EASEMENT

PERMANENT EASEMENT



PROFILE VIEW

HORIZONTAL SCALE 1" = 100',VERTICAL SCALE 1" = 20'

PRELIMINARY
NOT FOR CONSTRUCTION
JUNE 5 2008
ForeRunner Corporation

SUMMARY

SUMMARY OF MATERIALS		
1	30" O.D. LINE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 MILS FBE	
2	30" O.D. BORE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 MILS FBE	
	AND 40 MILS THICK ABRASION RESISTANT TOP COAT	490.0'
ITEM	DESCRIPTION	QUANTITY

SUMMARY OF MATERIALS		
ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS	
12361-180C-007	30" PIPELINE ALIGNMENT
DWG. NO.	TITLE

REVISIONS							
P3	ISSUE FOR PERMIT	PJD	6/4/08	CFE	6/4/08		
P2	PRELIMINARY	CFE	4/11/08	CFE	4/11/08		
P1	PRELIMINARY	MP	1/30/08	CFE	2/8/08		
REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE

ENGINEERING RECORD		
DRAWN	PJD	6/4/08
CHECKED	CFE	6/4/08
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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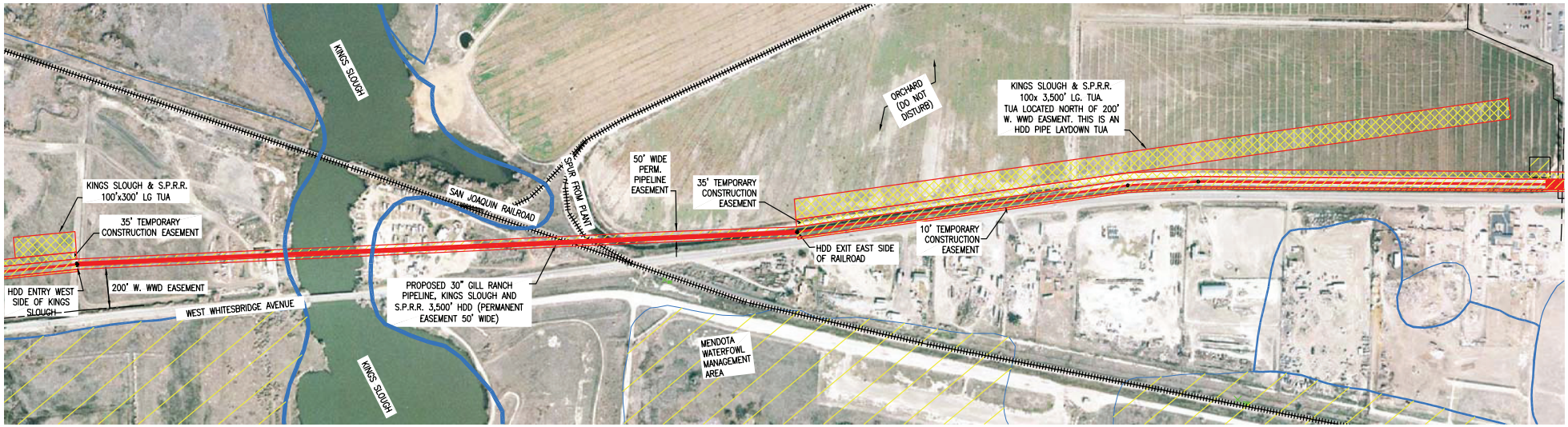
FORERUNNER CORPORATION
[illegible]

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
HWY. 180, SO. SAN BENITO AVE
CONVENTIONAL BORE

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361C	Madera/Fresno Co., CA	12361-180C-105	P3

Plotted by: M.PROVINES Date: 7/7/2008 12:38 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\02. Crossings\12361-180C-105.dwg



PLAN VIEW

SCALE 1" = 200' HORIZONTAL

REF. ALIGN. DWG.
12361-1800-008

SCALE 1"=200'

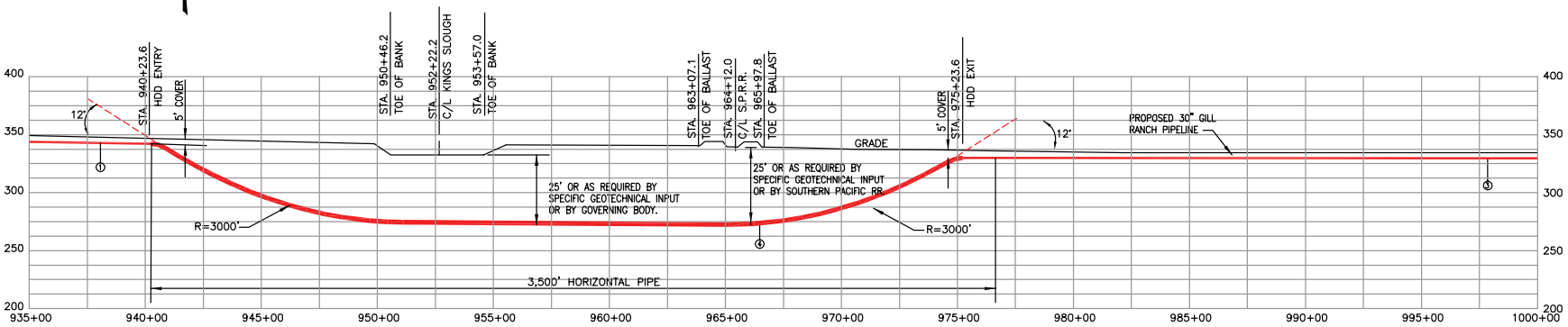
200 0 200 400 FEET

CA-ZONE IV, FEET
NAD 83

N

TEMP. CONSTRUCTION EASEMENT

PERMANENT EASEMENT



PROFILE VIEW

HORIZONTAL SCALE 1" = 500', VERTICAL SCALE 1" = 100'

PRELIMINARY
NOT FOR CONSTRUCTION
JUNE 5 2008
ForeRunner Corporation

SUMMARY

ITEM	DESCRIPTION	QUANTITY
1	30" O.D. LINE PIPE x 0.505" W.T., API 5L X70, W/ 14-16 MILS FBE	-
3	30" O.D. BORE PIPE x 0.607" W.T., API 5L X70, W/ 14-16 MILS FBE	3,500'
	AND 40 MILS THICK ABRASION RESISTANT TOP COAT	
4	30" O.D. BORE PIPE x 0.607" W.T., API 5L X70, W/ 14-16 MILS FBE	-

SUMMARY OF MATERIALS

ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS

DWG. NO.	TITLE
12361-1800-008	30" PIPELINE ALIGNMENT

REVISIONS

REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P4	ISSUE FOR PERMIT	PJD	6/5/08	CFE	6/5/08		
P3	PRELIMINARY	CFE	4/11/08	CFE	4/11/08		
P2	PRELIMINARY	CMC	2/27/08	CFE	2/27/08		
P1	PRELIMINARY	SL	2/06/08	CFE	2/06/08		

ENGINEERING RECORD

DRAWN	PJD	6/5/08
CHECKED	CFE	6/5/08
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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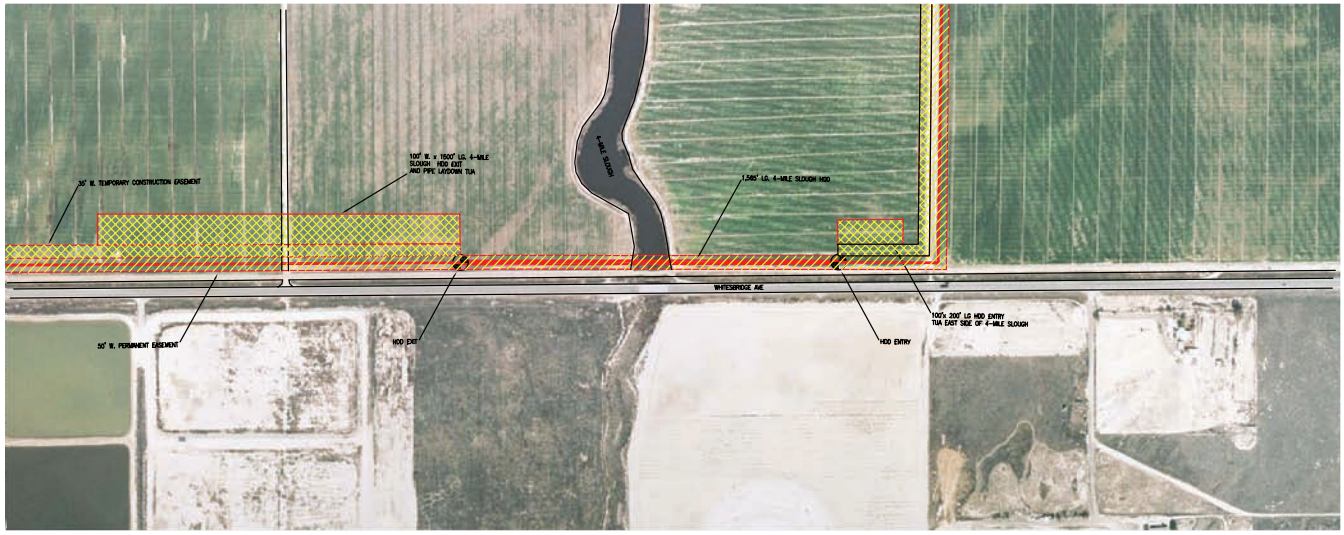
FORERUNNER CORPORATION
[illegible]
Livermore, CA [illegible]
[illegible]

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
KINGS SLOUGH & S.P.R.R.
HORIZONTAL DIRECTIONAL DRILL

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361C	Madera/Fresno Co., CA	12361-180C-106	P4

Plotted by: MCROWNES Date: 7/7/2008 12:43 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\02. Crossings\12361-180C-106.dwg



PLAN VIEW

SCALE 1" = 200' HORIZONTAL

REF. ALIGN. DWG.
12361-180C-011

SCALE 1"=200'

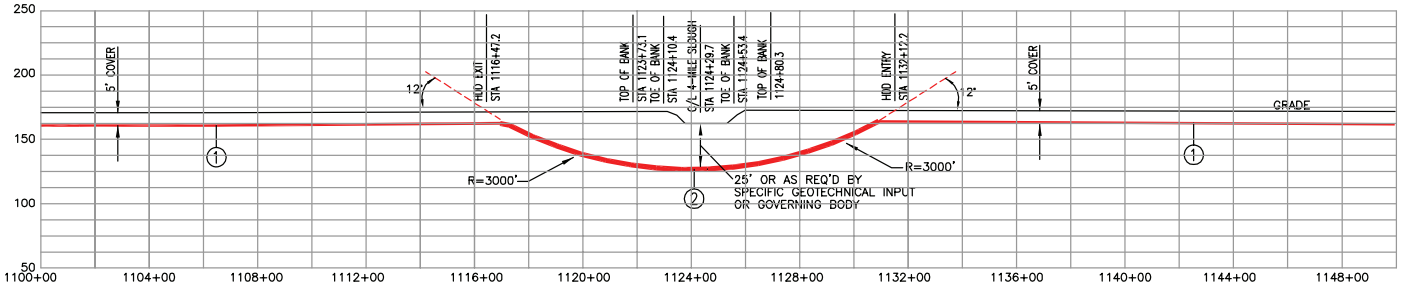
100 0 100 200 FEET

CA-ZONE IV, FEET
NAD 83

N

TEMP. CONSTRUCTION EASEMENT

PERMANENT EASEMENT



PROFILE VIEW

HORIZONTAL SCALE 1" = 200',VERTICAL SCALE 1" = 100'

PRELIMINARY
NOT FOR CONSTRUCTION
APRIL 11 2008
ForeRunner Corporation

SUMMARY

SUMMARY OF MATERIALS		
1	30" O.D. LINE PIPE x 0.505" W.T., API 5L X70, W/ 14-16 MILS FBE	-
2	30" O.D. BORE PIPE x 0.505" W.T., API 5L X70, W/ 14-16 MILS FBE AND 40 MILS THICK ABRASION RESISTANT TOP COAT	1,585'
ITEM	DESCRIPTION	QUANTITY

SUMMARY OF MATERIALS		
ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS	
DWG. NO.	TITLE
12361-180C-010	30" PIPELINE ALIGNMENT

REVISIONS						
REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR DATE
P1	PRELIMINARY	CE	4/11/08	CFE	4/11/08	

ENGINEERING RECORD		
DRAWN	MP	1/30/08
CHECKED	CFE	2/08/08
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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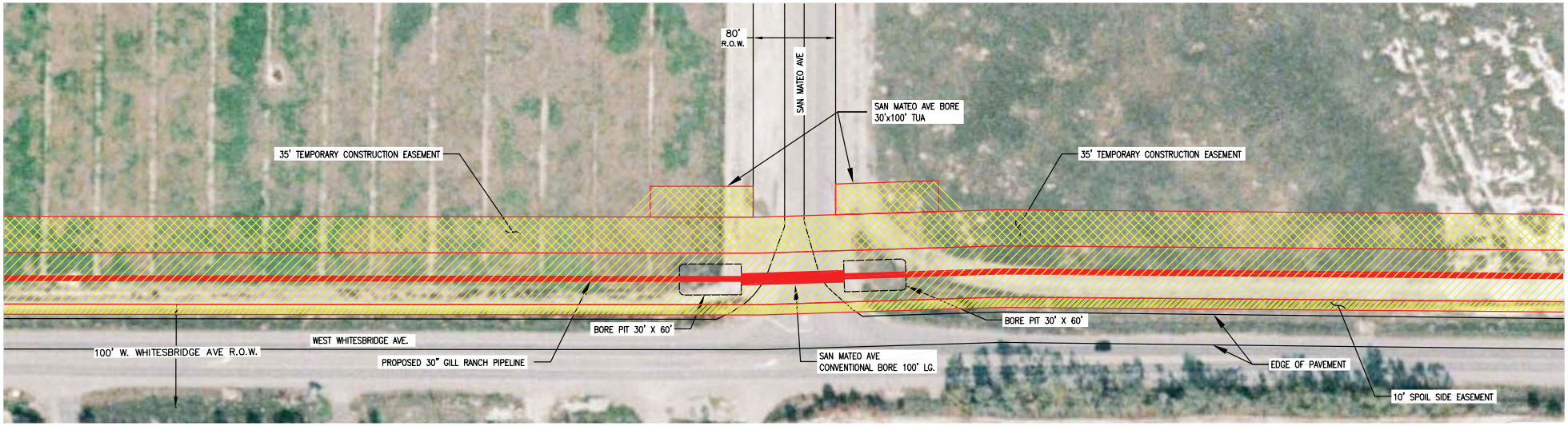
FORERUNNER CORPORATION

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
4-MILE SLOUGH
HORIZONTAL DIRECTIONAL DRILL

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361C	Madera/Fresno co., CA	12361-180C-107	P1

Plotted by: K.MONROE Date: 7/7/2008 12:44 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\02. Crossings\12361-180C-107.dwg



PLAN VIEW

SCALE 1" = 100' HORIZONTAL

REF. ALIGN. DWG.
12361-180C-008

SCALE 1"=100'

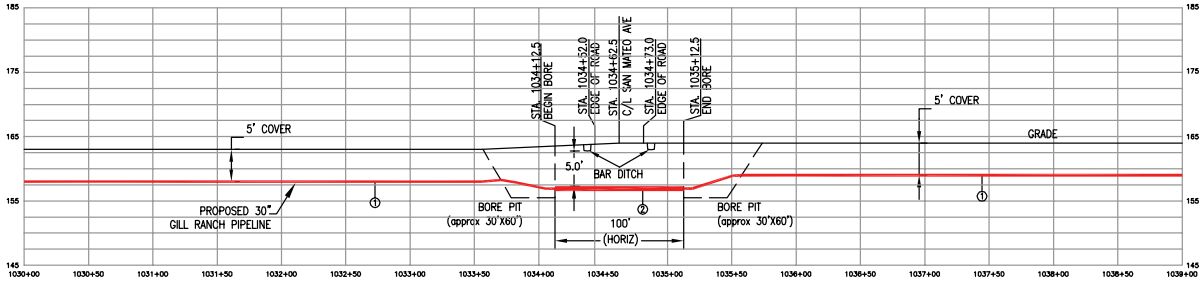
50 0 50 100 FEET

CA-ZONE IV, FEET
NAD 83

N

TEMP. CONSTRUCTION EASEMENT

PERMANENT EASEMENT



PROFILE VIEW

HORIZONTAL SCALE 1" = 100',VERTICAL SCALE 1" = 20'

PRELIMINARY
NOT FOR CONSTRUCTION
April 11 2008
ForeRunner Corporation

SUMMARY

SUMMARY OF MATERIALS		
1	30" O.D. LINE PIPE x 0.505" W.T., API 5L X70, W/ 14-16 MILS FBE	
2	30" O.D. BORE PIPE x 0.505" W.T., API 5L X70, W/ 14-16 MILS FBE	
	AND 40 MILS THICK ABRASION RESISTANT TOP COAT	100.0'
ITEM	DESCRIPTION	QUANTITY

SUMMARY OF MATERIALS		
ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS	
DWG. NO.	TITLE
12361-180C-008	30" PIPELINE ALIGNMENT

REVISIONS							
REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P3	PRELIMINARY	CE	4/11/08	CFE	4/11/08		
P2	PRELIMINARY	MP	2/27/08	CFE	2/27/08		
P1	PRELIMINARY	MP	1/30/08	CFE	2/8/08		

ENGINEERING RECORD		
DRAWN	MP	1/30/08
CHECKED	CE	2/8/08
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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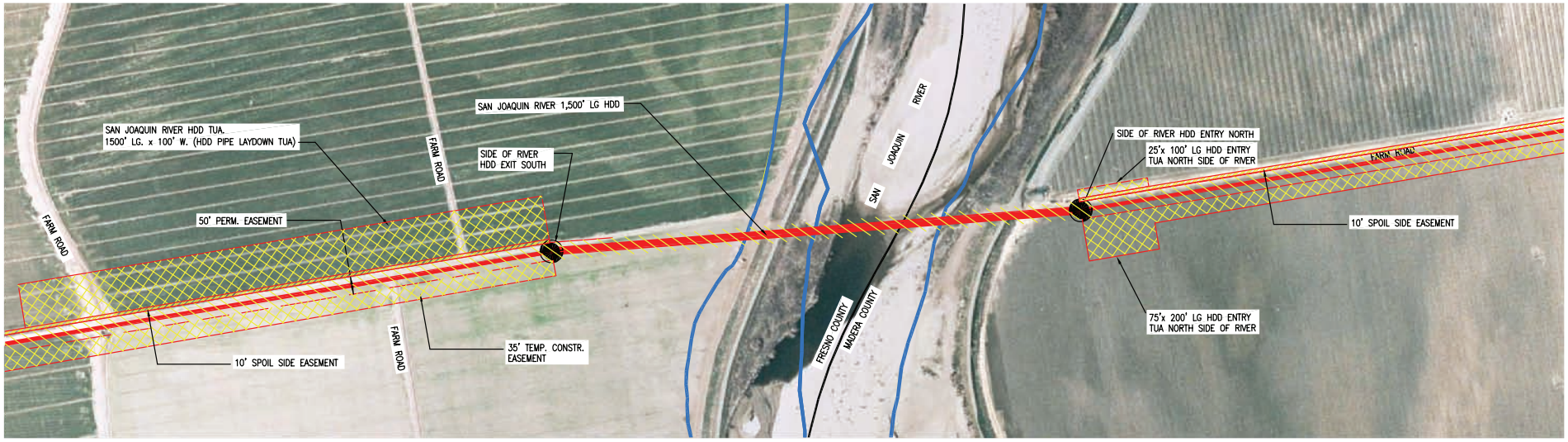
FORERUNNER CORPORATION

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
SAN MATEO AVE
CONVENTIONAL BORE

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361C	Madera/Fresno co., CA	12361-180C-108	P3

Plotted by: P.DORSEY Date: 7/7/2008 12:46 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\02. Crossings\12361-180C-108.dwg



PLAN VIEW

SCALE 1" = 300' HORIZONTAL

REF. ALIGN. DWG.
12361-180C-011

SCALE 1"=200'

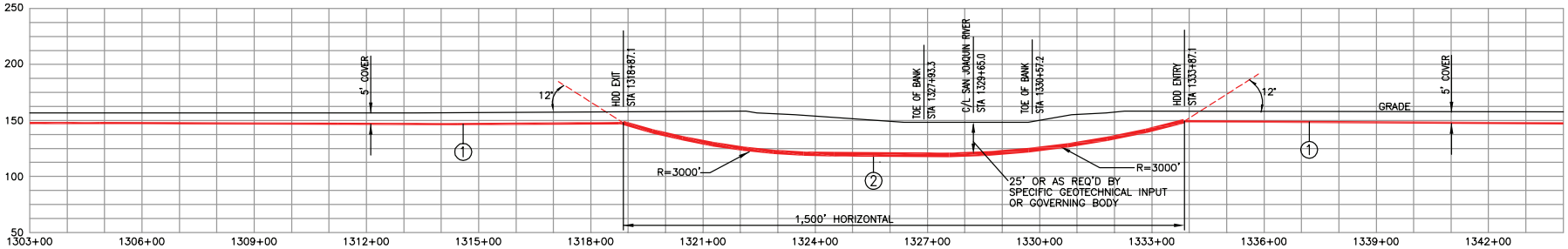
100 0 100 200 FEET

CA-ZONE IV, FEET
NAD 83

N

TEMP. CONSTRUCTION EASEMENT

PERMANENT EASEMENT



PROFILE VIEW

HORIZONTAL SCALE 1" = 300',VERTICAL SCALE 1" = 100'

ISSUE
FOR PERMIT
JUNE 5 2008
ForeRunner Corporation

SUMMARY

SUMMARY OF MATERIALS		
1	30" O.D. LINE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 MILS FBE	-
2	30" O.D. BORE PIPE x 0.506" W.T., API 5L X70, W/ 14-16 MILS FBE AND 40 MILS THICK ABRASION RESISTANT TOP COAT	1,500'
ITEM	DESCRIPTION	QUANTITY

SUMMARY OF MATERIALS		
ITEM	DESCRIPTION	QUANTITY

REFERENCE DRAWINGS	
DWG. NO.	TITLE
12361-180C-011	30" PIPELINE ALIGNMENT

REVISIONS							
REV.	DESCRIPTION	BY	DATE	CHK	DATE	APPR	DATE
P4	ISSUE FOR PERMIT	PJD	6/5/08				
P3	PRELIMINARY	CFE	4/11/08	CE	4/11/08		
P2	PRELIMINARY	CMC	2/27/08	CFE	2/27/08		
P1	PRELIMINARY	SL	2/06/08	CFE	2/06/08		

ENGINEERING RECORD		
DRAWN	PJD	6/16/08
CHECKED		
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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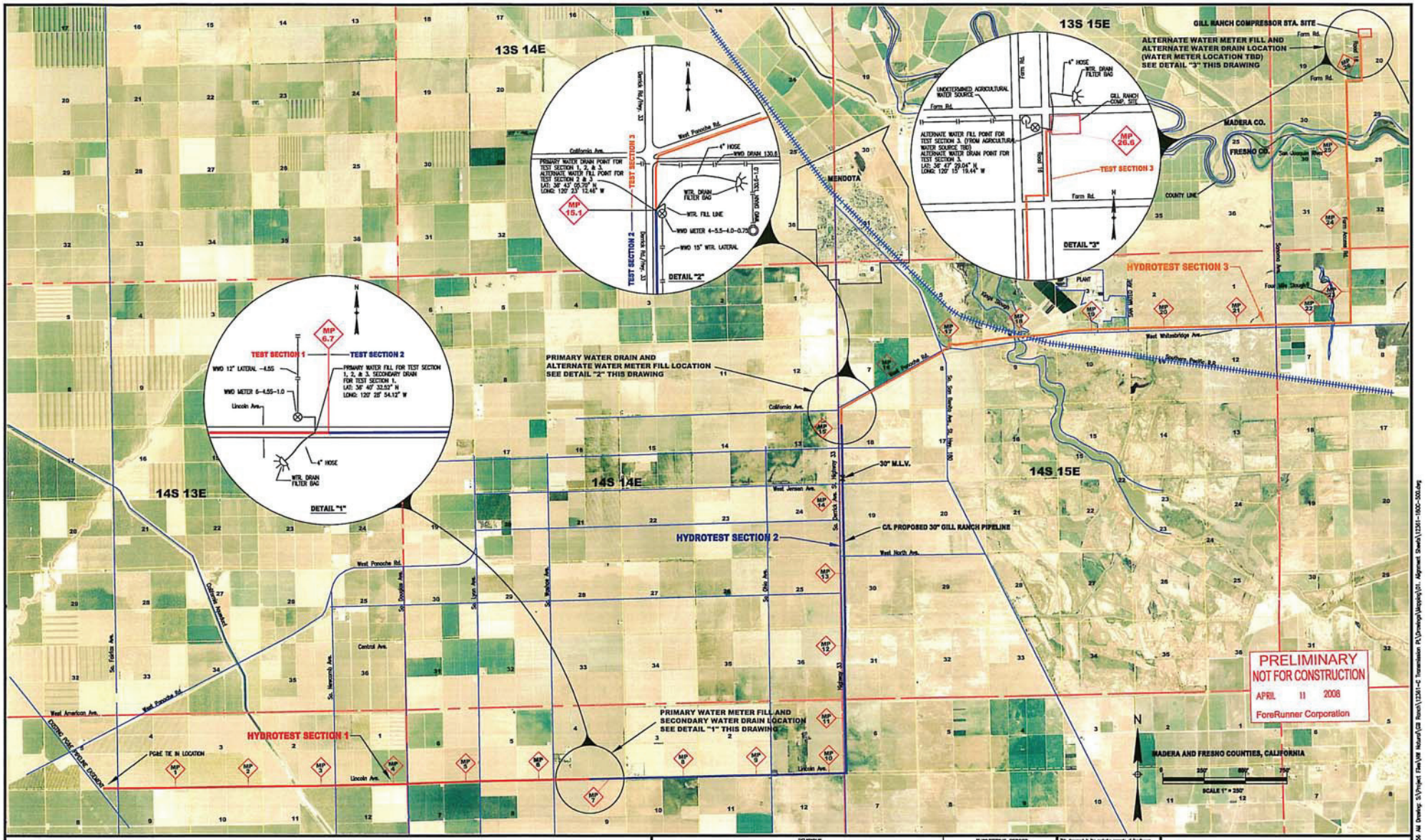
ForeRunner Corporation

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE ALIGNMENT
SAN JOAQUIN RIVER
HORIZONTAL DIRECTIONAL DRILL

SCALE	PROJ. NO.	CITY/COUNTY, STATE	DWG. NO.	REV
AS NOTED	12361C	Madera/Fresno Co., CA	12361-180C-109	P4

Plotted by: M.PROVINES Date: 7/7/2008 12:48 PM Drawing: S:\Project Files\NW Natural\Gill Ranch\12361-C Transmission PL\Drawings\Mapping\02. Crossings\12361-180C-109.dwg



REVISIONS					
P2	PRELIMINARY	PJD	4/11/08	CFE	4/11/08
P1	PRELIMINARY	PJD	2/18/08	CFE	2/18/08
REV.	DESCRIPTION	BY	DATE	CHK	DATE

ENGINEERING RECORD		
DRAWN	CFE	2/28/08
CHECKED	PA	2/28/08
CLIENT		
PROJECT MGMT.		
PROCESS		
MECHANICAL		
PIPING		
STRUCTURAL		
ELECTRICAL		
I & C		

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FORERUNNER CORPORATION

GILL RANCH STORAGE

GILL RANCH
30" PIPELINE HYDROTEST SECTIONS, HYDROTEST WATER SUPPLY AND DISCHARGE SITES

SCALE	PROJ. NO.	DIR/DRAWG. NAME	DWG. NO.	REV
AS SHOWN	12361-B	Madera/Fresno Co., CA	12361-180C-500	P2

Plotted by: CESOH Date: 4/11/2008 10:56 AM Drawing: S:\Project Files\GM Hubard\GR Ranch\12361-C Transmission PL\Drawings\Alignmg\01. Alignment Sheets\12361-180C-500.dwg

APPENDIX A.6

WELL DRILLING DETAILS

Preliminary Drilling Plan

Well drilling for the proposed IW and OM wells requires specialized equipment and procedures. The following information provides preliminary specifications for the well drilling, including a description of the drilling work sequence and equipment layout; rig scheduling and staffing; onsite materials and storage / handling procedures; and drilling rig specifications for a typical rig that will be employed for this work. This drilling plan will be updated after the rig is selected and prior to drilling.

Rig Work Sequence, Specifications, and Equipment Layout. Drilling equipment includes a drill rig, a rotary table, mud motors, drill pipe, rock bits and shale shakers.

The drilling and completion process of an IW well includes the following steps:

- Rig up and set surface casing at a minimum depth of 1,100′.
- Drill conventionally for a vertical well or with directional tools in a deviated to horizontal well, to ~6,400′ TVD (true vertical depth).
- Run and set an intermediate casing and cement in place.
- Drill a vertical or deviated hole to a total vertical depth around ~6,500′.
- Run and gravel pack a liner from 100′ above the shoe of the intermediate casing to total depth of the well.
- Using a drilling rig or a workover rig run production casing in hole to around 6,400′. Install production tree. Swab well in and clean well. At this time the well is ready for gas injection.

The drilling and completion process of a salt water disposal well entails the following steps:

- Rig up and set surface casing at a minimum depth of 1,100′.
- Drill a straight hole to top of Santa Margarita Formation around 3,200′- 3,500′.
- Run and set an intermediate casing and cement in place.
- Drill a straight hole up to 100′ into the formation.
- Run and gravel pack a liner from 100′ above the shoe of the intermediate casing to the total depth of the well.

- Using a drilling rig or a workover rig run tubing in hole to top of the liner. Install production tree. Swab well in and clean well.

At this point in the process the well is ready for water injection.

The drilling and completion process of an OM well entails the following steps:

- Rig up and set a surface casing at a minimum depth of 1,100′.
- Drill a straight hole to 6,700′.
- Run casing to bottom and cement the casing.
- Install production tree.
- Perforate well as needed

At this point in the process the well is ready for OM.

Typical drilling rig specifications for these types of wells are attached. The rig will be approximately 174 feet tall. The rig will be onsite for approximately 20 days per well. This unit will be leased on a long-term day rate based contract. At the end of the drilling process it will be removed from the job site.

The rig will be delivered to the site on tractor trailers; approximately 40 truck loads would arrive at the time of set up, with approximately 3-5 additional daily loads to deliver fuel, water, downhole equipment, mud, and supplies. All of this equipment will be removed at the end of the drilling program.

The attached rig specifications describe a typical drilling rig that will be employed for this Project.

Equipment that will be used during the drilling process includes:

- 142′ Mast
- 30′ substructure
- 2 Mud pumps, mud tank and shale shaker
- Cat walk and Pipe racks
- 4 Baker Tanks and 6 cuttings bins
- 15,000′ drill pipe,15,000′ casing

- 3 Generators and SCR house
- Logging truck
- Four pick-up trucks
- Vacuum truck
- Fuel and water tanks
- Well control equipment
- Parts House and pipe bins
- 4 Support trailers
- Assorted tools and downhole equipment

Drilling mud materials (in dry form) will to be transported to the well locations. During the drilling operation the drilling materials will be mixed in the designated mud tanks (part of the drilling rig) and used in the well for the purpose of removing the drilling cuttings during rotary drilling and containing the formation pressure. The well control equipment is used to contain any gas pressure that may migrate up through the mud column from the formation.

Use of the drill rig will require minor trenching to install lines for the safety and control equipment. In addition an earthen pit will be dug to store the drilling cuttings and used drilling mud.

Rig Schedule. The use of the rig will commence after GRS receives a CPCN from the CPUC and any other necessary authorizations. Actual time expected on each well is approximately 20 days. The entire drilling project is expected to take approximately six months.

Hours of Drilling Operation and Personnel. The drilling rig will operate 24 hours per day, seven days per week for the duration of drilling. A crew of 13 workers will be onsite. Of the 13, the rig crew (five people) will rotate on 8-hour shifts.

Water Demand and Source. Daily water demand during drilling operations is an estimated 16,000 gallons per day (gpd). Water for drilling will be obtained from an agricultural water well owned by an adjacent agricultural operator. Water will be trucked or temporarily piped and stored in a temporary water tank at the drill site. Bottled drinking water will be provided by the drilling contractor.

Onsite Sanitary Facilities. Portable onsite sanitary facilities will be provided by the drilling contractor. These facilities will be removed at the completion of the drilling.

Onsite Hazardous Materials. Onsite hazardous materials during drilling activities will include:

- 12,300 gallons diesel fuel stored in a temporary tank
- 500 gallons lube oil.

Drilling Waste Handling and Disposal. Drilling waste will consist primarily of drilling cuttings and used mud. The used drilling mud and the drilling cuttings will be collected in an earthen pit next to the drilling rig and will be transported by truck after the drilling operations are completed, to a county permitted disposal site. There are no hazardous chemicals in the proposed drilling mud.

Other Wastes. Other wastes will be generated and hauled off site for disposal or recycling during drilling, including:

- Minor amounts of waste lube oil
- 100 bbl unused or contaminated Sodium Chloride brine
- 50 bbl cement or cement contaminated mud
- Miscellaneous trash, pails, sacks and pallets

Spill Contingency and Emergency Response. GRS will develop a spill and emergency response contingency plan for the Project. The contingency plan will address well upsets (e.g., blowouts).

A separate and parallel spill prevention and countermeasure control plan (SPCC Plan) associated with the drilling program will be included in the final drilling plan. The SPCC Plan will include specific protection measures to contain any spilled fluids onsite. These measures may include sand bag barriers, silt fencing, construction fencing, and restriction of work to pre-developed areas. Equipment staging and maintenance would be performed in a designated location away from vegetated areas or drainages.

Noise and Vibration. Engine/pump noise from the drilling rig is estimated as follows:

- Rig floor: approx. 93 dBa
- At 50-feet elevation: approx. 85 dBa
- At 150 feet elevation: approx. 78 dBa

- Permissible exposure over 8 hours = 85 dBa.

Vibration levels are anticipated to be imperceptible on surrounding properties due to the absorptive characteristics of the sandy loam soils underlying the drill site.

Light and Glare. Night operations will require lighting on the rig floor and certain sections of the rig mast. Lights will be shielded and focused inward on the work location to avoid offsite glare.

Drilling and Production Emissions. The drilling rig prime mover and auxiliary equipment will be powered by portable onsite diesel generators. This portable equipment will be appropriately registered with the California Air Resources Board (CARB) Portable Equipment Registration Program (PERP).

Fire Protection. The drilling rig package will include water storage and fire suppression equipment. A safety manual which addresses fire safety and suppression will be on site.

Site Security. The well drilling is a 24/7 operation. The onsite personnel and supervision will provide security vigilance.

Typical Drill Rig Specifications

Drilling Range:	20,000' with 5" Drillpipe.
Drawworks:	National 1320 UE 2,000 H.P. Driven by (2)-1,000 H.P. General Electric 752 DC Traction Motors With a Baylor 7838 Electric Brake and Electrical Control Panel.
Mast:	DSI 142' High, Rated at 1,200,000# GNC and 1,300,000# Static Hook Capacity.
Substructure:	DSI 30' High With 1,800,000# Capacity.
Mud Pump #1:	National 12-P-160, 6-1/2"x10", 1,600 H.P., Powered by (2)-1,000 H.P. General Electric 752 Traction Motors Charged by (1)6x8 Centrifugal Pump.
Mud Pump #2:	National 12-P-160, 6-1/2"x10", 1,600 H.P., Powered by (2)-1,000 H.P. General Electric 752 Traction Motors Charged by (1)-6x8 Centrifugal Pump.
Rotary Table:	Oilwell 27-½" Independently Powered by (1)-1,000 H.P. General Electric 752 Traction Motor
Traveling System:	Continental Emsco 7 Sheave, 750 Ton Block/BJ Dynaplex 750 ton Hook and Oilwell PC 650 Swivel.
SCR/Power System:	(3)-Detroit Diesel, 16V2000 (1,495 BHP Each) Diesel Engines Driving (3)-Marathon 1,357 KW Generators Ross Hill Electric 3 Bridge SCR Unit and G.E. Electrical Control Unit.
Mud System:	(3)-Pit System, 1,400 Total Barrels, With Shaker, Volume, Mud Cleaning, Suction and Pill Mixing Compartments, (6)-Mud Agitators, and (2)-5x6 Centrifugal Pumps.
Blow Out Prevention Equipment:	Hydril GK 13-5/8", 5,000# Annular, Shaffer 13-5/8", 5,000# D-Ram, Koomey 160 Gallon Accumulator and 5,000# Choke Manifold.
Water/Fuel Storage:	400 BBLS / 21,000 Gallons.
Auxiliary Equipment:	(2)-Air Winches, Wireline Unit (.092"), (2)-Air compressors, Upper &