FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Right, East of Eastside Bypass

BEGUN: 4/18/10 FINISHED: 4/18/10

WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,305,418.5 E 6,099,812.0 (NAGD83)

TOTAL DEPTH: 31.1 ft.

STATE: California

REVIEWED BY: J. Vauk

GROUND SURFACE ELEVATION: 101.6 ft. (NAVD88)

T.O.C ELEVATION: 103.9 ft. (NAVD88) HOLE LOGGED BY: A. Warren

LABORATORY DATA LABORATORY CLASSIFICATION VISUAL CLASSIFICATION Ē MOISTURE CONTENT % CLASSIFICATION AND DEPTH GEOLOGIC U SYMBOL PLASTICITY INDEX -IQUID LIMI-% CORE RECOVERY ELEVATION ELEVATION **NOTES** GRAVEL % FINES SAND % CLAY PHYSICAL CONDITION % SILT % % ALL MEASUREMENTS ARE IN 0.0 to 4.6 feet FEET FROM THE GROUND FILL (Fill) SURFACE. 0.0 to 4.6 ft.: SANDY SILT, s(ML): About 65% fines with low plasticity, no toughness, rapid dilatancy; about 35% fine sand; maximum size: fine sand; dry to moist, brown; PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a soft to moderately firm consistency; high organic content; fill; highly disturbed. groundwater monitoring well. 4.6 to 31.1 feet QUATERNARY ALLUVIUM (Qal) LOCATION: Reach 4B1, river right, about 1 mile east from the center of the Eastside 68 Bypass, about 1.5 miles north of the intersection of W. El Nido Road and 4.6 to 7.0 ft.: SANDY LEAN CLAY, s(CL): About 60% fines with medium plasticity; about s(ML) Fill the Eastside Bypass. 40% fine sand; maximum size: fine sand; moist, brown; moderately firm consistency. DRILLED BY: PN-Regional Drill Crew Laboratory Data Interval Jerry Hansen, Driller 6.0 to 7.0 ft. Cody Kelly, Helper Ken Kreitz, Helper 7.0 to 8.6 ft.: CLAYEY SAND, SC: About 85% fine sand; about 15% fines with medium plasticity; maximum size: fine sand; moist, DRILL RIG: Central Mining Equipment 75 drill rig brown; moderately firm consistency; (CME-75) homogeneous. **DRILLING & SAMPLING** <u>Laboratory Data Interval</u> 7.0 to 8.0 ft. METHODS: Drill hole MW-10-94 was advanced 97.0 **8.6 to 10.1 ft.: POORLY GRADED SAND WITH CLAY, SP/SC:** About 90% fine sand; about 10% fines with medium plasticity; using hollow stem flight augers with a continuous dry core sampling system (FADC) from the ground surface to a total depth of 31.1 feet. maximum size: fine sand; wet, brown; FADC uses 7-5/8-inch O.D., 4-1/4-inch I.D. hollow stem augers, moderately soft consistency; loose, saturated with water. with a 5-foot-long, 3-inch I.D. split 10.1 to 11.8 ft.: <u>LEAN CLAY WITH SAND</u>, (CL)s: About 85% fines with medium sample barrel. s(CL) Interval Method plasticity, low toughness, and slow dilatancy; 0.0 to 31.1 ft. - FADC about 15% fine to coarse sand; maximum 93 size: coarse sand; moist, brown; firm s(CL) 29.2 63.8 0.0 28.2 10.7 22.6 DRILLING CONDITIONS AND 34.6 36.2 consistency; white calcium carbonate veins DRILLER'S COMMENTS: throughout. 0.0 to 31.1 ft. smooth drilling, soft 94.6 11.8 to 13.4 ft.: SILTY CLAY WITH SAND, (CL/ML)s: About 85% fines with low to medium plasticity, low toughness, rapid **CAVING CONDITIONS:** dilatancy; about 15% fine sand; maximum 45.8 16.4 62.2 37.8 0.0 25.1 9.0 19.2 s(CL) DRILL FLUID, RETURN AND size: fine sand; moist, brown; moderately firm consistency. COLOR: SC 0.0 to 13.6 ft. None 93.6 13.6 to 31.1 ft. Water, no return <u>Laboratory Data Interval</u> 12.0 to 13.0 ft. Qal WATER LEVEL: 13.4 to 15.0 ft.: <u>SILT WITH SAND, (ML)s</u>: About 80% fines with low plasticity and Not measured 93.0 toughness, rapid dilatancy; about 20% fine REASON FOR HOLE TERMINATION: sand; maximum size: fine sand; moist, brown; The hole was terminated upon moderately firm consistency. successful completion to the target SP/SC Laboratory Data Interval 14.0 to 15.0 ft. depth. HOLE COMPLETION: Well Casing: +2.3 to 9.8 ft. (T.O.C. 15.0 to 16.2 ft.: <u>SILTY SAND, SM</u>: About 60% fine sand; about 40% non-plastic to low 10 El. 103.9 ft.) 91.5 Dual U-pack Screen: 9.8 to 24.8 ft. (Slotted 0.010-inch) plasticity fines; moist, brown; moderately soft to moderately firm consistency. Well Screen Filter Pack: 2/12 Sand Filter Pack: 9.2 to 31.1 ft. (#3 Sand) Sump: 24.8 to 26.8 ft. (2-inch blank 16.2 to 17.5 ft.: FAT CLAY, CH: About 90% fines with medium to high plasticity, high toughness, no dilatancy; about 10% fine PVC with cap) (CL)s 100 Bentonite Seal: 2.0 to 9.2 ft. sand; maximum size: fine sand; moist, brown; very firm consistency; some silt. Well Completion: Steel surface casing with locking top, square 6-inches-wide and 5-foot-long. 89.8 (CL/ML)s

COMMENTS:

SJRRP.GP.

PROJECT DATABASE:

SJRRP DRILL

REPORT:

FADC = Flight Auger Dry Core NP = Non-plastic

NR = No Recovery NA = Not applicable I.D. = inner diameter

RM = River Mile

O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River

Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Right, East of Eastside Bypass

BEGUN: 4/18/10 FINISHED: 4/18/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,305,418.5 E 6,099,812.0 (NAGD83)

TOTAL DEPTH: 31.1 ft.

STATE: California

GROUND SURFACE ELEVATION: 101.6 ft. (NAVD88) T.O.C ELEVATION: 103.9 ft. (NAVD88)

HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

					LABO	DRAT	ORY	DATA	A		NO /	Z O	/	E
NOTES	DEPTH	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION ELEVATION	VISUAL	ELEVATION	CLASSIFICATION AND PHYSICAL CONDITION
		100	63.4	20.5	83.9	16.1	0.0	30.8	13.0	24.7	(CL)s	(CL/ML)s		17.5 to 19.6 ft.: SANDY SILT, s(ML): Abor 70% non-plastic to low plasticity fines with toughness and rapid dilatancy; about 30% fine sand; maximum size: fine sand; moist, brown; firm consistency.
	_										88.6	_		Laboratory Data Interval 17.5 to 18.5 ft.
	_											(ML)s	88.2	19.6 to 21.9 ft.: CLAYEY SILTY SAND, SC/SM: About 55% fine sand; about 45% fines with medium plasticity and slow dilatancy; maximum size: fine sand; moist olive brown and brown to reddish brown;
	15 		64.3	15.5	79.8	20.2	0.0	26.2	4.7	26.4	(CL-ML)s	,	86.6	moderately firm consistency. 21.9 to 24.7 ft.: SILTY SAND, SM: About 75% fine sand; about 25% non-plastic to lot plasticity fines with rapid dilatancy; maximusize: fine sand; wet, brown; moderately soft sections of black consistence.
	_											SM		consistency; loose, trace of black organic material. Laboratory Data Interval 22.6 to 23.6 ft.
		100										СН	85.4	24.7 to 25.8 ft.: POORLY GRADED SAND WITH SILT, SP/SM: About 90% fine sand; about 10% non-plastic fines; maximum size fine sand; wet, reddish brown to brown; so consistency.
	_											8	84.1	25.8 to 31.1 ft.: POORLY GRADED SAND SP: About 95% fine sand; about 5% fines; wet, brown; soft consistency; homogenous
	_		45.4	22.0	67.4	32.6	0.0	24.5	6.2	16.7	s(CL-ML)			Laboratory Data Interval 27.6 to 28.6 ft. Qal T.D.= 31.1 ft.
											83.1	s(ML)		
	_													-
													82.0	
	20—													
	_											SC/SM		
		100												
	_												79.7	_
												_		
	_		51.7	14.0	65.7	34.3	0.0	NP	NP	22.0	,	SM		_
		80									78.0	-		
COMMENTS: FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter		G.S.: b.g.s. T.O.0	= Gro = Bel C. = To	er dian und su low th op of v Joaqu	urface e grou vell ca	und su asing	rface		•	C	Completion Di	agram. Well	deve	provided in attached Well lopment information is Well Development form.
RM = River Mile			Г			15/201	<u>. T</u>	CHEE.	T 2 ()E 3	DRILL HOLL	E MW-10-94	٦	RECLAMATION Managing Water in the Wo



FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Right, East of Eastside Bypass

BEGUN: 4/18/10 FINISHED: 4/18/10
WATER LEVEL DEPTH AND ELEVATION: NA
DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,305,418.5 E 6,099,812.0 (NAGD83)

TOTAL DEPTH: 31.1 ft.

STATE: California
GROUND SURFACE ELEVATION: 101.6 ft. (NAVD88)

T.O.C ELEVATION: 103.9 ft. (NAVD88)

HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

					LABO	DRAT	ORY	DATA	١	1	≥NO		Z /	<u>⊨</u>	
NOTES	DEPTH	% CORE RECOVERY	_ 	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION	ELEVATION	VISUAL CLASSIFICATION ELEVATION	GEOLOGIC UNIT SYMBOL	CLASSIFICATION AND PHYSICAL CONDITION
		REC	% SILT	° C	% F	S %	5 %	רומו	A =	Ø Ø Ø Ø	/ ود	" " "	77/ 11	B.	
													SM		
													76.9	-	
	25-	•											SP/SM		
													75.8		
	_	80													_
	_														
														Qal	
													1	Qui	
			11.6	5.3	16.9	83.1	0.0	NP	NP	20.8	SM		SP		
												73.0	35		
	-														_
	30-	72													
	_												70.5		
							В	ОТТО	M OF H	HOLE			70.5		'

COMMENTS:

PROJECT DATABASE: SJRRP.GPJ

REPORT: SJRRP DRILL HOLE

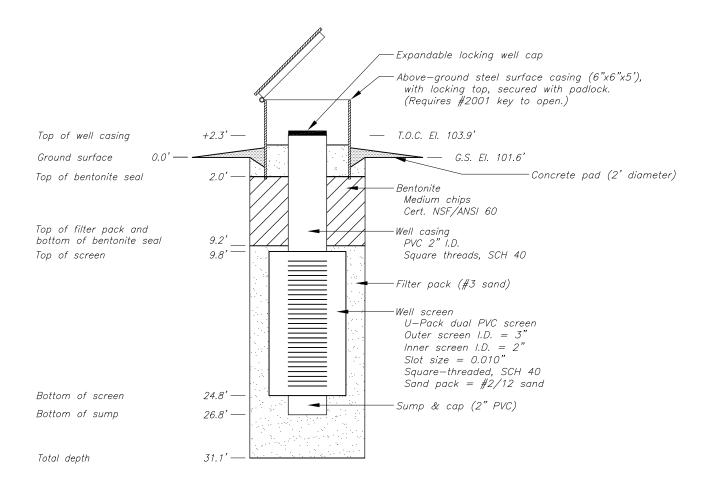
FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery

NA = Not applicable I.D. = inner diameter RM = River Mile O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River



MW-10-94	GEOLOGIST: A. WARREN
WELL COMPLETION DIAGRAM	DRILLER: G. HANSEN
DATE COMPLETED: 4/18/2010	HELPER: C. KELLY, K. KREITZ

TOP OF WELL CASING COORDINATES:
N2305418.5 E6099812.0 (NAD83) ELEVATION 103.9' (NAVD88)
GROUND SURFACE ELEVATION 101.6' (NAVD88)



NOT TO SCALE

NOTES:

 $T.O.C. = Top \ of \ well \ casing, \ l.D. = Inner \ Diameter, \ G.S. = Ground \ Surface, \ El. = Elevation$

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Left, west of Eastside Bypass

BEGUN: 4/14/10 FINISHED: 4/14/10

WATER LEVEL DEPTH AND ELEVATION: 9.1 ft. (El. 89.9 ft.) DATE WATER LEVEL WAS MEASURED: 4/14/2010

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,299,724.2 E 6,095,316.0 (NAGD83)

TOTAL DEPTH: 31.1 ft.

STATE: California GROUND SURFACE ELEVATION: 99.0 ft. (NAVD88)

T.O.C ELEVATION: 101.7 ft. (NAVD88)

HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

					LABO	DRAT	ORY	DATA	A		≻Ö	$\overline{}$	z O	Ŀ	
NOTES	рертн	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION	ELEVATION	VISUAL CLASSIFICATION ELEVATION	GEOLOGIC UNIT SYMBOL	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.			0,	0,	0,	6	6,			20	/				0.0 to 31.1 feet QUATERNARY ALLUVIUM (Qal)
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	_												OL		0.0 to 2.4 ft.: <u>ORGANIC CLAY, OL</u> : About 90% fines with medium plasticity, medium toughness, and rapid dilatancy; about 10% fine sand; maximum size: fine sand; moist, dark brown, organic odor; moderately firm consistency; high organic content.
LOCATION: Reach 4B1, RM 167, river right, about 1.4 miles southwest of the center of the SJR, about 2,800 feet west from the center of the Eastside Bypass, about 3,600 feet northwest	_	100											96.6		2.4 to 4.2 ft.: FAT CLAY, CH: About 95% fines with high plasticity and toughness, no dilatancy; about 5% fine sand; maximum size: fine sand; moist, dark brown; very firm consistency; fine olive brown stratification.
of the intersection of W. El Nido Road and the center of the Eastside Bypass.															<u>Laboratory Data Interval</u> 3.0 to 4.0 ft.
DRILLED BY: PN-Regional Drill Crew Jerry Hansen, Driller Cody Kelly, Helper Ken Kreitz, Helper	_		29.1	57.9	87.0	13.0	0.0	69.3	51.8	28.8	СН		СН		4.2 to 8.4 ft.: <u>SANDY LEAN CLAY, s(CL)</u> : About 55% fines with medium plasticity and toughness; about 45% fine sand; maximum size: fine sand; moist, olive brown; firm consistency; clay balls up to 1-inch-diameter.
DRILL RIG:	_	-										95.0	94.8		Laboratory Data Interval 6.0 to 7.0 ft.
Central Mining Equipment 75 drill rig (CME-75) DRILLING & SAMPLING METHODS: Drill hole MW-10-95 was advanced using hollow stem flight augers with a continuous dry core sampling system (FADC) from the ground	5—														8.4 to 11.1 ft.: SANDY LEAN CLAY, s(CL): About 70% fines with low plasticity; about 30% fine to medium sand; maximum size: medium sand; moist to wet, olive brown; moderately firm consistency; layered, light to moderate cemented claystone layers throughout unit.
surface to a total depth of 31.1 feet. FADC uses 7-5/8-inch O.D., 4-1/4-inch I.D. hollow stem augers,															<u>Laboratory Data Interval</u> 9.4 to 10.4 ft.
with a 5-foot-long, 3-inch l.D. split sample barrel. Interval Method	_	93	47.2	19.4	66.6	33.4	0.0	25.2	8.7	19.0	s(CL)		s(CL)	Qal	11.1 to 15.7 ft.: <u>CLAYEY SAND, SC</u> : About 80% fine sand; about 20% fines with medium plasticity; maximum size: fine sand; wet, olive brown marbled with reddish brown; firm
0.0 to 31.1 ft FADC											,	92.0			consistency.
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 8.6 ft. smooth drilling, soft 8.6 to 13.6 ft. soft, wet 13.6 to 23.6 ft. moderately soft 23.6 to 31.1 ft. firm	_											92.0			 15.7 to 20.6 ft.: FAT CLAY, CH: About 90% fines with high plasticity and toughness, no dilatancy; about 10% fine sand; maximum size: fine sand; moist, olive brown; moderately firm consistency.
CAVING CONDITIONS: None	_														Laboratory Data Interval 17.0 to 18.0 ft.
DRILL FLUID, RETURN AND COLOR: 0.0 to 13.6 ft. None 13.6 to 31.1 ft. Water, no return	_										Ā		90.6		20.6 to 22.3 ft.: SILTY CLAYEY SAND, SC/SM: About 70% fine sand; about 30% fines with low plasticity and medium toughness; maximum size: fine sand; moist, olive brown, moderately firm consistency, homogeneous.
WATER LEVEL: 9.1 ft. b.g.s. on 4/14/2010															22.3 to 23.6 ft.: SILTY SAND, SM: About 80% fine sand containing mica; about 20%
REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth.	10-		45.4	27.2	72.6	27.4	0.0	28.1	13.5	23.0	(CL)s	88.6	s(CL)		fines with low plasticity, no toughness, and rapid dilatancy; maximum size: fine sand; moist to wet, olive brown to reddish brown; moderately soft consistency.
HOLE COMPLETION: Well Casing: +2.7 to 13.0 ft. (T.O.C. El. 101.7 ft.) Dual U-pack Screen: 13.0 to 28.0 ft.	_	100											87.9		23.6 to 26.5 ft.: SANDY LEAN CLAY, s(CL): About 65% fines with low plasticity; about 35% fine sand; maximum size: fine sand; moist to wet, olive brown to reddish brown; moderately soft consistency.
(Slotted 0.010-inch) Well Screen Filter Pack: 2/12 Sand Filter Pack: 12.5 to 31.1 ft. (#3 Sand)													SC		<u>Laboratory Data Interval</u> 23.6 to 24.6 ft.
Sump: 28.0 to 30.0 ft. (2-inch blank COMMENTS: FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter RM = River Mile															
FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter		G.S.: b.g.s. T.O.0	= Gro = Bel C. = To	er dian und su low th op of v Joaqu	urface e grou vell ca	und su asing	ırface			C	Completion	n Dia	agram. Well dev	elopm	ed in attached Well ent information is Development form.
RM = River Mile			Γ	DA	TE: 9/	15/201	0	SHEF	T 1 (OF 3	DRILL	HOLE	MW-10-95		RECLAMATION Managing Water in the West

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Left, west of Eastside Bypass

BEGUN: 4/14/10 FINISHED: 4/14/10

WATER LEVEL DEPTH AND ELEVATION: 9.1 ft. (El. 89.9 ft.) DATE WATER LEVEL WAS MEASURED: 4/14/2010

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,299,724.2 E 6,095,316.0 (NAGD83)

TOTAL DEPTH: 31.1 ft.

STATE: California GROUND SURFACE ELEVATION: 99.0 ft. (NAVD88)

T.O.C ELEVATION: 101.7 ft. (NAVD88)

HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

					LABO	DRAT	ORY	DATA	4		>NOI /		NO /	Ė	
NOTES	DEPTH	RE ERY			ω ω		VEL	LIMIT	×CIT×	JRE NT %	LABORATORY CLASSIFICATION	NOIL	VISUAL CLASSIFICATION ELEVATION	ABOL	CLASSIFICATION AND
		% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	CLASS	ELEVATION	CLASSIFICA	GEOLOGIC UNIT SYMBOL	PHYSICAL CONDITION
PVC with cap) Jentonite Seal: 2.0 to 12.5 ft. Vell Completion: Steel surface asing with locking top, square -inches-wide and 5-foot-long.	_										,		sc		26.5 to 28.6 ft.: POORLY GRADED SAND WITH SILT, SP/SM: About 90% fine sand; about 10% fines with low plasticity; maximu size: fine sand; moist to wet, tan; moderatel soft consistency. 28.6 to 31.1 ft.: SILTY SAND, SM: About 85% fine to medium sand; about 15% fines with low plasticity; maximum size: medium sand; wet, tan; soft consistency.
	15—													-	Laboratory Data Interval 28.6 to 31.1 ft. T.D.= 31.1 ft.
													83.3		
	-	100													-
	_													_	-
			37.3	43.6	80.9	19.1	0.0	35.5	21.9	18.9	,	1.0			
	-										51	1.0	СН	Qal -	_
	-	_												_	-
	20-														_
													78.4		
	-	100												-	-
													SC/SM		_
													76.7		
	-												SM		-
													75.4		
COMMENTS: FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter	<u> </u>	G.S. b.g.s. T.O.0	= Gro . = Be C. = To	er dian und su low the op of v Joaqu	urface e grou well ca	und su asing	rface	<u> </u>		C	Completion	Dia	gram. Well devi	elopme	ed in attached Well ent information is Development form.
RM = River Mile															RECLAMATION Managing Water in the Wes



FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Left, west of Eastside Bypass

BEGUN: 4/14/10 FINISHED: 4/14/10

WATER LEVEL DEPTH AND ELEVATION: 9.1 ft. (EI. 89.9 ft.)
DATE WATER LEVEL WAS MEASURED: 4/14/2010

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,299,724.2 E 6,095,316.0 (NAGD83)

TOTAL DEPTH: 31.1 ft.

STATE: California
GROUND SURFACE ELEVATION: 99.0 ft. (NAVD88)

T.O.C ELEVATION: 101.7 ft. (NAVD88)

HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

					LABO	DRAT	ORY	DATA	4		×O		NO		П	
NOTES	DEPTH	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION	ELEVATION	VISUAL	ELEVATION	GEOLOGIC UNIT SYMBOL	CLASSIFICATION AND PHYSICAL CONDITION
			48.7	16.5	65.2	34.8	0.0	26.2	8.7	22.7	s(CL)					
	25-											74.4	s(CL)			_
													S(OL)			
	-	86														-
														72.5		
	-															-
													SP/SM		Qal	
	-															_
														70.4		
	-															
	30-	72	14.0	4.2	18.2	81.8	0.0	NP	NP	18.0	SM		SM			_
	_	-						OTTO	M OF I	JOI E		67.9		67.9		_
1							-	.0110	IVI OF I	IOLE						

COMMENTS:

PROJECT DATABASE: SJRRP.GPJ

REPORT: SJRRP DRILL HOLE

FADC = Flight Auger Dry Core

NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter

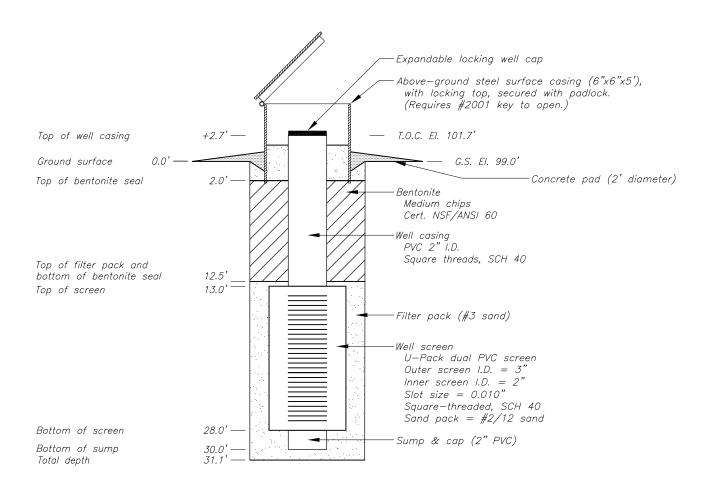
RM = River Mile

O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River



MW-10-95	GEOLOGIST: A. WARREN
WELL COMPLETION DIAGRAM	DRILLER: G. HANSEN
DATE COMPLETED: 4/14/2010	HELPER: C. KELLY, K. KREITZ

TOP OF WELL CASING COORDINATES:
N2299724.2 E6095316.0 (NAD83) ELEVATION 101.7' (NAVD88)
GROUND SURFACE ELEVATION 99.0' (NAVD88)



NOT TO SCALE

NOTES:

T.O.C. = Top of well casing, I.D. = Inner Diameter, G.S. = Ground Surface, El. = Elevation

FEATURE: Groundwater Monitoring LOCATION: Reach 4B1, River Right, RM 167 BEGUN: 4/15/10 FINISHED: 4/15/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,296,689.5 E 6,093,377.6 (NAGD83)

TOTAL DEPTH: 31.4 ft.

STATE: California GROUND SURFACE ELEVATION: 100.4 ft. (NAVD88)

T.O.C ELEVATION: 103.0 ft. (NAVD88) HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

											1	I			
				1	LABO	DRAT	ORY	DATA	\		\ S S S V	0 N		Ę	
NOTES	DEPTH	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION ELEVATION	VISUAL	ELEVATION	GEOLOGIC UNIT SYMBOL	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.											/				0.0 to 31.4 feet QUATERNARY ALLUVIUM (Qal)
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a	_														 0.0 to 3.0 ft.: <u>SANDY LEAN CLAY</u>, s(CL): About 70% fines with medium plasticity; about 30% fine sand; maximum size: fine sand; moist, dark brown.
groundwater monitoring well. LOCATION: Reach 4B1, RM 167, river right, about 1 mile northwest of the	_											s(CL)			3.0 to 5.3 ft.: LEAN CLAY, CL: About 95% fines with medium plasticity and toughness; about 5% fine sand; maximum size: fine sand; moist, dark brown; moderately firm consistency; bottom contact is gradual.
intersection of SJR and Indiana Avenue, 1.1 miles west from the center of the Eastside Bypass.		51													5.3 to 8.3 ft.: <u>LEAN CLAY WITH SAND</u> , (<u>CL)s:</u> About 85% fines with low plasticity and toughness; about 15% fine sand;
DRILLED BY: PN-Regional Drill Crew Jerry Hansen, Driller Cody Kelly, Helper Ken Kreitz, Helper	_												97.4	-	maximum size: fine sand; moist, olive brown with dark brown mottling; moderately firm consistency; soil becomes less firm with depth.
DRILL RIG: Central Mining Equipment 75 drill rig (CME-75)	_											CL			8.3 to 10.4 ft.: SILTY SAND, SM: About 65% fine sand containing mica; about 35% fines with low plasticity and toughness; maximum size: fine sand; wet, olive brown with reddish brown oxidation; moderately firm
DRILLING & SAMPLING METHODS: Drill hole MW-10-96 was advanced using hollow stem flight augers with a continuous dry core sampling system (FADC) from the ground surface to a total depth of 31.4 feet. FADC uses 7-5/8-inch 0.D., 4-1/4-inch 1.D. hollow stem augers, with a 5-foot-long, 3-inch 1.D. split	5—											CL	95.1	-	consistency; artificial plasticity from mica. 10.4 to 14.5 ft.: SILTY SAND, SM: About 80% fine to medium sand; about 20% non-plastic fines; maximum size: medium sand; wet, olive brown with reddish brown oxidation layers; soft consistency; interbedded layers of SP, SM, and s(ML) from 0.05- to 0.3-foot-thick.
sample barrel. Interval Method 0.0 to 31.4 ft FADC	_													Qal	<u>Laboratory Data Interval</u> 10.0 to 11.0 ft. 12.9 to 13.9 ft.
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 4.3 ft. smooth drilling, soft 4.3 to 8.9 ft. soft, wet, moved		100										(CL)s			14.5 to 16.2 ft.: No Recovery - POORLY GRADED SAND WITH SILT, SP/SM: Description based on soil recovered in the shoe and drilling conditions.
sampler out to 0.2 ft. 8.9 to 13.9 ft. moderately firm, wet 13.9 to 18.9 ft. firm 18.9 to 23.9 ft. moderately firm 23.9 to 31.4 ft. soft															16.2 to 21.9 ft.: POORLY GRADED SAND, SP: About 95% fine to medium sand; about 5% non-plastic fines; maximum size: medium sand; wet, gray; soft consistency, homogeneous.
CAVING CONDITIONS: None	-												92.1		Laboratory Data Interval 18.9 to 20.9 ft.
DRILL FLUID, RETURN AND COLOR: 0.0 to 8.9 ft. None 8.9 to 31.4 ft. Water, no return	_														21.9 to 22.9 ft.: SANDY LEAN CLAY, s(CL): About 55% fines with medium plasticity and toughness; about 45% fine sand; maximum size: fine sand; moist, dark gray; hydrogen
WATER LEVEL: Not measured REASON FOR HOLE												SM			sulfide odor; very firm consistency. 22.9 to 25.4 ft.: CLAYEY SAND, SC: About 85% fine sand; about 15% fines with low plasticity; maximum size: fine sand; moist,
TERMINATION: The hole was terminated upon successful completion to the target	10-												90.0		dark gray; moderately firm consistency. <u>Laboratory Data Interval</u>
HOLE COMPLETION: Well Casing: +2.6 to 10.0 ft. (T.O.C. El. 103.0 ft.)	_		50.0	9.5	59.5	40.5	0.0	NP	NP	22.6	s(ML)		90.0		23.9 to 24.9 ft. 25.4 to 30.4 ft.: SANDY LEAN CLAY, s(CL): About 70% fines with low plasticity and toughness; about 30% fine (powdery) sand;
Dual U-pack Screen: 10.0 to 25.0 ft. (Slotted 0.010-inch) Well Screen Filter Pack: 2/12 Sand Filter Pack: 9.5 to 31.4 ft. (#3 Sand) Sump: 25.0 to 27.0 ft. (2-inch blank		96													maximum size: fine sand; moist, dark gray with some chocolate brown marbling; moderately firm consistency; silt content and sand increases with depth.
PVC with cap) COMMENTS:															<u>Laboratory Data Interval</u>

PROJECT DATABASE: SJRRP.GPJ

REPORT: SJRRP DRILL HOLE

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery

NA = Not applicable I.D. = inner diameter RM = River Mile

O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing

SJR = San Joaquin River

Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.

FEATURE: Groundwater Monitoring LOCATION: Reach 4B1, River Right, RM 167 BEGUN: 4/15/10 FINISHED: 4/15/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,296,689.5 E 6,093,377.6 (NAGD83)

TOTAL DEPTH: 31.4 ft.

STATE: California GROUND SURFACE ELEVATION: 100.4 ft. (NAVD88)

T.O.C ELEVATION: 103.0 ft. (NAVD88)

HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

					LABO	DRAT	ORY	DATA	4		×O		N O		╘	
NOTES	DEPTH	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY	ELEVATION	VISUAL	ELEVATION	GEOLOGIC UNIT SYMBOL	CLASSIFICATION AND PHYSICAL CONDITION
Sentonite Seal: 2.0 to 9.5 ft. Vell Completion: Steel surface asing with locking top, square -inches-wide and 5-foot-long.		96									,		SM			25.0 to 26.0 ft. 30.4 to 31.4 ft.: FAT CLAY, CH: About 95% fines with high plasticity and toughness, no dilatancy; about 5% fine sand; maximum size fine sand; moist, chocolate brown; very firm
	_		11.3	4.3	15.6	84.4	0.0	NP	NP	16.9	SM	86.7				consistency. T.D.= 31.4 ft.
	_											50.7		85.9		_
	15—												SP/SM			_
	_	0												84.2		_
	_															_
	_														Qal	_
	-												SP			_
	20-		9.2	3.6	12.8	87.2	0.0	NP	NP	23.2	SM					_
	_	100										79.7				_
	_												s(CL)	78.5		_
	_												5(01)	77.5		_
COMMENTS:													SC			
FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter		O.D. : G.S. : b.g.s. T.O.C SJR :	= Gro	und si	urface	und su asing ver	ırface			C	:omplet	tion Dia	agram V	Vell devi	lonm	ed in attached Well ent information is Development form.
RM = River Mile			Г			15/201			T 2 ()E 3	DRII	LHOLE	MW-10-	.96		RECLAMATION Managing Water in the West



FEATURE: Groundwater Monitoring LOCATION: Reach 4B1, River Right, RM 167 BEGUN: 4/15/10 FINISHED: 4/15/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,296,689.5 E 6,093,377.6 (NAGD83)

TOTAL DEPTH: 31.4 ft.

STATE: California GROUND SURFACE ELEVATION: 100.4 ft. (NAVD88)

T.O.C ELEVATION: 103.0 ft. (NAVD88) HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

					LABO	DRAT	ORY	DATA	١		×o		NO		Ŀ	
NOTES	DEPTH	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION	ELEVATION	VISUAL	ELEVATION	GEOLOGIC UNIT SYMBOL	CLASSIFICATION AND PHYSICAL CONDITION
			23.2	14.1	37.3	62.7	0.0	25.2	10.7	12.7	SC	75.5	sc			
	25-		33.7	25.6	59.3	40.7	0.0	31.3	15.0	15.8	s(CL)	74.4		75.0		_
	_	100														_
	_												s(CL)		Qal	_
	_															_
	30-	100												70.0		
	_						В	отто	M OF I	HOLE			СН	69.0		

COMMENTS:

PROJECT DATABASE: SJRRP.GPJ

REPORT: SJRRP DRILL HOLE

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery

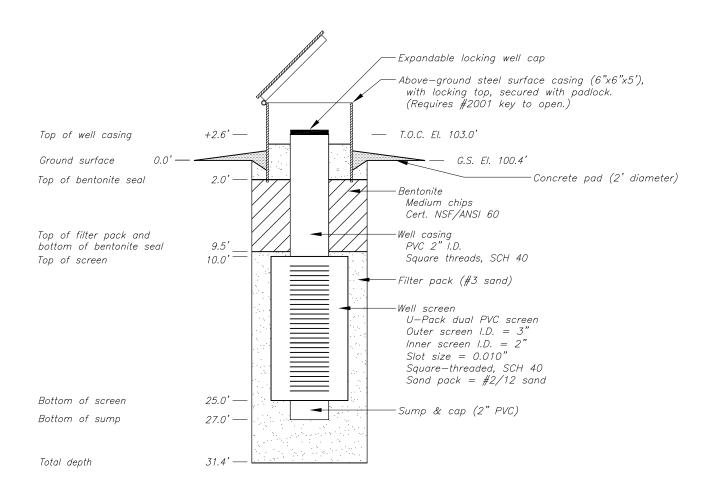
NA = Not applicable I.D. = inner diameter RM = River Mile

O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River



MW-10-96	GEOLOGIST: A. WARREN
WELL COMPLETION DIAGRAM	DRILLER: G. HANSEN
DATE COMPLETED: 4/15/2010	HELPER: C. KELLY, K. KREITZ

TOP OF WELL CASING COORDINATES:
N2296689.5 E6093377.6 (NAD83) ELEVATION 103.0' (NAVD88)
GROUND SURFACE ELEVATION 100.4' (NAVD88)



NOT TO SCALE

NOTES:

 $T.O.C. = Top \ of \ well \ casing, \ l.D. = Inner \ Diameter, \ G.S. = Ground \ Surface, \ El. = Elevation$

FEATURE: Groundwater Monitoring
LOCATION: Reach 4B1, River right, RM 167
BEGUN: 4/16/10 FINISHED: 4/16/10
WATER LEVEL DEPTH AND ELEVATION: NA
DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,294,443.5 E 6,091,007.0 (NAGD83)

COORDINATES: N 2,294,443.5 E 6,091,007.0 (NAGD8)

TOTAL DEPTH: 29.3 ft.

STATE: California
GROUND SURFACE ELEVATION: 101.2 ft. (NAVD88)

T.O.C ELEVATION: 103.7 ft. (NAVD88) HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE. PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well. LOCATION: Reach 481, RM 167, river right, about 180 feet northeast from the intersection of Indiana Avenue and the SJR. DRILLED BY: PN-Regional Drill Crew Jerry Helper Cody Kelly, Helper Kerk river, Helper Cody Kelly, Helper Kerk river, Helper Cody Kelly, Helper Kerk river, Helper Spring (CME-75) DRILLING & SAMPLING METHODS: DRIILING & SAMPLING METHOD & DESCRIPTION OF STREET METHOD & DESCRIPTIO						LABO	ORAT	ORY	DATA	١		Z		z	7		
### CALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE. 0.0 to 4.0 feet FILL (Fill) 0.0 to 4.0 feet Surface And	NOTES	ОЕРТН	% CORE	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION	ELEVATION	VISUAL	ELEVATION	GEOLOGIC UNIT SYMBOL	
PURPOSE OF HALE A servicine concluding a conditioning well. LOCATION. Road 8th first many factors of the state of the service of the state of the service of the state of the service of the state of the state of the service of the state of the service of the state of the service of the state of the state of the service of the state of the state of the service of the state of the service of the state of the service of the state of the st	FEET FROM THE GROUND		_							_		/		/			
SC	PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a	_															65% fine sand; about 35% fines with low plasticity; maximum size: fine sand; moist, dark brown; moderately soft consistency; disturbed fill.
wast from the intersection of Indiana Avenue and the SIR. DRILLED BY: PNR-Regional Drill Crew Jorry Harson, Driller Cody, Kelly, Helper Ken Froitz, Helper Ken Froit	Reach 4B1, RM 167, river right, about 180 feet northeast from the	-	88											sc		Fill	3.0 to 4.0 ft. 4.0 to 29.3 feet
DRILLENG CONDITIONS AND DRILL FLUD. RETURN AND COLOR. CAVING CONDITIONS NO BRILL FLUD. RETURN AND COLOR. CAVING CONDITIONS NO BRILLENG CONDITIONS NO BRILLENG CONDITIONS NO BRILLENG CONDITIONS: None CREASON FOR NOLE TREMINATIONS: None REASON FOR NOLE TREMINATION: TREMINATION: MATER LEVEL: NO REC	west from the intersection of Indiana	_	-														- 4.0 to 4.3 ft.: POORLY GRADED SAND, SP
Sen Kreitz, Helper DRILL Ric: Central Mining Equipment 75 drill rig (CME-75) DRILLING a SAMPLING METHODS: DRILLING a SAMPLING METHODS: DRILLING a Linguist with the proposed using heliow stem flight augers with soft of the proposed using heliow stem flight augers with soft of the proposed using heliow stem flight augers with soft of the proposed using heliow stem flight augers with soft of the proposed using heliow stem flight augers with soft of the proposed using heliow stem flight augers with soft of the proposed using heliow stem flight augers with soft of the proposed using heliow stem flight augers with soft of the proposed using heliow stem flight augers with soft of the proposed using heliow stem flight augers with soft of the proposed using heliow stem flight augers with soft of the proposed using heliow stem flight augers with soft of the proposed using heliow stem flight augers with soft of the proposed using heliow stem flight augers with soft of the proposed using heliow stem flight augers with soft of the proposed using heliow stem flight augers with soft of the proposed using heliow stem flight augers with soft of the proposed using heliow stem flight augers with a soft of the proposed using heliow stem flight augers with soft of the proposed of the proposed using heliow stem flight augers with soft of the proposed using heliow stem flight augers. Eaboratory Data Interval 8.3 to 9.3 to 14.3 ft. 3 ft. None soft of the proposed using heliow stem flight augers with soft placed with redshib from heliow stem flight augers with soft placed with redshib from stem stem stem stem and stem flight augers with soft flight with redshib from stem flight augers with soft flight with redshib from stem stem stem and stem flight augers with stem flight	PN-Regional Drill Crew Jerry Hansen, Driller			26.9	23.4	50.3	49.7	0.0	26.2	8.0	13.0	s(CL)					non-plastic fines; maximum size: fine sand; dry, tan; soft consistency.
DRILL RIG: Central Mining Equipment 75 drill rig (CME-75) RILLING 8 SAMPLING METHODS: DRILLING 8 SAMPLING METHODS: DRILLING 1 standard using hollow stem flight suggers with continuous dry core sampling a continuous dry core sampling surface to a total depth of 29.3 feet. FACC user 5-76-8-inch D.D., 4-1/4-inch I.D. hollow stem augers, with a 5-foot-foot-gained, 3-inch J.D. split sample barrel. Interval Method 0,0 to 23.3 ft. SAMPLING METHODS: Description based on soil recovered in shoe and drilling conditions. Hereval Method 0,0 to 23.3 ft. SAMPLING METHOL Systic sample barrel. Enterval Method 0,0 to 23.3 ft. SAMPLING METHOL Systic sample barrel. EAVING CONDITIONS: None CAVING CONDITIONS: None SPISM SPI		-											97.2	SP			WITH SILT, SP/SM :About 90% fine sand;
BRILLING & SAMPLING METHODS. Drill hole MW-10-97 was advanced using hollow sterm flight augers with a continuous dry core sampling system (FADC) from the ground surface to a total depth of 29.3 feet. FADC uses 7-28-inch O.D., 4-1/4-ruch 1.D. hollow sterm augers, with a 5-do-tolong, 3-inch 1.D. split sample barrol. Interval Method 0.0 to 29.3 ft FADC BRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 29.3 ft FADC BRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 29.3 ft Short System value of the state of the	Central Mining Equipment 75 drill rig	_															fine sand; dry, tan; soft consistency; stratified
Drill hole MW-10-97 was advanced using hollow stem flight augers with a continuous dry core sampling system (FADC) from the ground surface to a total depth of 29.3 feet. PADC uses 7-58-mich 0.D. Splft sample barrel. 88 SP/SM Description based on soil recovered in shee and drilling conditions. 19.3 to 14.3 ft; 3A BNDY_LEAN CLAY_SCLY (ARADED SAND WTH SILT, SP/SM): Description based on soil recovered in shee and drilling conditions. SP/SM Description based on soil recovered in shee and drilling conditions. 19.3 to 24.3 ft; 3A BNDY_LEAN CLAY_SCLY (ADADUT SAND part) are same distribution of the same distribution of t	DRILLING & SAMPLING) -															
surface to a total depth of 29.3 feet. FADC uses 7-75/si-nch 0.D. nc, 4-1/4-inch 1.D. hollow stem augers, with a 5-foot-long, 3-inch 1.D. split sample barrel. Interval Method 0.0 to 29.3 ft FADC DRILLING CONDITIONS AND DRILLING CONDITIONS AND DRILLING CONDITIONS AND DRILLING COMMENTS: 0.0 to 29.3 ft. smooth drilling, soft CAVING COMDITIONS: None DRILL FLUID, RETURN AND COLOR: 0.3 to 29.3 ft. Water, no return WATER LEVEL: Not measured REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth. Well Casning: +2.5 to 10.0 ft. (T.O.C. El. 103.7 ft.) Drill Paped Creen: 10.0 to 25.0 ft. Well Casning: +2.5 to 29.3 ft. (83.3 Sand) Sump: 25.0 to 27.0 ft. (2-inch blank PVC with cap) Bentonite Seat: 2.0 to 5.5 ft. Well Complicion: Steel surface	Drill hole MW-10-97 was advanced using hollow stem flight augers with a continuous dry core sampling	_	-														14.3 to 19.3 ft.: No Recovery - POORLY
Interval Method 0.0 to 29.3 ft FADC DRILLIF COMPLETION: WATER LEVEL: Not measured REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth. WHOLE COMPLETION: Well Casing: +2.5 to 10.0 ft. (T.O.C. E.1.03.7 ft.) Dual U-pack Screen: 10.0 to 25.0 ft. (Solted 0.010-inch) Well Screen Filter Pack: 212 Sand Bentonite Seal: 2.0 to 27.0 ft. (2-inch blank PVC with cag) Bentonite Seal: 2.0 to 5.5 ft. (Well Completion: Steel surface	surface to a total depth of 29.3 feet. FADC uses 7-5/8-inch O.D., 4-1/4-inch I.D. hollow stem augers, with a 5-foot-long, 3-inch I.D. split	_	68											SP/SM			and drilling conditions. — 19.3 to 24.3 ft.: SANDY LEAN CLAY, s(CL):
DRILLER'S COMMENTS: 0.0 to 29.3 ft. smooth drilling, soft CAVING CONDITIONS: None DRILL FLUID, RETURN AND COLOR: 0.0 to 93.1 ft. None 9.3 to 29.3 ft. None 9.3 to 29.3 ft. Water, no return WATER LEVEL: Not measured REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth. Well Cample Storeen: 10.0 to 25.0 ft. (Slotted 0.010-inch) Well Screen Filter Pack: 2/12 Sand Filter Pack: 5.5 to 29.3 ft. (#3 Sand) Sump: 25.0 to 27.0 ft. (2-inch blank PVC with cap) Bentonite Seal: 2.0 to 5.5 ft. Well Campletion: Steal: 2.0 to 5.5 ft. Well Campletion: Steal: surface	Interval Method																35% fine to coarse, hard, sub-angular sand; maximum size: coarse sand; wet to moist,
CAVING CONDITIONS: None DRILL FLUID, RETURN AND COLOR: 0.0 to 9.3 ft. None 93.10 29.3 ft. Water, no return WATER LEVEL: Not measured REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth. WHOLE COMPLETION: Well Casing: +2.5 to 10.0 ft. (T.O.C. El. 103.7 ft.) Dual U-pack Screen: 10.0 to 25.0 ft. (Slotted 0.010-inch) Well Screen Filter Pack: 2/12 Sand Filter Pack: 5.5 to 29.3 ft. (#3 Sand) Sump: 25.0 to 27.0 ft. (2-inch blank PVC with cap) Bentonite Seal: 2.0 to 5.5 ft. Well Completion: Steel surface	DRILLER'S COMMENTS:	_															rapid dilatancy; about 10% fine sand;
DRILL FLUID, RETURN AND COLOR: 0.0 to 9.3 ft. None 9.3 to 29.3 ft. Water, no return WATER LEVEL: Not measured REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth. Well Casing: +2.5 to 10.0 ft. (T.O.C. El. 10.3.7 ft.) Dual U-pack Screen: 10.0 to 25.0 ft. (Slotted 0.010-inch) Well Screen Filter Pack: 2/12 Sand Filter Pack: 2/12 Sand Filter Pack: 5.5 to 29.3 ft. (#3 Sand) Sump: 25.0 to 27.0 ft. (2-inch blank PVC with cap) Bentonite Seal: 2.0 to 5.5 ft. Well Completion: Steel surface		_		6.9	0.0	6.9	93.1	0.0	NP	NP	26.5	SP-SM	91.9		91.9		brown, strong reaction with HCl; firm consistency; abundant calcium carbonate
WATER LEVEL: Not measured REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth. HOLE COMPLETION: Well Casing: +2.5 to 10.0 ft. (T.O.C. El. 103.7 ft.) Dual U-pack Screen: 10.0 to 25.0 ft. (Slotted 0.010-inch) Well Screen Filter Pack: 2/12 Sand Filter Pack: 5.5 to 29.3 ft. (#3 Sand) Sump: 25.0 to 27.0 ft. (2-inch blank PVC with cap) Bentonite Seal: 2.0 to 5.5 ft. Well Completion: Steel surface	COLOR: 0.0 to 9.3 ft. None	10-														Qal	diameter. <u>Laboratory Data Interval</u>
TERMINATION: The hole was terminated upon successful completion to the target depth. HOLE COMPLETION: Well Casing: +2.5 to 10.0 ft. (T.O.C. El. 103.7 ft.) Dual U-pack Screen: 10.0 to 25.0 ft. (Slotted 0.010-inch) Well Screen Filter Pack: 2/12 Sand Filter Pack: 5.5 to 29.3 ft. (#3 Sand) Sump: 25.0 to 27.0 ft. (2-inch blank PVC with cap) Bentonite Seal: 2.0 to 5.5 ft. Well Completion: Steel surface	WATER LEVEL:																T.D.= 29.3 ft.
HOLE COMPLETION: Well Casing: +2.5 to 10.0 ft. (T.O.C. EI. 103.7 ft.) Dual U-pack Screen: 10.0 to 25.0 ft. (Slotted 0.010-inch) Well Screen Filter Pack: 2/12 Sand Filter Pack: 5.5 to 29.3 ft. (#3 Sand) Sump: 25.0 to 27.0 ft. (2-inch blank PVC with cap) Bentonite Seal: 2.0 to 5.5 ft. Well Completion: Steel surface	TERMINATION: The hole was terminated upon successful completion to the target	_	0											No Rec			
(Slotted 0.010-inch) Well Screen Filter Pack: 2/12 Sand Filter Pack: 5.5 to 29.3 ft. (#3 Sand) Sump: 25.0 to 27.0 ft. (2-inch blank PVC with cap) Bentonite Seal: 2.0 to 5.5 ft. Well Completion: Steel surface	HOLE COMPLETION: Well Casing: +2.5 to 10.0 ft. (T.O.C. El. 103.7 ft.)	_															
PVC with cap) Bentonite Seal: 2.0 to 5.5 ft. Well Completion: Steel surface	(Slotted 0.010-inch) Well Screen Filter Pack: 2/12 Sand Filter Pack: 5.5 to 29.3 ft. (#3 Sand) Sump: 25.0 to 27.0 ft. (2-inch blank	_															
	PVC with cap) Bentonite Seal: 2.0 to 5.5 ft. Well Completion: Steel surface	_													86.9		
6-inches-wide and 5-foot-long. COMMENTS:														SP/SM			

COMMENTS:

PROJECT DATABASE: SJRRP.GPJ

REPORT: SJRRP DRILL HOLE

FADC = Flight Auger Dry Core

NP = Non-plastic NR = No Recovery

NA = Not applicable I.D. = inner diameter RM = River Mile O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.

FEATURE: Groundwater Monitoring LOCATION: Reach 4B1, River right, RM 167 BEGUN: 4/16/10 FINISHED: 4/16/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

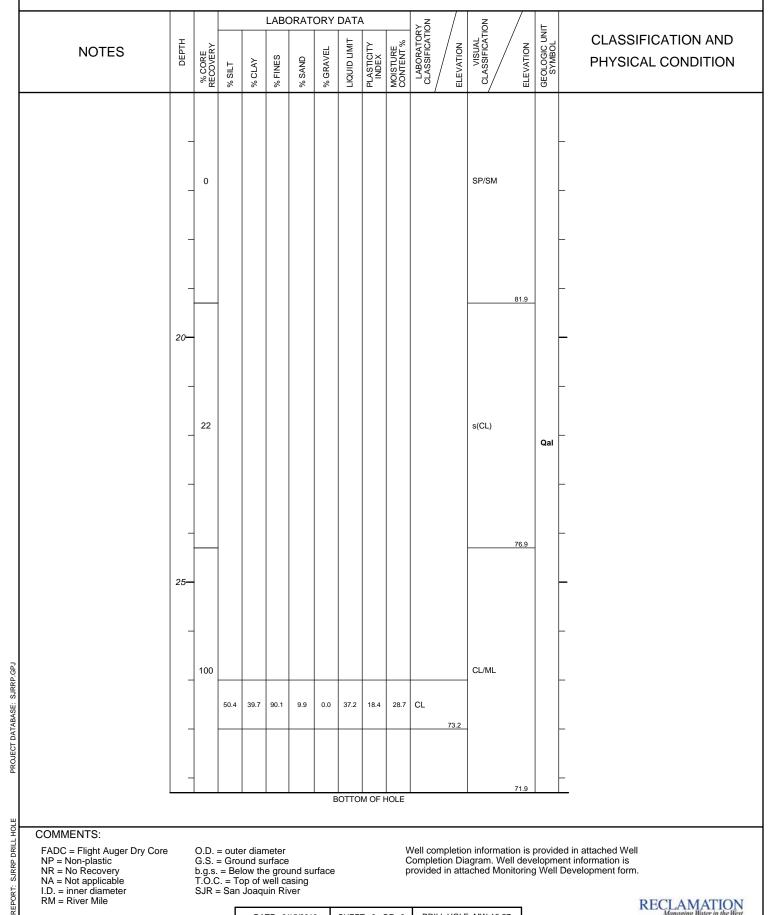
PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,294,443.5 E 6,091,007.0 (NAGD83) TOTAL DEPTH: 29.3 ft.

STATE: California

T.O.C ELEVATION: 103.7 ft. (NAVD88) HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

GROUND SURFACE ELEVATION: 101.2 ft. (NAVD88)



COMMENTS:

FADC = Flight Auger Dry Core

NP = Non-plastic NR = No Recovery

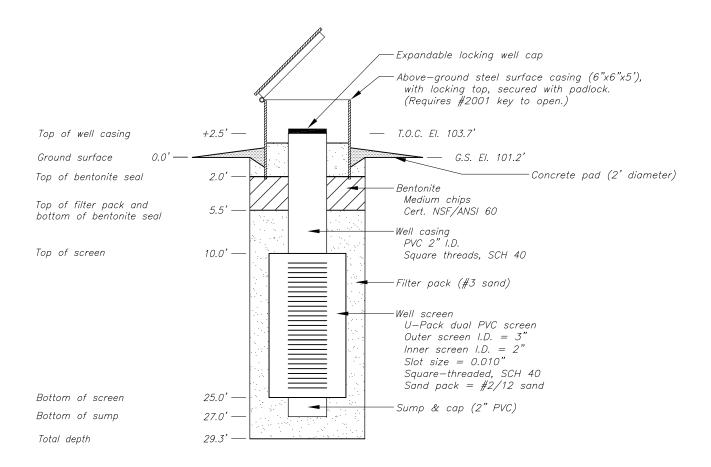
NA = Not applicable I.D. = inner diameter RM = River Mile

O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River



MW-10-97	GEOLOGIST: A. WARREN
WELL COMPLETION DIAGRAM	DRILLER: G. HANSEN
DATE COMPLETED: 4/16/2010	HELPER: C. KELLY, K. KREITZ

TOP OF WELL CASING COORDINATES:
N2294443.5 E6091007.0 (NAD83) ELEVATION 103.7' (NAVD88)
GROUND SURFACE ELEVATION 101.2' (NAVD88)



NOT TO SCALE

NOTES:

 $T.O.C. = Top \ of \ well \ casing, \ l.D. = Inner \ Diameter, \ G.S. = Ground \ Surface, \ El. = Elevation$

FEATURE: Groundwater Monitoring LOCATION: Reach 4B1, River Bank Left, RM 167 BEGUN: 3/31/10 FINISHED: 3/31/10

WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,293,516.2 E 6,091,162.9 (NAGD83)

TOTAL DEPTH: 31.2 ft.

STATE: California

GROUND SURFACE ELEVATION: 102.2 ft. (NAVD88)

T.O.C ELEVATION: 105.1 ft. (NAVD88)

HOLE LOGGED BY: J. Vauk REVIEWED BY: A. Warren

														,		
					LAB	ORAT	ORY	DATA	A		≻Z	/	z /	′	_	
NOTES	рертн	\ *					ی	Η	≥	щ. _%	ATOR, ICATIC	/ z	UAL	N	IC UNI	CLASSIFICATION AND
NOTES	DEF	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION	ELEVATION	VISUAL	ELEVATION	GEOLOGIC UNIT SYMBOL	PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.											/		/			0.0 to 3.4 feet FILL (Fill)
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	_	57											s(CL)		Fill	 0.0 to 3.4 ft.: SANDY LEAN CLAY, s(CL): About 60% fine sand; about 40% fines with medium plasticity, toughness and dry strength, slow dilatancy; maximum size: fine sand; dry, medium brown, no reaction to HCl; soft consistency; organics; fill embankment material.
Reach 4B1, RM 167, river left, about 160 feet south from the center of the SJR, about 1 mile west of the	-	1											98	3.8		– 3.4 to 31.2 feet QUATERNARY ALLUVIUM (Qal)
intersection of Indian Road and the SJR.	-												CL 98	3.0		 3.4 to 4.2 ft.: <u>LEAN CLAY, CL</u>: About 90% fines with medium to high plasticity, medium toughness and dry strength, no dilatancy;
DRILLED BY: PN-Regional Drill Crew Jerry Hansen, Driller Cody Kelly, Helper	5-		39.9	12.4	52.3	47.7	0.0	NP	NP	21.5	s(ML)		s(ML)			about 10% fine sand; maximum size: fine sand; moist, dark brown, no reaction to HCl; — soft consistency.
Ken Kreitz, Helper DRILL RIG: Central Mining Equipment 75 drill rig (CME-75)	_										,	95.7	, ,	5.6		 4.2 to 6.6 ft.: SANDY SILT, s(ML): About 65% non-plastic fines with rapid dilatancy; about 35% fine sand; maximum size: fine sand; moist, light brown, no reaction to HCl; soft consistency.
DRILLING & SAMPLING METHODS:	-	100											CL 94	4.8		Laboratory Data Interval 4.3 to 6.5 ft.
Drill hole MW-10-98 was advanced using hollow stem flight augers with a continuous dry core sampling system (FADC) from the ground	_															6.6 to 7.4 ft.: <u>LEAN CLAY, CL</u> : About 90% fines with medium plasticity, toughness and dry strength, no dilatancy; about 10% fine
surface to a total depth of 31.2 feet. FADC uses 7-5/8-inch O.D., 4-1/4-inch I.D. hollow stem augers, with a 5-foot-long, 3-inch I.D. split sample barrel. Interval Method 0.0 to 31.2 ft FADC	10-	-	40.9	18.0	58.9	41.1	0.0	NP	NP	25.8	s(ML)		s(CL/ML)			sand; maximum size: fine sand; moist, dark brown, no reaction to HCl; firm consistency. 7.4 to 13.2 ft.: SANDY SILTY CLAY, s(CL/ML): About 60% fines with medium plasticity, low toughness, medium dry strength, rapid dilatancy; about 40% fine sand; maximum size: fine sand; moist, brown, no reaction to HCl; soft consistency.
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 8.7 ft. smooth drilling, very soft	-	100													Qal	Laboratory Data Interval 8.0 to 13.0 ft.
8.7 to 31.2 ft. soft, wet to very wet CAVING CONDITIONS:	-														Qui	13.2 to 18.7 ft.: SITLY SAND, SM: About 70% fine to medium sand; about 30% non-plastic fines with rapid dilatancy;
None DRILL FLUID, RETURN AND	-											89.2	89	9.0		maximum size: medium sand; wet, greenish brown, no reaction to HCl; soft consistency; black organic material encountered at bottom
COLOR: 0.0 to 8.7 ft. None 8.7 to 31.2 ft. Water, no return	_	_														of depth interval, material was recovered disturbed by drilling action. Laboratory Data Interval
WATER LEVEL: Not measured	15-															13.5 to 18.5 ft. — 18.7 to 23.7 ft.: No Recovery - SILTY
REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth.	-	34	6.2	1.5	7.7	92.3	0.0	NP	NP	24.2	SP-SM		SM			SAND, SM: Description based on drilling action. 23.7 to 24.1 ft.: SILTY SAND, SM: About 75% fine to medium sand; about 25% non-plastic fines with rapid dilatancy;
HOLE COMPLETION: Well Casing: +2.9 to 9.0 ft. (T.O.C. El. 105.1 ft.) Dual U-pack Screen: 9.0 to 24.0 ft.	-	_														maximum size: medium sand; wet, gray, no reaction to HCl; soft consistency. <u>Laboratory Data Interval</u>
(Slotted 0.010-inch) Well Screen Filter Pack: 2/12 Sand Filter Pack: 8.4 to 26.0 ft. (#3 Sand) Sump: 24.0 to 26.0 ft. (2-inch blank	-											83.7	83	3.5		23.8 to 24.0 ft. 24.1 to 28.7 ft.: SANDY LEAN CLAY, s(CL): About 65 to 70% fines with medium to high
PVC with cap) Bottom Backfill: 26.0 to 31.2 ft. (Bentonite) Bentonite Seal: 1.0 to 8.4 ft. Well Completion: Steel surface	_	0											SM			plasticity, medium toughness and dry strength, no to slow dilatancy; about 30 to 35% fine to medium sand; maximum size: medium sand; moist, greenish brown, no reaction to HCl; firm consistency.
COMMENTS:																
FADC = Flight Auger Dry Core		O.D.	= oute	er diar	neter					V	Vell com	pletio	n information	is p	rovid	ed in attached Well

REPORT: SJRRP DRILL HOLE

PROJECT DATABASE: SJRRP.GPJ

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable

I.D. = inner diameter RM = River Mile

O.D. = outer diameter

G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River

Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, RM 167 BEGUN: 3/31/10 FINISHED: 3/31/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,293,516.2 E 6,091,162.9 (NAGD83)

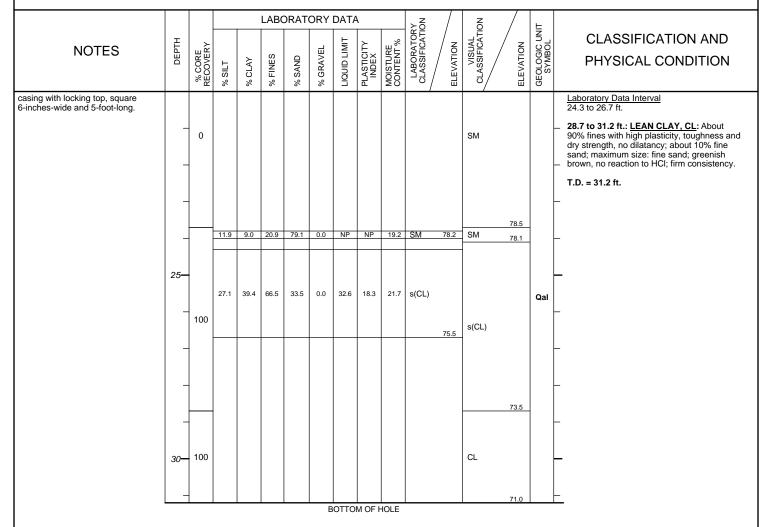
TOTAL DEPTH: 31.2 ft.

STATE: California

GROUND SURFACE ELEVATION: 102.2 ft. (NAVD88) T.O.C ELEVATION: 105.1 ft. (NAVD88)

HOLE LOGGED BY: J. Vauk

REVIEWED BY: J. Vaul



COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery

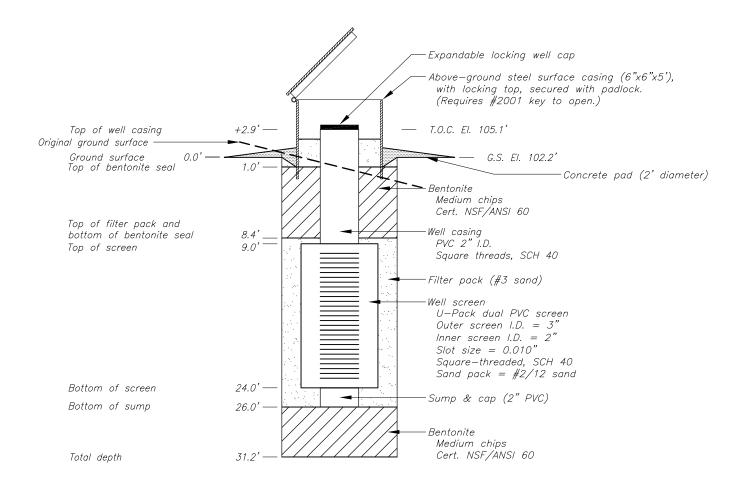
NA = Not applicable I.D. = inner diameter RM = River Mile O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.



PROJECT DATABASE: SJRRP.GPJ

MW-10-98	GEOLOGIST: J. VAUK
WELL COMPLETION DIAGRAM	DRILLER: G. HANSEN
DATE COMPLETED: 3/31/2010	HELPER: C. KELLY, K. KREITZ

TOP OF WELL CASING COORDINATES:
N2293516.2 E6091162.9 (NAD83) ELEVATION 105.1' (NAVD88)
GROUND SURFACE ELEVATION 102.2' (NAVD88)



NOT TO SCALE

NOTES:

T.O.C. = Top of well casing, I.D. = Inner Diameter, G.S. = Ground Surface, El. = Elevation

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, RM 167

BEGUN: 4/1/10 FINISHED: 4/1/10

WATER LEVEL DEPTH AND ELEVATION: 7.2 ft. (El. 97.1 ft.) DATE WATER LEVEL WAS MEASURED: 4/2/2010

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,292,632.1 E 6,090,051.8 (NAGD83)

TOTAL DEPTH: 28.7 ft.

STATE: California GROUND SURFACE ELEVATION: 104.3 ft. (NAVD88)

T.O.C ELEVATION: 107.1 ft. (NAVD88)

HOLE LOGGED BY: J. Vauk REVIEWED BY: A. Warren

				LABORATORY DATA									NO /	L			
NOTES	DEРТН						ᇜ	LIM I	≽	% ∏%	SATOF FICATI	/ N	inal Ficati	SOL UN	CLASSIFICATION AND		
NOTES	DE	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION	ELEVATION	VISUAL	GEOLOGIC UNIT SYMBOL	PHYSICAL CONDITION		
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.											,				0.0 to 28.7 feet QUATERNARY ALLUVIUM (Qal)		
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	_														 0.0 to 4.9 ft.: SILTY CLAY WITH SAND, (CL/ML)s: About 80% fines with high plasticity, low toughness, very high dry strength, no dilatancy; about 20% fine sand; maximum size: fine sand; dry, dark brown, strong reaction to HCl; soft consistency. 		
LOCATION: Reach 4B1, RM 167, river left, about 1,420 feet southwest of the center of the SJR, about 1.2 miles west of															Laboratory Data Interval 1.0 to 4.5 ft. 4.9 to 8.7 ft.: SANDY LEAN CLAY, s(CL):		
he intersection of Indiana Avenue and the SJR. DRILLED BY:	_	81													About 70% fines with medium plasticity and toughness, very high dry strength, no dilatancy; about 30% fine sand; maximum size: fine sand; moist, light brown, strong		
PN-Regional Drill Crew erry Hansen, Driller Cody Kelly, Helper Ken Kreitz, Helper			30.6	27.7	58.3	41.7	0.0	34.9	15.4	17.9	s(CL)		(CL/ML)s		reaction to HCl; soft consistency. <u>Laboratory Data Interval</u> 5.5 to 8.5 ft.		
ORILL RIG: Central Mining Equipment 75 drill rig CME-75) ORILLING & SAMPLING	_														 8.7 to 9.0 ft.: <u>SILTY CLAY WITH SAND</u>, (<u>CL/ML</u>)s: About 85% fines with medium plasticity and toughness, very high dry strength, no dilatancy; about 15% fine sand maximum size: fine sand; wet, light brown, 		
METHODS: Orill hole MW-10-99 was advanced using hollow stem flight augers with a continuous dry core sampling system (FADC) from the ground surface to a total depth of 28.7 feet. FADC uses 7-5/8-inch O.D., 1-1/4-inch I.D. hollow stem augers,	_											99.8			9.0 to 11.9 ft.: LEAN CLAY, CL: About 90.95% fines with high plasticity, medium toughness, high dry strength, no dilatancy; about 5-10% fine sand; maximum size: fine sand; moist, medium brown, strong reaction to HCl; firm consistency.		
rith a 5-foot-long, 3-inch I.D. split ample barrel. hterval Method .0 to 28.7 ft FADC	5—												99.4	Qal	11.9 to 18.7 ft.: INTERBEDDED - LEAN CLAY WITH SAND, (CL)s AND SANDY LEAN CLAY, s(CL): About 60 to 80% fines with high plasticity and toughness, very hig dry strength, no dilatancy; about 20 to 40%		
ORILLING CONDITIONS AND ORILLER'S COMMENTS: 0.0 to 3.7 ft. smooth drilling, soft 8.7 to 18.7 ft. very wet, add water 8.7 to 23.7 ft. moved sampler out													_		fine sand; maximum size: fine sand; moist, medium brown, no to weak reaction to HCl; hard consistency; strong reaction to HCl frc 13.7 to 17.6 ft; layers are 0.1 to 0.3-foot-thi		
0 0.4 ft. 3.7 to 27.6 ft. refusal, moved ampler in 0.2 ft. 7.6 to 28.7 ft. firm	_	34													Laboratory Data Interval 12.2 to 18.5 ft. 18.7 to 21.2 ft.: LEAN CLAY, CL: About		
CAVING CONDITIONS: Jone DRILL FLUID, RETURN AND	_	_	40.9	28.5	69.4	30.6	0.0	27.7	10.8	19.5	s(CL)	•	s(CL)		 95% fines with medium plasticity and toughness, high dry strength, no dilatancy; about 5% fine sand; maximum size: fine sa moist, dark brown, no reaction to HCl; soft consistency. 		
COLOR: .0 to 3.7 ft. None .7 to 28.7 ft. Water, no return											-1	<u>.</u>			Laboratory Data Interval 18.9 to 21.0 ft.		
VATER LEVEL: 1.2 ft. b.g.s. on 4/2/2010 REASON FOR HOLE REMINATION:	_	_													21.2 to 23.6 ft.: FAT CLAY, CH: About 95° fines with high plasticity, medium toughnes very high dry strength, no dilatancy; about fine sand; maximum size: fine sand; mediu brown, no reaction to HCl; hard consistency		
The hole was terminated upon uccessful completion to the target lepth.												95.8	95.6		<u>Laboratory Data Interval</u> 21.5 to 23.3 ft.		
	_												(CL/ML)s 95.3		23.6 to 24.9 ft.: SILTY SAND, SM: About 85% fine to medium sand; about 15% fines with low plasticity and toughness, medium strength, rapid dilatancy; maximum size: medium sand; wet, light brown, no reaction		
		88											CL		HCl; hard consistency. Laboratory Data Interval 23.9 to 24.7 ft.		
COMMENTS:													1	-			
FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter		G.S. = Ground surface									Complet	tion Di	agram. Well de	velopm	ed in attached Well ent information is Development form.		
RM = River Mile			Г	D.4	TE: 0/	14/201	<u>. T</u>	OUEE	T 1 (DF 0	I DDII		E MW-10-99		RECLAMATION Managing Water in the We.		

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, RM 167

BEGUN: 4/1/10 FINISHED: 4/1/10

WATER LEVEL DEPTH AND ELEVATION: 7.2 ft. (El. 97.1 ft.) DATE WATER LEVEL WAS MEASURED: 4/2/2010

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,292,632.1 E 6,090,051.8 (NAGD83)

TOTAL DEPTH: 28.7 ft.

STATE: California GROUND SURFACE ELEVATION: 104.3 ft. (NAVD88)

T.O.C ELEVATION: 107.1 ft. (NAVD88)

HOLE LOGGED BY: J. Vauk REVIEWED BY: A. Warren

ł						I ABO	DRAT	ORY	DATA	Α		7	7	7				
		ı									%	FORY ATIOI	/_	\L ATIOI	/.	_ =		CLASSIFICATION AND
	NOTES	DEPTH	% CORE RECOVERY	 -	¥	SH	9	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION	ELEVATION	VISUAL		ELEVALION OF OCIO	SYMBOL	PHYSICAL CONDITION
			RSO SO SO SO SO SO SO SO SO SO SO SO SO S	% SILT	% CLAY	% FINES	% SAND	% GR	LIQUI	PLAS	MOIS	P.E.E.	ELEV	GLAS	/ :		200	
		-	88											CL	92.	4	_	24.9 to 27.5 ft.: SANDY LEAN CLAY, s(CL): About 60% fines with medium plasticity, toughness and dry strength, slow dilatancy; about 40% fine to medium sand; maximum size: medium sand; moist, brown, no reaction to HCl; firm consistency: greater percentage of medium sand from 26.8 to 27.0 feet. Laboratory Data Interval 25.1 to 27.2 ft. 27.5 to 28.7 ft.: POORLY GRADED SAND WITH CLAY, SP/SC: About 90% fine to medium sand; about 10% fines with low plasticity and rapid dilatancy; maximum size: medium sand; wet, medium brown, no
																		reaction to HCI; soft consistency.
PROJECT DATABASE: SJRRP.GPJ		- 15 - -	100	44.8	36.9	81.7	18.3	0.0	33.4	16.3	25.4	(CL)s		(CL)s	s - s(CL)	c	- Alai	T.D.=28.7 ft.
ASE: 8													85.8					
DATAB.															85.	5		
DECT 1		-	-											1			-	
PRC			100	60.0	30.0	02.4	6.0	0.0	20.0	14.2	20.5	Cl		C				
				62.3	30.8	93.1	6.9	0.0	33.6	14.3	26.5	CL		CL				
ILL HOLE	COMMENTS:									<u> </u>								
ا ا	E400 E1144 E		~ -															

REPORT: SJRRP DRILL HOI

FADC = Flight Auger Dry Core

NP = Non-plastic NR = No Recovery NA = Not applicable

I.D. = inner diameter RM = River Mile

O.D. = outer diameter

G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River

DATE: 9/14/2010

DRILL HOLE MW-10-99

SHEET 2 OF 3



FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, RM 167

BEGUN: 4/1/10 FINISHED: 4/1/10

WATER LEVEL DEPTH AND ELEVATION: 7.2 ft. (El. 97.1 ft.) DATE WATER LEVEL WAS MEASURED: 4/2/2010

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,292,632.1 E 6,090,051.8 (NAGD83)

TOTAL DEPTH: 28.7 ft.

STATE: California GROUND SURFACE ELEVATION: 104.3 ft. (NAVD88)

T.O.C ELEVATION: 107.1 ft. (NAVD88)

HOLE LOGGED BY: J. Vauk REVIEWED BY: A. Warren

					LABO	ORAT	ORY	DATA	Α		% TORY CATION ALCON CATION				Ę	CLASSIFICATION AND		
NOTES	DEPTH	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION	ELEVATION	VISUAL	ELEVATION	GEOLOGIC UNIT SYMBOL	CLASSIFICATION AN PHYSICAL CONDITIC		
													,					
	-	100										83.3		83.1				
		100																
			47.8	41.6	89.4	10.6	0.0	37.6	19.4	25.0	CL		СН					
	-	-										81.0						
														80.7				
	-												_			_		
			8.3	6.8	15.1	84.9	0.0	NP	NP	16.3	SM		SM		Qal			
												79.6		79.4				
	25-												_					
		100																
	-		31.5	22.2	53.7	46.3	0.0	23.9	9.0	16.4	s(CL)		s(CL)					
													3(32)					
	_															_		
												77.1	_	76.8				
	-	100											SP/SC			_		
														75.6				
							Е	вотто	M OF I	HOLE								

COMMENTS:

REPORT: SJRRP DRILL HOLE

FADC = Flight Auger Dry Core

NP = Non-plastic NR = No Recovery

NA = Not applicable

I.D. = inner diameter

RM = River Mile

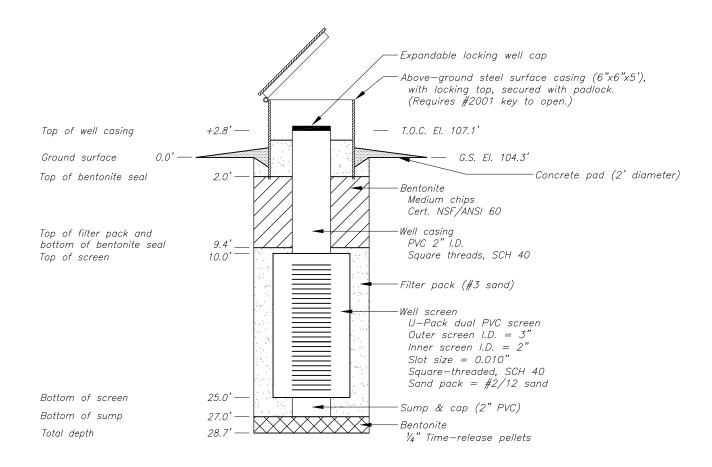
O.D. = outer diameter

G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River



MW-10-99	GEOLOGIST: J. VAUK
WELL COMPLETION DIAGRAM	DRILLER: G. HANSEN
DATE COMPLETED: 4/01/2010	HELPER: C. KELLY, K. KREITZ

TOP OF WELL CASING COORDINATES:
N2292632.1 E6090051.8 (NAD83) ELEVATION 107.1' (NAVD88)
GROUND SURFACE ELEVATION 104.3' (NAVD88)



NOT TO SCALE

NOTES:

 $T.O.C. = Top \ of \ well \ casing, \ l.D. = Inner \ Diameter, \ G.S. = Ground \ Surface, \ El. = Elevation$

FEATURE: Groundwater Monitoring LOCATION: Reach 4B1, River Bank Left, RM 167

BEGUN: 4/2/10 FINISHED: 4/2/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program COORDINATES: N 2,291,486.3 E 6,088,856.0 (NAGD83)

TOTAL DEPTH: 31.7 ft.

STATE: California GROUND SURFACE ELEVATION: 102.7 ft. (NAVD88)

T.O.C ELEVATION: 105.6 ft. (NAVD88)

HOLE LOGGED BY: J. Vauk REVIEWED BY: A. Warren

LABORATORY DATA LABORATORY CLASSIFICATION VISUAL CLASSIFICATION Ē CLASSIFICATION AND DEPTH GEOLOGIC L SYMBOL PLASTICITY INDEX % CORE RECOVERY -IQUID LIMI MOISTURE CONTENT % ELEVATION **NOTES** GRAVEL % FINES SAND % CLAY PHYSICAL CONDITION % SILT ALL MEASUREMENTS ARE IN 0.0 to 31.7 feet FEET FROM THE GROUND QUATERNARY ALLUVIUM (Qal) SURFACE. 0.0 to 5.1 ft.: SANDY LEAN CLAY, s(CL): About 55% fines with medium plasticity, low toughness, high dry strength, slow dilatancy; about 45% fine sand; maximum size: fine PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a sand; dry, dark brown, no reaction to HCl; soft 45 groundwater monitoring well. consistency. s(CL) <u>Laboratory Data Interval</u> 2.0 to 4.9 ft. LOCATION: Reach 4B1, RM 167, river left, about 3,070 feet southwest of the center of the SJR, about 1.4 miles west-southwest of the intersection of 29.2 27.2 56.4 43.6 0.0 29.7 13.7 15.4 s(CL) **5.1 to 9.2 ft.: SANDY FAT CLAY, s(CH):** About 60% fines with high plasticity and toughness, very high dry strength, no Indiana Avenue and the SJR. dilatancy; about 40% fine sand; maximum size: fine sand; moist, light orange brown, no DRILLED BY: reaction to HCI; firm consistency. PN-Regional Drill Crew 97.8 Jerry Hansen, Driller 5. 97.6 <u>Laboratory Data Interval</u> 5.3 to 9.0 ft. Cody Kelly, Helper Ken Kreitz, Helper DRILL RIG: 9.2 to 12.6 ft.: CLAYEY SAND, SC: About 55% fine sand with traces of medium sand; Central Mining Equipment 75 drill rig (CME-75) about 45% fines with low plasticity, 76 toughness, and dry strength, rapid dilatancy; maximum size: medium sand; wet, light **DRILLING & SAMPLING** 26.0 54.4 45.6 0.0 26.0 11.2 16.3 s(CL) s(CH) METHODS: brown Drill hole MW-10-100 was advanced using hollow stem flight augers with <u>Laboratory Data Interval</u> 9.5 to 12.4 ft. a continuous dry core sampling system (FADC) from the ground surface to a total depth of 31.7 feet. 12.6 to 13.0 ft.: SILT WITH SAND, (ML)s: FADC uses 7-5/8-inch O.D., 4-1/4-inch I.D. hollow stem augers, About 80% fines with low plasticity and toughness, very high dry strength, rapid 93.7 93.5 with a 5-foot-long, 3-inch I.D. split dilatancy; about 20% fine sand; maximum sample barrel. size: fine sand; wet, light orange brown, no reaction to HCI; firm consistency. 10 Qal Interval Method 0.0 to 31.7 ft. - FADC 13.0 to 14.2 ft.: No Recovery - CLAYEY SAND, SC: Description based on drilling conditions; fine grained material at 13.0 feet DRILLING CONDITIONS AND SC SM 13.2 6.5 19.7 80.3 0.0 NP NP 18.2 DRILLER'S COMMENTS: acts as a plug and SC material pushed out 0.0 to 14.2 ft. smooth drilling into formation. 14.2 to 24.2 ft. moved sampler out 76 14.2 to 16.2 ft.: POORLY GRADED SAND WITH SILT, SP/SM: About 90% fine to to 0.3 ft. 24.2 to 31.7 ft. moved sampler in 90.3 0.2 ft. medium sand; about 10% non-plastic fines 90.1 with rapid dilatancy; maximum size: medium sand; wet, light brown, no reaction to HCl; soft (ML)s **CAVING CONDITIONS:** 89.7 Soil caved from the borehole wall consistency; material is recovered disturbed from 30 8 to 31 7 ft by drilling action. SC DRILL FLUID, RETURN AND Laboratory Data Interval 14.5 to 16.0 ft. 88.5 COLOR: 0.0 to 14.2 ft. None 14.2 to 31.7 ft. Water, no return 16.2 to 19.7 ft.: CLAYEY SAND, SC: About 70% fine sand: about 30% fines with low 15 WATER LEVEL: SP/SM plasticity and toughness, medium dry SP-SM 1.0 6.5 NP NP 5.5 93.5 0.0 22.9 strength, slow dilatancy; maximum size: fine Not measured sand: moist, medium brown, no reaction to 86.7 REASON FOR HOLE HCI; firm consistency; no recovery from 16.6 86.5 TERMINATION: to 19.2 feet. The hole was terminated upon 48 PROJECT DATABASE: successful completion to the target 19.7 to 20.0 ft.: SILT, ML: About 90% non-plastic fines with rapid dilatancy; about 10% fine to medium sand; maximum size: depth. HOLE COMPLETION: medium sand; moist, brown, no reaction to Well Casing: +2.9 to 13.8 ft. (T.O.C. HCI; firm consistency. SC El. 105.6 ft.) Dual U-pack Screen: 13.8 to 28.8 ft. 20.0 to 23.4 ft.: SILTY SAND, SM: About (Slotted 0.010-inch)
Well Screen Filter Pack: 2/12 Sand 80-85% fine to medium sand with traces of coarse sand; about 15-20% non-plastic fines Filter Pack: 12.8 to 30.8 ft. (#3 with rapid dilatancy; maximum size: coarse Sand) sand; wet, brown, no reaction to HCI; soft Sump: 28.8 to 30.8 ft. (2-inch blank consistency; core loss likely. 83.0 PVC with cap) ML

COMMENTS:

S IRPP GP

REPORT:

FADC = Flight Auger Dry Core

NP = Non-plastic NR = No Recovery NA = Not applicable

I.D. = inner diameter RM = River Mile

O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing

SJR = San Joaquin River

Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, RM 167 BEGUN: 4/2/10 FINISHED: 4/2/10

WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,291,486.3 E 6,088,856.0 (NAGD83)

TOTAL DEPTH: 31.7 ft.

STATE: California

GROUND SURFACE ELEVATION: 102.7 ft. (NAVD88)

T.O.C ELEVATION: 105.6 ft. (NAVD88)

HOLE LOGGED BY: J. Vauk REVIEWED BY: A. Warren

					LABO	DRAT	ORY	DATA	Ą		≻O		N C	$\overline{}$	_	
NOTES	рертн	% CORE RECOVERY	 -	}	ES	9	GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION	ELEVATION	VISUAL	ELEVATION	GEOLOGIC UNIT SYMBOL	CLASSIFICATION AND PHYSICAL CONDITION
		RECC	% SILT	% CLAY	% FINES	% SAND	% GR	LIQUI	PLAS	MOIS	CLAS	ELEV.	CLA8	ELEV,	GEOL	
Bottom Backfill: 30.8 to 31.7 ft. (soil caved from borehole wall) Bentonite Seal: 2.0 to 12.8 ft.																Laboratory Data Interval 20.2 to 23.2 ft.
Well Completion: Steel surface casing with locking top, square 6-inches-wide and 5-foot-long.	- -	60	10.8	4.2	15.0	84.5	0.5	NP	NP	18.9	SM		SM			 23.4 to 24.2 ft.: <u>SANDY SILT, s(ML</u>): About 55% non-plastic fines with rapid dilatancy; about 45% fine sand; maximum size: fine sand; wet, light brown, no reaction to HCl; soft to firm consistency.
	_	_										79.5		79.3		24.2 to 29.7 ft.: SILTY SAND. SM: About 85% fine sand; about 15% non-plastic fines with rapid dilatancy; maximum size: fine sand; wet, light brown, no reaction to HCl; soft
	_												s(ML)	78.5		consistency. — <u>Laboratory Data Interval</u> 24.5 to 29.5 ft.
	25—															29.7 to 31.7 ft.: SILT WITH SAND, (ML)s: — About 80% non-plastic fines with rapid
	20														Qal	dilatancy; about 20% fine sand; maximum size: fine sand; wet, light brown, no reaction to HCl; soft consistency.
	_	42														T.D. = 31.7 ft.
	-	_	15.2	6.2	21.4	77.3	1.3	NP	NP	18.6	SM		SM			_
	_	-														-
	_															_
	30-											73.2		73.0		_
	30-	100											(ML)s			_
									M OF I					71.0		_

COMMENTS:

PROJECT DATABASE: SJRRP.GPJ

REPORT: SJRRP DRILL HOLE

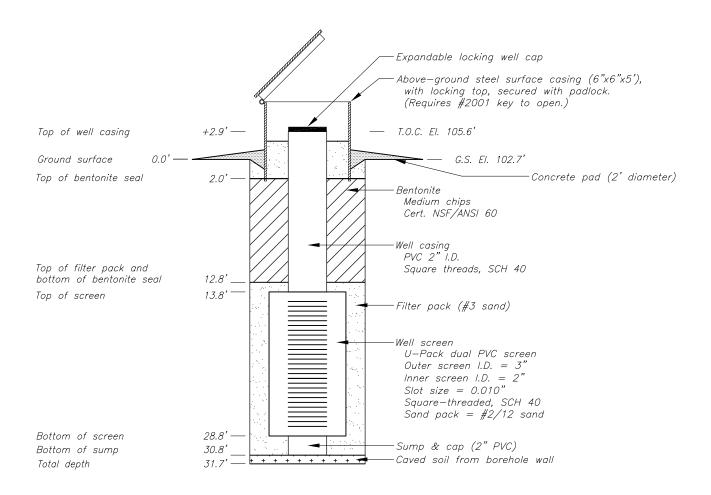
FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery

NR = No Recovery NA = Not applicable I.D. = inner diameter RM = River Mile O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River



MW-10-100	GEOLOGIST: J. VAUK
WELL COMPLETION DIAGRAM	DRILLER: G. HANSEN
DATE COMPLETED: 4/02/2010	HELPER: C. KELLY, K. KREITZ

TOP OF WELL CASING COORDINATES:
N2291486.3 E6088856.0 (NAD83) ELEVATION 105.6' (NAVD88)
GROUND SURFACE ELEVATION 102.7' (NAVD88)



NOT TO SCALE

NOTES:

T.O.C. = Top of well casing, I.D. = Inner Diameter, G.S. = Ground Surface, El. = Elevation

FEATURE: Groundwater Monitoring LOCATION: Reach 4B1, River Bank Right BEGUN: 4/27/10 FINISHED: 4/27/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program COORDINATES: N 2,313,919.5 E 6,070,042.5 (NAGD83)

TOTAL DEPTH: 31.1 ft.

STATE: California

GROUND SURFACE ELEVATION: 95.7 ft. (NAVD88) T.O.C ELEVATION: 98.4 ft. (NAVD88)

HOLE LOGGED BY: J. Vauk REVIEWED BY: A. Warren

					LABO	ORAT	ORY	DATA	١		≻Ö		NO /	L	
NOTES	DEРТН	≿					日	IMIT	<u></u>	% ⊓%	SATOR FICATI	/ 8	SUAL FICATI	SOL SOL	CLASSIFICATION AND
Notes	DE	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION	ELEVATION	VISUAL CLASSIFICATION ELEVATION	GEOLOGIC UNIT SYMBOL	PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.											ĺ		,		0.0 to 31.1 feet QUATERNARY ALLUVIUM (Qal)
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	_	74													 0.0 to 5.3 ft.: LEAN CLAY WITH SAND, (CL)s: About 85% fines with medium plasticity and toughness, very high dry strength, no dilatancy; about 15% fine sand; maximum size: fine sand; moist, dark brown, no to low reaction to HCl; soft consistency; organics present.
LOCATION: Reach 4B1, river right, about 1.4 miles north from the center of the SJR, just south of Sand Slough	_		33.0	36.5	69.5	30.5	0.0	34.9	17.3	21.7	s(CL)		(CL)s		Laboratory Data Interval 1.0 to 5.3 ft.
Road. DRILLED BY: PN-Regional Drill Crew Jerry Hansen, Driller Cody Kelly, Helper	5—											90.4	90.4		 5.3 to 8.4 ft.: SANDY LEAN CLAY, s(CL): About 70% fines with medium plasticity, low toughness, high dry strength, no dilatancy; about 30% fine sand; maximum size: fine sand; wet, brown, no to low reaction to HCl; soft consistency.
Ken Kreitz, Helper DRILL RIG: Central Mining Equipment 75 drill rig															<u>Laboratory Data Interval</u> 5.3 to 8.4 ft.
(CME-75) DRILLING & SAMPLING METHODS: Drill hole MW-10-102 was advanced using hollow stem flight augers with a continuous dry core sampling	_	100	56.9	21.2	78.1	21.9	0.0	29.4	9.3	20.9	(CL)s		s(CL)		8.4 to 10.9 ft.: LEAN CLAY WITH SAND, (CL)s: About 80% fines with medium plasticity, low toughness, very high dry — strength, no dilatancy; about 20% fine sand; maximum size: fine sand; moist, brown, no reaction to HCl; soft consistency.
system (FADC) from the ground surface to a total depth of 31.1 feet.												87.3	87.3		Laboratory Data Interval 8.4 to 10.9 ft.
FADC uses 7-5/8-inch O.D., 4-1/4-inch I.D. hollow stem augers, with a 5-foot-long, 3-inch I.D. split sample barrel.	10-		48.9	20.1	69.0	31.0	0.0	27.4	7.4	20.2	s(CL)		(CL)s	Qal	10.9 to 11.1 ft.: <u>SILTY SAND, SM</u> : About 60% fine sand; about 40% fines with low plasticity, toughness and dry strength, rapid dilatancy; maximum size: fine sand; wet, light brownish gray, no reaction to HCl; soft
0.0 to 31.1 ft FADC DRILLING CONDITIONS AND															consistency. 11.1 to 11.7 ft.: SILT WITH SAND, (ML)s:
DRILLER'S COMMENTS: 0.0 to 18.6 ft. smooth drilling, soft; wet at 11.7 ft. 18.6 to 31.1 ft. firm	-	92										84.8	84.8 SM 84.6 (ML)s 84.0		About 75% fines with low plasticity, toughness and dry strength, rapid dilatancy; about 25% fine sand; maximum size: fine sand; moist, brown, no reaction to HCl; soft consistency.
CAVING CONDITIONS: None DRILL FLUID, RETURN AND COLOR: 0.0 to 13.6 ft. None	_														11.7 to 18.5 ft.: POORLY GRADED SAND WITH SILT, SP/SM: About 90% fine to medium sand; about 10% non-plastic fines with rapid dilatancy; maximum size: medium sand; wet, brown with orange brown layers, no reaction to HCl; soft consistency.
13.6 to 31.1 ft. Water, no return WATER LEVEL:	_														 <u>Laboratory Data Interval</u> 11.7 to 18.5 ft.
REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth.	15—		6.3	1.6	7.9	92.1	0.0	NP	NP	25.4	SP-SM		SP/SM		18.5 to 19.2 ft.: LEAN CLAY WITH SAND, (CL)s: About 80% fines with high plasticity, medium toughness, high dry strength, no dilatancy; about 20% fine to medium sand; maximum size: medium sand; wet, brown.
HOLE COMPLETION: Well Casing: +2.7 to 14.1 ft. (T.O.C. El. 98.4 ft.) Dual U-pack Screen: 14.1 to 29.1 ft. (Slotted 0.010-inch)	_	66													Laboratory Data Interval 18.5 to 19.2 ft. 19.2 to 21.6 ft.: POORLY GRADED SAND, SP: About 95% fine to medium sand; about 5% non-plastic fines; maximum size: medium sand; wet, brown, no reaction to HCl; firm
Filter Pack: 2/12 Sand Filter Pack: 12.0 to 31.1 ft. (#3 Sand) Sump: 29.1 to 31.1 ft. (2-inch blank												77.2	77.2		 consistency; core loss likely. <u>Laboratory Data Interval</u>
PVC with cap) Bentonite Seal: 2.0 to 12.0 ft. Well Completion: Steel surface casing with locking top, square	-		41.0	34.2	75.2	24.8	0.0	35.8	18.4	21.8	(CL)s	76.5	(CL)s 76.5		19.2 to 21.6 ft.
FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter RM = River Mile		O.D. : G.S. : b.g.s. T.O.C SJR =	= Gro = Bel :. = To	und so low th op of v Joaqo	urface e grou vell ca uin Riv	und su asing	-	QHEE:	Т 1 С	p	Completi provided	on Dia	agram. Well dev	elopmo	ed in attached Well ent information is Development form. RECLAMATION Managing Water in the West

FEATURE: Groundwater Monitoring
LOCATION: Reach 4B1, River Bank Right
BEGUN: 4/27/10 FINISHED: 4/27/10
WATER LEVEL DEPTH AND ELEVATION: NA
DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,313,919.5 E 6,070,042.5 (NAGD83)

TOTAL DEPTH: 31.1 ft.

T.O.C ELEVATION: 98.4 ft. (NAVD88)

STATE: California

GROUND SURFACE ELEVATION: 95.7 ft. (NAVD88)

HOLE LOGGED BY: J. Vauk REVIEWED BY: A. Warren

					LABO	DRAT	ORY	DATA	١		≿Ö		Z O		L	
NOTES	DEРТН	E RY					ቯ	TIMI	Σ	RE AT %	RATOR	/ NO	SUAL FICATI	/ ₈	SIC UN BOL	CLASSIFICATION AND
	_ B	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY	ELEVATION	VISUAL	ELEVATION	GEOLOGIC UNIT SYMBOL	PHYSICAL CONDITION
	_	66	5.7	2.3	8.0	92.0	0.0	NP	NP	17.0	SP-SM	74.1	SP	74.1	9	21.6 to 23.6 ft.: SILTY SAND, SM: About 70% fine to medium sand; about 30% non-plastic fines with rapid dilatancy; maximum size: medium sand; wet, brown, no reaction to HCl; soft consistency; 0.1 ft. zones with (CL/ML)s.
	_	-											SM	72.1		23.6 to 28.3 ft.: POORLY GRADED SAND WITH SILT, SP/SM: About 90% fine to medium sand; about 10% non-plastic fines; maximum size: medium sand; wet, brown, no reaction to HCl; soft consistency; small zones of SM.
	25—													72.1	Qal	Laboratory Data Interval 23.6 to 28.3 ft. 28.3 to 28.6 ft.: SANDY LEAN CLAY, s(CL): About 60% fines with no to low plasticity, low toughness and dry strength; about 40% fine sand; maximum size: fine sand; moist, light brown, no reaction to HCI.
	_ _	32	11.5	3.9	15.4	84.6	0.0	NP	NP	21.9	SM		SP/SM			28.6 to 31.1 ft.: POORLY GRADED SAND WITH SILT, SP/SM: About 90% fine to medium sand; about 10% non-plastic fines; maximum size: medium sand; wet, brown, no reaction to HCl; soft consistency. T.D.= 31.1 ft.
												67.4	s(CL)	67.4 67.1		
	30-	44											SP/SM			- -
	_	-					В	вотто	M OF H	HOLE				64.6		<u>=</u>

COMMENTS:

PROJECT DATABASE: SJRRP.GPJ

REPORT: SJRRP DRILL HOLE

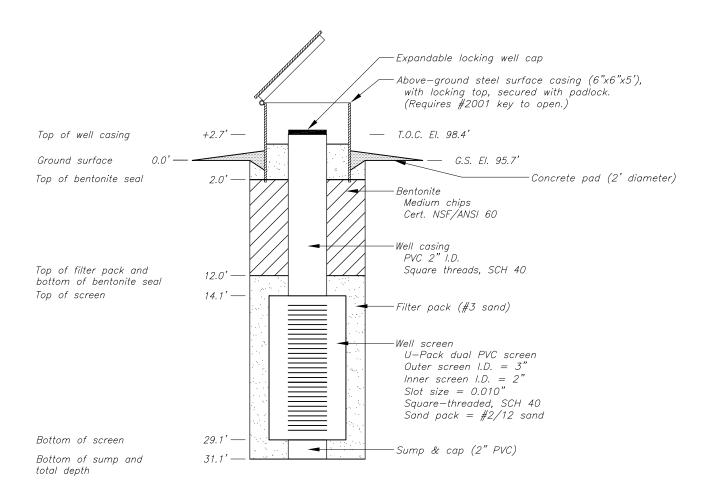
FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable

I.D. = inner diameter RM = River Mile O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River



MW-10-102	GEOLOGIST: J. VAUK
WELL COMPLETION DIAGRAM	DRILLER: G. HANSEN
DATE COMPLETED: 4/27/2010	HELPER: C. KELLY, K. KREITZ

TOP OF WELL CASING COORDINATES:
N2313919.5 E6070042.5 (NAD83) ELEVATION 98.4' (NAVD88)
GROUND SURFACE ELEVATION 95.7' (NAVD88)



NOT TO SCALE

NOTES:

 $T.O.C. = Top \ of \ well \ casing, \ l.D. = Inner \ Diameter, \ G.S. = Ground \ Surface, \ El. = Elevation$

FEATURE: Groundwater Monitoring LOCATION: Reach 4B1. River Right BEGUN: 4/19/10 FINISHED: 4/19/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program COORDINATES: N 2,308,736.0 E 6,070,617.2 (NAGD83)

TOTAL DEPTH: 41.3 ft.

STATE: California GROUND SURFACE ELEVATION: 99.1 ft. (NAVD88)

T.O.C ELEVATION: 101.6 ft. (NAVD88) HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

LABORATORY DATA LABORATORY CLASSIFICATION VISUAL CLASSIFICATION Ē CLASSIFICATION AND DEPTH GEOLOGIC L SYMBOL PLASTICITY INDEX % CORE RECOVERY -IQUID LIMI MOISTURE CONTENT % ELEVATION **NOTES** GRAVEL % FINES SAND % CLAY PHYSICAL CONDITION % SILT % % ALL MEASUREMENTS ARE IN 0.0 to 41.3 feet FEET FROM THE GROUND QUATERNARY ALLUVIUM (Qal) SURFACE. 0.0 to 4.2 ft.: SILTY SAND WITH ORGANIC PURPOSE OF HOLE: FINES, SM: About 70% fine sand; about 30% fines and organics; maximum size: fine sand; dry to moist, dark brown; highly To recover core, collect data to determine geologic and hydrologic site conditions, and install a disturbed; several layers of dark brown CH groundwater monitoring well. from 2 0 to 4 2 ft 55 **4.2 to 6.6 ft.: SILTY SAND, SM:** About 65% fine sand; about 35% non-plastic fines; maximum size: fine sand; moist, olive brown LOCATION: SM Reach 4B1, river right, about 1,300 feet north from the center of the SJR, just north of Chamberlain with reddish brown oxidation streaks; moderately soft consistency. Lane. 6.6 to 7.6 ft.: <u>LEAN CLAY WITH SAND</u>, (<u>CL)s:</u> About 80% fines with medium plasticity; about 20% fine sand; maximum DRILLED BY: PN-Regional Drill Crew Jerry Hansen, Driller Cody Kelly, Helper size: fine sand; moist, olive brown; moderately Ken Kreitz, Helper firm consistency. 94.9 DRILL RIG: aboratory Data Interval Central Mining Equipment 75 drill rig 6.6 to 7.6 ft. 7.6 to 8.5 ft.: SILTY SAND, SM: About **DRILLING & SAMPLING** 65% fine sand; about 35% non-plastic fines; maximum size: fine sand; moist, olive brown METHODS: SM Drill hole MW-10-103 was advanced with reddish brown oxidation streaks; using hollow stem flight augers with moderately soft consistency a continuous dry core sampling system (FADC) from the ground surface to a total depth of 41.3 feet. 8.5 to 10.0 ft.: SILTY SAND, SM: About 75% fine sand; about 25% non-plastic fines; 86 FADC uses 7-5/8-inch O.D., maximum size: fine sand; moist to wet, olive 92.5 4-1/4-inch I.D. hollow stem augers brown with reddish brown oxidation; with a 5-foot-long, 3-inch I.D. split moderately soft consistency; wet and sample barrel. saturated where disturbed by drilling action. 21.8 80.5 19.5 0.0 27.9 22.5 (CL)s (CL)s <u>Laboratory Data Interval</u> 9.0 to 10.0 ft. Interval Method 0.0 to 41.3 ft. - FADC Qal 91.5 10.0 to 11.1 ft.: <u>SILTY CLAY WITH SAND</u>, (CL/ML)s: About 85% fines with medium plasticity; about 15% fine sand; maximum size: fine sand; moist, olive brown; moderately DRILLING CONDITIONS AND SM DRILLER'S COMMENTS: 0.0 to 23.8 ft. smooth drilling, soft 23.8 to 33.8 ft. firm 90.6 33.8 to 41.3 ft. firm firm consistency. **CAVING CONDITIONS:** Laboratory Data Interval SM Soil caved from the borehole wall 10.0 to 11.0 ft. 27.0 CL-ML 21.5 90.9 0.0 27.1 from 40.8 to 41.3 ft. 694 9.1 6.9 11.1 to 13.1 ft.: POORLY GRADED SAND WITH SILT, SP/SM: About 90% fine sand; about 10% non-plastic fines; maximum size: DRILL FLUID, RETURN AND 89.1 89.1 10 COLOR: 0.0 to 18.8 ft. None fine sand; moist to wet, olive brown with 18.8 to 41.3 ft. Water, no return reddish brown oxidation; soft consistency. 42.2 47.1 89.3 10.7 0.0 33.7 14.4 24.6 CL-ML (CL/ML)s WATER LEVEL: 13.1 to 14.5 ft.: SILTY SAND, SM: About 88.1 85% fine sand; about 15% non-plastic fines; Not measured 88.0 maximum size: fine sand: moist to wet, olive 80 REASON FOR HOLE brown with reddish brown oxidation; TERMINATION: moderately soft consistency; wet and The hole was terminated upon saturated where disturbed by drilling action. successful completion to the target SP/SM 14.5 to 28.0 ft.: POORLY GRADED SAND, SP: About 100% fine to medium sand; trace depth. HOLE COMPLETION: of non-plastic fines; wet, brownish gray; soft Well Casing: +2.5 to 18.8 ft. (T.O.C. El. 101.6 ft.) consistency, homogenous; no recovery from 18.8 to 23.8 ft. 86.0 Dual U-pack Screen: 18.8 to 38.8 ft. (Slotted 0.010-inch)
Well Screen Filter Pack: 2/12 Sand aboratory Data Interval 15.0 to 16.0 ft. Filter Pack: 18.2 to 40.8 ft. (#3 Sand) SM Sump: 38.8 to 40.8 ft. (2-inch blank 28.0 to 28.6 ft.: POORLY GRADED SAND WITH SILT, SP/SM: About 90% fine sand; PVC with cap) about 10% non-plastic fines; maximum size: fine sand; moist, olive brown to reddish Bottom Backfill: 40.8 to 41.3 ft. (Soil 62 84.6 caved from the borehole wall) Bentonite Seal: 2.0 to 18.2 ft. brown; firm consistency SP Well Completion: Steel surface COMMENTS:

DATABASE

PROJECT

SIRRP

REPORT:

FADC = Flight Auger Dry Core

NP = Non-plastic NR = No Recovery NA = Not applicable

I.D. = inner diameter RM = River Mile

O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing

SJR = San Joaquin River

Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.

FEATURE: Groundwater Monitoring LOCATION: Reach 4B1, River Right BEGUN: 4/19/10 FINISHED: 4/19/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,308,736.0 E 6,070,617.2 (NAGD83) TOTAL DEPTH: 41.3 ft.

STATE: California

GROUND SURFACE ELEVATION: 99.1 ft. (NAVD88) T.O.C ELEVATION: 101.6 ft. (NAVD88)

HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

			LABORATORY DATA								Z N O S S S	NO /	<u></u>	
NOTES	DEPTH	čE ERY			ω		Æ	TIMIT	Σ×	JRE NT %	RATOR IFICAT	VISUAL	GIC UN	CLASSIFICATION AND
	۵	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	LABORATORY CLASSIFICATION ELEVATION	VISUAL CLASSIFICA ELEVATION	GEOLOGIC UNIT SYMBOL	PHYSICAL CONDITION
casing with locking top, square 6-inches-wide and 5-foot-long.			3.0	2.3	5.3	94.7	0.0	NP	NP	22.3				28.6 to 28.8 ft.: POORLY GRADED SAND, SP: About 95% fine sand; about 5% non-plastic fines; maximum size: fine sand; wet, gray; soft consistency.
	-	62									83.1			28.8 to 34.1 ft.: SILTY SAND, SM: About 85% fine to medium sand; about 15% non-plastic fines; maximum size: fine sand; wet, gray; moderately soft consistency; layer of fine and medium sand with approximately 1.0 ft. intervals.
														<u>Laboratory Data Interval</u> 29.0 to 30.0 ft.
	_													 34.1 to 37.8 ft.: FAT CLAY, CH: About 95% fines with high plasticity and toughness, no dilatancy; about 5% fine sand; maximum siz fine sand; moist, brown and olive gray mottled; very firm consistency; trace of charcoal fragments and ash tuff from 36.8 to 37.8 ft.
														<u>Laboratory Data Interval</u> 35.0 to 36.0 ft.
	20-													37.8 to 38.7 ft.: <u>CLAYEY SAND, SC</u> : About 55% fine sand; about 45% fines with high plasticity; maximum size: fine sand; moist, brown with green; very firm consistency; traccharcoal fragments.
	_	6										SP		 38.7 to 41.3 ft.: LEAN CLAY, CL: About 90% fines with medium plasticity and toughness, slow to no dilatancy; about 10% fine sand; maximum size: fine sand; moist, olive brown with reddish brown; moderately firm consistency; silty, homogenous.
	_												Qal	Laboratory Data Interval 38.8 to 39.8 ft.
														T.D.= 41.3 ft.
	-													_
	25-													_
	_													_
		40												
	-	-												
												71.1		
												SP/SM 70.5		
	-											SP 70.3		
		38	14.5	6.6	21.1	78.9	0.0	NP	NP	22.2		SM		
COMMENTS: FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter	1	O.D.: G.S.: b.g.s. T.O.C SJR:	= Gro = Bel C. = To	und so low th op of v	urface e grou well ca	und su asing	rface				Completion D	iagram. Well dev	elopm	ed in attached Well ent information is Development form.
RM = River Mile			Г	DΔ	TE: 0/	15/201	<u>.</u> Т	SHEE	T 2 ()F 3	DRILL HOL	E MW-10-103		RECLAMATION Managing Water in the Wes



FEATURE: Groundwater Monitoring LOCATION: Reach 4B1, River Right BEGUN: 4/19/10 FINISHED: 4/19/10 WATER LEVEL DEPTH AND ELEVATION: NA

DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program COORDINATES: N 2,308,736.0 E 6,070,617.2 (NAGD83)

TOTAL DEPTH: 41.3 ft.

STATE: California GROUND SURFACE ELEVATION: 99.1 ft. (NAVD88)

T.O.C ELEVATION: 101.6 ft. (NAVD88) HOLE LOGGED BY: A. Warren REVIEWED BY: J. Vauk

LABORATORY DATA VISUAL CLASSIFICATION LABORATORY CLASSIFICATION Ę **CLASSIFICATION AND** MOISTURE CONTENT % DEPTH LIQUID LIMIT PLASTICITY INDEX GEOLOGIC U SYMBOL % CORE RECOVERY ELEVATION **NOTES** ELEVATION % GRAVEL % FINES PHYSICAL CONDITION % CLAY % SAND % SILT 38 SM 65.0 35 21.4 CH 35.5 53.6 89.1 10.9 0.0 50.3 35.0 Qal 63.1 СН 100 61.3 SC 60.4 56.5 41.7 98.2 1.8 0.0 54.8 33.9 30.8 СН 59.3 CL 40-100 BOTTOM OF HOLE

COMMENTS:

PROJECT DATABASE: SJRRP.GPJ

REPORT: SJRRP DRILL HOLE

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery

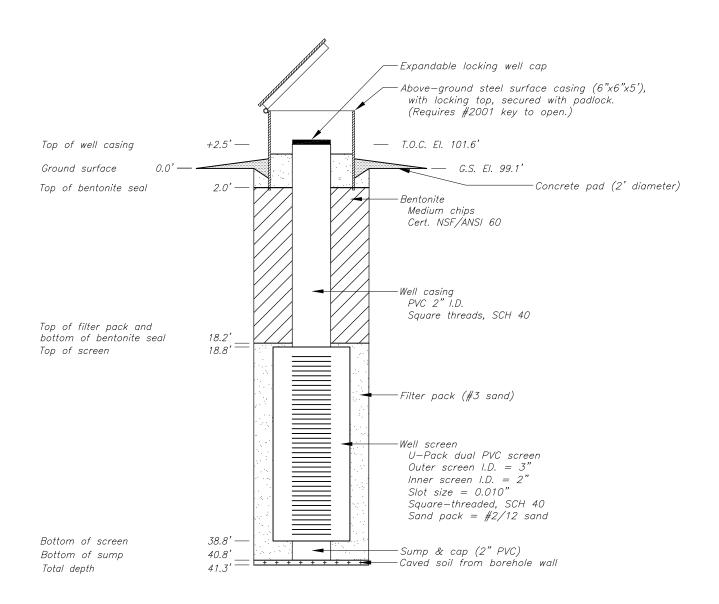
NA = Not applicable I.D. = inner diameter RM = River Mile

O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River



MW-10-103	GEOLOGIST: A. WARREN									
WELL COMPLETION DIAGRAM	DRILLER: G. HANSEN									
DATE COMPLETED: 4/19/2010	HELPER: C. KELLY, K. KREITZ									

TOP OF WELL CASING COORDINATES: N2308736.0 E6070617.2 (NAD83) ELEVATION 101.6' (NAVD88) GROUND SURFACE ELEVATION 99.1' (NAVD88)



NOT TO SCALE

NOTES:

T.O.C. = Top of well casing, I.D. = Inner Diameter, G.S. = Ground Surface, El. = Elevation

FEATURE: Groundwater Monitoring LOCATION: Reach 4B1 River Bank Left BEGUN: 4/27/10 FINISHED: 4/27/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program COORDINATES: N 2,303,597.9 E 6,069,923.7 (NAGD83)

TOTAL DEPTH: 31.1 ft.

STATE: California

GROUND SURFACE ELEVATION: 96.7 ft. (NAVD88)

T.O.C ELEVATION: 99.3 ft. (NAVD88) HOLE LOGGED BY: J. Vauk REVIEWED BY: A. Warren

LABORATORY DATA LABORATORY CLASSIFICATION VISUAL CLASSIFICATION Ē MOISTURE CONTENT % CLASSIFICATION AND DEPTH GEOLOGIC U SYMBOL PLASTICITY INDEX -IQUID LIMI-% CORE RECOVERY ELEVATION **NOTES** GRAVEL % FINES SAND % CLAY PHYSICAL CONDITION % SILT % ALL MEASUREMENTS ARE IN 0.0 to 31.2 feet FEET FROM THE GROUND QUATERNARY ALLUVIUM (Qal) SURFACE. 0.0 to 2.9 ft.: CLAYEY SAND, SC: About PURPOSE OF HOLE: 80% fine sand; about 20% fines with medium SC plasticity, low toughness and dry strength, no To recover core, collect data to dilatancy; maximum size: fine sand; dry, dark brown, strong reaction with HCl; soft to firm determine geologic and hydrologic site conditions, and install a 100 groundwater monitoring well. consistency; organics in top 2 feet. 2.9 to 4.0 ft.: SILTY CLAY WITH SAND, (CL/ML)s: About 75% fines with low plasticity, toughness, and dry strength, rapid LOCATION: 93.8 Reach 4B1, river left, about 185 feet south from the center of the SJR, about 1.2 miles east of intersection of Turner Island Road and the SJR. (CL/ML)s dilatancy; about 25% fine sand; maximum size: fine sand; moist, dark brown, no to weak reaction to HCI. DRILLED BY: 4.0 to 8.9 ft.: <u>LEAN CLAY WITH SAND</u>, (CL)s: About 80% fines with medium PN-Regional Drill Crew Jerry Hansen, Driller plasticity, toughness, and dry strength, no dilatancy; about 20% fine sand; maximum size: fine sand; moist, dark brown, no to weak Cody Kelly, Helper Ken Kreitz, Helper DRILL RIG: reaction to HCI. Central Mining Equipment 75 drill rig <u>Laboratory Data Interval</u> 4.0 to 8.9 ft. 32.3 41 2 73.5 26.5 0.0 40.8 26.5 18.4 (CL)s (CL)s 100 **DRILLING & SAMPLING** METHODS: 8.9 to 11.2 ft.: SANDY LEAN CLAY, s(CL): Drill hole MW-10-105 was advanced About 55% fines with medium plasticity, toughness, and dry strength, no dilatancy; using hollow stem flight augers with a continuous dry core sampling about 45% fine to medium sand (mostly fine); system (FADC) from the ground surface to a total depth of 31.2 feet. maximum size: medium sand. FADC uses 7-5/8-inch O.D., aboratory Data Interval 87.8 87.8 4-1/4-inch I.D. hollow stem augers 8.9 to 11.2 ft. with a 5-foot-long, 3-inch I.D. split 11.2 to 11.6 ft.: CLAYEY SAND, SC: About sample barrel. 60% fine to medium sand; about 40% fines with low plasticity, medium toughness and dry strength, rapid dilatancy; maximum size: Interval Method 0.0 to 31.2 ft. - FADC 10 Qal 23.4 43.2 56.5 0.3 15.4 SC s(CL) medium sand; wet, brown. DRILLING CONDITIONS AND DRILLER'S COMMENTS:
0.0 to 13.7 ft. smooth drilling, soft
13.7 to 18.7 ft. moderately soft 11.6 to 12.9 ft.: SILTY SAND, SM: About 85.5 85.5 85% fine to medium sand; about 15% 100 non-plastic fines with rapid dilatancy; SC 85.1 18.7 to 31.2 ft. slightly firm maximum size: medium sand; wet, gray, no reaction to HCI; soft consistency. **CAVING CONDITIONS:** 2.2 7.7 92.3 0.0 SP-SM SM Soil caved from the borehole wall aboratory Data Interval 11.6 to 12.9 ft. from 28.2 to 31.2 ft. 12.9 to 14.7 ft.: POORLY GRADED SAND WITH SILT, SP/SM: About 90% fine to medium sand; about 10% non-plastic fines DRILL FLUID, RETURN AND COLOR: 0.0 to 18.8 ft. None 2.1 7.5 92.5 0.0 NP NP 26.8 SP-SM SP/SM 5.4 18.8 to 31.2 ft. Water, no return with rapid dilatancy; maximum size: medium sand; wet, gray, no reaction to HCI; soft WATER LEVEL: consistency. 82.0 82.0 Not measured SM 81.7 Laboratory Data Interval 12.9 to 14.7 ft. 15 REASON FOR HOLE TERMINATION: The hole was terminated upon **14.7 to 15.0 ft.: SILTY SAND, SM:** About 80% fine to medium sand; about 20% successful completion to the target 26 non-plastic fines; maximum size: medium sand; wet, grayish brown, no reaction to HCl; depth. HOLE COMPLETION: soft consistency. ML Well Casing: +2.6 to 14.0 ft. (T.O.C. El. 99.3 ft.) 15.0 to 18.7 ft.: No Recovery - SILT, ML: Description based on drilling conditions. Dual U-pack Screen: 14.0 to 29.0 ft. (Slotted 0.010-inch)
Well Screen Filter Pack: 2/12 Sand 18.7 to 21.3 ft.: POORLY GRADED SAND WITH SILT, SP/SM: About 90% fine to Filter Pack: 12.2 to 28.2 ft. (#3 medium sand; about 10% non-plastic fines; maximum size: medium sand; wet, gray, no Sand) 78.0 Sump: 29.0 to 31.0 ft. (2-inch blank reaction to HCI; soft consistency. PVC with cap) Bottom Backfill: 28.2 to 31.2 ft. (Soil Laboratory Data Interval 18.7 to 21.3 ft. caved from the borehole wall) Bentonite Seal: 2.0 to 14.0 ft. COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic

NR = No Recovery

DATABASE

PROJECT

SIRRP

REPORT:

NA = Not applicable I.D. = inner diameter RM = River Mile

O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing

SJR = San Joaquin River

Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.

FEATURE: Groundwater Monitoring LOCATION: Reach 4B1. River Bank Left BEGUN: 4/27/10 FINISHED: 4/27/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,303,597.9 E 6,069,923.7 (NAGD83)

TOTAL DEPTH: 31.1 ft.

STATE: California GROUND SURFACE ELEVATION: 96.7 ft. (NAVD88)

T.O.C ELEVATION: 99.3 ft. (NAVD88)

HOLE LOGGED BY: J. Vauk REVIEWED BY: A. Warren

			LABORATORY DATA									7	Z O		Ŀ	
NOTES	рертн	≿						μ	≽	# % 1	LABORATORY CLASSIFICATION	/ 8	VISUAL	/ 8	GEOLOGIC UNIT SYMBOL	CLASSIFICATION AND
NOTES	DEI	% CORE RECOVERY	% SILT	% CLAY	% FINES	SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	ABOR ASSIF	ELEVATION	VIS ASSIF	ELEVATION	OLOG SYME	PHYSICAL CONDITION
		%Ä	%	%	%	%	%	9	7=	98	그러 /	<u> </u>	ਰ/	==	GE	
Well Completion: Steel surface casing with locking top, square 6-inches-wide and 5-foot-long.	_	68	5.2	1.7	6.9	91.5	1.6	NP	NP	22.2	SP-SM	75.4	SP/SM	75.4		21.3 to 21.4 ft.: SILT WITH SAND, (ML)s: About 85% non-plastic fines with rapid dilatancy; about 15% fine sand; maximum size: fine sand; wet, gray, no reaction to HCl
												70.4	(ML)s	75.3		21.4 to 28.6 ft.: POORLY GRADED SAND WITH SILT, SP/SM: About 90% fine to
	-		10.7	3.6 14.3 85	85.7	5.7 0.0	NP	NP	19.2	SM					medium sand; about 10% non-plastic fines; maximum size: medium sand; wet, gray; no reaction to HCl; soft consistency.	
	-											73.0				- <u>Laboratory Data Interval</u> 21.4 to 23.7 ft. 23.7 to 28.6 ft.
	-															28.6 to 28.7 ft.: <u>SILTY SAND, SM</u> : About 70% fine to medium sand; about 30% non-plastic fines with rapid dilatancy;
	25—												SP/SM			maximum size: medium sand; wet, gray, no reaction to HCl; soft consistency.
	_	42	8.0	1.6	9.6	88.7	1.7	NP	NP	18.6	SP-SM				Qal	28.7 to 31.2 ft.: No Recovery - POORLY GRADED SAND WITH SILT, SP/SM: Description based on drilling conditions.
	_															T.D.= 31.2 ft.
	-											68.1		68.1		_
	-												SM	68.0		_
	30-	0											SP/SM			-
		1					В	OTTO	M OF I	HOLE	1			65.5		=

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery

NA = Not applicable I.D. = inner diameter RM = River Mile

O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River

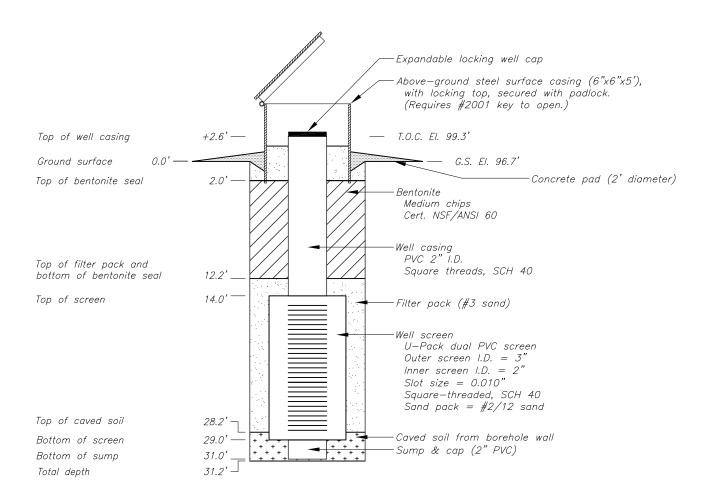
Well completion information is provided in attached Well Completion Diagram. Well development information is provided in attached Monitoring Well Development form.



PROJECT DATABASE: SJRRP.GPJ

MW-10-105	GEOLOGIST: J. VAUK							
WELL COMPLETION DIAGRAM	DRILLER: G. HANSEN							
DATE COMPLETED: 4/30/2010	HELPER: C. KELLY, K. KREITZ							

TOP OF WELL CASING COORDINATES:
N2303597.9 E6069923.7 (NAD83) ELEVATION 99.3' (NAVD88)
GROUND SURFACE ELEVATION 96.7' (NAVD88)



NOT TO SCALE

NOTES:

T.O.C. = Top of well casing, I.D. = Inner Diameter, G.S. = Ground Surface, El. = Elevation

FEATURE: Groundwater Monitoring LOCATION: Reach 4B1, River Bank Left BEGUN: 4/29/10 FINISHED: 4/29/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program COORDINATES: N 2,298,351.8 E 6,064,543.0 (NAGD83)

TOTAL DEPTH: 31.4 ft.

GROUND SURFACE ELEVATION: 96.0 ft. (NAVD88)

T.O.C ELEVATION: 98.9 ft. (NAVD88)

HOLE LOGGED BY: J. Vauk REVIEWED BY: A. Warren

STATE: California

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					LABO	DRAT	ORY	Y DATA			78 NON NON		NOL /	Ę	01.4001510.4510.4.4115
NOTES	DEPTH	ER Y	 		_		% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT %	RATO	ELEVATION	SUAL		CLASSIFICATION AND
	ğ	% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND					LABORATORY CLASSIFICATION		VISUAL	GEOLOGIC UNIT	PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.															0.0 to 31.4 feet QUATERNARY ALLUVIUM (Qal)
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	_	50													O.0 to 5.9 ft.: SANDY LEAN CLAY, s(CL): About 55% fines with medium plasticity and toughness, high dry strength, rapid dilatancy; about 45% fine sand; maximum size: fine sand; dry, dark brown, strong reaction to HCl; soft consistency; organics.
LOCATION: Reach 4B1, river left, about 1.1	_												s(CL)		Laboratory Data Interval 1.0 to 5.9 ft.
miles south from the center of the SJR, about 165 feet east of the intersection of Turner Island Road and Palazzo Road. DRILLED BY:	_	-	26.1	25.2	51.3	48.7	0.0	27.4	11.2	10.9	s(CL)				5.9 to 10.2 ft.: SANDY LEAN CLAY, s(CL): About 50% fines with medium plasticity and toughness, high dry strength, rapid dilatancy; about 50% fine sand; maximum size: fine sand; medium brown, no reaction to HCl; firm
PN-Regional Drill Crew Jerry Hansen, Driller Cody Kelly, Helper	5—														consistency. Laboratory Data Interval
Ken Kreitz, Helper	_											90.1	90.1		5.9 to 10.2 ft.
DRILL RIG: Central Mining Equipment 75 drill rig (CME-75) DRILLING & SAMPLING		91													10.2 to 13.2 ft.: CLAYEY SAND, SC: About 55-65% fine sand; about 35-45% fines with low plasticity, toughness, and dry strength, rapid dilatancy; maximum size: fine sand;
METHODS: Drill hole MW-10-107 was advanced using hollow stem flight augers with	_														 moist, medium brown, no reaction to HCl; frim consistency; greater percentage of sand with depth.
a continuous dry core sampling system (FADC) from the ground surface to a total depth of 31.4 feet.			31.8	23.6	55.4	44.2	0.4	29.0	11.5	16.1	s(CL)		s(CL)		Laboratory Data Interval 10.2 to 13.2 ft.
FADC uses 7-5/8-inch O.D., 4-1/4-inch I.D. hollow stem augers, with a 5-foot-long, 3-inch I.D. split sample barrel.	_														13.2 to 14.3 ft.: POORLY GRADED SAND WITH SILT, SP/SM: About 90% fine to medium sand; about 10% non-plastic fines; maximum size: medium sand; moist, grayish brown, no reaction to HCI; soft consistency.
Interval Method 0.0 to 31.4 ft FADC	10-											85.8	85.8	Qal	Laboratory Data Interval 13.2 to 14.3 ft.
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 13.9 ft. smooth drilling, soft 13.9 to 31.4 ft. moderately soft, wet at 13.9 feet	_	100	25.6	13.6	39.2	60.5	0.3	25.1	5.8	23.1	SC-SM	I	SC		14.3 to 14.5 ft.: SILT, ML: About 90% fines with no to low plasticity, toughness, and dry strength, slow dilatancy; about 10% fine sand; maximum size: fine sand; moist, gray, no reaction to HCI; soft consistency.
CAVING CONDITIONS: Soil caved from the borehole wall from 30.5 to 31.4 ft.	_											82.8	82.8		14.5 to 14.9 ft.: SILTY SAND, SM: About 85% fine to medium sand (mostly fine); about 15% non-plastic fines; maximum size:
DRILL FLUID, RETURN AND COLOR: 0.0 to 18.9 ft. None	_		11.7	3.1	14.8	85.2	0.0	NP	NP	21.0	SM		SP/SM		medium sand; wet, brown, no reaction to HCl; soft consistency.
18.9 to 31.4 ft. Water, no return WATER LEVEL: Not measured	15—											81.7	81.7 ML 81.5 SM 81.1		14.9 to 15.2 ft.: SILT WITH SAND, (ML)s: About 75% non-plastic fines with rapid dilatancy; about 25% fine sand; maximum size: fine sand; wet, grayish light brown; soft
REASON FOR HOLE	10											ML-	(ML)s 80.8 SP/SM 80.6 SP/SM 80.3	80.5	consistency. 15.2 to 15.4 ft.: POORLY GRADED SAND
The hole was terminated upon successful completion to the target depth.	_	64									(C	:L/ML)s ⁻		80.2	WITH SILT. SP/SM: About 90% fine to medium sand; about 10% non-plastic fines; maximum size: medium sand; wet, brown, no reaction to HCI; soft consistency.
HOLE COMPLETION: Well Casing: +2.9 to 14.1 ft. (T.O.C. El. 98.9 ft.) Usual U-pack Screen: 14.1 to 29.1 ft.	_		12.8	1.1	13.9	86.1	0.0	NP	NP	24.0	SM		SM		15.4 to 15.5 ft.: SILT, ML: About 80% non-plastic fines with rapid dilatancy; about 20% fine sand; maximum size: fine sand; wet, light brown, no reaction to HCl: soft
Well Screen Filter Pack: 2/12 Sand Filter Pack: 12.5 to 30.5 ft. (#3												77.4			consistency.
Sand) Sump: 29.1 to 31.1 ft. (2-inch blank PVC with cap) Bottom Backfill: 30.5 to 31.4 ft. (soil caved from the borehole wall)	_											77.1	77.1		15.5 to 15.7 ft.: POORLY GRADED SAND WITH SILT, SP/SM: About 90% fine to medium sand; about 10% non-plastic fines; maximum size: medium sand; wet, light brown, no reaction to HCl; soft consistency.
COMMENTS:															
COMMENTS: FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter RM = River Mile		G.S.: b.g.s. T.O.0		und so low the op of v	urface e grou well ca	und su asing	ırface			(Complet	ion Dia	agram. Well de	velopn	ded in attached Well lent information is I Development form.
RM = River Mile			Γ			14/201	<u>, T</u>	SHEE	T 1 (OF ?	וואַרו	I HOLE	MW-10-107		RECLAMATION Managing Water in the West
				DΑ	1⊑. 9/	14/207	v	SHEE	1 1 (JF Z	DKIL		- 14144-10-101		

FEATURE: Groundwater Monitoring LOCATION: Reach 4B1. River Bank Left BEGUN: 4/29/10 FINISHED: 4/29/10 WATER LEVEL DEPTH AND ELEVATION: NA DATE WATER LEVEL WAS MEASURED: NA

PROJECT: San Joaquin River Restoration Program

COORDINATES: N 2,298,351.8 E 6,064,543.0 (NAGD83)

TOTAL DEPTH: 31.4 ft.

STATE: California

GROUND SURFACE ELEVATION: 96.0 ft. (NAVD88) T.O.C ELEVATION: 98.9 ft. (NAVD88)

HOLE LOGGED BY: J. Vauk REVIEWED BY: A. Warren

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	NOTES	рертн	ZE ERY			S		/EL	LIMIT	Σ×	JRE NT %	LABORATORY CLASSIFICATION	NOF	VISUAL	/ §	GEOLOGIC UNIT SYMBOL	CLASSIFICATION AND
			% CORE RECOVERY	% SILT	% CLAY	% FINES	% SAND	% GRAVEL	ЫQUID ЫМІТ	PLASTICITY INDEX	MOISTURE CONTENT %	LABC	ELEVATION	CLASS	ELEVATION	GEOLO	PHYSICAL CONDITION
	Bentonite Seal: 2.0 to 12.5 ft. Well Completion: Steel surface casing with locking top, square 6-inches-wide and 5-foot-long.	_	60	12.2	1.8	14.0	84.7	1.3	NP	NP	18.2	SM		SP/SM			15.7 to 15.8 ft.: SILTY CLAY WITH SAND, (CL/ML)s: About 85% fines with medium plasticity, low toughness and dry strength, no dilatancy; about 15% fine sand; maximum size: fine sand; wet, light brown, no reaction to HCl.
		_															 15.8 to 18.9 ft.: SILTY SAND, SM: About 85% fine to medium sand; about 15% non-plastic fines; maximum size: medium sand; wet, light brown, no reaction to HCl; soft consistency.
		_											72.1		72.1		<u>Laboratory Data Interval</u> 15.7 to 18.9 ft.
		25—	_													Qal	18.9 to 23.9 ft.: POORLY GRADED SAND WITH SILT, SP/SM: About 90% fine to medium sand; about 10% non-plastic fines with rapid dilatancy; maximum size: medium sand; wet, grayish brown, no reaction to HCl; soft consistency.
		-	60	8.4	0.9	9.3	89.1	1.6	NP	NP	15.9	SW-SN	1	SP			Laboratory Data Interval 18.9 to 23.9 ft.
		_															23.9 to 28.9 ft.: POORLY GRADED SAND, SP: About 95% fine to medium sand; about 5% non-plastic fines with rapid dilatancy; maximum size: medium sand; wet, gray, no reaction to HCl; soft consistency.
													67.1		67.1		Laboratory Data Interval 23.9 to 28.9 ft.
		-															28.9 to 31.4 ft.: <u>No Recovery</u> .
		30-	0											No Rec			T.D.= 31.4 ft. —
			1		<u> </u>	<u> </u>		В	OTTO	M OF H	HOLE				64.6		_
- 1	i																

COMMENTS:

PROJECT DATABASE: SJRRP.GPJ

REPORT: SJRRP DRILL HOLE

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable

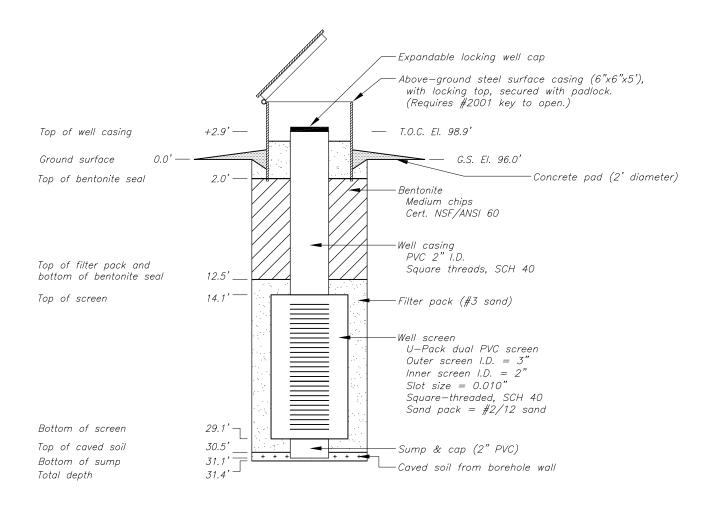
I.D. = inner diameter RM = River Mile

O.D. = outer diameter G.S. = Ground surface b.g.s. = Below the ground surface T.O.C. = Top of well casing SJR = San Joaquin River



MW-10-107	GEOLOGIST: J. VAUK
WELL COMPLETION DIAGRAM	DRILLER: G. HANSEN
DATE COMPLETED: 4/29/2010	HELPER: C. KELLY, K. KREITZ

TOP OF WELL CASING COORDINATES:
N2298351.8 E6064543.0 (NAD83) ELEVATION 98.9' (NAVD88)
GROUND SURFACE ELEVATION 96.0' (NAVD88)



NOT TO SCALE

NOTES:

T.O.C. = Top of well casing, I.D. = Inner Diameter, G.S. = Ground Surface, El. = Elevation

#3 Sand backfills the well above the top of the bentonite seal.

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, Merced County

BEGUN: 11/18/10 FINISHED: 11/18/10 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 8.26 ft. (87.6 ft. - 12/08/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,304,528.3 E 6,065,473.9 NAD83

TOTAL DEPTH: 31.3 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 95.3 ft. NADV88 ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: A. Warren REVIEWED BY: S. Dalton

ı																
					LAB	ORA	TOF	RY D	ATA	\ 	TORY	/ ₌	_	ISUAL	Λ	
	NOTES					_	딡	TIMIT	ΣĽ	쀭누	CLASSIFICATION			VISUAL CLASSIFICATION	/	CLASSIFICATION AND PHYSICAL CONDITION
		DEPTH	% CORE RECOVERY	<0.005	<0.075	SAND	GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	CLAS		SYMBOL	CLAS	/_	FITISICAL CONDITION
ł	ALL MEASUREMENTS ARE IN FEET FROM	۵	% ₹	V	V	%	%		굽	Σŏ	/ ∈	l. (όo	/	EI.	0.0 to 31.3 ft.
	THE GROUND SURFACE													s(CL)		QUATERNARY ALLUVIUM - Qal
	PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.		97												93.8	 0.0 to 1.5 ft. <u>SANDY LEAN CLAY, s(CL)</u>: About 65% fines with low plasticity; about 35% fine sand; dry, dark brown; firm; cemented.
	LOCATION: Reach 4B1, River Bank Left, Merced County, on farm road 1.500 feet East of Turner Island Road.	_												SM	92.2	1.5 to 3.1 ft. SILTY SAND, SM: About 60% fine sand; about 40% non plastic fines; dry, brown; loose consistency.
	DRILLED BY:												•			3.1 to 5.6 ft. POORLY GRADED SAND WITH SILT, SP-SM:
	Bureau of Reclamation: PN-Region drill crew: Gerry Hansen, driller	-														About 85-90% fine sand; about 15-10% non plastic fines; dry to moist, tan with reddish
	Chris Peterson, helper Dennis Read, helper			3.1	25.8	71.1	0.0	NP	NP	13.1	SM 90	2		SP-SM	۱	brown oxidation; moderately soft; homogenous with few layers.
	DRILL RIG: Truck mounted Central Mining Equipment (CME) 75	5-									30	.5			89.7	Lab Data Interval 4.0 to 5.0 ft.
	DRILLING & SAMPLING METHODS:	-	69												ŀ	- 5.6 to 13.8 ft. POORLY GRADED SAND, SP:
	The drill hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers	_		1.0	5.9	93.1	0.0	NP	NP	13.8	SP-SM 88	.3				About 95-100% fine to medium sand, trace coarse, rounded, hard sand; about 5% to trace
	equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5															fines with low plasticity; moist, tan with reddish brown and gray layers; soft; micaceous and granitic; finely layered.
	feet long split barrel dry core system (FADC). Unless indicated otherwise, the FADC was	-											▾		ŀ	Note: 7.0 ft.: Wet.
	placed inside the augers and the cutting shoe of the FADC extended 0.2 foot beyond the auger											•	*			Lab Data Interval
	drill bit. A free-spinning adapter was placed at the top of the FADC, so that the FADC did not rotate while advancing the augers.	_														 6.0 to 7.0 ft. Note: 8.3 to 13.8 ft.: Gray, no oxidation.
	Interval Method	10-	-											SP	ŀ	13.8 to 18.8 ft. <u>NO RECOVERY</u>
	0.0 to 31.3 ft. FADC															18.8 to 20.8 ft. POORLY GRADED SAND, SP:
	DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 3.6 ft Moderately soft	-	32												Ì	About 95-100% fine to medium sand, trace coarse, rounded, hard sand; about 5% to trace
	18.8 to 22.4 ft Very firm DRILLING FLUID, RETURN AND COLOR:	-														fines with low plasticity; moist, tan with reddish brown and gray layers; soft; micaceous and granitic; finely layered.
	0.0 to 31.3 ft Drilled without fluid	_														Note: At contact: layer of 1 inch rounded;
	WATER LEVEL FROM TOC: 10.50 ft. on 12/08/2010														04.5	decomposed (W9) gravel; soft; gray.
	REASON FOR HOLE TERMINATION: The hole was terminated upon successful	-		-											81.5	Lab Data Interval 19.0 to 20.0 ft.
	completion to the target depth.															20.8 to 23.0 ft. POORLY GRADED SAND WITH SILT, SP-SM:
	Well Casing: +3.0 to 8.0 ft. (2-inch blank PVC)	15—													Ī	 About 90% fine to medium sand; about 10% non plastic fines; wet, gray; soft; clayey layer at 22.0 ft.
	Dual U-pack Screen: 8.0 to 23.0 ft. (2-inch inner screen; 3-inch outer screen; slotted 0.010-inch) U-Pack Screen Filter Pack: #2/12 Sand	-										ľ	Qal		-	Lab Data Interval
	Filter Pack: 7.0 to 25.0 ft. (#3 Sand) Sump: 23.0 to 25.0 ft. (2-inch blank PVC with slip		0											NR		21.0 to 22.0 ft.
19:28 PIN	cap) Bentonite Seal: 2.0 to 7.0 ft.; 25.0 to 31.3 ft. Concrete Seal: 0.0 to 2.0 ft. Well Completion: Steel surface casing with	-													ŀ	 23.0 to 24.6 ft. <u>SILTY SAND, SM</u>: About 80% fine to medium sand; about 20% fines with low plasticity; wet, blue to gray; moderately soft; layered.
4 1	locking top, 6-inch by 6-inch by 5-foot long; 2.0 ft. diameter concrete pad.	-													ŀ	24.6 to 27.8 ft. LEAN CLAY WITH SAND,
/0 5	Lock: #2001 Masterlock	_	_												76.5	(CL)s: About 75% fines with medium plasticity,
5				0.0	4.6	95.4	0.0	NP	NP	28.2	SP					medium toughness; about 25% fine sand; moist, gray/green; very firm.
٤l											75	.3		SP		

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic

NR = No Recovery NA = Not applicable I.D. = inner diameter O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, Merced County

BEGUN: 11/18/10 FINISHED: 11/18/10
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 8.26 ft. (87.6 ft. - 12/08/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,304,528.3 E 6,065,473.9 NAD83

TOTAL DEPTH: 31.3 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 95.3 ft. NADV88 ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: A. Warren REVIEWED BY: S. Dalton

SHEET 2 OF 2

				LAB	ORA	TOF	RY D	ATA	١	ORY	/_	SUAL	/	
NOTES	DEРТН	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION m	GEOLOGIC UNIT	SYMBOL VISUAL CLASSIFICATION	/ EI.	CLASSIFICATION AND PHYSICAL CONDITION
										,				Note: 24.6 to 25.2 ft.: 35% sand.
	_	67											74.5	Lab Data Interval 25.5 to 26.5 ft.
	_	-	1.5	5.1	93.4	0.0	NP	NP	27.2	SP-SM 73.	.3	SP-SI	М	27.8 to 28.8 ft. SANDY LEAN CLAY. s(CL): About 55% fines with medium plasticity; about 45% fine sand; moist, gray-green; firm.
	-	100										SM	72.3	28.8 to 30.0 ft. <u>SILT, (ML):</u> About 90-95% non plastic fines; about 10-5% fine sand; moist, olive tan; moderately firm; layered; spongey.
												Sivi	70.7	 30.0 to 31.3 ft. <u>LEAN CLAY, CL</u>: About 100% fines with medium plasticity, medium toughness; moist, olive tan; firm.
	20													
	_	100	43.4	32.0	24.6	0.0	34.7	19.3	21.5	(CL)s 68.	.8	(CL)s		-
	-												ŀ	-
	_												67.5	-
												s(CL)	66.5	
	_											s(ML)	,	_
	30-	100											65.3	_
	_											CL	64.0	-
			•	'		вот	ТОМ	OF H	OLE		•	•	22	

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable

I.D. = inner diameter

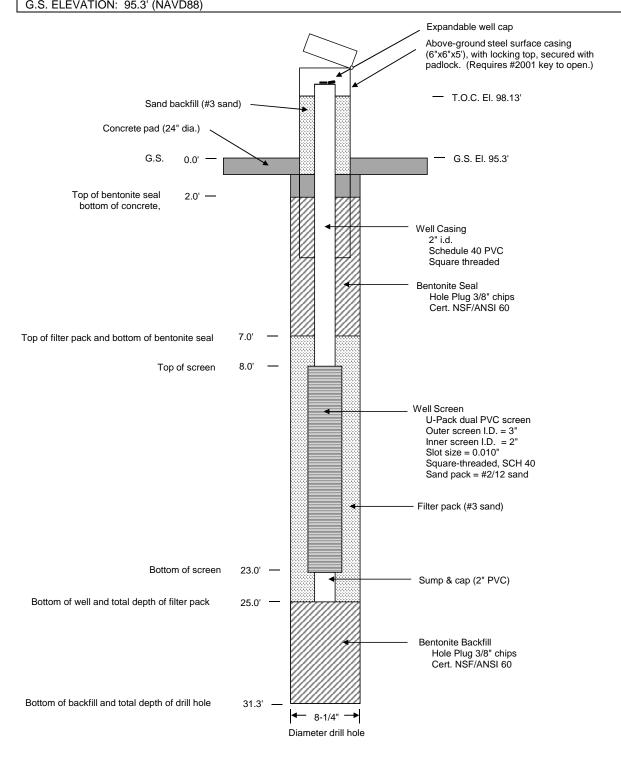
O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name Co	ounty Name	cool	Well Name MW -10-100
Facility License, Permit or Monitoring Number Co			
Faculty License, Permit or Monitoring Number	ounty Code	Wis. Unique Well Nu	Imber DNR Well ID Number
1. Can this well be purged dry? Yes	No.	11 Death to Water	Before Development After Development
2. Well development method		11. Depth to Water (from top of	a 10.56 n 10.61 n.
surged with bailer and bailed 4 1		well casing)	
surged with bailer and pumped 6 1			(2.95)
surged with block and bailed 42		Date	12.00.201012.08.20
surged with block and pumped 6 2		1	b. 2 1 0 9 1 20 1 0 1 2 1 0 8 1 20 m m d d d y y y y m m d d d y y y
surged with block, bailed and pumped 70		1	
compressed air		Time	c. 12:08 a.m. 12:35 a.m.
bailed only			
pumped only		12. Sediment in well	inchesinches
pumped slowly		bottom	
Other		13. Water clarity	Clear 20
0 -			Turbid □ 15 Turbid □ 25
3. Time spent developing well	min.		(Describe) (Describe)
4. Depth of well (from top of well casisng)			
5. Inside diameter of well	_ in.		
6. Volume of water in filter pack and well			
casing	_ gal.		
7. Volume of water removed from well		Fill in if drilling fluids	s were used and well is at solid waste facility:
7. Volume of water removed from well	_ gal.		
8. Volume of water added (if any)	_ gal.	14. Total suspended solids	mg/l
9. Source of water added		15. COD	mg/lmg/l
10. Analysis performed on water added?		16. Well developed by	2: Name (first, last) and Firm
(If yes, attach results)	□ N0	Firm:	ny Last Name: Cansen
17. Additional comments on development:			
1209-1220 - hand backer	d 500	Nan- Tuk	BID & SANDY
1222 1222	. 7		
1222-1233- pumo 29	Gallo	12	
	0		
Name and Address of Facility Contact/Owner/Responsible Pa	irty	I harabu aasifu daa	the above information in toron at a second at the second
First Last Name: Name:		of my knowledge.	the above information is true and correct to the best
Facility/Firm:		Signature:	
Street:		Print Name:	
City/State/Zip:		Firm:	

MW-10-106	GEOLOGIST: A. Warren									
WELL COMPLETION DIAGRAM	DRILLER: G. Hansen									
DATE COMPLETED: 11/18/2010	HELPERS: D. Read & C. Peterson									
LOCATION: Field east of Turner Island Road										
T.O.C. COORDINATES: N2304528.33 E6065473.87 (NAD93) EL. 98.13' (NAVD88)										
C C ELEVATION: 05 3' (NA)/D89)	•									



NOTES:

 $\label{eq:condition} \begin{array}{ll} \text{T.O.C.} = \text{Top of well casing, I.D.} & = \text{Inner Diameter, G.S.} = \text{Ground Surface, El.} = \text{Elevation} \\ \text{Dia.} = \text{Diameter} & \text{NS} = \text{Not Surveyed} \end{array}$

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, Merced County

BEGUN: 11/15/10 FINISHED: 11/15/10
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 7.14 ft. (89.9 ft. - 12/08/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,304,569.2 E 6,075,776.6 NAD83

TOTAL DEPTH: 31.3 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 97.0 ft. NADV88 ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: A. Warren REVIEWED BY: S. Dalton

				LAB	ORA	TOF	RY D	ATA	\	ORY TION		_	SUAL		
NOTES	рертн	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT SYMBOL	VISUAL	EI.	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE											•				0.0 to 31.3 ft. QUATERNARY ALLUVIUM - Qal
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	_	79											СН		O.0 to 3.5 ft. FAT CLAY, CH: About 100% fines, with high plasticity, no dilatancy; moist to dry, dark brown; very firm consistency; disturbed at 0.0 to 1.0 ft.
LOCATION: Reach 4B1, River Bank Left, Merced County, on a farm road about 2 miles East of Turner Island Road.	-	79												93.5	3.5 to 5.4 ft. LEAN CLAY, CL: About 90% fines with low plasticity; about 10% fine sand; dry to moist, olive brown with trace reddish brown oxidation; moderately firm; thinly bedded CL/CH at 5.4 ft.
DRILLED BY: Bureau of Reclamation: PN Region drill crew: Gerry Hansen, driller Chris Peterson, helper Dennis Read, helper	5 —												CL		5.4 to 6.3 ft. LEAN CLAY WITH SILT AND SAND, (CL/ML)s: About 80% fines with low plasticity; about 20% fine sand; moist, olive brown with reddish
DRILL RIG: Truck mounted Central Mining Equipment (CME) 75 DRILLING & SAMPLING METHODS:	-	62											(CL/N	91.6 ML)s 90.7	6.3 to 8.9 ft. FAT CLAY, CH: About 100% fines with high plasticity, high toughness, no dilatancy; moist, olive brown with reddish brown oxidation; very firm.
The drill hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade	-											Ţ			Lab Data Interval 7.5 to 8.5 ft.
drill bit. Continuous (undisturbed) sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet long split barrel dry core system (FADC). Unless indicated otherwise, the FADC was placed inside the augers and the	_		79.7	18.1	2.2	0.0	45.3	22.7	30.0	CL	88.5		СН	88.1	8.9 to 10.3 ft. LEAN CLAY WITH SAND, (CL)s: About 85% fines with low plasticity; about 15% fine sand; moist, olive brown with reddish
cutting shoe of the FADC extended 0.2 foot beyond the auger drill bit. A free-spinning adapter was placed at the top of the FADC, so that the FADC did not rotate while advancing the augers.	10-	-											(CL)s	86.7	brown; cemented in fine layers. 10.3 to 12.4 ft. LEAN CLAY, CL: About 90% fines with low plasticity; about 10% fine sand; wet, olive brown; soft and flowing; micaceous.
Interval Method 0.0 to 31.3 ft. FADC	_	100										-	CL		<u>Lab Data Interval</u> 11.0 to 12.0 ft.
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 4.3 ft Moderately firm 4.3 to 8.8 ft Soft 8.8 to 13.8 ft Moderately firm 18.8 to 23.8 ft Add catcher with nylon, add	-		15.2	73.4	11.4	0.0	28.3	7.0	26.1	CL	85.0			84.6	12.4 to 14.9 ft. LEAN CLAY WITH SILT, CL/ML: About 90-95% fines with low plasticity; about 10-5% fine sand; moist to dry, olive brown; very firm; silty texture.
water DRILLING FLUID, RETURN AND COLOR: 0.0 to 31.3 ft Drilled without fluid	-		31.8	57.3	10.9	0.0	29.2	13.1	17.7	CL	83.5	-	CL/M	IL	Lab Data Interval 12.5 to 13.5 ft.
WATER LEVEL FROM TOC: 9.83 ft. on 12/08/2010														82.1	14.9 to 18.6 ft. LEAN CLAY, CL: About 100% fines with low plasticity, low to medium toughness, no dilatancy; moist, olive
REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth.	15—											Qal			brown mottled with dark brown; firm; silty; loses toughness and firmness when worked with water.
Same and the get dopon.	_	100	35.8	51.4	12.8	0.0	31.7	17.3	20.6	CL	90.0		CL		Lab Data Interval 16.0 to 17.0 ft.
	_	-									80.0				18.6 to 18.8 ft. POORLY GRADED SAND WITH CLAY, SP-SC: About 90% fine sand, trace medium sand; about 10% fines with medium plasticity; moist to wet, gray.
	-												SP-S	78.4 C 78.2	Note: 18.6 to 18.7 ft.: Gradual contact.

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic

NR = No Recovery NA = Not applicable I.D. = inner diameter O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, Merced County

BEGUN: 11/15/10 FINISHED: 11/15/10
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 7.14 ft. (89.9 ft. - 12/08/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,304,569.2 E 6,075,776.6 NAD83

TOTAL DEPTH: 31.3 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 97.0 ft. NADV88 ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: A. Warren REVIEWED BY: S. Dalton

SHEET 2 OF 2

				LAB	OR <i>A</i>	TOF	RY D	ATA	١	ORY ION	/_		ION ION	
NOTES	ı	% CORE RECOVERY	10	10	٩D	GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	TURE ENT	CLASSIFICATION		SYMBOL	VISUAL CLASSIFICATION	CLASSIFICATION AND PHYSICAL CONDITION
	DEPTH	% COI	<0.005	<0.075	% SAND	% GR/	LIQUIE	PLAST INDEX	MOISTURE CONTENT	ਰ/]. U	SYMB	링 / EI.	
HOLE COMPLETION: Well Casing: +3.0 to 20.0 ft. (2-inch blank PVC)	_												SP-SM	18.8 to 23.2 ft. POORLY GRADED SAND WITH SILT, SP-SM: About 90% fine sand; about 10% non plastic fines; wet, gray; moderately soft to soft.
Dual U-pack Screen: 20.0 to 30.0 ft. (2-inch inner screen; 3-inch outer screen; slotted 0.010-inch)		62	1.6	5.1	93.3	0.0	NP	NP	27.9	SP-SM	5.0		o. o	Lab Data Interval 21.0 to 22.0 ft.
U-Pack Screen Filter Pack: #2/12 Sand Filter Pack: 19.0 to 31.3 ft. (#3 Sand) Sump: 30.0 to 31.3 ft. (2-inch blank PVC with slip cap) Bentonite Seal: 14.0 to 19.0 ft.	_												73.8	23.2 to 24.2 ft. SILTY SAND, SM: About 80% fine sand; about 20% non plastic fines; wet, olive tan; soft; dilatent.
Concrete Seal: 0.0 to 14.0 ft. Well Completion: Steel surface casing with locking top, 6-inch by 6-inch by 5-foot long; 2.0 ft. diameter concrete pad.	_												SM 72.8	24.2 to 27.4 ft. POORLY GRADED SAND WITH SILT, SP-SM: About 90% fine to medium sand, trace coarse;
Lock: #2001 Masterlock	25-													about 10% non plastic fines; wet, olive tan; moderately soft; granitic; oxidized reddish brown band from 27.2 to 27.4 ft.
	_	88											SP-SM	27.4 to 27.9 ft. SILTY SAND, SM: About 80% fine sand; about 20% non plastic fines; wet, gray to blue; moderately firm; micaceous.
	-		2.5	40.4	84.6	0.5	NP	NP	22.8	CM			69.6	27.9 to 31.3 ft. POORLY GRADED SAND, SP: About 95% fine sand; about 5% non plastic
	_		2.5	12.4	04.0	0.5	NP	INP	22.0	69	0.0	-	SM 69.1	fines; wet, gray; soft; 3/4 inch oxidized wood chunks are present.
	_													Lab Data Interval 27.9 to 28.0 ft.
													SP	
	30-	36												
	_					ВОТТ	OM (OF H	OLE				65.7	-

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable

I.D. = inner diameter

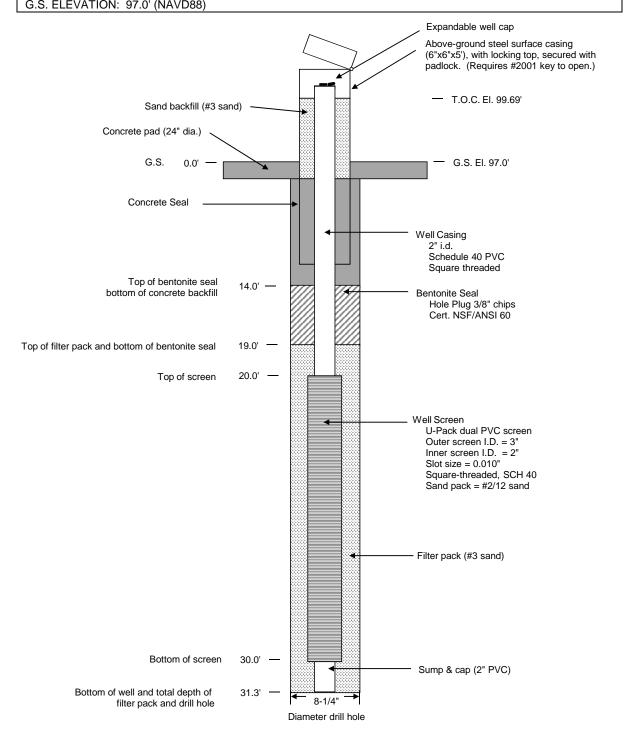
O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name	County Name		Well Name	11111 10-1110
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Nun	nber	MW-10-10G DNR Well ID Number
1. Can this well be purged dry? 2. Well development method surged with bailer and bailed surged with bailer and pumped surged with block and bailed surged with block and pumped surged with block, bailed and pumped compressed air bailed only pumped only pumped slowly Other 3. Time spent developing well 4. Depth of well (from top of well casisng) 5. Inside diameter of well 6. Volume of water in filter pack and well	No N	11. Depth to Water (from top of well casing) Date b. Time c. 12. Sediment in well bottom 13. Water clarity Fill in if drilling fluids 14. Total suspended solids 15. COD	Before Deve	elopment After Development 2 3 ft8 . 7 ft. (2 1 2 1 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2
17. Additional comments on development: 1/29-1/39 - bailed 5 gals 1/41-1/47 - pumped 2/90	by ha	rd		
Name and Address of Facility Contact /Owner/Responsible	Party			
First Last Name: Name:		I hereby certify that the of my knowledge.	he above info	rmation is true and correct to the best
Facility/Firm:		Signature:		
Street:		Print Name:		

MW-10-108	GEOLOGIST: A. Warren
WELL COMPLETION DIAGRAM	DRILLER: G. Hansen
DATE COMPLETED: 11/15/2010	HELPERS: D. Read & C. Peterson
LOCATION: Field east of Turner Island Road	
T.O.C. COORDINATES: N2304569.20 E6075776.63 (N	IAD93) EL. 99.69' (NAVD88)
C C ELEVATION: 07.0' (NA)/D00)	



NOTES:

$$\label{eq:condition} \begin{split} &\text{T.O.C.} = \text{Top of well casing, I.D.} = \text{Inner Diameter, G.S.} = \text{Ground Surface, El.} = \text{Elevation} \\ &\text{Dia.} = \text{Diameter} \quad \text{NS} = \text{Not Surveyed} \end{split}$$

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, Merced County

BEGUN: 11/16/10 FINISHED: 11/16/10 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 6.9 ft. (91.6 ft. - 12/08/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,301,959.1 E 6,075,822.8 NAD83

TOTAL DEPTH: 31.2 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 98.5 ft. NADV88 ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: A. Warren REVIEWED BY: S. Dalton

				LAB	ORA	TOF	RY D	DATA	\ 	LABORATORY CLASSIFICATION	Ę	VISUAL CLASSIFICATION	Λ	
NOTES		ERY			0	VEL	LIMIT	CITY	端 본	ABOR/ SSIFIC	GIC U	SSIFIC		CLASSIFICATION AND PHYSICAL CONDITION
	DEPTH	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	J S /	GEOLOGIC UNIT SYMBOL	CLA CLA	/ _{EI.}	
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE		8,11	V	V	6	0,			20	,	000		,	0.0 to 31.2 ft. QUATERNARY ALLUVIUM - Qal
PURPOSE OF HOLE:	_													- 0.0 to 2.5 ft. SANDY LEAN CLAY, s(CL):
To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	_	59.46										s(CL)		About 60% fines with medium plasticity; about 40% fine sand; organics (leaves, roots, etc.); dry, brown; powdered and loose.
LOCATION: Reach 4B1, River Bank Left, Merced County, on farm road about 2 miles East of Turner Island Road.	_												96.0	2.5 to 5.1 ft. CLAYEY SAND, SC: About 55% fine sand; about 45% fines medium plasticity, medium toughness; dry, brown; firm.
DRILLED BY: Bureau of Reclamation: PN Region drill crew:	_											sc		5.1 to 5.6 ft. SILTY SAND, SM: About 70% fine sand; about 30% non plastic fines; moist to wet, brown; moderately soft.
Gerry Hansen, driller Chris Peterson, helper Dennis Read, helper	_												20.4	5.6 to 9.8 ft. SANDY SILT, s(ML): About 65% fines with low plasticity, low
DRILL RIG:	5-											SM	93.4	toughness; about 35% fine sand; moist to wet, olive brown; moderately soft; flowing.
Truck mounted Central Mining Equipment (CME) 75	-	62												- <u>Lab Data Interval</u> 7.0 to 8.0 ft.
DRILLING & SAMPLING METHODS: The drill hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers	_										T			9.8 to 12.0 ft. LEAN CLAY WITH SILT AND
equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous (undisturbed) sampling was			10.7	65.7	23.6	0.0	NP	NP	25.5	(ML)s		s(ML)	,	About 85% fines with low plasticity, no toughness; about 15% fine sand; moist, olive
performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet long split barrel dry core system (FADC). Unless indicated otherwise, the	-									90.5				_ brown; firm. <u>Lab Data Interval</u>
FADC was placed inside the augers and the cutting shoe of the FADC extended 0.2 foot beyond the auger drill bit. A free-spinning	-		-											9.8 to 10.7 ft. - 12.0 to 13.7 ft. <u>CLAYEY SAND, SC</u> :
adapter was placed at the top of the FADC, so that the FADC did not rotate while advancing the	10-												88.7	About 60% fine sand; about 40% fines with medium plasticity; moist, olive brown;
augers.			32.7	60.1	7.2	0.0	32.8	16.6	22.8	CL 87.8				moderately firm; layered.
Interval Method 0.0 to 31.2 ft. FADC	-	100										(CL/N	/L)s	 13.7 to 17.5 ft. <u>LEAN CLAY, CL</u>: About 95% fines with medium plasticity, medium toughness, no dilatancy; about 5%
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 3.7 ft Moderately soft	_												86.5	fine sand; moist, olive brown; firm.
3.7 to 8.7 ft Wet 8.7 to 13.7 ft Add catcher and water 21.2 to 23.7 ft Add catcher with nylon												sc		 17.5 to 18.7 ft. <u>SANDY LEAN CLAY</u>, s(CL): About 65% fines with low plasticity; about 35% fine sand; moist, olive brown with slight reddish brown oxidation; moderately firm.
DRILLING FLUID, RETURN AND COLOR: 0.0 to 31.2 ft Drilled without fluid	-												84.8	Lab Data Interval 17.5 to 18.5 ft.
WATER LEVEL FROM TOC:	-													18.7 to 20.2 ft. <u>SANDY SILT, s(ML)</u> :
9.67 ft. on 12/08/2010 REASON FOR HOLE TERMINATION:	15-													About 55% fines with low plasticity; about 45% fine sand; moist, olive brown with reddish brown; very firm; soft, flowing Silty Sand, SM,
The hole was terminated upon successful completion to the target depth.											Qal	CL		interval from 19.7 to 20.2 ft.
HOLE COMPLETION: Well Casing: +3.0 to 20.0 ft. (2-inch blank PVC) Dual U-pack Screen: 20.0 to 30.0 ft. (2-inch inner	-	100												20.2 to 21.2 ft. <u>SILTY SAND, SM</u> : About 70% fine sand; about 30% non plastic fines; moist, dark gray with reddish brown; moderately firm.
screen; 3-inch outer screen; slotted 0.010-inch) U-Pack Screen Filter Pack: #2/12 Sand Filter Pack: 19.0 to 31.2 ft. (#3 Sand)	-												81.0	21.2 to 28.7 ft. <u>NO RECOVERY</u>
Sump: 30.0 to 31.2 ft. (2-inch blank PVC with slip cap) Bentonite Seal: 2.0 to 19.0 ft.	-	-	26.9	47.7	25.4	0.0	31.8	16.3	22.5	(CL)s		s(CL)		Note: Trace SILTY SAND, SM in shoe: About 80% fine sand; about 20% non plastic fines; wet, gray; soft.
Concrete Seal: 0.0 to 2.0 ft. Well Completion: Steel surface casing with	_									80.0			79.8	_ 28.7 to 30.3 ft. <u>NO RECOVERY</u>
locking top, 6-inch by 6-inch by 5-foot long; 2.0 ft. diameter concrete pad. Lock: #2001 Masterlock												s(ML)	78.8	

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic

NR = No Recovery NA = Not applicable I.D. = inner diameter O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, Merced County

BEGUN: 11/16/10 FINISHED: 11/16/10 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 9.61 ft. (91.6 ft. - 12/08/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,301,959.1 E 6,075,822.8 NAD83

TOTAL DEPTH: 31.2 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 98.5 ft. NADV88 ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: A. Warren REVIEWED BY: S. Dalton

SHEET 2 OF 2

1														
				LAB	ORA	TOF	RY D	ATA	١	ORY TION	/,		SUAL	Λ
NOTES	рертн	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION		GEOLOGIC UNIT	VISUAL	
		68											NR 78.	
	-												SM 77.	SP: About 95% fine sand; about 5% non plastic fines; wet, gray; moderately soft; layered.
	_													Lab Data Interval 30.0 to 31.0 ft.
		0												
	-													<u> </u>
	_													
	25—													-
													NR	
	-	0												<u> </u>
	_													
	_	-												-
	-													<u> </u>
	20	36												
	30-		0.0	4.1	95.5	0.4	NP	NP	22.8	SP			68.	2
	_					•••				67	.5		SP 67.	 3
						вотт	ГОМ	OF H	OLE					_

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable

I.D. = inner diameter

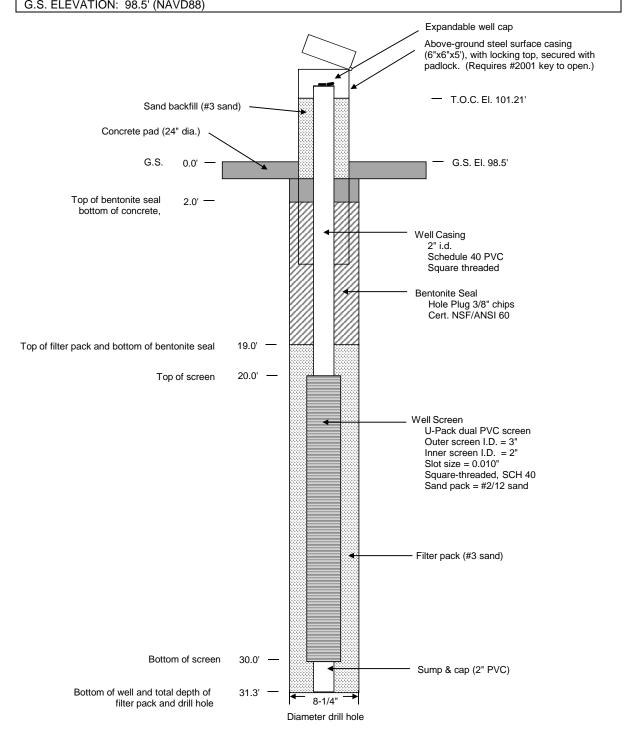
O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name	County Name	ed -	Well Name	MW-10-109
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well N	umber	DNR Well ID Number
1. Can this well be purged dry? 2. Well development method surged with bailer and bailed surged with bailer and pumped surged with block and bailed surged with block and pumped surged with block and pumped surged with block, bailed and pumped compressed air bailed only pumped only pumped slowly Other 3. Time spent developing well 4. Depth of well (from top of well casisng) 5. Inside diameter of well 6. Volume of water in filter pack and well casing	No N	Wis. Unique Well N 11. Depth to Water (from top of well casing) Date Time 12. Sediment in well bottom 13. Water clarity	Before Dev a	DNR Well ID Number velopment After Development b 7 ft 9 7 6 20 6 d y y y y m m d d y y y Z a.m. p.m 1 2 0 p.m. inches _ inches Clear 2 0 Turbid 2 5 (Describe)
9. Source of water added		15. COD		mg/l mg/l
10. Analysis performed on water added? Ye (If yes, attach results)	s 🗆 No	First Name: Ge	y: Name (first, I	Last Name: Kan Sen
17. Additional comments on development: 10:57-11:07 - hard back 5 11:09-11:16 Pamp 20				
Name and Address of Facility Contact/Owner/Responsible First Last Name: Name:	e Party	I hereby certify the of my knowledge.	at the above inf	formation is true and correct to the best
Facility/Firm:		Signature:		- 774
Street:		Print Name:		
City/State/Zip:		Firm:		

MW-10-109	GEOLOGIST: A. Warren							
WELL COMPLETION DIAGRAM	DRILLER: G. Hansen							
DATE COMPLETED: 11/16/2010	HELPERS: D. Read & C. Peterson							
LOCATION: Field east of Turner Island Road	LOCATION: Field east of Turner Island Road							
T.O.C. COORDINATES: N2301959.12 E6075822.75 (NAD93) EL. 101.21' (NAVD88)								
C C ELEVATION: 09 ELANAVIDOS								



NOTES:

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, Merced County

BEGUN: 11/12/10 FINISHED: 11/13/10 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 9.25 ft. (83.8 ft. - 12/08/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,312,999.7 E 6,050,877.0 NAD83

TOTAL DEPTH: 30.9 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 92.4 ft. NADV88 ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: A. Warren REVIEWED BY: S. Dalton

				LAB	ORA	TOF	RY D	ATA	١	ORY TION	/	_	SUAL	<u> </u>	
NOTES	рертн	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT SYMBOL	VISUAL	EI.	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE													SM	•	0.0 to 30.9 ft. QUATERNARY ALLUVIUM - Qal
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	_	75											CL	91.1	 0.0 to 1.3 ft. <u>SILTY SAND, SM</u>: About 75% fine sand, micaceous; about 25% non plastic fines; dry, brown; firm.
LOCATION: Reach 4B1, River Bank Left, Merced County, at intersection of ditch and San Joaquin River, North of Hereford Road.	_													90.2	1.3 to 2.2 ft. LEAN CLAY, CL: About 95% fines with medium plasticity, low toughness, slow dilatancy; about 5% fine sand; dry, brown; very firm; spongey texture.
DRILLED BY: Bureau of Reclamation: PN Region drill crew: Gerry Hansen, driller	_												SM		2.2 to 6.1 ft. SILTY SAND, SM: About 75% fine sand, micaceous; about 25% non plastic fines; dry, brown; firm.
Chris Peterson, helper Dennis Read, helper	5-	1													6.1 to 13.4 ft. POORLY GRADED SAND, SP: About 90-95% fine to medium sand
DRILL RIG: Truck mounted Central Mining Equipment (CME) 75	_	81.25												86.3	(predominately fine, coarsening downwards); about 10-5% non plastic fines; moist to wet, — gray with reddish orange oxidation; soft.
DRILLING & SAMPLING METHODS: The drill hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers	_														<u>Lab Data Interval</u> 6.0 to 7.0 ft.
equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous (undisturbed) sampling was performed by advancing a 4 inch o.d. by 3-3/8	_		1.3	11.6	87.1	0.0	NP	NP	13.7	SM	84.4				Note: 8.4 to 13.4. ft.: Predominately medium with trace coarse sand; less oxidation (gray); saturated.
inch i.d. by 5 feet long split barrel dry core system (FADC). Unless indicated otherwise, the FADC was placed inside the augers and the															<u>Lab Data Interval</u> 9.0 to 11.0 ft.
cutting shoe of the FADC extended 0.2 foot beyond the auger drill bit. A free-spinning adapter was placed at the top of the FADC, so												Ţ	SP		13.4 to 18.4 ft. <u>NO RECOVERY</u>
that the FADC did not rotate while advancing the augers.	10-		0.0	3.6	96.4	0.0	NP	NP	23.0	SP			51		18.4 to 23.2 ft. POORLY GRADED SAND, SP: About 95% fine to medium sand, trace coarse
Interval Method 0.0 to 30.9 ft. FADC	-	70									81.4	-			sand; about 5% fines; wet, gray; soft; about 1.0 _ ft. thick layers of fine and medium sand.
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 3.6 ft Soft	_														<u>Lab Data Interval</u> 19.0 to 20.0 ft.
8.4 to 18.4 ft Medium soft, add water, catcher with nylon 18.4 to 23.4 ft Add catcher with nylon															23.2 to 23.4 ft. CLAYEY SAND, SC: About 60% fine sand; about 40% fines with medium plasticity; wet, gray.
DRILLING FLUID, RETURN AND COLOR: 0.0 to 30.9 ft Drilled without fluid	-	_												79.0	23.4 to 30.9 ft. NO RECOVERY
WATER LEVEL FROM TOC: 8.2 ft. on 11/12/2010	-														_
REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth.	15—	0										Qal			-
HOLE COMPLETION: Well Casing: +3.0 to 18.0 ft. (2-inch blank PVC)	-												NR		-
Dual U-pack Screen: 18.0 to 28.0 ft. (2-inch inner screen; 3-inch outer screen; slotted 0.010-inch) U-Pack Screen Filter Pack: #2/12 Sand Filter Pack: 16.0 to 30.9 ft. (#3 Sand)	_	0													_
Sump: 28.0 to 30.9 ft. (2-inch blank PVC with slip cap) Bentonite Seal: 2.0 to 16.0 ft.	-													74.0	_
Concrete Seal: 0.0 to 2.0 ft. Well Completion: Steel surface casing with locking top, 6-inch by 6-inch by 5-foot long; 2.0 ft. diameter concrete pad.	_	-	0.0	4.6	95.4	0.0	NP	NP	24.4	SP					_
Lock: #2001 Masterlock	$ldsymbol{ldsymbol{ldsymbol{ldsymbol{ldsymbol{L}}}}$										72.4				

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery

NR = No Recovery NA = Not applicable I.D. = inner diameter O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, Merced County

BEGUN: 11/12/10 FINISHED: 11/13/10 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 9.25 ft. (83.8 ft. - 12/08/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,312,999.7 E 6,050,877.0 NAD83

TOTAL DEPTH: 30.9 ft.

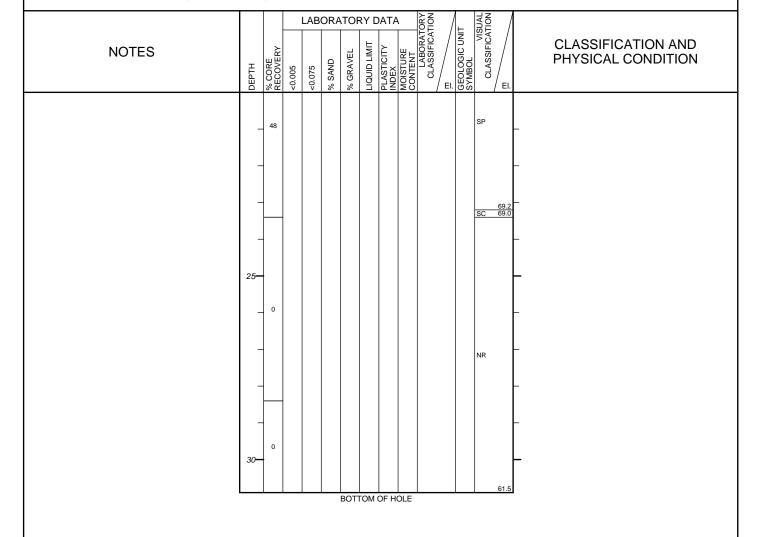
DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 92.4 ft. NADV88 ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: A. Warren

SHEET 2 OF 2

REVIEWED BY: S. Dalton



COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable

I.D. = inner diameter

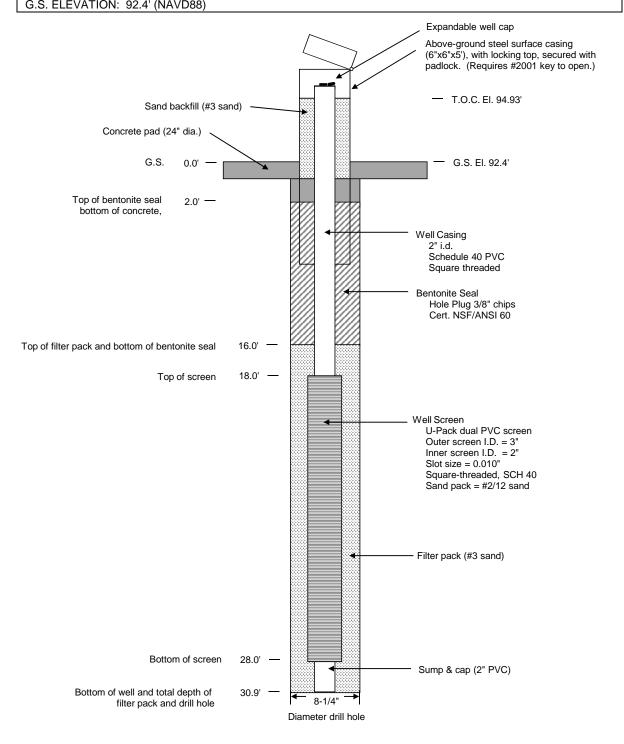
O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name 5 JRK	County Name	Nerced	Well Name 4W-10-110
	County Code	Wis. Unique Well N	
1. Can this well be purged dry? Yes	No No	11. Depth to Water	Before Development After Development
Well development method	,	(from top of	a [1.15 ft [1.10 ft.
surged with bailer and bailed 4 1		well casing)	(2.70
surged with bailer and pumped 6 1			2.10
surged with block and bailed 4 2		Date	12,08,2010 12,08,20
surged with block and pumped 6 2			b. m m d d d y y y y m m d d d y y y
surged with block, bailed and pumped 70		1	
compressed air)	Time	c. 13:05 a.m. 13:30 a.m.
bailed only			
pumped only	1	12. Sediment in well	inches inches
pumped slowly)	bottom	
Other		13. Water clarity	Clear 10 Clear 20
			Turbid □ 15 Turbid □ 25
3. Time spent developing well 30	min.		(Describe) (Describe)
4. Depth of well (from top of well casisng)	ft.		green.
5. Inside diameter of well	in.		
6. Volume of water in filter pack and well			
casing	gal.		
		Fill in if drilling fluid	ds were used and well is at solid waste facility:
7. Volume of water removed from well	gal.		
		14. Total suspended	mg/l
8. Volume of water added (if any)	_ gal.	solids	
9. Source of water added		15. COD	mg/l
		16. Well developed b	by: Name (first, last) and Firm
10. Analysis performed on water added? ☐ Yes	□ No	First Name:	Last Name:
(If yes, attach results)		Firm G-ERY	RY HANSEN
		Firm: Great	
17. Additional comments on development:	-11-		
1310-1319 Hand bail 5 9	ano		
1318-1328 Pump out	25 gal		
1010 1300	n - p		
Name and Address of Facility Contact /Owner/Responsible	Party	Thereby costify the	at the above information is true and governat to the bas
First Last		of my knowledge.	at the above information is true and correct to the bes
Name: Name:		of my knowledge.	
		Signature	
Facility/Firm:		Signature:	
Street:		Print Name:	·
		P:	
City/State/Zip:		Firm:	

MW-10-110	GEOLOGIST: A. Warren							
WELL COMPLETION DIAGRAM	DRILLER: G. Hansen							
DATE COMPLETED: 11/13/2010	HELPERS: D. Read & C. Peterson							
LOCATION: Field north of Hereford Road	LOCATION: Field north of Hereford Road							
T.O.C. COORDINATES: N2312999.71 E6050876.99 (NAD93) EL. 94.93' (NAVD88)								
C C ELEVATION: 02 4' (NA) (D89)								



NOTES:

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, Merced County

BEGUN: 11/11/10 FINISHED: 11/12/10 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 6.59 ft. (83.9 ft. - 12/08/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,307,942.6 E 6,049,544.3 NAD83

TOTAL DEPTH: 31.0 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 90.5 ft. NADV88 ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: A. Warren REVIEWED BY: S. Dalton

				LAB	ORA	TOF	RY D	ATA	١	ORY NOI			II ON		
NOTES	рертн	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT SYMBOL	VISUAL	EI.	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE		0 =			J	J	_					0 0			0.0 to 31.0 ft. QUATERNARY ALLUVIUM - Qal
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well. LOCATION:	_	100											s(ML))	O.0 to 2.8 ft. SANDY SILT, s(ML): About 60% fines with low plasticity, low toughness, rapid dilatancy; about 40% fine sand; dry, brown; micaceous; abundant roots and organics; calcareous veins at about 2.0 to 2.5 ft.
Reach 4B1, River Bank Left, Merced County, on a farm road about 900 feet East of the end of Hereford Road.	-													87.7	Note: Layer of SILTY SAND, SM, from 1.0 to 1.9 ft.
DRILLED BY: Bureau of Reclamation: PN Region drill crew: Gerry Hansen, driller Chris Peterson, helper Dennis Read, helper	-		1.6	19.9	78.5	0.0	NP	NP	9.7	SM	86.2	-	SM		2.8 to 5.7 ft. SILTY SAND, SM: About 80% fine sand; about 20% non plastic fines, no toughness, rapid dilatancy; moist to dry, brown; micaceous; soft; homogenous.
DRILL RIG: Truck mounted Central Mining Equipment (CME)	5-													84.8	Lab Data Interval 4.0 to 4.3 ft.
DRILLING & SAMPLING METHODS: The drill hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous (undisturbed) sampling was	_	100	34.0	56.3	9.7	0.0	39.4	19.5	31.4	CL	83.0	▼	CL/M	L	5.7 to 9.4 ft. LEAN CLAY WITH SILT, (CL/ML): About 90% fines with low plasticity, low toughness, slow dilatancy; about 10% fine sand; moist, brown with few reddish brown oxidation veinlettes; wet sandy zone from 8.0 to 8.1 ft.; trace woody debris; micaceous.
performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet long split barrel dry core system (FADC). Unless indicated otherwise, the FADC was placed inside the augers and the cutting shoe of the FADC extended 0.2 foot beyond the auger drill bit. A free-spinning adapter was placed at the top of the FADC, so	_	-												81.1	Lab Data Interval 6.5 to 7.5 ft. Note: 8.5 to 9.4 ft.: Grades to about 35-40% sand; many vertically oriented 0.5 to 1.0 inch woody debris pieces with reddish brown
that the FADC did not rotate while advancing the augers.	10-	_													oxidation halos. 9.4 to 12.7 ft. SANDY SILT, s(ML):
Interval Method 0.0 to 31.0 ft. FADC DRILLING CONDITIONS AND DRILLER'S COMMENTS:	-	100	16.6	47.4	36.0	0.0	NP	NP	33.5	s(ML)		-	s(ML))	About 65% non plastic fines, rapid dilatancy; about 35% fine sand; wet, gray; some black roots and vegetation from 3.0 inch to fragments; soft; flows when placed in corebox.
0.0 to 4.3 ft Soft 13.5 to 18.5 ft Very wet and soft 18.5 to 23.5 ft Add water, catcher with bag	-										78.5			77.8	
23.5 to 26.0 ft Add catcher with bag DRILLING FLUID, RETURN AND COLOR: 0.0 to 31.0 ft Drilled without fluid	-												CL	77.5	About 55% fine sand; about 45% fines with low plasticity, rapid dilatancy; wet, gray; <0.1 ft.
WATER LEVEL FROM TOC: 9.28 ft. on 12/08/2010	-													70.0	13.0 to 13.9 ft. LEAN CLAY, CL: About 95% fines with medium plasticity, medium toughness, medium dilatancy; about
REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth.	15-		24.2	52.5	23.3	0.0	28.9	11.4	23.8	(CL)s	75.0	Qal			5% fine sand, micaceous; moist, gray with trace reddish brown oxidation; moderate firm consistency.
HOLE COMPLETION: Well Casing: +3.0 to 8.0 ft. (2-inch blank PVC) Dual U-pack Screen: 8.0 to 28.0 ft. (2-inch inner screen; 3-inch outer screen; slotted 0.010-inch) U-Pack Screen Filter Pack: #2/12 Sand Filter Pack: 7.0 to 31.0 ft. (#3 Sand) Sump: 28.0 to 31.0 ft. (2-inch blank PVC with slip cap)	_	100											(CL)s		13.9 to 18.5 ft. LEAN CLAY WITH SAND, (CL)s: About 75% fines with low plasticity, slow dilatancy; about 25% fine sand, micaceous; moist, gray-brown with reddish brown oxidation; moderately firm; wet, sandy layer from 18.3 to 18.4 ft.
Bentonite Seal: 2.0 to 7.0 ft. Concrete Seal: 0.0 to 2.0 ft. Well Completion: Steel surface casing with locking top, 6-inch by 6-inch by 5-foot long; 2.0 ft. diameter concrete pad. Lock: #2001 Masterlock COMMENTS:	-												SM	72.0	Lab Data Interval 13.9 to 18.5 ft.

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter

O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, Merced County

BEGUN: 11/11/10 FINISHED: 11/12/10
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 6.59 ft. (83.9 ft. - 12/08/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,307,942.6 E 6,049,544.3 NAD83

TOTAL DEPTH: 31.0 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 90.5 ft. NADV88 ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: A. Warren REVIEWED BY: S. Dalton

SHEET 2 OF 2

				LAB	ORA	TOF	RY D	ATA	١	I SR	/	<u> </u>	TION	1
NOTES	рертн	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT	CLASSIFICATION	CLASSIFICATION AND PHYSICAL CONDITION
	_	- 66											69.:	18.5 to 21.2 ft. SILTY SAND, SM: About 85% fine sand; about 15% non plastic fines; wet, olive brown; loose and flowing; somewhat micaceous; firms up at bottom of interval.
	_		20.0	68.4	11.6	0.0	NP	NP	29.5	ML	68.6	<u> </u>	ML 68.6 SP-SM 68.6	21.2 to 21.9 ft. SILT, ML: About 90% fines with low plasticity, rapid
	_												67.3	Lab Data Interval 21.2 to 21.9 ft.
	25—	60	4.5	12.2	83.3	0.0	NP	NP	25.6	SM			SP-SM	21.9 to 22.5 ft. POORLY GRADED SAND WITH SILT, SP-SM: About 90% fine sand; about 10% fines; gray, wet.
	_										64.5	<u>;</u>	64.	22.5 to 23.2 ft. POORLY GRADED SAND, SP: About 95% medium sand; about 5% fines; gray to reddish brown, wet.
	_	0												23.2 to 26.0 ft. POORLY GRADED SAND WITH SILT, SP-SM: About 90-95% fine sand; about 5-10% fines; wet, gray; micaceous.
	_												NR	Note: 23.5 to 26.0 ft.: Flowing. Lab Data Interval
	30—	0												- 23.5 to 26.0 ft. 26.0 to 31.0 ft. NO RECOVERY
						BOTT	ГОМ	OF H	OLE				59.8	3

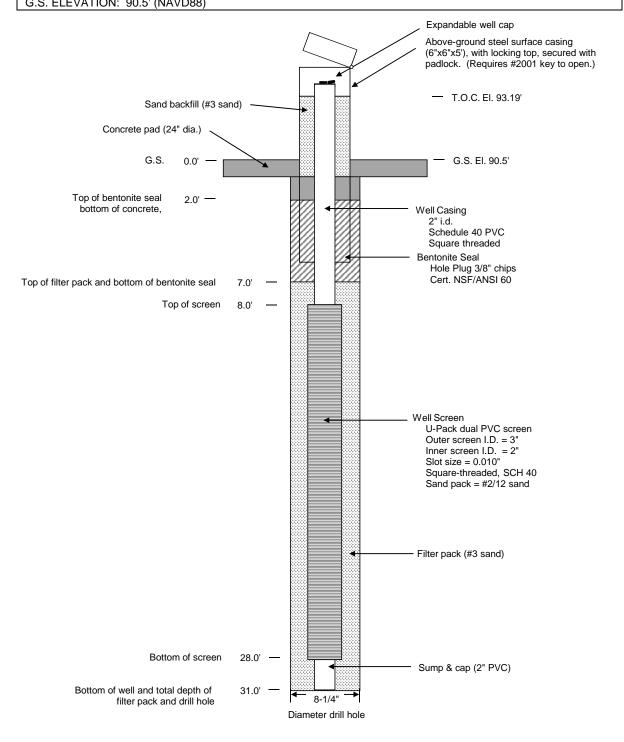
I.D. = inner diameter

U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name SSRR	County Name	nerced	Well Name	MW-10-111
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Nu	umber	DNR Well ID Number
Facility License, Permit or Monitoring Number 1. Can this well be purged dry? 2. Well development method surged with bailer and bailed surged with bailer and pumped surged with block and bailed surged with block and pumped surged with block, bailed and pumped compressed air bailed only pumped only pumped slowly Other 3. Time spent developing well	No N	11. Depth to Water (from top of well casing)	Before Dev a	
7. Volume of water removed from well 8. Volume of water added (if any)	gal.			nd well is at solid waste facility:
9. Source of water added		15. COD		mg/l mg/l
		16. Well developed b	y: Name (first, l	last) and Firm
10. Analysis performed on water added? Ye (If yes, attach results)	s 🗆 No	First Name: GE	RRY	Last Name: FLANSEN
17. Additional comments on development: 1346-1354 - hand ball 5 a 1356-1220 - phmp out Consistent Waterial.	/	als-5411 s	Slightly a. We	trated but
Name and Address of Facility Contact/Owner/Responsible First Last Name: Name:	e Party	I hereby certify that of my knowledge.	t the above inf	formation is true and correct to the best
Facility/Firm:		Signature:		-
Street:		Print Name:		
City/State/Zip:		Firm:	-	

MW-10-111	GEOLOGIST: A. Warren							
WELL COMPLETION DIAGRAM	DRILLER: G. Hansen							
DATE COMPLETED: 11/12/2010	HELPERS: D. Read & C. Peterson							
LOCATION: Field north of Hereford Road	LOCATION: Field north of Hereford Road							
T.O.C. COORDINATES: N2307942.60 E6049544.28 (NAD93) EL. 93.19' (NAVD88)								
C S ELEVATION: 00 E' (NAV/D88)								



NOTES:

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, Merced County

BEGUN: 11/21/10 FINISHED: 11/21/10 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 15.03 ft. (88.6 ft. - 12/10/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,319,024.5 E 6,082,067.1 NAD83

TOTAL DEPTH: 31.1 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 103.6 ft. NADV88 ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: A. Warren/G. Perea

REVIEWED BY: S. Dalton

	1	1	l		_			_		> マ	-		コマ		
				LAB	ORA					LABORATORY CLASSIFICATION		LINI	VISUAL		CLASSIFICATION AND
NOTES	Ę	% CORE RECOVERY	105	175	SAND	GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	STURE	LABO		GEOLOGIC UNIT SYMBOL	ASSIF		PHYSICAL CONDITION
	DEPTH	% C	<0.005	<0.075	S %	9 %	LIQI	7 <u>5</u>	ΘÖ		EI.	SYN	_	, EI.	201.0115
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE													SM		0.0 to 31.1 ft. QUATERNARY ALLUVIUM - Qal
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well. LOCATION:	-	81											CL	102.5	O.0 to 1.1 ft. SILTY SAND, SM: About 70% fine to coarse sand, hard, subangular; about 30% fines with low plasticity, low toughness; moist, brown to dark brown; organics at surface and subsurface (vegetation and roots); trace fine gravel.
Reach 4B1, River Bank Right, Merced County, on the South edge of Sandy Mush Rd., west of entrance to Merced Wildlife Refuge Hunter check.	-													100.0	1.1 to 3.6 ft. LEAN CLAY, CL: About 95% fines with low plasticity, low toughness; about 5% fine sand; dry, mottled olive tan and dark brown; moderate firmness;
DRILLED BY: Bureau of Reclamation: PN Region drill crew: Gerry Hansen, driller Chris Peterson, helper Dennis Read, helper	5-												CL/C	СН	layered with (CL)s. 3.6 to 6.7 ft. LEAN/FAT CLAY, CL/CH: About 100% fines with medium plasticity, medium toughness, no dilatancy; dry to moist, brown to dark brown: firm: CaCO3 veinlettes
DRILL RIG: Truck mounted Central Mining Equipment (CME) 75	-	100	58.4	38.2	3.4	0.0	60.3	40.7	20.1	СН	97.6				throughout. – Lab Data Interval
DRILLING & SAMPLING METHODS: The drill hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous (undisturbed) sampling was performed by advancing a 4 inch o.d. by 3-3/8	-	-												96.9	5.0 to 6.0 ft. 6.7 to 12.0 ft. LEAN CLAY, CL: About 90% fines with medium plasticity, medium toughness, no dilatancy; about 10% fine sand; moist to dry, tan to light brown.
inch i.d. by 5 feet long split barrel dry core system (FADC). Unless indicated otherwise, the															Note: 8.6 to 8.8 ft.: Moist
FADC was placed inside the augers and the cutting shoe of the FADC extended 0.2 foot	-		40.0	48.2	4.9	0.0	20.0	17.3	25.0	CI			CL		Note: 10.4 to 11.4 ft.: Trace fine gravel
beyond the auger drill bit. A free-spinning adapter was placed at the top of the FADC, so that the FADC did not rotate while advancing the	10-		40.5	40.2	4.5	0.0	33.0	17.5	25.5		93.6				<u>Lab Data Interval</u> 9.0 to 10.0 ft.
augers. Interval Method	_	100													Note: CaCO3 throughout, layers of increased sand throughout, reddish brown towards bottom of interval.
0.0 to 31.1 ft. FADC		100													12.0 to 16.6 ft. <u>LEAN CLAY, CL</u> :
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 3.6 ft Medium firm 8.6 to 13.6 ft Medium soft	-													91.6	About 95% fines with low plasticity, low toughness; about 5% fine to medium sand; moist, olive tan; firm; CaCO3 veinlettes throughout.
DRILLING FLUID, RETURN AND COLOR: 0.0 to 31.1 ft Drilled without fluid	-														Lab Data Interval 14.0 to 15.0 ft.
WATER LEVEL FROM TOC: 14.67 ft. on 12/10/2010	-		53.6	40.7	5.7	0.0	41.7	20.7	30.7	CL		_	CL		 16.6 to 20.3 ft. <u>LEAN CLAY/SILT, CL/ML</u>: About 100% fines with low plasticity, low toughness; trace sand; moist, olive tan; very
REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth.	15-										88.6	Qal			firm. Note: 18.6 to 20.3 ft.: Grades into 35% fine
HOLE COMPLETION: Well Casing: 0.5 to 20.0 ft. (2-inch blank PVC) Dual U-pack Screen: 20.0 to 30.0 ft. (2-inch inner screen; 3-inch outer screen; slotted 0.010-inch) U-Pack Screen Filter Pack: #2/12 Sand Filter Pack: 18.0 to 31.1 ft. (#3 Sand) Sump: 30.0 to 31.1 ft. (2-inch blank PVC with slip cap)	-	100										-di		87.0	sand, trace medium. 20.3 to 21.6 ft. CLAYEY SAND, SC: About 70% fine sand; about 30% fines with medium plasticity; moist, olive tan with reddish brown oxidation layers; firm; layered with fines in 0.1 ft. layers. Lab Data Interval
Bentonite Seal: 2.0 to 18.0 ft. Concrete Seal: 0.0 to 2.0 ft. (backfilled with #3	-												CL/M	и	20.5 to 21.5 ft.
Sand inside well vault) Well Completion: 8-inch diameter flush-mount traffic vault secured with 2 5/16" hex bolts; 2-foot diameter concrete pad. Lock: #2001 Masterlock	-												CL/N	nL	21.6 to 28.6 ft. LEAN CLAY, CL: About 95% fines with medium plasticity, medium toughness; about 5% fine sand; moist, olive-brown to brown; firm.
COMMENTS	Ь														

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic

NP = Non-plastic NR = No Recovery NA = Not applicable I.D. = inner diameter O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, Merced County

BEGUN: 11/21/10 FINISHED: 11/21/10 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 15.03 ft. (88.6 ft. - 12/10/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,319,024.5 E 6,082,067.1 NAD83

TOTAL DEPTH: 31.1 ft.

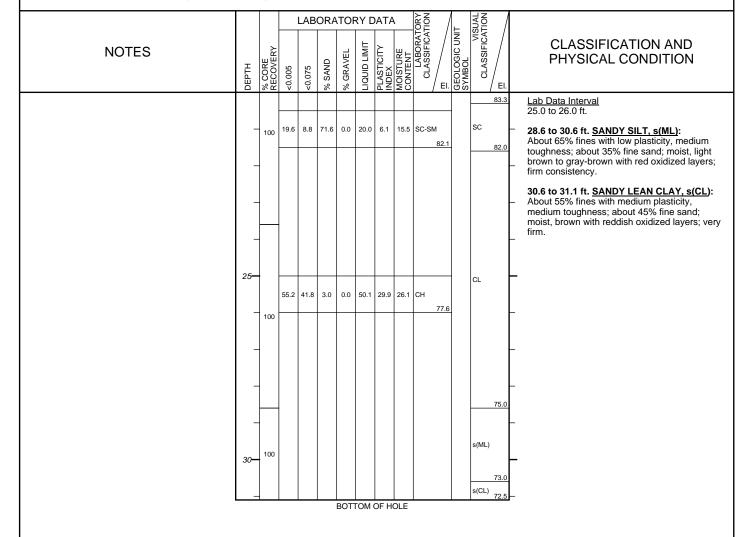
DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 103.6 ft. NADV88 ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: A. Warren/G. Perea

SHEET 2 OF 2

REVIEWED BY: S. Dalton



COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery

NA = Not applicable I.D. = inner diameter

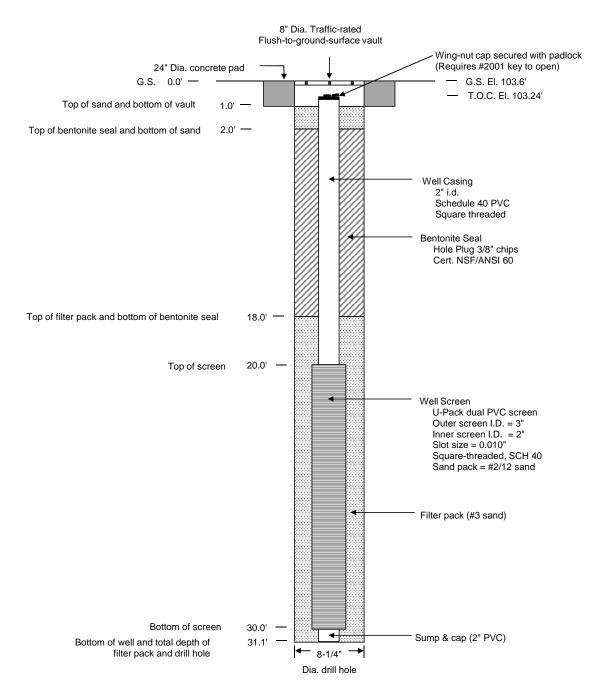
O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name	County Name		Well Name
STRRP	MERC	30	MW-10-117-
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well N	umber DNR Well ID Number
1. Can this well be purged dry? Yes	□ No 🔯	,	Before Development After Development
2. Well development method		11. Depth to Water (from top of	14.67 n. 04_68 n.
surged with bailer and bailed	4 1	well casing)	Flush Mount
surged with bailer and pumped			1-143 h Mean
	4 2	Date	. 12. 12. 22. 12. 12. 12. 12. 12. 12. 12
surged with block and pumped	62		b. L. Z. / L. Q. / 2 / 2 / L. / Q. / 2 / 2 / Q. / 2 / Z. / Q. / 2 / Q. / Q.
	70		
compressed air	20	Time	c. 68: 12 p.m. 09:03 p.m.
	10		21.03-0 p.m.
pumped only	51	12. Sediment in well	TRinchesinches
pumped slowly	50	bottom	
Other	20	13. Water clarity	Clear 10 Clear 20
			Turbid ☑ 15 Turbid ☐ 25
3. Time spent developing well	47 min.		(Describe) (Describe)
			TR.
4. Depth of well (from top of well casisng)	238r.	Ten/	Samuel Test
5. Inside diameter of well	-in:	/	
_24			
6. Volume of water in filter pack and well			
	gal.		
		Fill in if drilling fluid	s were used and well is at solid waste facility:
7. Volume of water removed from well 4	2 5 201	I in the trotting train	s were used and well is at solid waste facility:
	8	14 Total suspended	mg/l mg/l
8. Volume of water added (if any)	gal.	solids	mgrmgr
9. Source of water added		15. COD	mg/l mg/l
ERSTE Annual Anguage contract of the Contract			
		16. Well developed by	: Name (first, last) and Firm
10. Analysis performed on water added?	es □ No	First Name:	Last Name:
(If yes, attach results)	2 110	Tust Name.	Last Name:
		Firm:	
17. Additional comments on development:			
0815-0825 Bail	500/s -	Claude .	Brownsk Timi
0-0	20		
0828-0934 Pump	DRG 1	125841	LET SET Since Rocks
2830 - 2053- D		1-7-511	Couly wouldnot per
COST - Coss Gent	20541	157 554	Could would from
Nome and Address of Facility Grant 19 11	Sparce	Clean 1	
Name and Address of Facility Contact /Owner/Responsib	ole Party	I hereby certify that	the above information is true and correct to the best
Vame: Last		of my knowledge.	
Hette.			
acility/Firm:		Signature:	
Street:		Print Name:	
City/State/Zip:		Firm:	
-		-	

MW-10-112	GEOLOGIST: A. Warren							
WELL COMPLETION DIAGRAM	DRILLER: G. Hansen							
DATE COMPLETED: 11/21/2010	HELPERS: D. Read & C. Peterson							
LOCATION: Sandy Mush Road	•							
T.O.C. COORDINATES: N2319024.46 E6082067.06 (NAD83) ELEVATION 103.24 (NAVD88)								
G.S. FLEVATION: 103.6 (NAVD88)								



NOTES:

T.O.C. = Top of well casing, I.D. = Inner Diameter, G.S. = Ground Surface, El. = Elevation Dia. = Diameter NS = Not Surveyed #3 Sand backfills the well above the top of the bentonite seal.

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, Merced County

BEGUN: 11/14/10 FINISHED: 11/14/10 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 10.91 ft. (93.3 ft. - 12/08/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,302,079.4 E 6,081,383.4 NAD83

TOTAL DEPTH: 31.0 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 104.2 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: A. Warren
REVIEWED BY: S. Dalton

				LAB	ORA	TOF	RY D	ATA	١	ORY TION		/ _	SUAL TION	
NOTES	рертн	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT SYMBOL	CLASSIFICATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE													(ML)s	0.0 to 31.0 ft. QUATERNARY ALLUVIUM - Qal
PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	_	53											103.2 CL 102.7	0.0 to 1.0 ft. SILT WITH SAND, (ML)s: About 80% fines with low plasticity; about 20% fine sand; dry, brown; soft; abundant twigs and roots.
LOCATION: Reach 4B1, River Bank Left, Merced County, on a farm road about 3.3 miles East of Turner Island Road.	_		24.5	58.9	16.6	0.0	35.6	11.5	23.0	(ML)s		-	(ML-CL)s	1.0 to 1.5 ft. LEAN CLAY, CL: About 90% fines with low plasticity, slow dilatancy; about 10% fine sand; dry to moist, dark brown; organic odor; moderate soft; gradual upper contact.
DRILLED BY: Bureau of Reclamation: PN Region drill crew: Gerry Hansen, driller Chris Peterson, helper Dennis Read, helper	5 			-			-		20.0	l` ′	100.2	-	99.7 SM 99.4	1.5 to 4.5 ft. SILT WITH SAND TO LEAN CLAY WITH SAND, (ML-CL)s: About 85% fines with medium plasticity, low toughness, rapid dilatancy; about 15% fine sand; dry, brown; layered.
DRILL RIG: Truck mounted Central Mining Equipment (CME) 75	_	83												Lab Data Interval - 3.0 to 4.0 ft.
DRILLING & SAMPLING METHODS: The drill hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade	_		13.6	50.8	35.6	0.0	NP	NP	32.2	s(ML)	96.7	-	s(ML)	4.5 to 4.8 ft. SILTY SAND, SM: About 80% fine sand; about 20% non plastic fines; dry, gray; soft; micaceous.
drill bit. Continuous (undisturbed) sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet long split barrel dry core system (FADC). Unless indicated otherwise, the FADC was placed inside the augers and the	-												96.0 SP 95.7	brown with reddish brown oxidation layers;
cutting shoe of the FADC extended 0.2 foot beyond the auger drill bit. A free-spinning adapter was placed at the top of the FADC, so that the FADC did not rotate while advancing the augers.	10-													flowing and soft; 0.1 ft. layer of clean fine sand at 6.5 ft. Lab Data Interval 6.5 to 7.5 ft.
Interval Method 0.0 to 31.0 ft. FADC	_	32	4.4	9.0	86.6	0.0	NP	NP	25.3	SM		Ī		8.2 to 8.5 ft. POORLY GRADED SAND, SP: About 95% fine to medium sand; about 5% non plastic fines; wet, gray.
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 3.8 ft Soft 8.5 to 13.5 ft Add water and catcher 18.5 to 23.5 ft Catcher with nylon	-													8.5 to 18.5 ft. POORLY GRADED SAND WITH SILT, SP-SM: About 90% fine sand; about 10% non plastic fines; wet, gray; soft.
23.5 to 28.5 ft Remove catcher DRILLING FLUID, RETURN AND COLOR:	-										90.7		SP-SM	Lab Data Interval 8.5 to 13.5 ft.
0.0 to 31.0 ft Drilled without fluid WATER LEVEL FROM TOC: 10.30 ft. on 12/08/2010	-													Note: 13.5 to 18.5 ft.: Homogenous, slight oxidation, soft. 18.5 to 19.7 ft. SANDY FAT CLAY, s(CH):
REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth.	15—											Qal		About 60% fines with medium to high plasticity, medium to high toughness; about 40% fine sand; wet to moist, dark gray to gray; layered; moderate firmness.
	_	36	1.7	7.4	90.9	0.0	NP	NP	23.7	SP-SM	И			19.7 to 25.0 ft. FAT CLAY, CH: About 95-100% fines with high plasticity, high toughness, no dilatancy; about 5% to trace fine sand; moist, gray; very firm.
	_													Note: 22.5 to 23.5 ft.: Gray mottled with brown.
											85.7		85.7	Lab Data Interval 20.5 to 21.5 ft.
	_												s(CH) 84.5	25.0 to 26.5 ft. LEAN CLAY INTERBEDDED WITH CLAYEY SAND, CL & SC: LEAN CLAY, CL: About 90% fines with medium plasticity; about 10% fine sand.

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery

NR = No Recovery NA = Not applicable I.D. = inner diameter O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, Merced County

BEGUN: 11/14/10 FINISHED: 11/14/10
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 10.91 ft. (93.3 ft. - 12/08/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,302,079.4 E 6,081,383.4 NAD83

TOTAL DEPTH: 31.0 ft.

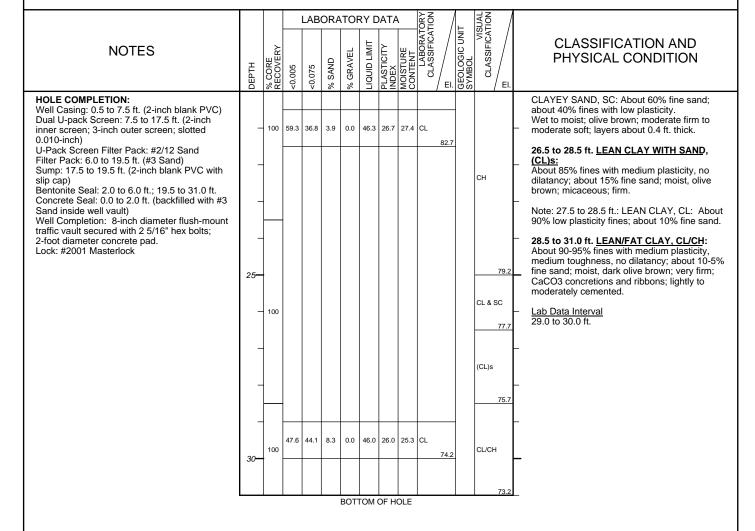
DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 104.2 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

SHEET 2 OF 2

HOLE LOGGED BY: A. Warren
REVIEWED BY: S. Dalton



COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable

I.D. = inner diameter

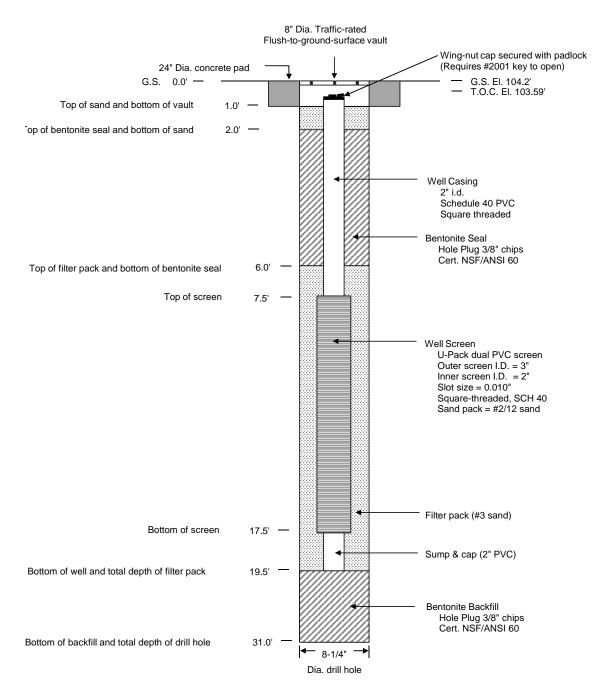
O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name	County Name	ced	Well Name P31 / MW-10-11
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well N	
1. Can this well be purged dry? Yes	No No	11. Depth to Water	Before Development After Development
2. Well development method		(from top of	a. 10.30 ft. 10.00 ft.
	4 1	well casing)	
surged with bailer and pumped			
	4 2	Date	. 12.08,2010 12,08,201
	62	Date	b. $\frac{12}{m}\frac{08}{d}\frac{2010}{dyyyy}\frac{12}{m}\frac{201}{ddyyyy}$
	70	1	
	20	Time	c. 9:25 p.m. 10:15 p.m.
	10		
	5 1	12. Sediment in well	inches
	5.0	bottom	
Other	•	13. Water clarity	Clear 10 Clear 20
	***		Turbid □ 15 Turbid □ 25
3. Time spent developing well5	min.		(Describe) (Describe)
4. Depth of well (from top of well casisng)	2. <u>2</u> ft.		
5. Inside diameter of well _2.4	<u>○</u> <u>o</u> in.		
6. Volume of water in filter pack and well casing	gal.		
7. Volume of water removed from well _ 31	<u>5</u> gal.		ds were used and well is at solid waste facility:
8. Volume of water added (if any)	gal.	solids	mgi
9. Source of water added		15. COD	mg/lmg/l
			by: Name (first, last) and Firm
10. Analysis performed on water added? You (If yes, attach results)	es 🗆 No	1000	erry Last Name: Mahsen
17. Additional comments on development:		Firm: BOK	
Removed 5 g W/has	nd hars	01	
Started Dump. @ 95	0-952	-6.5 Cal	-purged dry dry
recharged to 100 by	955		
pumped 20g fro.	n 958	-1006 - hot.	dry
Name and Address of Facility Contact /Owner/Responsible	le Party		
First Last Name: Name:		of my knowledge.	at the above information is true and correct to the best
Facility/Firm:		Signature:	
Street:		Print Name:	
City/State/Zip:	Y 1	Firm:	

MW-10-113	GEOLOGIST: A. Warren							
WELL COMPLETION DIAGRAM	DRILLER: G. Hansen							
DATE COMPLETED: 11/14/2010	HELPERS: D. Read & C. Peterson							
LOCATION: Field east of Turner Island Road								
T.O.C. COORDINATES: N2302079.43 E6081383.44 (NAD83) ELEVATION 103.59' (NAVD88)								
G.S. ELEVATION: 104.2' (NAVD88)								



NOTES:

T.O.C. = Top of well casing, I.D. = Inner Diameter, G.S. = Ground Surface, El. = Elevation Dia. = Diameter

#3 Sand backfills the well above the top of the bentonite seal.

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, Merced County

BEGUN: 11/17/10 FINISHED: 11/17/10 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 7.65 ft. (91.9 ft. - 12/08/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,300,134.5 E 6,076,281.4 NAD83

TOTAL DEPTH: 31.1 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 99.5 ft. NADV88 ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: A. Warren REVIEWED BY: S. Dalton

					LAB	ORA	TOF	RY D	ATA	١	ORY TION	/_		NOI NOI		
	NOTES	DEРТН	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	MOISTURE CONTENT	LABORATORY CLASSIFICATION		SYMBOL	VISUAL CLASSIFICATION	EI.	CLASSIFICATION AND PHYSICAL CONDITION
	ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE															0.0 to 31.1 ft. QUATERNARY ALLUVIUM - Qal
	PURPOSE OF HOLE: To recover core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well. LOCATION:	-	76											(CL)s		O.0 to 3.6 ft. LEAN CLAY WITH SAND, (CL)s: About 80% fines with medium plasticity, medium toughness; about 20% fine sand; dry, dark brown; firm; some CaCO3 white veinlettes and horizons.
	Reach 4B1, River Bank Left, Merced County, on Middle Ditch, South of San Joaquin River, on edge of farm field.	-	_												95.9	3.6 to 5.6 ft. CLAYEY SAND, SC: About 60% fine sand; about 40% fines with medium plasticity; dry, tan; trace cemented
	DRILLED BY: Bureau of Reclamation: PN Region drill crew: Gerry Hansen, driller Chris Patersen, beloer	-		19.1	18.9	60.9	1.1	28.7	10.2	13.9	SC 95	.1		sc		layers up to 1/4 inch thick; moderate firm to moderate soft.
	Chris Peterson, helper Dennis Read, helper	5-	-											SC		Lab Data Interval 3.7 to 4.4 ft.
	DRILL RIG: Truck mounted Central Mining Equipment (CME) 75 DRILLING & SAMPLING METHODS:	-	96										-		93.9	5.6 to 10.1 ft. LEAN CLAY, CL: About 90-95% fines with medium plasticity, medium toughness; about 5-10% fine sand; dry to moist, olive tan with reddish brown oxidation; firm to very firm.
	The drill hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous (undisturbed) sampling was	-		57.5	38.1	4.4	0.0	44.0	22.0	24.7	CL	-	¥			Lab Data Interval 7.0 to 8.0 ft.
	performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5 feet long split barrel dry core system (FADC). Unless indicated otherwise, the	-									91	.5		CL		Note: 8.6 to 10.1 ft.: Disturbed by drilling action, some silty layers.
	FADC was placed inside the augers and the cutting shoe of the FADC extended 0.2 foot beyond the auger drill bit. A free-spinning adapter was placed at the top of the FADC, so that the FADC did not rotate while advancing the	- 10 													89.4	 10.1 to 10.6 ft. SANDY LEAN CLAY, s(CL): About 65% fines with medium plasticity, medium toughness; about 35% fine sand; moist, olive brown with red brown; medium firmness; layered.
	augers. Interval Method 0.0 to 31.1 ft. FADC	-	82											s(CL)	88.9	10.6 to 13.6 ft. POORLY GRADED SAND WITH SILT, SP-SM: About 90% fine sand, micaceous; about 10% non plastic fines; moist to wet, olive tan;
	DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 3.7 ft Moderate soft	-														medium soft; sand coarsens downwards to fine and medium at 12.6 to 13.6 ft.
	8.6 to 13.6 ft Moderate firm, add water 13.6 to 31.1 ft Catcher with nylon															Lab Data Interval 13.0 to 13.5 ft.
	DRILLING FLUID, RETURN AND COLOR: 0.0 to 31.1 ft Drilled without fluid	_		0.5	5.2	94.3	0.0	NP	NP	21.8	SP-SM ₈₆	.0				13.6 to 23.6 ft. POORLY GRADED SAND, SP: About 95% fine and medium sand, micaceous;
	WATER LEVEL FROM TOC: 10.45 ft. on 12/08/2010	-														about 50% line and medium sand, micaceous, about 5% non plastic fines; moist to wet, olive tan; medium soft.
	REASON FOR HOLE TERMINATION: The hole was terminated upon successful completion to the target depth.	15 														Lab Data Interval 16.0 to 17.0 ft.
	HOLE COMPLETION: Well Casing: +3.0 to 12.0 ft. (2-inch blank PVC)	_	40									- °	Qal			23.6 to 28.6 ft. NO RECOVERY Note: Trace POORLY GRADED SAND, SP in
4:19:31 PM	Dual U-pack Screen: 13.0 to 28.0 ft. (2-inch inner screen; 3-inch outer screen; slotted 0.010-inch) U-Pack Screen Filter Pack: #2/12 Sand Filter Pack: 12.0 to 31.1 ft. (#3 Sand) Sump: 28.0 to 31.1 ft. (2-inch blank PVC with slip cap)	-		1.1	6.7	92.1	0.1	NP	NP	24.4	SP-SM 82	.5		SP-SM	I	sock 28.6 to 29.9 ft. POORLY GRADED SAND WITH CLAY, SP-SC: About 90% fine sand; about 10% fines with medium to high plasticity; wet, blue to gray;
JRRP.GPJ 8/10/11	Bentonite Seal: 2.0 to 12.0 ft Concrete Seal: 0.0 to 2.0 ft. Well Completion: Steel surface casing with locking top, 6-inch by 6-inch by 5-foot long; 2.0 ft. diameter concrete pad. Lock: #2001 Masterlock	-														medium soft. <u>Lab Data Interval</u> _ 28.6 to 29.6 ft.
Ŋ	COMMENTS:				_						I		1			

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic

NR = No Recovery NA = Not applicable I.D. = inner diameter O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, Merced County

BEGUN: 11/17/10 FINISHED: 11/17/10
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 7.65 ft. (91.9 ft. - 12/08/2010)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,300,134.5 E 6,076,281.4 NAD83

TOTAL DEPTH: 31.1 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 99.5 ft. NADV88 ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: A. Warren REVIEWED BY: S. Dalton

SHEET 2 OF 2

PLASTICITY PV INDEX MOISTURE CONTENT LABORATORY CLASSIFICATION LABORATORY DATA VISUAL CLASSIFICATION GEOLOGIC UNIT **CLASSIFICATION AND** LIQUID LIMIT **NOTES** % CORE RECOVERY % GRAVEL PHYSICAL CONDITION % SAND <0.075 <0.005 29.9 to 31.1 ft. FAT CLAY, CH: About 90% fines with high plasticity; high toughness; about 10% fine sand; moist, green gray; very firm; homogenous. 28 Lab Data Interval 30.0 to 31.0 ft. 25 0 70.9 4.7 94.6 0.2 NP NP 21.1 SP-SM 0.5 SP-SC 100 *30*-55.0 39.3 24.0 CH **BOTTOM OF HOLE**

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-plastic NR = No Recovery NA = Not applicable

I.D. = inner diameter

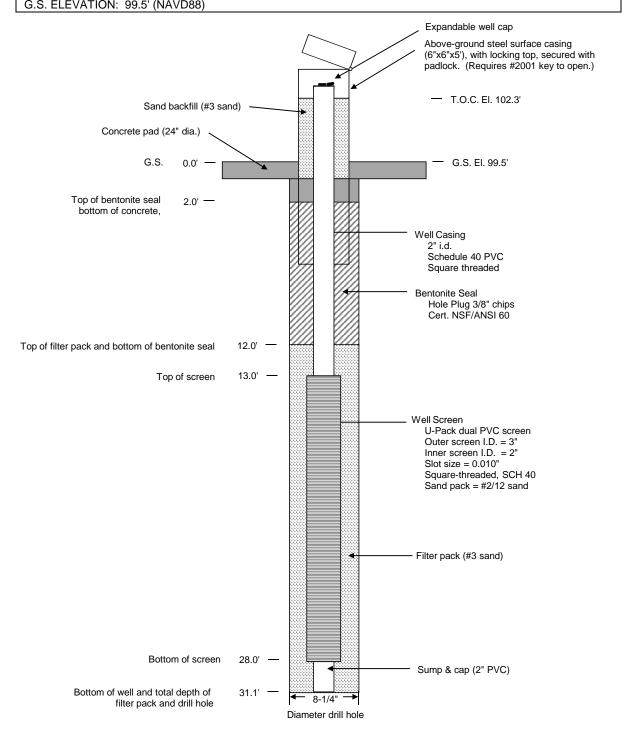
O.D. = outer diameter G.S. = Ground surface T.O.C. = Top of well casing SJR = San Joaquin River

U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name	County Name		Well Name		
S3RRP	Me	rced	Well Ivalie	P30 /MW-	10-114
Facility License, Permit or Monitoring Number	County Code		lumber	DNR Well ID Nur	
1. Can this well be purged dry? Yes] No	11. Depth to Water		velopment After	
2 Wall development mathed	/	(from top of	. 1.0	45. 1	0.45 n. (2.
2. Well development method surged with bailer and bailed	4 1	well casing)	a		
	61				
	4 2	Date	. 12.09	2.20101	2.08.201
	62	Duite	m m d	d v v v v m	$\frac{2}{m}\frac{081201}{d}$
	70				
	20	Time	c. 10:2	5 p.m. (0	:48 p.m.
	10				
	5 1	12. Sediment in well		inches	inches
	5 0	bottom			
Other	30	13. Water clarity	Clear 🖂	10 Clear	₹ 20
			Turbid 🖾		
3. Time spent developing well	min.		(Describe)	(Describ	e)
4. Depth of well (from top of well casisng)	<u>5</u> ft.				
5. Inside diameter of well	in.				7.00
6. Volume of water in filter pack and well		1			
casing	gal.	F			C!Y
	25_ gal.	Fill in if drilling flu	ids were used a	and well is at solid w	aste facility:
7. Volume of water removed from well	gal.				
0.44				mg/l	mg/1
8. Volume of water added (if any)	gal.	solids			
9. Source of water added		15. COD		mg/l	me/l
7. Journe of Water and			-		
		16. Well developed			
10. Analysis performed on water added?	es 🗆 No	First Name: Ge	vry.	Last Name: Ha	nsen
(If yes, attach results)		Firm:)		
17. Additional comments on development:		Trum.			
1020 1013 have the	0 0	/	, ,	1	
1025-1040 - Handbul 5	gal - C	lear then	turbe	C1	
1041-1048 - pumped 20	sallin	s to rea	N.		
	o con				
Name and Address of Facility Contact/Owner/Responsib	ole Party	I hereby certify th	at the above in	nformation is true an	d correct to the best
First Last Name: Name: Name:		of my knowledge			
Name:			1		
Facility/Firm:		Signature:	100		780
			W		
Street:		Print Name:			
City/State/Zip:		Firm:			
City/oratio/Zip.			_		
		1			

MW-10-114	GEOLOGIST: A. Warren							
WELL COMPLETION DIAGRAM	DRILLER: G. Hansen							
DATE COMPLETED: 11/17/2010	HELPERS: D. Read & C. Peterson							
LOCATION: Field east of Turner Island Road								
T.O.C. COORDINATES: N2300134.48 E6076281.43 (NAD93) EL. 102.3' (NAVD88)								
C C ELEVATION: 00 5' (NA)/D00)								



NOTES:

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, RM 153, Merced County

BEGUN: 4/28/11 FINISHED: 4/28/11
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 4.0 ft. (86.9 ft. - 5/16/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,313,031.5 E 6,054,048.8 NAD83

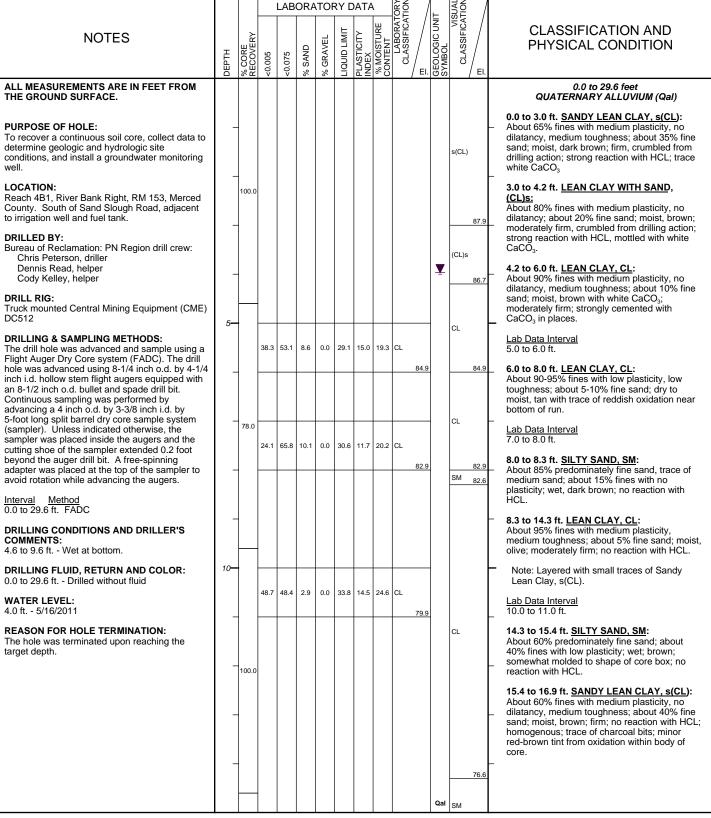
TOTAL DEPTH: 29.6 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 90.93 ft. NADV88
ANGLE FROM HORIZONTAL: -90°
HOLE LOGGED BY: A. Warren/M. Lyttoe

REVIEWED BY: T. Lewis



COMMENTS:

FADC = Flight Auger Dry Core NP = Non-Plastic NR = No Recovery

NR = No Recovery NA = Not Applicable I.D. = Inner Diameter O.D. = Outer Diameter G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ₹ = Top of Groundwater

SHEET 2 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, RM 153, Merced County

BEGUN: 4/28/11 FINISHED: 4/28/11 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 4.0 ft. (86.9 ft. - 5/16/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,313,031.5 E 6,054,048.8 NAD83

TOTAL DEPTH: 29.6 ft.

DEPTH TO BEDROCK: Not Encountered

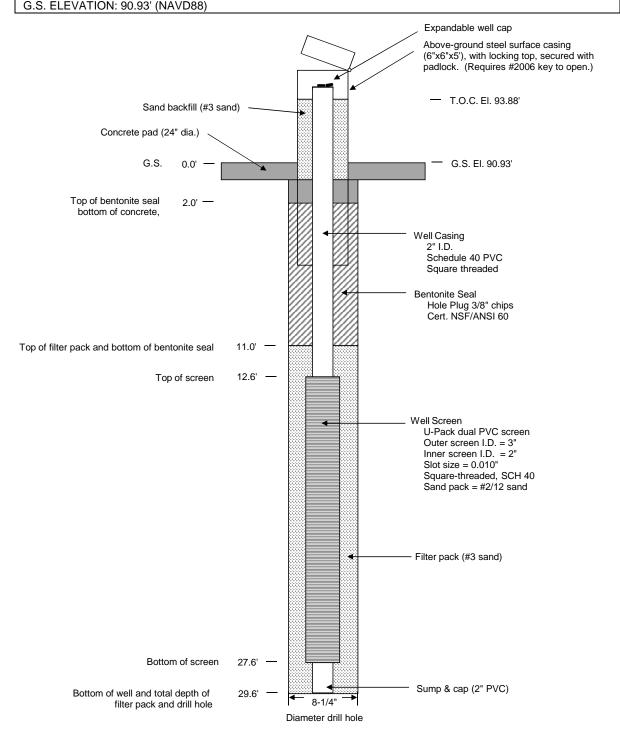
STATE: California

GROUND ELEVATION: 90.93 ft. NADV88 ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: A. Warren/M. Lyttge

REVIEWED BY: T. Lewis

HOLE COMPLETION: Completed as a groundwater monitoring well. Well Casing: +2.95 to 12.6 ft. (2-inch I.D. blank PVC) Dual U-pack Screen: 12.6 to 27.6 ft. (2-inch I.D. inner screen; 3-inch I.D. outer screen; slotted 0.010-inch) U-Pack Screen Filter Pack: (#2/12 Sand) Filter Pack: 11.0 to 29.6 ft. (#3 Sand) Sump: 27.6 to 29.6 ft. (2-inch I.D. blank PVC with slip cap) Concrete Seal: 0.0 to 2.0 ft. Bentonite Seal: 2.0 to 11.0 ft. Well Completion: 6-inch by 6-inch by 5-foot long steel surface casing with locking top; 2.0-foot diameter concrete pad. Lock: #2006 Masterlock	- OEPTH	% CORE RECOVERY		44.4	QNVS %	% GRAVEL	TIQUID LIMIT 31.5	PLASTICITY PLASTICITY INDEX			SY SY	s(CL)	CLASSIFICATION AND PHYSICAL CONDITION EI. 16.9 to 19.3 ft. LEAN CLAY, CL: About 85% fines with medium plasticity, no dilatancy; medium to high toughness; about 15% fine sand; moist; olive; firm; strong reaction with HCL; stratified; trace of charcoal bits; minor localized oxidation. Note: Strong cementation from 17.9 to 18.2 ft. Lab Data Interval 18.0 to 19.0 ft. 19.3 to 24.8 ft. SANDY SILT, s(ML): About 60% fines with low plasticity, low dry strength, slow dilatancy, low toughness; about 40% fine sand; brown; very firm; no reaction with HCL; homogenous; slight trace of charcoal bits; localized oxidation. Lab Data Interval
Completed as a groundwater monitoring well. Well Casing: +2.95 to 12.6 ft. (2-inch I.D. blank PVC) Dual U-pack Screen: 12.6 to 27.6 ft. (2-inch I.D. inner screen; 3-inch I.D. outer screen; slotted 0.010-inch) U-Pack Screen Filter Pack: (#2/12 Sand) Filter Pack: 11.0 to 29.6 ft. (#3 Sand) Sump: 27.6 to 29.6 ft. (2-inch I.D. blank PVC with slip cap) Concrete Seal: 0.0 to 2.0 ft. Bentonite Seal: 2.0 to 11.0 ft. Well Completion: 6-inch by 6-inch by 5-foot long steel surface casing with locking top; 2.0-foot diameter concrete pad. Lock: #2006 Masterlock	- 20-			44.4	12.7					CL		s(CL)	About 85% fines with medium plasticity, no dilatancy; medium to high toughness; about 15% fine sand; moist; olive; firm; strong reaction with HCL; stratified; trace of charcoal bits; minor localized oxidation. Note: Strong cementation from 17.9 to 18.2 ft. Lab Data Interval 18.0 to 19.0 ft. 19.3 to 24.8 ft. SANDY SILT, s(ML): About 60% fines with low plasticity, low dry strength, slow dilatancy, low toughness; about 40% fine sand; brown; very firm; no reaction with HCL; homogenous; slight trace of charcoal bits; localized oxidation. Lab Data Interval
	-	1											23.0 to 24.0 ft. 24.8 to 25.2 ft. POORLY SORTED SAND WITH CLAY, SP-SC: About 90% fine sand; about 10% fines with medium plasticity; moist, gray with reddish-brown in top half; firm; no reaction with HCL; slight increase in fines toward the bottom; oxidation in top half. 25.2 to 26.3 ft. POORLY SORTED SAND, SP:
	_ _ _	68.0	10.8	57.0	32.2	0.0	NP	NP	23.7	s(ML) 66.9	<u> </u>	SP-SC	About 95% fine sand with lenses of medium sand; about 5% fines; wet, gray grading to brown toward bottom; molded to shape of core box; no reaction with HCL. Lab Data Interval 25.5 to 26.0 ft. 26.3 to 26.5 ft. CLAYEY SAND, SC: About 85% fine sand; about 15% fines with medium plasticity; moist, gray; soft; no reaction with HCL. Note: Contains lenses of Lean Clay with Sand, (CL)s. 26.5 to 29.6 ft. No Recovery
	-	38.0	2.1	5.2	92.7	0.0	NP	NP	23.0	SP-SM 64.9	<u>.</u>		4.6 4.4 —
COMMENTS: FADC = Flight Auger Dry Core NP = Non-Plastic += Ak NR = No Recovery T.O.C NA = Not Applicable I.D. = Inner Diameter O.D. = Outer Diameter	bove C. = T = Sar	Ground Group	und S f We guin	Surfa II Ca: Rive	ce sing	вотт	ГОМ (OF HO	DLE		n. We	on info	ormation is provided in attached Well Completion elopment information is provided in attached Monitoring orm.

MW-11-137	GEOLOGIST: M. Lyttge							
WELL COMPLETION DIAGRAM	DRILLER: C. Peterson							
DATE COMPLETED: 4/28/2011	HELPERS: D. Read & C. Kelly							
LOCATION: Field South of Sand Slough Road. Reach 4B1, River Bank Right, RM 153, Merced County.								
T.O.C. COORDINATES: N2313031.54 E6054048.76 (NAD93) EL.93.88 (NAVD88)								
C C FLEVATION, OO COL(NA)/DOO								



NOTES:

U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name	County Name		Well Name	/	
SJRR P	MERCE	0	W-1.3.	1MW-11-13	37
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well No		'DNR Well ID Number	
1. Can this well be purged dry? Yes	No 🗌	11. Depth to Water	4	elopment After Dev	2000000
2. Well development method			a′ :	<u>0</u> _ft	fi.
surged with bailer and bailed 4	- 1	well casing)			
surged with bailer and pumped 6	51				
surged with block and bailed 4	2	Date	b.0511	61 20 1 1 05 y y y y m m	116,201
surged with block and pumped 🔯 6	5 2		mm d d	yyyy m m	dd yyyy
surged with block, bailed and pumped 7	0		. 7 7	∠ [] a.m.	C[] a.m.
compressed air	2.0	Time	c. 1 4: 2:	5 p.m. 1:1	. 三 p.m.
bailed only	0				
pumped only	5 1	12. Sediment in well		inches	inches
pumped slowly	0	bottom		8 9 9	
	<u> </u>	13. Water clarity	Clear 🛮 1	0 Clear [2 0
			Turbid 🔀 1	5 Turbid 🗆 :	2 5
	min.		(Describe) GRAY	(Describe)	
4. Depth of well (from top of well casisng) 31			SHWB		
5. Inside diameter of well	0 0 in.				
6. Volume of water in filter pack and well			***************************************		altre moralishe musikasa ne kanno e kan san e kanlo andanan a.
	gal.		1		-
	2 gal.	Fill in if drilling fluid	ds were used ar	nd well is at solid waste	facility;
7. Volume of water removed from well	gai.	14 Total assessed		mg/l	mall:
8. Volume of water added (if any)	gal.	solids	especially especially entering assuming	1118/1	mg/
9. Source of water added		15. COD		mg/l	mg/l
		16 W-11 d-11-land N	N /6 1		
		16. Well developed b	by. Name (IIIst, i		
10. Analysis performed on water added? You (If yes, attach results)	es 🗆 No	First Name:		Last Name:	
		Firm:			
17. Additional comments on development: SUKGED WITH BLUCK & BALL	CHECK	14. 116 East	C. d. 18 Mat	MILWINTER	47 2 F
SURFUE WITH BLOCK V DAGE	Crecio D	and the second	3000		7 2
INTERNALS VUTIL 5 GALS.					
Pumpoo wITH SUMP PUL	mp UI	WTIC CLEM	n. 50	GALS.	
Name and Address of Facility Contact/Owner/Responsible	le Party				
First Last	,	1		formation is true and co	orrect to the best
Name: Name:		of my knowledge.			
Facility/Firm:		Signature:			
Street:		Print Name:			· · · · · · · · · · · · · · · · · · ·
City/State/Zip:		Firm:			
			6		

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, RM 148.5, Merced County

BEGUN: 4/29/11 FINISHED: 4/29/11

DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 6.6 ft. (86.7 ft. - 5/16/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,323,926.7 E 6,054,783.8 NAD83

TOTAL DEPTH: 30.2 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 93.32 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: M. Lyttge REVIEWED BY: T. Lewis

				LAB	ORA	TOF	RY D	ATA	١	ORY TON		_	NOI NOI	/	
NOTES	рертн	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	% MOISTURE CONTENT	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT SYMBOL	CLASSIFICATION	/	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.													,		0.0 to 30.2 feet QUATERNARY ALLUVIUM (Qal)
PURPOSE OF HOLE: To recover a continuous soil core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well. LOCATION:	-	-											s(CL)	_	0.0 to 2.2 ft. SANDY LEAN CLAY, s(CL): About 65% fines with medium plasticity, medium toughness; about 35% fine sand; moist, dark brown with tan mottling; firm, portion crumbled from drilling action; strong reaction with HCL; moderately cemented with
Reach 4B1, River Bank Right, RM 148.5, Merced County. Adjacent to Mariposa Bypass.		100.0											s(CL)		CaCO ₃ from 1.2 to 2.0 ft. 2.2 to 3.0 ft. <u>SANDY LEAN CLAY, s(CL)</u> : About 600/ fines with the distribution
DRILLED BY: Bureau of Reclamation: PN Region drill crew: Chris Peterson, driller Dennis Read, helper	-	_	63.6	24.8	11.6	0.0	61.4	47.0	24.4	СН			90	.3	About 60% fines with medium plasticity, no dilatancy, low toughness; about 40% fine sand; moist, light brown with dark brown mottling; firm; no reaction with HCL.
Cody Kelley, helper DRILL RIG: Truck mounted Central Mining Equipment (CME) DC512 DRILLING & SAMPLING METHODS:	5 										89.3		(CH)s	-	3.0 to 6.6 ft. FAT CLAY WITH SAND. (CH)s: About 85% fines with high plasticity, high dry strength, no dilatancy, medium to high toughness; about 15% fine sand; dark brown; firm; reaction with HCL in CaCO ₃ nodules; moderate to strong CaCO ₃ cementation from 5.0 to 6.0 ft.
The drill hole was advanced and sample using a Flight Auger Dry Core system (FADC). The drill hole was advanced using 8-1/4 inch o.d. by 4-1/4	_														Lab Data Interval 3.0 to 4.0 ft.
inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5-foot long split barrel dry core sample system (sampler). Unless indicated otherwise, the sampler was placed inside the augers and the	_	_										<u>¥</u>	86 (ML)s	<u>.7</u>	6.6 to 8.1 ft. SILT WITH SAND, (ML)s: About 90% fines with low plasticity, slow dilatancy, low toughness; about 10% fine sand; moist, tan; soft to firm; weak reaction with HCL; traces of CaCO ₃ and charcoal.
cutting shoe of the sampler extended 0.2 foot beyond the auger drill bit. A free-spinning adapter was placed at the top of the sampler to avoid rotation while advancing the augers. Interval Method	-	60.0											85 SP-SM85	.2 — .1	8.1 to 8.2 ft. POORLY GRADED SAND WITH SILT, SP-SM: About 90% fine sand; about 10% fines with low plasticity; wet, brown; retains shape of core barrel; minor oxidation; no reaction with HCL.
0.0 to 30.2 ft. FADC DRILLING CONDITIONS AND DRILLER'S	-	1											NR	ŀ	8.2 to 10.2 ft. <u>No Recovery</u> 10.2 to 12.8 ft. SILTY SAND, SM:
COMMENTS: 5.2 to 10.2 ft Wet at bottom.	10-												83	L	About 60% fine sand; about 40% fines with low plasticity; wet, brown; retains shape of core barrel; minor oxidation; no reaction with HCL.
DRILLNG FLUID, RETURN AND COLOR: 0.0 to 30.2 ft Drilled without fluid			20.7	19.9	59.4	0.0	19.7	6.4	17.2	SC-SI	и			.1	Note: From 11.0 to 12.3 core molded to shape of core box.
WATER LEVEL: 6.6 ft 5/16/2011	-										82.3		SM	-	Lab Data Interval 10.5 to 11.0 ft.
REASON FOR HOLE TERMINATION: The hole was terminated upon reaching the target depth.	_	_												_	12.8 to 13.1 ft. LEAN CLAY, CL: About 100% fines with medium plasticity, no dilatancy, medium toughness; trace of fine sand; moist, gray; firm.
	-	58.0											CL 80	_	13.1 to 15.2 ft. <u>No Recovery</u>
	_	_											NR	-	15.2 to 18.7 ft. LEAN CLAY, CL: About 95% fines with medium plasticity, no dilatancy, medium toughness; about 5% fine sand; moist, gray; firm.
5															<u>Lab Data Interval</u> 16.0 to 17.0 ft.
5	15—	\vdash										Qal	78	.1	
														\perp	

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-Plastic

NR = No Recovery

NA = Not Applicable

I.D. = Inner Diameter O.D. = Outer Diameter

G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ■ = Top of Groundwater

SHEET 2 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, RM 148.5, Merced County

BEGUN: 4/29/11 FINISHED: 4/29/11 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 6.6 ft. (86.7 ft. - 5/16/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,323,926.7 E 6,054,783.8 NAD83

TOTAL DEPTH: 30.2 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 93.32 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: M. Lyttge REVIEWED BY: T. Lewis

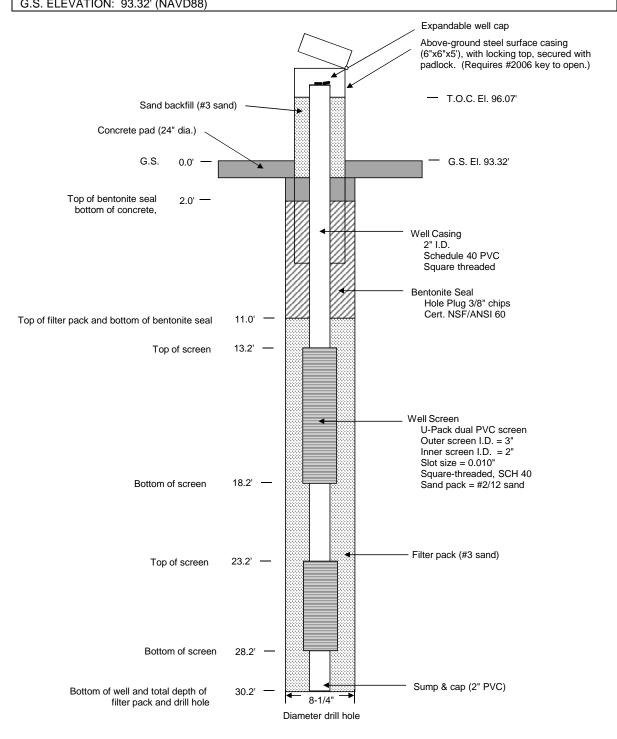
				LAB	ORA	TOF	RY D	_	١	TORY TION		_	SUAL		
NOTES	DEPTH	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	% MOISTURE CONTENT	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT SYMBOL	VISUAL	EI.	CLASSIFICATION AND PHYSICAL CONDITION
HOLE COMPLETION:		812	V	V	6	0		<u> </u>	0		/	00		/ =1.	18.7 to 20.9 ft. SILT, ML:
Completed as a groundwater monitoring well. Well Casing: +2.75 to 13.2 ft. and 18.2 to 23.2 ft. (2-inch I.D. blank PVC)	_		40.1	48.3	11.6	0.0	30.4	16.1	22.8	CL	76.3		CL		About 90% fines with low plasticity, slow dilatancy, low toughness; about 10% fine sand; moist, tan; firm; very weak reaction with HCL; mottled with oxidation; trace of charcoal.
Dual U-pack Screen: 13.2 to 18.2 ft. and 23.2 to 28.2 ft. (2-inch I.D. inner screen; 3-inch I.D. outer screen; slotted 0.010-inch) U-Pack Screen Filter Pack: (#2/12 Sand)		100.0	1												<u>Lab Data Interval</u> 19.0 to 20.0 ft.
Filter Pack: 11.0 to 30.2 ft. (#212 Sand) Filter Pack: 11.0 to 30.2 ft. (#3 Sand) Sump: 28.2 to 30.2 ft. (2-inch I.D. blank PVC with slip cap) Concrete Seal: 0.0 to 2.0 ft. Bentonite Seal: 2.0 to 11.0 ft.	_													74.6	20.9 to 22.4 ft. SANDY LEAN CLAY, s(CL): About 65% fines with low plasticity, slow dilatancy, medium toughness; about 35% fine sand; moist, gray; firm; no reaction with HCL.
Well Completion: 6-inch by 6-inch by 5-foot long steel surface casing with locking top; 2.0-foot diameter concrete pad. Lock: #2006 Masterlock	20-		20.3	75.3	4.4	0.0	30.2	6.0	28.1	ML	73.3		ML		22.4 to 23.7 ft. SILTY SAND, SM: About 75% fine and medium sand; about 25% low plasticity fines; wet, gray; molded to shape of box; minor oxidation near bottom; no reaction with HCL.
	_													72.4	<u>Lab Data Interval</u> 22.5 to 23.5 ft.
													s(CI	L)	23.7 to 30.2 ft. <u>No Recovery</u>
	-	_												70.9	_
		70.0												70.0	
	-	1	8.3	14.9	76.8	0.0	20.8	4.2	16.3	SC-S			SM		_
											69.8			69.6	
	-														_
	25—	_													_
	-														=
	_												NR		-
		0.0													
	-														-
	-														-
EL q	30-														_
* 1	ـــّـــ					BOT	ГОМ	OF H	OLE			<u> </u>	<u> </u>	63.1	
18/1															

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-Plastic NR = No Recovery NA = Not Applicable I.D. = Inner Diameter O.D. = Outer Diameter

G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ■ = Top of Groundwater

MW-11-138	GEOLOGIST: M. Lyttge							
WELL COMPLETION DIAGRAM	DRILLER: C. Peterson							
DATE COMPLETED: 4/29/2011	HELPERS: D. Read & C. Kelly							
LOCATION: Adjacent to Mariposa Bypass. Reach 4B1,	River Bank Right, RM 148.5, Merced County.							
T.O.C. COORDINATES: N2323926.73 E6054783.77 (NAD93) EL. 96.07 (NAVD88)								
C S ELEVATION: 03 22' (NAV/D88)								



NOTES:

U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name	County Name	· 100	Well Name	/no.41 - 11	172
STRRP	MENRO		1/	MW-11-	170
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well No	umber	DNR Well ID N	umber
1. Can this well be purged dry?	No 😡	11. Depth to Water			Development 9 6 ft.
2. Well development method			a	ft	ft.
	1	well casing)			
surged with block and bailed 4 surged with block and pumped 6 surged with block, bailed and pumped 7	1 2 2 2 0 0	I .			05/16/2011 m m d d y y y y y $0:400 p.m.$
pumped only		12. Sediment in well		inches	inches
	0	bottom			
Other	Ž	13. Water clarity	Clear □ 1 Turbid 2 1		□ 20 d□ 25
	min.		(Describe) Brown	(Desc	
	.7 ft.		3400		
5. Inside diameter of well	in.		***************************************		The state of the s
6. Volume of water in filter pack and well casing	gal.	Fill in if drilling fluid	is were used as	nd well is at solid	waste facility:
7. Volume of water removed from well	gal.	14. Total suspended			·
8. Volume of water added (if any)	gal.	solids		mg/i	
9. Source of water added	-	15. COD		mg/l	mg/l
		16. Well developed b	y: Name (first, I	ast) and Firm	
10. Analysis performed on water added? (If yes, attach results)	es 🗆 No	First Name:		Last Name:	
	·	Firm:			
17. Additional comments on development: SUNGED WITH BLOCK & BH IN TEN VALS. UNTIL 5 GAR	CC CHEC	NO VAGE FO	n 96 VB	anc Min	TOS AT 2 F
Rupen wit sump pump	O UNTIC	CLEUR.	50 6	405,	
Name and Address of Facility Contact /Owner/Responsible	e Party	T	1	r	
First Last Name: Name:		of my knowledge.		formation is true	and correct to the best
Facility/Firm:		Signature:			
Street:		Print Name:			
City/State/Zip:		Firm:			

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, RM 148.5, Merced County

BEGUN: 4/30/11 FINISHED: 4/30/11

DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 5.2 ft. (84.4 ft. - 5/16/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,322,532.5 E 6,054,528.6 NAD83

TOTAL DEPTH: 29.8 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 89.60 ft. NADV88

ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: M. Lyttge REVIEWED BY: T. Lewis

				LAB	ORA	TOF	RY D	ATA	١	ORY	. ,	/_	SUAL				
NOTES	рертн	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	% MOISTURE CONTENT	LABORATORY CLASSIFICATION	EI	GEOLOGIC UNIT	VISUAL	CLASSIFICAT	CLASSIFICATION AND PHYSICAL CONDITION		
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.													sc		0.0 to 29.8 feet QUATERNARY ALLUVIUM (Qal)		
PURPOSE OF HOLE: To recover a continuous soil core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	-	-												88.9	0.0 to 0.7 ft. CLAYEY SAND, SC: About 60% fine sand; about 40% fines with medium plasticity; dry to moist, light gray/brown; firm; weak reaction with HCL.		
LOCATION: Reach 4B1, River Bank Right, RM 148.5, Merced County. North of Sand Slough Road.	_	100.0											SM	1	 0.7 to 3.0 ft. <u>SILTY SAND, SM:</u> About 80% fine sand; about 20% fines with low plasticity; dry to moist, brown; roots and grass; weak reaction with HCL; trace CaCO₃ nodules. 		
DRILLED BY: Bureau of Reclamation: PN Region drill crew: Chris Peterson, driller Dennis Read, helper Cody Kelley, helper	_													86.6	Note: 0.7 to 0.8 ft: LEAN CLAY, CL: About 100% fines with medium plasticity, medium toughness; trace of fine sand.		
DRILL RIG: Truck mounted Central Mining Equipment (CME) DC512	_		45.7	24.7	29.6	0.0	47.2	34.2	23.0	(CL)s	S		(CI	_)s	3.0 to 6.3 ft. LEAN CLAY WITH SAND, (CL)s: About 80% fines with medium plasticity, medium toughness; about 20% fine sand; moist, chocolate brown mottled with light tan;		
DRILLING & SAMPLING METHODS: The drill hole was advanced and sample using a Flight Auger Dry Core system (FADC). The drill	5-										84.6	Ţ			strong reaction with HCL; moderately cemented with CaCO ₃ from 4.6 to 5.4 ft., very soft where not cemented.		
hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous sampling was performed by	_														<u>Lab Data Interval</u> _ 4.0 to 5.0		
advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5-foot long split barrel dry core sample system (sampler). Unless indicated otherwise, the sampler was placed inside the augers and the cutting shoe of the sampler extended 0.2 foot	_	82.0	12.9	23.1	64.0	0.0	NP	NP	22.8	SM	82.6	<u></u>	SM		6.3 to 7.4 ft. SILTY SAND, SM: About 65% fine sand; about 35% fines with low plasticity; wet, brown; somewhat molded to shape of core box; no reaction with HCL; trace charcoal.		
beyond the auger drill bit. A free-spinning adapter was placed at the top of the sampler to avoid rotation while advancing the augers.		62.0											(0)	82.2	<u>Lab Data Interval</u> 6.5 to 7.0 ft.		
Interval Method 0.0 to 29.8 ft. FADC			21.5	51.4	27.1	0.0	26.8	6.0	23.1	(CL-I	ML)s 81.1		(CI	_)s 81.0	7.4 to 8.6 ft. LEAN CLAY WITH SAND, (CL)s:		
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 4.8 to 9.8 ft Wet at 6.0 ft. 9.8 to 14.8 ft Catcher in.	-												s(C	CL) _{80.7}			
14.8 to 20.8 ft Catcher and baggie in. 20.8 to 24.8 ft Catcher and baggie in. 24.8 to 29.8 ft Catcher and baggie in.	10-														Lab Data Interval 8.0 to 8.5 ft.		
DRILLING FLUID, RETURN AND COLOR: 0.0 to 29.8 ft Drilled without fluid															8.6 to 8.9 ft. SANDY LEAN CLAY, s(CL): About 60% fines with medium plasticity; about 40% fine sand; moist to wet, gray; retains shape of core barrel; no reaction with HCL.		
WATER LEVEL: 5.2 ft 5/16/2011															8.9 to 9.8 ft. <u>No Recovery</u>		
REASON FOR HOLE TERMINATION: The hole was terminated upon reaching the target depth.	-														9.8 to 29.8 ft. No Recovery Note: 19.8 to 24.8 ft.: Trace (0.1 ft.)		
адустория.	_	0.0													recovery of heterogeneous mix of fine to medium sand. Logged as: POORLY SORTED SAND WITH SILT, SP-SM: About 90 % fine to medium sand, about 10% fines with no plasticity; wet, gray.		
	_														Note: Intervals with no recovery: when augers were pulled there was wet, fine to — medium sand between threads.		
												Qal	NR	ł			
COMMENTS:																	

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-Plastic

NR = No Recovery NA = Not Applicable I.D. = Inner Diameter O.D. = Outer Diameter G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ▼ = Top of Groundwater

SHEET 2 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, RM 148.5, Merced County

BEGUN: 4/30/11 FINISHED: 4/30/11 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 5.2 ft. (84.4 ft. - 5/16/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,322,532.5 E 6,054,528.6 NAD83

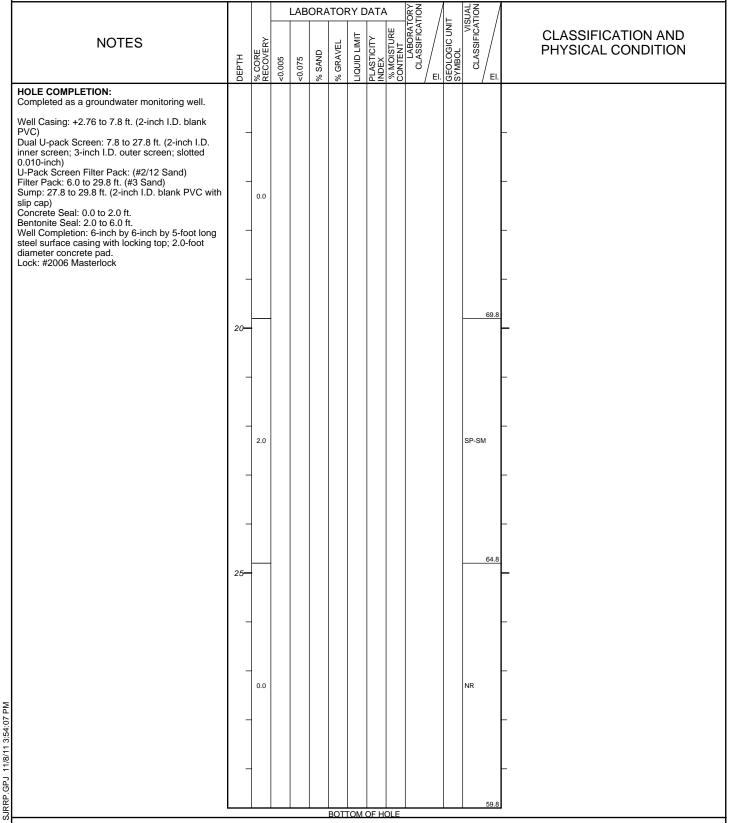
TOTAL DEPTH: 29.8 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 89.60 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: M. Lyttge REVIEWED BY: T. Lewis



COMMENTS:

SJRRP.GPJ

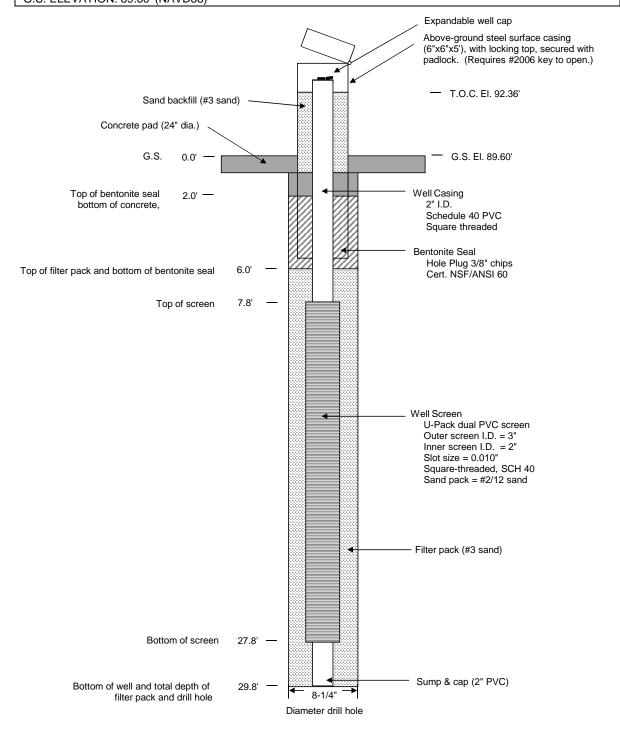
SJRRP DH

FADC = Flight Auger Dry Core NP = Non-Plastic NR = No Recovery NA = Not Applicable I.D. = Inner Diameter

O.D. = Outer Diameter

G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ▼ = Top of Groundwater

MW-11-139	GEOLOGIST: M. Lyttge								
WELL COMPLETION DIAGRAM	DRILLER: C. Peterson								
DATE COMPLETED: 4/30/2011	HELPERS: D. Read & C. Kelly								
LOCATION: Field North of Sand Slough Road. Reach 4B1, River Bank Right, RM 148.5, Merced County.									
T.O.C. COORDINATES: N2322532.47 E6054528.62 (NAD93) EL.92.39' (NAVD88)									
G.S. FLEVATION: 89 60' (NAVD88)									



NOTES:

U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name County Nam	
STRRP MER	CED W-11-/MW-11-139
Facility License, Permit or Monitoring Number County Code	Wis. Unique Well Number DNR Well ID Number
1. Can this well be purged dry? Yes No	Before Development After Development 11. Depth to Water
2. Well development method	(from top of $a = 8.2$ ft. 9.2 ft.
surged with bailer and bailed 4 1	well casing)
surged with bailer and pumped 6 1	
surged with block and bailed 4 2	Date b. 05/16/20/165/16/20/1
surged with block and pumped 2 6 2	mm ddyyyy mm ddyyy
surged with block, bailed and pumped 70	л с // с јя в.т
compressed air	Time c. $10:45$ a.m. $11:30$ p.m.
bailed only	
pumped only	12. Sediment in well inches inches
pumped slowly	bottom
Other	13. Water clarity Clear 10 Clear 20
	Turbid Ø 15 Turbid □ 25
3. Time spent developing well45 min.	(Describe) (Describe)
4. Depth of well (from top of well casisne)	
4. Depth of well (from top of well casisng) 34. \(\subseteq \text{ft.}\)	GNAY
5. Inside diameter of well	Sans
5. Inside diameter of well $\underline{2}.\underline{0}$ in.	
	And described the second described of the second descr
6. Volume of water in filter pack and well	And the state of t
casing gal.	Fill in it deithing Oulds owner wood and wall is at actid wants facilities
7. Volume of water removed from well 55 gal.	Fill in if drilling fluids were used and well is at solid waste facility:
7. Volume of water removed from well gal.	14 T . 1
8. Volume of water added (if any) gal.	14. Total suspended mg/l mg/l mg/l
8. Volume of water added (if any) gal.	sorius
9. Source of water added	15. COD mg/l mg/l
Commissional Commission Commissio	
	16. Well developed by: Name (first, last) and Firm
10. Analysis performed on water added?	First Name: Last Name:
(If yes, attach results)	
3.71 A.J.C	Firm:
17. Additional comments on development: SURGED WITH BLOCK & BACK CHECK V	INCUE FOR SEVERNIC MINUTES AT ZETS
WYENDAL UNTIL 5 GHES PUMPE	
Pumpso WITH SUMP PUMP 50) 6ACS,
Name and Address of Facility Contact/Owner/Responsible Party	I hereby certify that the above information is true and correct to the best
First Last	of my knowledge.
Name: Name:	
Facility/Firm	Signature:
Facility/Firm:	
Street:	Print Name:
City/State/Zip:	Firm:
-	

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, RM 155.1, Merced County

BEGUN: 5/1/11 FINISHED: 5/1/11
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 5.9 ft. (88.7 ft. - 5/16/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,307,852.1 E 6,057,225.7 NAD83

TOTAL DEPTH: 30.3 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 94.61 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: M. Lyttge
REVIEWED BY: T. Lewis

				LAB	ORA	TOF			١	TION TION		<u> </u>	SUAL	
NOTES	DEPTH	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	% MOISTURE CONTENT	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT SYMBOL	CLASSIFICATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.										Í			,	0.0 to 3.4 feet ROADFILL (Fill)
PURPOSE OF HOLE: To recover a continuous soil core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring	_	-											(CL)s	0.0 to 2.1 ft. <u>LEAN CLAY WITH SAND</u> , (CL)s: dry to moist, brown; no reaction with HCL.
well. LOCATION: Description: Description Park Left PM 455 4 Margad	-	_										Fill	92.	2.1 to 3.0 ft. POORLY SORTED SAND WITH SILT, SP-SM About 90% fine sand; brown; no reaction with HCL.
Reach 4B1, River Bank Left, RM 155.1, Merced County. Field east of Turner Island Road.		86.8											SP-SM 91.	3.0 to 3.4 ft. <u>SILTY SAND, SM</u> About 80% fine sand; moist; brown; no reaction with HCL.
DRILLED BY: Bureau of Reclamation: PN Region drill crew: Chris Peterson, driller Dennis Read, helper													SM 91.:	3.4 to 30.3 feet QUATERNARY ALLUVIUM (Qal)
Cody Kelley, helper DRILL RIG:	-	-											SP	3.4 to 5.8 ft. POORLY SORTED SAND, SP: About 95% fine to medium sand; moist, light brown; about 5% fines; molded to shape of
Truck mounted Central Mining Equipment (CME) DC512	5												90.	core box; minor oxidation from 4.3 to 4.6 ft. and from 5.3 to 5.4 ft.; no reaction with HCL.
DRILLING & SAMPLING METHODS: The drill hole was advanced and sample using a Flight Auger Dry Core system (FADC). The drill			0.5	5.7	93.8	0.0	NP	NP	21.0	SP-SM	1 88.8	_	89.3 SP 88.3	
hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit.	_	-									00.0	Ţ	SP-SM	5.3 to 5.8 ft. 5.8 to 6.8 ft. POORLY SORTED SAND
Continuous sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5-foot long split barrel dry core sample system	_												87.	WITH SILT, SP-SM:
(sampler). Unless indicated otherwise, the sampler was placed inside the augers and the cutting shoe of the sampler extended 0.2 foot													CL 87.	barrel; minor oxidation in 0.01 to 0.03 ft. thick bands; no reaction with HCL.
beyond the auger drill bit. A free-spinning adapter was placed at the top of the sampler to avoid rotation while advancing the augers.	_	100.0												6.8 to 7.6 ft. LEAN CLAY, CL: About 100% fines with medium plasticity, medium dry strength, slow dilatancy, medium toughness; trace of fine sand, mostly mica;
Interval Method 0.0 to 30.3 ft. FADC	_													moist, brown; firm; minor nodules of oxidation; no reaction with HCL.
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 0.0 to 5.3 ft Wet at bottom. 10.3 to 15.3 ft Catcher in. 15.3 to 20.3 ft Catcher and baggie in.	10-		68.0	29.0	3.0	0.0	72.8	43.2	52.7		84.6		СН	7.6 to 12.0 ft. FAT CLAY, CH: About 100% fines with high plasticity, high dry strength, high toughness; trace of fine sand, mostly mica; moist, dark gray; firm; minor oxidation.
20.3 to 25.3 ft Catcher and baggie in. 25.3 to 30.3 ft Catcher and baggie in.	_													<u>Lab Data Interval</u> 9.0 to 10.0 ft.
DRILLING FLUID, RETURN AND COLOR: 0.0 to 30.3 ft Drilled without fluid														12.0 to 13.6 ft. POORLY SORTED SAND WITH SILT, SP-SM:
WATER LEVEL: 5.9 ft 5/16/2011	_	-											82.	plasticity; wet, brown; retains shape of core barrel; minor oxidation in nodules and 0.01 to
REASON FOR HOLE TERMINATION: The hole was terminated upon reaching the target depth.	_	100.0											SP-SM	0.03 ft. thick bands throughout; no reaction with HCL.
	_												81.	13.6 to 15.3 ft. SANDY SILT, s(ML): About 65% fines with low plasticity; about 35% fine sand; wet, gray; somewhat molded to shape of core box; no reaction with HCL; trace brown fibrous organics.
			14.6	53.0	32.4	0.0	NP	NP	34.7	s(ML)	-		s(ML)	<u>Lab Data Interval</u> 14.0 to 15.0 ft.
	15—	-									79.6		79.:	 -

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-Plastic NR = No Recovery

NR = No Recovery NA = Not Applicable I.D. = Inner Diameter O.D. = Outer Diameter G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ▼ = Top of Groundwater

GEOLOGIC LOG OF DRILL HOLE NO. MW-11-140

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, RM 155.1, Merced County

BEGUN: 5/1/11 FINISHED: 5/1/11
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 5.9 ft. (88.7 ft. - 5/16/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,307,852.1 E 6,057,225.7 NAD83

TOTAL DEPTH: 30.3 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 94.61 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

SHEET 2 OF 2

HOLE LOGGED BY: M. Lyttge REVIEWED BY: T. Lewis

LABORATORY DATA LABORATORY CLASSIFICATION VISUAI CLASSIFICATION PLASTICITY INDEX % MOISTURE CONTENT **CLASSIFICATION AND** LIQUID LIMIT **NOTES** % CORE RECOVERY GRAVEL PHYSICAL CONDITION SAND <0.005 **15.3 to 30.3 ft. No Recovery**Trace sand on sampler and augers. Logged as POORLY SORTED SAND WITH SILT, (SP-SM): About HOLE COMPLETION: Completed as a groundwater monitoring well. Well Casing: +2.67 to 13.3 ft. (2-inch I.D. blank 90% fine sand; about 10% fines with no Qal plasticity; wet, gray. Dual U-pack Screen: 13.3 to 28.3 ft. (2-inch I.D. inner screen; 3-inch I.D. outer screen; slotted 0.010-inch) U-Pack Screen Filter Pack: (#2/12 Sand) Filter Pack: 12.0 to 30.3 ft. (#3 Sand) Sump: 28.3 to 30.3 ft. (2-inch I.D. blank PVC with slip cap) Concrete Seal: 0.0 to 2.0 ft. Bentonite Seal: 2.0 to 12.0 ft. Well Completion: 6-inch by 6-inch by 5-foot long steel surface casing with locking top; 2.0-foot diameter concrete pad. Lock: #2006 Masterlock 20-SP-SM 0.0 25-0.0 SJRRP.GPJ 11/8/11 3:54:07 PM BOTTOM OF HOLE

COMMENTS:

SJRRP.GPJ

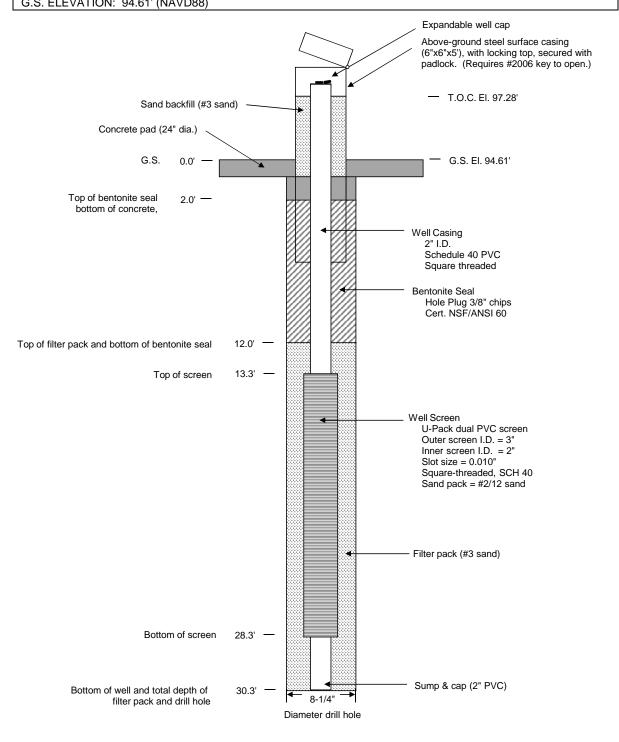
SJRRP DH

FADC = Flight Auger Dry Core NP = Non-Plastic NR = No Recovery NA = Not Applicable I.D. = Inner Diameter

O.D. = Outer Diameter

G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ▼ = Top of Groundwater

MW-11-140	GEOLOGIST: M. Lyttge								
WELL COMPLETION DIAGRAM	DRILLER: C. Peterson								
DATE COMPLETED: 5/1/2011	HELPERS: D. Read & C. Kelly								
LOCATION: Field east of Turner Island Road. Reach 4B1, River Bank Left, RM 155.1, Merced County.									
T.O.C. COORDINATES: N2307852.05 E6057225.69 (NAD93) EL. 97.28 (NAVD88)									
C S ELEVATION: 04 61' (NAV/D99)									



NOTES:

U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name	County Name		Well Name	/	P
SJRRP	MERCE		W-20,	/MW-M	-140
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well N	umber	DNR Well ID	Vumber
1. Can this well be purged dry? Yes	No 📈	11. Depth to Water			er Development
2. Well development method		(from top of	a 8 :	<u> </u>	5 5 ft.
surged with bailer and bailed	4 1	well casing)			
surged with bailer and pumped	61				
	4 2	Date	b. 0511	612011	051161201 mm d d y y y
	6 2		m m d d	д уууу	mm ddyyy
	70	_	1 3	5 □ a.m.	2./5 a.m.
	20	Time	c : _ :	<u> </u>	=: p.m.
bailed only		12. Sediment in well		ingling	to a to a c
pumped only pumped slowly		bottom		inches	inches
	5 0	13. Water clarity	Clear 1	 'Clea	20
Odici		15. Water clairty	Turbid 🔣		(, □ 20 id□ 25
3. Time spent developing well	40 min.		(Describe)		cribe)
4. Depth of well (from top of well casisng)	32ft.		GREEN	1/	
4. Deput of well (from top of well casisfig)			SHULD		
5. Inside diameter of well 2	00 in.				
•			***************************************		
6. Volume of water in filter pack and well					
casing	gal.				1
		Fill in if drilling flui	ds were used a	and well is at soli	d waste facility:
7. Volume of water removed from well	gal.				
		14. Total suspended		mg/l	mg/l
8. Volume of water added (if any)	gal.	solids			
0.5		15. COD		**	10
9. Source of water added		15. COD		mg/i	mg/l
		16. Well developed t	ov: Name (first	last) and Firm	
10. Analysis performed on water added?	rcs □ No	First Name:)	Last Name:	
(If yes, attach results)		rust ranc.		Last ivaine.	
,		Firm:			
17. Additional comments on development:				entinal I	augusTES AT
17. Additional comments on development: 5UKG-BD WITH BLOCK &	BULL CHE	FOR VALUE	FOR SE	300000	4/100/07 11
1 FT. IN TENUACS UNTIL	5 6AC	Su Pump &	9		
Pumper with sump p		//.		SO RACO	2
Pumper with sump &	unp u	all cle	9-1c.		/4
• 6					
Name and Address of Facility Contact/Owner/Responsi	ble Party	I hereby certify th	at the above in	formation is tone	and correct to the best
First Last		of my knowledge.		dominadon is due	and correct to the best
Name:Name:			7		
P-111-721		Signature:			
Facility/Firm:					
Street:		Print Name:			
City/State/Zip:		Firm:			
-	54				
		<u> </u>			

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, RM 148.8, Merced County

BEGUN: 5/2/11 FINISHED: 5/2/11
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 4.7 ft. (84.6 ft. - 5/16/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,321,075.1 E 6,053,794.7 NAD83

TOTAL DEPTH: 29.6 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 89.26 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: M. Lyttge
REVIEWED BY: T. Lewis

				LAB	ORA	TOF	RY D	ATA	١	ORY TON		_	ION ION		
NOTES	рертн	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	% MOISTURE CONTENT	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION	/ EI.	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.		_			Ţ										0.0 to 29.6 feet QUATERNARY ALLUVIUM (Qal)
PURPOSE OF HOLE: To recover a continuous soil core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	_	-											SC (CL)s	88.2	0.0 to 1.1 ft. CLAYEY SAND, SC: About 65% fine sand; about 35% fines with medium plasticity, medium toughness; dry to moist, brown; strong reaction with HCL; trace of visible CaCO₃ nodules.
LOCATION: Reach 4B1, River Bank Right, RM 148.8, Merced County. North of Sand Slough Road.	-	97.8												87.2	(CL)s: About 75% fines with medium plasticity,
DRILLED BY: Bureau of Reclamation: PN Region drill crew: Chris Peterson, driller	_	_											sc		medium toughness; about 25% fine sand; dry to moist, gray; hard; strong reaction with HCL; — CaCO ₃ nodules, small charcoal nodules.
Dennis Read, helper Cody Kelley, helper DRILL RIG:	_													85.4	2.1 to 3.9 ft. CLAYEY SAND, SC: About 60% fine sand; about 40% fines with medium plasticity; moist, brown; weak reaction with HCL.
Truck mounted Central Mining Equipment (CME) DC512 DRILLING & SAMPLING METHODS: The drill hole was advanced and sample using a Flight Auger Dry Core system (FADC). The drill	5—											Ţ			3.9 to 8.1 ft. SILTY SAND, SM: About 55% fine sand; about 45% fines with low plasticity; moist to wet, light brown; strong reaction with HCL; where moist keeps shape, where wet becomes loose.
hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous sampling was performed by	_												SM		Lab Data Interval 6.0 to 7.0 ft.
advancing a 4 inch o.d. by 3-3/8 inch i.d. by			14.0	30.4	55.6	0.0	NP	NP	21.3	SM					8.1 to 9.6 ft. No Recovery
5-foot long split barrel dry core sample system (sampler). Unless indicated otherwise, the sampler was placed inside the augers and the cutting shoe of the sampler extended 0.2 foot beyond the auger drill bit. A free-spinning	_	70.0									82.3				Note: Interval possibly compacted SM above. — Material is above compactible in moist section.
adapter was placed at the top of the sampler to avoid rotation while advancing the augers.															9.6 to 11.9 ft. LEAN CLAY WITH SAND, (CL)s:
Interval Method 0.0 to 29.6 ft. FADC														81.2	 About 75% fines with medium plasticity, no dilatancy, medium toughness; about 25% fine sand; moist, gray; firm; weak reaction with HCL; small charcoal bits throughout.
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 4.6 to 9.6 ft Wet. 19.6 to 24.6 ft Catcher with nylon. 24.6 to 29.6 ft Catcher with nylon.	-												NR	79.7	- 11.9 to 15.0 ft. SANDY LEAN CLAY, s(CL): About 60% fines with medium plasticity, no dilatancy, medium toughness; about 40% fine sand; moist, gray; firm; weak reaction with
DRILLING FLUID, RETURN AND COLOR: 0.0 to 29.6 ft Drilled without fluid	10-														HCL; minor amount of small charcoal bits throughout.
WATER LEVEL: 4.7 ft 5/16/2011													(CL)s		Lab Data Interval 12.0 to 13.0 ft.
REASON FOR HOLE TERMINATION: The hole was terminated upon reaching the target depth.	_	96.0												77.4	15.0 to 18.3 ft. SANDY SILT, s(ML): About 55% fines with low plasticity; about 45% fine sand; moist to wet, brown; retains shape of core barrel; no reaction with HCL; oxidation in thin bands (0.01 ft. thick); band of charcoal
		30.0	23.8	32.5	43.7	0.0	25.5	10.3	19.3	s(CL)					(0.02 ft. thick) at 16.1 ft. <u>Lab Data Interval</u> 16.0 to 17.0 ft.
	-	-									76.3				18.3 to 19.6 ft. <u>No Recover</u> y
													s(CL)		Note: Interval possibly compacted s(ML) above.
	_											Qal		74.3	19.6 to 19.8 ft. SILTY SAND, SM: About 55% fine sand; about 45% fines with low plasticity; moist to wet, brown; retains shape of core barrel; no reaction with HCL.

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-Plastic NR = No Recovery NA = Not Applicable I.D. = Inner Diameter O.D. = Outer Diameter

G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ▼ = Top of Groundwater

GEOLOGIC LOG OF DRILL HOLE NO. MW-11-141

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, RM 148.8, Merced County

BEGUN: 5/2/11 FINISHED: 5/2/11
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 4.7 ft. (84.6 ft. - 5/16/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,321,075.1 E 6,053,794.7 NAD83

TOTAL DEPTH: 29.6 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 89.26 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

SHEET 2 OF 2

HOLE LOGGED BY: M. Lyttge REVIEWED BY: T. Lewis

LABORATORY DATA LABORATORY CLASSIFICATION VISUAL CLASSIFICATION SEOLOGIC UNIT PLASTICITY INDEX % MOISTURE CONTENT **CLASSIFICATION AND** LIQUID LIMIT **NOTES** % CORE RECOVERY GRAVEL PHYSICAL CONDITION SAND <0.005 HOLE COMPLETION: 19.8 to 24.6 ft. POORLY SORTED SAND Completed as a groundwater monitoring well. WITH SAND, SP-SM: About 90% fine sand; about 10% fines; wet, gray; molds to shape of box; no reaction with HCL. Well Casing: +2.69 to 12.6 ft. (2-inch I.D. blank Dual U-pack Screen: 12.6 to 27.6 ft. (2-inch I.D. inner screen; 3-inch I.D. outer screen; slotted Lab Data Interval 44.2 NP 13.9 41.9 0.0 NP 24.5 s(ML) 0.010-inch) 20.0 to 21.0 ft. s(ML) U-Pack Screen Filter Pack: (#2/12 Sand) 72.3 Filter Pack: 12.0 to 29.6 ft. (#3 Sand) Sump: 27.6 to 29.6 ft. (2-inch I.D. blank PVC with 24.6 to 29.6 ft. No Recovery 72.0 slip cap) Concrete Seal: 0.0 to 2.0 ft. Bentonite Seal: 2.0 to 12.0 ft. Well Completion: 6-inch by 6-inch by 5-foot long steel surface casing with locking top; 2.0-foot 71.0 diameter concrete pad. Lock: #2006 Masterlock NR 69.7 SM 69.5 20-11.3 86.3 0.0 NP NP 26.5 SM 22.0 SP-SM 25 0.0 NR BOTTOM OF HOLE

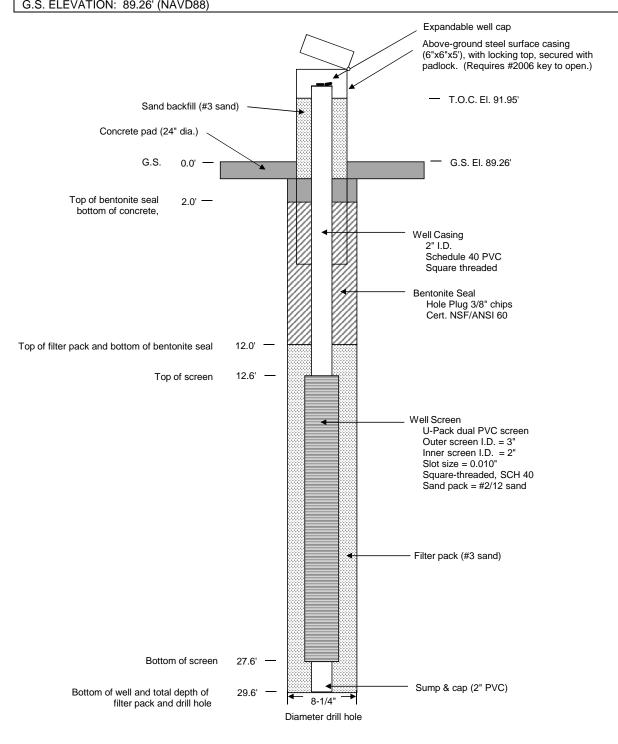
COMMENTS:

FADC = Flight Auger Dry Core NP = Non-Plastic NR = No Recovery NA = Not Applicable I.D. = Inner Diameter

O.D. = Outer Diameter

G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ▼ = Top of Groundwater

MW-11-141	GEOLOGIST: M. Lyttge						
WELL COMPLETION DIAGRAM	DRILLER: C. Peterson						
DATE COMPLETED: 5/2/2011	HELPERS: D. Read & C. Kelly						
LOCATION: Field North of Sand Slough Road. Reach 4B	1, River Bank Right, RM 148.8, Merced County.						
T.O.C. COORDINATES: N2321075.09 E6053794.68 (NAD93) EL.91.95' (NAVD88)							
C C ELEVATION: 90.36' (NAV/D99)							



NOTES:

U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name 5 JRR P	County Name MERO	760	Well Name W-12/MW-/1-14/
Facility License, Permit or Monitoring Number	n	Wis. Unique Well No	
Tabling District, Common Professional Practice		, , , , , , , , , , , , , , , , , , ,	
1. Can this well be purged dry? Yes	No 🔀	11. Depth to Water	Before Development After Development
2. Well development method		(from top of	a = 7.7 ft. 8.2 ft.
	-1	well casing)	
_	1		
	2	Date	20511612011 05116120
surged with block and pumped 🔞 6	2		$b.\frac{0}{m}\frac{5}{m}\frac{1}{d}\frac{1}{d}\frac{6}{d}\frac{1}{y}\frac{20}{y}\frac{1}{y}\frac{1}{y}\frac{0}{m}\frac{5}{m}\frac{1}{d}\frac{1}{d}\frac{1}{y}\frac{20}{y}$
surged with block, bailed and pumped 7	0		⊠ a.m o . o Γl a.m.
compressed air	2.0	Time	c. 11:40 p.m. 12:20 p.m.
bailed only	0		
pumped only	5.1	12. Sediment in well	inches inches
pumped slowly	0	bottom	
Other	_	13. Water clarity	Clear 10 Clear 20
	72		Turbid ■ 15 Turbid □ 25
3. Time spent developing well	t D min.		(Describe) (Describe)
4. Depth of well (from top of well casisng) 37	<u>2</u> ft.		Brown
5. Inside diameter of well	00 in.		54110
6. Volume of water in filter pack and well			
	gal.		;
•		Fill in if drilling fluid	ds were used and well is at solid waste facility:
7. Volume of water removed from well 55	gal.		
	r 8-··	14 Total suspended	mg/l
8. Volume of water added (if any)	gal.	solids	
	#		
9. Source of water added		15. COD	mg/lmg/l
			The Manual Control of the Control of
	·····	1	y: Name (first, last) and Firm
10. Analysis performed on water added? (If yes, attach results)	as □ No	First Name:	Last Name:
		Firm:	
17. Additional comments on development: SURGED WITH BLOCK & BALL	CHECK W	HILVE FOR	SEVERHE MINUTES AT 2 FT.
INTENNALS UNTIL 5 GALS		, cu	, , , , , , , , , , , , , , , , , , , ,
INTERNAL S GACS	. FUMP	60.	
PUMPED WITH SUMP PUM	up out	L CLEMA.	50 GA-65,
, ,			
-			
Name and Address of Facility Contact/Owner/Responsible	le Party	I hereby certify the	at the above information is true and correct to the bes
First Last		of my knowledge.	
Name: Name:			
Facility/Firm:		Signature:	
a weiting i it it is			
Street:		Print Name:	
	, , , , , , , , , , , , , , , , , , , ,		
City/Staw/Zip:		Firm:	
			_
1		1	

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, RM 155.6, Merced County

BEGUN: 5/3/11 FINISHED: 5/3/11 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 4.2 ft. (91.8 ft. - 5/16/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,319,228.4 E 6,071,446.9 NAD83

TOTAL DEPTH: 29.7 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 96.00 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: M. Lyttge REVIEWED BY: T. Lewis

		_							<u> </u>				_	
NOTES	рертн	% CORE RECOVERY		C0.075	ORA GNPS %	% GRAVEL OT		% MOISTURE CONTENT	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT SYMBOL	VISUAL	EI.	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.		0.2			Ū.	0.	 	J			0 07	<i>'</i>		0.0 to 29.7 feet QUATERNARY ALLUVIUM (Qal)
PURPOSE OF HOLE: To recover a continuous soil core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well. LOCATION:	_											s(CL)	93.9	O.0 to 2.1 ft. SANDY LEAN CLAY, s(CL): About 70% fines with medium plasticity, medium toughness; about 30% fine sand, trace medium sand; dry from 0.0 to 1.0 ft. and moist from 1.0 to 2.1 ft., dark gray; firm; CaCO ₃ nodules; strongly cemented; strong reaction with HCL.
Reach 4B1, River Bank Right, RM 155.6, Merced County. North of Sand Slough Road. DRILLED BY:		97.9										СН		2.1 to 3.4 ft. FAT CLAY, CH: About 95% fines with high plasticity, high toughness; about 5% fine sand; moist, dark
Bureau of Reclamation: PN Region drill crew: Chris Peterson, driller Dennis Read, helper Cody Kelley, helper												(CL)s	92.6	gray; firm; strong reaction with HCL. 3.4 to 4.4 ft. LEAN CLAY WITH SAND, (CL)s: About 80% fines with medium plasticity,
DRILL RIG: Truck mounted Central Mining Equipment (CME) DC512	_										Ţ	(CL)s	91.6	medium toughness; about 20% fine sand; moist; hard; CaCO ₃ nodules; strong reaction with HCL.
DRILLING & SAMPLING METHODS: The drill hole was advanced and sample using a Flight Auger Dry Core system (FADC). The drill hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit.	5-		30.3	38.6	26.8	4.3			s(CL)	90.0				4.4 to 7.8 ft. SANDY LEAN CLAY, s(CL): About 65% fines with medium plasticity, medium toughness; about 35% fine sand; moist, brown; firm; weak reaction with HCL; CaCO ₃ nodules.
Continuous sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by	_											s(CL)		Lab Data Interval 5.0 to 6.0 ft.
5-foot long split barrel dry core sample system (sampler). Unless indicated otherwise, the sampler was placed inside the augers and the cutting shoe of the sampler extended 0.2 foot beyond the auger drill bit. A free-spinning adapter was placed at the top of the sampler to	-	100.0												7.8 to 9.7 ft. <u>SILTY SAND, SM</u> : About 55% fine sand; about 45% fines with low plasticity; moist, brown; soft; weak reaction with HCL.
avoid rotation while advancing the augers. Interval Method 0.0 to 29.7 ft. FADC	-											SM	88.2	9.7 to 13.1 ft. LEAN CLAY, CL: About 90% fines with medium plasticity, medium toughness; about 10% fine sand with trace medium and coarse sand; light gray; very soft/soupy; no reaction with HCL; water added.
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 20.7 to 24.7 ft Add catcher. 24.7 to 29.7 ft Add catcher and nylon.	-											0		- <u>Lab Data Interval</u> 10.0 to 11.0 ft.
DRILLING FLUID, RETURN AND COLOR: 0.0 to 29.7 ft Drilled without fluid	10-												86.3	13.1 to 15.0 ft. SANDY LEAN CLAY, s(CL): About 75% fines with medium plasticity, medium toughness; about 25% fine sand;
WATER LEVEL: 4.2 ft 5/16/2011			53.3	34.8	11.9	0.0			CL					gray; soft to firm; no reaction with HCL; trace charcoal bits.
REASON FOR HOLE TERMINATION: The hole was terminated upon reaching the target depth.	_									85.0		CL		15.0 to 19.7 ft. LEAN CLAY WITH SAND, (CL)s: About 80% fines with low plasticity; about 20% fine sand; moist, brown; firm, holds shape of sampler; minor areas of oxidation; no reaction with HCL.
		98.0												Lab Data Interval 17.0 to 18.0 ft.
	-	_											82.9	19.7 to 24.7 ft. <u>SILT WITH SAND, (ML)s</u> : About 70% fines with low plasticity; about 30% fine sand; wet, brown; soft, somewhat molded to core box; no reaction with HCL.
	_											s(CL)		 <u>Lab Data Interval</u> 19.7 to 24.7 ft.
											Qal		81.0	
1														

COMMENTS:

SJRRP DH SJRRP.GPJ SJRRP.GPJ 11/8/11 3:54:08 PM

FADC = Flight Auger Dry Core NP = Non-Plastic NR = No Recovery

NA = Not Applicable I.D. = Inner Diameter O.D. = Outer Diameter G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ■ = Top of Groundwater

SHEET 2 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, RM 155.6, Merced County

BEGUN: 5/3/11 FINISHED: 5/3/11
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 4.2 ft. (91.8 ft. - 5/16/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,319,228.4 E 6,071,446.9 NAD83

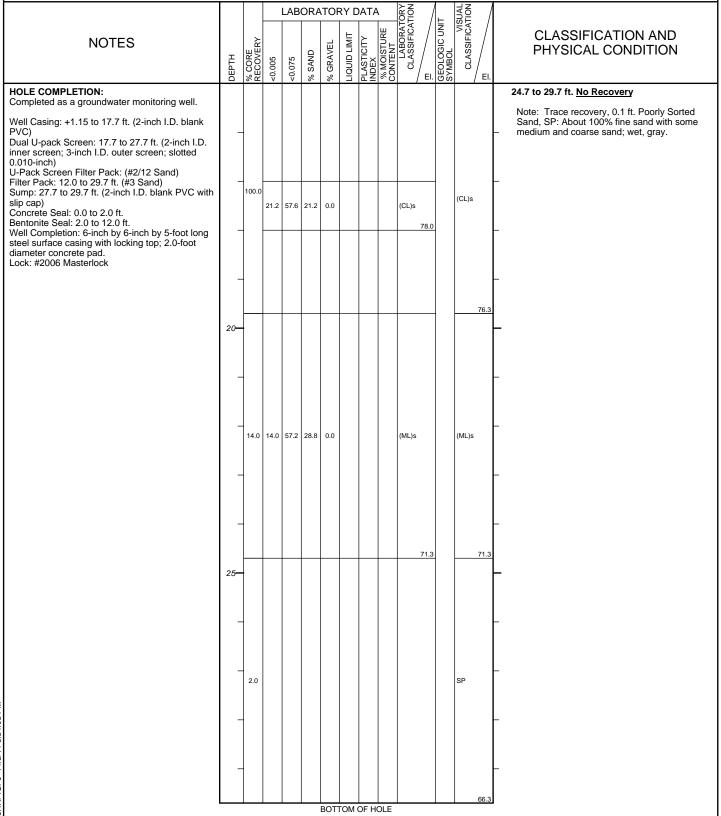
TOTAL DEPTH: 29.7 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 96.00 ft. NADV88
ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: M. Lyttge REVIEWED BY: T. Lewis



COMMENTS:

FADC = Flight Auger Dry Core NP = Non-Plastic NR = No Recovery NA = Not Applicable I.D. = Inner Diameter

O.D. = Outer Diameter

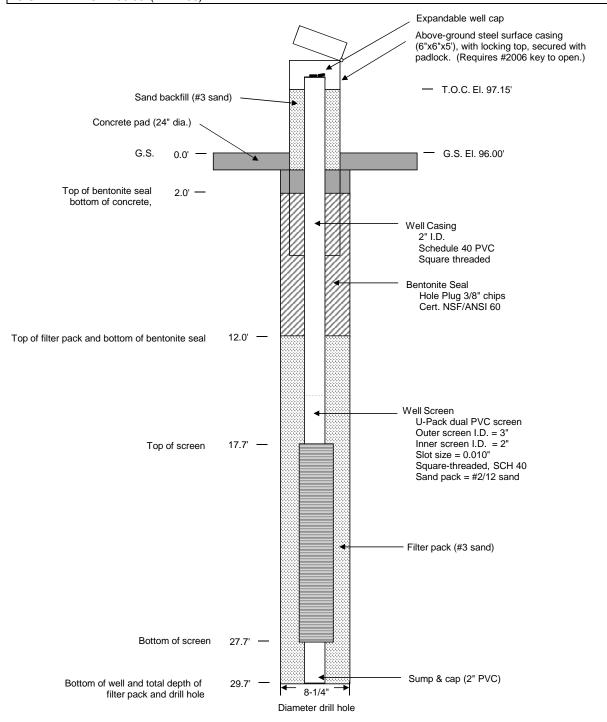
G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ▼ = Top of Groundwater

MW-11-142	GEOLOGIST: M. Lyttge
WELL COMPLETION DIAGRAM	DRILLER: C. Peterson
DATE COMPLETED: 5/3/2011	HELPERS: D. Read & C. Kelly

LOCATION: At the intersection of Sandy Mush Road and Nickel Road. Reach 4B1, River Bank Right, RM 155.6, Merced County.

T.O.C. COORDINATES: N2319228.43 E6071446.90 (NAD93) EL. 97.15' (NAVD88)

G.S. ELEVATION: 96.00' (NAVD88)



*NOT TO SCALE

NOTES:

U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name	County Name		Well Name			
STRKP	MERCO	50		MW-	11-142	
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Nu	umber	DNR Well	ID Number	
1. Can this well be purged dry? Yes	No 🔀	11. Depth to Water			After Development	
2. Well development method			a. <u> </u>	<u>4</u> _ ft.		
surged with bailer and bailed 4	1 1	well casing)				
	5 1		_			
	1 2	Date	b. 05/16	12011	y m m d d y	2/1
,	5 2		mm do	з ууу	y mm ddy	у у
	7 0		8 20	Ø 8.m.	9:00 a.m.	
	20	Time	c : :	_ p.m.	p.m.	
	10 51	12. Sediment in well		inches	inches	
	5 0	bottom		nicrics	menes	
Other	, 0	13. Water clarity	Clear 🔲 1	0 30	Clear 20	
	one, once		Turbid 🗷		Turbid □ 25	
	+ 0 min.		(Describe) Brown	(Describe)	
4. Depth of well (from top of well casisng)	€, <u>₹</u> ft.		SAWK			
5. Inside diameter of well	00 in.					
6. Volume of water in filter pack and well						
casing	gal.		***************************************	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	>	
		Fill in if drilling fluid	ls were used a	nd well is at	solid waste facility:	
7. Volume of water removed from well	gal.					
		14. Total suspended		mg/l	mg/l	
8. Volume of water added (if any)	gal.	solids				
9. Source of water added		15. COD		ma/l	mg/l	
7. Jource of water anica		15. COD		mg/r		
		16. Well developed b	y: Name (first,	last) and Firm		
10. Analysis performed on water added? (If yes, attach results)	cs 🗆 No	First Name:		Last Name:		
		Firm:			·	
17. Additional comments on development: SURGED WITH BLOCK + CH VWTIL 5 GUCS. PUMPED.	ECK VULU	to Four SEVI	banc n	INUTE	S AT 2 FT,	. /Nh
Pump with sump pu	np vut	IL CLEMA	- 50	GALS		
			,			
Name and Address of Facility Contact/Owner/Responsib	le Party	11	salanta .	<i></i>		
First Last	•	of my knowledge.	it the above in	lormation is	true and correct to the b	oest
Name:Name:		of my knowledge.				
Facility/Firm:		Signature:				
Street:		Print Name:				•
City/State/Zip:		Firm:				

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, RM 155.6, Merced County

BEGUN: 5/4/11 FINISHED: 5/4/11
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 1.9 ft. (91.2 ft. - 5/16/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,316,951.0 E 6,071,041.9 NAD83

TOTAL DEPTH: 29.6 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 93.08 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: M. Lyttge REVIEWED BY: T. Lewis

		_								т.				
NOTES	рертн	% CORE RECOVERY		C0.075	ORA SAND	% GRAVEL OT			% MOISTURE CONTENT	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT SYMBOL	CLASSIFICATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.		0,11	V	v	0,	0,	1	ш_				00	(CL)s 92.7	1 0.0 to 29.0 feet
PURPOSE OF HOLE: To recover a continuous soil core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	-	_											(CH)s	QUATERNARY ALLUVIUM (Qal) - 0.0 to 0.4 ft. LEAN CLAY WITH SAND, (CL)s: Disturbed surficial material.
LOCATION: Reach 4B1, River Bank Right, RM 155.6, Merced County. West of Nickle Road, at the East Side Irrigation Canal.	-	91.3										<u>_</u>	3.09	0.4 to 2.3 ft. FAT CLAY WITH SAND, (CH)s: About 85% fines with high plasticity, high toughness; about 15% fine sand; moist, dark gray to brown; firm; weak reaction with HCL, strong reaction with HCL where CaCO ₃ is visible; CaCO ₃ present in fine gravel, strongly
DRILLED BY: Bureau of Reclamation: PN Region drill crew: Chris Peterson, driller Dennis Read, helper Cody Kelley, helper	-													cemented nodules from 1.1 to 2.3 ft. 2.3 to 8.0 ft. LEAN CLAY WITH SAND, (CL)s: About 80% fines with high plasticity, high toughness; about 15% fine sand; moist; soft
DRILL RIG: Truck mounted Central Mining Equipment (CME) DC512														and firm; weak reaction with HCL. Lab Data Interval 5.0 to 6.0 ft.
DRILLING & SAMPLING METHODS: The drill hole was advanced and sample using a Flight Auger Dry Core system (FADC). The drill hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit.	5-	 	39.9	39.7	20.4	0.0	40.0	23.8	35.4	(CL)s	87.1		(CL)s	8.0 to 9.8 ft. LEAN CLAY, CL: About 90% fines with medium plasticity, medium toughness; about 10% fine sand; moist, gray to blue with tan mottling; hard; no reaction with HCL.
Continuous sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5-foot long split barrel dry core sample system (sampler). Unless indicated otherwise, the sampler was placed inside the augers and the cutting shoe of the sampler extended 0.2 foot	-	82.0												9.8 to 11.7 ft. <u>SILTY SAND, SM:</u> About 55% fine sand; about 45% fines with low plasticity; moist, light brown; firm; no reaction with HCL.
beyond the auger drill bit. A free-spinning adapter was placed at the top of the sampler to avoid rotation while advancing the augers. Interval Method	-												85.1	11.7 to 13.6 ft. SILTY SAND, SM: About 65% fine sand; about 35% fines with low plasticity; wet, light brown; soft; no reaction with HCL.
0.0 to 29.6 ft. FADC DRILLING CONDITIONS AND DRILLER'S													CL	Lab Data Interval 12.0 to 13.0 ft.
COMMENTS: 19.6 to 24.6 ft Catcher with nylon. 24.6 to 29.6 ft Catcher with nylon.													83.3	reaction with HCL; oxidation in coarse
DRILLNG FLUID, RETURN AND COLOR: 0.0 to 29.6 ft Drilled without fluid	10-													sand-sized cemented nodules. Lab Data Interval
WATER LEVEL: 1.9 ft 5/16/2011 REASON FOR HOLE TERMINATION: The hole was terminated upon reaching the target depth.	-	-											SM 81.4	15.0 to 16.0 ft. 17.3 to 19.6 ft. SILT WITH SAND, (ML)s: About 85% fines with low plasticity; about 15% fine sand; moist, light brown to gray; firm; no reaction with HCL; minor oxidation.
target deput.	-	100.0												Lab Data Interval 18.0 to 19.0 ft.
	-	-	11.0	22.1	66.9	0.0	NP	NP	24.4		80.1		SM 79.5	19.6 to 20.2 ft. SILT WITH SAND, (ML)s: About 80% fines with low plasticity; about 20% fine sand; moist, light brown; no reaction with HCL; minor oxidation concretions.
	-												79.5	Lab Data Interval - 19.6 to 20.1 ft.
												Qal		
3	Ь—	1	Ь	_										!

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-Plastic NR = No Recovery

NA = Not Applicable I.D. = Inner Diameter O.D. = Outer Diameter G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ▼ = Top of Groundwater

SHEET 2 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, RM 155.6, Merced County

BEGUN: 5/4/11 FINISHED: 5/4/11 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 1.9 ft. (91.2 ft. - 5/16/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,316,951.0 E 6,071,041.9 NAD83

TOTAL DEPTH: 29.6 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 93.08 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: M. Lyttge REVIEWED BY: T. Lewis

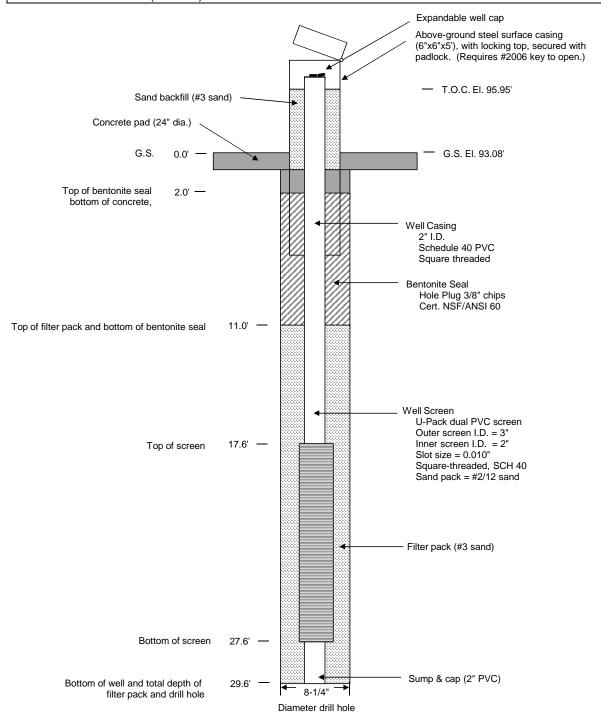
				LAB	ORA	ATOI	RY C	ATA	۱ ۱	TORY ATION		ţ	SUAL		
NOTES	DEРТН	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	% MOISTURE CONTENT	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT SYMBOL	VISUAL	EI.	CLASSIFICATION AND PHYSICAL CONDITION
HOLE COMPLETION: Completed as a groundwater monitoring well.			35.7	61.9	2.4	0.0			30.5				CL		20.2 to 24.3 ft. WELL SORTED SAND WITH SILT, SW-SM:
Well Casing: +2.87 to 17.6 ft. (2-inch I.D. blank PVC)	_										77.1				About 90% fine sand; about 10% fines with log plasticity; moist, light brown; soft; no reaction with HCL.
Dual U-pack Screen: 17.6 to 27.6 ft. (2-inch I.D. inner screen; 3-inch I.D. outer screen; slotted 0.010-inch) U-Pack Screen Filter Pack: (#2/12 Sand) Filter Pack: 11.0 to 29.6 ft. (#3 Sand)	-	100.0													24.3 to 24.6 ft. SILTY SAND, SM: About 70% fine sand; about 30% fines with lo plasticity; moist, light brown; no reaction with HCL; minor oxidation concretions.
Sump: 27.6 to 29.6 ft. (2-inch I.D. blank PVC with slip cap) Concrete Seal: 0.0 to 2.0 ft.														75.8	24.6 to 29.6 ft. No Recovery
Bentonite Seal: 2.0 to 11.0 ft. Well Completion: 6-inch by 6-inch by 5-foot long steel surface casing with locking top; 2.0-foot diameter concrete pad. Lock: #2006 Masterlock	-		18.9	64.0	17.1	0.0	26.1	4.1	25.9	(ML)s	74.1		(ML):	5	_
			13.0	66.1	20.9	0.0	NP	NP	27.4	(ML)s			(ML):	73.5	
	20-										73.0			72.9	-
	-														_
	-	24.0											SW-S	SM	_
	-														-
	-												SM	68.8	-
	25 -													68.5	_
	-														_
	-	0.0											NR		-
	_														-
	_														_
						POT	TOM	OF !!	015					63.5	
NP = Non-Plastic + = A NR = No Recovery T.O. NA = Not Applicable SJR	= Greater San	Groo Fop o n Joa	und S f We quin	Surfa II Ca: Rive	ce sing	ROL	ГОМ	UF H	OLE	Well Diag Well	ram.	. We	ll de	velop	nation is provided in attached Well Completion oment information is provided in attached Monitorin n.
O.D. = Outer Diameter	, op C	,, UIU	unul	ruici											SHEET 2 OF 2 DRILL HOLE MW-11-14

MW-11-143	GEOLOGIST: M. Lyttge
WELL COMPLETION DIAGRAM	DRILLER: C. Peterson
DATE COMPLETED: 5/4/2011	HELPERS: D. Read & C. Kelly

LOCATION: West of Nickle Road, at East Side Irrigation Canal. Reach 4B1, River Bank Right, RM 155.6, Merced County.

T.O.C. COORDINATES: N2316951.03 E6071041.86 (NAD93) EL. 95.95' (NAVD88)

G.S. ELEVATION: 93.08' (NAVD88)



*NOT TO SCALE

NOTES:

U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name 5 TRR	County Name MERCE		Well Name	1 mw-11-143
				DNR Well ID Number
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Nu	imber	DNK Well ID Number
1. Can this well be purged dry? 2. Well development method surged with bailer and bailed	No X	11. Depth to Water (from top of well casing) Date	Before Dev a. $\underline{\qquad}4$. b. $\underline{051}$ $\underline{16}$ $\underline{05}$	relopment After Development 9 ft
4. Depth of well (from top of well casising) 32			Brown	
5. Inside diameter of well	in.			
6. Volume of water in filter pack and well casing		Fill in if drilling fluid	ls were used a	and well is at solid waste facility:
7. Volume of water removed from well	gal.			
8. Volume of water added (if any)	gal.	solids	***************************************	
9. Source of water added		15. COD		mg/l mg/l
		16. Well developed b	y: Name (first,	last) and Firm
10. Analysis performed on water added? Yes (If yes, attach results)	s 🗆 No	First Name:		Last Name:
		Firm:		
17. Additional comments on development: SUNGED WITH BLOCK & C. INTERVALS VNTLL 5 BALS. PUMPED WITH SUMP PUMP	Pum 182	<i>D</i> .		
Name and Address of Facility Contact /Owner/Responsible	Party	11		formation in turn and arrows to the con-
First Last Name: Name:Name:	-	of my knowledge.	it the above in	formation is true and correct to the best
Facility/Firm:		Signature:		
Street:		Print Name:	. ,	
City/State/Zip:	·····	Firm:		
Ŷ				T-

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, RM 148.5, Merced County

BEGUN: 5/11/11 FINISHED: 5/11/11
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 3.9 ft. (85.2 ft. - 5/12/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,324,756.2 E 6,057,112.5 NAD83

TOTAL DEPTH: 29.5 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 89.12 ft. NADV88 ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: A. Warren

REVIEWED BY: T. Lewis

				LAB	ORA	TOF	RY D	ATA	١	ORY TON			JON JON		
NOTES	рертн	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	% MOISTURE CONTENT	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT SYMBOL	VISUAL CLASSIFICATION	EI.	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.											<i>-</i>				0.0 to 29.5 feet QUATERNARY ALLUVIUM (Qal)
PURPOSE OF HOLE: To recover a continuous soil core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	-	-	32.6	28.4	38.4	0.6	32.6	20.2	16.7	s(CL)	87.1	-	s(CL)	87.1	O.0 to 2.0 ft. SANDY LEAN CLAY, s(CL): About 55% fines with medium plasticity, no dilatancy, medium toughness; about 45% fine sand; trace fine, angular gravel in top inches; dry to moist, brown; layered; roots and organics; slight reaction with HCL.
Reach 4B1, River Bank Right, RM 148.5, Merced County. Adjacent to Mariposa Bypass.	=	68.9									07.1			07.1	Note: 1.1 to 2.0 ft.: Moist; moderately soft, crumbled by drilling action.
DRILLED BY: Bureau of Reclamation: PN Region drill crew: Chris Peterson, driller	=	=													Lab Data Interval 1.0 to 2.0 ft.
Dennis Read, helper Cody Kelley, helper DRILL RIG: Truck mounted Central Mining Equipment (CME) DC512	-	-										Ţ	(CL)s	84.4	2.0 to 4.7 ft. LEAN CLAY WITH SAND, (CL)s: About 85% fines with low to medium plasticity, medium toughness; about 15% fine sand; moist, dark brown; moderately firm; layered; slight reaction with HCL.
DRILLING & SAMPLING METHODS: The drill hole was advanced and sample using a Flight Auger Dry Core system (FADC). The drill hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit.	5—		32.5	29.3	38.2	0.0	29.9	16.5	24.1	s(CL)	83.1	_	s(CL)		4.7 to 6.9 ft. SANDY LEAN CLAY, s(CL): About 60% fines with low plasticity; about 40% fine sand; moist to wet, light brown; soft; strong reaction with HCL; white streaks and layers of CaCO ₃ .
Continuous sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5-foot long split barrel dry core sample system	_										00.1				Note: Dark brown clay smeared down sides of sampler from drilling action.
(sampler). Unless indicated otherwise, the sampler was placed inside the augers and the cutting shoe of the sampler extended 0.2 foot beyond the auger drill bit. A free-spinning adapter was placed at the top of the sampler to avoid rotation while advancing the augers.	-	90.0												82.2	Lab Data Interval 5.0 to 6.0 ft. 6.9 to 9.5 ft. LEAN CLAY, CL: About 90% fines with medium plasticity, medium toughness; about 10% fine sand;
Interval Method 0.0 to 29.5 ft. FADC	-		42.1	47.8	10.1	0.0	45.5	31.5	30.2	CI			CL		 moist, dark brown; very firm; no reaction with HCL.
DRILLING CONDITIONS AND DRILLER'S COMMENTS:	_				10.1	0.0		01.0	00.2		80.1				Note: 8.4 to 8.5 ft.: Lens of Sandy Clay, SC: 55% fine sand; 45% fines; dark gray.
4.5 to 9.5 ft Wet. 14.5 to 19.5 ft Catcher with nylon. 19.5 to 24.5 ft Catcher with nylon.														79.6	
24.5 to 29.5 ft Catcher with nylon. DRILLING FLUID, RETURN AND COLOR: 0.0 to 29.5 ft Drilled without fluid	10—												sc	78.6	9.5 to 10.5 ft. CLAYEY SAND, SC: About 60% fine sand; about 40% fines with low to medium plasticity; wet, dark gray; soft to medium soft; interbedded in about 0.5 to 0.1 ft. layers; no reaction with HCL.
WATER LEVEL: 3.9 ft 5/12/2011	-														10.5 to 19.5 ft. <u>POORLY GRADED SAND,</u> SP:
REASON FOR HOLE TERMINATION: The hole was terminated upon reaching the target depth.	_	48.0													About 95% fine and medium sand with abundant mica; about 5% fines; wet, dark gray to gray; no reaction with HCL.
															<u>Lab Data Interval</u> 14.5 to 15.5 ft.
	_														19.5 to 29.5 ft. <u>No Recovery</u>
	_														Note: Recovered trace amounts of Poorly Sorted Sand, SP, material similar to 10.5 to 19.5 interval.
COMMENTS												Qal			

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-Plastic

NR = No Recovery
NA = Not Applicable

I.D. = Inner Diameter
O.D. = Outer Diameter

G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ▼ = Top of Groundwater

GEOLOGIC LOG OF DRILL HOLE NO. MW-11-144

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, RM 148.5, Merced County

BEGUN: 5/11/11 FINISHED: 5/11/11
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 3.9 ft. (85.2 ft. - 5/12/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,324,756.2 E 6,057,112.5 NAD83

TOTAL DEPTH: 29.5 ft.

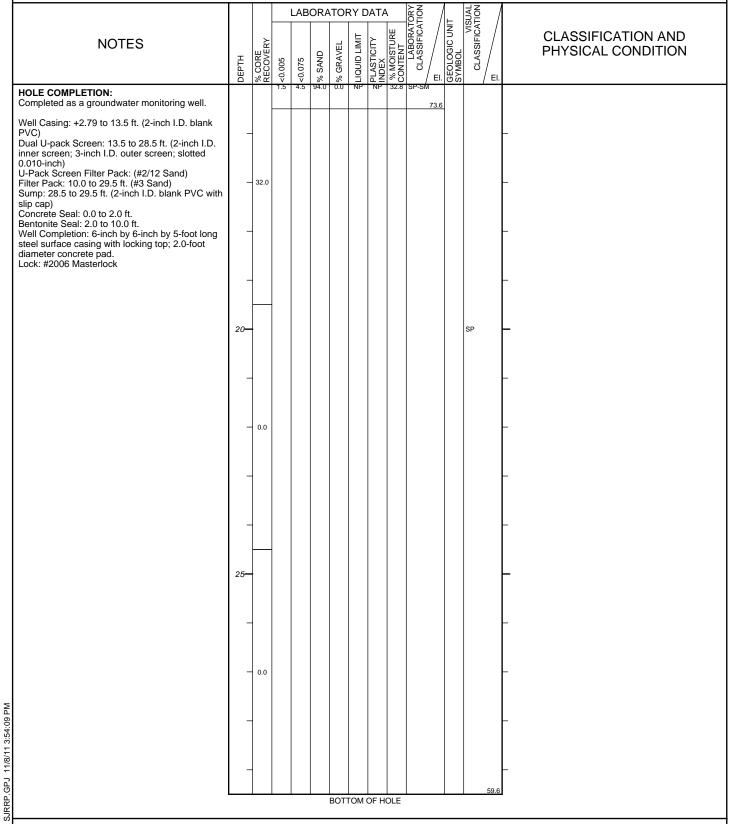
DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 89.12 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

SHEET 2 OF 2

HOLE LOGGED BY: A. Warren REVIEWED BY: T. Lewis



COMMENTS:

SJRRP.GPJ

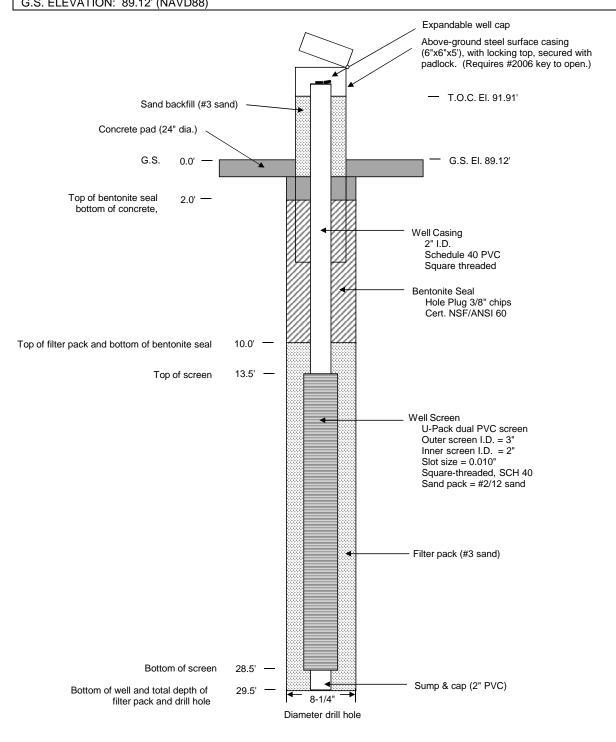
SJRRP DH

FADC = Flight Auger Dry Core NP = Non-Plastic NR = No Recovery NA = Not Applicable I.D. = Inner Diameter

O.D. = Outer Diameter

G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ▼ = Top of Groundwater

MW-11-144	GEOLOGIST: A. Warren
WELL COMPLETION DIAGRAM	DRILLER: C. Peterson
DATE COMPLETED: 5/11/2011	HELPERS: D. Read & C. Kelly
LOCATION: Adjacent to Mariposa Bypass. Reach 4B1, I	River Bank Right, RM 148.5, Merced County.
T.O.C. COORDINATES: N2324756.23 E6057112.53 (N.	AD93) EL. 91.91' (NAVD88)
C S ELEVATION: 90 13' (NAV/D99)	



NOTES:

U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

7-11-05	<u> </u>	[337 11 5]
Facility/Project Name	County Name	ed Well Name MW-11-144/W-9
Facility License, Permit or Monitoring Number	My Cl County Code	Wis Unique Well Number DNR Well ID Number
Paciffy Eldense, Permit of Mordioring Number	County Code	Wis Unique Well Mullioer Divk Well ID Number
		Since your was such hards the same with the same sound the same sound to the same so
1. Can this well be purged dry? Yes	No F	Before Development After Development
our dis voir oo pagos as j.	L)XI	11 Parata 17
2. Well development method		(from top of a 3 9 0 ft 3 9 0 ft.
surged with bailer and bailed 4	1	well casing)
surged with bailer and pumped 6		
surged with block and bailed 4		Date 5,12,2011 5,12,201
surged with block and pumped 6		Date b. $\frac{5}{m \text{ m}} \frac{12}{d \text{ d}} \frac{2011}{y \text{ y y y}} \frac{5}{m \text{ m}} \frac{1201}{d \text{ d}} \frac{201}{y \text{ y y}}$
	0	
	0	Time c. 3:30 p.m. 4:15 p.m.
bailed only		
pumped only	1	12. Sediment in well traceinches Mace inches
pumped slowly	0	bottom
Other	200	13. Water clarity Clear 10 Clear 20
		Turbid ≥ 15 Turbid 25
3. Time spent developing well	5 min.	(Describe) (Describe)
· ·	-	brown Omane, Cloudy,
4. Depth of well (from top of well casising) = 27	., <mark>O</mark> ft.	fine I sucon bearlescent w
		sized) sand inicas 11.
5. Inside diameter of well	in.	15 present chay
		in whenter stream
6. Volume of water in filter pack and well		AND CONTROL OF THE CO
casing	. gal.	
4 7	5	Fill in if drilling fluids were used and well is at solid waste facility:
7. Volume of water removed from well	_, <u> </u>	
		14. Total suspended mg/l mg/l
8. Volume of water added (if any)	gal.	solids
		15 000
9. Source of water added		15. COD mg/l
		16 W.N.J., Land You N. (6 a. L.), 16
		16. Well developed by: Name (first, last) and Firm
10. Analysis performed on water added?	s 🗆 No	First Name: Last Name:
(If yes, attach results)		P'
17. Additional comments on development:		Firm:
17. Additional comments on development:	2 mall a	March Value as allowed
Surged for 5 mins w/ tube &	2 10011 0	Street St. 5 Street
purged w/ pump ~ ? sal	lunion d	tarts clearing THA 11
7. 00	6	
after 20 gallono; still clo	ury & o	paque.
Ilmil scotla	カフへ	before measuring;
• 4		material in English ?
Name and Address of Facility Contact/Owner/Responsibl	e Party	I hereby certify that the above information is true and correct to the best
First Last		of my knowledge.
Name: Name:		1 1.
Facility/Circs		Signature:
Facility/Firm:		
Street:		Print Name: Alison Warren
		The same of the sa
City/State/Zip:		Firm: BOR
ong, orang orp.		The state of the s

NOTE: See instructions for more information including a list of county codes and well type codes.

27.5

13.5-28.5 29.5

SHEET 1 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, RM 153, Merced County

BEGUN: 5/12/11 FINISHED: 5/12/11
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 5.7 ft. (83.6 ft. - 5/13/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,306,718.2 E 6,045,189.3 NAD83

TOTAL DEPTH: 29.7 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 89.26 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: A. Warren REVIEWED BY: T. Lewis

				LAB	ORA	TOF	RY D	ATA	١	ORY TON		_	J'AL JON	/	
NOTES	рертн	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	% MOISTURE CONTENT	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT SYMBOL	VISUAL	/ EI.	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.														,	0.0 to 29.7 feet QUATERNARY ALLUVIUM (Qal)
PURPOSE OF HOLE: To recover a continuous soil core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	-	-											s(ML)	O.0 to 3.0 ft. SANDY SILT, s(ML): About 70% fines with low plasticity, no dilatancy, no toughness; about 30% fine sand; dry, brown; firm; abundant roots, one live worm; moderate reaction with HCL.
LOCATION: Reach 4B1, River Bank Left, RM 153, Merced County. Circle Island.	-	61.7													 3.0 to 4.7 ft. <u>SANDY SILT, s(ML)</u>: About 65% fines with low plasticity, slow dilatancy, low toughness; about 35% fine sand, micaceous; moist, dark brown; soft; layered;
DRILLED BY: Bureau of Reclamation: PN Region drill crew: Chris Peterson, driller Dennis Read, helper Cody Kelley, helper	-													86.3	no reaction with HCL. 4.7 to 7.2 ft. SANDY SILT, s(ML): About 60% fines with no plasticity; about 40% fine sand; wet, tan; soft; micaceous.
DRILL RIG: Truck mounted Central Mining Equipment (CME) DC512	_												s(ML	.)	Lab Data Interval 5.0 to 6.0 ft.
DRILLING & SAMPLING METHODS: The drill hole was advanced and sample using a Flight Auger Dry Core system (FADC). The drill hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers equipped with	5—		14.6	45.6	39.8	0.0	NP	NP	28.6	s(ML)		Ţ		84.6	7.2 to 9.8 ft. LEAN CLAY, CL: About 90% fines with medium plasticity, no dilatancy, medium to high toughness; about 10% fine sand; moist, dark brown; firm; homogenous; some crenulations of reddish brown oxidation.
an 8-1/2 inch o.d. bullet and spade drill bit. Continuous sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5-foot long split barrel dry core sample system	_										83.3		s(ML)	Lab Data Interval 7.5 to 8.5 ft.
(sampler). Unless indicated otherwise, the sampler was placed inside the augers and the cutting shoe of the sampler extended 0.2 foot beyond the auger drill bit. A free-spinning adapter was placed at the top of the sampler to	-	80.0												82.1	9.8 to 11.1 ft. CLAYEY SAND, SC: About 60% fine sand; about 40% fines with medium plasticity; wet, tan; moderately soft; some reddish brown oxidation; no reaction with HCL.
avoid rotation while advancing the augers. Interval Method 0.0 to 29.7 ft. FADC	_	-	50.5	43.3	6.2	0.0	56.5	33.4	31.2	СН	80.8		CL		 11.1 to 14.7 ft. <u>SILTY SAND, SM:</u> About 85% fine sand; about 15% fines with no plasticity; wet, tan; saturated and flowing, several firmer lenses at bottom.
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 9.7 to 14.7 ft Catcher 14.7 to 19.7 ft Catcher with nylon. 19.7 to 24.7 ft Catcher with nylon.	-													79.5	14.7 to 19.7 ft. <u>No Recovery</u> 19.7 to 24.7 ft. <u>POORLY GRADED SAND</u> <u>WITH SILT, SP-SM</u> :
24.7 to 29.7 ft Catcher with nylon. DRILLING FLUID, RETURN AND COLOR: 0.0 to 29.7 ft Drilled without fluid	10-												sc		About 90% fine sand, trace medium sand; about 10% fines with no plasticity; wet, gray; several ½ in. thick lenses of clay, spaced about 1.0 ft. intervals; medium soft; no reaction with HCL.
WATER LEVEL: 5.7 ft 5/13/2011	-													78.2	<u>Lab Data Interval</u> 19.7 to 24.7 ft.
REASON FOR HOLE TERMINATION: The hole was terminated upon reaching the target depth.	-	60.0											SM		24.7 to 29.7 ft. CLAYEY GRAVEL WITH SAND, (GC)s: About 65% coarse, soft, subrounded gravels; about 20% fine to coarse sand, trace white, rounded, coarse sand; about 15% fines with medium plasticity; maximum particle size, less than 3 inches; wet, gray; no reaction with HCL.
	-	=													-
												Qal		74.6	

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-Plastic NR = No Recovery

NA = Not Applicable I.D. = Inner Diameter O.D. = Outer Diameter G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ▼ = Top of Groundwater

SHEET 2 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Left, RM 153, Merced County

BEGUN: 5/12/11 FINISHED: 5/12/11
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 5.7 ft. (83.6 ft. - 5/13/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,306,718.2 E 6,045,189.3 NAD83

TOTAL DEPTH: 29.7 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

REVIEWED BY: T. Lewis

GROUND ELEVATION: 89.26 ft. NADV88 ANGLE FROM HORIZONTAL: -90° HOLE LOGGED BY: A. Warren

PLASTICITY TO INDEX NO STURE CONTENT LABORATORY CLASSIFICATION LABORATORY DATA VISUAL GEOLOGIC UNIT SYMBOL **CLASSIFICATION AND** LIQUID LIMIT **NOTES** % CORE RECOVERY GRAVEL PHYSICAL CONDITION SAND <0.005 HOLE COMPLETION: Completed as a groundwater monitoring well. Well Casing: +2.83 to 13.7 ft. (2-inch I.D. blank Dual U-pack Screen: 13.7 to 28.7 ft. (2-inch I.D. inner screen; 3-inch I.D. outer screen; slotted 0.010-inch) U-Pack Screen Filter Pack: (#2/12 Sand)
Filter Pack: 12.0 to 29.7 ft. (#3 Sand)
Sump: 28.7 to 29.7 ft. (2-inch I.D. blank PVC with 0.0 NR slip cap) Concrete Seal: 0.0 to 2.0 ft. Bentonite Seal: 2.0 to 12.0 ft. Well Completion: 6-inch by 6-inch by 5-foot long steel surface casing with locking top; 2.0-foot diameter concrete pad. Lock: #2006 Masterlock 69.6 20-8.5 87.9 0.0 NP 3.6 NP 23.7 SM SP-SM 26.0 64.6 64.6 25 (GC)s BOTTOM OF HOLE

COMMENTS:

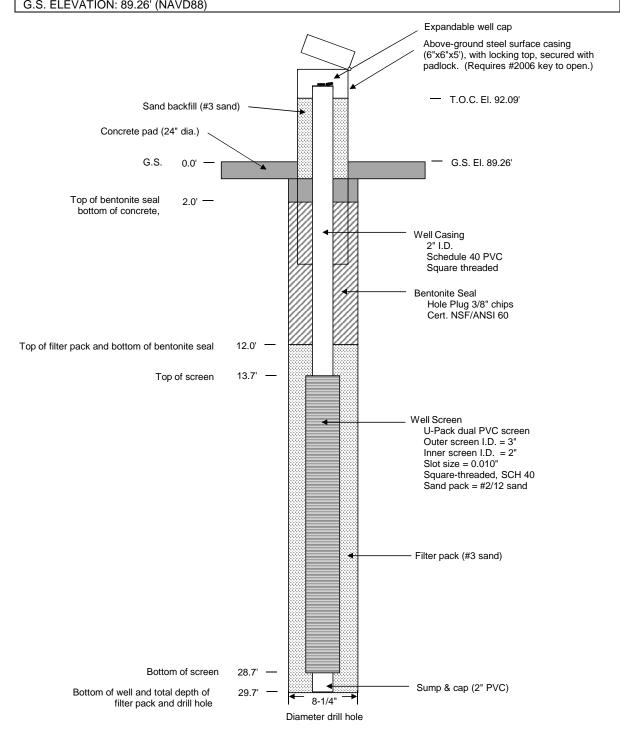
SJRRP.GPJ 11/8/11 3:54:10 PM

SJRRP.GPJ

SJRRP DH

FADC = Flight Auger Dry Core NP = Non-Plastic NR = No Recovery NA = Not Applicable I.D. = Inner Diameter G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ▼ = Top of Groundwater

MW-11-145	GEOLOGIST: A. Warren							
WELL COMPLETION DIAGRAM	DRILLER: C. Peterson							
DATE COMPLETED: 5/12/2011	HELPERS: D. Read & C. Kelly							
LOCATION: Circle Island. Reach 4B1, River Bank Left, RM 153, Merced County.								
T.O.C. COORDINATES: N2306718.15 E6045189.32 (N	AD93) EL.92.09' (NAVD88)							
C C ELEVATION: 90 36' (NAV/D99)								



NOTES:

San Joaquin River Restoration Program
U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name	County Name	ed Well Name W-11-145/W-12	
STRKP	Merc	ed MW-11-145/W-12	1_
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number DNR Well ID Number	
1. Can this well be purged dry? Yes	No D	Before Development After Development 11. Depth to Water	
2. Well development method	/	(from top of a <u>5</u> . 7 _ ft <u>5</u> . 7	ft=
surged with bailer and bailed 4	1	well casing)	
surged with bailer and pumped 🔲 6	1		
surged with block and bailed 4	2	Date b. $\frac{5}{m}$ / $\frac{13}{d}$ / $\frac{20}{y}$ / $\frac{1}{y}$ / $\frac{5}{m}$ / $\frac{1}{d}$	3,201
surged with block and pumped 6	2	mm ddyyyy mm d	d y y y
	0	Time c. 7:35 8 a.m. 8 25 p.m.	j≼a.m.
	0	Time c1:53 p.m. 022] p.m.
bailed only		~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	
	1	12. Sediment in well inches i	inches
	0		
Other	2	13. Water clarity Clear 10 Clear 20 Turbid 15 Turbid 25	
3. Time spent developing well 4	0 min.	(Describe) (Describe)	
J. Time spent developing went	U min.	prown, obaico, onaque	ı
4. Depth of well (from top of well casisng) _ 29	O ft.	Ene said Clouder	
		omes up white Pin	1 90
5. Inside diameter of well	in.		<u> </u>
6. Volume of water in filter pack and well			
casing f	gal.	;	
7. Volume of water removed from well 5.2	. 5 gal.	Fill in if drilling fluids were used and well is at solid waste facil	ity:
Volume of water removed from well	<u>U</u> gai.	14. Total suspended mg/l	meA
8. Volume of water added (if any)	gal.	solids	6, .
9. Source of water added	States of the control	15. COD mg/l	_mg/l
		16. Well developed by: Name (first, last) and Firm	
10. Analysis performed on water added?	s DNo	First Name: Last Name:	
(If yes, attach results)	7	Last Ivane.	
-		Firm:	
17. Additional comments on development:	01 11 1	neck value every 2-3 feet for a n, turbed, soundy water. about 2 gall/min; HL HL 50 gal	1/ 4000
Surged w/ tubing, surge block	& ball cl	reck value every distect tour	21 min
brilled 2.5 gallers of dent	c brown	n, turbed, and y water	
Accounted to belleve of world and a	In the second	inha + 12 noll/min : All till 50 model	Long
tamber trom astern of mell into	dund dund	about 2 gall/min, Int 1/12 DO God	
		,	
Name and Address of Facility Contact /Owner/Responsibl	- Dante		, <u></u>
First Last	e rarty	I hereby certify that the above information is true and correct	to the best
Name: Name:		of my knowledge.	
Facility/Firm:		Signature:	
		M. C.	
Street:		Print Name: Alism Warren	
C'n (Com 77)		Rad	
City/State/Zip:		Firm: BOK	

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, RM 155.6, Merced County

BEGUN: 5/13/11 FINISHED: 5/13/11
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 3.5 ft. (93.3 ft. - 5/16/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,320,427.9 E 6,072,333.8 NAD83

TOTAL DEPTH: 30.2 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 96.75 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: A. Warren REVIEWED BY: T. Lewis

ſ					LAB	ORA	TOF	RY D	ATA	١	ORY TON	/	_	UAL	NO! /	
	NOTES	рертн	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	% MOISTURE CONTENT	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT SYMBOL	VISUAL	CLASSIFICAT	CLASSIFICATION AND PHYSICAL CONDITION
	ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.													s(l	ML)	0.0 to 30.2 feet QUATERNARY ALLUVIUM (Qal)
	PURPOSE OF HOLE: To recover a continuous soil core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	-	_											Ľ	96.1 iM)g 95.3 CL) 95.1 M 94.8	O.0 to 0.7 ft. SANDY SILT, s(ML): About 65% fines with no plasticity, high dilatancy, no toughness; about 35% fine sand; dry, dark brown; lightly cemented; slight reaction with HCL.
	LOCATION: Reach 4B1, River Bank Right, RM 155.6, Merced County. North of Sandy Mush Road.	_	96.2	69.9	26.0	4.1	0.0	60.1	38.7	26.2	СН	94.0		CL	34.0	0.7 to 1.5 ft. SILTY SAND WITH GRAVEL, (SM)g: About 40% fine sand; about 40% fines with no plasticity; about 20% rounded, elongate, hard
	DRILLED BY: Bureau of Reclamation: PN Region drill crew: Cody Kelley, driller	-											T			fine gravel; maximum particle size, ¾ inch; dry, tan; cemented; slight reaction with HCL.
	Dennis Read, helper Chris Peterson, helper DRILL RIG:	-														1.5 to 1.7 ft. SANDY LEAN CLAY, s(CL): About 60% fines with medium plasticity; about 40% fine sand; moist to dry, dark brown; layered with about 0.1 ft. thick sandy layers;
	Truck mounted Central Mining Equipment (CME) DC512	5-														slight reaction with HCL. — 1.7 to 2.0 ft. SILTY SAND, SM:
	DRILLING & SAMPLING METHODS: The drill hole was advanced and sample using a Flight Auger Dry Core system (FADC). The drill hole was advanced using 8-1/4 inch o.d. by 4-1/4	3_														About 50% fine sand; about 50% fines with no plasticity; dry, tan; strong reaction with HCL; about 50% CaCO ₃
	inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5-foot long split barrel dry core sample system	-	-											Cŀ	н	2.0 to 2.8 ft. LEAN CLAY, CL: About 100% fines with medium plasticity, medium toughness; trace fine sand; moist, dark brown to black; crumbles easily; high amount of organics; no reaction with HCL.
	(sampler). Unless indicated otherwise, the sampler was placed inside the augers and the cutting shoe of the sampler extended 0.2 foot beyond the auger drill bit. A free-spinning		100.0		28.0	11.2	0.0	57.4	40.2	21.7	СН					<u>Lab Data Interval</u> 2.0 to 2.8 ft.
	adapter was placed at the top of the sampler to avoid rotation while advancing the augers. Interval Method	-	_									88.8				 2.8 to 10.3 ft. FAT CLAY, CH: About 90% fines with medium to high plasticity, no dilatancy, high toughness; about 10% fine sand; moist, dark brown; firm to very firm; no
	0.0 to 30.2 ft. FADC DRILLING CONDITIONS AND DRILLER'S	-														 reaction with HCL. Lab Data Interval
	COMMENTS: 10.2 to 15.2 ft Wet. 15.2 to 20.2 ft Catcher with nylon.	10-	1													7.0 to 8.0 ft. 10.3 to 11.5 ft. LEAN CLAY WITH SAND,
	20.2 to 25.2 ft Catcher with nylon. 25.2 to 30.2 ft Catcher with nylon.														86.5	(CL)s: About 75% fines with medium plasticity, medium toughness; about 25% fine sand;
	DRILLING FLUID, RETURN AND COLOR: 0.0 to 30.2 ft Drilled without fluid	_	-											(C	EL)s 85.3	 moist, dark brown with reddish brown oxidation; firm; no reaction with HCL.
	WATER LEVEL: 3.5 ft 5/16/2011	-														11.5 to 13.3 ft. SANDY LEAN CLAY, s(CL): About 65% fines with medium plasticity, medium toughness; about 35% fine to medium
	REASON FOR HOLE TERMINATION: The hole was terminated upon reaching the target depth.		94.0											s(0	CL)	sand; moist, dark brown; no reaction with HCL. 13.3 to 14.3 ft. SILTY SAND, SM:
<u> </u>		-	-												83.5	 About 75% fine sand, trace medium sand; about 25% fines with no plasticity; wet, brown; water pools on surface.
:54:10 PI		_		8.6	13.5	77.9	0.0	NP	NP	20.0	SM	82.5		SN	M 82.5	<u>Lab Data Interval</u> — 13.3 to 14.3 ft.
P.GPJ 11/8/11 3:54:10 PM		15—	-									52.0	Qal	1	ML) 81.6	14.3 to 15.2 ft. SANDY SILT, s(ML): About 60% fines with no plasticity, no toughness; about 40% fine sand; moist, tan
SURRY.																

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-Plastic NR = No Recovery

NA = Not Applicable I.D. = Inner Diameter O.D. = Outer Diameter G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ▼ = Top of Groundwater

GEOLOGIC LOG OF DRILL HOLE NO. MW-11-146

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, RM 155.6, Merced County

BEGUN: 5/13/11 FINISHED: 5/13/11
DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 3.5 ft. (93.3 ft. - 5/16/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,320,427.9 E 6,072,333.8 NAD83

TOTAL DEPTH: 30.2 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 96.75 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

SHEET 2 OF 2

HOLE LOGGED BY: A. Warren REVIEWED BY: T. Lewis

PLASTICITY TO INDEX NO STURE CONTENT LABORATORY CLASSIFICATION LABORATORY DATA VISUAL CLASSIFICATION GEOLOGIC UNIT SYMBOL **CLASSIFICATION AND** LIQUID LIMIT **NOTES** % CORE RECOVERY GRAVEL PHYSICAL CONDITION SAND <0.005 **HOLE COMPLETION:** 15.2 to 20.2 ft. SANDY SILT, s(ML):About 55% fines with no plasticity, rapid dilatancy, no toughness; about 45% fine sand; wet, tan with Completed as a groundwater monitoring well. Well Casing: +2.92 to 19.2 ft. (2-inch I.D. blank reddish brown oxidation; loose and flowing. Dual U-pack Screen: 19.2 to 29.2 ft. (2-inch I.D. 20.2 to 30.2 ft. POORLY GRADED SAND, inner screen; 3-inch I.D. outer screen; slotted 0.010-inch) 22.0 s(ML) About 95% fine to medium sand; about 5% U-Pack Screen Filter Pack: (#2/12 Sand) Filter Pack: 17.0 to 30.2 ft. (#3 Sand) Sump: 29.2 to 30.2 ft. (2-inch I.D. blank PVC with fines with no plasticity; wet, gray; homogenous; no reaction with HCL. Lab Data Interval 21.0 to 22.0 ft. slip cap) Concrete Seal: 0.0 to 2.0 ft. Bentonite Seal: 2.0 to 17.0 ft. Well Completion: 6-inch by 6-inch by 5-foot long Lab Data Interval steel surface casing with locking top; 2.0-foot 26.5 to 27.5 ft. diameter concrete pad. Lock: #2006 Masterlock 20-76.6 95.6 0.0 NP NP 25.8 86.0 25 0.0 4.2 95.8 0.0 NP NP 26.9 SP 69.3 **BOTTOM OF HOLE**

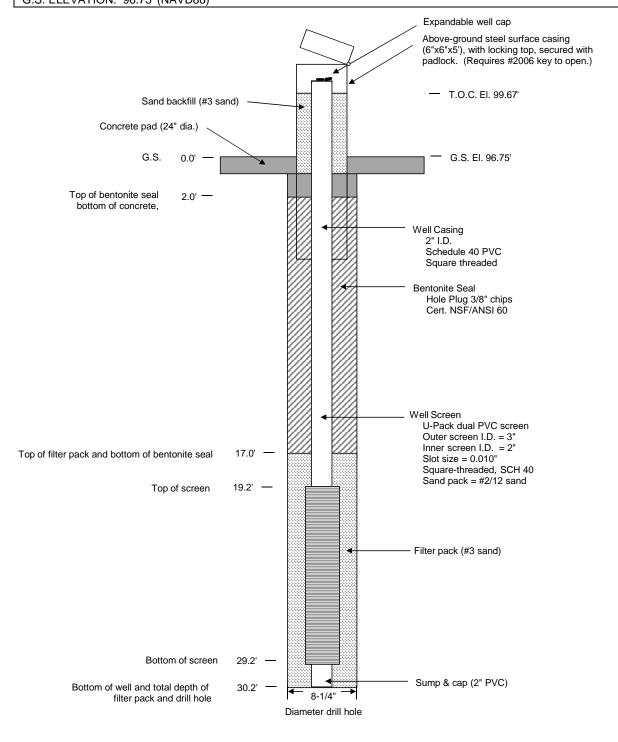
COMMENTS:

FADC = Flight Auger Dry Core NP = Non-Plastic NR = No Recovery NA = Not Applicable I.D. = Inner Diameter

O.D. = Outer Diameter

G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ▼ = Top of Groundwater

MW-11-146	GEOLOGIST: A. Warren						
WELL COMPLETION DIAGRAM	DRILLER: C. Peterson						
DATE COMPLETED: 5/13/2011	HELPERS: D. Read & C. Kelly						
LOCATION: North of Sandy Mush Road. Reach 4B1, River Bank Right, RM 155.6, Merced County.							
T.O.C. COORDINATES: N2320427.88 E6072333.82 (NAD93) EL. 99.67' (NAVD88)							
G S ELEVATION: 96.75' (NAV/D88)							



NOTES:

San Joaquin River Restoration Program
U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name S J R R P	County Name MERC	E 10	Well Name W-15	MW-11-146
Facility License, Permit or Monitoring Number		Wis. Unique Well Nu		DNR Well ID Number
t acting the state of the state				
Can this well be purged dry? Yes 2. Well development method	No 🄀	11. Depth to Water (from top of		relopment After Development 5 ft6_8ft.
	1	well casing)	· -	
surged with bailer and pumped 6 surged with block and bailed 4 surged with block and pumped 6 surged with block, bailed and pumped 7 compressed air 2 bailed only 1 pumped only 5 pumped slowly 5 Other 1	1 2 2 0 0 0 1	1	c 7 : 3 ! — . Clear	
4. Depth of well (from top of well casisng) _ 32			Brown	WARRING THE COLUMN TO THE COLUMN
5. Inside diameter of well	0 in.			
	gal.	Fill in if drilling fluid	is were used a	nd well is at solid waste facility:
7. Volume of water removed from well	gal.			
8. Volume of water added (if any)	gal.	solids		
9. Source of water added		15. COD		mg/l mg/l
		16. Well developed by	y: Name (first,	last) and Firm
10. Analysis performed on water added? (If yes, attach results)	s 🗆 No	First Name:		Last Name:
17. Additional comments on development: SURGED WITH BLOCK & BALL CH VINTIL 5 GALS, PUMPER. PUMPER WITH SUMP PUM		t for Seve		
Name and Address of Facility Contact / Owner/Responsibl First Last Name: Name:		I hereby certify that of my knowledge.	t the above in	formation is true and correct to the best
Facility/Firm:		Signature:		
Street:		Print Name:		
City/State/Zip:		Firm:		
<u> </u>		84		

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, RM 155.6, Merced County

BEGUN: 5/14/11 FINISHED: 5/14/11

DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 4.6 ft. (93.3 ft. - 5/15/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,321,462.9 E 6,073,278.0 NAD83

TOTAL DEPTH: 30.0 ft.

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 97.85 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: A. Warren
REVIEWED BY: T. Lewis

			LABORATORY DATA				١	ORY TON		_	TION			
NOTES	рертн	% CORE RECOVERY	<0.005	<0.075	% SAND	% GRAVEL	LIQUID LIMIT	PLASTICITY INDEX	% MOISTURE	LABORATORY CLASSIFICATION	EI.	GEOLOGIC UNIT SYMBOL	CLASSIFICATION	CLASSIFICATION AND PHYSICAL CONDITION
ALL MEASUREMENTS ARE IN FEET FROM THE GROUND SURFACE.		-										0 0		0.0 to 29.5 feet QUATERNARY ALLUVIUM (Qal)
PURPOSE OF HOLE: To recover a continuous soil core, collect data to determine geologic and hydrologic site conditions, and install a groundwater monitoring well.	-												96.6 OL/CL 95.9	tan with white CaCO ₃ ; moderately cemented; strong reaction with HCL; roots and grass
Reach 4B1, River Bank Right, RM 155.6, Merced County. North of Sandy Mush Road.		94.0												1.3 to 2.0 ft. ORGANIC/LEAN CLAY, OL/CL: About 95% fines with low plasticity, low
DRILLED BY: Bureau of Reclamation: PN Region drill crew: Chris Peterson, driller Dennis Read, helper	-		45.7	29.6	24.7	0.0	46.6	30.8	19.7	(CL)s	94.4	-	(CL)s	toughness; about 5% to trace sand; moist, dark brown to black; moderately soft and crumbled from drilling action; no reaction with HCL.
Cody Kelley, helper	-	-												2.0 to 4.8 ft. LEAN CLAY WITH SAND, (CL)s:
DRILL RIG: Truck mounted Central Mining Equipment (CME) DC512	5-											Ţ	93.1	About 75% fines with medium plasticity; about 25% fine sand; moist, brown; moderately firm; layered; moderate reaction with HCL.
DRILLING & SAMPLING METHODS: The drill hole was advanced and sample using a Flight Auger Dry Core system (FADC). The drill													sc	<u>Lab Data Interval</u> 2.5 to 3.5 ft.
hole was advanced using 8-1/4 inch o.d. by 4-1/4 inch i.d. hollow stem flight augers equipped with an 8-1/2 inch o.d. bullet and spade drill bit. Continuous sampling was performed by advancing a 4 inch o.d. by 3-3/8 inch i.d. by 5-foot long split barrel dry core sample system	-												91.4	4.8 to 6.5 ft. CLAYEY SAND, SC: About 55% fine sand; about 45% fines with medium plasticity; moist, tan with white CaCO ₃ ; moderately soft, crumbled from drilling action; strong reaction with HCL; abundant white CaCO ₃ .
(sampler). Unless indicated otherwise, the sampler was placed inside the augers and the cutting shoe of the sampler extended 0.2 foot beyond the auger drill bit. A free-spinning adapter was placed at the top of the sampler to avoid rotation while advancing the augers.	_	84.0	17.0	35.1	46.2	1.7	31.1	13.7	18.2	s(CL)	89.9		s(CL) 89.9	6.5 to 8.0 ft. SANDY LEAN CLAY, s(CL): About 55% fines with medium plasticity, slow
Interval Method 0.0 to 30.0 ft. FADC	-												sc	<u>Lab Data Interval</u> - 7.0 to 8.0 ft.
DRILLING CONDITIONS AND DRILLER'S COMMENTS: 10.0 to 15.0 ft Wet, catcher. 15.0 to 20.0 ft Catcher with nylon. 20.0 to 25.0 ft Catcher with nylon.	10-												87.9	8.0 to 10.0 ft. CLAYEY SAND, SC: About 75% fine sand; about 25% fines with medium plasticity; tan; moderately soft; no reaction with HCL.
25.0 to 30.0 ft Catcher with nylon.														Note: 2 inch thick layer of CaCO ₃ at 7.0 ft.
DRILLING FLUID, RETURN AND COLOR: 0.0 to 30.0 ft Drilled without fluid WATER LEVEL:	-		2.1	9.1	88.8	0.0	NP	NP	20.3	SP-SN	м	_		10.0 to 15.0 ft. POORLY GRADED SAND WITH SILT, SP-SM: About 90% fine sand, trace medium sand; about 10% fines with no plasticity; wet, tan;
4.6 ft 5/15/2011	-										85.9			does not hold shape; no reaction with HCL.
REASON FOR HOLE TERMINATION: The hole was terminated upon reaching the target depth.		38.0											SP-SM	Lab Data Interval 11.0 to 12.0 ft.
	-													15.0 to 16.0 ft. LEAN CLAY WITH SAND, (CL)s: About 70% fines with medium plasticity, medium toughness; about 30% fine sand; tan, wet; soft and disturbed from drilling action; moderate reaction with HCL.
	15-											Qal	82.9	16.0 to 16.8 ft. SILT WITH SAND, (ML)s: About 80% fines with low plasticity, low toughness; about 20% fine sand; moist, brown to tan; firm; slight reaction with HCL; minor
													(CL)s	CaCO ₃ veins.
	ь												81.9	

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-Plastic

NR = No Recovery NA = Not Applicable

I.D. = Inner Diameter O.D. = Outer Diameter G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River ▼ = Top of Groundwater

SHEET 2 OF 2

FEATURE: Groundwater Monitoring

LOCATION: Reach 4B1, River Bank Right, RM 155.6, Merced County

BEGUN: 5/14/11 FINISHED: 5/14/11 DEPTH AND ELEVATION OF WATER LEVEL

AND DATE MEASURED: 4.6 ft. (93.3 ft. - 5/15/2011)

PROJECT: San Joaquin River Restoration Project

COORDINATES: N 2,321,462.9 E 6,073,278.0 NAD83

TOTAL DEPTH: 30.0 ft.

LABORATORY DATA

DEPTH TO BEDROCK: Not Encountered

STATE: California

GROUND ELEVATION: 97.85 ft. NADV88 ANGLE FROM HORIZONTAL: -90°

HOLE LOGGED BY: A. Warren REVIEWED BY: T. Lewis

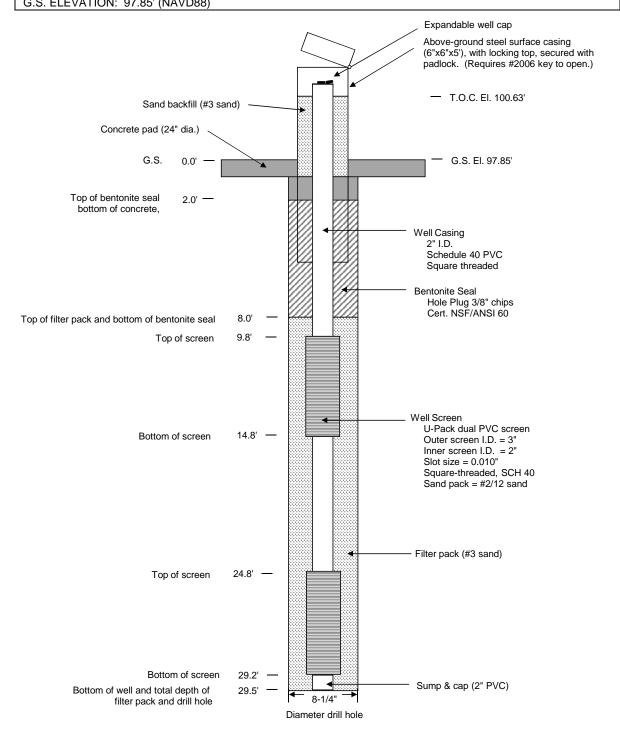
LABORATORN CLASSIFICATION VISUAL CLASSIFICATION SEOLOGIC UNIT PLASTICITY INDEX % MOISTURE CONTENT **CLASSIFICATION AND** LIQUID LIMIT **NOTES** % CORE RECOVERY GRAVEL PHYSICAL CONDITION SAND <0.005 **HOLE COMPLETION:** 16.8 to 17.0 ft. LEAN CLAY WITH SAND, Completed as a groundwater monitoring well. (ML)s (CL)s: About 70% fines with medium plasticity, medium toughness; about 30% fine sand; tan, Well Casing: +2.78 to 9.8 ft. and 14.8 to 24.8 ft. (2-inch I.D. blank PVC) (CL)s 80.9 wet; soft and disturbed from drilling action; Dual U-pack Screen: 9.8 to 14.8 ft. and 24.8 to moderate reaction with HCL. 29.2 ft. (2-inch I.D. inner screen; 3-inch I.D. outer 100.0 screen; slotted 0.010-inch) 17.0 to 20.6 ft. LEAN CLAY, CL: U-Pack Screen Filter Pack: (#2/12 Sand) Filter Pack: 8.0 to 5.5 ft. (#3 Sand) About 90% fines with low plasticity, medium toughness; about 10% fine sand; moist, brown Sump: 29.2 to 29.5 ft. (2-inch I.D. blank PVC with to tan; firm; slight reaction with HCL; minor 56.2 10.3 0.2 33.1 15.7 24.2 CL CaCO₂ veins. slip cap) Concrete Seal: 0.0 to 2.0 ft. CL 78.9 Bentonite Seal: 2.0 to 8.0 ft. Lab Data Interval Well Completion: 6-inch by 6-inch by 5-foot long 18.0 to 19.0 ft. steel surface casing with locking top; 2.0-foot 20.6 to 22.8 ft. LEAN CLAY WITH SAND, diameter concrete pad. Lock: #2006 Masterlock (CL)s: About 80% fines with low plasticity, low to medium toughness; about 20% fine sand; moist, tan; firm; no reaction with HCL; layers of reddish brown oxidation at lower contact. 22.8 to 24.8 ft. CLAYEY SAND, SC: About 75% fine sand; about 25% fines with high plasticity; wet to moist, reddish orange; firm; no reaction with HCL. (CL)s 30.6 47.8 20.6 1.0 27.4 10.7 22.0 (CL)s 24.8 to 27.5 ft. LEAN CLAY, CL: About 90% fines with medium to high plasticity, 75. medium toughness; about 10% fine sand; moist, olive tan with reddish brown oxidation: moderate cementation and strong reaction with HCL from 24.8 to 25.4 ft. Note: About 20% fine sand from 24.8 to 25.4 27.5 to 30.0 ft. CLAYEY SAND, SC: About 60% fine sand; about 40% fines with medium plasticity; moist, reddish brown; firm; 25 no reaction with HCI. Lab Data Interval 29.0 to 30.0 ft. CL 70.4 100.0 SC. 24.6 39.6 35.8 0.0 23.9 8.8 20.1 s(CL) BOTTOM OF HOLE

COMMENTS:

FADC = Flight Auger Dry Core NP = Non-Plastic NR = No Recovery NA = Not Applicable I.D. = Inner Diameter O.D. = Outer Diameter

G.S. = Ground Surface + = Above Ground Surface T.O.C. = Top of Well Casing SJR = San Joaquin River

MW-11-147	GEOLOGIST: A. Warren							
WELL COMPLETION DIAGRAM	DRILLER: C. Peterson							
DATE COMPLETED: 5/14/2011	HELPERS: D. Read & C. Kelly							
LOCATION: North of Sandy Mush Road. Reach 4B1, River Bank Right, RM 155.6, Merced County.								
T.O.C. COORDINATES: N2321462.91 E6073278.01 (NAD93) EL. 100.63' (NAVD88)								
C C ELEVATION: 07.95' (NAVIDOS)								



NOTES:

U.S. Department of Interior, Bureau of Reclamation

MONITORING WELL DEVELOPMENT

Facility/Project Name	County Name		Well Name	
SIRRP	MEK	CGB	W-10	7-MW-11-147
Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well No	ımber	DNR Well ID Number
surged with block, bailed and pumped 7	No X	11. Depth to Water (from top of well casing)	Before Dev a	relapment After Development 6 ft. $\frac{1}{2} = \frac{5}{6}$ ft. 6 $\frac{1}{2} = \frac{5}{2} = \frac{1}{6}$ ft. 6 $\frac{1}{2} = \frac{5}{2} = \frac{1}{2} = \frac{5}{2} = \frac{1}{2}$ ft. 6 $\frac{1}{2} = \frac{5}{2} = \frac{1}{2} = \frac{5}{2} = \frac{1}{2} $
Other	70 min.	13. Water clarity	Clear 1 Turbid 1 (Describe)	5 Turbid 2 5 (Describe)
5. Inside diameter of well2	<u>O</u> in.	77	SAWE	
6. Volume of water in filter pack and well casing	gal.	Fill in if drilling fluid	is were used a	nd well is at solid waste facility:
7. Volume of water removed from well	gal.			mg/ling/l
8. Volume of water added (if any)	gal.	solids	STATES STATES STATES	
9. Source of water added	ge agan dan ministrating gilik histori kegalanan kangangan pangangan pangangan	15. COD		mg/l mg/l
		16. Well developed b	y: Name (first,	last) and Firm
10. Analysis performed on water added? Ye (If yes, attach results)	s 🗆 No	First Name:		Last Name:
17. Additional comments on development:		<u> </u>		
SUNGED WITH BLOCK + A UNTIL PUMPER 5 GALS PUMPER WITH SUMP PO W CLEMN UP.	on P			
Name and Address of Facility Contact /Owner/Responsibl First Last Name: Name:	e Party	I hereby certify the of my knowledge.		formation is true and correct to the best
Facility/Firm:		Signature:		
Street:		Print Name:		
City/State/Zip:		Firm:		-
<u> </u>				