

APPENDIX D
BP-SERIES WELL BORING LOGS
REMEDIAL INVESTIGATION REPORT
GROUNDWATER OPERABLE UNIT
Arizona Department of Environmental Quality
Broadway-Pantano Water Quality Assurance Revolving Fund Site
June 1, 2012

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

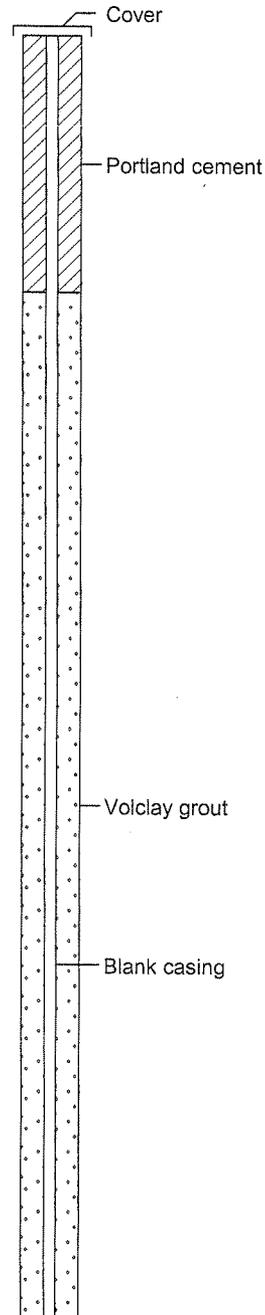
Start Date : January 3, 2002
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589345

1005 North Alamo

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
0			WELL GRADED GRAVELLY SILTY SAND (angular sand grains; fine grained subangular gravel ~ 25-30%; silty fines ~ 10-15%); grayish orange (10YR 7/4)
	SW		slight decrease in gradation; slight decrease in gravel to ~ 15% and silty fines to less than 5%
50			
	SP		POORLY GRADED SAND (medium grained sand; silty fines ~ 5-8%; no gravel); grayish orange (10YR 7/4); abundant muscovite
100			

Well: BP-1
Elev.: 2535.50

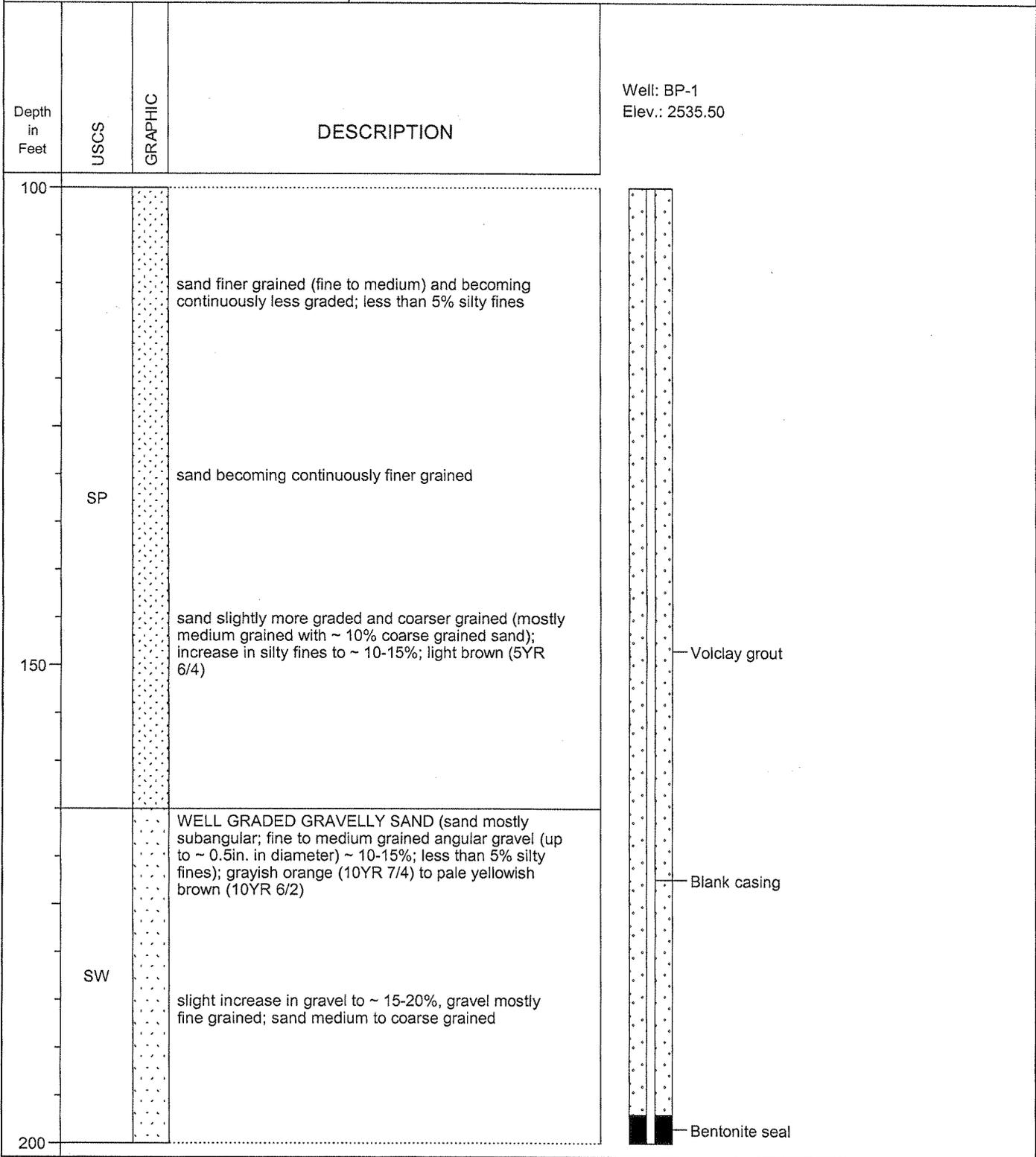


Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

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Slot Size : 0.020-inch
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1005 North Alamo



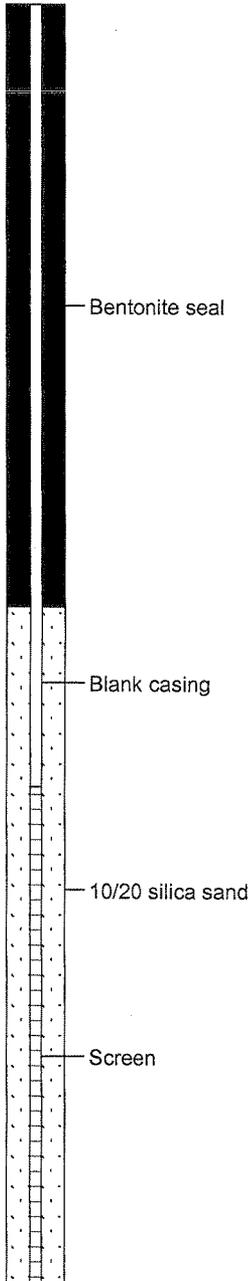
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Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : January 3, 2002
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589345

1005 North Alamo

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	<p>Well: BP-1 Elev.: 2535.50</p>  <p>Bentonite seal</p> <p>Blank casing</p> <p>10/20 silica sand</p> <p>Screen</p>
200	SW			
	SP		POORLY GRADED SILTY GRAVELLY SAND (sand medium grained; silty fines ~ 5-10%; medium grained gravel up to 1in. in diameter ~ 5%); grayish orange (10YR 7/4)	
250	SW		WELL GRADED GRAVELLY SAND (gravel up to ~ 2in. in diameter ~10%; silty fines ~ 5%); grayish orange (10YR 7/4) gravel fine grained, increase in amount of gravel to ~ 20-25% sand moderately well graded; decrease in gravel to ~ 10-15% (up to ~ 0.5in. in diameter)	
300	SP		POORLY GRADED GRAVELLY SAND (sand medium grained with ~ 10% coarse grained sand; fine gravel ~ 10%); grayish orange (10YR 7/4)	

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Slot Size : 0.020-inch
ADWR No. : 55-589345

1005 North Alamo

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Well: BP-1 Elev.: 2535.50
300	SP		slight increase in gradation; increase in gravel to ~ 15%; increase in grain size of gravel to up to ~ 0.75in. in diameter	
			WELL GRADED GRAVELLY SAND (fine to medium grained gravel up to ~ 1in. in diameter ~15%; less than 5% silty fines); grayish orange (10YR 7/4)	▼
350	SW		sand coarser grained; slight increase in gravel to ~ 20%; slight increase in silty fines to ~ 5-10%; moderate yellowish brown (10YR 5/4)	10/20 silica sand
			gravel up to ~ 1.5in. in diameter; decrease in silty fines to less than 5%; color difficult to distinguish due to variation of grain composition, generally pale yellowish brown (10YR 6/2); garnets present; visible crystals of muscovite, quartz and feldspar; gravel composed of fragmented dioritic gneiss	Screen
400				

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

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Well Casing Diameter : 5-inch PVC

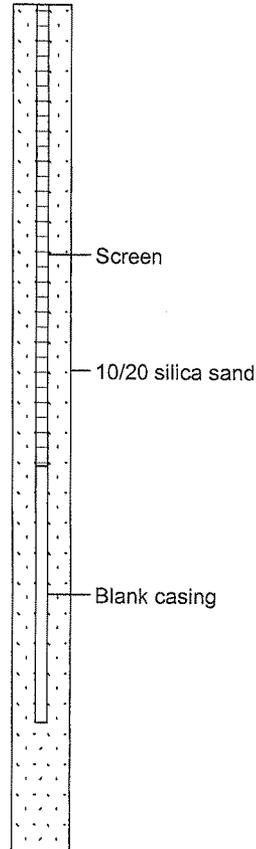
Slot Size : 0.020-inch
ADWR No. : 55-589345

1005 North Alamo

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
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Well: BP-1
Elev.: 2535.50

400	SW		WELL GRADED GRAVELLY SAND TO WELL GRADED SANDY GRAVEL (gravel up to ~ 1.5in. in diameter; less than 5% silty fines); pale yellowish brown (10YR 6/2)
			increase in coarse grained gravel; abundant garnets
	SW/GW		
450			Boring BP-1 terminated at ~466 feet bgs.



Note: Moisture content not noted in descriptions due to injection of water for dust control during drilling.

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LOG OF BORING BP-2

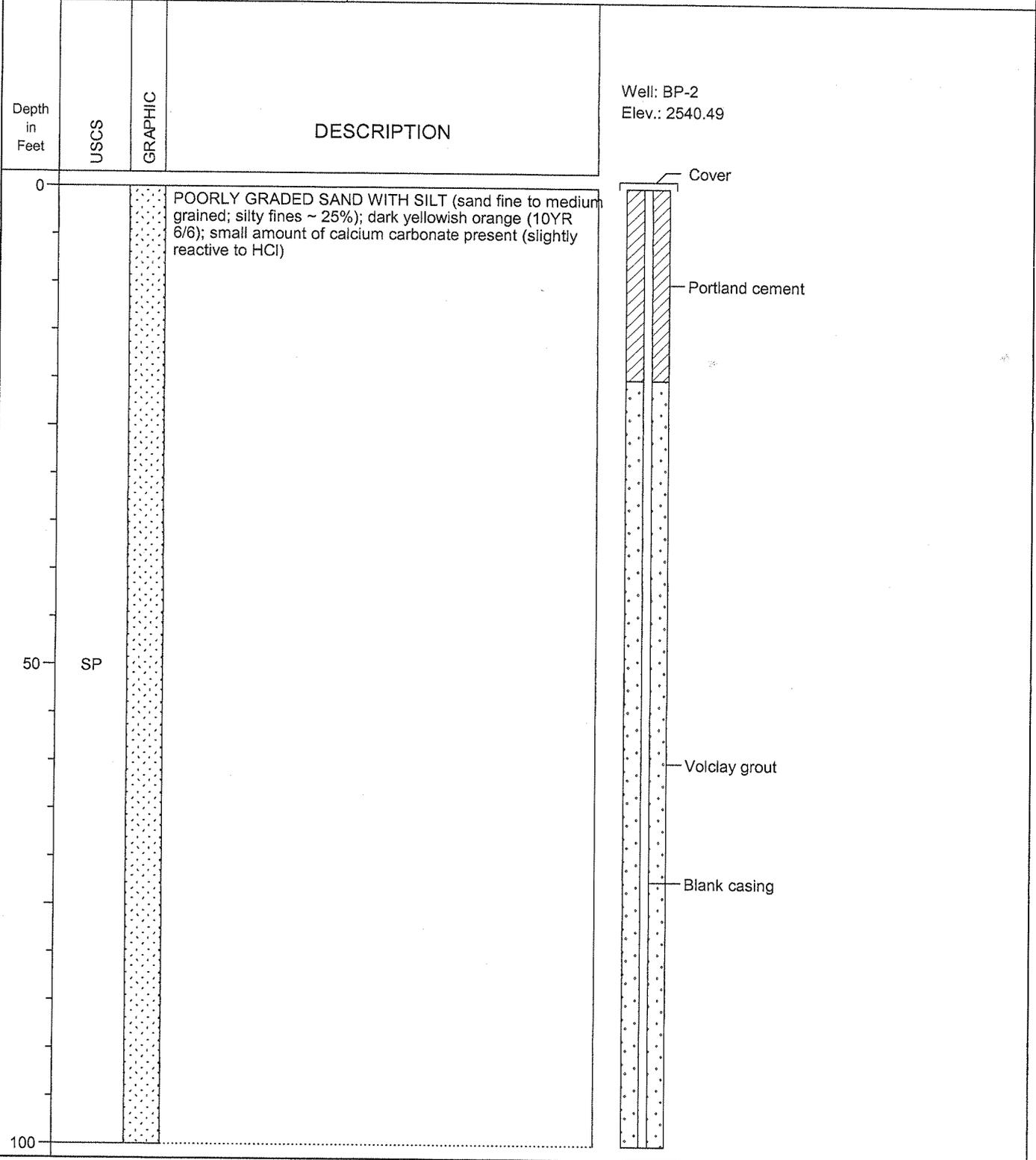
(Page 1 of 5)

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : December 6, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Ed Vandegrift
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589349

6063 East Rosewood



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Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

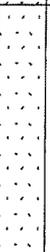
Start Date : December 6, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Ed Vandegrift
Well Casing Diameter : 5-inch PVC

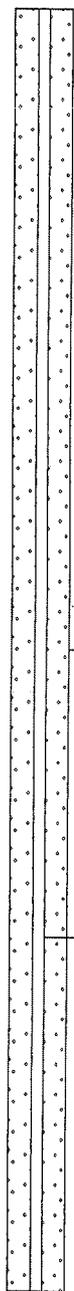
Slot Size : 0.020-inch
ADWR No. : 55-589349

6063 East Rosewood

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
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Well: BP-2
Elev.: 2540.49

100	SP		grayish orange (10YR 7/4); no reaction to HCl
150	SW		WELL GRADED SAND (silty fines ~ 10-15%); moderate yellowish brown (10YR 5/4)
	SP		POORLY GRADED SAND (sand medium to coarse grained) fine grained gravel present (up to 0.5" in diameter)



Volclay grout

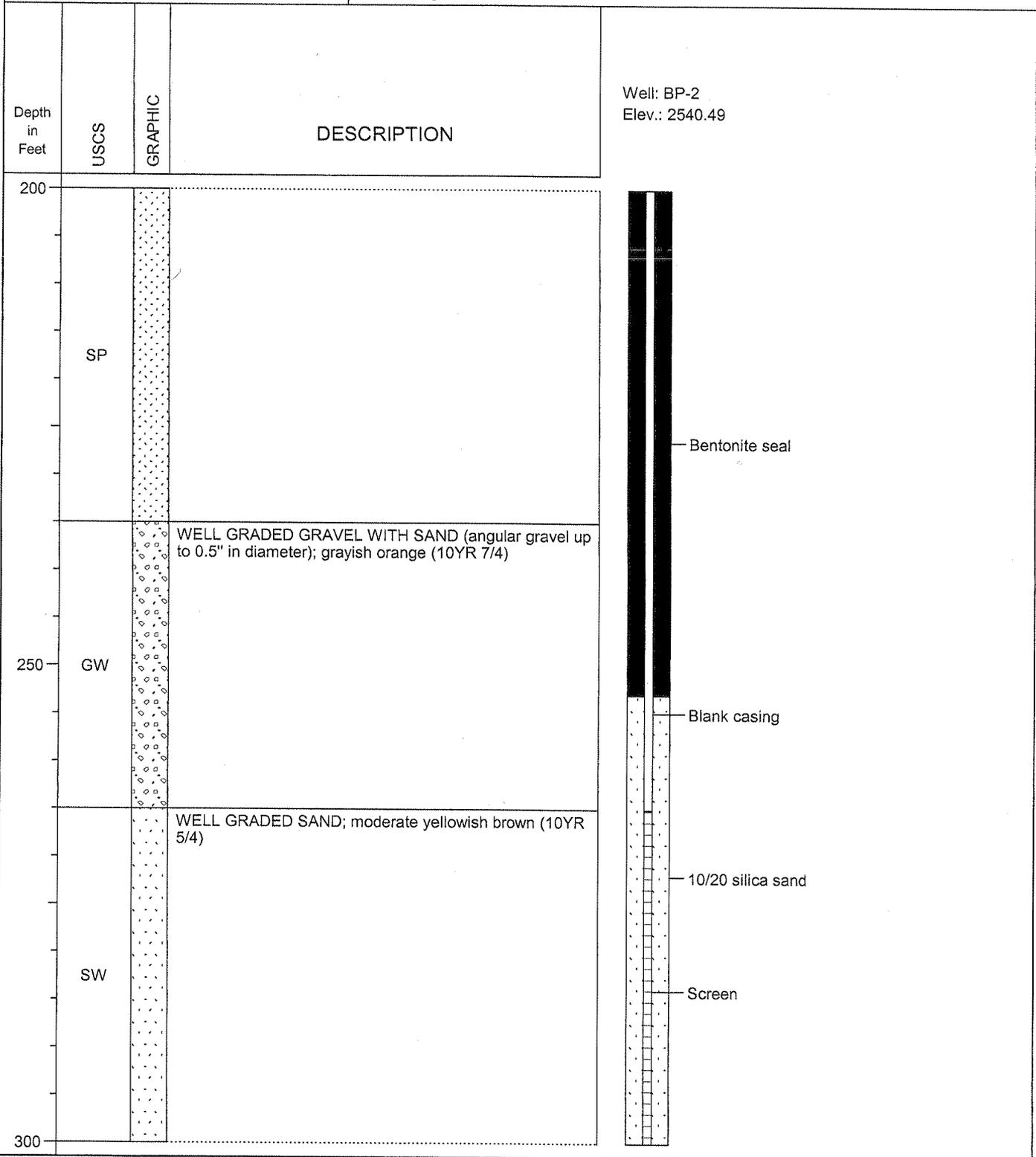
Blank casing

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Drilling Method : ARCH
SECOR Rep on-site : Ed Vandegrift
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589349

6063 East Rosewood

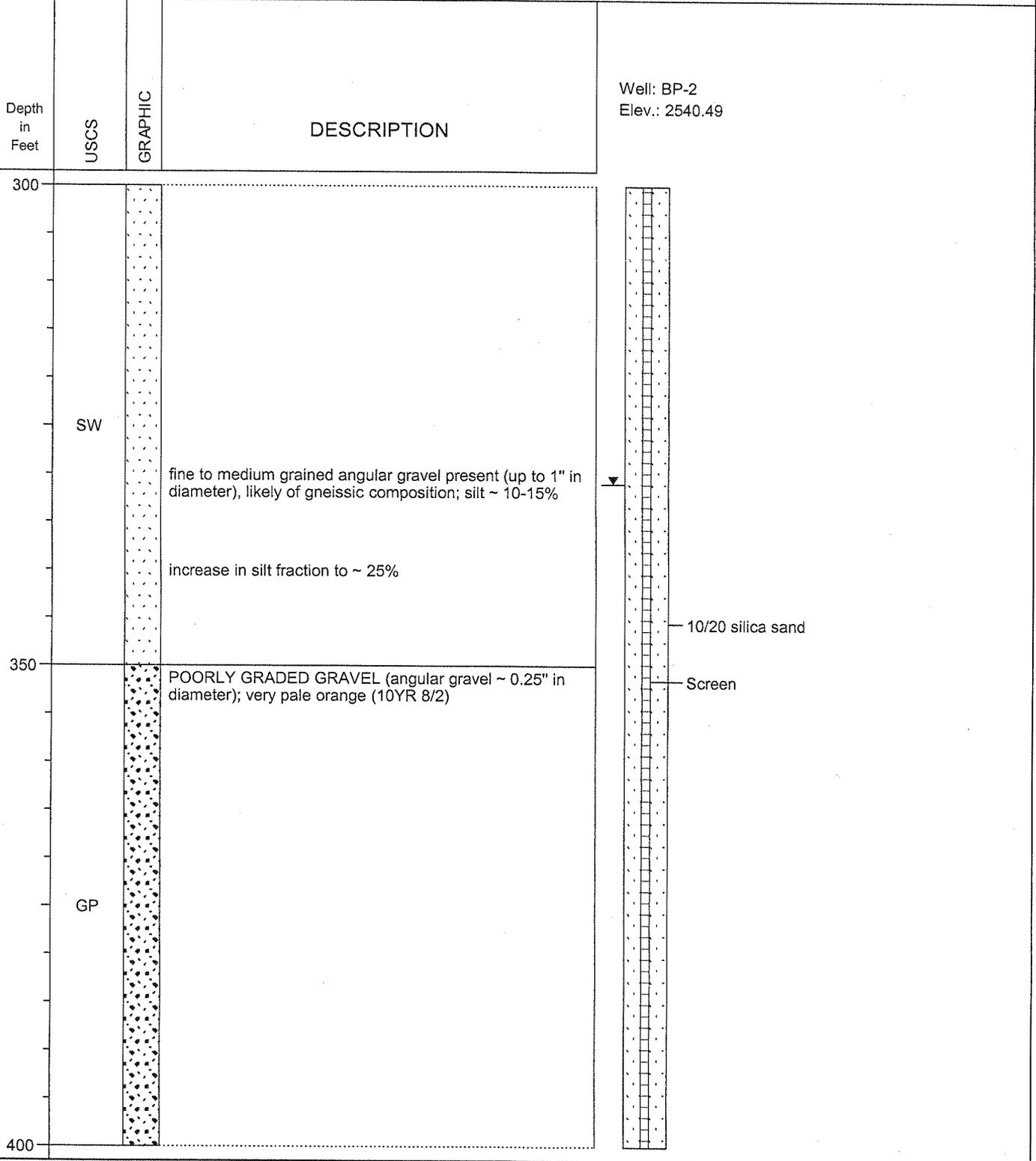


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Start Date : December 6, 2001
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Drilling Method : ARCH
SECOR Rep on-site : Ed Vandegrift
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589349

6063 East Rosewood



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Well Casing Diameter : 5-inch PVC

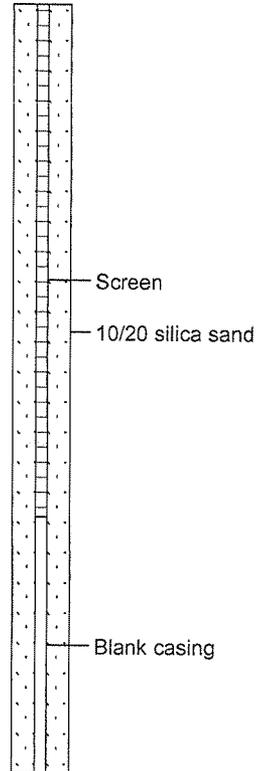
Slot Size : 0.020-inch
ADWR No. : 55-589349

6063 East Rosewood

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
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Well: BP-2
Elev.: 2540.49

400	GP		WELL GRADED SANDY GRAVEL TO POORLY GRADED GRAVELLY SAND (sand fine grained); gravel likely composed of a fragmented granitic schist or gneiss; garnets abundant
	GW/SP		
	SW		WELL GRADED SAND WITH GRAVEL (fine grained gravel up to 0.5" in diameter); garnets abundant gravel larger grained, up to 2" in diameter
450	GW		WELL GRADED GRAVEL WITH SAND; pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4) Boring BP-2 terminated at ~460 feet bgs.



Note: Moisture content not noted in descriptions due to injection of water for dust control during drilling.

500

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

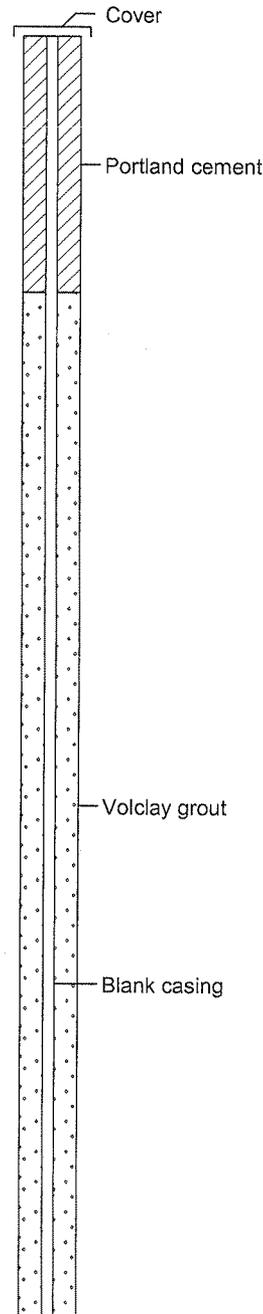
Start Date : June 24, 2002
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589348

Sahuara Avenue

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
0			
			WELL GRADED GRAVELLY, SILTY SAND; sand and gravel mostly subangular; ~10-15% gravel up to 0.75" in diameter; ~5-10% silty fines; grayish orange (10YR 7/4)
			slight decrease in gravel; grayish orange (10YR 7/4) to light brown (5YR 6/4)
50	SW		decrease in silty fines to less than 5%; slight increase in gravel to ~15%; sand medium to coarse grained; grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2)
			slight increase in silty fines; slight decrease in gravel; gravel up to ~1.25" in diameter; grayish orange (10YR 7/4) to light brown (5YR 6/4)
			decrease in silty fines to less than 5%; slight increase in gravel to ~15%; grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2)
100			

Well: BP-3
Elev.: 2533.41

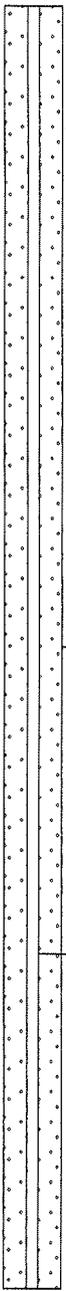


Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

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Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589348

Sahuara Avenue

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Well: BP-3 Elev.: 2533.41
100			<p>gravel no longer present; sand less well graded</p> <p>~10% fine gravel present; sand well graded; pale yellowish brown (10YR 6/2)</p> <p>150 SW slight increase in silty fines; pale yellowish brown (10YR 6/2) to grayish orange (10YR 7/4)</p>	 <p>Volclay grout</p> <p>Blank casing</p>
200				

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

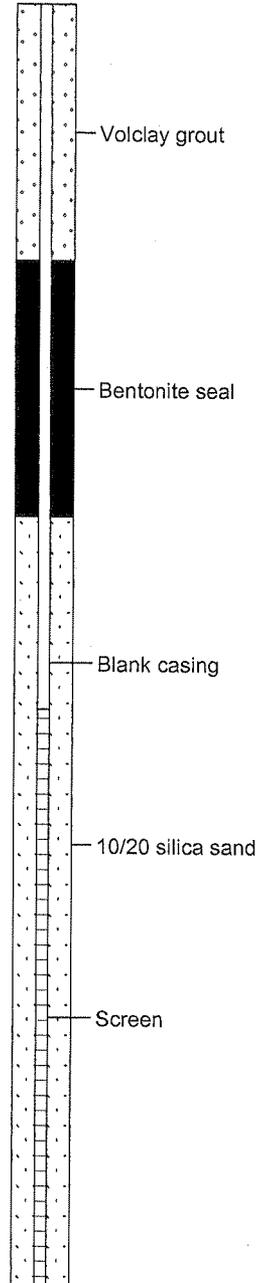
Start Date : June 24, 2002
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589348

Sahuara Avenue

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
200	SW		POORLY GRADED SAND; sand medium grained; 5-10% silty fines; pale yellowish brown (10YR 6/2)
250	SP		sand slightly more graded
300			sand finer grained and poorly graded

Well: BP-3
Elev.: 2533.41

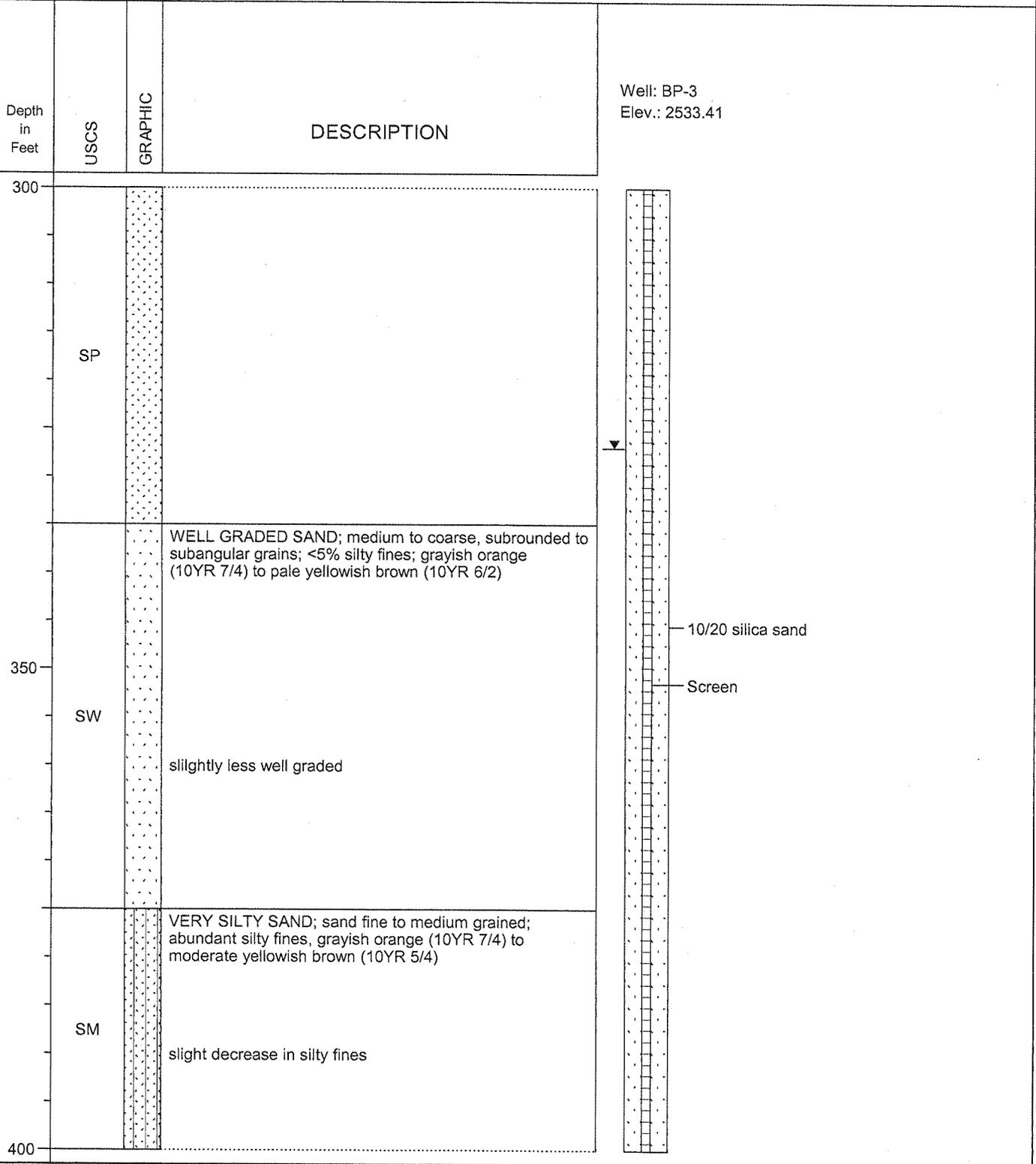


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Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Kelli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589348

Sahuara Avenue



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Start Date : June 24, 2002
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Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

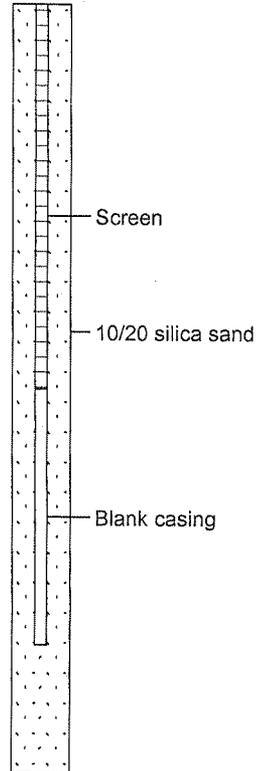
Slot Size : 0.020-inch
ADWR No. : 55-589348

Sahuara Avenue

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
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Well: BP-3
Elev.: 2533.41

400	SM		continued decrease in silty fines; increase in sand grain size to medium to coarse
450			Boring BP-3 terminated at ~460' below surface grade.



Note:
Moisture content not noted as water was periodically injected for dust control during drilling.

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LOG OF BORING BP-4

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Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

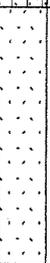
Start Date : December 18, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Ed Vandegrift
Well Casing Diameter : 5-inch PVC

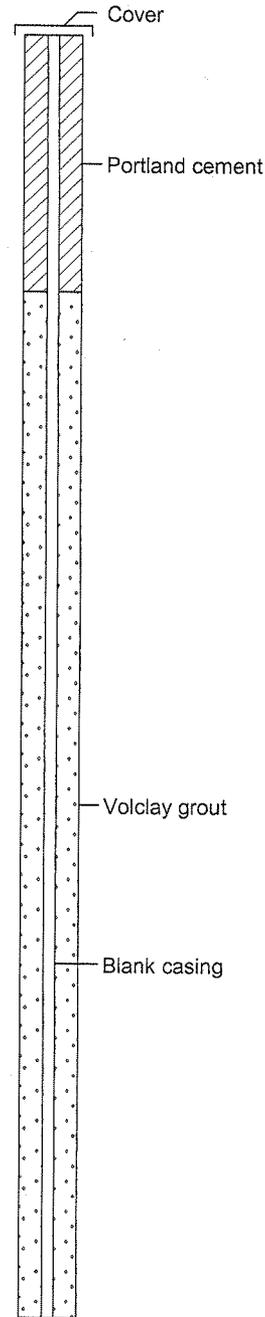
Slot Size : 0.020-inch
ADWR No. : 55-589347

6056 East Baker Street

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
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Well: BP-4
Elev.: 2547.31

0			SILTY SAND (sand fine to medium grained; small amount of angular gravel up to 0.25" in diameter); moderate yellowish brown (10YR 5/4)
	SM		
50			WELL GRADED SAND (trace amounts of rounded gravel up to 0.25" in diameter); grayish orange (10YR 7/4)
	SW		
			SILTY SAND (sand medium grained; silty fines ~ 35-40%; no gravel)
	SM		
100			



Arizona Department of Environmental Quality
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Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Ed Vandegrift
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589347

6056 East Baker Street

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Well: BP-4 Elev.: 2547.31
100	SM			
	SP		POORLY GRADED CLEAN SAND (sand coarse grained); very pale orange (10YR 8/2)	
			WELL GRADED SAND (less than 5% silty fines); moderate yellowish brown (10YR 5/4)	
150	SW		rounded gravel present, ~ 5%	Volclay grout
	SM		SILTY SAND WITH GRAVEL (silty fines ~ 30%; angular gravel up to 1" in diameter ~ 20%); moderate yellowish brown (10YR 5/4) gravel no longer present; slight increase in silty fines to ~ 35%	Blank casing
200				

Arizona Department of Environmental Quality
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Drilling Method : ARCH
SECOR Rep on-site : Ed Vandegrift
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589347

6056 East Baker Street

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Well: BP-4 Elev.: 2547.31
200	SM			
	SP		POORLY GRADED SAND WITH SILT (sand fine to medium grained; silty fines ~ 10%); grayish orange (10YR 7/4)	
250	GW		WELL GRADED GRAVEL WITH SAND (gravel up to 1" in diameter; sand ~ 15%; less than 5% silty fines); dark yellowish orange (10YR 6/6); gravel mostly composed of white quartz and mica	
	SM		SILTY SAND (sand fine to medium grained; silty fines ~ 40%; no gravel present); moderate yellowish brown (10YR 5/4)	
300	GW		WELL GRADED GRAVEL WITH SAND (gravel up to 1" in diameter; sand ~ 15%; less than 5% silty fines); dark yellowish orange (10YR 6/6); gravel mostly composed of white quartz and mica	

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

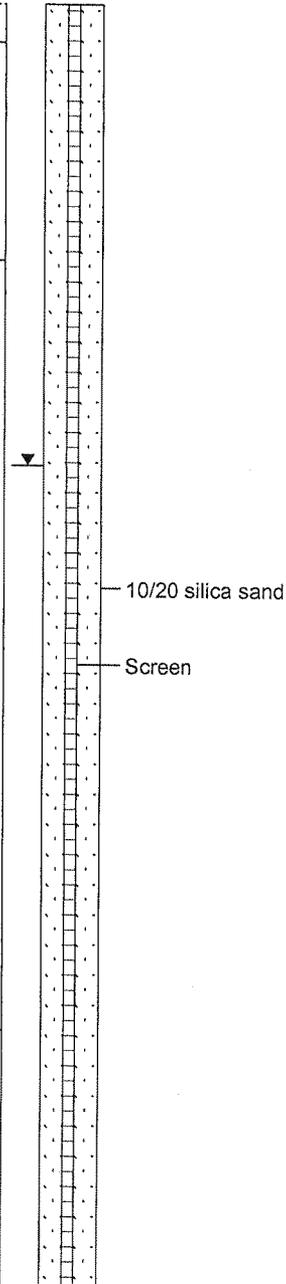
Start Date : December 18, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Ed Vandegrift
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589347

6056 East Baker Street

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
300	GW		
			WELL GRADED SAND (less than 5% silty fines; no gravel present); dark yellowish orange (10YR 6/6)
	SW		
			SILTY SAND (sand fine to medium grained; silty fines ~ 35-40%; no gravel present); pale yellowish brown (10YR 6/2)
			slight increase in silt fraction
350	SM		
			WELL GRADED GRAVELLY SAND (gravel up to 1" in diameter; less than 5% silty fines); very pale orange (10YR 8/2); gravel appears to be fragments of granitic schist
	SW		
400			

Well: BP-4
Elev.: 2547.31



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Well Casing Diameter : 5-inch PVC

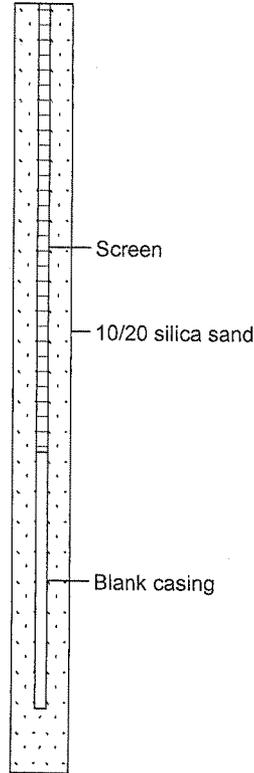
Slot Size : 0.020-inch
ADWR No. : 55-589347

6056 East Baker Street

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
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400	SW		
	SM		WELL GRADED SILTY SAND (silty fines ~ 35%); pale yellowish brown. (10YR 6/2)
	SW		WELL GRADED SAND WITH GRAVEL (gravel up to 2" in diameter); pale yellowish brown (10YR 6/2)
450			Boring BP-4 terminated at ~460 feet bgs.

Well: BP-4
Elev.: 2547.31



Note: Moisture content not noted in descriptions due to injection of water for dust control during drilling.

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

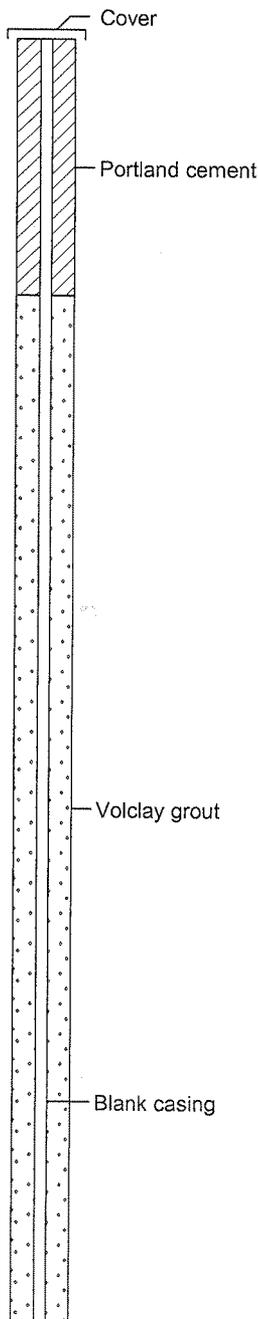
Start Date : January 10, 2002
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589346

6445 East Brian Kent

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
0			very hard, consolidated layer of caliche from approximately 3 to 6 feet below grade
	SM		SILTY SAND (sand moderately well graded; silty fines ~ 25%); grayish orange (10YR 7/4); small fragments of caliche still present
	SW		WELL GRADED SILTY GRAVELLY SAND (sand mostly medium and coarse grained; angular gravel up to ~ 0.5in. in diameter ~ 15%; silty fines ~ 10%); grayish orange (10YR 7/4)
	GW		WELL GRADED SANDY GRAVEL (fine grained, angular gravel [up to ~ 0.75in. in diameter]; sand coarse grained; silty fines less than 5%); color difficult to distinguish due to variation in mineral composition of gravel, most like pale yellowish brown (10YR 6/2)
			WELL GRADED SILTY GRAVELLY SAND (sand mostly medium and coarse grained; angular gravel up to ~ 0.5in. in diameter ~ 15%; silty fines ~ 10%); grayish orange (10YR 7/4)
50	SW		subangular to subrounded gravel up to ~ 1in. in diameter; increase in silty fines to ~ 15%; light brown (5YR 6/4)
			sand slightly less well graded; decrease in silty fines to ~ 5%; pale yellowish brown (10YR 6/2)
100	SP		POORLY GRADED SAND (subangular to subrounded, medium grained sand; less than 5% silty fines); grayish orange (10YR 7/4)

Well: BP-5
Elev.: 2570.38

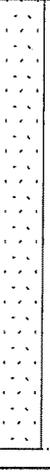


Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

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Drilling Company : WDC Exploration
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SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589346

6445 East Brian Kent

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Well: BP-5 Elev.: 2570.38
100	SP		<p>slight increase in gradation</p> <p>sand finer grained; pale yellowish brown (10YR 6/2)</p>	 <p>Volclay grout</p> <p>Blank casing</p>
150	SW		<p>WELL GRADED GRAVELLY SILTY SAND (sand grains subangular to subrounded; fine grained, angular to subangular gravel ~ 10%; silty fines ~ 5-10%); grayish orange (10YR 7/4)</p> <p>increase in silty fine fraction to ~ 15%; gravel up to ~ 0.5in. in diameter; grayish orange (10YR 7/4) to light brown (5YR 6/4)</p>	
200				

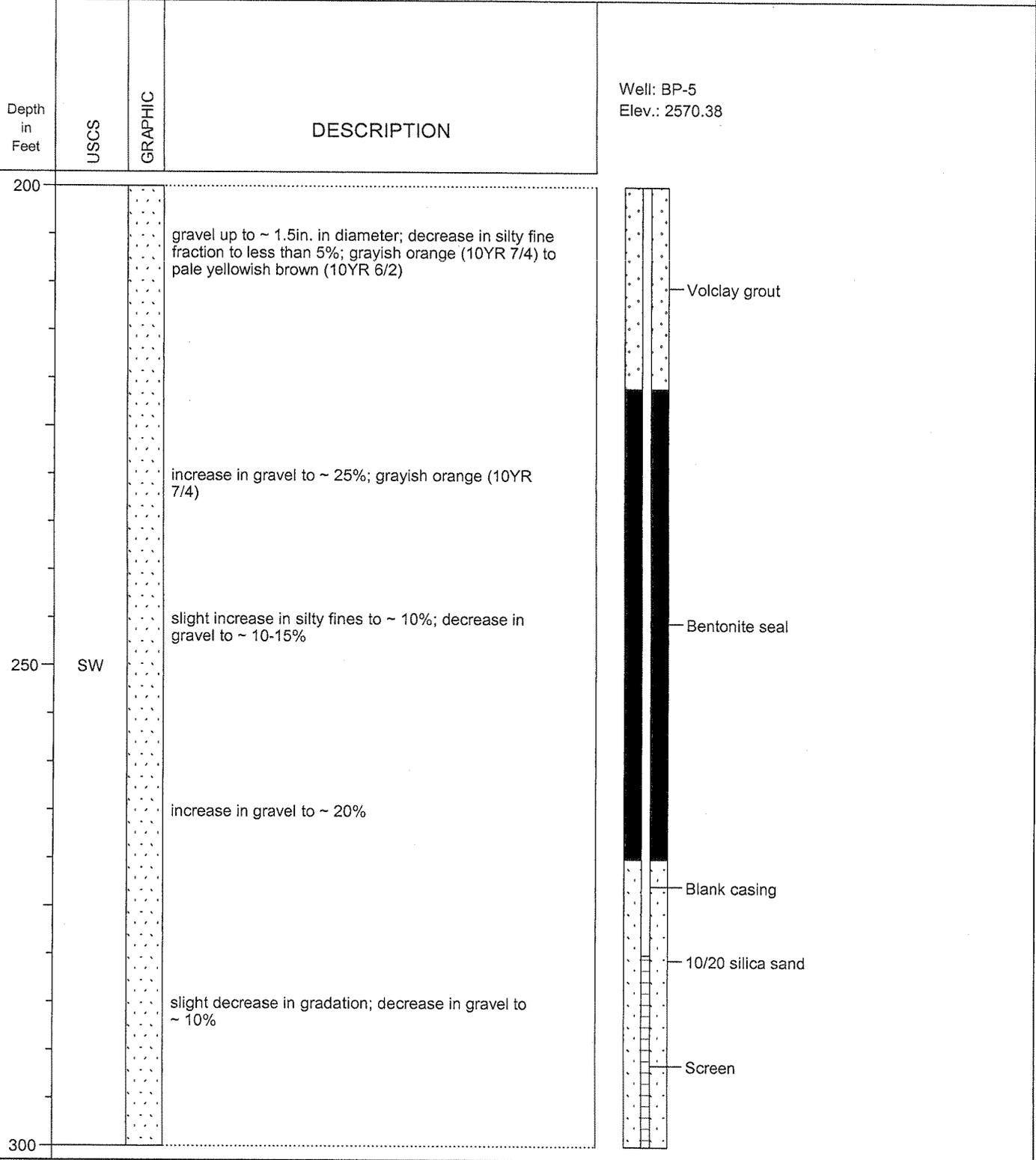
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Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : January 10, 2002
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589346

6445 East Brian Kent



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Arizona Department of Environmental Quality
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Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589346

6445 East Brian Kent

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
300	SW		
	SP		POORLY GRADED GRAVELLY SILTY SAND (subrounded, medium grained sand; subangular fine grained gravel ~ 5-10%; silty fines ~ 5-10%; grayish orange (10YR 7/4))
350	SW		MODERATELY WELL GRADED GRAVELLY SAND (sand coarser grained and mostly subangular; subangular, fine grained gravel [up to ~ 0.75in. in diameter] ~ 10%; less than 5% silty fines); pale yellowish brown (10YR 6/2); slightly damp to damp*
	GW/SW		WELL GRADED SANDY GRAVEL TO WELL GRADED GRAVELLY SAND (subangular gravel up to ~ 1in. in diameter; subrounded to rounded, medium to coarse grained sand); pale yellowish brown (10YR 6/2); moist*
	SP		POORLY GRADED SILTY GRAVELLY SAND (sand medium to coarse grained and subrounded to rounded; silty fines ~ 10-15%; subrounded gravel up to ~ 0.75in. in diameter ~ 10%; grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2); wet*
	GW		WELL GRADED SANDY GRAVEL (gravel angular and mostly coarse grained [up to ~ 2in. in diameter]; coarse grained sand ~ 10-15%)
400	SW		MODERATELY WELL GRADED GRAVELLY SAND (sand subrounded to rounded; gravel angular and mostly fine grained [up to ~ 0.5in. in diameter] ~ 20%; less than 5% silty fines); pale yellowish brown (10YR 6/2)

Well: BP-5
Elev.: 2570.38



10/20 silica sand

Screen

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : January 10, 2002
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

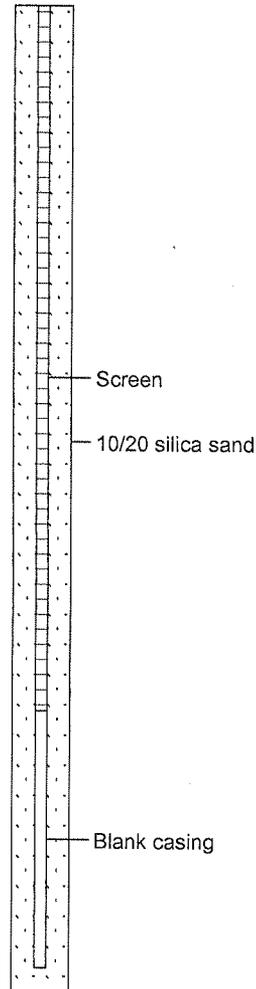
Slot Size : 0.020-inch
ADWR No. : 55-589346

6445 East Brian Kent

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
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Well: BP-5
Elev.: 2570.38

400			decrease in gravel to ~ 10-15%; sand grains subangular to subrounded
	SW		gravel up to ~ 1in. in diameter; abundant muscovite and garnets; gravel appears to be gneiss fragments
450			gravel up to ~ 1.5in. in diameter ~ 20-25%
			Boring BP-5 terminated at ~ 477 feet bgs.



*Moisture content only noted in descriptions between 345' and 370' as water was periodically injected for dust control during drilling prior to 345'.

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : December 14, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

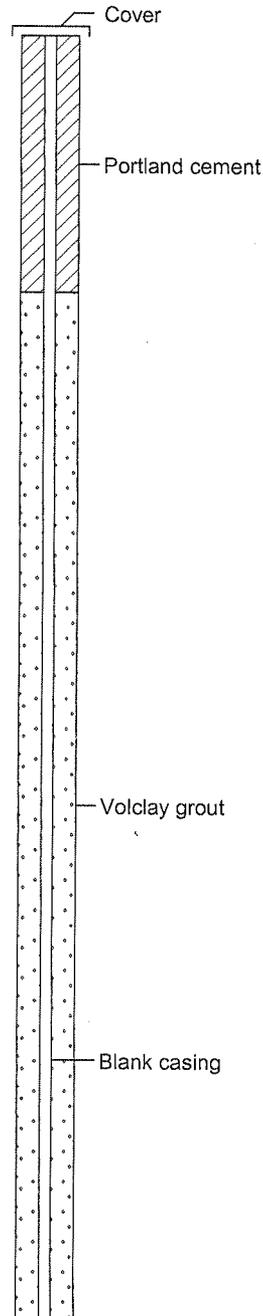
Slot Size : 0.020-inch
ADWR No. : 55-589343

7034 East Kingston Drive

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
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Well: BP-7
Elev.: 2579.35

0			POORLY GRADED GRAVELLY SAND (sand medium to coarse grained and subrounded; gravel ~ 10-15% and subangular; less than 5% silt); moderate yellowish brown (10YR 5/4)
	SP		gravel no longer present; mostly medium grained sand
50			WELL GRADED GRAVELLY SAND (appreciable amount of gravel, ~ 30%; less than 5% silt; mostly subangular grains); moderate yellowish brown (10YR 5/4)
	SW		slight decrease in gravel; slightly less well graded
			POORLY GRADED SAND (sand medium to coarse grained and mostly subrounded; less than 5% fine gravel and silt); moderate yellowish brown (10YR 5/4)
100	SP		

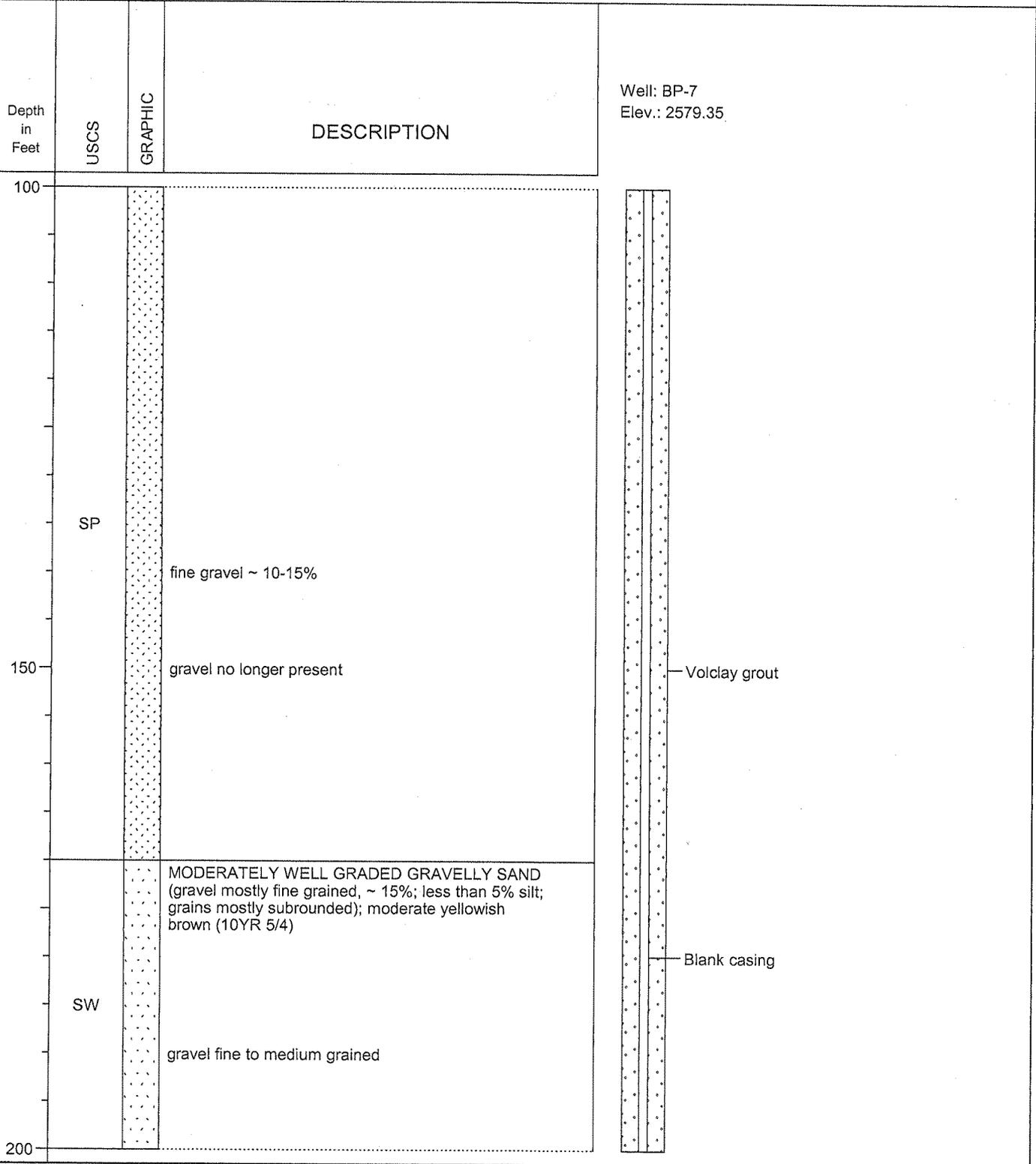


Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : December 14, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589343

7034 East Kingston Drive

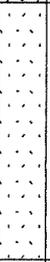
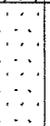


Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

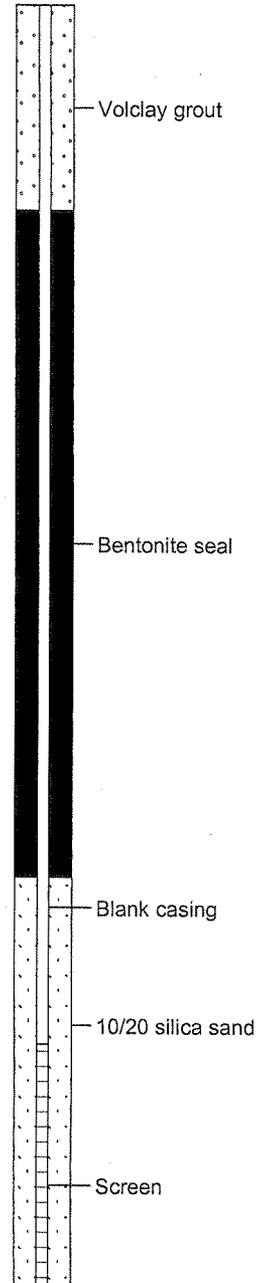
Start Date : December 14, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589343

7034 East Kingston Drive

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
200	SW		
	SP		POORLY GRADED SAND (sand medium to coarse grained and mostly subrounded; less than 5% fine gravel and silt); moderate yellowish brown (10YR 5/4)
250	SW		WELL GRADED GRAVELLY SAND (fine grained gravel ~ 30-35%; less than 5% silt; subangular to subrounded grains); pale yellowish brown (10YR 6/2)
	SP		POORLY GRADED GRAVELLY SAND (sand medium to coarse grained; fine gravel ~ 10%; less than 5% silt; grains mostly subrounded); pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4)
300	SW		MODERATELY WELL GRADED GRAVELLY SAND (fine gravel ~ 10-12%; less than 5% silt; subangular to subrounded grains); grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2)

Well: BP-7
Elev.: 2579.35



Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : December 14, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589343

7034 East Kingston Drive

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
300	SW		
	SP		POORLY GRADED SAND (sand medium to coarse grained and mostly subrounded; less than 5% fine gravel and silt); grayish orange (10YR 7/4)
	SW		WELL GRADED GRAVELLY SAND (fine to medium grained gravel ~ 25-30%; less than 5% silt); pale yellowish brown (10YR 6/2)
	SM		SILTY SAND (appreciable amount of silt and moderate amount of clay present)
	GW		SANDY WELL GRADED GRAVEL (angular gravel; less than 5% silt); gneiss/schist fragments with garnets
350			
	SP		POORLY GRADED GRAVELLY SAND (sand coarse grained; gravel mostly fine grained, ~ 15-20%; silt ~ 5-8%; grains mostly subrounded); moderate yellowish brown (10YR 5/4); garnets abundant
	SP		slight increase in silt, ~ 10-15%; sand medium to coarse grained and subangular; grayish orange (10YR 7/4)
400			

Well: BP-7
Elev.: 2579.35



10/20 silica sand

Screen

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : December 14, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

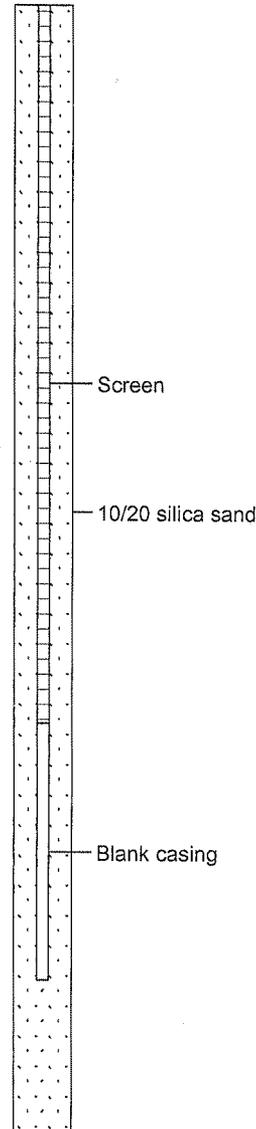
Slot Size : 0.020-inch
ADWR No. : 55-589343

7034 East Kingston Drive

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
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Well: BP-7
Elev.: 2579.35

400	SP		
	SW/GW		WELL GRADED GRAVELLY SAND TO WELL GRADED SANDY GRAVEL (sand coarse grained; gravel fine grained; less than 5% silt; angular to subangular grains); grayish orange (10YR 7/4)
			MODERATELY WELL GRADED GRAVELLY SAND (gravel up to 2in. in diameter, ~ 15%; less than 5% silt; angular to subangular grains); pale yellowish brown (10YR 6/2)
450	SW		increase in gravel, ~ 30%
			Boring BP-9 terminated at ~488 feet bgs.



Note: Moisture content not noted in descriptions due to injection of water for dust control during drilling.

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : July 9, 2001
Drilling Company : WDC Exploration
Drilling Method : Stratex/ARCH

Slot Size : 0.020-inch
ADWR No. : 55-587095

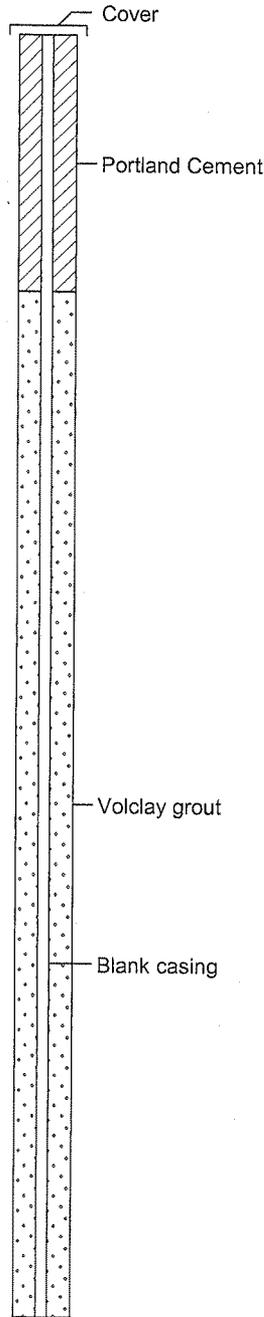
7055 East Broadway Boulevard

SECOR Reps on-site : Keli Mandeville/Ed Vandegrift
Well Casing Diameter : 5-inch PVC

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
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Well: BP-8
Elev.: 2602.64

0			Two layers of asphalt pavement (5-in thick total)
	GP		POORLY-GRADED GRAVEL WITH SAND (coarse-grained sand, gravel to 2-cm diameter, trace silt); pale yellowish brown (10YR 6/2); dry.
	SW		WELL GRADED SAND (~5% coarse gravel to 2-cm diameter); moderate brown (5YR 4/4); slightly damp.
50			
	GP		POORLY-GRADED GRAVEL (~15% coarse-grained sand with little to no fines); moderate yellowish brown (10YR 5/4); dry to slightly damp; no odors.
	SW		WELL GRADED SAND WITH GRAVEL (~25% gravel to 1-cm diameter); pale yellowish brown (10YR 6/2); damp.
100			

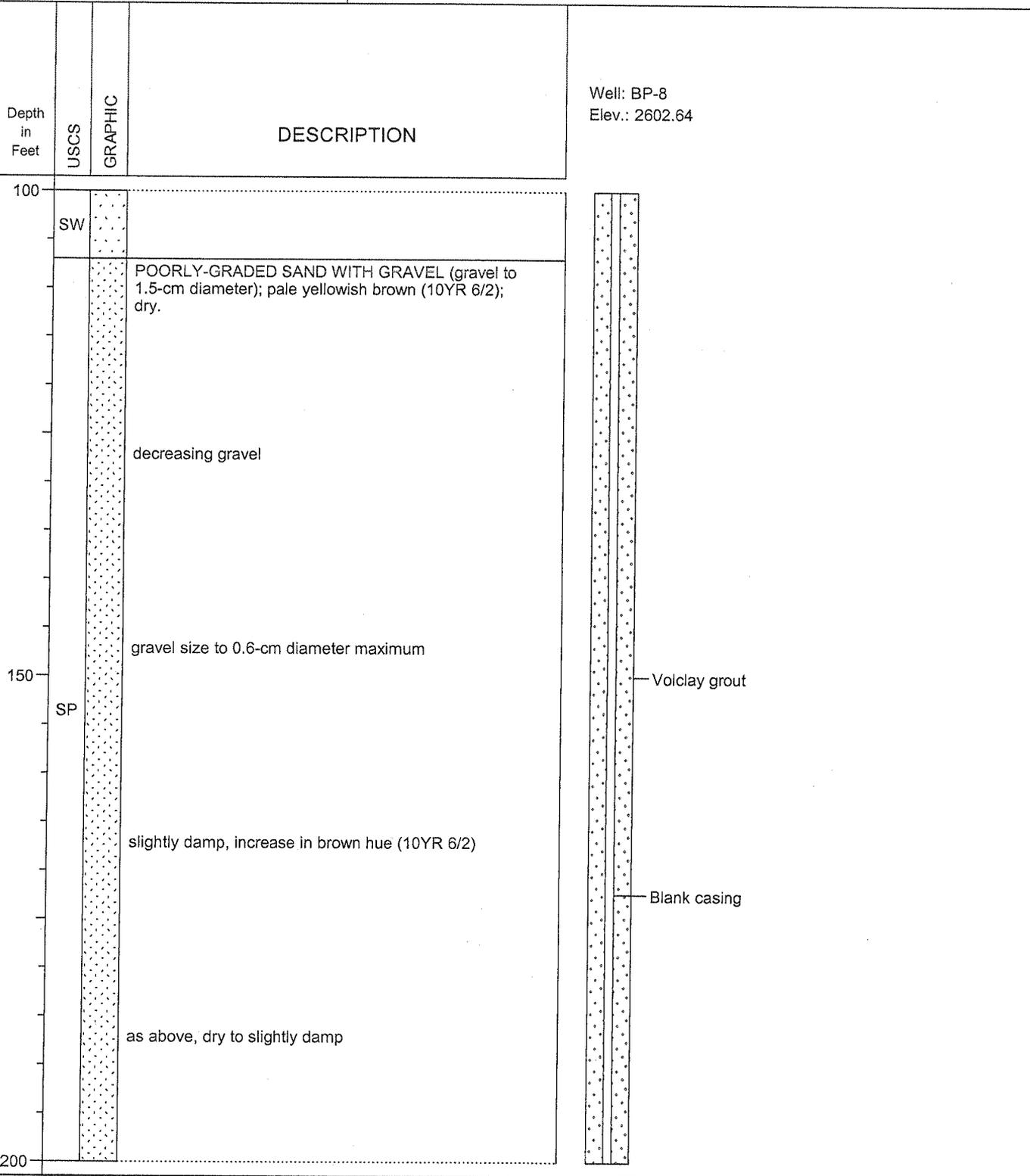


Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : July 9, 2001
Drilling Company : WDC Exploration
Drilling Method : Stratex/ARCH
SECOR Reps on-site : Keli Mandeville/Ed Vandegrift
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-587095

7055 East Broadway Boulevard



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Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : July 9, 2001
 Drilling Company : WDC Exploration
 Drilling Method : Stratex/ARCH
 SECOR Reps on-site : Keli Mandeville/Ed Vandegrift
 Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
 ADWR No. : 55-587095

7055 East Broadway Boulevard

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Well: BP-8 Elev.: 2602.64
200			POORLY-GRADED SAND WITH GRAVEL (gravel to 1.5-cm diameter); pale yellowish brown (10YR 6/2); dry. decreasing coarse-grained sand	
			medium- to coarse-grained sand with gravel (gneiss) to 5-cm diameter	
			as above	Volclay grout
250	SP		coarse-grained sand; pale yellowish brown (10YR 6/2)	Blank casing
			trace silty fines (~5%); angular rock (gneiss) fragments to 7-cm diameter	Bentonite seal
300				#30 transition sand
				10/20 silica sand
				Screen

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : July 9, 2001
 Drilling Company : WDC Exploration
 Drilling Method : Stratex/ARCH
 SECOR Reps on-site : Keli Mandeville/Ed Vandegrift
 Well Casing Diameter : 5-inch PVC
 Slot Size : 0.020-inch
 ADWR No. : 55-587095

7055 East Broadway Boulevard

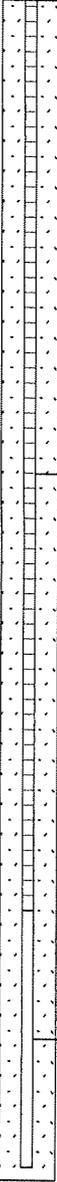
Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Well: BP-8 Elev.: 2602.64
300	SP		WELL GRADED SAND (~5-10% fine gravel with gneiss fragments); pale yellowish brown (10YR 6/2); slightly damp to damp.	
SW		gneiss fragments to 3-cm diameter	10/20 silica sand	
350	SP		POORLY-GRADED SAND WITH GRAVEL (~15-20% fine gravel, trace (5%) silty fines); pale yellowish brown (10YR 6/2); no odor.	Screen
		increasing silty fines (10%), decreasing gravel (10%), color to grayish orange (10YR 7/4)		
		increasing coarse-grained sand. Groundwater first observed at approximately 378 feet.		
400				

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : July 9, 2001
Drilling Company : WDC Exploration
Drilling Method : Stratex/ARCH
SECOR Reps on-site : Keli Mandeville/Ed Vandegrift
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-587095

7055 East Broadway Boulevard

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Well: BP-8 Elev.: 2602.64
400	SP		POORLY-GRADED GRAVEL WITH SAND (coarse-grained sand/fine-grained gravel); variations of colors - closest to pale yellowish brown (10YR 6/2); gravel (gneiss) angular to subangular 10-cm diameter; no fines observed; saturated.	
450	GP		cobbles (micaceous-garnet shist) angular to subangular.	
500			Boring BP-8 terminated at ~492 feet bgs.	Screen
				10/20 silica sand
				Blank casing

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : December 7, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

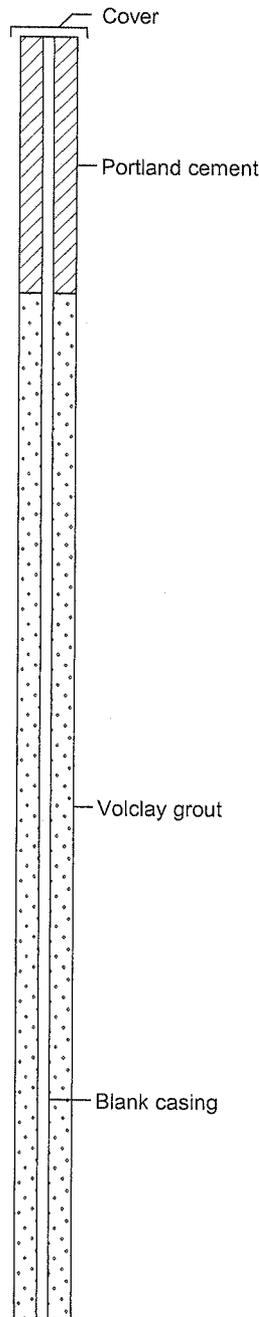
Slot Size : 0.020-inch
ADWR No. : 55-589342

7525 East Broadway Boulevard

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
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Well: BP-9
Elev.: 2581.80

0			MODERATELY WELL GRADED GRAVELLY SAND (sand medium to coarse grained; fine grained gravel ~ 10%; silt ~ 5%; subangular to subrounded grains); moderate brown (5YR 4/4)
50	SW		increase in finer grained sand; grayish orange (10YR 7/4)
			increase in coarser grained sand; slight decrease in silt; light brown (5YR 6/4)
100	SP		POORLY GRADED SAND (sand mostly medium grained with small amount of fine and coarse grains; less than 5% gravel and silt; subrounded grains); light brown (5YR 6/4)



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LOG OF BORING BP-9

(Page 2 of 5)

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : December 7, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589342

7525 East Broadway Boulevard

Depth
in
Feet

USCS

GRAPHIC

DESCRIPTION

Well: BP-9
Elev.: 2581.80

100

SP

slight increase in silt; grayish orange (10YR 7/4)

SILTY SAND (sand medium to fine grained; fine
grained gravel less than 5%; silt ~ 10-15%); moderate
yellowish brown (10YR 5/4)

150

SM

slight decrease in silt; fine and medium grained gravel
less than 5% (up to ~ 1in. in diameter); increase in
coarser grained sand; light brown (5YR 6/4)

POORLY GRADED GRAVELLY SAND (sand medium to
coarse grained; fine to medium grained gravel ~ 5-7%
(up to ~ 1in. in diameter)); light brown (5YR 6/4)

SP

200



Volclay grout

Blank casing

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

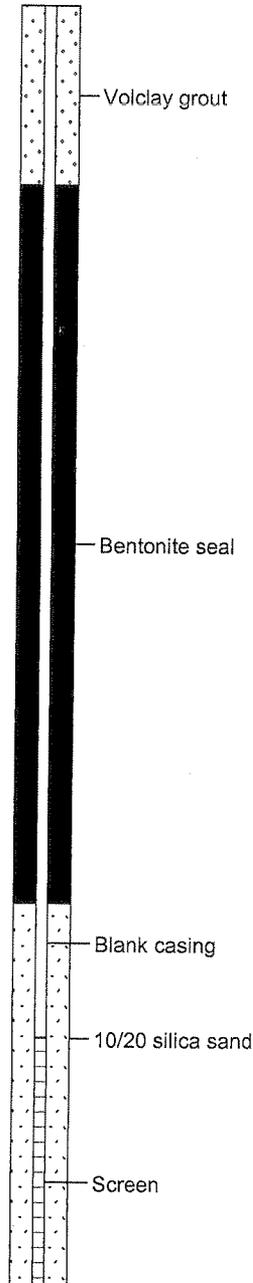
Start Date : December 7, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589342

7525 East Broadway Boulevard

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
200	SP		gravel no longer present; silt present (less than 5%); subrounded to rounded sand grains; moderate yellowish brown (10YR 5/4)
			MODERATELY WELL GRADED GRAVELLY SAND (sand medium to coarse grained; fine gravel ~ 15%; less than 5% silt; subangular to subrounded grains); grayish orange (10YR 7/4)
250	SW		slight decrease in gravel; light brown (5YR 6/4)
			POORLY GRADED SAND (sand medium to coarse grained; less than 5% gravel and silt; subrounded to rounded grains); moderate yellowish brown (10YR 5/4)
	SP		sand fine to medium grained; grayish orange (10YR 7/4)
300			

Well: BP-9
Elev.: 2581.80

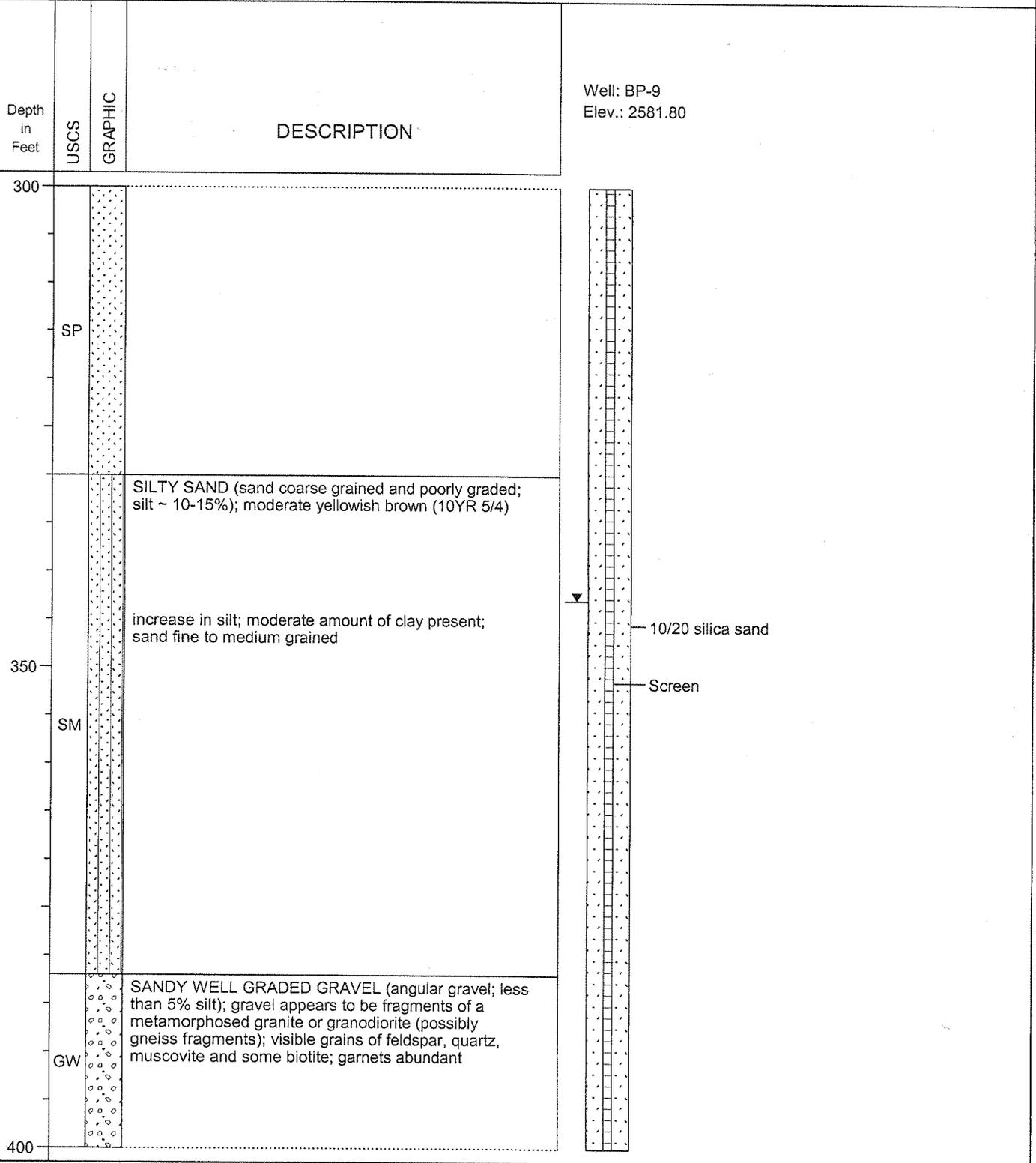


Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : December 7, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589342

7525 East Broadway Boulevard



Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : November 28, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Ed Vandegriff
Well Casing Diameter : 5-inch PVC

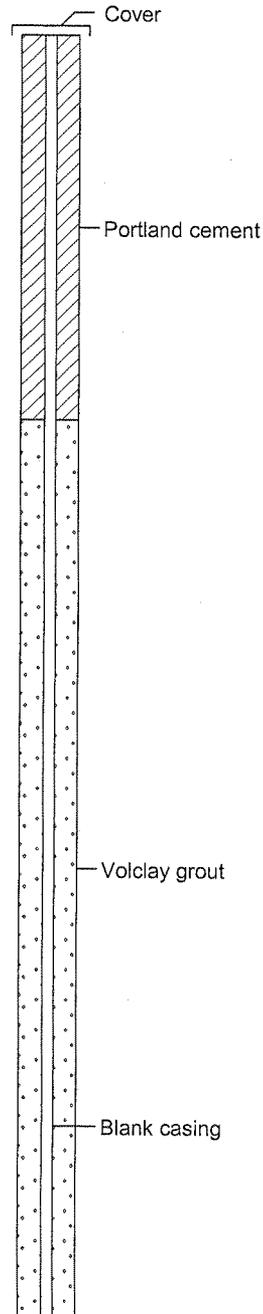
Slot Size : 0.020-inch
ADWR No. : 55-589341

7342 East Broadway Boulevard

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
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Well: BP-10
Elev.: 2594.93

0			WELL GRADED SAND WITH SILT (silty fines ~ 20%); moderate brown (5YR 4/4)
50	SW		sand fine to medium grained; moderate yellowish brown (10YR 5/4)
			moderate reddish brown (10YR 4/6)
100			moderate yellowish brown (10YR 5/4)



Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : November 28, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Ed Vandegrift
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589341

7342 East Broadway Boulevard

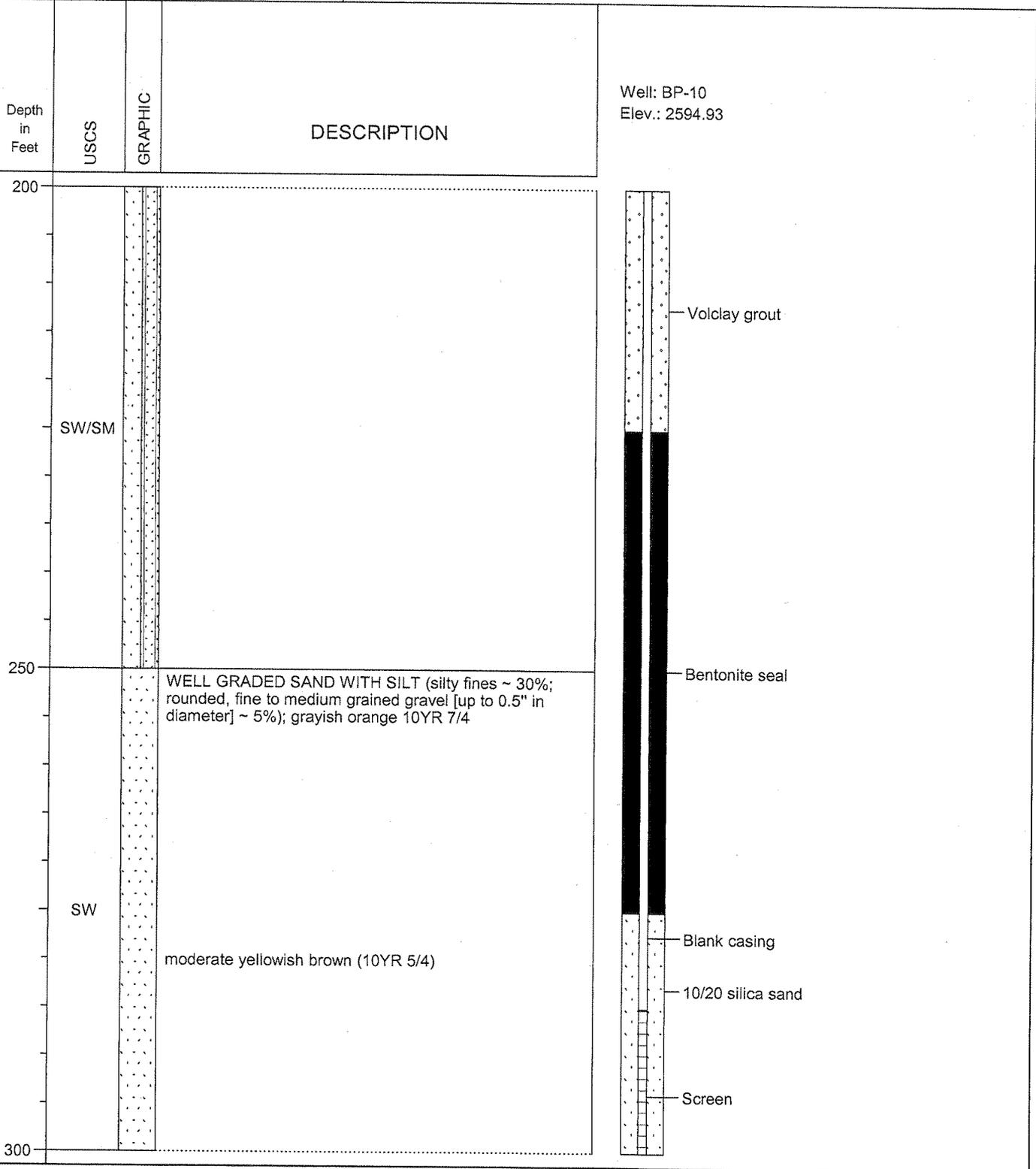
Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Well: BP-10 Elev.: 2594.93
100	SW		WELL GRADED SILTY SAND (silty fines ~ 35-40%); moderate yellowish brown (10YR 5/4)	
SW/SM		trace amounts of angular fine gravel (up to 0.25" in diameter); grayish orange (10YR 7/4)		
150	SW		WELL GRADED SAND WITH GRAVEL (angular, fine to medium grained gravel [up to 0.5" in diameter] ~ 30%); grayish orange (10YR 7/4)	
SW/SM		WELL GRADED SILTY SAND (silty fines ~ 40%; angular, fine to medium grained gravel [up to 1" in diameter] ~ 5-10%); moderate brown (5YR 4/4)		
200				

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : November 28, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Ed Vandegrift
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589341

7342 East Broadway Boulevard



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LOG OF BORING BP-10

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Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

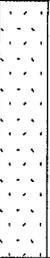
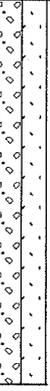
Start Date : November 28, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Ed Vandegrift
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589341

7342 East Broadway Boulevard

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
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Well: BP-10
Elev.: 2594.93

300	SW		angular gravel up to 2" in diameter
	SW/SM		WELL GRADED SILTY SAND (silty fines ~ 35-40%; angular, fine grained gravel [up to 0.25" in diameter] ~5%); grayish orange (10YR 7/4)
350	SW		WELL GRADED SAND (silty fines ~ 10%; no gravel present); moderate yellowish brown (10YR 5/4)
	GW/SW		WELL GRADED SANDY GRAVEL TO WELL GRADED GRAVELLY SAND (silty fines ~ 10%)
400			



10/20 silica sand

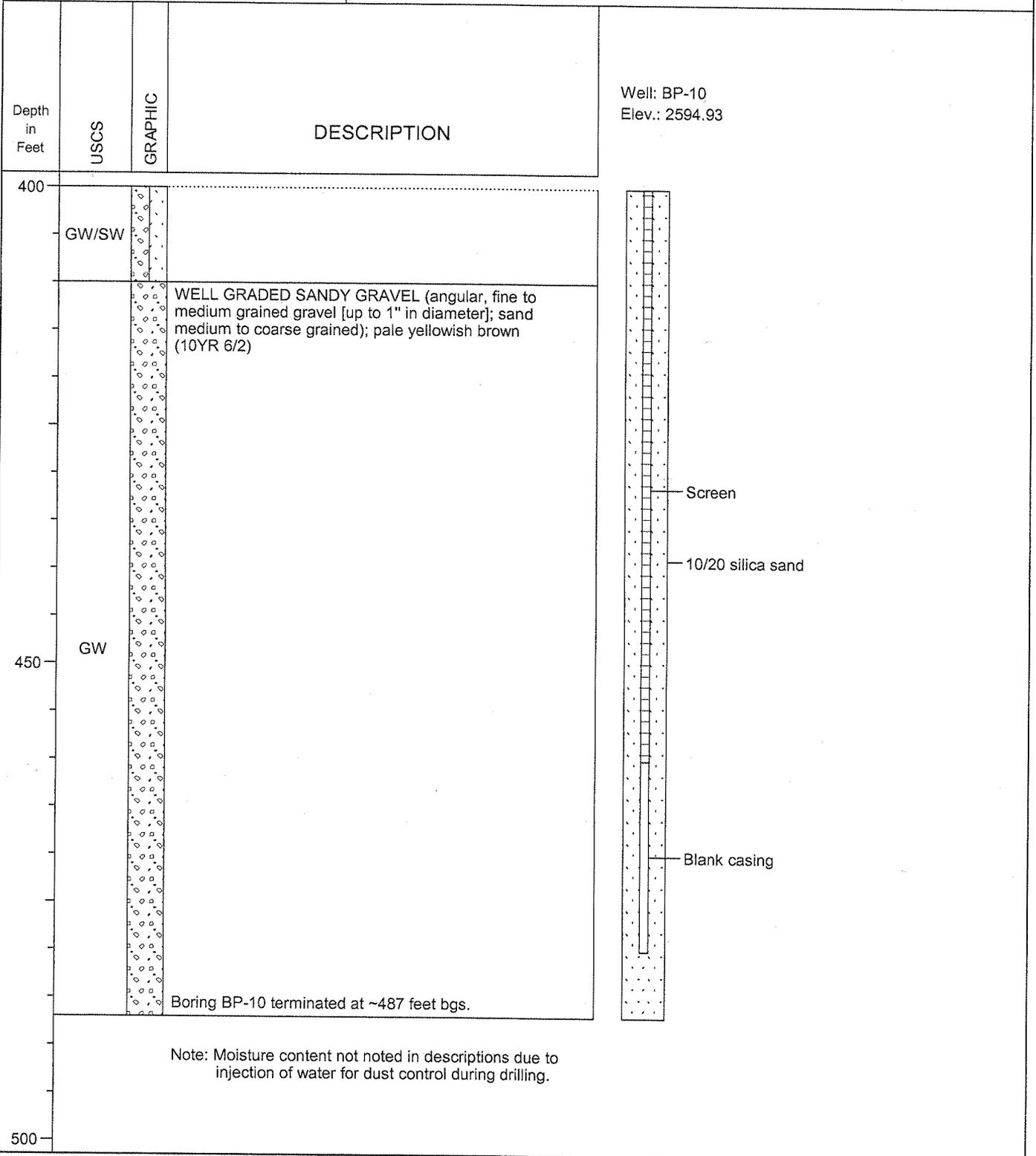
Screen

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : November 28, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Ed Vandegrift
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589341

7342 East Broadway Boulevard



Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : August 20, 2001

Slot Size : 0.020-inch

Drilling Company : THF

ADWR No. : 55-588207

Drilling Method : ARCH

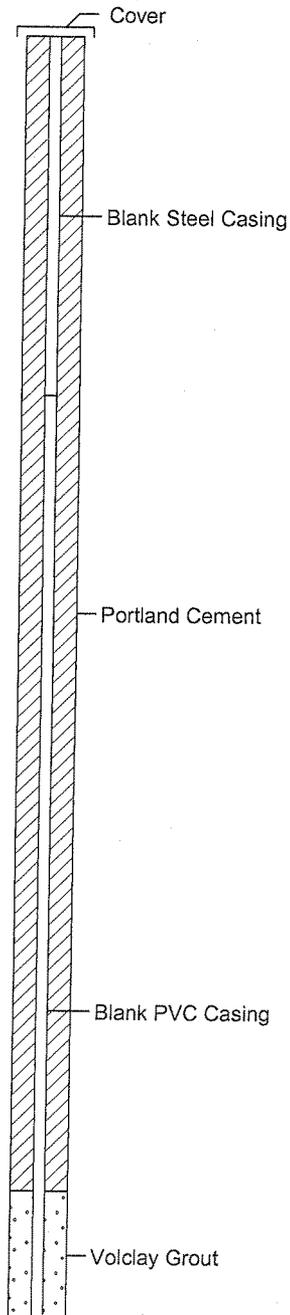
SECOR Reps on-site : Keli Mandeville/Ed Vandegriff

Well Casing Diameter : 5-inch

Broadway South Landfill

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
0	AB		Approximately 3 feet of soil cap covering landfill
	LF		Landfill Material: newspaper bits, glass shards, wood fragments, plastic, gravel, soil
			Approximate end of landfill material
			WELL GRADED GRAVELLY SAND (medium to coarse grained sand; ~25% angular to sub-angular, fine to medium grained gravel; ~5% silt/clay); grayish orange (10YR 7/4); slightly damp; no odor
			decreasing gravel; less damp
50	SW		gravel mostly fine grained; increasing brownish tint, light brown (5YR 5/6)
			slight increase in brownish red color, moderate brown (5YR 4/4)
100			

Well: BP-11
Elev.: 2606.97



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LOG OF BORING BP-11

(Page 2 of 5)

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : August 20, 2001

Slot Size : 0.020-inch

Drilling Company : THF

ADWR No. : 55-588207

Drilling Method : ARCH

SECOR Reps on-site : Keli Mandeville/Ed Vandegrift

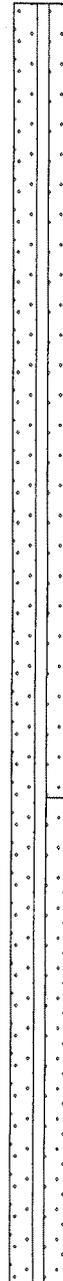
Broadway South Landfill

Well Casing Diameter : 5-inch

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
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Well: BP-11
Elev.: 2606.97

100	SW		
	GW/SW		CLEAN, SANDY GRAVEL TO GRAVELLY SAND (medium to coarse grained sand; fine grained, angular gravel); quartz and feldspar visible in gravel, foliation observed in larger grains; definite color change, grayish orange (10YR 6/2); dry
			WELL GRADED GRAVELLY SAND (medium to coarse grained sand; ~5-7% fine grained, angular to subangular gravel); light brown (5YR 6/4); dry to slightly damp; no odor
			increasing dampness
150			decreasing gravel
	SW		slight increase in yellowish tint, pale yellowish brown (10YR 6/2)
			grains less well graded; no gravel or fines; decrease in yellowish tint, light brown (5YR 6/4)
200			



Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : August 20, 2001
Drilling Company : THF
Drilling Method : ARCH
SECOR Reps on-site : Keli Mandeville/Ed Vandegrift
Well Casing Diameter : 5-inch

Slot Size : 0.020-inch
ADWR No. : 55-588207

Broadway South Landfill

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Well: BP-11 Elev.: 2606.97
200	SW		<p>~20-25% fine grained sand present; pale yellowish brown (10YR 6/2)</p> <p>decrease in fine grained sand; ~5-7% silt/clay present; light brown (5YR 6/4)</p>	<p>Volclay Grout</p> <p>Blank PVC Casing</p>
250	SP		<p>POORLY GRADED SAND (fine to medium grained sand; ~5% silt/clay); grayish orange (10YR 7/4); dry</p> <p>increase in moisture to damp; light brown (5YR 6/4)</p>	
300	SW	<p>WELL GRADED SAND (angular to subangular, medium to coarse grained sand); pale yellowish brown (10YR 6/2); dry</p> <p>~10-15% silt/clay present; less brown in color, grayish orange (10YR 7/4)</p> <p>decrease in coarse grained sand, increasing amount fine to medium grained sand</p>		

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : August 20, 2001

Slot Size : 0.020-inch

Drilling Company : THF

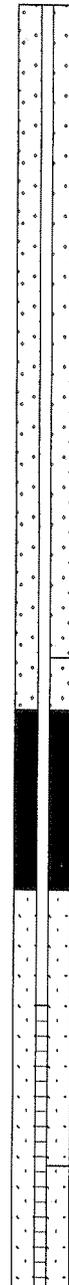
ADWR No. : 55-588207

Drilling Method : ARCH

SECOR Reps on-site : Keli Mandeville/Ed Vandegrift

Well Casing Diameter : 5-inch

Broadway South Landfill

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Well: BP-11 Elev.: 2606.97
300	SW		<p>increasing amount coarse grained sand, ~20% fine grained gravel; slightly damp to damp</p> <p>sand mostly coarse grained; ~10% fine to medium grained gravel; moderate yellowish brown (10YR 5/4); quartz and feldspar visible in larger grains; foliation observed in select grains</p> <p>sand ranging from fine to medium grained; gravel mostly fine grained, some clasts recognizable as possible metamorphosed granite fragments</p>	<p>Volclay Grout</p> <p>Blank PVC Casing</p> <p>Bentonite Seal</p> <p>10/20 Silica Sand</p> <p>Screened PVC</p>
350				
400				

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : August 20, 2001

Slot Size : 0.020-inch

Drilling Company : THF

ADWR No. : 55-588207

Drilling Method : ARCH

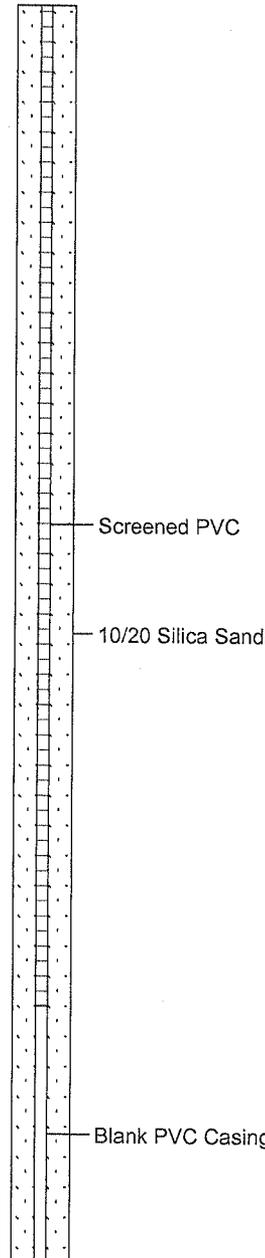
SECOR Reps on-site : Keli Mandeville/Ed Vandegrift

Well Casing Diameter : 5-inch

Broadway South Landfill

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
400	SW		
	GC/SC		COARSE GRAINED, CLAYEY SAND TO FINE GRAINED, CLAYEY GRAVEL; angular grains; wet; moderate yellowish brown clay color (10YR 5/4); color of sand and gravel not distinguishable due to variation in mineral assemblage
450	GC		FINE GRAINED, CLAYEY GRAVEL WITH COARSE GRAINED SAND; angular grains; wet; moderate yellowish brown clay color (10YR 5/4); color of sand and gravel grains not distinguishable due to variation in mineral assemblage; quartz and feldspar visible in small (~5mm) fragments of gneiss
	CL		SANDY, SILTY CLAY; (medium grained sand ~10%); moderate yellowish brown (10YR 5/4); wet
500			Boring BP-11 terminated at ~498 feet bgs.

Well: BP-11
Elev.: 2606.97



Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : November 16, 2001
 Drilling Company : WDC Exploration
 Drilling Method : ARCH
 SECOR Reps on-site : Keli Mandeville/Ed Vandegrift
 Well Casing Diameter : 5-inch PVC

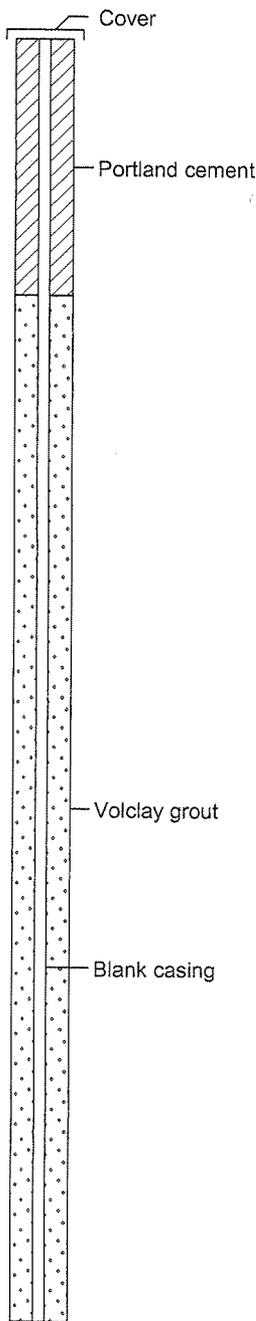
Slot Size : 0.020-inch
 ADWR No. : 55-589338

6708 East 12th Street

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
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Well: BP-15
 Elev.: 2595.45

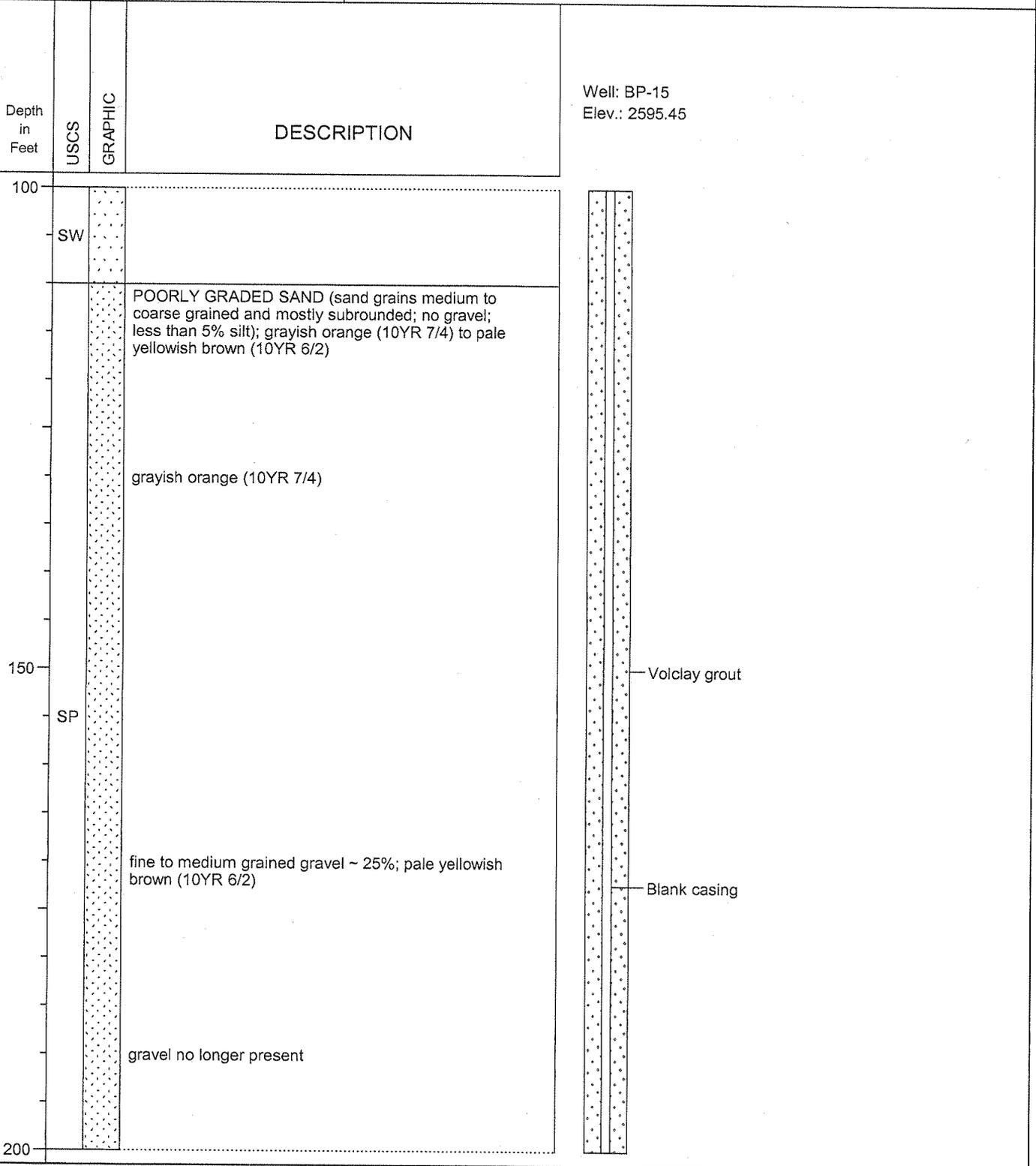
0			Thin layer of gravel and asphalt (~1.5 in. thick)
			WELL GRADED GRAVELLY SAND (sand grains subangular to subrounded; fine to medium grained gravel ~ 7-8%; less than 5% silt); grayish orange (10YR 7/4); no odor; visible muscovite and quartz grains
	SW		sand coarser grained and less well graded; increase in gravel to ~ 40%; color difficult to distinguish due to variation in grain composition - between pale yellowish brown (10YR 6/2) and grayish orange (10YR 7/4)
50			POORLY GRADED SAND (sand medium to coarse grained and mostly subrounded; less than 5% gravel and silt); grayish orange (10YR 7/4)
	SP		sand slightly coarser grained; slight increase in gradation of grains
	SW		FAIRLY WELL GRADED GRAVELLY SAND (subangular to subrounded grains; sand medium to coarse grained; fine to medium grained gravel ~ 25%; ~ 5% silt); grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2)
100			



Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : November 16, 2001
 Slot Size : 0.020-inch
 Drilling Company : WDC Exploration
 ADWR No. : 55-589338
 Drilling Method : ARCH
 SECOR Reps on-site : Keli Mandeville/Ed Vandegrift
 Well Casing Diameter : 6-inch PVC

6708 East 12th Street

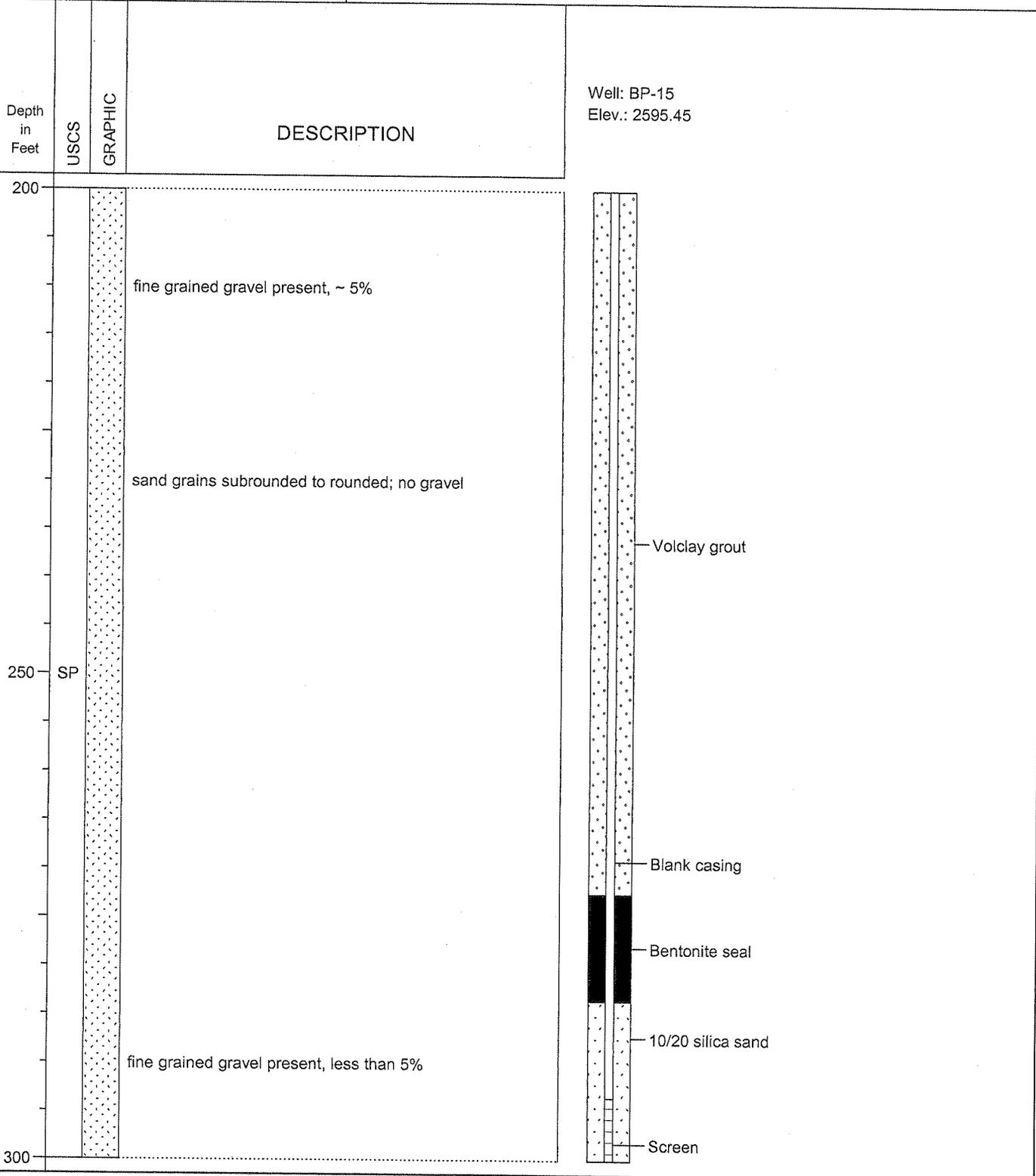


Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : November 16, 2001
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Reps on-site : Keli Mandeville/Ed Vandegrift
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589338

6708 East 12th Street

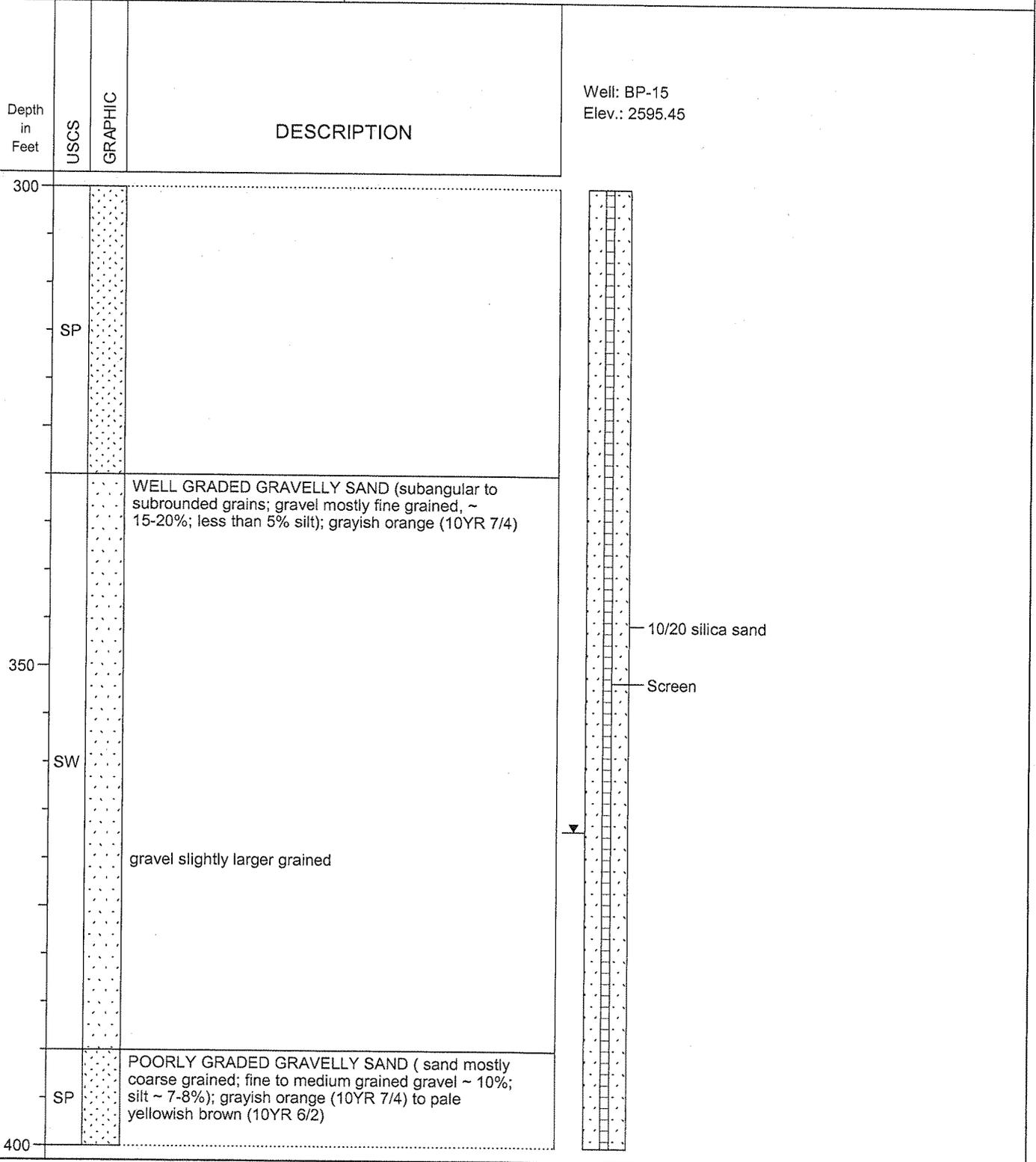


Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : November 16, 2001
 Drilling Company : WDC Exploration
 Drilling Method : ARCH
 SECOR Reps on-site : Keli Mandeville/Ed Vandegrift
 Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
 ADWR No. : 55-589338

6708 East 12th Street



Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : November 16, 2001

Slot Size : 0.020-inch

Drilling Company : WDC Exploration

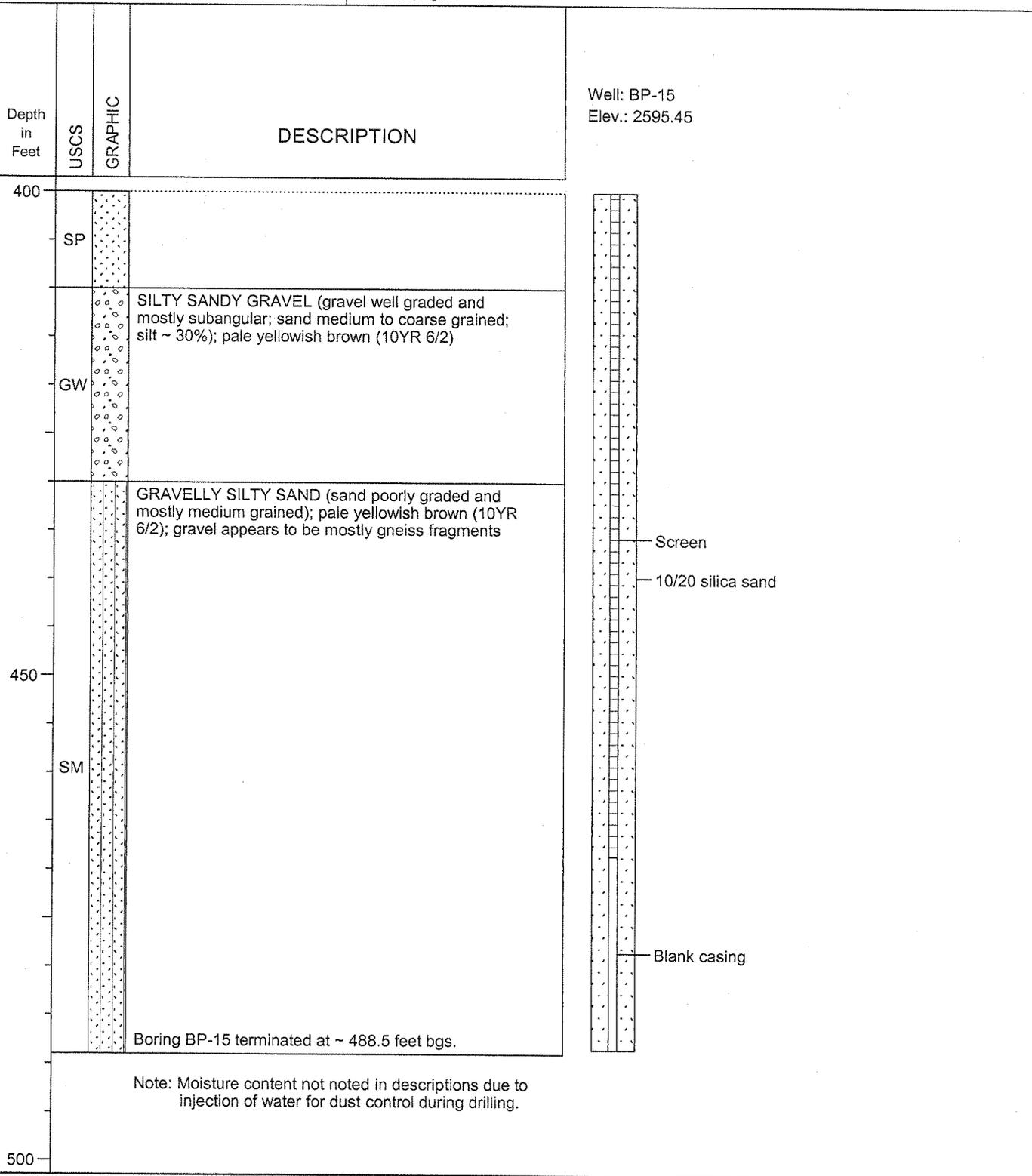
ADWR No. : 55-589338

Drilling Method : ARCH

SECOR Reps on-site : Keli Mandeville/Ed Vandegrift

Well Casing Diameter : 5-inch PVC

6708 East 12th Street



SECOR INTERNATIONAL
Incorporated

LOG OF BORING BP-16

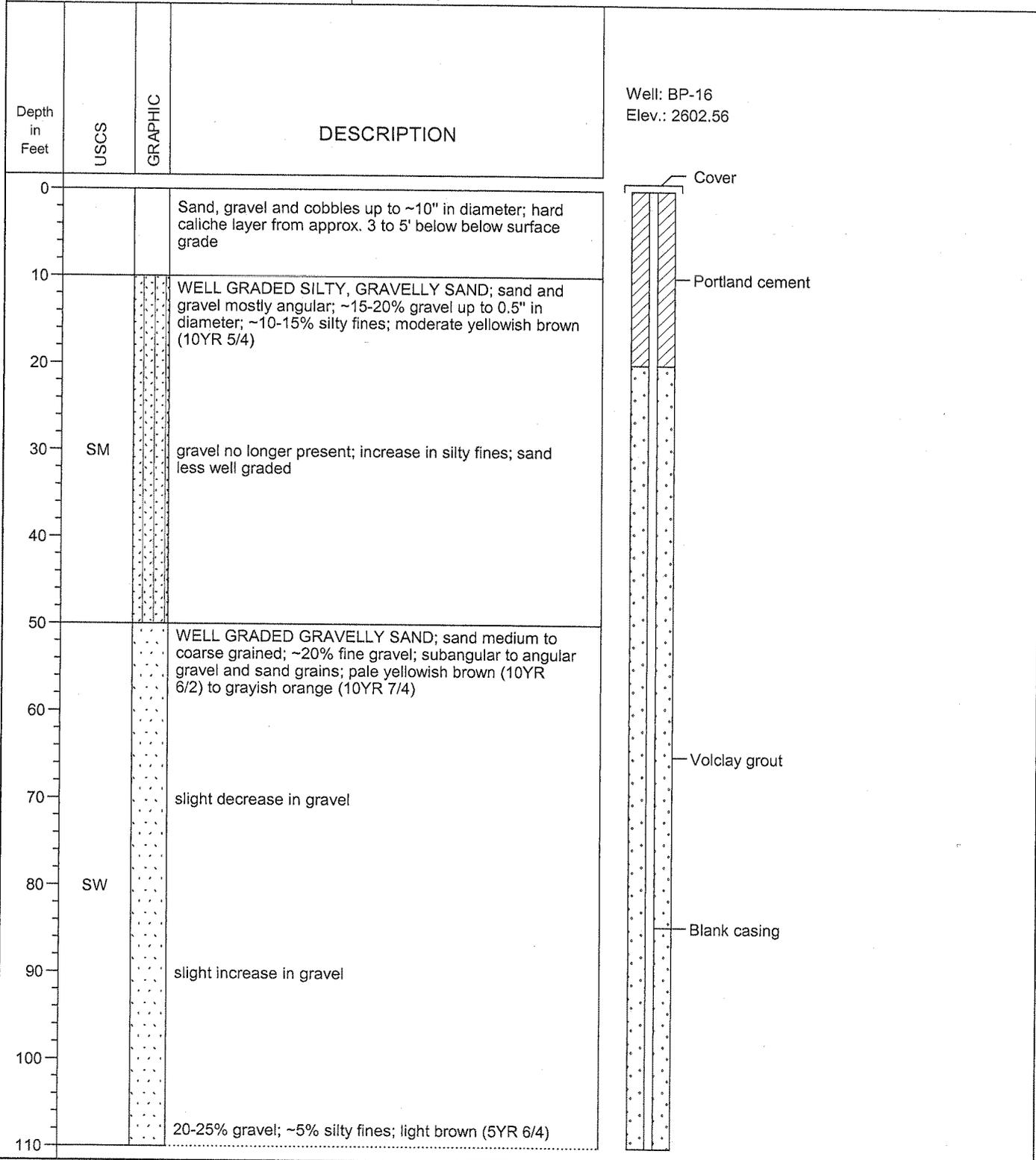
(Page 1 of 5)

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : June 17, 2002
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589337

Montego Drive

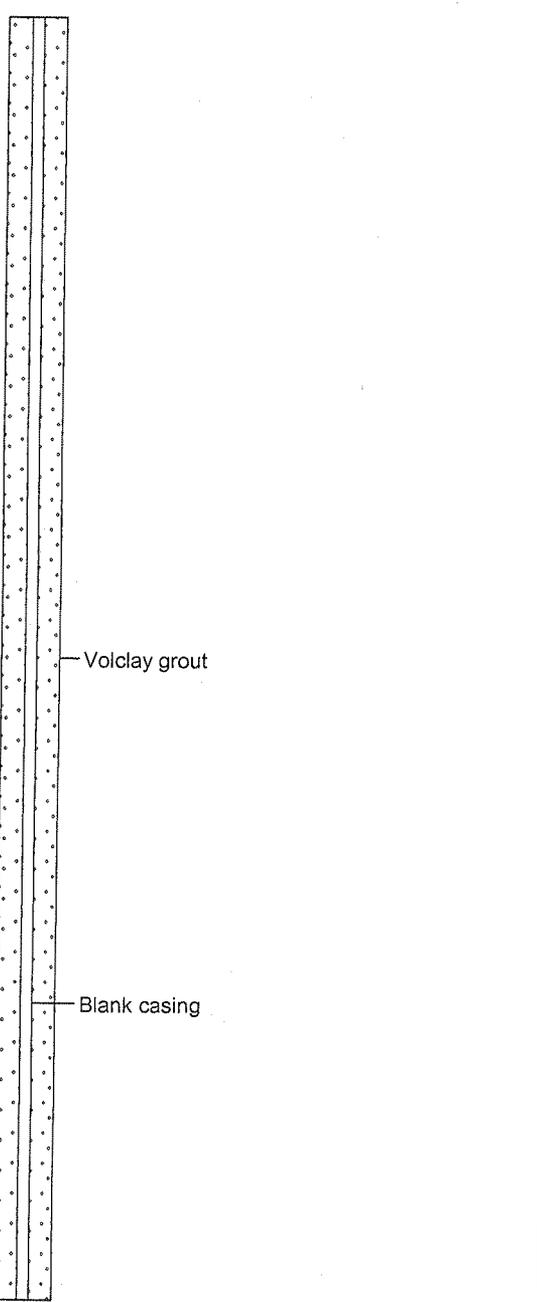


Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : June 17, 2002
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589337

Montego Drive

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Well: BP-16 Elev.: 2602.56
110 120 130 140 150 160 170 180 190 200 210 220	SW		<p>sand slightly finer grained; decrease in gravel to ~15%; pale yellowish brown (10YR 6/2)</p> <p>~20% gravel up to 1.25" in diameter; <5% silty fines; sand more coarse grained</p> <p>decrease in gravel to less than 5%; decrease in sand grain size; less well graded</p>	 <p>Volclay grout</p> <p>Blank casing</p>

SECOR INTERNATIONAL

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LOG OF BORING BP-16

(Page 3 of 5)

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

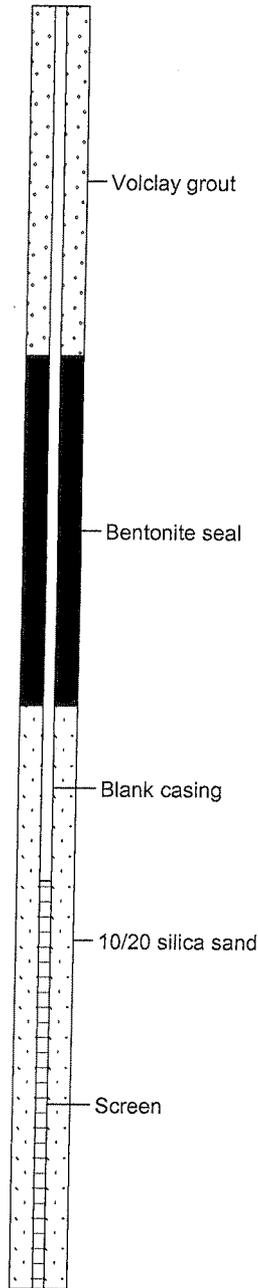
Start Date : June 17, 2002
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589337

Montego Drive

Well: BP-16
Elev.: 2602.56

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
220	SW		
230			WELL GRADED GRAVELLY SAND TO WELL GRADED SANDY GRAVEL; grains mostly subangular; sand mostly coarse grained; gravel up to 0.5" in diameter; <5% silty fines; pale yellowish brown (10YR 6/2)
240	SW/GW		
250			WELL GRADED SAND; sand medium to coarse grained; ~5% fine gravel; sand and gravel grains subrounded to subangular; <5% silty fines; pale yellowish brown (10YR 6/2)
260			
270			
280			sand slightly finer grained and less well graded; gravel no longer present
290	SW		
300			
310			sand well graded; ~5-7% fine gravel
320			
330			



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Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : June 17, 2002
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-589337

Montego Drive

Depth
in
Feet

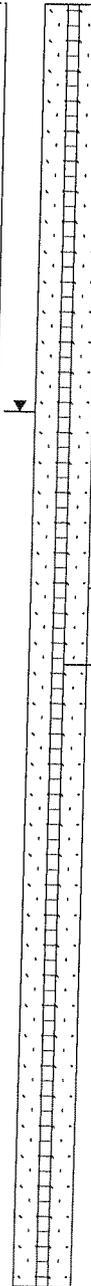
USCS

GRAPHIC

DESCRIPTION

Well: BP-16
Elev.: 2602.56

Depth in Feet	USCS	DESCRIPTION
330		
340		
350	SW	significant decrease in gradation of sand grains, close to being poorly graded; sand mostly medium grained and subrounded to rounded; < 5% fine gravel; silty fines no longer present
360		
370	SW/GW	WELL GRADED GRAVELLY SAND TO WELL GRADED SANDY GRAVEL; gravel subangular to subrounded and up to 1" in diameter; pale yellowish brown (10YR 6/2)
380	SW	WELL GRADED SAND; sand medium to coarse grained; ~5-7% fine gravel; sand and gravel grains subrounded to subangular; <5% silty fines; pale yellowish brown (10YR 6/2)
390		
400	SM/ML	SILTY SAND TO SANDY SILT; sand mostly fine grained; moderate yellowish brown (10YR 5/4)
410		
420	GW	WELL GRADED SILTY, SANDY GRAVEL; sand and gravel grains mostly subangular to angular; sand mostly medium to coarse grained; silty fines ~10%; abundant quartz and feldspar visible in gravel; minimal amount of small garnets present; grayish orange (10YR 7/4)
430		
440	SW	MODERATELY WELL GRADED SILTY SAND; sand fine to medium grained; grayish orange (10YR 7/4)



Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : June 17, 2002
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

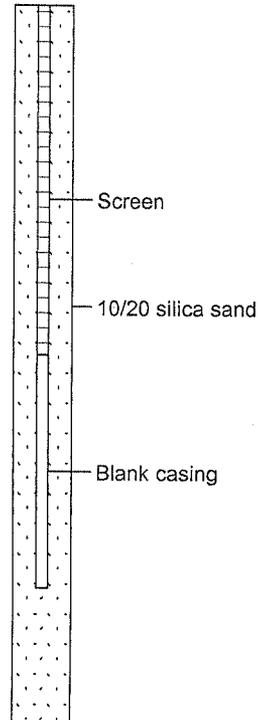
Slot Size : 0.020-inch
ADWR No. : 55-589337

Montego Drive

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
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Well: BP-16
Elev.: 2602.56

440	SW		
450	GW		WELL GRADED SILTY, SANDY GRAVEL; sand and gravel grains mostly subangular to angular; sand mostly medium to coarse grained; silty fines ~10%; abundant quartz and feldspar visible in gravel; minimal amount of small garnets present; grayish orange (10YR 7/4)
460			
470			decrease in silty fines to less than 5%; gravel up to ~1.5" in diameter; pale yellowish brown (10YR 6/2)
480			
490			
500			Boring BP-16 terminated at ~501.5' below surface grade.



Note:
Moisture content not noted in descriptions as water was periodically injected for dust control during drilling.

510
520
530
540
550

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LOG OF BORING BP-19

(Page 1 of 5)

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

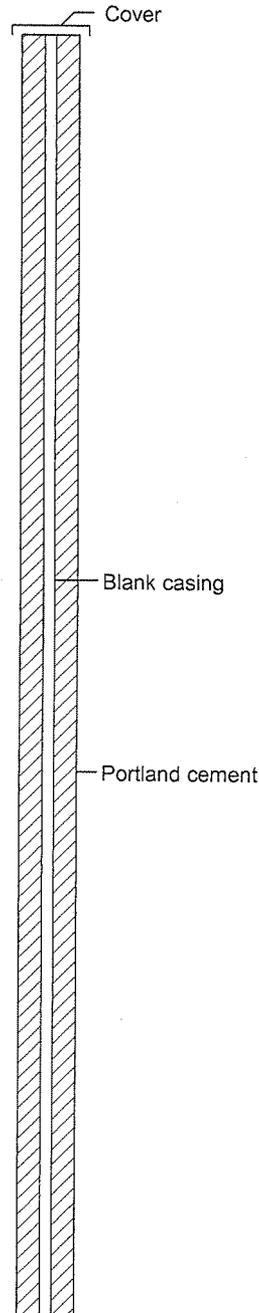
Start Date : February 10, 2003
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-596237

7001 East Hawthorne Street

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
0			
	SW		WELL GRADED GRAVELLY SAND; gravel up to 2" in diameter ~10-15%, mostly subrounded; sand subrounded to subangular; trace amount of silty fines; light brown (5YR 6/4) grayish orange (10YR 7/4)
50	SW/SP		sand less well graded and mostly fine to medium grained; decrease in gravel to less than 5%; no silt
100	SW		sand well graded; subangular gravel up to 0.5" in diameter ~5%; trace amount of silty fines

Well: BP-19
Elev.: 2545.44



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LOG OF BORING BP-19

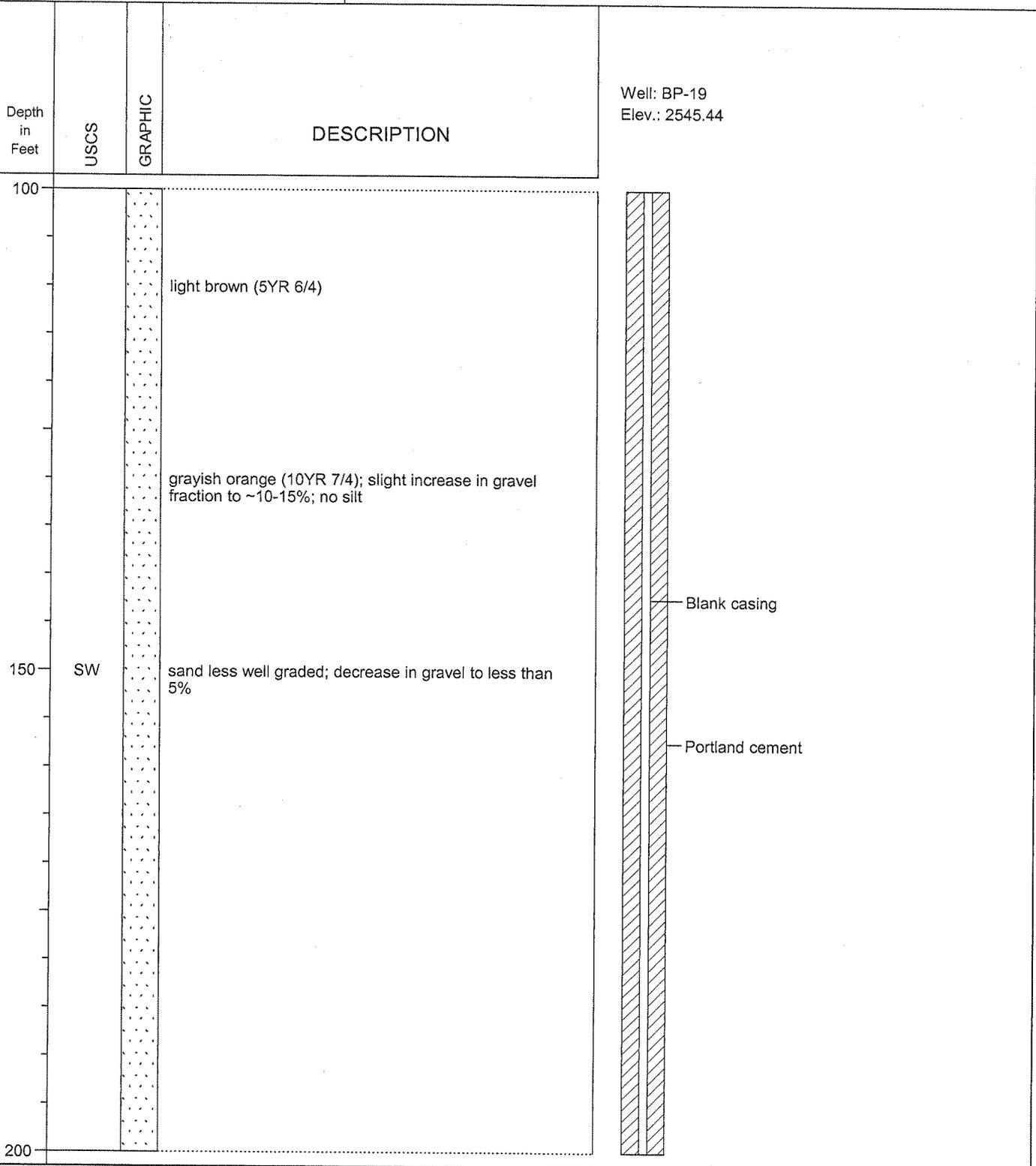
(Page 2 of 5)

Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : February 10, 2003
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-596237

7001 East Hawthorne Street



Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : February 10, 2003
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

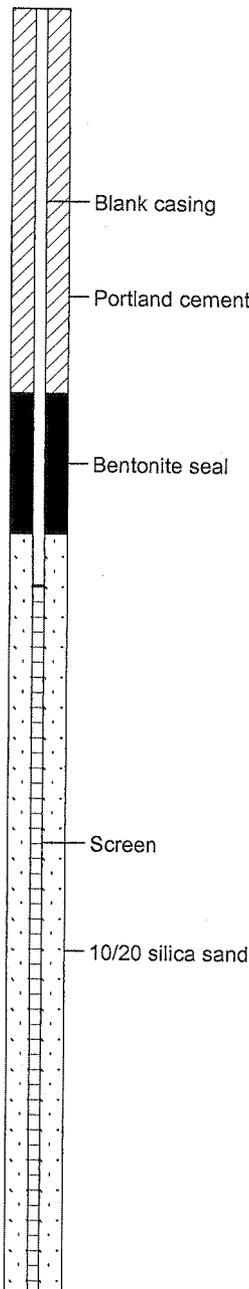
Slot Size : 0.020-inch
ADWR No. : 55-596237

7001 East Hawthorne Street

Depth in Feet	USCS	GRAPHIC	DESCRIPTION
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Well: BP-19
Elev.: 2545.44

200	SW		<p>increase in gravel to ~10-15%; grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2); small garnets abundant, ~0.5-1mm in diameter</p> <p>grayish orange (10YR 7/4)</p>
250	SW		300



Arizona Department of Environmental Quality
Broadway-Pantano WQARF Site

Start Date : February 10, 2003
Drilling Company : WDC Exploration
Drilling Method : ARCH
SECOR Rep on-site : Keli Mandeville
Well Casing Diameter : 5-inch PVC

Slot Size : 0.020-inch
ADWR No. : 55-596237

7001 East Hawthorne Street

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Well: BP-19 Elev.: 2545.44
300			sand more coarse grained	
SW				
350			grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2); rock fragments up to 1" in diameter appear to be of metamorphosed diorite	Screen
			slight increase in silty fine fraction	10/20 silica sand
SP			POORLY GRADED COARSE SAND; angular sand grains; color difficult to distinguish due to large variation in mineral composition of grains, most similar to pale yellowish brown (10YR 6/2); trace amount of silty fines	
400				



URS Corporation
7720 N. 16th Street, Suite 100
Phoenix, Arizona

Log of Borehole: BP-20

Project No.: 23444449

Project: Broadway N. Landfill

Client: City of Tucson Environmental Services

Project Manager: Chris Courtney, R.G.

Logged by: Chris Courtney, R.G. and Mike Makerov

SUBSURFACE PROFILE							Penetration Rate (ft/hr)	Depth (feet bis)	Well Completion Details
Depth	Symbol	Lithology	% fines	% sand	% gravel	Description			
0						Ground Surface			
0 - 10		SM	40	60	0	SILTY SAND very pale orange (10 YR 8/2), very angular to angular sands, well graded, fine to coarse sands up to 10 mm, gneiss and quartz clasts with some muscovite, no cementation	20	0 - 10	<p>6" Steel Sleeve ASTM 53B</p> <p>Neat Cement (Type III)</p> <p>5" Sch 80 PVC - Blank</p> <p>Bentonite Slurry</p>
10 - 20		SW	0	20	80	GRAVELLY SAND very pale orange sands (10 YR 8/2), white and gray clasts, very angular to angular, well graded, fine sand to fine gravel up to 25 mm, chert, quartz, gneiss, and muscovite, no cementation		10 - 20	
20 - 40		SC	20	80	0	CLAYEY SAND pale yellowish brown (10 YR 6/2), angular to subangular sands, moderately graded, fine to medium sands, granite, gneiss, quartz, no plasticity, no cementation	60	20 - 40	
40 - 48		SW	0	100	0	CLEAN SAND very pale orange (10 YR 8/2), subangular to subrounded, moderately graded, fine to coarse sands up to 5 mm, granite, chert, quartz, gneiss, no cementation	48	40 - 48	
48 - 50								48 - 50	

Drilled By: Layne Christensen Company

Hole Size: 10.5"

Drill Method: Casing Advance - Becker Hammer

Datum:

Drill Date: 8/11/2005 to 8/22/05

Page: 1 of 10



URS Corporation
7720 N. 16th Street, Suite 100
Phoenix, Arizona

Log of Borehole: BP-20

Project No.: 23444449

Project: Broadway N. Landfill

Client: City of Tucson Environmental Services

Project Manager: Chris Courtney, R.G.

Logged by: Chris Courtney, R.G. and Mike Makerov

SUBSURFACE PROFILE							Penetration Rate (ft/hr)	Depth (feet blis)	Well Completion Details
Depth	Symbol	Lithology	% fines	% sand	% gravel	Description			
52	[Symbol: Dotted pattern]	SW	0	100	0	CLEAN SAND very pale orange (10 YR 8/2), subangular to subrounded, moderately graded, fine to coarse sands up to 5 mm, granite, chert, quartz, gneiss, no cementation	48	52	<p>Bentonite Slurry</p> <p>5" Sch 80 PVC - Blank</p>
54		SC	20	80	0	CLAYEY SAND pale yellowish brown (10 YR 6/2), subangular to subrounded, poorly graded, mostly fine to medium sands, granite, quartz, muscovite, gneiss, low plasticity, light reaction to HCl.	55	54	
56								56	
58	SC/SM	80	20	0	SILTY SANDY CLAY pale yellowish brown (10 YR 6/2), subangular to angular sands, poorly graded sands, fine to medium grained, quartz and muscovite, moderate plasticity, no cementation		58		
60							60		
62	[Symbol: Diagonal lines]	60	40	0	increase in sand size to coarse grained and increase in percent sands		62		
64							64		
66	[Symbol: Diagonal lines]	60	40	0	increase in sand size to coarse grained and increase in percent sands		66		
68							68		
70	[Symbol: Diagonal lines]	60	40	0	increase in sand size to coarse grained and increase in percent sands		70		
72							72		
74	[Symbol: Diagonal lines]	60	40	0	increase in sand size to coarse grained and increase in percent sands		74		
76							76		
78	[Symbol: Diagonal lines]	60	40	0	increase in sand size to coarse grained and increase in percent sands		78		
80							80		
82	[Symbol: Diagonal lines]	60	40	0	increase in sand size to coarse grained and increase in percent sands		82		
84							84		
86	[Symbol: Diagonal lines]	60	40	0	increase in sand size to coarse grained and increase in percent sands		86		
88							88		
90	[Symbol: Diagonal lines]	60	40	0	increase in sand size to coarse grained and increase in percent sands		90		
92							92		
94	[Symbol: Diagonal lines]	60	40	0	increase in sand size to coarse grained and increase in percent sands		94		
96							96		
98	[Symbol: Diagonal lines]	60	40	0	increase in sand size to coarse grained and increase in percent sands		98		
100							100		

Drilled By: Layne Christensen Company

Drill Method: Casing Advance - Becker Hammer

Drill Date: 8/11/2005 to 8/22/05

Hole Size: 10.5"

Datum:

Page: 2 of 10



URS Corporation
7720 N. 16th Street, Suite 100
Phoenix, Arizona

Log of Borehole: BP-20

Project No.: 23444449

Project: Broadway N. Landfill

Client: City of Tucson Environmental Services

Project Manager: Chris Courtney, R.G.

Logged by: Chris Courtney, R.G. and Mike Makerov

SUBSURFACE PROFILE							Penetration Rate (ft/hr)	Depth (feet bls)	Well Completion Details
Depth	Symbol	Lithology	% fines	% sand	% gravel	Description			
102		SC	20	80	0	CLAYEY SAND pale yellowish brown (10YR 6/2), subangular to subrounded, moderately graded, fine to coarse sand up to 5 mm, granite, quartz, muscovite, gneiss, low plasticity, light reaction to HCl.	55	102	
104									
106									
108									
110									
112									
114									
116									
118									
120									
122									
124									
126		SC/GC	30	70	0	slight increase in clay content	33	106	
108									
110									
112									
114									
116									
118									
120									
122									
124									
126									
128									
130									
132									
134									
136									
138									
140									
142									
144									
146									
148									
150									

Drilled By: Layne Christensen Company

Drill Method: Casing Advance - Becker Hammer

Drill Date: 8/11/2005 to 8/22/05

Hole Size: 10.5"

Datum:

Page: 3 of 10



URS Corporation
7720 N. 16th Street, Suite 100
Phoenix, Arizona

Log of Borehole: BP-20

Project No.: 23444449

Project: Broadway N. Landfill

Client: City of Tucson Environmental Services

Project Manager: Chris Courtney, R.G.

Logged by: Chris Courtney, R.G. and Mike Makerov

SUBSURFACE PROFILE

Depth	Symbol	Lithology	% fines	% sand	% gravel	Description	Penetration Rate (ft/hr)	Depth (feet bis)	Well Completion Details					
152		GC	20	20	60	<p>CLAYEY SANDY GRAVEL pale yellowish brown (10 YR 6/2), very angular to angular, well graded, fine sands to coarse gravel up to 70 mm, gneiss, quartz, biotite, possible feldspar, low plasticity, no cementation</p> <p>increase in gravel size, appearance of cobbles up to 120 mm, and decrease in percent fines. Cobbles are Catalina gneiss.</p> <p>fewer cobbles and gravel, smaller sand size</p> <p>angular to subangular grains</p>	33	152						
154								154						
156								156						
158								158						
160								160						
162								162						
164								164						
166								166						
168								168						
170								170						
172								20		40	40	172	27	172
174								174						
176								176						
178								178						
180								180						
182								182						
184								184						
186								186						
188								188						
190								10		40	50	190		28
192	192													
194	194													
196	196													
198	198													
200	200													

Drilled By: Layne Christensen Company

Drill Method: Casing Advance - Becker Hammer

Drill Date: 8/11/2005 to 8/22/05

Hole Size: 10.5"

Datum:

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URS Corporation
7720 N. 16th Street, Suite 100
Phoenix, Arizona

Log of Borehole: BP-20

Project No.: 23444449

Project: Broadway N. Landfill

Client: City of Tucson Environmental Services

Project Manager: Chris Courtney, R.G.

Logged by: Chris Courtney, R.G. and Mike Makerov

SUBSURFACE PROFILE							Penetration Rate (ft/hr)	Depth (feet bls)	Well Completion Details
Depth	Symbol	Lithology	% fines	% sand	% gravel	Description			
202		GC	10	40	50	CLAYEY SANDY GRAVEL pale yellowish brown (10 YR 6/2), angular to subangular, well graded, fine sands to coarse gravel, gneiss, quartzite, no cementation, fewer fines, fewer cobbles than previous depths.	28	202	
204								204	
206								206	
208								208	
210		SP	10	70	20	SILTY GRAVELLY SAND WITH COBBLES pale yellowish brown (10 YR 6/2), angular gravels, subrounded sands, poorly graded sands, mostly coarse grained clasts up to 150 mm, gneiss gravels and cobbles, quartz sands, some feldspar in sands, no cementation.	20	210	
212								212	
214								214	
216								216	
218								218	
220								220	
222								222	
224								224	
226								226	
228								228	
230								230	
232								232	
234								234	
236								236	
238								238	
240	240								
242	242								
244	244								
246	246								
248	248								
250	250								
							17	240	
								242	
								244	
								246	
								248	
								250	

Drilled By: Layne Christensen Company

Drill Method: Casing Advance - Becker Hammer

Drill Date: 8/11/2005 to 8/22/05

Hole Size: 10.5"

Datum:

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URS Corporation
7720 N. 16th Street, Suite 100
Phoenix, Arizona

Log of Borehole: BP-20

Project No.: 23444449

Project: Broadway N. Landfill

Client: City of Tucson Environmental Services

Project Manager: Chris Courtney, R.G.

Logged by: Chris Courtney, R.G. and Mike Makerov

SUBSURFACE PROFILE							Penetration Rate (ft/hr)	Depth (feet bis)	Well Completion Details
Depth	Symbol	Lithology	% fines	% sand	% gravel	Description			
252	GW	SM/GM	0	40	60	CLEAN SANDY GRAVEL multi-colored sands and gravels, angular to subangular gravels, subangular to subrounded sands, well graded, coarse sand to coarse gravel up to 30 mm, gneiss, schist, quartz, no cementation.	48	252	10/20 Colorado Silica Sand
254						254			
256						256			
258						258			
260	GW	SM/GM	60	20	20	GRAVELLY SANDY SILT pale yellowish brown silts (10 YR 6/2), multicolored gravels, subangular to subrounded, poorly graded, silt to fine sands with fine gravels up to 12 mm, gneiss schist, and quartz clasts, no cementation		260	5" Sch 80 PVC - 0.020 Slot Screen
262						262			
264						264			
266						266			
268	GW	GW	0	40	60	CLEAN SANDY GRAVEL multi-colored sands and gravels, angular to subangular gravels, subangular to subrounded sands, well graded, coarse sand to coarse gravel up to 30 mm, gneiss, schist, quartz, no cementation.		268	
270						270			
272						272			
274						274			
276	SW	SW	0	70	30	CLEAN GRAVELLY SAND multi-colored sands and gravels, angular to subangular gravels, subangular to subrounded sands, well graded, coarse sand to coarse gravel up to 30 mm, gneiss, schist, quartz, no cementation		276	
278						278			
280						280			
282						282			
284								284	
286								286	
288								288	
290								290	
292								292	
294								294	
296								296	
298								298	
300								300	

Drilled By: Layne Christensen Company

Drill Method: Casing Advance - Becker Hammer

Drill Date: 8/11/2005 to 8/22/05

Hole Size: 10.5"

Datum:

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URS Corporation
7720 N. 16th Street, Suite 100
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Log of Borehole: BP-20

Project No.: 23444449

Project: Broadway N. Landfill

Client: City of Tucson Environmental Services

Project Manager: Chris Courtney, R.G.

Logged by: Chris Courtney, R.G. and Mike Makerov

SUBSURFACE PROFILE							Penetration Rate (ft/hr)	Depth (feet bis)	Well Completion Details
Depth	Symbol	Lithology	% fines	% sand	% gravel	Description			
302	[Diagonal Hatching]	SC/GC	20	60	20	GRAVELLY CLAYEY SAND pale yellowish brown (10 YR 6/2), subangular to subrounded sands, angular gravels, well graded, gravels up to 50 mm, gneiss quartz, and schist clasts, low plasticity, no cementation.	17	302	10/20 Colorado Silica Sand
304								304	
306								306	
308								308	
310	[Dotted Pattern]	SP	5	80	15	CLEAN GRAVELLY SAND multi-colored sands and gravels, angular to subangular gravels, subangular to subrounded sands, well graded, coarse sand to coarse gravel up to 30 mm, gneiss, schist, quartz, trace silt and clay, no cementation.	24	310	5" Sch 80 PVC - 0.020 Slot Screen
312								312	
314								314	
316								316	
318	[Dotted Pattern]	SW	10	70	20	GRAVELLY SAND pale yellowish brown (10 YR 6/2), subangular to subrounded sand and gravel, well graded, coarse gravel up to 70 mm, quartz, gneiss, and schist clasts, slickenslides noted, no cementation.	42	318	325' on 8/22/2005
320								320	
322								322	
324								324	
326	[Dotted Pattern]	SW	5	80	15	GRAVELLY SAND pale yellowish brown (10 YR 6/2), subangular to subrounded sand and gravel, well graded, coarse gravel up to 70 mm, quartz, gneiss, and schist clasts, slickenslides noted, no cementation.	42	326	5" Sch 80 PVC - 0.020 Slot Screen
328								328	
330								330	
332								332	
334	[Dotted Pattern]	SW	5	80	15	GRAVELLY SAND pale yellowish brown (10 YR 6/2), subangular to subrounded sand and gravel, well graded, coarse gravel up to 70 mm, quartz, gneiss, and schist clasts, slickenslides noted, no cementation.	42	334	5" Sch 80 PVC - 0.020 Slot Screen
336								336	
338								338	
340								340	
342	[Diagonal Hatching]	SC	35	60	5	CLAYEY SAND pale yellowish brown (10 YR 6/2), subangular to subrounded, fine to coarse sand, well graded, quartz, quartzite, and gneiss clasts, no plasticity, no cementation.	54	342	5" Sch 80 PVC - 0.020 Slot Screen
344								344	
346								346	
348								348	
350								350	

Drilled By: Layne Christensen Company

Drill Method: Casing Advance - Becker Hammer

Drill Date: 8/11/2005 to 8/22/05

Hole Size: 10.5"

Datum:

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URS Corporation
7720 N. 16th Street, Suite 100
Phoenix, Arizona

Log of Borehole: BP-20

Project No.: 23444449

Project: Broadway N. Landfill

Client: City of Tucson Environmental Services

Project Manager: Chris Courtney, R.G.

Logged by: Chris Courtney, R.G. and Mike Makerov

SUBSURFACE PROFILE						Description	Penetration Rate (ft/hr)	Depth (feet blis)	Well Completion Details
Depth	Symbol	Lithology	% fines	% sand	% gravel				
352	[Diagonal Hatching]	SC	35	60	5	CLAYEY SAND pale yellowish brown (10 YR 6/2), subangular to subrounded, fine to coarse sand, well graded, quartz, quartzite, and gneiss clasts, no plasticity, no cementation	46	352	[Well Completion Diagram]
354								354	
356								356	
358								358	
360	[Dotted Pattern]	SW	<5	70	25	CLEAN GRAVELLY SAND light brown sand (10 YR 8/3), dark gray with light gray speckles for gneiss, subangular to subrounded, fine grained sand and gravel, well graded, quartz and gneiss clasts, no plasticity, no cementation.	42	360	10/20 Colorado Silica Sand
362								362	
364								364	
366								366	
368								368	
370								370	
372								372	
374								374	
376	[Dotted Pattern]	SP	10	80	10	POORLY GRADED SAND light brown (10 YR 8/3), subangular to subrounded, gravel is subangular, fine sand, trace silt, trace fine gravels, quartz and gneiss clasts, no plasticity, no cementation.	37	376	5" Sch 80 PVC - 0.020 Slot Screen
378								378	
380								380	
382								382	
384	[Dotted Pattern]	SW	<5	55	40	CLEAN GRAVELLY SAND light brown (10 YR 8/3), subangular to subrounded, fine sand to coarse gravel, well graded, quartz and gneiss clasts, no plasticity, no cementation.	75	384	[Well Completion Diagram]
386								386	
388								388	
390								390	
392								392	
394								394	
396	396								
398	398								
400	400								

Drilled By: Layne Christensen Company

Drill Method: Casing Advance - Becker Hammer

Drill Date: 8/11/2005 to 8/22/05

Hole Size: 10.5"

Datum:

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URS Corporation
7720 N. 16th Street, Suite 100
Phoenix, Arizona

Log of Borehole: BP-20

Project No.: 23444449

Project: Broadway N. Landfill

Client: City of Tucson Environmental Services

Project Manager: Chris Courtney, R.G.

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SUBSURFACE PROFILE							Penetration Rate (ft/hr)	Depth (feet bls)	Well Completion Details
Depth	Symbol	Lithology	% fines	% sand	% gravel	Description			
402		SW	<5	55	40	CLEAN GRAVELLY SAND light brown (10 YR 8/3), subangular to subrounded, fine sand to coarse gravel, well graded, quartz and gneiss clasts, cobbles to 110 mm, no plasticity, no cementation.	60	402	
404								404	
406								406	
408								408	
410								410	
412			<5	65	30		50	412	
414								414	
416								416	
418								418	
420								420	
422						12	422		
424							424		
426							426		
428							428		
430							430		
432			<5	55	40	subrounded gneiss cobbles up to 100 mm	31	432	
434								434	
436								436	
438								438	
440								440	
442							20	442	
444								444	
446								446	
448								448	
450								450	

Drilled By: Layne Christensen Company

Drill Method: Casing Advance - Becker Hammer

Drill Date: 8/11/2005 to 8/22/05

Hole Size: 10.5"

Datum:

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URS Corporation
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Phoenix, Arizona

Log of Borehole: BP-20

Project No.: 23444449

Project: Broadway N. Landfill

Client: City of Tucson Environmental Services

Project Manager: Chris Courtney, R.G.

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SUBSURFACE PROFILE							Penetration Rate (ft/hr)	Depth (feet blis)	Well Completion Details
Depth	Symbol	Lithology	% fines	% sand	% gravel	Description			
452		GW	0	60	40	CLEAN GRAVELLY SAND dark gray with light gray speckles, subangular to subrounded, medium sand to coarse gravel, well graded, gneiss and quartz clasts, no plasticity, no cementation, cobbles up to 200 mm present.	40	452	 Stainless Steel Threaded End Cap
454									
456									
458									
460									
462									
464									
466									
468									
470									
472								472	
474								474	
476								476	
478								478	
480								480	
482								482	
484								484	
486								486	
488								488	
490								490	
492								492	
494								494	
496								496	
498								498	
500								500	

Drilled By: Layne Christensen Company

Drill Method: Casing Advance - Becker Hammer

Drill Date: 8/11/2005 to 8/22/05

Hole Size: 10.5"

Datum:

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URS Corporation
7720 N. 16th Street, Suite 100
Phoenix, Arizona

Log of Borehole: BP-21

Project No.: 23444449

Project: Broadway N. Landfill

Client: City of Tucson Environmental Services

Project Manager: Chris Courtney, R.G.

Logged by: Chris Courtney, R.G. and Mike Makerov

SUBSURFACE PROFILE

Depth	Symbol	Lithology	% fines	% sand	% gravel	Description	Penetration Rate (ft/hr)	Depth (feet bls)	Well Completion Details
0						Ground Surface		0	
2		SM	40	60	0	SILTY SAND very pale orange (10 YR 8/2), subangular to subrounded grains, well graded, fine to coarse sands, granite and quartz clasts, no plasticity, no cementation.	60	2	6" Steel Sleeve ASTM 53B
4							150	4	
6						color change to brownish yellow (10 YR 6/8)		6	
8								8	
10								10	
12								12	
14								14	
16								16	
18								18	
20		SW	10	60	30	GRAVELLY SAND pale yellowish brown (10 YR 6/2), angular to subrounded gravels up to 55 mm, well graded, fine to coarse sands, gneiss and quartz clasts, no plasticity, no cementation	100	20	Neat Cement (Type III)
22								22	
24								24	
26								26	
28								28	
30			10	50	40			30	
32								32	
34								34	
36								36	
38								38	
40			15	50	35			40	
42							120	42	5" Sch 80 PVC - Blank
44								44	
46								46	
48								48	
50								50	

Drilled By: Layne Christensen Company

Hole Size: 10.5"

Drill Method: Casing Advance - Becker Hammer

Datum:

Drill Date: 8/23/2005 to 8/26/05

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URS Corporation
7720 N. 16th Street, Suite 100
Phoenix, Arizona

Log of Borehole: BP-21

Project No.: 23444449

Project: Broadway N. Landfill

Client: City of Tucson Environmental Services

Project Manager: Chris Courtney, R.G.

Logged by: Chris Courtney, R.G. and Mike Makerov

SUBSURFACE PROFILE							Penetration Rate (ft/hr)	Depth (feet bis)	Well Completion Details
Depth	Symbol	Lithology	% fines	% sand	% gravel	Description			
52		SW	<5	90	<5	CLEAN SAND brownish yellow (10 YR 6/8), subangular to subrounded, well graded, fine to coarse sands, quartz and gneiss clasts, no plasticity, no cementation.	75	52	
54		SW/GW	10	55	35	GRAVELLY SAND pale yellowish brown (10 YR 6/2), subangular to subrounded, well graded, fine to coarse sands, quartz and gneiss clasts, gravel up to 40 mm, no plasticity, no cementation.		60	
56						WELL GRADED CLEAN SAND pale yellowish brown (10 YR 6/2), subangular to subrounded, well graded, fine to coarse sands, quartz and gneiss clasts, no plasticity, no cementation		62	
58		SW	5	85	10	CLAYEY SAND pale yellowish brown (10 YR 6/2), subangular to subrounded grains, sand and clay mixtures, quartz grains, low plasticity, no cementation.		64	
60						GRAVELLY SAND pale yellow brown (10 YR 6/2), angular to subrounded particles, well graded, fine to coarse sand, quartz and gneiss clasts, no plasticity, no cementation.		66	
62		SC	40	55	5		68		
64							SW	<5	70
66		5" Sch 80 PVC - Blank							
68									
70									
72									
74									
76									
78									
80									
82									
84									
86									
88									
90									
92									
94									
96									
98									
100									

Drilled By: Layne Christensen Company

Drill Method: Casing Advance - Becker Hammer

Drill Date: 8/23/2005 to 8/26/05

Hole Size: 10.5"

Datum:

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URS Corporation
7720 N. 16th Street, Suite 100
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Project: Broadway N. Landfill

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Project Manager: Chris Courtney, R.G.

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SUBSURFACE PROFILE							Penetration Rate (ft/hr)	Depth (feet bls)	Well Completion Details
Depth	Symbol	Lithology	% fines	% sand	% gravel	Description			
102	[Diagonal Hatching]	SC	40	55	5	CLAYEY SAND pale yellowish brown (10YR 6/2), subangular to subrounded, sand and clay mixtures, quartz grains, low plasticity, no cementation.	66	[Diagonal Hatching]	Bentonite Slurry
104		SC/SW	30	45	25	CLAYEY SANDIGRAVELLY SAND pale yellowish brown (10 YR 6/2), angular to subrounded, well graded, fine to coarse grained, gneiss and quartz clasts, cobbles up to 240 mm, low plasticity, no cementation.	75		
106			SC	40	50	10	CLAYEY SAND pale yellowish brown (10 YR 6/2), subangular to subrounded, well graded, fine to coarse sands, quartz and gneiss clasts, low plasticity, no cementation.		
108	[Diagonal Hatching]	SC	45	50	5			[Diagonal Hatching]	5" Sch 80 PVC - Blank
110									
112									
114									
116									
118									
120									
122									
124									
126									
128									
130									
132									
134									
136									
138									
140									
142									
144									
146									
148									
150									

Drilled By: Layne Christensen Company

Hole Size: 10.5"

Drill Method: Casing Advance - Becker Hammer

Datum:

Drill Date: 8/23/2005 to 8/26/05

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URS Corporation
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Project: Broadway N. Landfill

Client: City of Tucson Environmental Services

Project Manager: Chris Courtney, R.G.

Logged by: Chris Courtney, R.G. and Mike Makerov

SUBSURFACE PROFILE							Penetration Rate (ft/hr)	Depth (feet bis)	Well Completion Details
Depth	Symbol	Lithology	% fines	% sand	% gravel	Description			
152		SC/SP				CLAYEY SAND/GRAVELLY SAND pale yellowish brown (10 YR 6/2), angular to subrounded, poorly graded - missing intermediate sizes, gneiss and quartz clasts, no plasticity, no cementation.	66	152	
154								154	
156								156	
158								158	
160								160	
162		SC	40	50	10	CLAYEY SAND WITH GRAVEL pale yellowish brown (10 YR 6/2), angular to subrounded, well graded, fine to coarse sands, quartz and gneiss clasts, no plasticity, no cementation.		162	
164								164	
166								166	
168								168	
170								170	
172			35	50	15		60	172	
174								174	
176								176	
178								178	
180								180	
182		SC/SW	25	50	25	CLAYEY SAND/GRAVELLY SAND pale yellowish brown (10 YR 6/2), angular to subangular, well graded, fine to coarse grained, gneiss and quartz clasts, no plasticity, no cementation.	42	182	
184								184	
186								186	
188								188	
190								190	
192			30	45	25		50	192	
194								194	
196								196	
198								198	
200								200	

Drilled By: Layne Christensen Company

Hole Size: 10.5"

Drill Method: Casing Advance - Becker Hammer

Datum:

Drill Date: 8/23/2005 to 8/26/05

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URS Corporation
7720 N. 16th Street, Suite 100
Phoenix, Arizona

Log of Borehole: BP-21

Project No.: 23444449

Project: Broadway N. Landfill

Client: City of Tucson Environmental Services

Project Manager: Chris Courtney, R.G.

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SUBSURFACE PROFILE							Penetration Rate (ft/hr)	Depth (feet bls)	Well Completion Details	
Depth	Symbol	Lithology	% fines	% sand	% gravel	Description				
202		sc	35	60	5	CLAYEY SAND pale yellowish brown (10 YR 6/2), angular to subrounded gravel, well graded fine to coarse sand, gneiss and quartz clasts, low plasticity, no cementation.	46	202		
204								204		
206								206		
208								208		
210								210		
212								212		
214								214		
216								216		
218								218		
220								220		
222								35		222
224								224		
226								226		
228								228		
230								230		
232								40		232
234								234		
236								236		
238								238		
240								240		
242								54		242
244								244		
246								246		
248								248		
250								100		250
	54	250								

Drilled By: Layne Christensen Company

Drill Method: Casing Advance - Becker Hammer

Drill Date: 8/23/2005 to 8/26/05

Hole Size: 10.5"

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SUBSURFACE PROFILE							Penetration Rate (ft/hr)	Depth (feet blis)	Well Completion Details
Depth	Symbol	Lithology	% fines	% sand	% gravel	Description			
252	[Diagonal Hatching]	SC	35	60	5	CLAYEY SAND pale yellowish brown (10 YR 6/2), angular to subrounded gravel, well graded fine to coarse sand, gneiss and quartz clasts, low plasticity, no cementation.	46	252	<p>10/20 Colorado Silica Sand</p> <p>5" Sch 80 PVC - 0.020 Slot Screen</p>
254		SC/SW	30	45	25	CLAYEY SAND/GRAVELLY SAND pale yellowish brown (10 YR 6/2), angular to subrounded, well graded, fine to coarse sand, gneiss and quartz clasts, low plasticity, no cementation.	60	254	
256								256	
258	258								
260	260								
262	262								
264	264								
266	SC	45	50	5	CLAYEY SAND pale yellowish brown (10 YR 6/2), subangular to subrounded sand, well graded, fine to coarse sand, gneiss and quartz clasts, low plasticity, no cementation.	54	266		
268							268		
270							270		
272							272		
274							274		
276							276		
278							278		
280							280		
282							282		
284							284		
286							286		
288							40	50	
290	290								
292	292								
294	294								
296	296								
298	298								
300							300		

Drilled By: Layne Christensen Company

Drill Method: Casing Advance - Becker Hammer

Drill Date: 8/23/2005 to 8/26/05

Hole Size: 10.5"

Datum:

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Log of Borehole: BP-21

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Project: Broadway N. Landfill

Client: City of Tucson Environmental Services

Project Manager: Chris Courtney, R.G.

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SUBSURFACE PROFILE							Penetration Rate (ft/hr)	Depth (feet bls)	Well Completion Details
Depth	Symbol	Lithology	% fines	% sand	% gravel	Description			
302		sc	40	50	10	CLAYEY SAND pale yellowish brown (10 YR 6/2), subangular to subrounded sand, well graded, fine to coarse sand, gneiss and quartz clasts, low plasticity, no cementation.	60		
304									
306									
308			45	50	5	slightly less gravel	54		10/20 Colorado Silica Sand
310									
312									
314									
316									
318									
320									
322									
324									
326									
328			30	60	10		75		5" Sch 80 PVC - 0.020 Slot Screen
330									
332									
334									
336									
338									
340									
342									
344									
346									
348			100						
350									
350									

Drilled By: Layne Christensen Company

Drill Method: Casing Advance - Becker Hammer

Drill Date: 8/23/2005 to 8/26/05

Hole Size: 10.5"

Datum:

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URS Corporation
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Log of Borehole: BP-21

Project No.: 23444449

Project: Broadway N. Landfill

Client: City of Tucson Environmental Services

Project Manager: Chris Courtney, R.G.

Logged by: Chris Courtney, R.G. and Mike Makerov

SUBSURFACE PROFILE							Penetration Rate (ft/hr)	Depth (feet bis)	Well Completion Details
Depth	Symbol	Lithology	% fines	% sand	% gravel	Description			
352		SC	30	60	10	CLAYEY SAND pale yellowish brown (10 YR 6/2), subangular to subrounded sand, well graded, fine to coarse sand, gneiss and quartz clasts, low plasticity, no cementation.	100		
354		SC/SW	25	50	25	CLAYEY SAND/GRAVELLY SAND pale yellowish brown (10 YR 6/2), subangular to subrounded, well graded fine to coarse sand, quartz and gneiss clasts, no plasticity, no cementation.	75		
356									
358									
360		GW	0	10	90	CLEAN GRAVEL WITH TRACE SAND multicolored clasts (most white/gray and black), subangular to subrounded, well graded fine to coarse gravels with coarse sand, gravels up to 60 mm, gneiss and quartz clasts, no cementation.	60		
362									
364									
366									
368									
370									
372		GP	0	30	70	SANDY GRAVEL multicolored clasts (most white/gray and black), subangular to subrounded, poorly graded fine to coarse gravels with coarse sand, gneiss and quartz clasts, trace cobbles up to 100 mm, no cementation.	60		
374									
376									
378									
380									
382									
384									
386									
388									
390									
392									
394									
396									
398									
400									

Drilled By: Layne Christensen Company

Hole Size: 10.5"

Drill Method: Casing Advance - Becker Hammer

Datum:

Drill Date: 8/23/2005 to 8/26/05

Page: 8 of 10



URS Corporation
7720 N. 16th Street, Suite 100
Phoenix, Arizona

Log of Borehole: BP-21

Project No.: 23444449

Project: Broadway N. Landfill

Client: City of Tucson Environmental Services

Project Manager: Chris Courtney, R.G.

Logged by: Chris Courtney, R.G. and Mike Makerov

SUBSURFACE PROFILE							Penetration Rate (ft/hr)	Depth (feet bis)	Well Completion Details
Depth	Symbol	Lithology	% fines	% sand	% gravel	Description			
402	[Symbol: Dotted pattern]	SW	0	70	30	GRAVELLY SAND multicolored sand and gravels, subangular to subrounded, well graded coarse sand with fine gravels up to 30 mm, quartz and gneiss clasts, no cementation.	85	402	[Well Completion Diagram: 10/20 Colorado Silica Sand from 402 to 428]
404								404	
406								406	
408	[Symbol: Dotted pattern]	GP	0	40	60	SANDY GRAVEL WITH COBBLES multicolored clasts (most white/gray and black), subangular to subrounded, poorly graded fine to coarse gravels with coarse sand, gneiss and quartz clasts, trace cobbles up to 80 mm, no cementation.	30	408	[Well Completion Diagram: 10/20 Colorado Silica Sand from 402 to 428]
410								410	
412								412	
414								414	
416	[Symbol: Dotted pattern]	SW	0	70	30	GRAVELLY SAND WITH COBBLES multicolored sands and gravels, angular to subrounded, well graded, coarse sand to coarse gravel with some cobbles up to 100 mm, gneiss and quartz clasts (more mafic than previous), no cementation.	30	416	[Well Completion Diagram: 10/20 Colorado Silica Sand from 402 to 428]
418								418	
420								420	
422								422	
424								424	
426								426	
428								428	
430								430	
432								432	
434								434	
436	436								
438	438								
440	440								
442	442								
444	444								
446	446								
448	448								
450	450								

Drilled By: Layne Christensen Company

Drill Method: Casing Advance - Becker Hammer

Drill Date: 8/23/2005 to 8/26/05

Hole Size: 10.5"

Datum:

Page: 9 of 10



URS Corporation
7720 N. 16th Street, Suite 100
Phoenix, Arizona

Log of Borehole: BP-21

Project No.: 23444449

Project: Broadway N. Landfill

Client: City of Tucson Environmental Services

Project Manager: Chris Courtney, R.G.

Logged by: Chris Courtney, R.G. and Mike Makerov

SUBSURFACE PROFILE

Depth	Symbol	Lithology	% fines	% sand	% gravel	Description	Penetration Rate (ft/hr)	Depth (feet bls)	Well Completion Details
452	[Dotted pattern symbol]	SW	0	70	30	GRAVELLY SAND WITH COBBLES multicolored sands and gravels, angular to subrounded, well graded, coarse sand to coarse gravel with some cobbles up to 100 mm, gneiss and quartz clasts (more mafic than previous), no cementation.	40	452	Stainless Steel Threaded End Cap
454							454		
456							456		
458							458		
460							460		
462							462		
464							464		
466							466		
468							468		
470							470		
472							472		
474							474		
476							476		
478							478		
480							30	480	
482								482	
484								484	
486								486	
488								488	
490								490	
492								492	
494								494	
496								496	
498								498	
500								500	

Drilled By: Layne Christensen Company

Drill Method: Casing Advance - Becker Hammer

Drill Date: 8/23/2005 to 8/26/05

Hole Size: 10.5"

Datum:

Page: 10 of 10

PROJECT: Broadway South Landfill	WELL / PROBEHOLE / BOREHOLE NO: BP-22	PAGE 1 OF 14	SECOR
LOCATION: Broadway Boulevard and Prudence Road			
PROJECT NUMBER: 18OT.20401.06			
DRILLING: STARTED 5/2/06 COMPLETED: 5/11/06	NORTHING (ft):	EASTING (ft):	
INSTALLATION: STARTED 5/2/06 COMPLETED: 5/11/06	LATITUDE:	LONGITUDE:	
DRILLING COMPANY: Layne Christensen Company	GROUND ELEV (ft):	TOC ELEV (ft):	
DRILLING EQUIPMENT: Becker Hammer	INITIAL DTW (ft): 403.70 5/5/06	BOREHOLE DEPTH (ft): 458.0	
DRILLING METHOD: Percussion-Hammer	STATIC DTW (ft):	WELL DEPTH (ft): 458.0	
SAMPLING EQUIPMENT: Cyclone	WELL CASING DIAMETER (in): 1.4	BOREHOLE DIAMETER (in): 10 3/4	
	LOGGED BY: K. Harker	CHECKED BY: C. Pollock	

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace P/D (units)	Depth (feet)	Well Construction
			Fill Material consists of silt, clay, sand, and gravel, Boring post hole dug to approx. 2.5 feet bgs							Above ground dog house vault with 1 inch and 4 inch PVC caps
5		SC	CLAYEY SAND WITH GRAVEL; SC; 5YR 4/4 brown; fine to coarse-grained; medium plasticity; dense; dry; no odor; none cementation; subangular; well graded; 55% sand, 30% clay, 15% fine to coarse (5-35mm), subangular gravel Medium dense; slight odor		1633 - soil			3.2	5	4 inch schedule 80 PVC, Blank Casing with cement grout
10			Loose; 55% sand, 30% fine (5-15mm), subangular gravel, 15% clay, trace of trash - glass, wood, plastic		1641 - soil			3.5	10	
15		SM	SILTY SAND WITH GRAVEL; SM; 10YR 2/2 dark yellowish brown; fine to coarse-grained; non plastic; loose; dry; strong odor; none cementation; subangular; well graded; 40% sand, 25% silt, 25% (5-35mm), subangular gravel, 10% trash-glass, plastic, wood, metal		1647 - soil			6.8	15	
20			15% trash - glass pieces, wood fragments, plastic, paper, trace of clay		1650 - soil			11.3	20	
25		SC	CLAYEY SAND WITH GRAVEL; SC; 5YR 4/4 brown; fine to coarse-grained; medium plasticity; medium dense; dry; slight odor; none cementation; subangular; well graded; 40% sand, 35% fine (5-15mm), subangular gravel, 25% clay		1700 - soil			7.8	25	1 inch schedule 80 PVC, Blank Casing with cement grout
30			40% sand, 30% clay, 20% fine (5-15mm), subangular gravel		1706 - soil			12.0	30	
					1710					

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

PROJECT: Broadway South Landfill	WELL / PROBEHOLE / BOREHOLE NO: BP-22	 SECOR
LOCATION: Broadway Boulevard and Prudence Road	PAGE 2 OF 14	
PROJECT NUMBER: 18OT.20401.06		
DRILLING: STARTED 5/2/06 COMPLETED: 5/11/06	NORTHING (ft):	EASTING (ft):
INSTALLATION: STARTED 5/2/06 COMPLETED: 5/11/06	LATITUDE:	LONGITUDE:
DRILLING COMPANY: Layne Christensen Company	GROUND ELEV (ft):	TOC ELEV (ft):
DRILLING EQUIPMENT: Becker Hammer	INITIAL DTW (ft): 403.70 5/5/06	BOREHOLE DEPTH (ft): 458.0
DRILLING METHOD: Percussion-Hammer	STATIC DTW (ft):	WELL DEPTH (ft): 458.0
SAMPLING EQUIPMENT: Cyclone	WELL CASING DIAMETER (in): 1.4	BOREHOLE DIAMETER (in): 10 3/4
	LOGGED BY: K. Harker	CHECKED BY: C. Pollock

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
		SM	SILTY SAND ; SM; 5YR 6/4 light brown; fine to coarse-grained; non plastic; loose; dry; slight odor; none cementation; subangular; poorly graded; 85% sand, 15% silt, trace of fine (5 mm), subangular gravel and clay		- soil			5.5		
40		SM	CLAYEY SAND WITH GRAVEL ; SM; 5YR 4/4 brown; fine to coarse-grained; low plasticity; medium dense to loose; dry; slight odor; none cementation; subangular; well graded; 55% sand, 30% fine (5-10mm), subangular gravel, 15% clay		1713 - soil			3.7	40	4 inch schedule 80 PVC, Blank Casing with cement grout
45		SW	SAND WITH GRAVEL ; SW; 5YR 5/6 light brown; fine to coarse-grained; loose; dry; slight odor; none cementation; subangular; well graded; 75% sand, 25% fine (5-10mm), subrounded gravel, trace of silt		1755 - soil			1.6	45	
50		SC	CLAYEY SAND WITH GRAVEL ; SC; 5YR 4/4 brown; fine to coarse-grained; low plasticity; medium dense to loose; dry; slight odor; none cementation; subangular; well graded; 60% sand, 20% clay, 20% fine to coarse (5-40mm), subrounded gravel		1800 - soil			6.9	50	
55		SM	SILTY SAND WITH GRAVEL ; SM; 5YR 6/4 light brown; fine to coarse-grained; non plastic; loose; dry; no odor; none cementation; subangular; well graded; 50% sand, 30% fine (5-7mm), subangular gravel, 20% silt, trace of clay		1805 - soil			4.4	55	1 inch schedule 80 PVC, Blank Casing with cement grout
60			45% sand, 40% fine (5-7mm), subangular gravel, 15% silt, trace of clay		1812 - soil			3.8	60	
65			SILTY SAND ; 5YR 5/6 light brown; fine to medium-grained; poorly graded; 60% sand, 40% silt, trace of fine (5 mm), subrounded gravel		1814 - soil			4.2	65	
					1820					

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR INTL.GDT 10/23/06

PROJECT: **Broadway South Landfill**
 LOCATION: **Broadway Boulevard and Prudence Road**
 PROJECT NUMBER: **18OT.20401.06**

WELL / PROBEHOLE / BOREHOLE NO:

BP-22 PAGE 3 OF 14



SECOR

DRILLING: STARTED **5/2/06** COMPLETED: **5/11/06**
 INSTALLATION: STARTED **5/2/06** COMPLETED: **5/11/06**
 DRILLING COMPANY: **Layne Christensen Company**
 DRILLING EQUIPMENT: **Becker Hammer**
 DRILLING METHOD: **Percussion-Hammer**
 SAMPLING EQUIPMENT: **Cyclone**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **403.70 5/5/06** BOREHOLE DEPTH (ft): **458.0**
 STATIC DTW (ft): WELL DEPTH (ft): **458.0**
 WELL CASING DIAMETER (in): **1.4** BOREHOLE DIAMETER (in): **10 3/4**
 LOGGED BY: **K. Harker** CHECKED BY: **C. Pollock**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
		SC	CLAYEY SAND WITH GRAVEL ; SC; 5YR 4/4 brown; fine to coarse-grained; low plasticity; loose; dry; slight odor; none cementation; subangular; well graded; 60% sand, 30% clay, 10% fine (5-10mm), subangular gravel		- soil			6.8		
75			Non plastic; no odor; 70% sand, 15% clay, 15% fine to coarse (5-25mm), subangular gravel, trace of silt		1828 - soil			5.8	75	4 inch schedule 80 PVC, Blank Casing with cement grout
80			Low plasticity; 50% sand, 30% fine to cobbles (5-75mm), subangular gravel, 20% clay		1830 - soil			4.1	80	
85			CLAYEY SAND ; 5YR 5/6 light brown; fine to medium-grained; low plasticity; loose; dry; no odor; none cementation; subangular; poorly graded; 80% sand, 20% clay, trace of fine (5-10mm), subrounded gravel		0931 - soil			7.0	85	
90			WITH GRAVEL ; 5YR 4/4 brown; medium plasticity; medium dense to loose; 70% sand, 15% clay, 15% fine to coarse (5-40mm), subrounded gravel		0936 - soil			1.2	90	
95			CLAYEY SAND ; fine to coarse-grained; low plasticity; loose; well graded; 85% sand, 15% clay, trace of fine (5-7mm), subangular gravel		0942 - soil			1.7	95	1 inch schedule 80 PVC, Blank Casing with cement grout
100			WITH GRAVEL ; 60% sand, 20% clay, 20% fine to coarse (5-20mm), subangular gravel		0945 - soil			0.7	100	
					0951					

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR INTL.GDT 10/23/06

PROJECT: Broadway South Landfill	WELL / PROBEHOLE / BOREHOLE NO: BP-22	 SECOR
LOCATION: Broadway Boulevard and Prudence Road	PAGE 4 OF 14	
PROJECT NUMBER: 18OT.20401.06		
DRILLING: STARTED 5/2/06 COMPLETED: 5/11/06	NORTHING (ft):	EASTING (ft):
INSTALLATION: STARTED 5/2/06 COMPLETED: 5/11/06	LATITUDE:	LONGITUDE:
DRILLING COMPANY: Layne Christensen Company	GROUND ELEV (ft):	TOC ELEV (ft):
DRILLING EQUIPMENT: Becker Hammer	INITIAL DTW (ft): 403.70 5/5/06	BOREHOLE DEPTH (ft): 458.0
DRILLING METHOD: Percussion-Hammer	STATIC DTW (ft):	WELL DEPTH (ft): 458.0
SAMPLING EQUIPMENT: Cyclone	WELL CASING DIAMETER (in): 1.4	BOREHOLE DIAMETER (in): 10 3/4
	LOGGED BY: K. Harker	CHECKED BY: C. Pollock

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
		SW	SAND WITH GRAVEL ; SW; 10YR 7/4 grayish orange; fine to coarse-grained; loose; dry; no odor; none cementation; subangular; well graded; 85% sand, 15% fine to coarse (5-25mm), subrounded gravel, trace of silt		- soil			2.2		
110		SC	CLAYEY SAND WITH GRAVEL ; SC; 5YR 4/4 brown; fine to medium-grained; low plasticity; medium dense to loose; dry; no odor; none cementation; subangular; well graded; 45% sand, 30% fine to coarse (5-40mm), subrounded gravel, 25% clay		1004 - soil			0.0	110	4 inch schedule 80 PVC, Blank Casing with cement grout
115			CLAYEY SAND ; fine to coarse-grained; loose; 80% sand, 20% clay, trace of fine (5-7mm), subangular gravel		1009 - soil			0.9	115	
120			WITH GRAVEL ; 50% sand, 35% fine (5-15mm), subangular to subrounded gravel, 15% clay		1013 - soil			2.7	120	
125			CLAYEY SAND ; fine to medium-grained; subrounded; poorly graded; 80% sand, 20% clay, trace of fine (5-7mm), subrounded gravel and silt		1017 - soil			1.6	125	
130			WITH GRAVEL ; fine to coarse-grained; medium plasticity; medium dense to loose; well graded; 45% sand, 35% fine to coarse (5-45mm), subangular to subrounded gravel, 20% clay		1026 - soil			1.2	130	1 inch schedule 80 PVC, Blank Casing with cement grout
135			Low plasticity; loose; 70% sand, 15% clay, 15% fine to coarse (5-20mm), subrounded gravel		1044 - soil			5.1	135	
					1053 - soil					

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

PROJECT: **Broadway South Landfill**
 LOCATION: **Broadway Boulevard and Prudence Road**
 PROJECT NUMBER: **18OT.20401.06**

WELL / PROBEHOLE / BOREHOLE NO:



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SECOR

DRILLING: STARTED **5/2/06** COMPLETED: **5/11/06**
 INSTALLATION: STARTED **5/2/06** COMPLETED: **5/11/06**
 DRILLING COMPANY: **Layne Christensen Company**
 DRILLING EQUIPMENT: **Becker Hammer**
 DRILLING METHOD: **Percussion-Hammer**
 SAMPLING EQUIPMENT: **Cyclone**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **403.70 5/5/06** BOREHOLE DEPTH (ft): **458.0**
 STATIC DTW (ft): WELL DEPTH (ft): **458.0**
 WELL CASING DIAMETER (in): **1.4** BOREHOLE DIAMETER (in): **10 3/4**
 LOGGED BY: **K. Harker** CHECKED BY: **C. Pollock**

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction	
		SC	Medium plasticity; 50% sand, 30% fine to coarse (5-20mm), subangular gravel, 20% clay		- soil			4.1			
145			45% sand, 35% clay, 20% fine to coarse (5-20mm), subangular to subrounded gravel		1100 - soil			4.2	145		4 inch schedule 80 PVC, Blank Casing with cement grout
150			Low plasticity; 65% sand, 20% clay, 15% fine to coarse (5-20mm), subangular gravel		1117 - soil			4.0	150		
155			Poorly graded; 60% sand, 30% clay, 10% fine (5-15mm), subrounded gravel		1124 - soil			3.5	155		1 inch schedule 80 PVC, Blank Casing with cement grout
160			Fine to medium-grained; 60% sand, 30% clay, 10% fine (5-10mm), subrounded gravel		1133 - soil			5.8	160		4 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal
165			Fine to coarse-grained; well graded; 55% sand, 30% fine to coarse (5/10mm), subangular gravel, 15% clay, trace of silt		1146 - soil			4.9	165		
170		SM	SILTY SAND WITH GRAVEL ; SM; 5YR 6/4 light brown; fine to coarse-grained; non plastic; loose; dry; no odor; none cementation; subangular; well graded; 50% sand, 30% fine to coarse (5-20mm), subrounded gravel, 20% silt, trace of clay		1157 - soil			5.7	170	1 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal	
					1204						

PROJECT: **Broadway South Landfill**
 LOCATION: **Broadway Boulevard and Prudence Road**
 PROJECT NUMBER: **18OT.20401.06**

WELL / PROBEHOLE / BOREHOLE NO:



BP-22 PAGE 6 OF 14

SECOR

DRILLING: STARTED **5/2/06** COMPLETED: **5/11/06**
 INSTALLATION: STARTED **5/2/06** COMPLETED: **5/11/06**
 DRILLING COMPANY: **Layne Christensen Company**
 DRILLING EQUIPMENT: **Becker Hammer**
 DRILLING METHOD: **Percussion-Hammer**
 SAMPLING EQUIPMENT: **Cyclone**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **403.70 5/5/06** BOREHOLE DEPTH (ft): **458.0**
 STATIC DTW (ft): WELL DEPTH (ft): **458.0**
 WELL CASING DIAMETER (in): **1.4** BOREHOLE DIAMETER (in): **10 3/4**
 LOGGED BY: **K. Harker** CHECKED BY: **C. Pollock**

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR INTL.GDT 10/23/06

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
180		SM	65% sand, 20% silt, 15% fine to coarse (5-20mm), subrounded gravel		- soil			2.9		
180			55% sand, 30% fine to coarse (5-20mm), subrounded gravel, 15% silt		1234 - soil			4.1	180	4 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal
185			SILTY SAND ; fine to medium-grained; poorly graded; 80% sand, 20% silt, trace of fine (5-10mm), subrounded gravel and clay		1310 - soil			2.8	185	1 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal
190		SC	CLAYEY SAND WITH GRAVEL ; SC; 5YR 4/4 brown; fine to medium-grained; medium plasticity; medium dense to loose; dry; no odor; none cementation; subrounded; poorly graded; 55% sand, 35% clay, 10% fine (5-10mm), subrounded to rounded gravel, trace of silt		1323 - soil			1.8	190	
195		SM	SILTY SAND WITH GRAVEL ; SM; 5YR 6/4 light brown; fine to coarse-grained; non plastic; loose; dry; no odor; none cementation; subangular; well graded; 50% sand, 30% fine (5-7mm), subangular gravel, 20% silt, trace of clay		1342 - soil			4.1	195	1 inch and 4 inch schedule 80 PVC, Blank Casing with filter sand 8-12
200		SC	CLAYEY SAND WITH GRAVEL ; SC; 5YR 4/4 brown; fine to coarse-grained; medium plasticity; loose; dry; no odor; none cementation; subrounded; poorly graded; 50% sand, 35% clay, 15% fine to coarse (10-30mm), subrounded to rounded gravel		1350 - soil			1.8	200	1 inch schedule 80 PVC, 0.02 inch slotted casing, filter sand 8-12 1 inch PVC end plug, filter sand 8-12
205			Subangular; well graded; 50% sand, 30% clay, 20% fine (5-15mm), subangular to subrounded gravel		1416 - soil			3.9	205	
					1430 - soil					

PROJECT: **Broadway South Landfill**
 LOCATION: **Broadway Boulevard and Prudence Road**
 PROJECT NUMBER: **18OT.20401.06**

WELL / PROBEHOLE / BOREHOLE NO:



BP-22 PAGE 7 OF 14

SECOR

DRILLING: STARTED **5/2/06** COMPLETED: **5/11/06**
 INSTALLATION: STARTED **5/2/06** COMPLETED: **5/11/06**
 DRILLING COMPANY: **Layne Christensen Company**
 DRILLING EQUIPMENT: **Becker Hammer**
 DRILLING METHOD: **Percussion-Hammer**
 SAMPLING EQUIPMENT: **Cyclone**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **403.70 5/5/06** BOREHOLE DEPTH (ft): **458.0**
 STATIC DTW (ft): WELL DEPTH (ft): **458.0**
 WELL CASING DIAMETER (in): **1.4** BOREHOLE DIAMETER (in): **10 3/4**
 LOGGED BY: **K. Harker** CHECKED BY: **C. Pollock**

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR INTL.GDT 10/23/06

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
		GW-GC	GRAVEL WITH SAND AND CLAY; GW-GC; N6 light gray; fine-grained; medium plasticity; loose; dry; no odor; none cementation; well graded; 45% (5-15mm), subangular to subrounded gravel, 35% fine to coarse-grained sand, 20% clay		- soil			2.0		
215		SC	CLAYEY SAND; SC; 5YR 4/4 brown; fine to medium-grained; medium plasticity; dense; dry; no odor; none cementation; subrounded; poorly graded; 60% sand, 40% clay		1438 - soil			0.5	215	← 4 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal
220		SM	SILTY SAND; SM; 5YR 6/4 light brown; fine to coarse-grained; non plastic; loose; dry; no odor; none cementation; subangular; well graded; 70% sand, 30% silt, trace of fine (5-7mm), subangular gravel and clay		1450 - soil			1.3	220	
225		GP-GC	GRAVEL WITH SAND AND CLAY; GP-GC; N7 - 5YR 4/4 light gray to brown; fine-grained; medium plasticity; loose; dry; no odor; none cementation; poorly graded; 55% (5-10mm), subangular to angular gravel, 30% fine to coarse-grained sand, 15% clay		1455 - soil			1.2	225	
230			Low plasticity; 45% (5-15mm), subangular to subrounded gravel, 40% fine to coarse-grained sand, 15% clay		1457 - soil			1.5	230	
235		SW	SAND; SW; 5YR 6/4 light brown; fine to coarse-grained; loose; dry; no odor; none cementation; subangular; well graded; trace of fine (5-10mm), subrounded gravel and clay		1506 - soil			0.8	235	← 1 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal
240			Trace of silt		1511 - soil			0.9	240	
					1522					← 1 inch and 4 inch schedule 80 PVC, Blank Casing with

PROJECT: **Broadway South Landfill**
 LOCATION: **Broadway Boulevard and Prudence Road**
 PROJECT NUMBER: **18OT.20401.06**

WELL / PROBEHOLE / BOREHOLE NO:

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DRILLING: STARTED **5/2/06** COMPLETED: **5/11/06**
 INSTALLATION: STARTED **5/2/06** COMPLETED: **5/11/06**
 DRILLING COMPANY: **Layne Christensen Company**
 DRILLING EQUIPMENT: **Becker Hammer**
 DRILLING METHOD: **Percussion-Hammer**
 SAMPLING EQUIPMENT: **Cyclone**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **403.70 5/5/06** BOREHOLE DEPTH (ft): **458.0**
 STATIC DTW (ft): WELL DEPTH (ft): **458.0**
 WELL CASING DIAMETER (in): **1.4** BOREHOLE DIAMETER (in): **10 3/4**
 LOGGED BY: **K. Harker** CHECKED BY: **C. Pollock**

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction		
		SC	CLAYEY SAND WITH GRAVEL ; SC; 5YR 4/4 brown; fine to coarse-grained; low plasticity; loose; dry; no odor; none cementation; subangular; well graded; 45% sand, 30% fine (5-15mm), subangular gravel, 25% clay		- soil			0.7		filter sand 8-12		
250			75% sand, 15% clay, 10% fine (5-15mm), subangular gravel		1535 - soil			1.4	250	1 inch schedule 80 PVC, 0.02 inch slotted casing, filter sand 8-12 1 inch PVC end plug, filter sand 8-12		
255			CLAYEY SAND ; medium plasticity; medium dense to loose; 70% sand, 30% clay, trace of fine (5 mm), subangular gravel		1548 - soil			2.3	255			
260			WITH GRAVEL ; low plasticity; 55% sand, 25% fine (5-10mm), subangular gravel, 20% clay		1601 - soil			0.9	260	4 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal		
265				SM	SILTY SAND WITH GRAVEL ; SM; 5YR 6/4 light brown; fine to coarse-grained; non plastic; loose; dry; no odor; none cementation; subangular; well graded; 65% sand, 20% silt, 15% fine (5-10mm), subangular gravel		- soil			5.1	265	
270					Fine (5-15mm), subrounded gravel		1628 - soil			5.2	270	
275	65% sand, 20% fine (5-15mm), subrounded gravel, 15% silt				1640 - soil			5.7	275	1 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal		
					1700							

PROJECT: **Broadway South Landfill**
 LOCATION: **Broadway Boulevard and Prudence Road**
 PROJECT NUMBER: **18OT.20401.06**

WELL / PROBEHOLE / BOREHOLE NO:
BP-22 PAGE 9 OF 14



DRILLING: STARTED **5/2/06** COMPLETED: **5/11/06**
 INSTALLATION: STARTED **5/2/06** COMPLETED: **5/11/06**
 DRILLING COMPANY: **Layne Christensen Company**
 DRILLING EQUIPMENT: **Becker Hammer**
 DRILLING METHOD: **Percussion-Hammer**
 SAMPLING EQUIPMENT: **Cyclone**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **403.70 5/5/06** BOREHOLE DEPTH (ft): **458.0**
 STATIC DTW (ft): WELL DEPTH (ft): **458.0**
 WELL CASING DIAMETER (in): **1.4** BOREHOLE DIAMETER (in): **10 3/4**
 LOGGED BY: **K. Harker** CHECKED BY: **C. Pollock**

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
		SW	SAND ; SW; 5YR 6/4 light brown; fine to coarse-grained; loose; dry; no odor; none cementation; subrounded; well graded; trace of fine (5 mm), subrounded gravel and silt		- soil			7.9		
285		SC	CLAYEY SAND WITH GRAVEL ; SC; 5YR 4/4 brown; fine to coarse-grained; medium plasticity; loose; dry; no odor; none cementation; subangular; well graded; 50% sand, 35% clay, 15% fine (5-10mm), subrounded gravel		1715 - soil			5.5	285	4 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal
290			5YR 6/4 light brown; fine to medium-grained; low plasticity; 70% sand, 15% clay, 15% fine (5-10mm), subrounded gravel		1727 - soil			6.3	290	1 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal
295			5YR 4/4 brown; fine to coarse-grained; 50% sand, 35% clay, 15% fine (5-10mm), subangular gravel		1735 - soil			6.9	295	1 inch and 4 inch schedule 80 PVC, Blank Casing with filter sand 8-12
300		GP-GM	GRAVEL WITH SAND AND SILT ; GP-GM; 5YR 6/4 light brown; fine-grained; non plastic; loose; dry; no odor; none cementation; subangular; poorly graded; 70% gravel, 20% fine to coarse-grained sand, 10% silt		1751 - soil			5.4	300	1 inch schedule 80 PVC, 0.02 inch slotted casing, filter sand 8-12 1 inch PVC end plug, filter sand 8-12
305		SC	CLAYEY SAND WITH GRAVEL ; SC; 5YR 4/4 brown; fine to coarse-grained; medium plasticity; dense; dry; no odor; none cementation; subangular; well graded; 55% sand, 30% clay, 15% fine to coarse (5-20mm), subangular gravel		1030 - soil			6.2	305	
310			Low plasticity; 50% sand, 30% clay, 20% fine (5-10mm), subangular gravel		1042 - soil			5.2	310	
					1105					

PROJECT: Broadway South Landfill	WELL / PROBEHOLE / BOREHOLE NO:	 SECOR
LOCATION: Broadway Boulevard and Prudence Road	BP-22 PAGE 10 OF 14	
PROJECT NUMBER: 18OT.20401.06		
DRILLING: STARTED 5/2/06 COMPLETED: 5/11/06	NORTHING (ft):	EASTING (ft):
INSTALLATION: STARTED 5/2/06 COMPLETED: 5/11/06	LATITUDE:	LONGITUDE:
DRILLING COMPANY: Layne Christensen Company	GROUND ELEV (ft):	TOC ELEV (ft):
DRILLING EQUIPMENT: Becker Hammer	INITIAL DTW (ft): 403.70 5/5/06	BOREHOLE DEPTH (ft): 458.0
DRILLING METHOD: Percussion-Hammer	STATIC DTW (ft):	WELL DEPTH (ft): 458.0
SAMPLING EQUIPMENT: Cyclone	WELL CASING DIAMETER (in): 1.4	BOREHOLE DIAMETER (in): 10 3/4
	LOGGED BY: K. Harker	CHECKED BY: C. Pollock

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
		SC	Medium plasticity; subrounded; 45% sand, 40% clay, 15% fine (5-10mm), subangular gravel	-	- soil			5.8		
320			Low plasticity; subangular; 50% sand, 30% clay, 20% fine to coarse (5-20mm), subangular gravel	-	1121 - soil			4.5	320	
325		SM	SILTY SAND ; SM; 5YR 6/4 light brown; fine to coarse-grained; non plastic; loose; dry; no odor; none cementation; subrounded; well graded; 75% sand, 25% silt, trace of fine (5 mm), subrounded gravel and clay	-	1131 - soil			7.0	325	
330		SC	CLAYEY SAND WITH GRAVEL ; SC; 5YR 4/4 brown; fine to coarse-grained; medium plasticity; dense; dry; no odor; none cementation; subangular; well graded; 60% sand, 25% clay, 15% fine (5-10mm), subangular sand	-	1219 - soil			5.3	330	
335			CLAYEY SAND ; subrounded; 60% sand, 40% clay, trace of fine (5-10mm), subangular gravel	-	1224 - soil			4.4	335	
340		SW	SAND WITH GRAVEL ; SW; 5YR 6/4 light brown; fine to coarse-grained; loose; dry; no odor; none cementation; subangular; well graded; 70% sand, 30% fine (5-7mm), subangular gravel, trace of clay	-	1251 - soil			4.3	340	
345		SC	CLAYEY SAND WITH GRAVEL ; SC; 5YR 4/4 brown; fine to coarse-grained; low plasticity; loose; dry; no odor; none cementation; subangular; well graded; 55% sand, 35% clay, 10% fine (5-10mm), subangular sand	-	1308 - soil			4.4	345	
				-	1325					

← 4 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR INTL.GDT 10/23/06

PROJECT: **Broadway South Landfill**
 LOCATION: **Broadway Boulevard and Prudence Road**
 PROJECT NUMBER: **18OT.20401.06**

WELL / PROBEHOLE / BOREHOLE NO:

BP-22 PAGE 11 OF 14



DRILLING: STARTED **5/2/06** COMPLETED: **5/11/06**
 INSTALLATION: STARTED **5/2/06** COMPLETED: **5/11/06**
 DRILLING COMPANY: **Layne Christensen Company**
 DRILLING EQUIPMENT: **Becker Hammer**
 DRILLING METHOD: **Percussion-Hammer**
 SAMPLING EQUIPMENT: **Cyclone**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **403.70 5/5/06** BOREHOLE DEPTH (ft): **458.0**
 STATIC DTW (ft): WELL DEPTH (ft): **458.0**
 WELL CASING DIAMETER (in): **1.4** BOREHOLE DIAMETER (in): **10 3/4**
 LOGGED BY: **K. Harker** CHECKED BY: **C. Pollock**

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
		SW	SAND WITH GRAVEL; SW; 5YR 7/2 grayish orange pink; fine to coarse-grained; loose; dry; no odor; none cementation; subrounded; well graded; 80% sand, 20% fine (5-10mm), subrounded gravel, trace of clay		- soil			3.1		<p>4 inch schedule 80 PVC, Blank Casing with filter sand 8-12</p> <p>4 inch schedule 80 PVC, 0.02 inch slotted casing, filter sand 8-12</p>
355		SM	SILTY SAND WITH GRAVEL; SM; 5YR 6/4 light brown; fine to coarse-grained; non plastic; loose; dry; no odor; none cementation; subangular; well graded; 60% sand, 30% silt, 10% fine (5-15mm), subrounded gravel, trace of clay		1405 - soil			2.6	355	
360		SC	CLAYEY SAND WITH GRAVEL; SC; 5YR 4/4 brown; fine to coarse-grained; medium plasticity; loose; dry; no odor; none cementation; subangular; well graded; 40% sand, 35% clay, 25% fine to coarse (5-20mm), subangular to subrounded gravel		1431 - soil			4.6	360	
365			Subrounded; 55% sand, 25% fine to coarse (5-20mm), subangular gravel, 20% clay		1442 - soil			4.2	365	
370		SW	SAND WITH GRAVEL; SW; 5YR 7/2 grayish orange pink; fine to coarse-grained; loose; dry; no odor; none cementation; subangular; well graded; 75% sand, 25% fine to coarse (5-20mm), subangular to angular gravel, trace of clay		1451 - soil			3.3	370	
375		SC	CLAYEY SAND WITH GRAVEL; SC; 5YR 6/4 - 4/4 light brown to brown; fine to coarse-grained; medium plasticity; medium dense to loose; moist; no odor; none cementation; subangular; well graded; 45% sand, 30% fine to coarse (5-20mm), subangular gravel, 25% clay		1457 - soil			2.3	375	
380			5YR 4/4 brown; saturated; 60% sand, 25% clay, 15% fine to coarse (5-20mm), subangular gravel		1530 - soil			2.5	380	
					1610					

PROJECT: **Broadway South Landfill**
 LOCATION: **Broadway Boulevard and Prudence Road**
 PROJECT NUMBER: **18OT.20401.06**

WELL / PROBEHOLE / BOREHOLE NO:

BP-22 PAGE 12 OF 14



DRILLING: STARTED **5/2/06** COMPLETED: **5/11/06**
 INSTALLATION: STARTED **5/2/06** COMPLETED: **5/11/06**
 DRILLING COMPANY: **Layne Christensen Company**
 DRILLING EQUIPMENT: **Becker Hammer**
 DRILLING METHOD: **Percussion-Hammer**
 SAMPLING EQUIPMENT: **Cyclone**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **403.70 5/5/06** BOREHOLE DEPTH (ft): **458.0**
 STATIC DTW (ft): WELL DEPTH (ft): **458.0**
 WELL CASING DIAMETER (in): **1.4** BOREHOLE DIAMETER (in): **10 3/4**
 LOGGED BY: **K. Harker** CHECKED BY: **C. Pollock**

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
		SC	50% sand, 25% clay, 25% fine to coarse (5-20mm), subangular gravel		- soil			2.5		
390		GW-GC	GRAVEL WITH SAND AND CLAY; GW-GC; 5YR 4/4 brown; fine to coarse-grained; low plasticity; dense; saturated; no odor; none cementation; subangular; well graded; 40% gravel, 30% fine to coarse-grained sand, 30% clay		1616 - soil			2.5	390	
395		SC	CLAYEY SAND WITH GRAVEL; SC; 5YR 4/4 brown; fine to coarse-grained; medium plasticity; medium dense; wet; no odor; none cementation; subangular; well graded; 50% sand, 25% clay, 25% fine (5-10mm), subangular gravel		1655 - soil			1.9	395	
400			Saturated; 60% sand, 20% clay, 20% fine (5-10mm), subangular gravel		1754 - soil			8.7	400	
405			45% sand, 35% fine (5-10mm), subangular gravel, 20% clay		1815 - soil			6.8	405	
410			50% sand, 30% fine to coarse (5-25mm), subangular to subrounded gravel, 20% clay		1830 - soil			6.1	410	
415		SW	SAND WITH GRAVEL; SW; 5YR 6/4 light brown; fine to coarse-grained; loose; saturated; no odor; none cementation; subangular; well graded; 65% sand, 35% fine to coarse (5-25mm), subangular gravel, trace of clay		0936 - soil			6.4	415	
					0942					

← 4 inch schedule 80 PVC, 0.02 inch slotted casing, filter sand 8-12

PROJECT: Broadway South Landfill	WELL / PROBEHOLE / BOREHOLE NO: BP-22	 SECOR
LOCATION: Broadway Boulevard and Prudence Road	PAGE 13 OF 14	
PROJECT NUMBER: 18OT.20401.06		
DRILLING: STARTED 5/2/06 COMPLETED: 5/11/06	NORTHING (ft):	EASTING (ft):
INSTALLATION: STARTED 5/2/06 COMPLETED: 5/11/06	LATITUDE:	LONGITUDE:
DRILLING COMPANY: Layne Christensen Company	GROUND ELEV (ft):	TOC ELEV (ft):
DRILLING EQUIPMENT: Becker Hammer	INITIAL DTW (ft): 403.70 5/5/06	BOREHOLE DEPTH (ft): 458.0
DRILLING METHOD: Percussion-Hammer	STATIC DTW (ft):	WELL DEPTH (ft): 458.0
SAMPLING EQUIPMENT: Cyclone	WELL CASING DIAMETER (in): 1.4	BOREHOLE DIAMETER (in): 10 3/4
	LOGGED BY: K. Harker	CHECKED BY: C. Pollock

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
		SC	CLAYEY SAND WITH GRAVEL; SC; 5YR 4/4 brown; fine to coarse-grained; low plasticity; medium dense; saturated; no odor; none cementation; subangular; well graded; 60% sand, 20% clay, 20% fine to cobbles (5-110mm), subangular gravel		- soil			7.2		
425			70% sand, 15% clay, 15% fine to coarse (5-30mm), subangular gravel		1000 - soil			6.4	425	
430		SW-SC	SAND WITH GRAVEL AND CLAY; SW-SC; 5YR 4/4 brown; fine to coarse-grained; low plasticity; loose; wet; no odor; none cementation; subangular; well graded; 60% sand, 30% fine (5-15mm), subangular gravel, 10% clay		1048 - soil			6.0	430	4 inch schedule 80 PVC, 0.02 inch slotted casing, filter sand 8-12
435					1059 - soil			5.9	435	
440		SW	SAND WITH GRAVEL; SW; 5YR 6/4 light brown; fine to coarse-grained; loose; wet; no odor; none cementation; subangular; well graded; 60% sand, 40% fine to coarse (5-40mm), subangular gravel, trace of silt		1117 - soil			6.8	440	
445			Fine to cobbles (5-110mm), subangular gravel		1124 - soil			5.8	445	4 inch schedule 80 PVC, Blank Casing with filter sand 8-12
450					1136 - soil			5.8	450	4 inch PVC end plug, filter sand 8-12
					1248					

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

PROJECT: Broadway South Landfill	WELL / PROBEHOLE / BOREHOLE NO:	 SECOR
LOCATION: Broadway Boulevard and Prudence Road	BP-22 PAGE 14 OF 14	
PROJECT NUMBER: 18OT.20401.06		
DRILLING: STARTED 5/2/06 COMPLETED: 5/11/06	NORTHING (ft):	EASTING (ft):
INSTALLATION: STARTED 5/2/06 COMPLETED: 5/11/06	LATITUDE:	LONGITUDE:
DRILLING COMPANY: Layne Christensen Company	GROUND ELEV (ft):	TOC ELEV (ft):
DRILLING EQUIPMENT: Becker Hammer	INITIAL DTW (ft): 403.70 5/5/06	BOREHOLE DEPTH (ft): 458.0
DRILLING METHOD: Percussion-Hammer	STATIC DTW (ft):	WELL DEPTH (ft): 458.0
SAMPLING EQUIPMENT: Cyclone	WELL CASING DIAMETER (in): 1.4	BOREHOLE DIAMETER (in): 10 3/4
	LOGGED BY: K. Harker	CHECKED BY: C. Pollock

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
	•••••	SW	SAND ; 5YR 4/4 brown; saturated; subrounded; trace of fine (5 mm), subangular gravel and clay		- soil			5.2		•••••
			Hole terminated at 458 feet.							
460									460	
465									465	
470									470	
475									475	
480									480	
485									485	

PROJECT: Broadway South Landfill	WELL / PROBEHOLE / BOREHOLE NO:	BP-23 PAGE 1 OF 14	 SECOR
LOCATION: Broadway Boulevard and Prudence Road			
PROJECT NUMBER: 18OT.20401.06			
DRILLING: STARTED 4/25/06 COMPLETED: 5/2/06	NORTHING (ft):	EASTING (ft):	
INSTALLATION: STARTED 4/25/06 COMPLETED: 5/2/06	LATITUDE:	LONGITUDE:	
DRILLING COMPANY: Layne Christensen Company	GROUND ELEV (ft):	TOC ELEV (ft):	
DRILLING EQUIPMENT: Becker Hammer	INITIAL DTW (ft): 358.00 4/27/06	BOREHOLE DEPTH (ft): 455.0	
DRILLING METHOD: Percussion-Hammer	STATIC DTW (ft):	WELL DEPTH (ft): 455.0	
SAMPLING EQUIPMENT: Cyclone	WELL CASING DIAMETER (in): 1.4	BOREHOLE DIAMETER (in): 10 3/4	
	LOGGED BY: D. Fischer	CHECKED BY: C. Pollock	

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
			Fill Material consists of well graded sand with gravel, Boring post hole dug to approx. 3 feet bgs							Above ground dog house vault with 1 inch and 4 inch PVC caps
5		SW	SAND WITH GRAVEL ; SW; loose; dry; well graded; trace of cobbles and fines		- soil			3.1	5	
10		SP	SAND ; SP; fine-grained; poorly graded; debris waste		- soil			6.7	10	4 inch schedule 80 PVC, Blank Casing with cement grout
15					- soil			19.4	15	
20					- soil			16.7	20	
25		SW	SAND WITH GRAVEL ; SW; light brown; fine to coarse-grained; loose; dry; subrounded; well graded; 30% medium-grained sand		- soil			9.4	25	1 inch schedule 80 PVC, Blank Casing with cement grout
30					- soil			3.5	30	

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

PROJECT: Broadway South Landfill	WELL / PROBEHOLE / BOREHOLE NO:	BP-23 PAGE 2 OF 14	 SECOR
LOCATION: Broadway Boulevard and Prudence Road			
PROJECT NUMBER: 18OT.20401.06			
DRILLING: STARTED 4/25/06 COMPLETED: 5/2/06	NORTHING (ft):	EASTING (ft):	
INSTALLATION: STARTED 4/25/06 COMPLETED: 5/2/06	LATITUDE:	LONGITUDE:	
DRILLING COMPANY: Layne Christensen Company	GROUND ELEV (ft):	TOC ELEV (ft):	
DRILLING EQUIPMENT: Becker Hammer	INITIAL DTW (ft): 358.00 4/27/06	BOREHOLE DEPTH (ft): 455.0	
DRILLING METHOD: Percussion-Hammer	STATIC DTW (ft):	WELL DEPTH (ft): 455.0	
SAMPLING EQUIPMENT: Cyclone	WELL CASING DIAMETER (in): 1.4	BOREHOLE DIAMETER (in): 10 3/4	
	LOGGED BY: D. Fischer	CHECKED BY: C. Pollock	

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
		SW	Some fines		- soil			7.9		<div style="position: absolute; top: 30%; left: 50%; transform: translate(-50%, -50%);">4 inch schedule 80 PVC, Blank Casing with cement grout</div> <div style="position: absolute; top: 70%; left: 50%; transform: translate(-50%, -50%);">1 inch schedule 80 PVC, Blank Casing with cement grout</div>
40					- soil			6.7	40	
45		SW	SAND ; SW; tan; fine to coarse-grained; 30% fine-grained sand, trace of fine gravel		- soil			4.7	45	
50					- soil			3.5	50	
55					- soil			4.5	55	
60					- soil			6.7	60	
65					- soil			9.3	65	

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

PROJECT: **Broadway South Landfill**
 LOCATION: **Broadway Boulevard and Prudence Road**
 PROJECT NUMBER: **18OT.20401.06**

WELL / PROBEHOLE / BOREHOLE NO:

BP-23 PAGE 3 OF 14



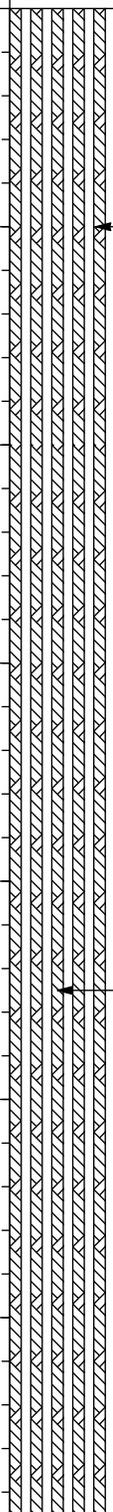
DRILLING: STARTED **4/25/06** COMPLETED: **5/2/06**
 INSTALLATION: STARTED **4/25/06** COMPLETED: **5/2/06**
 DRILLING COMPANY: **Layne Christensen Company**
 DRILLING EQUIPMENT: **Becker Hammer**
 DRILLING METHOD: **Percussion-Hammer**
 SAMPLING EQUIPMENT: **Cyclone**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **358.00 4/27/06** BOREHOLE DEPTH (ft): **455.0**
 STATIC DTW (ft): WELL DEPTH (ft): **455.0**
 WELL CASING DIAMETER (in): **1.4** BOREHOLE DIAMETER (in): **10 3/4**
 LOGGED BY: **D. Fischer** CHECKED BY: **C. Pollock**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
75		SP	SAND; SP; light brown; fine to coarse-grained; dry; poorly graded; 50% medium-grained sand, trace of fine gravel and fines		- soil			7.0		
75					- soil			7.6	75	4 inch schedule 80 PVC, Blank Casing with cement grout
80					- soil			4.0	80	
85			Tan; 40% fine-grained sand, trace of fines		- soil			4.3	85	
90		SW	SAND; SW; light brown; fine to coarse-grained; dry; well graded; 30% fine-grained sand with fines, trace of fine gravel		- soil			6.0	90	
95					- soil			6.9	95	1 inch schedule 80 PVC, Blank Casing with cement grout
100					- soil			7.0	100	

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

PROJECT: Broadway South Landfill	WELL / PROBEHOLE / BOREHOLE NO:	BP-23 PAGE 4 OF 14	 SECOR
LOCATION: Broadway Boulevard and Prudence Road			
PROJECT NUMBER: 18OT.20401.06			
DRILLING: STARTED 4/25/06 COMPLETED: 5/2/06	NORTHING (ft):	EASTING (ft):	
INSTALLATION: STARTED 4/25/06 COMPLETED: 5/2/06	LATITUDE:	LONGITUDE:	
DRILLING COMPANY: Layne Christensen Company	GROUND ELEV (ft):	TOC ELEV (ft):	
DRILLING EQUIPMENT: Becker Hammer	INITIAL DTW (ft): 358.00 4/27/06	BOREHOLE DEPTH (ft): 455.0	
DRILLING METHOD: Percussion-Hammer	STATIC DTW (ft):	WELL DEPTH (ft): 455.0	
SAMPLING EQUIPMENT: Cyclone	WELL CASING DIAMETER (in): 1.4	BOREHOLE DIAMETER (in): 10 3/4	
	LOGGED BY: D. Fischer	CHECKED BY: C. Pollock	

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction		
	[Dotted Pattern]	SW	SAND ; light brown; fine to coarse-grained; loose; dry; well graded; 30% fine-grained sand with fines, trace of fine gravel	-	-			6.4				
110				-	-	-	-		17.4		110	4 inch schedule 80 PVC, Blank Casing with cement grout
115				-	-	-	-		6.8		115	
120				-	-	-	-		8.0		120	
125				SW	SAND WITH GRAVEL ; SW; fine to coarse-grained; loose; dry; trace of fines	-	-				5.4	125
130	-	-	-			-		6.2	130	1 inch schedule 80 PVC, Blank Casing with cement grout		
135	-	-	-			-		5.1	135			

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

PROJECT: **Broadway South Landfill**
 LOCATION: **Broadway Boulevard and Prudence Road**
 PROJECT NUMBER: **18OT.20401.06**

WELL / PROBEHOLE / BOREHOLE NO:

BP-23 PAGE 5 OF 14



SECOR

DRILLING: STARTED **4/25/06** COMPLETED: **5/2/06**
 INSTALLATION: STARTED **4/25/06** COMPLETED: **5/2/06**
 DRILLING COMPANY: **Layne Christensen Company**
 DRILLING EQUIPMENT: **Becker Hammer**
 DRILLING METHOD: **Percussion-Hammer**
 SAMPLING EQUIPMENT: **Cyclone**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **358.00 4/27/06** BOREHOLE DEPTH (ft): **455.0**
 STATIC DTW (ft): WELL DEPTH (ft): **455.0**
 WELL CASING DIAMETER (in): **1.4** BOREHOLE DIAMETER (in): **10 3/4**
 LOGGED BY: **D. Fischer** CHECKED BY: **C. Pollock**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
		SW	SAND ; fine to coarse-grained; loose; dry; 30% fine-grained sand with fines, trace of fine gravel		-			8.2		
145					-			7.1	145	4 inch schedule 80 PVC, Blank Casing with cement grout
150					-			6.5	150	1 inch schedule 80 PVC, Blank Casing with cement grout
155					-			6.7	155	
160					-			7.6	160	4 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal
165					-			4.9	165	
170		SP	SAND ; SP; tan; fine-grained; loose; dry; poorly graded		-		9.2	170	1 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal	

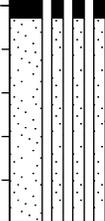
GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

PROJECT: Broadway South Landfill	WELL / PROBEHOLE / BOREHOLE NO: BP-23	 SECOR
LOCATION: Broadway Boulevard and Prudence Road	PAGE 6 OF 14	
PROJECT NUMBER: 18OT.20401.06		
DRILLING: STARTED 4/25/06 COMPLETED: 5/2/06	NORTHING (ft):	EASTING (ft):
INSTALLATION: STARTED 4/25/06 COMPLETED: 5/2/06	LATITUDE:	LONGITUDE:
DRILLING COMPANY: Layne Christensen Company	GROUND ELEV (ft):	TOC ELEV (ft):
DRILLING EQUIPMENT: Becker Hammer	INITIAL DTW (ft): 358.00 4/27/06	BOREHOLE DEPTH (ft): 455.0
DRILLING METHOD: Percussion-Hammer	STATIC DTW (ft):	WELL DEPTH (ft): 455.0
SAMPLING EQUIPMENT: Cyclone	WELL CASING DIAMETER (in): 1.4	BOREHOLE DIAMETER (in): 10 3/4
	LOGGED BY: D. Fischer	CHECKED BY: C. Pollock

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
		SP	SAND ; tan; fine-grained; loose; dry; poorly graded		- soil			5.2		
180		SW	SAND ; SW; light brown; fine to coarse-grained; loose; dry; well graded; 30% medium-grained sand		- soil			6.1	180	4 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal
185					- soil			4.4	185	1 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal
190					- soil			6.7	190	
195					- soil			5.6	195	1 inch and 4 inch schedule 80 PVC, Blank Casing with filter sand 8-12
200					- soil			4.6	200	1 inch schedule 80 PVC, 0.02 inch slotted casing, filter sand 8-12 1 inch PVC end plug, filter sand 8-12
205		GW	GRAVEL WITH SAND ; GW; loose; dry; well graded; 40% coarse (1/2" to 2" diameter), subangular to angular gravel, fine sand to coarse gravel		- soil			3.7	205	

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR INTL.GDT 10/23/06

PROJECT: Broadway South Landfill	WELL / PROBEHOLE / BOREHOLE NO:	 SECOR
LOCATION: Broadway Boulevard and Prudence Road	BP-23 PAGE 7 OF 14	
PROJECT NUMBER: 18OT.20401.06		
DRILLING: STARTED 4/25/06 COMPLETED: 5/2/06	NORTHING (ft):	EASTING (ft):
INSTALLATION: STARTED 4/25/06 COMPLETED: 5/2/06	LATITUDE:	LONGITUDE:
DRILLING COMPANY: Layne Christensen Company	GROUND ELEV (ft):	TOC ELEV (ft):
DRILLING EQUIPMENT: Becker Hammer	INITIAL DTW (ft): 358.00 4/27/06	BOREHOLE DEPTH (ft): 455.0
DRILLING METHOD: Percussion-Hammer	STATIC DTW (ft):	WELL DEPTH (ft): 455.0
SAMPLING EQUIPMENT: Cyclone	WELL CASING DIAMETER (in): 1.4	BOREHOLE DIAMETER (in): 10 3/4
	LOGGED BY: D. Fischer	CHECKED BY: C. Pollock

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
		SW	SAND ; SW; light brown; loose; dry; subangular; well graded; 25% medium-grained sand with fines, trace of fine to coarse (to 2' diameter) gravel		- soil			7.3		 <p>4 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal</p>
215					- soil			6.4	215	
220					- soil			6.1	220	
225		SP	SAND ; SP; light brown; medium-grained; loose; dry; subangular; poorly graded		- soil			5.1	225	
230					- soil			6.6	230	
235			Tan; fine to coarse-grained; 50% medium-grained sand, trace of fines		- soil			9.8	235	 <p>1 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal</p>
240					- soil			7.9	240	 <p>1 inch and 4 inch schedule 80 PVC, Blank Casing with</p>

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

PROJECT: Broadway South Landfill	WELL / PROBEHOLE / BOREHOLE NO: BP-23	 SECOR
LOCATION: Broadway Boulevard and Prudence Road	PAGE 8 OF 14	
PROJECT NUMBER: 18OT.20401.06		
DRILLING: STARTED 4/25/06 COMPLETED: 5/2/06	NORTHING (ft):	EASTING (ft):
INSTALLATION: STARTED 4/25/06 COMPLETED: 5/2/06	LATITUDE:	LONGITUDE:
DRILLING COMPANY: Layne Christensen Company	GROUND ELEV (ft):	TOC ELEV (ft):
DRILLING EQUIPMENT: Becker Hammer	INITIAL DTW (ft): 358.00 4/27/06	BOREHOLE DEPTH (ft): 455.0
DRILLING METHOD: Percussion-Hammer	STATIC DTW (ft):	WELL DEPTH (ft): 455.0
SAMPLING EQUIPMENT: Cyclone	WELL CASING DIAMETER (in): 1.4	BOREHOLE DIAMETER (in): 10 3/4
	LOGGED BY: D. Fischer	CHECKED BY: C. Pollock

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
		SP	SAND ; SP; tan; fine to coarse-grained; loose; dry; subangular; poorly graded; 50% medium-grained sand, trace of fines and subrounded gravel		-	-		6.0		filter sand 8-12
250								8.5	250	1 inch schedule 80 PVC, 0.02 inch slotted casing, filter sand 8-12 1 inch PVC end plug, filter sand 8-12
255								12.4	255	
260								7.5	260	4 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal
265								8.3	265	
270								7.7	270	
275								7.0	275	1 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

PROJECT: Broadway South Landfill	WELL / PROBEHOLE / BOREHOLE NO: BP-23	 SECOR
LOCATION: Broadway Boulevard and Prudence Road	PAGE 9 OF 14	
PROJECT NUMBER: 18OT.20401.06		
DRILLING: STARTED 4/25/06 COMPLETED: 5/2/06	NORTHING (ft):	EASTING (ft):
INSTALLATION: STARTED 4/25/06 COMPLETED: 5/2/06	LATITUDE:	LONGITUDE:
DRILLING COMPANY: Layne Christensen Company	GROUND ELEV (ft):	TOC ELEV (ft):
DRILLING EQUIPMENT: Becker Hammer	INITIAL DTW (ft): 358.00 4/27/06	BOREHOLE DEPTH (ft): 455.0
DRILLING METHOD: Percussion-Hammer	STATIC DTW (ft):	WELL DEPTH (ft): 455.0
SAMPLING EQUIPMENT: Cyclone	WELL CASING DIAMETER (in): 1.4	BOREHOLE DIAMETER (in): 10 3/4
	LOGGED BY: D. Fischer	CHECKED BY: C. Pollock

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction		
	[Graphic Log]	SP	SAND ; SP; tan; fine to coarse-grained; loose; dry; subangular; poorly graded; 50% medium-grained sand, trace of fines	[Sample]	-			7.9		<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">← 4 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal</div> <div style="margin-bottom: 10px;">← 1 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal</div> <div style="margin-bottom: 10px;">← 1 inch and 4 inch schedule 80 PVC, Blank Casing with filter sand 8-12</div> <div style="margin-bottom: 10px;">← 1 inch schedule 80 PVC, 0.02 inch slotted casing, filter sand 8-12</div> <div style="margin-bottom: 10px;">← 1 inch PVC end plug, filter sand 8-12</div> </div>		
285				-	-	-	-	-	-		13.6	285
290				-	-	-	-	-	-		6.8	290
295				-	-	-	-	-	-		9.2	295
300				-	-	-	-	-	-		8.1	300
305				-	-	-	-	-	-		7.1	305
310				-	-	-	-	-	-		5.1	310

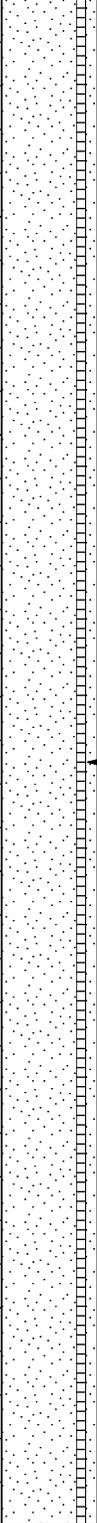
GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

PROJECT: Broadway South Landfill	WELL / PROBEHOLE / BOREHOLE NO:	 SECOR
LOCATION: Broadway Boulevard and Prudence Road	BP-23 PAGE 10 OF 14	
PROJECT NUMBER: 18OT.20401.06		
DRILLING: STARTED 4/25/06 COMPLETED: 5/2/06	NORTHING (ft):	EASTING (ft):
INSTALLATION: STARTED 4/25/06 COMPLETED: 5/2/06	LATITUDE:	LONGITUDE:
DRILLING COMPANY: Layne Christensen Company	GROUND ELEV (ft):	TOC ELEV (ft):
DRILLING EQUIPMENT: Becker Hammer	INITIAL DTW (ft): 358.00 4/27/06	BOREHOLE DEPTH (ft): 455.0
DRILLING METHOD: Percussion-Hammer	STATIC DTW (ft):	WELL DEPTH (ft): 455.0
SAMPLING EQUIPMENT: Cyclone	WELL CASING DIAMETER (in): 1.4	BOREHOLE DIAMETER (in): 10 3/4
	LOGGED BY: D. Fischer	CHECKED BY: C. Pollock

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction			
		SP	SAND ; SP; tan; fine to coarse-grained; loose; dry; subangular; poorly graded; 50% medium-grained sand, trace of fines		-			6.2					
320					-					7.8		320	
325					-					12.0		325	← 4 inch schedule 80 PVC, Blank Casing with bentonite 3/8" chip and 1/4" pellet seal
330					-					5.3		330	
335						Tan; medium-grained; dry	-			8.1		335	
340										8.0		340	
345			Fine to coarse-grained; dry; 50% medium-grained sand, trace of fines and fine gravel	-			8.9	345	← 4 inch schedule 80 PVC, Blank Casing with filter sand				

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

PROJECT: Broadway South Landfill	WELL / PROBEHOLE / BOREHOLE NO:	BP-23 PAGE 11 OF 14	 SECOR
LOCATION: Broadway Boulevard and Prudence Road			
PROJECT NUMBER: 18OT.20401.06			
DRILLING: STARTED 4/25/06 COMPLETED: 5/2/06	NORTHING (ft):	EASTING (ft):	
INSTALLATION: STARTED 4/25/06 COMPLETED: 5/2/06	LATITUDE:	LONGITUDE:	
DRILLING COMPANY: Layne Christensen Company	GROUND ELEV (ft):	TOC ELEV (ft):	
DRILLING EQUIPMENT: Becker Hammer	INITIAL DTW (ft): 358.00 4/27/06	BOREHOLE DEPTH (ft): 455.0	
DRILLING METHOD: Percussion-Hammer	STATIC DTW (ft):	WELL DEPTH (ft): 455.0	
SAMPLING EQUIPMENT: Cyclone	WELL CASING DIAMETER (in): 1.4	BOREHOLE DIAMETER (in): 10 3/4	
	LOGGED BY: D. Fischer	CHECKED BY: C. Pollock	

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction				
		SP	SAND ; SP; tan; fine to coarse-grained; loose; dry; subangular; poorly graded; 50% medium-grained sand, trace of fines and fine gravel		-			11.1			8-12			
355								-				9.8	355	
360							Moist; 40% coarse-grained sand, trace of fines and fine gravel		-				10.7	360
365									-				5.2	365
370									-				2.4	370
375									-				3.1	375
380									-				3.5	380
					-					4 inch schedule 80 PVC, 0.02 inch slotted casing, filter sand 8-12				

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

PROJECT: **Broadway South Landfill**
 LOCATION: **Broadway Boulevard and Prudence Road**
 PROJECT NUMBER: **18OT.20401.06**

WELL / PROBEHOLE / BOREHOLE NO:

BP-23 PAGE 12 OF 14



DRILLING: STARTED 4/25/06 COMPLETED: 5/2/06
 INSTALLATION: STARTED 4/25/06 COMPLETED: 5/2/06
 DRILLING COMPANY: **Layne Christensen Company**
 DRILLING EQUIPMENT: **Becker Hammer**
 DRILLING METHOD: **Percussion-Hammer**
 SAMPLING EQUIPMENT: **Cyclone**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **358.00 4/27/06** BOREHOLE DEPTH (ft): **455.0**
 STATIC DTW (ft): WELL DEPTH (ft): **455.0**
 WELL CASING DIAMETER (in): **1.4** BOREHOLE DIAMETER (in): **10 3/4**
 LOGGED BY: **D. Fischer** CHECKED BY: **C. Pollock**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
		SP	SAND ; SP; tan; fine to coarse-grained; loose; saturated; subangular; poorly graded; 50% medium-grained sand, trace of fines and fine gravel		- soil			3.5		
390					- soil			2.7	390	
395					- soil			2.8	395	
400		GW	GRAVEL ; GW; tan; fine to coarse-grained; loose; saturated; subrounded; well graded; 70% fine (to 3" diameter) gravel, trace of coarse-grained sand		- soil			2.7	400	
405					- soil			2.0	405	
410		SP	SAND ; SP; tan; fine to coarse-grained; loose; saturated; subangular; poorly graded; 40% coarse-grained sand		- soil			2.3	410	
415			WITH GRAVEL ; medium to coarse-grained; fine to coarse gravel		- soil			3.9	415	

← 4 inch schedule 80 PVC, 0.02 inch slotted casing, filter sand 8-12

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR INTL.GDT 10/23/06

PROJECT: Broadway South Landfill	WELL / PROBEHOLE / BOREHOLE NO:	BP-23 PAGE 13 OF 14	 SECOR
LOCATION: Broadway Boulevard and Prudence Road			
PROJECT NUMBER: 18OT.20401.06			
DRILLING: STARTED 4/25/06 COMPLETED: 5/2/06	NORTHING (ft):	EASTING (ft):	
INSTALLATION: STARTED 4/25/06 COMPLETED: 5/2/06	LATITUDE:	LONGITUDE:	
DRILLING COMPANY: Layne Christensen Company	GROUND ELEV (ft):	TOC ELEV (ft):	
DRILLING EQUIPMENT: Becker Hammer	INITIAL DTW (ft): 358.00 4/27/06	BOREHOLE DEPTH (ft): 455.0	
DRILLING METHOD: Percussion-Hammer	STATIC DTW (ft):	WELL DEPTH (ft): 455.0	
SAMPLING EQUIPMENT: Cyclone	WELL CASING DIAMETER (in): 1.4	BOREHOLE DIAMETER (in): 10 3/4	
	LOGGED BY: D. Fischer	CHECKED BY: C. Pollock	

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
			NO RECOVERY		-			NR		
425					-			NR	425	
430		SW	SAND ; SW; brown; fine to coarse-grained; medium dense; saturated; subangular; well graded; 30% coarse-grained sand, trace of fines and fine to coarse (to 3" diameter) gravel		-			-	430	4 inch schedule 80 PVC, 0.02 inch slotted casing, filter sand 8-12
435					-			-	435	
440					-			-	440	
445					-			-	445	4 inch schedule 80 PVC, Blank Casing with filter sand 8-12
450					-			-	450	4 inch PVC end plug, filter sand 8-12

Hole terminated at 455 feet.

PROJECT: Broadway South Landfill	WELL / PROBEHOLE / BOREHOLE NO:	 SECOR
LOCATION: Broadway Boulevard and Prudence Road	BP-23 PAGE 14 OF 14	
PROJECT NUMBER: 18OT.20401.06	DRILLING: STARTED 4/25/06 COMPLETED: 5/2/06	NORTHING (ft):
	INSTALLATION: STARTED 4/25/06 COMPLETED: 5/2/06	EASTING (ft):
DRILLING COMPANY: Layne Christensen Company	DRILLING EQUIPMENT: Becker Hammer	LATITUDE:
DRILLING METHOD: Percussion-Hammer	DRILLING METHOD: Percussion-Hammer	LONGITUDE:
SAMPLING EQUIPMENT: Cyclone	DRILLING METHOD: Percussion-Hammer	GROUND ELEV (ft):
	SAMPLING EQUIPMENT: Cyclone	TOC ELEV (ft):
		INITIAL DTW (ft): 358.00 4/27/06 BOREHOLE DEPTH (ft): 455.0
		STATIC DTW (ft):
		WELL DEPTH (ft): 455.0
		WELL CASING DIAMETER (in): 1,4 BOREHOLE DIAMETER (in): 10 3/4
		LOGGED BY: D. Fischer CHECKED BY: C. Pollock

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
460									460	
465									465	
470									470	
475									475	
480									480	
485									485	

GEO FORM 304 BORING LOGS BSDP-1, BSDP-2, BSDP-3, BSDP-4, BP-22, AND BP-23.GPJ SECOR.INTL.GDT 10/23/06

PROJECT: **Broadway-Pantano WQARF Site**
 LOCATION: **Green Hills Ave. between 5th St. & Baker**
 PROJECT NUMBER: **18OT.20401.08**

WELL / PROBEHOLE / BOREHOLE NO:

BP-24A PAGE 2 OF 4



DRILLING: STARTED **12/5/07** COMPLETED: **12/7/07**
 INSTALLATION: STARTED **12/7/07** COMPLETED: **12/12/07**
 DRILLING COMPANY: **WDC**
 DRILLING EQUIPMENT: **Star 30K**
 DRILLING METHOD: **ARCH**
 SAMPLING EQUIPMENT: **Shovel, scoop sieve**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **335 12/6/07** WELL DEPTH (ft): **355.0**
 STATIC DTW (ft): **336.45 12/13/07** BOREHOLE DEPTH (ft): **358.0**
 WELL CASING DIAMETER (in): **5** BOREHOLE DIAMETER (in): **10**
 LOGGED BY: **M Newton** CHECKED BY: **C Pollock**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace P/D (units)	Depth (feet)	Well Construction
105		SW-SM	SAND WITH SILT ; SW-SM; 10YR 5/4 yellowish brown; fine to coarse-grained; loose; dry; no odor; no staining; subrounded; well graded; Approx. 80% sand, 10% gravel, 10% silt		---			0.0	105	
110				1648	---	0.0	110			
115				---				115		
120				1740	---	0.3	120			
125				---				125		
130				1751	---	0.4	130			
135				---				135		
140				0811	12/6/07	0.3	140			
145				---				145		
150				0817	---	0.5	150	Blank 5" SCH. 80 PVC		
155		---				155				
160		0858	---	0.0	160	Bentonite Grout				
165		---				165				
170		0909	---	0.6	170					
175		---				175				
180		SW-SC	SAND WITH CLAY AND GRAVEL ; SW-SC; 7.5YR 5/4 brown; fine to coarse-grained; loose; moist; no odor; no staining; subrounded; well graded; Approx. 70% sand, 20% gravel, 10% clay		0946	---	1.1	180		
185				---				185		
190				0955	---	1.5	190			
195				---				195		
				1033						

PROJECT: **Broadway-Pantano WQARF Site**
 LOCATION: **Green Hills Ave. between 5th St. & Baker**
 PROJECT NUMBER: **18OT.20401.08**

WELL / PROBEHOLE / BOREHOLE NO:

BP-24A PAGE 3 OF 4



DRILLING: STARTED **12/5/07** COMPLETED: **12/7/07**
 INSTALLATION: STARTED **12/7/07** COMPLETED: **12/12/07**
 DRILLING COMPANY: **WDC**
 DRILLING EQUIPMENT: **Star 30K**
 DRILLING METHOD: **ARCH**
 SAMPLING EQUIPMENT: **Shovel, scoop sieve**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **335 12/6/07** WELL DEPTH (ft): **355.0**
 STATIC DTW (ft): **336.45 12/13/07** BOREHOLE DEPTH (ft): **358.0**
 WELL CASING DIAMETER (in): **5** BOREHOLE DIAMETER (in): **10**
 LOGGED BY: **M Newton** CHECKED BY: **C Pollock**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
205		SW-SC	SAND WITH CLAY AND GRAVEL ; SW-SM; as above		---			0.0		
210		SW-SM	SAND WITH SILT AND GRAVEL ; SW-SM; 7.5YR 6/4 light brown; fine to coarse-grained; loose; dry; no odor; no staining; subangular; well graded; Approx. 80% sand, 10% gravel, 10% silt		1046			0.1		
215		SW-SM			---					
220		SW-SM	Moist		1120			0.1		
225		SW-SM			---					
230		SW-SM			1129			0.3		
235		SW-SM			---					
240		SW-SM			1318			0.0		
245		SW-SM			---					
250		SW-SM			1340			0.0		Blank 5" SCH. 80 PVC
255		SW-SM			---					
260		SW-SM			1435			0.0		Bentonite Grout
265		SM	SILTY SAND ; SM; 10YR 6/4 light yellowish brown; fine to medium-grained; loose; dry; no odor; no staining; subangular; poorly graded; Approx. 80% sand, 20% silt		1454			0.0		
270		SW-SM			---					
275		SW-SM	SAND WITH SILT AND GRAVEL ; SW-SM; 7.5YR 6/3 light brown; fine to coarse-grained; loose; dry; no odor; no staining; subangular; well graded; Approx. 80% sand, 10% silt, 10% gravel		1550			0.0		
280		SW-SM			---					
285		SW-SM			---					
290		SW-SM			1606			0.0		
295		SW-SM			---					
					1702					

GEO FORM 304 BP-24 CLUSTER.GPJ SECOR INTL.GDT 3/18/08

PROJECT: **Broadway-Pantano WQARF Site**
 LOCATION: **Green Hills Ave. between 5th St. & Baker**
 PROJECT NUMBER: **18OT.20401.08**

WELL / PROBEHOLE / BOREHOLE NO:

BP-24A PAGE 4 OF 4



DRILLING: STARTED **12/5/07** COMPLETED: **12/7/07**
 INSTALLATION: STARTED **12/7/07** COMPLETED: **12/12/07**
 DRILLING COMPANY: **WDC**
 DRILLING EQUIPMENT: **Star 30K**
 DRILLING METHOD: **ARCH**
 SAMPLING EQUIPMENT: **Shovel, scoop sieve**

NORTHING (ft):
 LATITUDE:
 GROUND ELEV (ft):
 INITIAL DTW (ft): **335 12/6/07**
 STATIC DTW (ft): **336.45 12/13/07**
 WELL CASING DIAMETER (in): **5**
 LOGGED BY: **M Newton**

EASTING (ft):
 LONGITUDE:
 TOC ELEV (ft):
 WELL DEPTH (ft): **355.0**
 BOREHOLE DEPTH (ft): **358.0**
 BOREHOLE DIAMETER (in): **10**
 CHECKED BY: **C Pollock**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
305		SW-SM SW-SM	SAND WITH SILT AND GRAVEL ; SW-SM; as above		---			0.3	305	Bentonite Grout 8-12 Sand
310		GP	GRAVEL WITH SAND ; GP; 7.5YR 6/4 light brown; fine-grained; loose; dry; no odor; no staining; subangular; poorly graded; Approx. 75% gravel, 20% sand, 5% silt		1730 ---			0.0	310	Bentonite TR30 Pellets
315									315	
320					0841 12/7/07			0.2	320	Blank 5" SCH. 80 PVC
325		SW-SM	SAND WITH SILT AND GRAVEL ; SW-SM; 7.5YR 5/4 brown; fine to coarse-grained; loose; moist; subrounded; well graded; Approx. 50% sand, 30% gravel, 20% silt		0910 ---			0.3	330	
335			First encounter of groundwater		1016 ---			0.5	335	8-12 Sand
340			Dry; Approx. 80% sand, 10% gravel, 10% silt		1041 ---			0.2	340	0.020 Slotted 5" SCH. 80 PVC
345									345	
350									350	
355			Moist; Approx. 50% sand, 30% gravel, 20% silt		1105 ---			0.1	355	
360			Hole terminated at 358 feet.						360	
365									365	
370									370	
375									375	
380									380	
385									385	
390									390	
395									395	

PROJECT: **Broadway-Pantano WQARF Site**
 LOCATION: **Green Hills Ave. between 5th St. & Baker**
 PROJECT NUMBER: **18OT.20401.08**

WELL / PROBEHOLE / BOREHOLE NO:

BP-24B PAGE 1 OF 5



DRILLING: STARTED **11/26/07** COMPLETED: **11/29/07**
 INSTALLATION: STARTED **11/29/07** COMPLETED: **12/4/07**
 DRILLING COMPANY: **WDC**
 DRILLING EQUIPMENT: **Star 30K**
 DRILLING METHOD: **ARCH**
 SAMPLING EQUIPMENT: **Shovel, scoop sieve**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **335 11/28/07** WELL DEPTH (ft): **405.0**
 STATIC DTW (ft): **335.02 12/6/07** BOREHOLE DEPTH (ft): **414.0**
 WELL CASING DIAMETER (in): **5** BOREHOLE DIAMETER (in): **10**
 LOGGED BY: **M Newton** CHECKED BY: **C Pollock**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace P/D (units)	Depth (feet)	Well Construction		
5		SW-SM	Asphalt SAND WITH SILT AND GRAVEL ; SW-SM; 5YR 4/6 yellowish red; fine to coarse-grained; loose; moist; no odor; no staining; subrounded; well graded; Approx. 50% sand, 30% gravel, 10% cobbles, 10% silt Note: All lithologic descriptions are based on visual examination of drill cuttings		0821 11/27/07			0.0	5			
10									10		Neat Cement	
15		SM	SILTY SAND WITH GRAVEL ; SM; 5YR 4/6 yellowish red; fine to medium-grained; loose; dry; no odor; no staining; subrounded; poorly graded; Approx. 55% sand, 30% silt, 15% gravel		1006 ---			0.0	15			
20									20			
25						1014 ---			0.0		25	
30				Approx. 70% sand, 15% gravel, 15% silt					30			
35						1058 ---		0.1	35			
40									40			
45		SM	SILTY SAND ; SM; 7.5YR 6/4 light brown; fine to medium-grained; loose; dry; no odor; no staining; subrounded; poorly graded; Approx. 70% sand, 25% silt, 5% gravel		1108 ---			0.0	45			
50									50		Blank 5" SCH. 80 PVC	
55					1126 ---			0.0	55			
60								60	Bentonite Grout			
65	SW-SM	SAND WITH SILT AND GRAVEL ; SW-SM; 7.5YR 6/4 light brown; fine to coarse-grained; loose; dry; no odor; no staining; subangular; well graded; Approx. 70% sand, 15% gravel, 15% silt		1133 ---			0.2	65				
70								70				
75					1149 ---			0.1	75			
80								80				
85					1153 ---			0.0	85			
90								90				
95					1213				95			

PROJECT: **Broadway-Pantano WQARF Site**
 LOCATION: **Green Hills Ave. between 5th St. & Baker**
 PROJECT NUMBER: **18OT.20401.08**

WELL / PROBEHOLE / BOREHOLE NO:

BP-24B PAGE 2 OF 5



DRILLING: STARTED **11/26/07** COMPLETED: **11/29/07**
 INSTALLATION: STARTED **11/29/07** COMPLETED: **12/4/07**
 DRILLING COMPANY: **WDC**
 DRILLING EQUIPMENT: **Star 30K**
 DRILLING METHOD: **ARCH**
 SAMPLING EQUIPMENT: **Shovel, scoop sieve**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **335 11/28/07** WELL DEPTH (ft): **405.0**
 STATIC DTW (ft): **335.02 12/6/07** BOREHOLE DEPTH (ft): **414.0**
 WELL CASING DIAMETER (in): **5** BOREHOLE DIAMETER (in): **10**
 LOGGED BY: **M Newton** CHECKED BY: **C Pollock**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace P/D (units)	Depth (feet)	Well Construction
105		SW-SM SW-SM	SAND WITH SILT AND GRAVEL ; SW-SM; 7.5YR 6/4 light brown; fine to coarse-grained; loose; dry; no odor; no staining; subangular; well graded; Approx. 70% sand, 15% gravel, 15% silt		---			0.5	105	
110				1219	---	0.5	110			
115							115			
120				1422	---	0.1	120			
125							125			
130				1427	---	0.0	130			
135							135			
140				1445	---	0.5	140			
145							145			
150				1449	---	1.3	150	Blank 5" SCH. 80 PVC		
155							155			
160				1507	---	0.0	160	Bentonite Grout		
165							165			
170				1512	---	0.0	170			
175							175			
180				1539	---	0.0	180			
185					185					
190		1545	---	0.2	190					
195					195					
					1604					

PROJECT: **Broadway-Pantano WQARF Site**
 LOCATION: **Green Hills Ave. between 5th St. & Baker**
 PROJECT NUMBER: **18OT.20401.08**

WELL / PROBEHOLE / BOREHOLE NO:

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DRILLING: STARTED **11/26/07** COMPLETED: **11/29/07**
 INSTALLATION: STARTED **11/29/07** COMPLETED: **12/4/07**
 DRILLING COMPANY: **WDC**
 DRILLING EQUIPMENT: **Star 30K**
 DRILLING METHOD: **ARCH**
 SAMPLING EQUIPMENT: **Shovel, scoop sieve**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **335 11/28/07** WELL DEPTH (ft): **405.0**
 STATIC DTW (ft): **335.02 12/6/07** BOREHOLE DEPTH (ft): **414.0**
 WELL CASING DIAMETER (in): **5** BOREHOLE DIAMETER (in): **10**
 LOGGED BY: **M Newton** CHECKED BY: **C Pollock**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
205		SW-SM	SAND WITH SILT AND GRAVEL ; SW-SM; 7.5YR 6/4 light brown; fine to coarse-grained; loose; dry; no odor; no staining; subangular; well graded; Approx. 70% sand, 15% gravel, 15% silt		---			0.0	205	
210		SW-SM			1611	---			0.0	
215		SM	SILTY SAND ; SM; 7.5YR 6/4 light brown; fine-grained; loose; dry; no odor; no staining; subangular; poorly graded; Approx. 80% sand, 20% silt		---			0.1	215	
220					1655	---			0.1	
225		SW-SM	SAND WITH SILT AND GRAVEL ; SW-SM; 7.5YR 6/4 light brown; fine to coarse-grained; loose; dry; no odor; no staining; subangular; well graded; Approx. 70% sand, 15% gravel, 15% silt		---			0.2	225	
230					1702	---			0.2	
235					---			0.2	235	
240					1720	---		0.2	240	
245					---			0.3	245	
250					1727	---		0.3	250	
255		SM	SILTY SAND ; SM; 7.5YR 6/4 light brown; fine to medium-grained; loose; dry; no odor; no staining; subangular; poorly graded; Approx. 70% sand, 25% silt, 5% gravel		---			0.3	255	
260					0856	11/28/07			0.3	
265					---			0.2	265	
270					0903	---		0.2	270	
275		SW-SM	SAND WITH SILT AND GRAVEL ; SW-SM; 7.5YR 6/4 light brown; fine to coarse-grained; loose; dry; no odor; no staining; subangular; well graded; Approx. 60% sand, 30% gravel, 10% silt		---			0.1	275	
280						0936	---		0.1	
285					---			0.2	285	
290					0948	---		0.2	290	
295					---				295	
						1015				

GEO FORM 304 BP-24 CLUSTER.GPJ SECOR INTL.GDT 3/18/08

PROJECT: **Broadway-Pantano WQARF Site**
 LOCATION: **Green Hills Ave. between 5th St. & Baker**
 PROJECT NUMBER: **18OT.20401.08**

WELL / PROBEHOLE / BOREHOLE NO:

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DRILLING: STARTED **11/26/07** COMPLETED: **11/29/07**
 INSTALLATION: STARTED **11/29/07** COMPLETED: **12/4/07**
 DRILLING COMPANY: **WDC**
 DRILLING EQUIPMENT: **Star 30K**
 DRILLING METHOD: **ARCH**
 SAMPLING EQUIPMENT: **Shovel, scoop sieve**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **335 11/28/07** WELL DEPTH (ft): **405.0**
 STATIC DTW (ft): **335.02 12/6/07** BOREHOLE DEPTH (ft): **414.0**
 WELL CASING DIAMETER (in): **5** BOREHOLE DIAMETER (in): **10**
 LOGGED BY: **M Newton** CHECKED BY: **C Pollock**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
305		SW-SM	SAND WITH SILT AND GRAVEL ; SW-SM; as above		---			0.2		
310		SW-SM / GP	GRAVEL WITH SAND ; GP; 7.5YR 6/4 light brown; fine to coarse-grained; loose; dry; no odor; no staining; angular; poorly graded; Cuttings appear to be approx. 60% sand-sized, 40% gravel-sized; granitic cobbles predominate		1033			0.3		
315					---					
320					1117			0.0		
325					---					Blank 5" SCH. 80 PVC
330					1138			0.1		Bentonite Grout
335		SW-SM	SAND WITH SILT AND GRAVEL ; SW-SM; 7.5YR 6/4 light brown; fine to coarse-grained; loose; moist; no odor; no staining; subrounded; well graded; Approx. 70% sand, 20% gravel, 10% silt		1321			0.1		
340					---					
345		GP-GM	GRAVEL WITH SAND AND SILT ; GP-GM; 7.5YR 6/4 light brown; loose; moist; no odor; no staining; angular; poorly graded; Cuttings appear to be approx. 70% sand-sized, 15% silt, 15% gravel; granitic cobbles predominate		1337			0.0		
350					---					
355					1453			0.0		
360			Wet		---					
365		SP-SC	CLAYEY SAND ; SP-SC; 7.5YR 6/4 light brown; medium to coarse-grained; loose; wet; subangular; poorly graded; Approx. 60% sand, 40% clay		1524			0.3		8-12 Sand
370					---					Bentonite TR30 Pellets
375					1610			0.1		
380		SW-SM	SAND WITH SILT AND GRAVEL ; SW-SM; 7.5YR 6/4 light brown; fine to coarse-grained; loose; wet; angular; well graded; Approx. 70% sand, 20% gravel, 10% silt		---					
385					1656			0.1		8-12 Sand
390					---					
395		GP	GRAVEL WITH SAND ; GP; see below		0844					0.020 Slotted 5" SCH. 80 PVC

GEO FORM 304 BP-24 CLUSTER.GPJ SECOR INTL.GDT 3/18/08

PROJECT: **Broadway-Pantano WQARF Site**
 LOCATION: **Green Hills Ave. between 5th St. & Baker**
 PROJECT NUMBER: **18OT.20401.08**

WELL / PROBEHOLE / BOREHOLE NO:

BP-24B PAGE 5 OF 5



SECOR

DRILLING: STARTED **11/26/07** COMPLETED: **11/29/07**
 INSTALLATION: STARTED **11/29/07** COMPLETED: **12/4/07**
 DRILLING COMPANY: **WDC**
 DRILLING EQUIPMENT: **Star 30K**
 DRILLING METHOD: **ARCH**
 SAMPLING EQUIPMENT: **Shovel, scoop sieve**

NORTHING (ft):
 LATITUDE:
 GROUND ELEV (ft):
 INITIAL DTW (ft): **335 11/28/07**
 STATIC DTW (ft): **335.02 12/6/07**
 WELL CASING DIAMETER (in): **5**
 LOGGED BY: **M Newton**

EASTING (ft):
 LONGITUDE:
 TOC ELEV (ft):
 WELL DEPTH (ft): **405.0**
 BOREHOLE DEPTH (ft): **414.0**
 BOREHOLE DIAMETER (in): **10**
 CHECKED BY: **C Pollock**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
405		GP	GRAVEL WITH SAND ; GP; fine-grained; loose; wet; no odor; no staining; angular; poorly graded; Approx. 70% gravel, 30% sand. color ranges from white to black		11/29/07				405	
410		GP			0939				410	
415				Hole terminated at 414 feet.					415	
420									420	
425									425	
430									430	
435									435	
440									440	
445									445	
450									450	
455									455	
460									460	
465									465	
470									470	
475									475	
480									480	
485									485	
490									490	
495									495	

PROJECT: **Broadway-Pantano WQARF Site**
 LOCATION: **Green Hills Ave. between 5th St. & Baker**
 PROJECT NUMBER: **18OT.20401.08**

WELL / PROBEHOLE / BOREHOLE NO:

BP-24C PAGE 1 OF 5



DRILLING: STARTED **11/5/07** COMPLETED: **11/15/07**
 INSTALLATION: STARTED **11/19/07** COMPLETED: **11/21/07**
 DRILLING COMPANY: **WDC**
 DRILLING EQUIPMENT: **Star 30K**
 DRILLING METHOD: **ARCH**
 SAMPLING EQUIPMENT: **SimulProbe sampler, shovel, sieve**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **345 11/7/07** WELL DEPTH (ft): **460.0**
 STATIC DTW (ft): **335.64 11/26/07** BOREHOLE DEPTH (ft): **462.0**
 WELL CASING DIAMETER (in): **5** BOREHOLE DIAMETER (in): **10**
 LOGGED BY: **M Newton** CHECKED BY: **C Pollock**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace P/D (units)	Depth (feet)	Well Construction			
5		SW-SM	Asphalt		1443 11/5/07			0.3	5				
10			SAND WITH SILT AND GRAVEL ; SW-SM; 5YR 4/6 yellowish red; fine to coarse-grained; loose; moist; no odor; no staining; subrounded; well graded; Approx. 50% sand, 35% gravel, 10% silt, & 5% cobbles		0943 11/6/07			0.1	10		Neat Cement		
15			Note: All lithologic descriptions are based on visual examination of drill cuttings								15		
20			Dry; Approx. 60% fine to coarse sand, 30% fine gravel, 10% silt. subangular to subrounded			0951 ---			0.6		20		
25											25		
30							1014 ---				0.6	30	
35											35		
40							1021 ---				0.7	40	
45											45		
50					10YR 6/6 brownish yellow		1100 ---				0.0	50	Blank 5" SCH. 80 PVC
55									55				
60					1121 ---			0.1	60	Bentonite Grout			
65									65				
70					1223 ---			0.0	70				
75									75				
80			Subangular; Approx. 60% fine to coarse sand, 20% gravel, 20% silt		1229 ---			0.3	80				
85									85				
90					1248 ---			0.0	90				
95									95				
					1441								

PROJECT: **Broadway-Pantano WQARF Site**
 LOCATION: **Green Hills Ave. between 5th St. & Baker**
 PROJECT NUMBER: **18OT.20401.08**

WELL / PROBEHOLE / BOREHOLE NO:

BP-24C PAGE 2 OF 5



DRILLING: STARTED **11/5/07** COMPLETED: **11/15/07**
 INSTALLATION: STARTED **11/19/07** COMPLETED: **11/21/07**
 DRILLING COMPANY: **WDC**
 DRILLING EQUIPMENT: **Star 30K**
 DRILLING METHOD: **ARCH**
 SAMPLING EQUIPMENT: **SimulProbe sampler, shovel, sieve**

NORTHING (ft):
 EASTING (ft):
 LATITUDE:
 LONGITUDE:
 GROUND ELEV (ft):
 TOC ELEV (ft):
 INITIAL DTW (ft): **345 11/7/07** WELL DEPTH (ft): **460.0**
 STATIC DTW (ft): **335.64 11/26/07** BOREHOLE DEPTH (ft): **462.0**
 WELL CASING DIAMETER (in): **5** BOREHOLE DIAMETER (in): **10**
 LOGGED BY: **M Newton** CHECKED BY: **C Pollock**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace P/D (units)	Depth (feet)	Well Construction		
105		SW-SM	SAND WITH SILT AND GRAVEL ; SW-SM; 5YR 4/6 yellowish red; fine to coarse-grained; loose; moist; no odor; no staining; subrounded; well graded; Approx. 50% sand, 35% gravel, 10% silt, & 5% cobbles		---			0.1	105			
110		SW-SM		Approx. 60% fine to coarse sand, 30% fine gravel, 10% silt		1449			0.2		110	
115						---					115	
120							1456				1.8	120
125							---					125
130							1519				0.0	130
135							---					135
140							1531				0.0	140
145							---					145
150					Approx. 75% fine to coarse sand, 20% silt, 5% fine gravel		1602				0.2	150
155					---				155			
160					1612			1.3	160	Bentonite Grout		
165					---				165			
170					1624			0.0	170			
175					---				175			
180			10YR 6/4 light yellowish brown; Approx. 60% fine to coarse sand, 30% gravel, 10% silt		1632			0.9	180			
185					---				185			
190			5YR 6/6 reddish yellow		0839			0.2	190			
195					11/7/07				195			
					0847							

GEO FORM 304 BP-24 CLUSTER.GPJ SECOR INTL.GDT 3/18/08

PROJECT: **Broadway-Pantano WQARF Site**
 LOCATION: **Green Hills Ave. between 5th St. & Baker**
 PROJECT NUMBER: **18OT.20401.08**

WELL / PROBEHOLE / BOREHOLE NO:

BP-24C PAGE 3 OF 5



DRILLING: STARTED **11/5/07** COMPLETED: **11/15/07**
 INSTALLATION: STARTED **11/19/07** COMPLETED: **11/21/07**
 DRILLING COMPANY: **WDC**
 DRILLING EQUIPMENT: **Star 30K**
 DRILLING METHOD: **ARCH**
 SAMPLING EQUIPMENT: **SimulProbe sampler, shovel, sieve**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **345 11/7/07** WELL DEPTH (ft): **460.0**
 STATIC DTW (ft): **335.64 11/26/07** BOREHOLE DEPTH (ft): **462.0**
 WELL CASING DIAMETER (in): **5** BOREHOLE DIAMETER (in): **10**
 LOGGED BY: **M Newton** CHECKED BY: **C Pollock**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
205		SW-SM	SAND WITH SILT AND GRAVEL ; SW-SM; as above		---			0.8		
210		SW-SM	SILTY SAND ; SM; 10YR 6/4 light yellowish brown; fine to medium-grained; loose; dry; no odor; no staining; subrounded; poorly graded; Approx. 70% fine to medium sand, 30% silt		0902	---		1.0		
215					---					
220					0908	---		2.2		
225		SW-SM	SAND WITH SILT AND GRAVEL ; SW-SM; 10YR 6/4 light yellowish brown; fine to coarse-grained; loose; dry; no odor; no staining; subangular; well graded; Approx. 60% fine to coarse sand, 20% gravel, 20% silt		0918	---		1.6		
230					---					
235					0927	---		2.8		
240					---					
245					0946	---		0.0		
250					---					Blank 5" SCH. 80 PVC
255		SM	SILTY SAND ; SM; 5YR 6/4 light reddish brown; fine to medium-grained; loose; dry; no odor; no staining; subrounded; poorly graded; Approx. 70% fine to medium sand, 30% silt		1005	---		1.0		Bentonite Grout
260					---					
265		SW-SM	SAND WITH SILT AND GRAVEL ; SW-SM; 10YR 6/4 light yellowish brown; fine to coarse-grained; loose; dry; no odor; no staining; subangular; well graded; Approx. 70% fine to coarse sand, 20% fine gravel, 10% silt		1016	---		0.8		
270					---					
275					1033	---		0.8		
280					---					
285					1041	---		0.6		
290					---					
295					1103					

PROJECT: **Broadway-Pantano WQARF Site**
 LOCATION: **Green Hills Ave. between 5th St. & Baker**
 PROJECT NUMBER: **18OT.20401.08**

WELL / PROBEHOLE / BOREHOLE NO:

BP-24C PAGE 4 OF 5



DRILLING: STARTED **11/5/07** COMPLETED: **11/15/07**
 INSTALLATION: STARTED **11/19/07** COMPLETED: **11/21/07**
 DRILLING COMPANY: **WDC**
 DRILLING EQUIPMENT: **Star 30K**
 DRILLING METHOD: **ARCH**
 SAMPLING EQUIPMENT: **SimulProbe sampler, shovel, sieve**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **345 11/7/07** WELL DEPTH (ft): **460.0**
 STATIC DTW (ft): **335.64 11/26/07** BOREHOLE DEPTH (ft): **462.0**
 WELL CASING DIAMETER (in): **5** BOREHOLE DIAMETER (in): **10**
 LOGGED BY: **M Newton** CHECKED BY: **C Pollock**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace P/D (units)	Depth (feet)	Well Construction			
305		GP	GRAVEL WITH SAND ; GP; 5YR 6/4 light reddish brown; loose; dry; no odor; no staining; subangular; poorly graded; Appears as approx. 60% sand, 40% gravel. Coarse and hard gravel layer, drilling slow, angular chips		---			0.6	305				
310					1136		---		1.6		310		
315												315	
320								1349	---		0.5	320	
325												325	
330								1621	---		0.3	330	
335												335	
340								1654	---		1.2	340	
345						Wet; Cuttings are moist, likely first encounter of groundwater							345
350								1749	---		1.0	350	
355		GM	10YR 6/4 light yellowish brown; medium-grained; loose; wet; angular; poorly graded; Approx. 80% fine gravel, 20% fine sand		1850	---			355	Blank 5" SCH. 80 PVC			
360			SILTY GRAVEL WITH SAND ; GM; 10YR 6/3 pale brown; medium-grained; dense; wet; no odor; no staining; subrounded; poorly graded; Approx. 50% fine gravel, 30% fine sand, 20% silt		BP24B-355	11/8/07	1.5	54	0.1	355	Bentonite Grout		
365					1051	11/9/07		0.0	365				
370		SP-SM	SAND WITH SILT AND GRAVEL ; SP-SM; 10YR 6/3 pale brown; medium to coarse-grained; medium dense; wet; no odor; no staining; subrounded; poorly graded; Approx. 70% medium to coarse sand, 15% fine to fine gravel, 15% silt						370				
375						1455	BP24B-375	1.5	6 8 16	0.0	375		
380											380		
385							1615	---		0.0	385		
390											390		
395			Gravel/cobbles present		1430	BP24B-395	.5	32	0.3	395			

GEO FORM 304 BP-24 CLUSTER.GPJ SECOR INTL.GDT 3/18/08

PROJECT: **Broadway-Pantano WQARF Site**
 LOCATION: **Green Hills Ave. between 5th St. & Baker**
 PROJECT NUMBER: **18OT.20401.08**

WELL / PROBEHOLE / BOREHOLE NO:

BP-24C PAGE 5 OF 5



DRILLING: STARTED **11/5/07** COMPLETED: **11/15/07**
 INSTALLATION: STARTED **11/19/07** COMPLETED: **11/21/07**
 DRILLING COMPANY: **WDC**
 DRILLING EQUIPMENT: **Star 30K**
 DRILLING METHOD: **ARCH**
 SAMPLING EQUIPMENT: **SimulProbe sampler, shovel, sieve**

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **345 11/7/07** WELL DEPTH (ft): **460.0**
 STATIC DTW (ft): **335.64 11/26/07** BOREHOLE DEPTH (ft): **462.0**
 WELL CASING DIAMETER (in): **5** BOREHOLE DIAMETER (in): **10**
 LOGGED BY: **M Newton** CHECKED BY: **C Pollock**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction
405		SP-SM SP-SM	SAND WITH SILT AND GRAVEL ; SP-SM; 10YR 6/3 pale brown; medium to coarse-grained; medium dense; wet; no odor; no staining; subrounded; poorly graded; Approx. 70% medium to coarse sand, 15% fine to fine gravel, 15% silt		1556 ---			0.0	405	
410		SC	CLAYEY SAND WITH GRAVEL ; SC; 10YR 7/3 pale brown; coarse-grained; dense; wet; no odor; no staining; subrounded; poorly graded; Approx. 40% coarse sand, 30% fine to medium gravel, 30% clay		2010 BP24B-415	1	8 33	0.1	415	Bentonite Grout
420					0910 11/13/07			0.3	425	Bentonite TR30 Pellets
430		GP	GRAVEL WITH SAND ; GP; very dense; wet; no odor; no staining; subangular; poorly graded; Granitic; approx. 80% gravel, 20% sand No recovery		1205 BP24B-435	.5	30		430	Blank 5" SCH. 80 PVC
440					1403 ---			0.2	445	8-12 Sand
450					1810 BP24B-455	.5	37		455	0.020 Slotted 5" SCH. 80 PVC
460					1059 11/15/07			0.2	460	
465			Hole terminated at 462 feet.						465	
470									470	
475									475	
480									480	
485									485	
490									490	
495									495	

PROJECT: **Broadway Pantano WQARF Site**
 LOCATION: **North Center Drive**
 PROJECT NUMBER: **18OT.20401.08**

DRILLING: **STARTED 5/1/08 COMPLETED: 5/2/08**
 INSTALLATION: **STARTED 5/5/08 COMPLETED: 5/9/08**
 DRILLING COMPANY: **Yellow Jacket Drilling**
 DRILLING EQUIPMENT: **Speedstar 50K**
 DRILLING METHOD: **Air Rotary Casing Hammer**
 SAMPLING EQUIPMENT: **Shovel, split-barrel sampler**

WELL / PROBEHOLE / BOREHOLE NO:

BP-25 PAGE 1 OF 4



NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **325 5/1/08** BOREHOLE DEPTH (ft): **380.0**
 STATIC DTW (ft): **311.84 5/9/08** WELL DEPTH (ft): **375.0**
 WELL CASING DIAMETER (in): **5** BOREHOLE DIAMETER (in): **10**
 LOGGED BY: **M Newton** CHECKED BY: **CRP**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace P/D (units)	Depth (feet)	Well Construction
			Fill Soil							Concrete
5		SP-SM	SAND WITH SILT AND GRAVEL; SP-SM; 7.5YR 5/6 dark brown; medium to coarse-grained; loose; dry; no odor; no staining; subangular; poorly graded; Approx. 60% sand, 30% fine gravel, 10% silt		0855 5/1/08			0.0	5	
10					0859 ---		0.0	10		
15								0.0	15	
20		GP-GM	GRAVEL WITH SAND AND SILT; GP-GM; 7.5YR 5/6 dark brown; medium to coarse-grained; loose; dry; no odor; no staining; subrounded; poorly graded; Approx. 60% gravel, 30% coarse sand, 10% silt		0907 ---			0.0	20	Neat Cement
25							0.0	25		
30		SC	CLAYEY SAND WITH GRAVEL; SC; 5YR 5/4 reddish brown; fine to coarse-grained; loose; dry; no odor; no staining; subrounded; well graded; Approx. 60% sand, 25% fine gravel, 15% clay		0916 ---			0.0	30	
35							0.0	35		
40							0.0	40		
45							0.0	45		
50							0.0	50		
55							0.0	55		
60							0.0	60		
65						0.0	65	Blank 5" SCH. 80 PVC		
70								0.0	70	Bentonite Grout
75								0.0	75	
80								0.0	80	
85								0.0	85	
90								0.0	90	
95								0.0	95	
					1047					

PROJECT: **Broadway Pantano WQARF Site**
 LOCATION: **North Center Drive**
 PROJECT NUMBER: **18OT.20401.08**

DRILLING: **STARTED 5/1/08 COMPLETED: 5/2/08**
 INSTALLATION: **STARTED 5/5/08 COMPLETED: 5/9/08**
 DRILLING COMPANY: **Yellow Jacket Drilling**
 DRILLING EQUIPMENT: **Speedstar 50K**
 DRILLING METHOD: **Air Rotary Casing Hammer**
 SAMPLING EQUIPMENT: **Shovel, split-barrel sampler**

WELL / PROBEHOLE / BOREHOLE NO: **BP-25** PAGE 2 OF 4

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **325 5/1/08** BOREHOLE DEPTH (ft): **380.0**
 STATIC DTW (ft): **311.84 5/9/08** WELL DEPTH (ft): **375.0**
 WELL CASING DIAMETER (in): **5** BOREHOLE DIAMETER (in): **10**
 LOGGED BY: **M Newton** CHECKED BY: **CRP**



SECOR

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace P/D (units)	Depth (feet)	Well Construction
105		SC			---			0.0	105	
110				1051	---	0.2	110			
115				---			0.0	115		
120				1106	---	0.0	120			
125				---			0.0	125		
130				1108	---	0.0	130			
135				---			0.0	135		
140				1126	---	0.0	140			
145				---			0.0	145		
150				1130	---	0.0	150	Blank 5" SCH. 80 PVC		
155				---			0.0	155		
160				1139	---	0.0	160	Bentonite Grout		
165				---			0.0	165		
170				1143	---	0.0	170			
175				---			0.0	175		
180		1151	---	0.0	180					
185		---			0.0	185				
190		1156	---	0.0	190					
195		---			0.0	195				
					1205					

GEO FORM 304 BP-25.GPJ SECOR INTL.GDT 6/3/08

PROJECT: **Broadway Pantano WQARF Site**
 LOCATION: **North Center Drive**
 PROJECT NUMBER: **18OT.20401.08**

DRILLING: **STARTED 5/1/08 COMPLETED: 5/2/08**
 INSTALLATION: **STARTED 5/5/08 COMPLETED: 5/9/08**
 DRILLING COMPANY: **Yellow Jacket Drilling**
 DRILLING EQUIPMENT: **Speedstar 50K**
 DRILLING METHOD: **Air Rotary Casing Hammer**
 SAMPLING EQUIPMENT: **Shovel, split-barrel sampler**

WELL / PROBEHOLE / BOREHOLE NO: **BP-25** PAGE 3 OF 4

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **325 5/1/08** BOREHOLE DEPTH (ft): **380.0**
 STATIC DTW (ft): **311.84 5/9/08** WELL DEPTH (ft): **375.0**
 WELL CASING DIAMETER (in): **5** BOREHOLE DIAMETER (in): **10**
 LOGGED BY: **M Newton** CHECKED BY: **CRP**



SECOR

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Well Construction	
205		SC			---			0.0	205		
210				1210	---	0.0	210				
215											215
220				1222	---	0.1	220				
225											225
230				1226	---	0.0	230				
235											235
240				1240	---	0.0	240	Bentonite Grout			
245											245
250					SP-SC	SAND WITH CLAY AND GRAVEL; SP-SC; 7.5YR 5/4 brown; medium to coarse-grained; dense; dry; no odor; no staining; subangular; poorly graded; Approx. 50% sand, 40% fine to coarse gravel, 10% clay		1243	---		0.0
255		GP	GRAVEL WITH SAND; GP; 7.5YR 5/4 brown; medium to coarse-grained; very dense; moist; no odor; no staining; subangular; poorly graded; Approx. 80% gravel, 20% medium to coarse sand		1432	---	0.0	255	Bentonite/Cement Grout		
260							260				
265								265			
270		SC	CLAYEY SAND WITH GRAVEL; SC; 7.5YR 5/4 brown; fine to coarse-grained; dense; dry; no odor; no staining; subangular; well graded; Approx. 60% sand, 25% fine gravel, 15% clay		1437	---	0.0	270			
275								275			
280		GP-GC	GRAVEL WITH SAND AND CLAY; GP-GC; 7.5YR 5/4 brown; medium to coarse-grained; very dense; moist; no odor; no staining; subangular; poorly graded; siliceous; Approx. 70% gravel, 20% coarse sand, 10% clay		1455	---	0.0	280	8-12 Sand		
285								285	Bentonite Uncoated Pellets		
290								290			
295								295	8-12 Sand		
					1539						

GEO FORM 304 BP-25.GPJ SECOR INTL.GDT 6/3/08

PROJECT: **Broadway Pantano WQARF Site**
 LOCATION: **North Center Drive**
 PROJECT NUMBER: **18OT.20401.08**

DRILLING: **STARTED 5/1/08 COMPLETED: 5/2/08**
 INSTALLATION: **STARTED 5/5/08 COMPLETED: 5/9/08**
 DRILLING COMPANY: **Yellow Jacket Drilling**
 DRILLING EQUIPMENT: **Speedstar 50K**
 DRILLING METHOD: **Air Rotary Casing Hammer**
 SAMPLING EQUIPMENT: **Shovel, split-barrel sampler**

WELL / PROBEHOLE / BOREHOLE NO: **BP-25** PAGE 4 OF 4

NORTHING (ft): EASTING (ft):
 LATITUDE: LONGITUDE:
 GROUND ELEV (ft): TOC ELEV (ft):
 INITIAL DTW (ft): **325 5/1/08** BOREHOLE DEPTH (ft): **380.0**
 STATIC DTW (ft): **311.84 5/9/08** WELL DEPTH (ft): **375.0**
 WELL CASING DIAMETER (in): **5** BOREHOLE DIAMETER (in): **10**
 LOGGED BY: **M Newton** CHECKED BY: **CRP**



SECOR

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace P/D (units)	Depth (feet)	Well Construction		
305		GP-GC			---			0.0	305			
310				1551	---			0.0	310			
315						---			0.0		315	
320						1612	---		0.0		320	
325							---		0.0		325	
330						1649	---		0.0		330	
335						0755	BP-25-335	.5	NA		0.0	335
340						1420	5/2/08				0.1	340
345							---				0.0	345
350						1426	---				0.0	350
355					---			0.0	355			
360				1444	---			0.0	360			
365					---			0.0	365			
370				1450	---			0.0	370			
375					---			0.0	375			
380			Hole terminated at 381.5 feet.		1050	BP-25-380	.25	NA	0.0	380		
385					---			0.0	385			
390					---			0.0	390			
395					---			0.0	395			