Project: Muscoy RA

Location: San Bernardino, CA **Project Number: 18600069.06010**

Log of Monitoring Wells: MW-136A, MW-136B, MW-136C

Dates Drilled: 3/14/02 - 3/19/02	Total Depth Drilled: 930 feet	Logged By: M.Hogaboom, T.Gere, P.Crispell
Drilling Contractor: Water Development Corp	Borehole Diameter: 14 1/2-inch	Checked By: DLB
Drill Rig Type Dresser T 70 W	Well Construction Dates: 3/20/02 - 3/21/02	Screen Slot Size: 0.020-inch
Drilling Method: Reverse Circulation Mud Rotary	Well Diameter: 4-inch	
Drill Bit: 10 5/8 and 14 1/2-inch Mill Bit	Well Casing: Low Carbon and Stainless Steel	
Comments:		

Depth, feet | Graphic Log | LITHOLOGY DESCRIPTION | E-LOG | WELL CONSTRUCTION

LITHOLOGY DESCRIPTION

0

Sandy Silt (SM-ML). (0,30,65,5) Trace clay, trace mica, non plastic, very fine to trace medium sand, subangular to subrounded, dark grayish brown 10YR 4/2, dry.

Silty Sand (SM). (0,65,30,5) Trace clay, micaceous, fine grained sand, subangular to subrounded, trace medium grained, nonplastic fines, clays low plastic, yellowish brown 10YR 5/4, damp.

16" OD conductor casing set to approximately 48' bgs with air rotary casing hammer.

50

Silty Clay (CL). Soft, moderately plasticity, micaceous, light olive brown 2.5Y 5/3.

59' - Gravelly Sand lense.

Sand (SP). Poorly graded, subangular to subrounded, predominantly medium grained, multicolor, grading to SW-GP.

Gravelly Sand (SW-GP). (20,80,0,0) Well graded, fine to coarse grained, subangular to subrounded, gravel angular to subangular, fine grained to 1/2". At 75' - Less gravels to 10%, fine grained.

80' - Increase in coarse gravels to >1" diameter (25,75,0,0).

Rig Chatter

97' - Decrease gravels to predominately fine grained 15%.

100

100' - (25,75,0,0) Fine to coarse grained sand, fine to coarse gravel up to 1" diameter, angular to subrounded, multicolored.

Silty Clay (CL). Moderate plasticity, dark gray 2.5Y 4/1.

112' - Color change to olive brown 2.5Y 4/3.

Gravelly Sand (SW-GP). (20,80,0,0) Well graded, fine to coarse grained, subangular to subrounded, gravels fine grained to 1/2", multicolored.

125' - Increase in fines - small lense.

Clay (CL). Olive brown clay lense. Grading to SW.

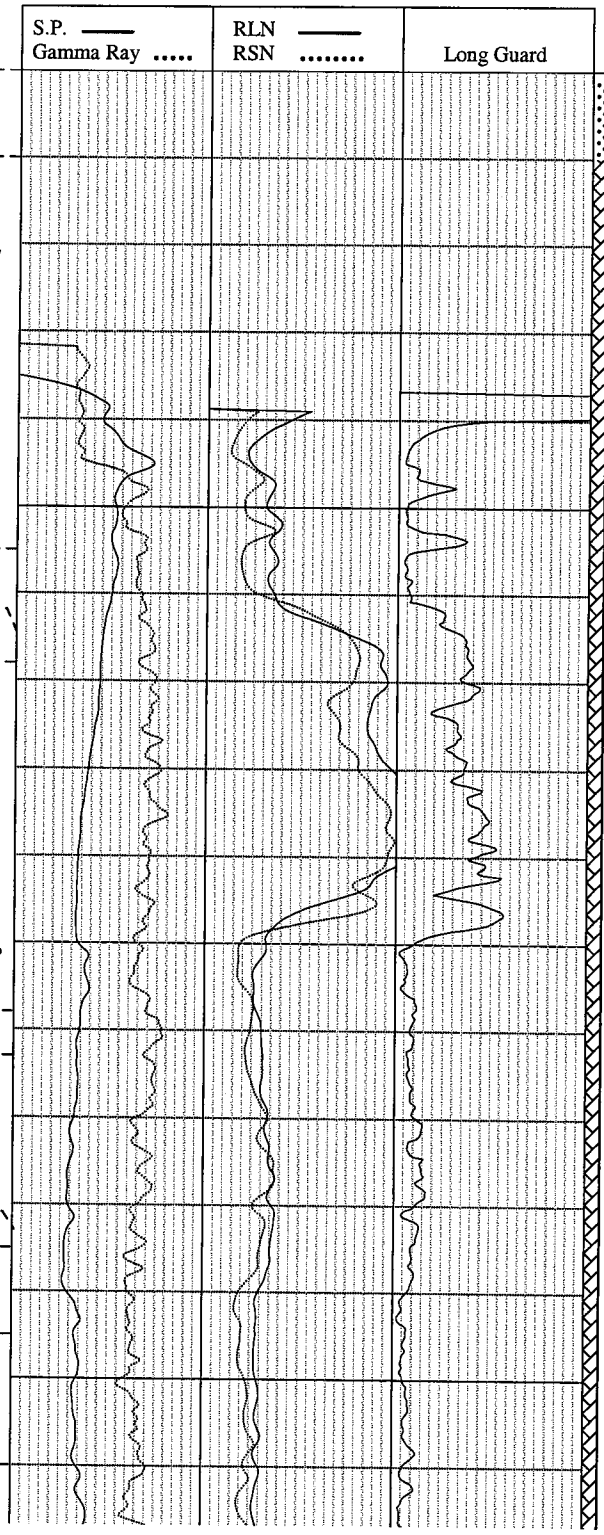
Gravelly Sand (SW-GP). (15,85,0,0) Well graded, fine to coarse grained, subangular to subrounded, gravels to 1/2" diameter, angular to subangular, multicolored.

150

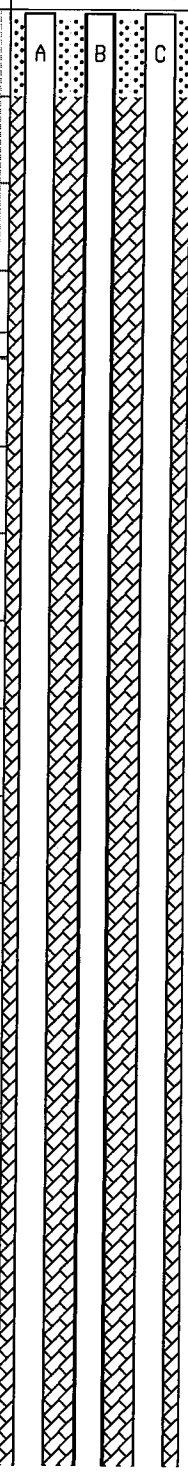
Silty Clay (CL). Medium stiff, moderate plasticity, micaceous, dark gray 2.5Y 4/1.

Sand (SW). (5,95,0,0) Trace fine gravel, well graded, fine to coarse grained, subangular to subrounded, multicolored.

E-LOG



WELL CONSTRUCTION



Flush Mount E40 Christy Box, 16" Stovepipe with Locking Lid

1-10' - 6X9 Sand

4-inch Low Carbon Steel Blank Casing:
A - 0.8-410'
B - 0.8-490'
C - 0.8 - 720'

10-355' - Grout 9-Sack Slurry Mix

0 50 100 150

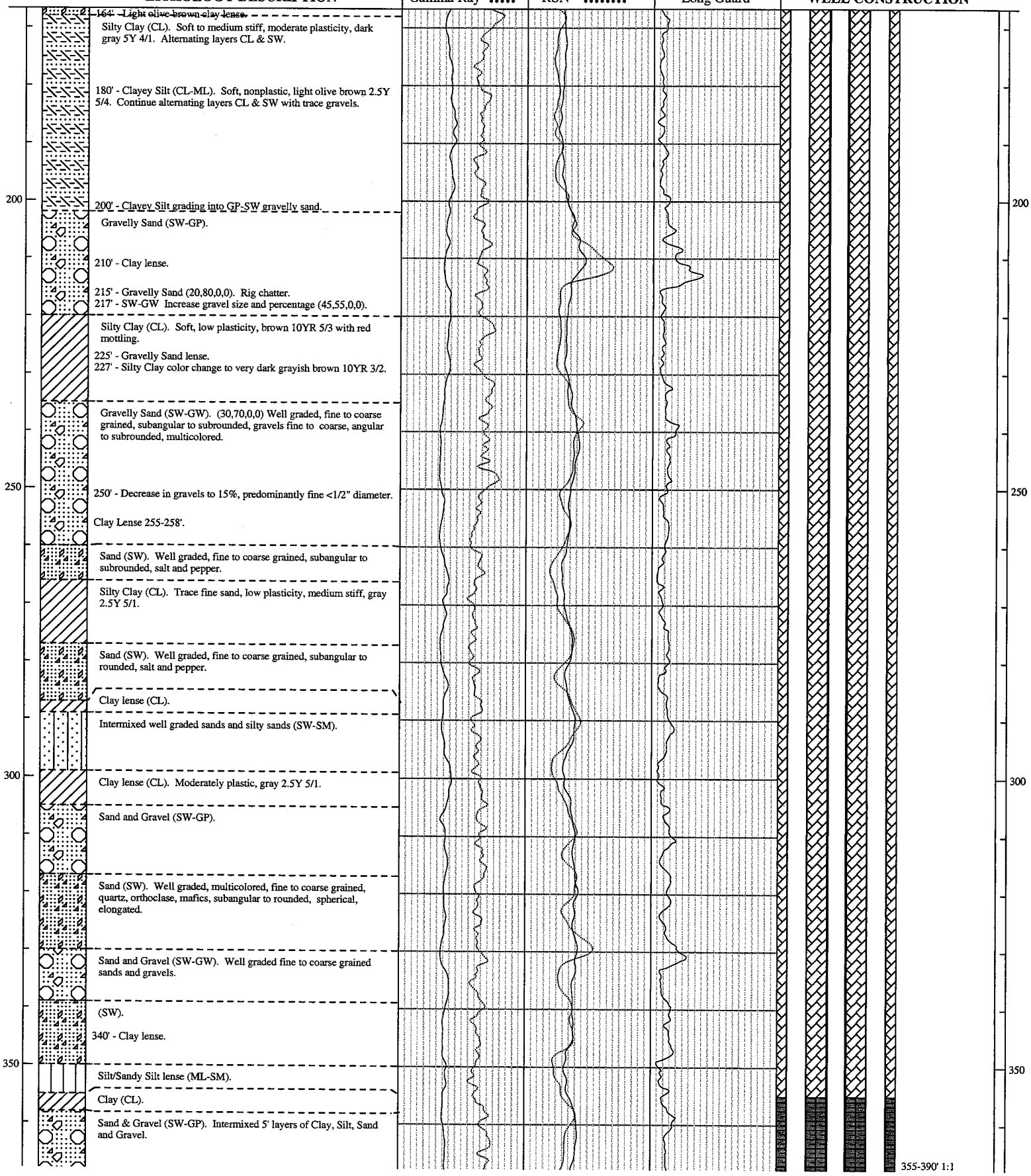
URS
2870 Gateway Oaks Dr., Ste 300
Sacramento, CA 95833
916-679-2000

Project: Muscoy RA

Location: San Bernardino, CA **Project Number: 18600069.06010**

Log of Monitoring Wells: MW-136A, MW-136B, MW-136C

Depth, feet | Graphic Log | LITHOLOGY DESCRIPTION | E-LOG | WELL CONSTRUCTION



164' - Light olive brown clay lense.

Silty Clay (CL). Soft to medium stiff, moderate plasticity, dark gray 5Y 4/1. Alternating layers CL & SW.

180' - Clayey Silt (CL-ML). Soft, nonplastic, light olive brown 2.5Y 5/4. Continue alternating layers CL & SW with trace gravels.

200' - Clayey Silt grading into GP-SW gravelly sand.

Gravelly Sand (SW-GP).

210' - Clay lense.

215' - Gravelly Sand (20,80,0,0). Rig chatter.
217' - SW-GW Increase gravel size and percentage (45,55,0,0).

Silty Clay (CL). Soft, low plasticity, brown 10YR 5/3 with red mottling.

225' - Gravelly Sand lense.
227' - Silty Clay color change to very dark grayish brown 10YR 3/2.

Gravelly Sand (SW-GW). (30,70,0,0) Well graded, fine to coarse grained, subangular to subrounded, gravels fine to coarse, angular to subrounded, multicolored.

250' - Decrease in gravels to 15%, predominantly fine <1/2" diameter.

Clay Lense 255-258'.

Sand (SW). Well graded, fine to coarse grained, subangular to subrounded, salt and pepper.

Silty Clay (CL). Trace fine sand, low plasticity, medium stiff, gray 2.5Y 5/1.

Sand (SW). Well graded, fine to coarse grained, subangular to rounded, salt and pepper.

Clay lense (CL).

Intermixed well graded sands and silty sands (SW-SM).

Clay lense (CL). Moderately plastic, gray 2.5Y 5/1.

Sand and Gravel (SW-GP).

Sand (SW). Well graded, multicolored, fine to coarse grained, quartz, orthoclase, mafics, subangular to rounded, spherical, elongated.

Sand and Gravel (SW-GW). Well graded fine to coarse grained sands and gravels.

(SW).

340' - Clay lense.

Silt/Sandy Silt lense (ML-SM).

Clay (CL).

Sand & Gravel (SW-GP). Intermixed 5' layers of Clay, Silt, Sand and Gravel.

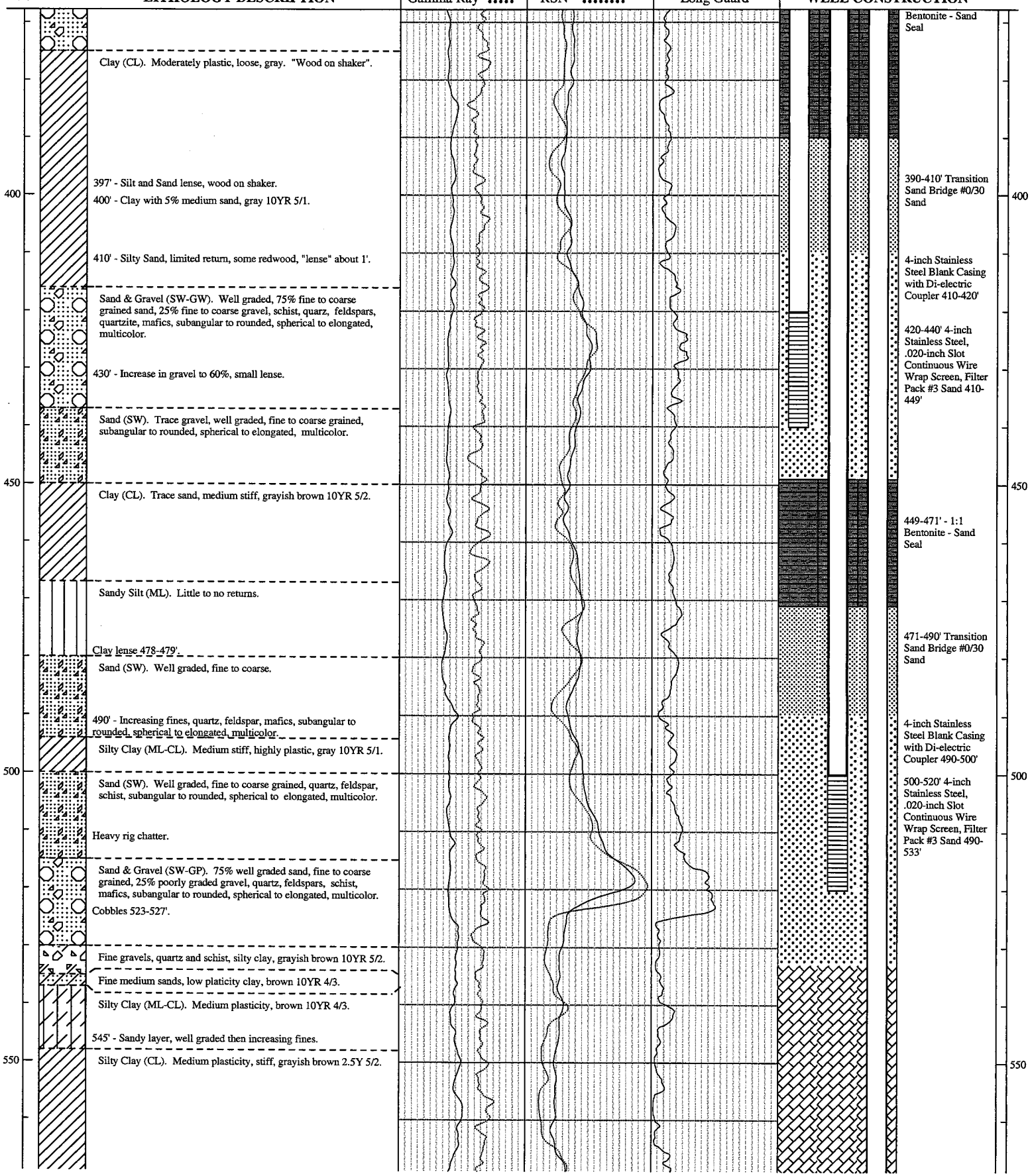
URS
2870 Gateway Oaks Dr., Ste 300
Sacramento, CA 95833
916-679-2000

Project: Muscoy RA

Location: San Bernardino, CA **Project Number: 18600069.06010**

Log of Monitoring Wells: MW-136A, MW-136B, MW-136C

Depth, feet | Graphic Log | LITHOLOGY DESCRIPTION | E-LOG (S.P. —— Gamma Ray ..... | RLN —— RSN ..... | Long Guard) | WELL CONSTRUCTION



URS
2870 Gateway Oaks Dr., Ste 300
Sacramento, CA 95833
916-679-2000

Project: Muscoy RA

Location: San Bernardino, CA **Project Number: 18600069.06010**

Log of Monitoring Wells: MW-136A, MW-136B, MW-136C

Depth, feet | Graphic Log | LITHOLOGY DESCRIPTION | E-LOG (S.P. ——, Gamma Ray ..... | RLN ——, RSN ..... | Long Guard) | WELL CONSTRUCTION

Sand (SW). Trace gravel, well graded, fine to coarse grained, quartz, feldspars, schist, subangular to rounded, spherical to elongate, multicolor.

Sandy Clay (CL). Moderate plasticity, firm, brown 10YR 5/3.

Sand (SW). Trace gravel, well graded, fine to coarse grained, quartz, feldspars, schist, subangular to rounded, spherical to elongate, multicolor.

600

Silty Clay (CL). Medium plasticity, soft, micaceous, grayish brown 10YR 5/2.

Sand (SW). Trace gravel, well graded, fine to coarse grained, quartz, feldspars, schist, subangular to rounded, spherical to elongate.

Alternating layers of Clay and Sand. 1-5' Clay, medium plasticity, firm, micaceous, brown 10YR 5/3. Sand, well graded, fine to coarse grained, quartz, schist, feldspar, subangular to rounded, spherical to elongate.

620' - Clay layers are thicker than sand layers predominantly.

Sand (SW). Well graded, fine to coarse grained, quartz, feldspar, schist, subangular to rounded, spherical to elongated.

Increase in grain size to fine gravel up to 1" at 644-645'. Grain size fine to medium grained gravel with depth.

650

Clay (CL). Medium plasticity, firm, brown 10YR 5/3.

Sandy Silt (SM-ML). Soft to firm silt, pale brown 10YR 6/3, 20% well graded sand, fine to coarse grained, quartz, feldspar, schist, subangular to rounded, spherical to elongated.

Clay (CL). High plasticity, very stiff, gray 10YR 5/1.

680' - 4' interval sandy clay.

690' - Silty Clay, low plasticity, soft, micas, brown 10YR 5/3.

700

700' - Increase in sand to 40%.

Sand (SW). Well graded with trace gravel (<5%), fine to coarse grained, quartz, feldspar, subangular to rounded, spherical to elongate, multicolor.

711-714' Increased clay to 30%.

Clayey Sand (SC). Poorly graded, fine to medium grained, quartz, feldspar, schist, subangular to subrounded, elongate to spherical, multicolor, 65% sand, 35% clay.

730-735' - Increase clay, decrease sands.

Sand (SW). Well graded with trace fine gravel, fine to coarse grained, quartz, feldspar, schist, subangular to rounded, spherical to elongate, multicolor.

750

Intermixed layers of clayey sand and silty clay approx 1-3' thick.

533-692' - Grout 9-Sack Slurry Mix

692-718' Transition Sand Bridge #0/30 Sand

4-inch Stainless Steel Blank Casing with Di-electric Coupler 720-730'

730-750' 4-inch Stainless Steel, .020-inch Slot Continuous Wire Wrap Screen, Filter Pack #3 Sand 718-760'

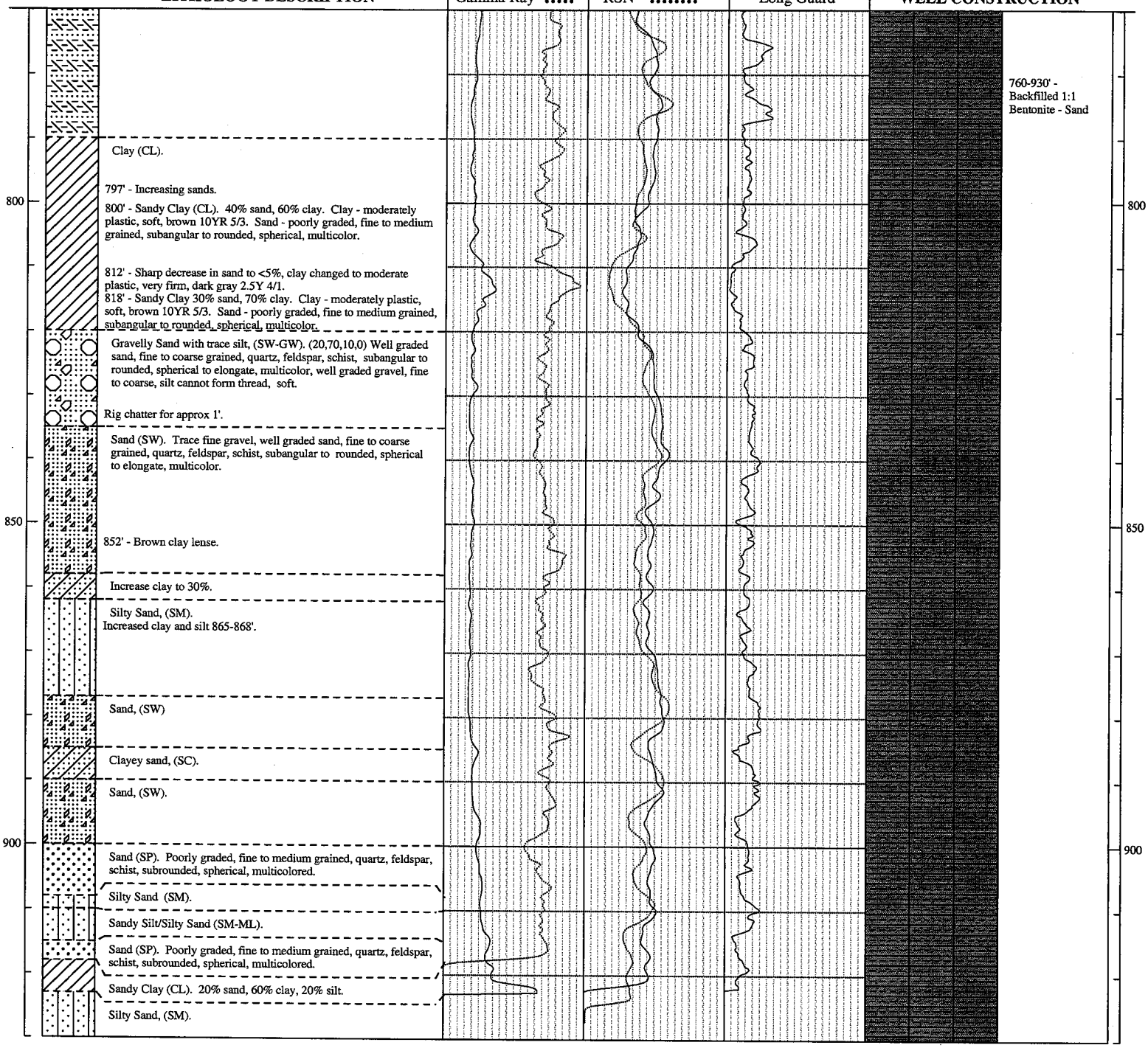
URS
2870 Gateway Oaks Dr., Ste 300
Sacramento, CA 95833
916-679-2000

Project: Muscoy RA

Location: San Bernardino, CA **Project Number: 18600069.06010**

Log of Monitoring Wells: MW-136A, MW-136B, MW-136C

Depth, feet | Graphic Log | LITHOLOGY DESCRIPTION | E-LOG (S.P. ——, Gamma Ray ..... | RLN ——, RSN ..... | Long Guard) | WELL CONSTRUCTION



Clay (CL).

797' - Increasing sands.

800' - Sandy Clay (CL). 40% sand, 60% clay. Clay - moderately plastic, soft, brown 10YR 5/3. Sand - poorly graded, fine to medium grained, subangular to rounded, spherical, multicolor.

812' - Sharp decrease in sand to <5%, clay changed to moderate plastic, very firm, dark gray 2.5Y 4/1.
818' - Sandy Clay 30% sand, 70% clay. Clay - moderately plastic, soft, brown 10YR 5/3. Sand - poorly graded, fine to medium grained, subangular to rounded, spherical, multicolor.

Gravelly Sand with trace silt, (SW-GW). (20,70,10,0) Well graded sand, fine to coarse grained, quartz, feldspar, schist, subangular to rounded, spherical to elongate, multicolor, well graded gravel, fine to coarse, silt cannot form thread, soft.

Rig chatter for approx 1'.

Sand (SW). Trace fine gravel, well graded sand, fine to coarse grained, quartz, feldspar, schist, subangular to rounded, spherical to elongate, multicolor.

852' - Brown clay lense.

Increase clay to 30%.

Silty Sand, (SM).
Increased clay and silt 865-868'.

Sand, (SW)

Clayey sand, (SC).

Sand, (SW).

Sand (SP). Poorly graded, fine to medium grained, quartz, feldspar, schist, subrounded, spherical, multicolored.

Silty Sand (SM).

Sandy Silt/Silty Sand (SM-ML).

Sand (SP). Poorly graded, fine to medium grained, quartz, feldspar, schist, subrounded, spherical, multicolored.

Sandy Clay (CL). 20% sand, 60% clay, 20% silt.

Silty Sand, (SM).

URS
2870 Gateway Oaks Dr., Ste 300
Sacramento, CA 95833
916-679-2000