APPENDIX H
PACIFIC MATERIALS LABORATORY SOIL CORROSIVITY (MARCH 2007)

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Materials
Laboratory
of Santa Barbara, Inc.

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March 30, 2007
Lab No: 74167-2
File No: 07-6038A-2

R.D. Olson Development
Attn: Scott McChesney
2955 Main Street, Suite 300
Irvine, CA 92614

SUBJECT: Soil Corrosivity Study
Proposed Residence Inn by Marriott
6300 Hollister Avenue / Robin Hill
Goleta, California

Dear Mr. McChesney:

Per your request, soil samples from the subject site have been delivered to Schiff Associates in Claremont, California, for corrosivity testing and analysis.

Please see Enclosure A for the results of the Soil Corrosivity Study.

If you have any questions concerning this matter, please do not hesitate to call. Thank you for the opportunity of providing this service.

Respectfully submitted,

PACIFIC MATERIALS LABORATORY, INC.

Ronald J. Pike, G. E. 2291

RJP:jb

SOIL CORROSIVITY

A major factor in determining soil corrosivity is electrical resistivity. The electrical resistivity of a soil is a measure of its resistance to the flow of electrical current. Corrosion of buried metal is an electrochemical process in which the amount of metal loss due to corrosion is directly proportional to the flow of electrical current (DC) from the metal into the soil. Corrosion currents, following Ohm's Law, are inversely proportional to soil resistivity. Lower electrical resistivities result from higher moisture and soluble salt contents and indicate corrosive soil.

A correlation between electrical resistivity and corrosivity toward ferrous metals is:

Soil Resistivity in ohm-centimeters			Corrosivity Category
over		10,000	mildly corrosive
2,000	to	10,000	moderately corrosive
1,000	to	2,000	corrosive
below		1,000	severely corrosive

Other soil characteristics that may influence corrosivity towards metals are pH, soluble salt content, soil types, aeration, anaerobic conditions, and site drainage.

Electrical resistivities were in the mildly corrosive to corrosive categories with as-received moisture. When saturated, the resistivities were in the moderately to severely corrosive categories. One of the four as-received resistivities was near its saturated value. The remaining resistivities dropped considerably with added moisture because the samples were dry as-received.

Soil pH values varied from 7.4 to 8.0. This range is mildly to moderately alkaline.

The soluble salt content of the samples ranged from low to high.

Ammonium and nitrate were detected in low concentrations.

Tests were not made for sulfide and negative oxidation-reduction (redox) potential because these samples did not exhibit characteristics typically associated with anaerobic conditions.

This soil is classified as severely corrosive to ferrous metals.

Electrically insulate steel tie-back rods from dissimilar metals and metals with dissimilar coatings (cement-mortar vs. dielectric) to facilitate the application of cathodic protection.

Apply cathodic protection to steel tie-back rods as per NACE International Standard RP0169-2002. The amount of cathodic protection current needed can be minimized by coating the tie back rods.

Hydraulic Elevator

Coat hydraulic elevator cylinders as described above for steel pipe. Electrically insulate each cylinder from building metals by installing dielectric material between the piston platen and car, insulating the bolts, and installing an insulated joint in the oil line. Apply cathodic protection to hydraulic cylinders as per NACE International Standard RP0169-2002. As an alternative to electrical insulation and cathodic protection, place each cylinder in a plastic casing with a plastic watertight seal at the bottom.

The elevator oil line should be placed above ground if possible but, if underground, should be protected by providing a bonded dielectric coating, electrically isolating the pipeline, and applying of cathodic protection to steel piping as per NACE International Standard RP0169-2002; or should be placed in a PVC casing pipe to prevent contact with soil and soil moisture.

Iron Pipe

Pressurized Pipe:

Encase pressurized cast and ductile iron piping per AWWA Standard C105, coat with epoxy or polyurethane intended for underground use, or with wax tape per AWWA C217. The thin factory-applied asphaltic coating applied to ductile iron pipe for transportation and aesthetic purposes does not constitute a corrosion control coating. Electrically insulate underground iron pipe from dissimilar metals and from above ground iron pipe with insulating joints per NACE International Standard RP0286-2002. Bond all nonconductive type joints for electrical continuity. Install corrosion monitoring test stations at each end of the pipeline, at each end of any casings, and other locations as necessary so the interval between test stations does not exceed 1,500 feet. Apply cathodic protection to cast and ductile iron piping as per NACE International Standard RP0169-2002.

Non-Pressurized Pipe (Select one of the following alternatives for protection):

1. Polyethylene encase cast- and ductile-iron piping per AWWA Standard C105. Electrically insulate underground pipe from dissimilar metals and from above ground iron pipe with insulating joints per NACE International Standard RP0286-2002. Protect all non-cast iron and non-ductile iron fittings and valves with wax tape per AWWA Standard C217-99 after assembly. Install electrical resistance (ER) probes designed for cast and ductile iron piping to discern if/when cathodic protection will be warranted in the future.
2. Concrete encase all buried portions of metallic piping so that there is a minimum of 3 inches of concrete cover provided over and around surfaces of pipe, fittings, and valves.
3. Apply cathodic protection to cast and ductile iron piping as per NACE International Standard RP0169-2002. The amount of cathodic protection current needed can be minimized by coating the piping. Install corrosion monitoring test stations at each end of the pipeline, at each end of any casings, and other locations as necessary so the interval between test stations does not exceed 1,500 feet.

lifting lugs are used, they should be carefully drilled out 1.5 inches deep and the hole filled with epoxy.

CLOSURE

Our services have been performed with the usual thoroughness and competence of the engineering profession. No other warranty or representation, either expressed or implied, is included or intended.

Please call if you have any questions.

Respectfully Submitted,
SCHIFF ASSOCIATES

Leobardo Solis Eric Fredette for

Reviewed by,

John W. French, P. E.

PROFESSIONAL ENGINEER
JOHN W. FRENCH
No. CR001023
12/7/07
CORROSION
CALIFORNIA

Enc: Table 1

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DATE	INVOICE #
03/30/2007	82834

BILL TO:

R.D. Olson Development
c/o Scott McChesney
2955 Main Street, Suite 300
Irvine, CA 92614

P.O. NUMBER	TERMS	PROJECT
	Net 30	6038A-2 6300 H...

QUANTITY	DESCRIPTION	RATE	AMOUNT
1	Corrosivity Test 03/30/07	1,525.00	1,525.00
1	Processing Fee	20.00	20.00
	Lab No. 74167-2 Residence Inn by Marriott 6300 Hollister Avenue / Robin Hill Goleta, California		
	Note: To ensure proper application of payments, please indicate invoice number(s) being paid with all payments. We cannot guarantee correct application without invoice number information.		
	Interest rate of 1.5% per month charged on past due accounts.	TOTAL	$1,545.00