Appendix B

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Concrete Slab Testing Report (4/26/2011)

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Concrete Slab Testing Report

April 26th , 2011

Greg Sheehan
JLS, Inc
3460 Swetzer Road
Loomis, CA 95650

Job Address:
Board of Equalization 450 N Street Sacramento, CA

Re: Install ASTM F 1869 Calcium Chloride and ASTM F 2170 Relative HumidityTesting for MVER and ASTM F 710 pH Testing of Concrete

Dear Mr. Sheehan:

Per your request, I am providing you this report regarding the two (2) calcium chloride (CC) tests and twelve(12) relative humidity (RH) test probes and twelve (12) pH tests conducted on the above ground concrete slab in the BOE building on the 21st floor in Sacramento, CA. I set two (2) Calcium Chloride tests and twelve (12) relative humidity tests probes into the above grade concrete slab on April 12th 2011. I also conducted concrete pH testing at the jobsite on April 12th 2011 and terminated all the tests and calculated findings on April 15th 2011. The final test readings and Ph observed are recorded below.

BACKGROUND ON CALCIUM CHLORIDE and RELATIVE HUMIDITY TESTING:
The Anhydrous calcium chloride concrete moisture test was developed in the 1950's to quantify the volume of water vapor emitting from a 1,000 square foot area of concrete slab surface over 24 hours. This test is directly specified, along with ASTM F 2170 Insitu relative humidity probes, by the vast majority of the Floor Covering Industry as the primary measure of moisture acceptability for floor covering/coating installation.

The same scale was calibrated with a 50 gram weight and used for starting and ending weight values. The ambient air temperature and relative humidity the building and testing climate must be between 65 – 85 degrees Fahrenheit with relative humidity between 40 – 60% for at least 48 hours prior to, and during testing.

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Floor covering material can be sensitive to concrete slab moisture emission volume and elevated pH and alkalinity levels. Floors or coatings which are adhered directly to concrete slabs may be subject to failure, if moisture and pH levels exceed product tolerances over time.

Relative Humidity testing using ASTM F 2170 test probes needs to be inserted into a concrete slab 40% of the slab depth if drying from one side and 20% of the slab depth if drying from two sides. The above grade slab at the BOE building dictate that the Insitu RH probes will be inserted at 20% of the 5 inch thick slab or set at a 1 inch depth.

Moisture and pH tests cannot prevent a failure, but can help identify the potential for it. Patching compounds, like floors and coatings, can also have problems with moisture and pH conditions. Always check the manufacturer's specifications for moisture and pH for all floor products. A serious side effect of trapped moisture under a floor is a high sustained humidity. High humidity (generally 75% or more) against a construction product can result in mold growth. If mold or growth is encountered anytime, stop the job immediately and call for professional help.

TEST DATA on April 12th 2011:
AMBIENT AIR TEMPERATURE of building climate at jobsite: 67 degrees F.
AMBIENT RELATIVE HUMIDITY of building climate at jobsite: 40 %

Starting Weight Values of CC Test Kits and pH on April 12th 2011

Test Location #1 Recorded Starting Values	pH 10.0
Test Location #2 Recorded Starting Values	pH 13.0
Test Location #3 Recorded Starting Values	pH 10.0
***Test Location #4 Recorded Starting Values**	**30.2 grams & pH 8.0**
Test Location #5 Recorded Starting Values	pH 11.0
Test Location #6 Recorded Starting Values	pH 13.0
Test Location #7 Recorded Starting Values	pH 11.0+
Test Location #8 Recorded Starting Values	pH 10.0+
***Test Location #9 Recorded Starting Values**	**30.4 grams & pH 14.0**
Test Location #10 Recorded Starting Values	pH 9.0
Test Location #11 Recorded Starting Values	pH 12.0+
Test Location #12 Recorded Starting Values	pH 10.0+

***Test #4 and #9 are the only locations where CC tests were performed.**

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START TEST DATA on April 12th 2011:
AMBIENT AIR TEMPERATURE of building climate at jobsite: 71 degrees F.
AMBIENT RELATIVE HUMIDITY of building climate at jobsite: 40 %

Ending Weight Values of CC Test Kits on April 15th 2011 (67 total test hours)

Test Location #4 Recorded Ending Values	32.0 grams
Test Location #9 Recorded Ending Values	32.3 grams

The following equation to determine the vapor emission volume in Pounds per 1,000 square feet in 24 hours:

$$\frac{\text{Weight Gain} \times 118.932}{\text{Total Hours}} = \text{POUNDS}$$

For example: start test weight: 30.4 grams, end test weight: 32.3 grams
Test # 9 would be as follows: $\frac{1.9 \text{ total weight gain} \times 118.932}{\text{Total Test Hours (67hrs)}}$ = 3.37lbs. Pounds per 1,000 sq ft in 24 hours

TERMINATED TEST DATA on April 15th 2011:
AMBIENT AIR TEMPERATURE of building climate at jobsite: 70 degrees F.
AMBIENT RELATIVE HUMIDITY of building climate at jobsite: 42 %

PH TESTS:
Most of the twelve (12) pH test conducted were observed to be elevated between 10-14 on the pH scale with 7 being neutral only test #4 and #10 were recorded at a pH of 9 or lower. **However, all other pH tests indicated a high pH at 10 or more and test locations #2, #6, #9, #11, were observed to be exceptionally high at a pH of 12 or more** (see map of 21st floor and test locations). This concrete is indicating high alkalinity and is not ready to accept any type of resilient flooring without some type of an approved floor sealing or coating product that mitigates high pH. Check with the product manufacturer and specifications for an acceptable adhesive or coating that can be installed with the elevated pH on the concrete surface.

CALCIUM CHLORIDE TESTS:
My observations today April 15th, 2011, of the two (2) Calcium Chloride test installed on the concrete slab on April 12th 2011, indicate low moisture vapor emission rates (MVER). The two (2) tests at test # 4 and #9 were 3.55lbs and 3.37lbs over 1,000 sq ft

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in 24 hours respectively. Any vapor emission above 5.00 lbs over 1,000 sq ft in 24hours is cause for concern and may require further testing. Please confirm with the manufacturer that the flooring products to be installed on the concrete is acceptable per all the final test data recorded in this report.

RELATIVE HUMIDITY TESTS:
My test observations recorded today on April 15th 2011 of the twelve (12) relative humidity (RH) test probes are as follows.

Test #1	70 Degrees F and 45 RH
Test #2	71 Degrees F and 49 RH
Test #3	72 Degrees F and 44 RH
Test #4	75 Degrees F and 43 RH
Test #5	77 Degrees F and 30 RH
Test #6	74 Degrees F and 40 RH
Test #7	67 Degrees F and 54 RH
Test #8	72 Degrees F and 50 RH
Test #9	72 Degrees F and 43 RH
Test #10	73 Degrees F and 44 RH
Test #11	72 Degrees F and 44 RH
Test #12	73 Degrees F and 40 RH

All twelve (12) relative humidity tests are within the acceptable range below 75% relative humidity at the time of testing.

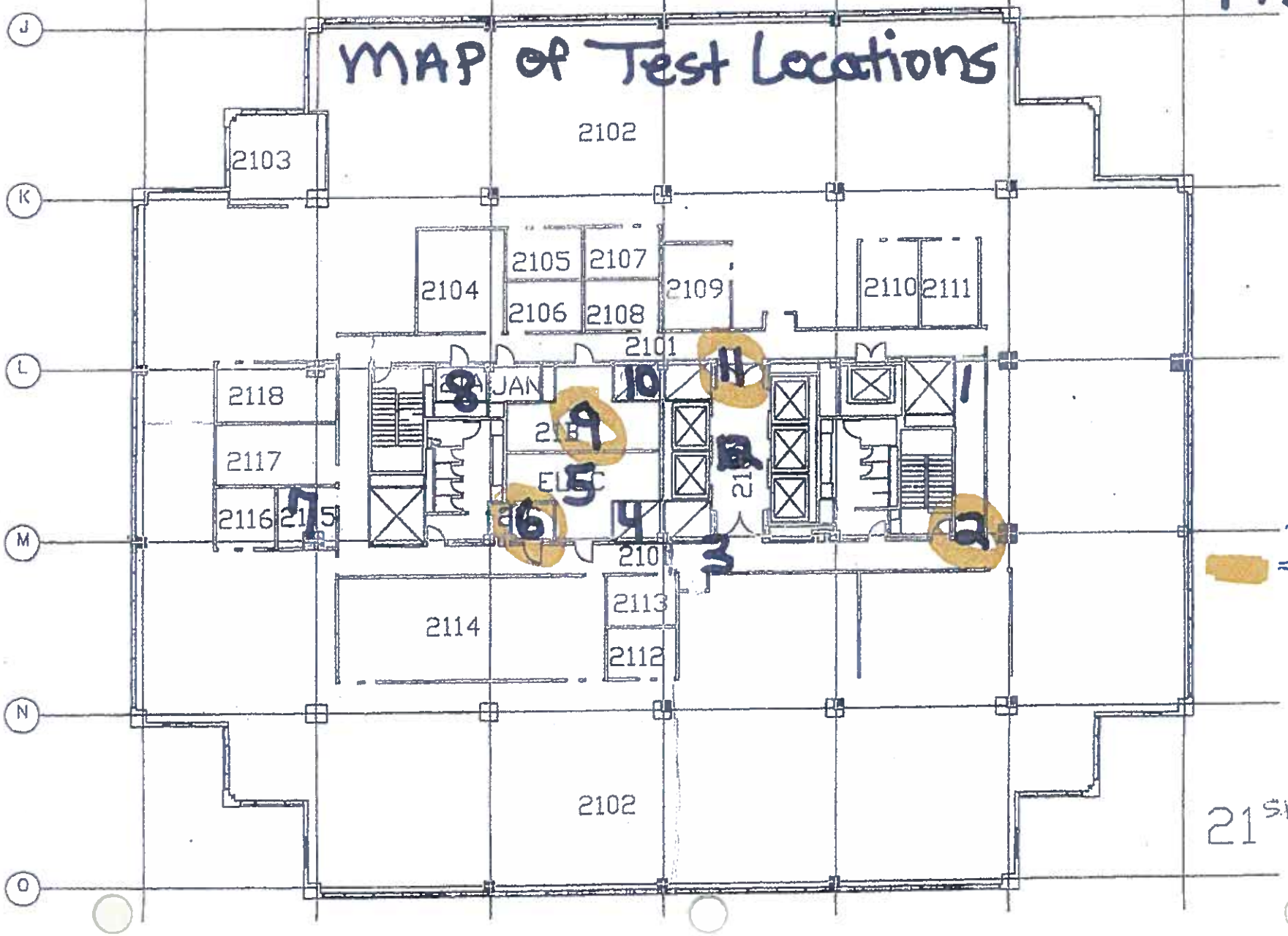
TESTS CONCLUSION:
Due to the elevated pH recorded at 10 of the 12 test locations, a concrete slab sealer that guarantees to protect resilient flooring from alkalinity or sulfate attack should be considered prior to installing any flooring product. Koesters concrete sealing products are highly successful against elevated pH in concrete slabs and strongly recommended. Only Koesters certified personnel should be considered when choosing a qualified company to apply a competent concrete sealer such as Koesters.

If you have any questions please don't hesitate to call me.

Thank you,

Randall S. Stout
Principal Consultant

Board Of Equalization Building

450 N St. Sac, CA

4-15-2011