FOUNDATION REPAIR of CA
LIFTING • LEVELING • WATERPROOFING

Structural Foundation & Crawl Space Evaluation Report

1234 Main St, Livermore, CA, 94550

INTRODUCTION

SITE OVERVIEW

Originally built in 1985, the existing residence is a single family, one-story home with attached garage that has a wood frame structure of approximately 3,200 sq-ft in the center of a 1.4 acre lot. The home rests on a foundation composed of a raised concrete perimeter foundation with a crawl space comprised of a pier/post/girder system supporting the floor. Concrete covers approximately 30% of the properties perimeter with a roof-line that is pitched and a front porch that is raised.

FOR THE PURPOSES OF THIS EVALUATION, NORTH WILL BE ASSUMED TO BE FROM THE FRONT OF THE HOUSE TOWARDS THE REAR.

PURPOSE

The main purpose of the evaluation report was to view the evidences of differential movement of the foundation through visual observation and using an high precision altimeter to measure the settlement or heave, and give our professional opinion on whether or not the foundation was performing its intended function at the time of the inspection, or was in need of repair.

LIMITATIONS

The scope of the evaluation included limited, visual observations at the interior and exterior of the structure. Only those items readily visible and accessible at the time of the evaluation were viewed, and any items causing visual obstruction, including, but not limited to, furniture, furnishings, floor or wall coverings, foliage, soil, appliances, insulation, etc., were not moved. Also excluded from the scope of this evaluation is any discussion of or condition relating to geological faults and/or subsidence. No material testing or physical samples were taken and our observations may not be indicative of all the factors contributing to the problems observed. The basis of our opinions will be the apparent performance of that portion of the home readily visible at the time of the evaluation. Disassembly or removal of any portion of the structure is beyond the scope of this evaluation. We make no representation regarding the condition of this property other than as contained in this written report. There is no warranty or guarantee, either expressed or implied, regarding the habitability, future performance, life, insurability, merchantability, workmanship, and/or need for repair of any item assessed.

SCOPE OF WORK

Foundation Repair of CA conducted an observation of the property's visible foundation, crawl space, interior floor elevations, and concrete slabs/ walkways to identify areas of damage or concern from visual observation.

The scope of our Evaluation Report consisted of the following items:

Exterior Assessment:

- Exterior photographs indicating structural movement
- Perimeter measurements
- Visible cracks in the foundation, slabs, walls, brick/ stone fascia etc.
- Rolling/ bowing in foundation walls, chimney movement and separation
- Properties concrete perimeter walkway tripping hazards
- Grading issues, drainage concerns, down spout placement

Interior Assessment:

- Interior photographs indicating structural movement
- Visible cracks in foundation, floors, walls, ceilings, dry wall etc.
- Identify bowing, heaving or sloping floors and misaligned doors and windows.
- Floor elevation measurements (elevation variances) with high precision altimeter

Crawl Space Assessment:

- Interior photographs indicating structural movement
- Foundation walls with visible cracking, spalling, crumbling, exposed rebar etc.
- Condition/ movement of pier post assemblies and girders system
- Obvious visual damaged or rotting wood members
- Signs of moisture, standing water, exterior water intrusion
- Relative humidity level (hygrometer reading)
- Earthquake resistance level (at foundation and sub-floor level)

THE RESULTS OF THE EVALUATION AND THE CORRESPONDING REPAIR RECOMMENDATIONS IF NEEDED ARE PRESENTED IN THE FOLLOWING PAGES.

OBSERVATIONS

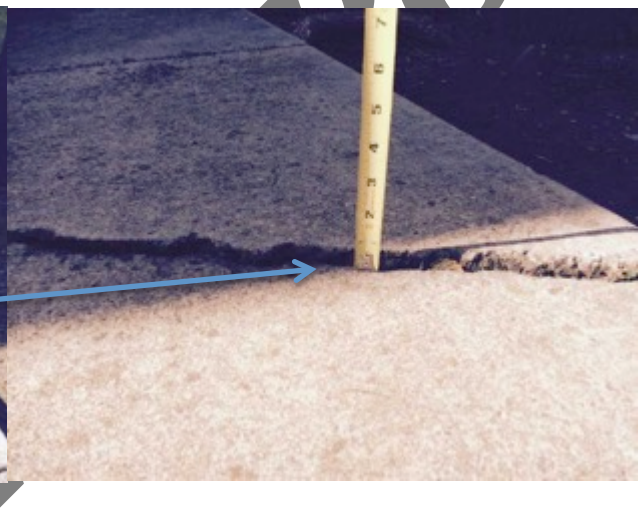
EXTERIOR ASSESSMENT

Viewable areas of foundation, exterior walls and condition of brick/ stone/ stucco/ wood siding that could be an indication structural movement:

A visual inspection of the raised concrete perimeter foundation around the exterior perimeter of the house showed only a small portion of the exterior foundation wall area to be visible due to the stucco siding extending down over the raised foundation walls. Two hairline vertical cracks were noted in the raised foundation wall (one at the east side and one at the west side of the home). These two cracks are thin and are not compromising the structural integrity of the foundation. It is recommended to seal these two cracks with an epoxy to help seal from moisture intrusion, which can then be painted over to match the existing siding color. Cracking in the stucco siding was also noted around some of the corners of windows and doors. Please note that the following is only some, not all, of the cracks observed on the exterior portion of the house. (Please see blue arrows and pictures below)

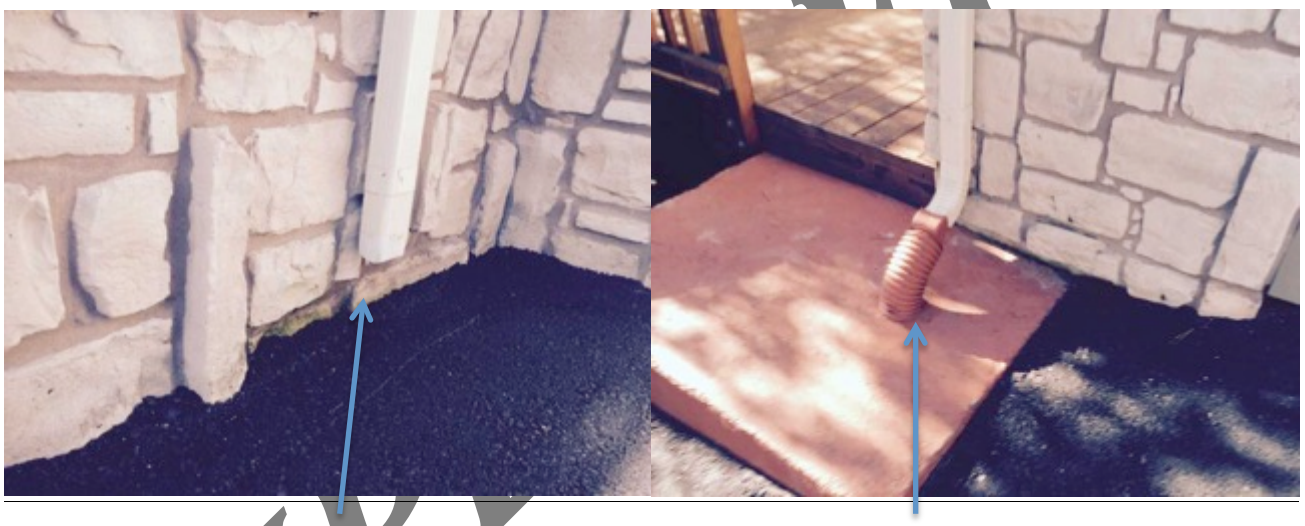
Properties concrete slab perimeter driveways, walkways, and patios:

The properties concrete perimeter driveway, walk-ways showed some signs of notable cracking with some potential tripping hazards present at the side driveway due to the areas concrete slab displacement from settlement. It is recommended to seal all cracks to help stop water intrusion which can undermine the soil under the concrete slabs. It is also recommended to monitor the sections with displacement to see if the potential tripping hazards become more pronounced over to time. Some form of concrete restoration through polyurethane foam injection could lift these areas to minimize the potential tripping hazards as one possible solution. (Please see blue arrows and pictures below)



Land topology, down spout placement, and exterior water drainage:

Land topology around the property's immediate foundation perimeter is mostly flat with the exception of the south garage wall that has the hillside sloping away from the home. An exterior water drainage system for the down spouts such as being buried with extensions to divert water away from the foundation was present for all but 1 of the downspouts. It is recommended to maintain the water drainage extensions connected to all down spouts to divert the water at minimum 10 feet away from the foundation perimeter, not allow for leakage, and to keep the gutter system maintained. Water pouring out of the downspouts without proper water drainage or having a slope in the ground that leads down towards the home will allow the water to be directed in an area that could help compromise the soil around the perimeter of the foundation, which can contribute to water intrusion and structural settlement issues. (Please see blue arrows and pictures below)

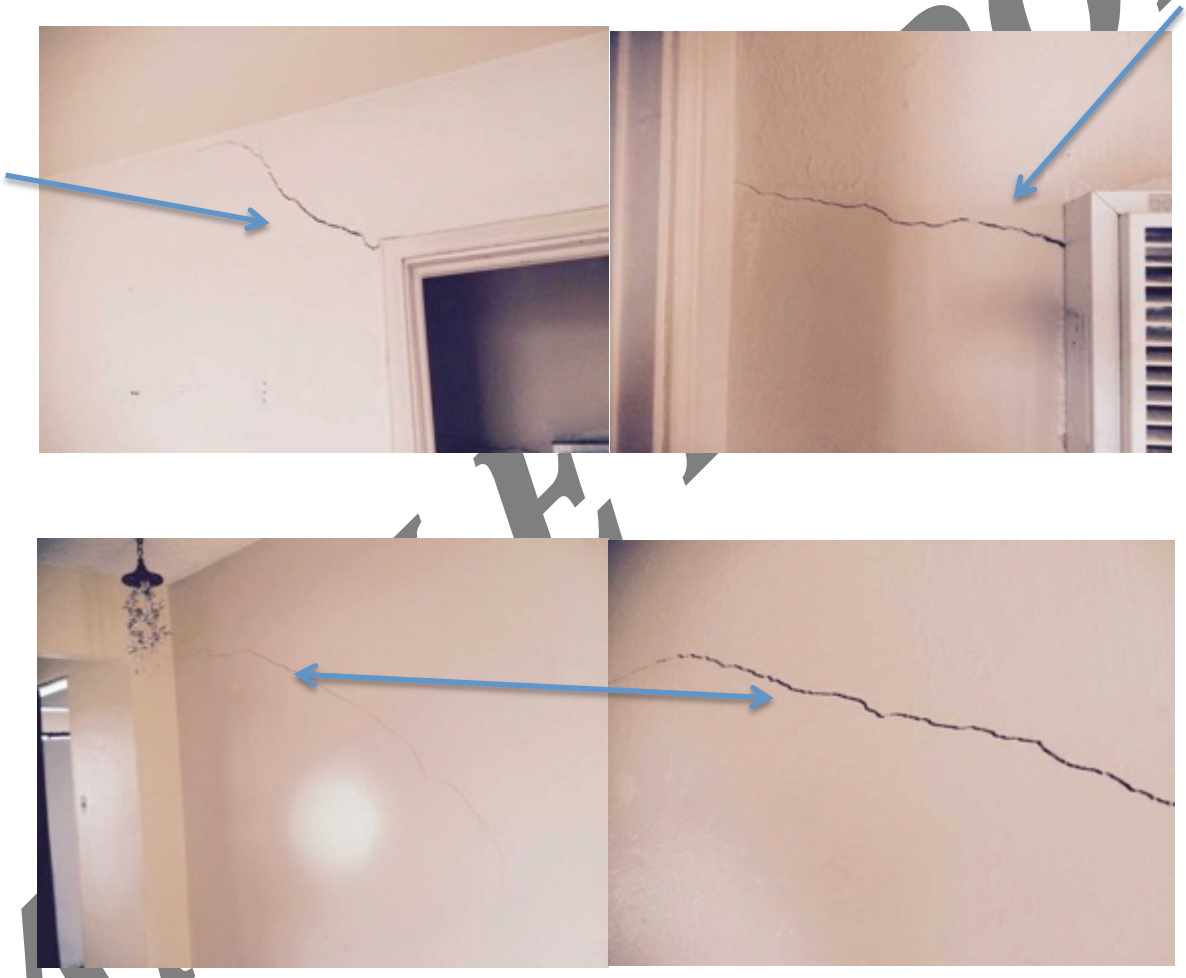


Downspout without drainage extension **Downspout with drainage extension**

INTERIOR ASSESSMENT

Viewable areas of foundation, interior floors, walls, ceilings, dry wall and trim that could be an indication structural movement:

Dry wall cracking and separation of materials was observed on the interior portion of the home at the time of the evaluation as seen in the photos below. Note that the following is only some, not all, of the cracks and separation of materials observed on the interior portion of the house. (Please see blue arrows and pictures below)



Floor elevation measurements (elevation variances) with high precision altimeter to identify heaving, sagging or sloping floors:

A high precision altimeter elevation survey was performed on the interior floor of the subject property, using the foundation perimeter as the bench mark or starting point; designated as “0.0” on the floor plan (Figure A). Measurements of the floor elevation were made in tenths of an inch. The highest elevation reading recorded was 0 inches while the lowest point was -2 inches. The maximum difference in the floor elevation readings was 2 inches. Center portions of the home supported by the pier post assemblies and girder system were generally in line with the perimeter measurements and no major changes in elevation were noted.

CRAWL SPACE ASSESSMENT

Viewable areas of foundation walls condition:

The interior portion of the raised foundation wall was visible from the crawl space. There were no obvious signs of cracking, concrete crumbling, rust, or exposed rebar. The areas that showed light horizontal cracking on the exterior portions of the raised foundation wall were assessed from the inside and no cracking was present.

C**ondition of pier post assemblies and girder system:**

The crawlspace isolated pier post assemblies are supporting the main girders or support beams at the interior of the home. These assemblies are necessary to maintain a relatively firm and consistent elevation of the finished floor. All of the pier/ post assemblies were straight on the girders and structurally sound. There does not appear to be any major settlement or movement of the concrete piers, which was reflected by the relatively level elevation readings above.

Signs of moisture, standing water, or direct water intrusion:

The interior portion of the raised concrete foundation wall that was visible from the crawl space showed it at some point had a moderate level of moisture with mineral deposits (efflorescence caused as humidity/ moisture dries leaving a white crystallization). The crawl space area was dry along the exterior foundation wall and interior portions at the time of the evaluation.

It was not raining at the time of the evaluation and, therefore, it could not be determined with certainty if water would enter the crawl space at any other points or pool at any localized low areas around the property. (Please see blue arrow and picture below)

Relative humidity level (hygrometer reading):

The relative humidity level in the crawl space was recorded at 53% using a hygrometer. Permanently maintaining a relative humidity level less than 60% inhibits fungal growth.

Earthquake resistance level (at foundation and sub-floor level):

Foundation anchorage with anchor bolting was adequate and noted throughout sections of the crawl space.

Foundation Anchor Bolt

CONCLUSIONS AND RECOMENDATIONS

FOUNDATION CONCLUSIONS

Foundation Settlement:

Changes in the soil conditions beneath your home can cause raised foundation wall settlement. The weight of your home can cause loosely compacted soil to compact over time, creating elevation changes in the foundation wall as well. Similar voids are often the result of erosion caused by excessive water. When your raised foundation wall cannot support the weight of structure across the span it begins to sink.

There is evidence of foundation settlement through visual observation and the use of the altimeter to measure the degree of elevation changes that were outside of industry standards. It is my opinion that a section of the structures foundation is not performing to its full-intended function at the time of the evaluation, and is in need of repair if looking for a permanent solution to stop additional sinking.

The structure and foundation is showing signs of differential settlement. For example the span between the “0.0” elevation reading to -2” seen going from north to south on the foundation perimeter on the west wall of the bedrooms and bathroom had a 2” elevation drop over 17 linear feet.

Deep foundation stabilization or lifting through underpinning with push piers would be recommended to stop further settlement in this area and all other areas seen to be sinking. Any visual signs of potential additional settlement should be monitored over time in the future to see if there is any further progression. Other areas of the home should be monitored closely with the amount of settlement already seen.

Foundation Cracking:

The thin vertical cracks seen on the exterior of the home should be sealed with an epoxy to help stop moisture intrusion which can make the rebar within the concrete rust and or expand and contract which can lead to more cracking.

FOUNDATION RECOMMENDATIONS

- Install push piers around the portions of the raised foundation perimeter wall to cover the low elevation areas seen outside of industry standard which will stabilize and protect the structure from further settlement in those areas.

- Install epoxy to all thin vertical cracks on exterior raised foundation wall.

- It is recommended to have a structural engineer perform a conditions report in addition to this Evaluation Report due to the piering recommendation. Any piering installations require a third party structural engineer to perform a conditions report to create calculations and drawings to be submitted to the city for permitting.

EXTERIOR CONCRETE SLAB CONCLUSIONS

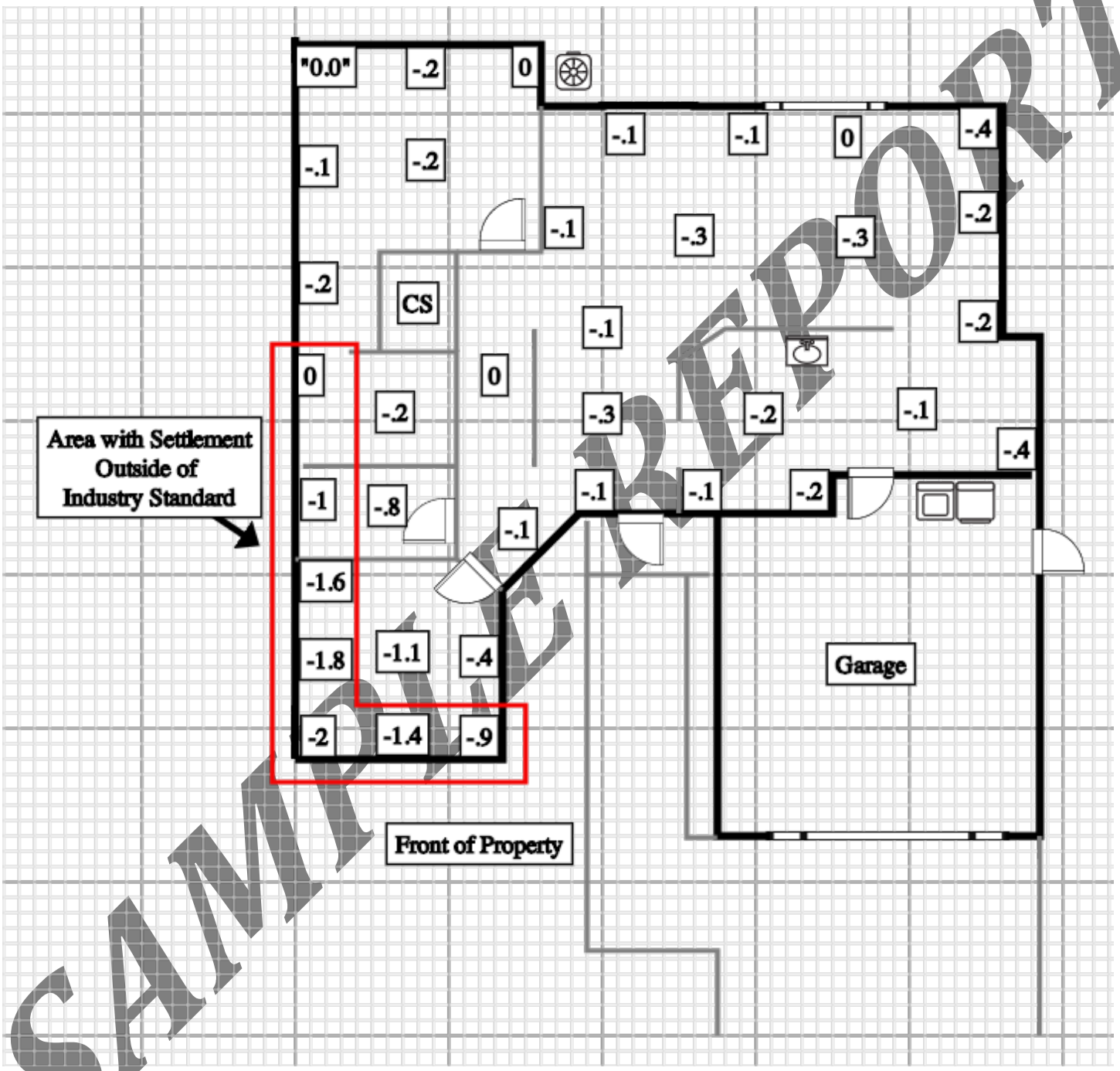
Tripping Hazard:

The properties concrete perimeter driveway, walk-ways and back patio that showed signs of notable cracking with a potential tripping hazard present at the walkway due to the areas concrete slab displacement from settlement could be restored by sealing all cracks and lifting the concrete with a polyurethane foam injection.

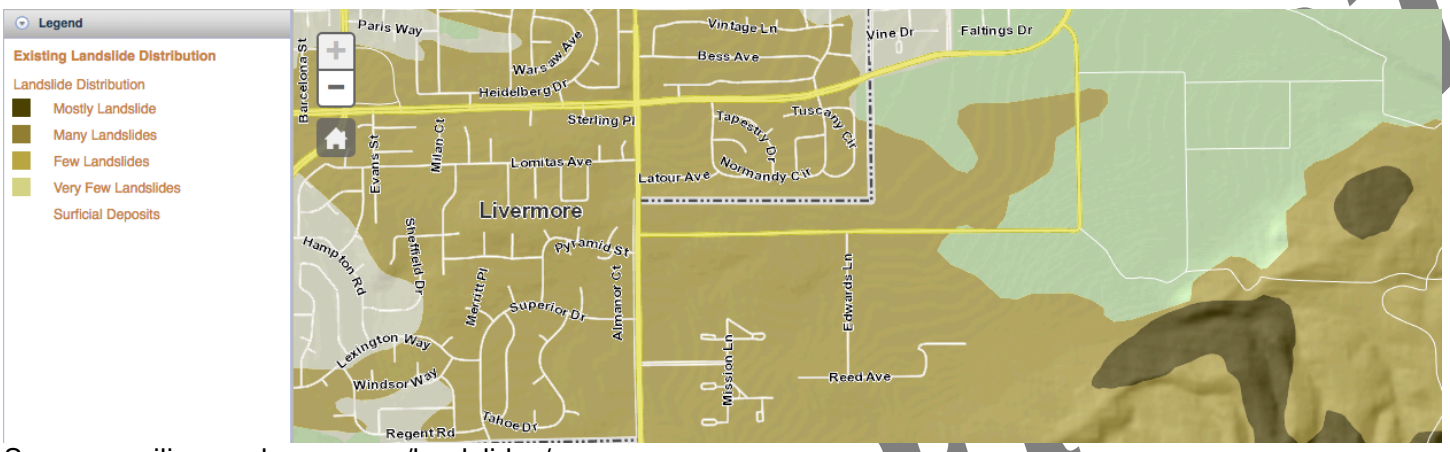
EXTERIOR CONCRETE SLAB RECOMMENDATION

- Inject polyurethane foam under displaced slabs to minimize surface height differences to reduce tripping hazards and seal all cracks to help stop potential water intrusion.

Elevation Survey (Figure A)



Land Slide Hazard Map (Figure B)



Source: resilience.abag.ca.gov/landslides/

San Francisco Bay Region Hazards

While many Bay Area residents are familiar with the hazards associated with earthquakes, there are other hazards that can impact the region. This map application is intended to provide general information related to hazard potential, planning areas, and impact severity.

****Disclaimer****

The information provided is intended for planning use only and is not intended to be site-specific. Rather, it depicts general risks within neighborhoods and the relative risks from community to community. Hazard levels are less likely to be accurate if your neighborhood is on, or near, the border between zones. The information in this map application is not a substitute for a site-specific investigation by a licensed professional.

Maintenance Program

It is recommended to implement a standard home maintenance program as follows:

- Keep rain gutters, downspouts, and drain lines clean and properly connected without leakage directed at least 10 feet away from the foundation perimeter to lower areas of the property away from the home.

- Monitor foundation and sub floor conditions for changes every three years by a qualified professional.

- Maintain proper function of existing interior and exterior drain and pluming lines to not allow for water leaks.

- Homes with crawl spaces should be monitored annually and after rain fall for any signs of moisture, direct water intrusion, or water leaks.

- Implement a professional pest control program per residential standards to help maintain all wood subfloor and framing systems.