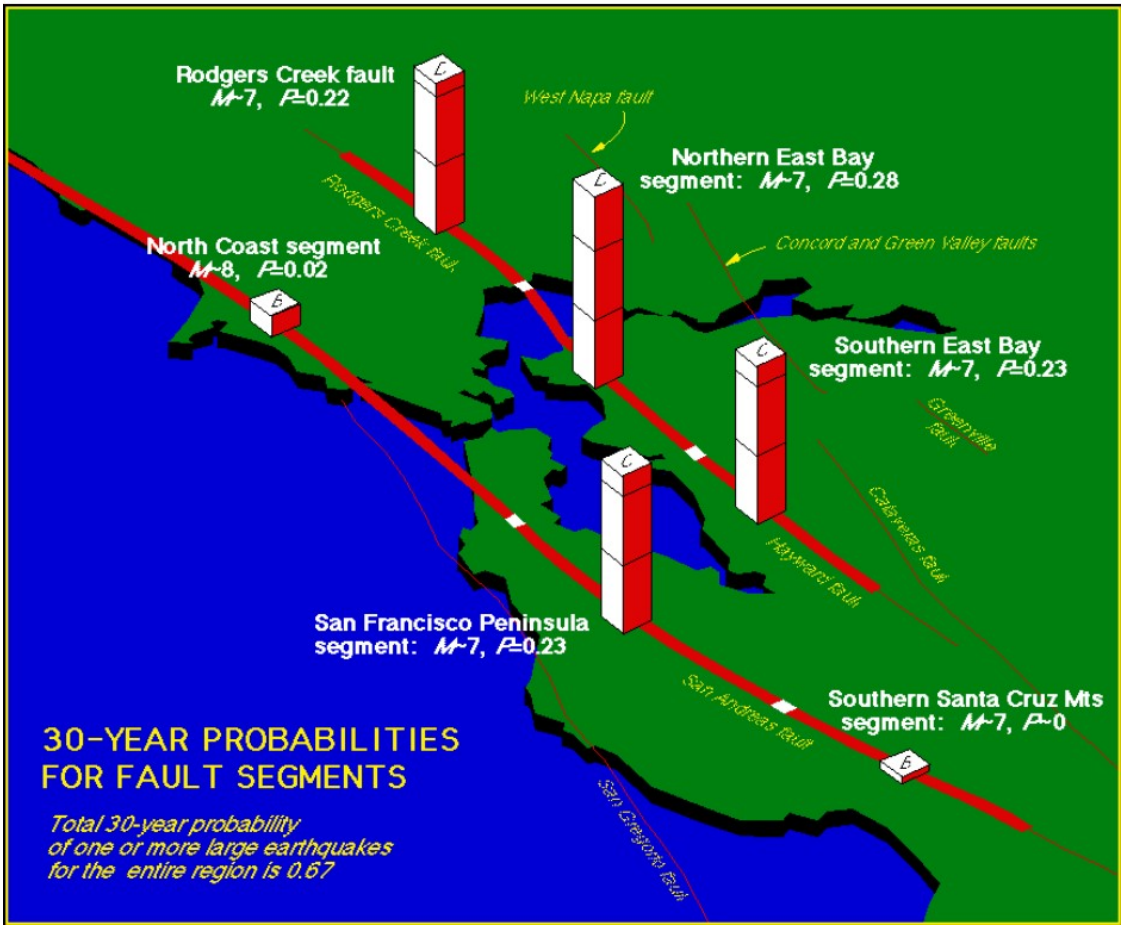
Bay Area Retrofit
www.bayarearetrofit.com

510-548-1111
Workers' Comp. #2246
Contractors Lic. #558462
Liability Insurance GL3984008
Bond #6334450

When making a decision about whether or not it is worth spending thousands of dollars it is important to grasp what the risk of catastrophic damage my be. This hinges on two factors: the amount of shaking your building will be subjected to and the ability of the building to resist seismic forces. I will be looking at both of these factors in this report.

The bar graph below tells us the probability of a large earthquake on the 4 segments of the Hayward Fault that are a threat to your building: the Rodgers Creek fault, the Northern East Bay segment of the Hayward fault and the Southern East Bay segment of the Hayward Fault. Each of these faults can rupture together or independenly.

The Northern East Bay Segment is the most serious threat because it has the highest probability of rupturing and is the closest to your building. In other words, its rupture will create the highest shaking intensity based on the Modified Mercalli Intensity Scale (MMI). The probability of a rupture is ~28% over the next 30 years. Earthquake prediction is not an exact science and some forecasters differ slightly from what you see here. This is the probability risk.



In addition, your building will be in zone IX on the MMI Scale according to USGS statistics. This table shows that 15% of the multi-story building like yours will become uninhabitable if this happens. This table was created in 1995 which means it targets buildings built between 1939 and 1995. I believe your building dates to 1984 which it on the upper end of this time period. This is in your favor because building code requirements to resist seismic forces increased steadily from 1939 until 45 years later when your building was constructed. Visually this was obvious to me given the entire structure was bolted, covered with plywood, and had holdowns to resist overturning forces. It also had bracing at the garage door openings. Most of the soft story buildings we work on don't have any bracing at all.

This also means it was built to resist force levels specified in the 1982 Uniform Building Code. I do not know how those force levels compare to the current building code except to say many cities I work with require retrofit designs meet the force level resistance requirements of the 1976 Uniform Building Code. Insurance companies also require that we fill out a form that confirms the building is in compliance with the 1976 Uniform Building Code. I have no idea why this year is so significant but it does look like the seismic provisions noteworthy. Based on the 1984 construction date we can therefore with confidence conclude that it at can at a minimum resist these force levels.

TABLE: PERCENT OF DWELLING UNITS RED TAGGED

TYPE	INTENSITY					
	V	VI	VII	VIII	IX	X+
Mobile Homes	0	0	0.87	40	90	100
Unreinforced Masonry	0	0.05	2.9	45	70	80
Non-Wood , 4-7 Stories, <1940	0	0.30	8.0	45	70	80
Non-Wood, 4-7 Stories, >1939	0	0	0	16	54	70
Non-Wood, 7+ Stories, <1940	0	0.30	8.0	45	70	80
Non-Wood, 7+ Stories, >1939	0	0	0	16	54	70
Wood-Frame, 4-7 Stories, <1940, Multi-Family	0	1.4	2.5	45	70	80
Wood-Frame, 4-7 Stories, >1939, Multi-Family	0	0	0.09	10	15	25
Wood-Frame, 1-3 Stories, <1940, Multi-Family	0	0.05	0.53	11	44	64
Wood-Frame, 1-3 Stories, >1939, Multi-Family	0	0.01	0.04	6.5	15	25

In light of this I would tentatively put the probability of your building being red-tagged at less than 5%. One never knows how a building will react but given the data I have I think this is a good estimate and I may be way off base. I can only present to you my understanding of this subject gleaned over the past 25 years of doing this.

Vi Gang has created a tentative design that meets the current 2022 building code if you want to increase your level of protection. Briefly looking at his tentative design I would guess the price to be between $250,000 and $300,000. In order to give you a fixed price I would need to see his final design.

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