



Bay Area Housing and Community Multiple Hazards Risk Assessment

Why Study Regional Housing and Communities?

The natural hazards faced by the Bay Area, such as ground shaking and liquefaction from earthquakes and flooding from extreme storm events and sea level rise, will affect infrastructure along the San Francisco Bay shoreline, but will have a particularly significant consequences on people where they live. Not only is much of the region's housing vulnerable, but in many communities there are members such as the elderly, people with special mobility or medical needs, people without automobiles, or renters that may lack access to information and services or the financial means or the physical capacity necessary to prepare for and respond to these hazards.

The resilience of the region depends on the capacity of its housing to quickly recover. If people can stay in their homes and have access to the social networks and services they rely on they will be better able to participate in the rebuilding their neighborhoods and cities, better able to go to work and support local business, and better able to support the recovery trajectory of the entire region. Therefore, a key first step in improving regional resilience is to better understand the vulnerability of existing housing. In addition, the historic response to disasters has demonstrated that specific needs of certain community members must also be considered in order to both build resilience and protect public health and safety. Lastly, the region needs to look beyond existing housing and begin considering how to create resilient housing in areas of future growth. In the San Francisco Bay Area, locally designated areas of focused growth are known as Priority Development Areas (PDAs). Some of the PDAs or portions of the PDAs where new housing is anticipated or planned could be at risk from earthquakes and sea level rise, and therefore planning and policy strategies to ensure their resilience are needed.

Two regional collaborative planning efforts will inform this project. ABAG's Resilience Initiative has identified priority actions to improve the region's resilience to natural disasters, while at the same time BCDC's Adapting to Rising Tides project has been working to improve the region's understanding of how to plan for and respond to sea level rise and storm events.

The approach to conducting this project is three-fold:

- 1) Characterize the vulnerability of existing housing, community members, and representative future high growth areas to ground shaking, liquefaction, and flooding due to sea level rise (Assess)
- 2) Develop policy and planning strategies as well as implementation options that can help local jurisdictions address the identified vulnerabilities (Strategies)
- 3) Share findings with local jurisdictions (Document & Disseminate)

This project will result in a number of key outcomes including:

- Selection, analysis and mapping of key characteristics that describe housing and community member vulnerability at a scale that will highlight where additional more fine-scale analysis is needed
- Improved understanding of synergies and conflicts between earthquake risk mitigation, sea level rise adaptation, and smart growth
- Recommendations for policy, planning, coordination, education, and programmatic strategies that can be implemented by local jurisdictions
- Tools and resources for that can be applied at neighborhood, local and regional scales to assess housing and community member vulnerability in a manner leading to implementable strategies
- Active and engaged experts that can advise the region in how to improve existing, and build future, housing and community resilience

How will the Assessment be Conducted?

To develop a regional narrative and map of housing and community vulnerability the assessment will evaluate the relationships among the following:

- a) Hazards and impacts
- b) Existing housing characteristics (housing indicators)
- c) Community member characteristics (community indicators)
- d) Representative future high growth areas (either entire or portions of PDAs)

Project staff have selected the earthquake and sea level rise scenarios and impacts that will be evaluated. For earthquakes these include ground shaking and liquefaction due to a M6.9 Hayward Scenario or a M7.8 San Andreas Scenario, which together cover the majority of the highest probability and greatest potential earthquakes impacts in the Bay Area. For sea level rise these the future flooding and the potential for elevated groundwater and salinity due to 24, 36 or 48 inches of sea level rise. These three future sea level rise projections will be used to understand a total of fifteen (15) different combinations of future sea level and storm events (extreme water levels).

Project staff is working with the Advisory Committee to select the existing housing and community member characteristics (indicators) that can be used to evaluate regional vulnerability. Key to this effort is developing a meaningful process to both select and apply indicators in a manner that goes beyond a creating a laundry list of all possible characteristics. Rather, the final indicators used in the assessment will be based on the Advisory Committee's experience and expertise in how best to understand and communicate vulnerability in a transparent and locally actionable way. In addition, project staff are also documenting other characteristics that cannot be evaluated in the current project but are important to consider either at more refined scale or if and when the information becomes available at a regional scale.

How will the Assessment Inform the Selection of Strategies?

The outcomes of the assessment will inform the consideration and selection of policy, planning, coordination, education, and programmatic strategies. In this way, the strategies recommended to local jurisdictions will be grounded in an understanding of what characteristics and conditions make housing and community members more or less resilience and capable of recovery.

As an example, if a local jurisdiction has a resilience goal to “promote housing mitigation to reduce housing loss and expedite recovery¹” and the assessment finds that the jurisdiction has an areas at risk of **liquefaction** and **future flooding** due to sea level rise a number of **soft-story, multi-family units** that are **not retrofit** and are housing mainly **elderly community members** then recommended strategies could be to require or incentivize (1) the retrofit of these existing structures housing the elderly; (2) the installation of back up power supplies (generators); (3) relocation of the elderly to less vulnerable housing types; and, (4) the construction of future housing for elderly community members in areas at not at risk.

In addition, implementation options describing how local jurisdictions could integrate the recommended strategies into existing plans and policies, such as land use plans, hazard mitigation plans, zoning and building codes or ordinances will be provided, and if new initiatives or efforts will be necessary they will be described.

¹ Example resilience goal from ABAG's Regional Resilience Initiative Housing Policy Paper, March 2013