earthquake and hazards program
Association of Bay Area Governments

Adapting to Rising Tides

Housing and Community Risk Key Issue Statements (August 26, 2014)

Key issue: Ground shaking can damage cripple wall and house-over-garage single-family homes
Many established residential neighborhoods have single-family homes that could be significantly damaged during an earthquake. These include homes with short unreinforced walls that raise the first floor 1-5 feet above ground level (i.e., cripple walls) and those that are two or more stories with garages or other large openings on the first floor. Renters and owners of single-family homes that are not retrofit, and those that do not have hazard insurance, may be displaced from their existing neighborhood and could have a difficult time rebuilding or finding a replacement home. Some residents may also struggle to find housing that is affordable near the jobs, schools, medical facilities, and other services they rely on. (Strategies: 1-3, 7, 11, 17-21, 39)

Key issue: Ground shaking can damage weak story, concrete and cripple wall multi-family housing
There are an number of multi-family housing types that can collapse if not properly retrofit. This includes those with parking or retail on the ground floor (i.e., weak story or open front), that are built from concrete that is not properly reinforced (i.e., non-ductile), or those that have short unreinforced walls that raise the first floor 1-5 feet above ground level (i.e., cripple walls). Depending on the number of units, damage to multi-family housing can displace a large number of residents that may then struggle to find housing that is affordable near jobs, schools, medical facilities, and other services they rely on. In addition, multi-family housing does not always receive an equitable share of state or federal financial and technical assistance during recovery efforts and therefore may not always be rebuilt in a timely manner. (Strategies: 1-3, 7, 8, 11, 17-22, 24, 39)

Key issue: Housing is generally built to life safety rather than shelter-in-place standards
Newly constructed housing built to life safety standards can still be damaged during an earthquake. For example modern building codes generally do not address liquefaction risk since it is not a life safety consideration. The result is that some residents will not be able to shelter-in-place or remain in their homes, and that extensive repairs or rebuilding may be required. (Strategies: 22-26, 36)

Key issue: Most foundations cannot withstand liquefaction
Homes located where soils are susceptible to liquefaction, for example along the Bay shoreline or on fill, may experience significant enough damage during an earthquake to become uninhabitable. Most single- and multi-family homes under 10 stories are unlikely to have foundations stable enough to withstand liquefaction even if they can withstand ground shaking. (Strategies: 1, 2, 11, 23)

Key issue: Most houses cannot withstand any amount of flooding
If exposed to flooding, most housing built in the Bay Area will be damaged as current construction materials, siting and design standards do not consider potential exposure to either water or salt. As sea level rises existing and future housing of all types within FEMA identified Special Flood Hazard Areas (SFHAs) will be at greater risk of flooding, and housing in low-lying areas not currently at risk may begin to experience flooding. (Strategies: 1, 2, 27-31)

Key issue: Houses with habitable space or critical equipment below-grade are at risk from flooding
Homes with habitable living space or critical building equipment below-grade are likely to be significantly damaged by flooding. Neighborhoods with existing drainage issues, for example that

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experience street or basement flooding during current rainfall events or when groundwater levels are high, will be at even greater risk as the Bay rises. (Strategies: 1, 2, 27-31)

Key issue: Many community members have limited access to resources
Many Bay Area residents that live in areas at risk from natural disasters are resource constrained. This includes households that are low and very low income, households of all income levels that are housing and transportation cost burdened, and transit dependent households that do not own a car. Resource-limited households are less able to prepare for natural disasters, and if displaced from damaged homes will likely struggle to find housing that is affordable and near to the jobs, schools, medical facilities, and other services they rely on. (Strategies: 4, 7, 34, 38, 39)

Key issue: Housing affordability is an existing challenge that could hinder recovery
Housing affordability for both renters and owners is an existing challenge in the Bay Area that will compound the number of community members displaced by a natural disaster. Much of the region is housing cost burdened already, spending 30% or more of income on housing. For others, the amount spent on housing is fairly stable either through rent-control policies or because they own their homes and their property tax burden is unchanging. Loss or damage of housing that results in increased costs to either renters or home-owners will likely increase the number of permanently displaced Bay Area residents as finding housing that is affordable and near jobs, schools, medical facilities, and other services they rely on will be challenging. (Strategies: 2, 4, 7, 34, 37, 39)

Key issue: Renters have limited ability to improve their housing resilience
Many Bay Area residents that live in areas at risk from natural disasters are renters. Renters have a limited ability to improve the housing they live in and often do not have hazard insurance to protect themselves and their belongings in case of a disaster. Communities with a large number of renters, and in particular resource-limited renters, will need to assist these residents both during a disaster, for example with shelter-in-place facilities, as well as post-disaster with finding interim, affordable housing to avoid the permanent displacement of renters from communities due to damaged housing. (Strategies: 2, 4, 7, 20, 36, 37)

Key issue: Many community members have limited or inadequate information about hazards
Access to timely, correct, and meaningful information both before and after a natural disaster can be challenging in all communities and can be a particular challenge in communities that are ethnically and culturally diverse, and where there is a large number of households where English is not the primary language spoken. Additionally, in the Bay Area many of these same community members are resource-constrained renters who are often living in overcrowded housing. Damage to housing during a natural disaster can lead to a significant amount of displacement and a struggle to find housing that is affordable and near enough to jobs, schools, medical facilities, and other services. (Strategies: 2, 38, 39)

Key issue: Information on elderly and very young community members is limited
Up-to-date and easily accessible information about the number of elderly and very young living in a community can be challenging to find, particularly during a disaster when it is most needed. It can be difficult to evacuate these community members, especially if they need specialized equipment or supervision, and shelter-in-place facilities need to be prepared to both house them safely and maintain communication with concerned family members. (Strategies: 2, 34, 36, 38, 39)

DRAFT

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Adapting to Rising Tides

Housing and Community Risk Draft Strategy List (August 26, 2014)

Scale	#	Strategy Name	Strategy Snapshot
The following strategies involve complex research or regulations that require initiative or buy-in from the state. Local jurisdictions should be aware of issues that need to be guided by the state and support state action on these areas. These strategies are generally prerequisites for actions at the local level, or they greatly assist jurisdictions in developing and implementing specific actions.			
S	1	Complete seismic hazard mapping of urban and urbanizing areas	The California Geological Survey (CGS) is encouraged to complete mapping of seismic hazard zones for the portions of the Bay Area that are not currently mapped or in the process of being mapped with priority given to urban and urbanizing areas.
S	2	Develop education program(s) to encourage homeowners and renters to purchase of hazard insurance	Create targeted education programs that encourage homeowners and renters to better understand their risk and make more informed decisions about the purchase of earthquake and flood insurance. This includes education about retrofitting versus insurance, understanding the site-specific hazards of their building, helping them understand what the costs versus benefits are of purchasing insurance, and what is and is not covered by hazard insurance policies.
S	3	Improve the quality assurance of non-engineered retrofits by developing a statewide retrofitting license for contractors	Increase the number of skilled contractors, contractor knowledge, owner assurance and trust in their retrofit, and consistency in retrofit quality between jurisdictions by developing a statewide program to train and license contractors in seismic retrofits.
S	4	Protect affordable housing during recovery	Develop policies that protect affordable housing from being damaged by a natural disaster, mandate that affordable housing that is damaged be rebuilt as affordable housing, ensure funding streams are available for rebuilding damaged affordable housing, and encourage building new affordable housing to ensure that low-income residents are able to stay in the region.
The following strategies require initiative greater than a single jurisdiction can provide because the issues extend beyond jurisdictional boundaries. In some cases, local action doesn't make sense without regional cooperation or coordination. In many cases, this regional work will then spur community-specific actions at the local level with policy, assistance, or information-sharing.			
R	5	Establish a cooperative shoreline management program	Coordinate between government agencies, organizations, and land owners to establish and maintain a cooperative shoreline management program. This cooperative program could identify strategies for shared decision making and funding to reduce current and future flood risks in a manner that benefits and balances issues of equity, economy, and environment.
R	6	Develop guidelines for the siting and design of transit stations and transit service to reduce transit disruptions after an event	Metropolitan Transportation Commission (MTC), county congestion management agencies, local jurisdictions, and transit providers such as Bay Area Rapid Transit or the Water Emergency Transportation Authority to work together or separately to develop guidelines for the siting and design of transit stations and transit service to reduce transit disruptions after a flooding or seismic event.

DRAFT

R	7	Encourage innovative insurance solutions at the state and federal levels, and in partnership with the private sector (all hazards)	Lobby and advocate for the expansion of state- and federally-mandated catastrophe insurance programs, such as the California Earthquake Authority. Better insurance solutions could enhance mitigation efforts by offering incentives such building permit rebates, lower premiums or deductibles for retrofitted homes, state-level tax incentives, and state and federal grants to fortify homes and business.
R	8	Advocate for changes to federal and state programs to improve multi-family rebuilding efforts	Lobby at the state and federal levels to ensure multi-family housing receive a fair and equitable share of financial and technical assistance during rebuilding and recovery efforts.
R	9	Decrease reliance on grid-supplied power	Lessen household energy demands on the grid through energy efficiency and/or on-site energy generation or storage to promote buildings that will maintain livable conditions in the event of extended loss of power or heating fuel. This can be done through incentives for residential energy efficiency retrofits, weatherization projects, building design standards that promote energy load reductions, and on-site generated electricity or bi-direction energy sources.
R	10	Host a regional "Smart and Safe" growth design competition	Develop a region-wide design competition to promote innovative approaches to design and build high-density, mixed-use community development or redevelopment in a safe and smart manner in areas that are susceptible to multiple hazards.
The following strategies can be initiated and implemented at a local jurisdictional level. In many cases, initiation and/or implementation would be easier, or advantageous to the region with coordination or assistance from a regional body such as ABAG; however this partnership is not a prerequisite for action.			
The following strategy greatly benefits the efficacy of the following strategies and should be considered a prerequisite for strategies 12-23			
L	11	Develop locally-specific seismic hazard maps	Develop locally-specific seismic hazard maps to improve upon mapping resolution, support more informed and nuanced decision making about development and hazard mitigation, and also consider the correlation of seismic hazards with other hazard related risks such as wildfire, tsunami, flood, and permanent inundation.
The following strategies all address where to build to avoid the highest hazard areas. Strategies 14-17 provide specific actions that can be used to meet the goals of strategies 12 and 13. Strategy 11 should be used as a prerequisite to determine the highest hazard areas within a jurisdiction.			
L	12	Increase protection of critical facilities and lifelines	Require critical infrastructure and public-service facilities to be located or relocated outside the high hazard areas, or that seismic- and flood-related mitigation and other protective measures be undertaken to enhance the structural integrity, overall performance, and functionality of facilities that must be located within high hazard areas through updating general and specific plans, zoning codes, development guidelines, and building codes. Emphasis should be given to ensuring the continuity of operations of critical facilities and lifelines essential to helping residents remain in their homes following a disaster and facilitating and

DRAFT

			expediting community and regional post-disaster recovery.
L	13	Reduce or prohibit development of housing in the most hazardous areas while ensuring equity and beneficial use of these areas	Reduce or prohibit development in high hazard areas, incentivize relocation out of these areas, and reduce or prohibit rebuilding after a disaster. This strategy also works to create beneficial uses, such as open space, flood mitigation and recreation, for non-developable high hazard lands.
L	14	Establish overlay zoning districts to help facilitate safe and smart new development	Establish overlay zoning districts to cluster new development into lower hazard areas on a particular site while also establishing special conditions for development in high hazard areas.
L	15	Establish a Transfer of Development Rights program to redirect development from high hazard areas to preferred, low hazard areas	Amend local development codes to establish a Transfer of Development Rights (TDR) program, which could place permanent conservation or hazard mitigation easements on properties in high hazard areas, to prevent or minimize the vulnerability of new development to seismic and flood hazards.
L	16	Adopt Community Benefit Agreement policies to ensure more resilient communities	Adopt policies requiring Community Benefits Agreements (CBAs), which are legally binding contracts with developers that set forth tangible benefits a community will receive from a development/redevelopment project, as a tool to improve community resilience and capacity to recover from a disaster. These benefits might include construction of parks or public gathering spaces, community health or medical facilities, shelter in place facilities, etc.
The following strategies address the retrofit of fragile housing in seismic hazard areas. Strategy 11 should be considered a prerequisite to identify high hazard areas, and strategy 17 should be considered a prerequisite for strategies 18 and 19. Strategies 18 and 19 should be considered prerequisites for strategy 20, as locally appropriate.			
L	17	Create a fragile housing inventory	Create and maintain a database that includes the type and location of fragile housing by building type and housing tenure (owner vs. renter), and the property's retrofit status. This would include developing and sustaining standardized, transferrable procedures for collecting and managing data. The inventory should contain, at a minimum, unreinforced masonry buildings, soft-story buildings, and non-ductile concrete buildings.
L	18	Develop soft story retrofit program	Develop a retrofit program to address soft story housing in areas where it makes up a significant of a jurisdiction's housing stock. Pair programs with financing tools and incentives. Consider different incentives and financing tools for more vulnerable communities, such as low-income residents or renters.
L	19	Develop cripple wall retrofit program	Develop a retrofit program to address cripple wall housing in areas where it makes up a significant of a jurisdiction's housing stock. Pair programs with financing tools and incentives. Consider different incentives and financing tools for more vulnerable communities, such as low-income residents or renters.
L	20	Require hazard disclosure for renters	Develop policies that require residential property managers and landlords to disclose hazard risk information to renters in a manner similar to that required when residential properties are sold, as well as information about whether the property is

DRAFT

			included in a fragile housing inventory.
L	21	Expand requirements triggered by major upgrades and repairs to existing buildings to address seismic and flood-related hazards.	Develop and adopt special repair and upgrade standards for existing buildings that are not typically part of hazardous building abatement programs and are also potential candidates for conversion to mixed-use or higher-density residential use in areas of expected growth. This strategy focuses on reducing the risks posed by existing hazardous buildings by addressing both seismic and flood-related hazards at the time of upgrade (such as a mixed-use or residential conversion) or major repairs following a disaster.
The following strategies aim to increase the building standards for new construction in seismic hazard zones. Strategy 11 should be considered a prerequisite to identify high hazard areas, and is especially crucial for strategies 22 and 23. In some cases, these strategies may also apply to major renovations of existing buildings.			
L	22	Assign higher seismic importance factor to new large scale residential buildings.	Amend the local building code to enhance structural and nonstructural design requirements for new large scale residential buildings by adoption of increased seismic Importance Factor to improve their seismic performance level.
L	23	Enhance minimum design requirements for new small scale residential building foundations in liquefaction zones	Amend the local building code to require enhanced foundation design requirements for new small-scale residential development (e.g. single or two-family dwellings) as well as for significant modifications to existing small-scale residential development in order to limit foundation damage due to liquefaction.
L	24	Restrict use of significant structural irregularities in residential buildings	Amend the local building code to restrict the use of structural irregularities in the design of new residential construction as well as existing residential construction subject to significant modification in areas with high or moderate shaking and liquefaction potential.
L	25	Enhance minimum requirements for non-structural anchorage and bracing of interior partition walls in residential buildings	Amend the local building code to include enhanced non-structural anchorage and bracing requirements for interior partition walls in existing residential buildings in areas with shaking potential.
L	26	Require utility connections to buildings that accommodate displacement in earthquakes	Amend the local building code to require that utility connections to buildings have adequate allowance for displacement in earthquakes.
The following strategies address flooding hazards and can be used to protect both existing and new housing.			
L	27	Participate in FEMA's Community Rating System	Participate in FEMA's Community Rating System (CRS), a voluntary incentive program that recognizes and encourages community floodplain management activities which exceed the minimum National Flood Insurance Program (NFIP) requirements.
L	28	Reduce flood risk through integrated shoreline and watershed management	Develop a program to work with public and private landowners to decrease the risk of flooding by advancing engineered and nature-based shoreline protection improvement projects in coordination with watershed management projects that reduce and/or store runoff during rainfall events and improve the condition in the floodplain.

DRAFT

L	29	Increase standards in local floodplain management ordinances beyond the minimum requirements of FEMA's NFIP program	Adopt a floodplain management ordinance that exceeds the minimum requirements of the NFIP to reduce potential risk from flood events that exceed the 100-year (1% annual chance) event. A strong floodplain management ordinance will ensure that land use decisions more fully take into account current flood risks based on available information and assessments, as well as considering more extreme events and/or future flood risk that may accrue as sea level rises.
L	30	Require flood-proof construction methods and techniques within and adjacent to SFHAs	Amend general plans to require flood-proof construction techniques in structures in special flood hazard zones, high hazard zones, and adjacent areas. Requiring flood-proofing techniques in these special flood hazard and high hazard zones could reduce the potential of damage to structure and its contents the event of a flood. Requiring the same level of flood-proofing in areas adjacent to these zones could reduce the potential for damage in areas that may be flooded in the future with sea level rise, or by flood events that exceed the FEMA 1% annual chance (100-year) flood elevation.
L	31	Revise minimum building elevation standards and maximum building height-limits for new development	Revise building standards to require that habitable building space and sensitive building components be elevated above current and future flood levels. At the same time, maximum building height limits could be updated to reduce conflicts where these codes are applied together.
The following strategies provide policy tools that can be used in conjunction with financing mechanisms laid out in the financing mechanism table to assist with costs associated with hazard abatement			
L	32	Create geologic hazard abatement districts (GHADS) to fund hazard mitigation	Establish Geologic Hazard Abatement Districts (GHADs) as a mechanism for raising funds and defining responsibility for the prevention, mitigation, abatement or control of geologic hazards, including landslides, land subsidence, soil erosion, earthquake, fault movement or any other natural or unnatural movement of land or earth. GHAD related projects can include the mitigation or abatement of structural hazards that are partly or wholly caused by geologic hazards and they can include flood control structures. Once established, GHADs are an independent political subdivision of the State and have similar authorities as local governments, including: taxing and bonding ability, certain legal immunity, and an ability to exercise eminent domain.
L	33	Create Mello-Roos Community Facilities Districts to provide financing to property owners for resiliency improvements	Collaboration among local governments and property owners to form a district in which property owners opt in to participate, wherein the district would use capital raised by issuing bonds to make resiliency improvements, which is paid back through a property tax assessment.
The following strategies are actions that jurisdictions can take place prior to a disaster that will assist in keeping residents in their homes after a disaster occurs. Many of the previous strategies that are aimed at limiting damage should be considered prerequisites for these strategies, as they will lessen the need for a protracted recovery experience.			
L	34	Create a pre-disaster rebuild and recovery plan	Make decisions and implement as policy, such as when, where, and how rebuilding will occur after a natural disaster, which areas

DRAFT

			will be rebuilt according to existing plans and codes and which will be re-planned, whether rebuilt homes will be encouraged or required to be more likely to withstand the effects of future hazard events, and who will be in charge of coordinating and overseeing the recovery process through the development of a pre-disaster recovery plan.
L	35	Revise local plans and development codes to allow temporary land uses to facilitate and expedite post-disaster recovery	Revise local plans and development codes to permit interim or temporary land uses to support critical public facilities to facilitate and expedite recovery after a disaster event.
L	36	Develop and implement a shelter-in-place program	Develop a comprehensive shelter-in-place program to allow residents to remain in their homes after a disaster. Establish engineering criteria to determine shelter-in-place capacity, develop acceptable habitability standards for sheltering-in-place, and prepare and adopt regulations that allow for the use of these standards in a declared housing emergency period. Also develop plans for implementing the program, such as public training materials, coordinating with post-disaster evaluation procedures, and setting up neighborhood support centers.
L	37	Ensure rental units are re-built after loss or damage from natural disasters	Develop policies to ensure that rental units damaged during a natural disaster are replaced in kind (with a similar number/type) during rebuilding and recovery rather than being converted to owner-occupied properties.
The following strategies represent strategies that can be implemented most effectively with close coordination with neighborhood nonprofits and community organizations			
N	38	Create a community capacity inventory	Develop a community capacity inventory by first defining the elements that should be included (such as critical facilities and community services), and then developing and sustaining standardized, transferrable procedures for collecting and managing data. Partnerships with NGOs such as Code for America could yield an open-source, collaborative format for collecting and sharing this information.
N	39	Disseminate best available hazard and climate risk information through community-based organizations and non-traditional partners	Seek opportunities to expand existing, successful community-based programs (e.g. programs on crime, blight, education or other important community issues) in order to better communicate hazard and climate risk information to community members.

DRAFT

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Association of Bay Area Governments

Adapting to Rising Tides

Establish a cooperative shoreline management program

Coordinate with government agencies, organizations, and land owners to establish and maintain a cooperative shoreline management program. This cooperative program could identify strategies for shared decision making and funding to reduce current and future flood risks in a manner that benefits and balances issues of equity, economy, and environment.

Lead			**Key Partner(s)**		
State	*Region*	**Local jurisdiction**	*State*	**Region**	**Local**

Target Development Type		**Community Vulnerability Addressed**					
Existing	**New**	**Community-wide**	*Age*	*Language & Ethnicity*	*Cost Burdened*	*Housing Tenure*	*Access to Resources*

Hazard Addressed			**Vulnerable Housing Type Addressed**			
Ground shaking	***Liquefaction***	**Flooding**	*Cripple Wall*	*Soft story or House over garage*	*Unreinforced Masonry*	*Non-ductile concrete*

Description

Shoreline management is difficult to coordinate, especially when there are multiple landowners, landowners that are protected by shorelines they do not own, and agencies and organizations that own shoreline areas but have other mandates and priorities. Additionally, the Bay Area has multiple regulatory agencies with jurisdictional authority over the shoreline. Shoreline projects are usually conducted as maintenance and improvement projects that address immediate needs. The projects do not consider future climate and the longer term challenges of sea level rise or storm surge, nor do they fully reduce or mitigate flood risks. In addition, these projects often address the single issue of flood protection and do not assess flooding in a natural and sustainable manner (e.g., placing riprap slope protection on a single shoreline segment to address areas of ongoing erosion).

This strategy proposes a cooperative shoreline management program that would establish and maintain coordinated decision making and financing among public agencies and private entities. There is no simple mechanism for this type of coordination. The goal of this strategy is long-term, effective, and integrated management of the shoreline including ongoing maintenance and new capital investments that mitigate the impacts of temporary storm event flooding and permanent inundation from sea level rise.

Models for this type of coordination could come from existing joint powers authority structures, through memorandum of understanding, or other tools designed to organize diverse interests and allow for shared decision-making and financing. An identified mechanism for cost sharing would be necessary to encourage and support larger scale shoreline or landscape projects that involve multiple agencies, organizations, and property owners. Funding could be tiered, based on the type of project being implemented or on the number of those participating or the length of shoreline being addressed. For example, multi-objective projects such as living or horizontal levees that provide flood risk reduction as well as ecosystem, water quality, and public access benefits could be eligible for more funding support in the form of federal, state, and regional grant programs than a traditional levee approach. Similarly, a strategy that is cooperatively implemented by a number of agencies, organizations, and property owners and reduces flood risk for an entire neighborhood could receive more funding than a strategy that is cooperatively implemented by fewer partners and reduces flood risks for only several homes or land uses.

It can be challenging to initiate coordination among agencies, organizations, and property owners on issues beyond their regular planning and programmatic efforts. A regional, state, or federal agency could serve as an early convener and provide staff and technical assistance. Possible convener agencies include Association of Bay Area Governments (ABAG), Bay Conservation and Development

DRAFT

Commission (BCDC), United States Army Corps of Engineers (USACE), Environmental Protection Agency (EPA), National Oceanic and Atmospheric Administration (NOAA), or United States Fish and Wildlife Services (USFWS).

A coordinated shoreline management program that results in projects that meet the needs of a variety of stakeholders is likely to have broader economic, social, and environmental co-benefits, including habitat restoration, habitat and home protection, and job security.

Governance/ Implementation issues:

This strategy will require coordination among agencies, organizations, and land owners that typically have not cooperated in the past on decision making and financing of shared projects. New coordination efforts could cause significant challenges, particularly in initiating and maintaining the program with full participation of all stakeholders.

Potential Financing Mechanisms

This strategy will require the convening agency to dedicate resources to initiate and run a working group of participating stakeholders. Resources will also be required from participating stakeholders. The costs associated with coordination would likely be shared by each of the participating entities. Furthermore, coordinated management efforts may lead to cost savings among cooperating agencies by reducing duplication of efforts or inconsistencies. The financing mechanism for future coordinated management that results from collaboration would depend on the project scale and objectives , and could include several options such as state grant programs, tax-based special districts, fee-based special districts, etc.

Timing

Implementation		
Short-term	**Medium-term**	**Long-term**
√		

Key Partner(s)

State	Region	Local
No state partners are needed for this strategy.	All agencies with jurisdiction over shoreline protection infrastructure and adjacent assets, and other regional stakeholders such as adjacent landowners.	All agencies with jurisdiction over shoreline protection infrastructure and adjacent assets, and other regional stakeholders such as adjacent landowners.

Example(s)

The following is an example of existing policies and actions in cities which recommend coordination with regional agencies, and can be leveraged to implement this strategy:

- State of Washington Cooperative Shoreline Master Program (SMP)
  - The Shoreline Management Act (SMA, RCW 90.58.020) establishes a cooperative program between local and state governments for management of Washington's fresh and saltwater shorelines.
  - Local governments develop and administer a Shoreline Master Program for their local area, and the Washington Department of Ecology provides support and oversight. See: http://www.ecy.wa.gov/programs/sea/SMA/guidelines/index.html
  - As a part of this program, two-year Shoreline Master Program grants are available to local governments (cities, towns, and counties) as assistance for implementing and

DRAFT

updating approved SMPs. Grant limits are dependent on shoreline length, complexity, population, and development pressure. See:

http://www.ecy.wa.gov/programs/sea/grants/smp/moreinfo.html

DRAFT

earthquake and hazards program
Association of Bay Area Governments

Adapting to Rising Tides

Reduce or prohibit development in the most hazardous areas while ensuring equity and beneficial use of these areas

Reduce or prohibit development in high hazard areas, incentivize relocation out of these areas, and reduce or prohibit rebuilding after a disaster. This strategy also works to create beneficial uses, such as open space, flood mitigation and recreation, for non-developable high hazard lands.

Lead			**Key Partner(s)**		
State	*Region*	**Local jurisdiction**	*State*	**Region**	**Local**

Target Development Type		**Community Vulnerability Addressed**					
Existing	**New**	**Community-wide**	*Age*	*Language & Ethnicity*	*Cost Burdened*	*Housing Tenure*	*Access to Resources*

Hazard Addressed			**Vulnerable Housing Type Addressed**			
Ground shaking	**Liquefaction**	**Flooding**	*Cripple Wall*	*Soft story or House over garage*	*Unreinforced Masonry*	*Non-ductile concrete*

Description

Existing zoning regulations and designations in a community may not always facilitate safe new development or protect existing development from hazards. This may result in new development or redevelopment in locations that are vulnerable to damaging seismic hazards, or temporary flooding and permanent inundation from storm surge and sea level rise.

Local governments are encouraged to review and update general and specific plans, zoning codes, development guidelines, and building codes considering ways to limit or prohibit development, provide incentives for relocating existing development, and limit or prohibit redevelopment after a disaster in the highest hazard areas. The new codes, plans and guidelines should also encourage the development of beneficial uses such as open space and recreation in areas deemed unsafe for development.

To determine the highest hazard areas, jurisdictions should apply a “microzonation” approach to identify those portions of hazard areas (such as those identified on state seismic hazard maps or in FEMA flood zones) that have the highest hazards and vulnerabilities. More detailed geologic and flood risk investigations may be needed to identify the highest hazard micro-zones within hazard areas and identify specific areas where damage to housing could be catastrophic, or areas where mitigation proves to be too difficult or costly. This strategy should be tied to local hazard mapping efforts (see strategy: Develop locally-specific seismic hazard maps and policies for the evaluation and mitigation of hazards). At a minimum, jurisdictions should examine areas with potential for landslide, liquefaction, fault rupture, and temporary or permanent flooding.

Various mandates and incentives could be considered as options for implementing this strategy and will be discussed in greater detail in the following strategies. They include:

- Adding policy statements and criteria to general plan open space elements and specific/area plans for designated areas; amending zoning ordinances to create a zoning overlay district;
- Officially designating these areas for open space, flood mitigation or recreational uses. These areas could be redesigned with green infrastructure for flood mitigation and have multiple uses and benefits if well-designed;
- Amending building codes to prevent the restoration of hazardous buildings to pre-disaster event conditions (see strategy: Expand requirements triggered by major upgrades and repairs to existing buildings to address seismic and flood-related hazards);
- Adopting a transfer of development rights (TDR) program (see strategy: Establish a Transfer

DRAFT

of Development Rights program to redirect development from high hazard areas to preferred, low hazard areas);

- Instituting a post-disaster voluntary buyout program to acquire substantially damaged and hazardous properties; or increasing existing standards, such as for FEMA's NFIP program (see strategy: Increase standards in local floodplain management ordinances beyond the minimum requirements of FEMA's NFIP program).

Governance/ Implementation issues:

Local governments are the lead agencies for implementing this strategy. However, successful implementation will require collaboration and partnerships between local governments, open space trusts and park agencies, and potential funding agencies, as well as with developers and property owners. Guidance documents, case studies, and draft ordinances may need to be developed to help promote adoption of this strategy.

The strategy could adversely impact property tax revenues from high hazard zones, as it redirects new and existing development to other locations. However, this strategy could help reduce the economic and social costs of hazards. The strategy could also have some indirect environmental and social benefits if it results in the creation or protection of habitat, open space, recreational areas in hazard zones.

This strategy could be linked to the State of California's Hazard Mitigation Plan, the ABAG Regional Hazard Mitigation Plan (see http://quake.abag.ca.gov/mitigation/), and local hazard mitigation plans.

Potential Financing Mechanisms

This strategy involves two separate components, both of which require different forms of funding. Firstly, funding is needed to conduct a detailed land assessment in order to identify hazard zones that pose the highest risk to new and existing development. However, this may have already been accomplished, such as through conducting detailed local hazard mapping (see strategy: Develop locally-specific seismic hazard maps and policies for the evaluation and mitigation of hazards); through the development of a Local Hazard Mitigation Plan; or through the implementation of other similar strategies. Local general funds as well as local, state, and federal grants are a likely source for this component.

Secondly, funding will be required to implement the mandates or incentives aimed at reducing of hazards to new and existing development. Also, the type of funding will depend on the nature of the mandate or incentive. If the mandate involves the creation of an overlay district which designates high hazard areas for open space or recreational uses, then the district has the ability to finance the creation and maintenance of open space in the same way that tax-based special districts finance projects. In such cases, the district raises upfront capital by issuing bonds which are backed by taxes levied on district residents and businesses. Financing for incentive-based programs such as buyout programs typically comes from FEMA grants. See each strategy that addresses implementation tools for more detailed financing mechanisms: Create geologic hazard abatement districts (GHADS) to fund hazard mitigation, Create Mello-Roos Community Facilities Districts to provide financing to property owners for resiliency improvements.

Timing

Implementation		
Short-term	**Medium-term**	**Long-term**
√		

DRAFT

Key Partner(s)

State	Region	Local
No state partners are needed for this strategy.	Bay Conservation and Development Commission (BCDC)	Local regional open space districts and non-profit organizations involved in open space acquisition and management could be potential partners.

Example(s)

The following are examples of programs put in place to transfer high-hazard lands into parks, permanent open space or other beneficial uses:

- Buyout Program, City of Grand Forks, North Dakota
    - The City of Grand Forks, North Dakota has built a river greenway development, following the 1997 Red River flood. After the 1997 flood, Grand Forks used FEMA Hazard Mitigation Grant Program funds and US Department of Housing and Urban Development (HUD) Community Development Block Grant–disaster recovery grant funds to buy out almost 800 homes. In compliance with National Flood Insurance Program (NFIP) guidelines, the City established a voluntary buyout program to acquire all the properties that had structural damage exceeding 50% of the pre-flood market value and that were located in the 100-year floodplain. Over time, the City expanded the buyout program to include other heavily damaged properties, both inside and outside the 100-year floodplain, as well as properties that were likely to be in the path of the proposed alignment of a new levee flood protection system. Properties that were purchased with FEMA-HMGP funding ultimately were converted to park land or other permissible uses under the FEMA guidelines. In all, over 2,200 acres of land along both sides of the Red River were converted into a permanent greenway of open space that is designed to provide numerous recreational opportunities and room for the river to expand in future floods without endangering lives or property. The greenway features several parks, a campground, two golf courses, over 20 miles of multi-purpose trails, and fishing sites. See: http://www.grandforksgov.com/greenway/index.html

- Open Space Districts, San Francisco Bay Area, California
    - Some Bay Area communities have limited development potential in more flood-prone and geologically hazardous lands. These lands were then later acquired by open space trusts and park districts and turned into permanent open space and recreational areas. One of the landmark examples is the Windy Hill Open Space Preserve in the Town of Portola Valley, CA (see http://openspace.org/preserves/pr_windy_hill.asp). The 1,132 acre preserve that exists today originated from a 1979 donation of 535 acres of land to the Peninsula Open Space Trust (POST) that included landslide prone areas along the San Andreas fault and for which development potential was limited in the Town of Portola Valley's General Plan and its land movement potential and slope-density regulations. The land was subsequently transferred to Mid-peninsula Regional Open Space District (MROSD) which manages it along with 25 other preserves, spanning 62,000 acres in San Mateo and Santa Clara Counties.

- Federal guidelines applicable to this strategy include the following:
    - FEMA 2006, *National Flood Insurance Program (NFIP) Community Rating System (CRS): A*

DRAFT

Local Official's Guide to Saving Lives, Preventing Property Damage, Reducing the Cost of Flood Insurance. See: http://www.fema.gov/media-library/assets/documents/16104?id=3655)

DRAFT

earthquake and hazards program
Association of Bay Area Governments

Adapting to Rising Tides

Adopt Community Benefit Agreement policies to ensure more resilient communities

This strategy recommends that local governments adopt policies requiring Community Benefits Agreements (CBA), which are legally binding contracts with developers that set forth tangible benefits a community will receive from a development/redevelopment project, as a tool to improve community resilience and capacity to recover from a disaster. These benefits might include construction of parks or public gathering spaces, community health or medical facilities, shelter in place facilities, etc.

Lead			**Key Partner(s)**		
State	*Region*	**Local jurisdiction**	*State*	*Region*	**Local**

Target Development Type		**Community Vulnerability Addressed**					
Existing	**New**	**Community-wide**	*Age*	*Language & Ethnicity*	*Cost Burdened*	*Housing Tenure*	*Access to Resources*

Hazard Addressed			**Vulnerable Housing Type Addressed**			
Ground shaking	**Liquefaction**	**Flooding**	**Cripple Wall**	**Soft story or House over garage**	**Unreinforced Masonry**	**Non-ductile concrete**

Description

This strategy recommends using community benefits tools to increase resilience and recovery by adopting Community Benefits Agreements with developers that ensure that a new development or redevelopment project results in tangible benefits that are shared equally by all community members.

A Community Benefits Agreement (CBA) is a project-specific agreement between a developer and a broad community coalition that details the project's contributions to the community and encourages community support for the project. Addressing a range of community issues, properly structured CBAs are legally binding and directly enforceable by the signatories. In some cases, the community benefits terms from a CBA may be incorporated into an agreement between the local government and the developer, such as a development agreement or lease. This agreement gives the local government the power to enforce the community benefits terms.

CBAs promote meaningful, up-front communication between the developer and a broad community coalition. This can decreases the developers' risk that the project will face local opposition by working with community members to gain support of the project or to address concerns and reduce opposition. CBAs can also maximizing the positive impact of development on the community by helping meet unmet needs or by providing broad community benefits including provisions for affordable housing, park, recreation and community facilities, infrastructure improvements, local jobs, and local goods and services (e.g. grocery stores). Benefits provided by CBAs could be targeted at increasing the resilience and recovery of entire neighborhoods or communities in areas at risk from natural hazards. Such benefits could include provision of safe community gathering spaces, public or private facilities that could serve as emergency coordination centers and provide shelter during and after an event, improvement of community infrastructure (such as improved drainage, flood protection and management), increased transit, construction of local medical care facilities or fire stations that have the specific equipment and training to assist community members if a disaster should occur. Additional benefits could include supporting programs that decrease local reliance on grid-supplied power (see strategy: Decrease reliance on grid-supplied power), that disseminate best available hazard and climate risk information, or create and maintain data and information to increase resilience such as a jurisdiction-wide fragile housing inventory or a community capacity inventory.

CBAs offer two important advantages over the traditional land use approval process. First, the process of negotiating a CBA allows for a more constructive and collaborative conversation about meeting

DRAFT

community needs and can reduce the often adversarial and highly structured nature of hearings that are part of a local government's project approval process. Second, a private agreement is free from certain critical legal constraints that apply to government conditions on development projects, so the community and the developer may negotiate over a wide variety of points and come up with creative approaches. However, it is important to coordinate CBAs with local permitting and land use requirements, as CBAs do not eliminate or change the need to be consistent with local zoning and land use designations or with CEQA requirements.

Governance/ Implementation issues:

Lead: the jurisdiction is the lead for initiating community benefit agreements with a developer and engaging community coalitions.

The jurisdiction may prioritize CBAs for development projects in hazard areas where fragile housing is prevalent. The decision of whether to undertake a CBA for a particular project will depend on factors such as cost effectiveness and the degree of benefit the CBA could potentially bring to the community.

Potential Financing Mechanisms

Financing for this strategy would be borne largely by the developer.

Timing

Implementation		
Short-term	**Medium-term**	**Long-term**
√		

Key Partner(s)

State	Region	Local
There are no state partners needed for this strategy.	*There are no regional partners needed for this strategy.*	Community Benefits Coalitions *Jurisdictions can partner with community benefits coalitions to establish the desired outcomes of a CBA with the developer. These are groups with deep roots in the community, typically representing a broad array of stakeholders such as local residents across the income spectrum, minority groups, representatives from labor, environmental and faith groups, and affordable housing advocates. Bay Area coalitions include: local chapters of the Association of Community Organizations for Reform Now (ACORN), East Bay Alliance for a Sustainable Economy (EBASE), The San Francisco Foundation.*

Example(s)

The following are examples of Community Benefit Agreements currently in effect.

- Oakland Army Base CBA (Oakland, CA)

DRAFT

- In July 2012, the Revive Oakland! coalition won a package of jobs measures for the $800 million redevelopment of the Oakland Army Base undertaken by local Oakland developer CCIG and global corporation Prologis. The package included at least $300 million in public resources. The project, a modern goods movement and warehousing development, was expected to produce more than 2,800 construction jobs and 2,000 operations positions. The Jobs Policies won by the coalition established requirements for local hire, disadvantaged hire, living wages, limitations on use of temporary workers, and community oversight and enforcement. The policies resulted from extensive work between City staff, City Councilmembers and a broad range of community stakeholders, and were included as terms of the Lease Disposition and Development Agreement between Oakland and the project developers and made binding on project contractors and tenants. The City and community groups also entered into a cooperation agreement under which the groups agreed to support the project in exchange for assurances about the delivery of community benefits.

- Bayview-Hunters Point CBA (San Francisco, CA)
  - In May 2008, the San Francisco Labor Council, the Association of Community Organizations for Reform (ACORN), and the San Francisco Organizing Project (SFOP) entered into a community benefits agreement regarding a major development project in the Bayview-Hunters Point neighborhood of San Francisco. Under the CBA, Lennar, a national housing developer, agreed that if the project moved forward, Lennar would ensure that 32% of housing units built within the project are affordable, at a range of income levels; provide over $27 million in housing assistance funds targeted to neighborhood residents, including down payment assistance enabling additional units to be sold below market rates; provide over $8.5 million in job training funds targeted to neighborhood residents; ensure that all project employers participate in a state-of-the-art local hiring program; and ensure labor peace in key industries within the project: grocery stores, hotels, and certain service contracts.

DRAFT

earthquake and hazards program
Association of Bay Area Governments

Adapting to Rising Tides

Develop and implement a cripple wall retrofit program

Develop a retrofit program to address cripple wall housing in areas where it makes up a large percentage of a jurisdiction's housing stock (as a whole or for a specific vulnerable community). Pair programs with financing tools and incentives. Consider different incentives and financing tools for low-income homeowners or renters. The program should consider how to handle compliance and enforcement standards, mechanisms for enacting the program, and which retrofit standards to use.

Lead			**Key Partner(s)**		
State	*Region*	**Local jurisdiction**	**State**	**Region**	*Local*

Target Development Type		**Community Vulnerability Addressed**					
Existing	*New*	**Community-wide**	*Age*	*Language & Ethnicity*	*Cost Burdened*	*Housing Tenure*	*Access to Resources*

Hazard Addressed			**Vulnerable Housing Type Addressed**			
Ground shaking	*Liquefaction*	*Flooding*	**Cripple Wall**	*Soft story or House over garage*	*Unreinforced Masonry*	*Non-ductile concrete*

Description

Cripple walls are the short wood stud walls that enclose a crawl space under the first floor of a building. Most Bay Area detached homes built before 1940 have cripple walls, often indicated by a series of steps leading up to the front door. Cripple walls are at risk of severe damage or collapse during an earthquake, and may require that a home be demolished and rebuilt, even if the rest of the home is intact. ABAG estimates only 20-40% of older homes in the Bay Area have been strengthened, leaving an estimated 200,000 unbraced cripple walls. Retrofit solutions are often relatively affordable and can be completed by the homeowner in many cases. By retrofitting these vulnerable structures fewer people will be displaced from their homes after an earthquake, and necessary repair costs will be reduced.

Two points should be addressed by a jurisdiction taking action: (1) A standard must be adopted by the local jurisdiction to give guidance on how to strengthen the walls, and (2) develop an education and/or incentive program for implementation.

1. Adopt a Standard

A cripple wall retrofit standard is necessary to ensure the investments being made are significantly improving the building performance. Without a standard, building departments will generally provide a permit for any cripple wall improvement as it will nominally improve the performance. Using a standard ensures upgrades use proper bolt sizing/spacing and plywood coverage, significantly improving the performance of the structure. In the Bay Area, many jurisdictions have adopted a standard plan set for simple, short cripple wall retrofits, called Plan Set A (http://www.abag.ca.gov/bayarea/eqmaps/fixit/plansets.html). More complex retrofits (irregular building footprints, cripple walls over 4 feet in height) must be reviewed by an engineer and require a different standard.

2. **Get building owners to retrofit!**

Both education and incentives can be successful methods to achieve adoption. Relative to many other fragile building types cripple wall retrofits are more affordable and non-invasive. The typical cripple wall home retrofit, completed by a licensed contractor, costs between $2,000 - $10,000 depending on the condition and size of the home. The cost of repair after a damaging earthquake can be more than ten times greater. In areas where this investment can be financed by the building owner an education program may be successful by itself. Similarly, with some existing experience and additional training homeowners can complete a retrofit on their own using resources like the standard

DRAFT

Plan Set A (see above), and some jurisdictions have even provided free training and tool lending services to assist homeowners who want to do the work themselves. Financial incentives can make owners more willing to retrofit, who otherwise are unable to afford the improvement. Another option for incentives is expedited permitting or waiver of permit fees, particularly if the homeowner uses Plan Set A, which is standardized and does not require special plan review.

Alternately, this retrofit program could be made mandatory. This would require a fragile building inventory (see strategy: Create a fragile housing inventory), noticing, and consequences for lack of compliance. A mandatory program could also be supplemented with education and financing incentives.

Governance/ Implementation issues:

This strategy will require the adoption of cripple wall retrofit standards. Once adopted, building officials will need to be educated about the changes. Building owners who retrofit will need to obtain a permit from a building inspector who confirmed the retrofit was done in accordance with the adopted standard. If there is an education or incentive program to implement, standard resources will be needed to operate such programs.

Potential Financing Mechanisms

Retrofits can be paid through many mechanisms. In many cases homeowners will pay for retrofits out of their own savings or take out loans. This is particularly true with cripple wall retrofits, as they tend to be fairly low-cost. Some jurisdictions may choose to provide financial incentives, such as grants or rebates as discussed in the examples below.

Timing

Implementation		
Short-term	**Medium-term**	**Long-term**
	√	

Key Partner(s)

State	Region	Local
California Earthquake Authority (CEA) *The CEA has been working on programs to incentivize cripple wall retrofit programs through rebates from the state. Jurisdictions could benefit from lessons learned by CEA and utilize pre-developed standards and guidelines.*	Association of Bay Area Governments (ABAG) *ABAG could, through partnership with the CEA and local jurisdictions, help develop and establish model ordinance language and common retrofit standards and procedures for use throughout the language as well as provide case studies from other jurisdictions*	*There are no local partners needed for this strategy.*

Example(s)

The following examples offer retrofit standards to consider for use as part of a cripple wall retrofit program as well as examples of successful incentives and tools that jurisdictions have used for cripple wall retrofits.

Standards

- 2010 California Existing Building Code, Title 24, Part 2, Appendix A - Prescriptive Provisions for Seismic Strengthening of Cripple Walls and Sill Plate Anchorage of Light, Wood-Frame Residential Buildings

  CEBC Chapter A3 provides detailed descriptions of building elements that need to exist and

DRAFT

the prescriptive plans on completing a retrofit. See: http://publicecodes.cyberregs.com/st/ca/st/b200v10/st_ca_st_b200v10_appaa3_sec001.htm

- City of Los Angeles Prescriptive Standard. See: http://www.abag.ca.gov/bayarea/eqmaps/fixit/manual/PT14-App-A.PDF

- Standard Plan Set A and model resolution for jurisdictions to adopt Plan Set A. See: http://quake.abag.ca.gov/residents/planset/

Incentives

- Financial – The City of Berkeley uses tax rebates and fee waivers to incentivize retrofits. See:

  http://www.cityofberkeley.info/Planning_and_Development/Building_and_Safety/Transfer_Tax_Reductions_For_Qualifying_Seismic_Work.aspx

- Financial – The California Earthquake Authority through their Brace + Bolt program offered $3,000 to homeowners to retrofit their homes. The first pilot period has closed, but future programs are likely. See:

  https://www.earthquakebracebolt.com/

- Training – San Leandro has run training programs to educate owners and contractors on current retrofitting standards. See:

  http://www.sanleandro.org/depts/cd/bldg/retrofit/default.asp0

- Materials – the City of Berkeley and the City of Oakland have tool lending libraries for residents who want to perform seismic work themselves. See:

  http://www.berkeleypubliclibrary.org/locations/tool-lending-library

  http://oaklandlibrary.org/locations/tool-lending-library

DRAFT

earthquake and hazards program
Association of Bay Area Governments

Adapting to Rising Tides

Require hazard disclosure for renters

This strategy recommends the development of policies that require residential property managers and landlords to disclose hazard risk information to renters in a manner similar to that required when residential properties are sold, including if the property is listed on a fragile housing inventory.

Lead			**Key Partner(s)**		
State	*Region*	**Local jurisdiction**	**State**	**Region**	**Local**

Target Development Type		**Community Vulnerability Addressed**					
Existing	**New**	*Community-wide*	*Age*	*Language & Ethnicity*	*Cost Burdened*	**Housing Tenure**	*Access to Resources*

Hazard Addressed			**Vulnerable Housing Type Addressed**			
Ground shaking	**Liquefaction**	**Flooding**	**Cripple Wall**	**Soft story or House over garage**	**Unreinforced Masonry**	**Non-ductile concrete**

Description

Renters have few protections from hazards in their rental units because they rarely have the ability to directly influence the retrofit of the building. Many renters are unaware also of the particular hazards a building faces, and also the condition and status of the building. Currently few jurisdictions require disclosures to renters, though law requires disclosures when a building is purchased and sold. Empowering renters to make decisions about the safety of where they live gives renters more control over the safety of their housing and sends a signal to landlords that safety from hazards is a critical component of good business and may increase retrofits for multifamily buildings.

This strategy recommends developing policies that would require residential property managers and landlords to provide lessees with a disclosure statement for natural hazard risk, in a manner similar to the Natural Hazard Disclosure Statement required by California Civil Code 1002.6c for sellers of real property. The lessor would provide disclosure to the lessee when entering into a rental agreement or lease for a residence that lies within a statutorily defined hazard area and/or is classified in a fragile housing inventory (see related strategy: Fragile housing inventory).

The California Civil Code requires certain landlord disclosures (e.g., lead, asbestos, carcinogenic material contamination) but does not require disclosure for natural hazard risk. Currently, natural hazard risk disclosure is only mandated for sale or transfer of property under the Natural Hazards Disclosure Act, as set forth in Civil Code Section 1002.6c, which requires that sellers of real property and their agents provide prospective buyers with a Natural Hazard Disclosure Statement, including a checklist, when the property being sold lies within one or more of six state-mapped hazard areas:

- A ***special flood hazard area*** designated by the Federal Emergency Management Agency
- An ***area of potential flooding*** in the event of a dam failure, designated by the state Office of Emergency Services
- A ***very high fire hazard severity zone*** designated by the California Department of Forestry and Fire Protection
- A ***wildland fire area*** that may contain substantial forest fire risks and hazards, designated by the State Board of Forestry
- An ***earthquake fault zone*** designated by the State Geologist
- A ***seismic hazard zone*** designated by the State Geologist

Additionally, several jurisdictions require supplemental advisory disclosures in addition to the Transfer Disclosure Statement required by Civil Code Section 1102.6 including requirements that sellers to disclose the existence of certain known fragile housing conditions (e.g., cripple walls with no shear paneling, soft story conditions) to buyers at the time of sale. This disclosure should also be made

DRAFT

available to renters, including the retrofit status of the building.

By aligning required landlord disclosures with required disclosures for sellers of property in natural hazard areas and/or with fragile housing conditions, a jurisdiction can provide social and economic benefits to renter households by making them aware that they live in a hazard zone; disclosure may prompt these community members to not rent a property if they deem the hazard too high, or to take precautionary measures that would increase their resilience to a natural disaster, such as purchase hazard insurance or obtain necessary resources to prepare their households for emergencies.

Governance/ Implementation issues:

Implementing new mandatory disclosures for landlords may be met with resistance from property management and landlord associations, as they may feel that it could hurt their business or force them to lower rents on unsafe buildings. This strategy may, in actuality, have little effect in many markets, including very tight housing markets or among very low-income renters, where renters have less freedom of choice.

However, disclosures could also incentivize landlords to retrofit as a way of making their units more desirable. This strategy has the potential to influence the rental market to naturally value safer buildings over unsafe buildings. While this can be beneficial for landlords, who are able to charge a premium for retrofitted buildings, it also has the potential to devalue unretrofitted buildings and force low-income residents into unsafe housing.

Standardizing disclosures across the region can help ensure equity across the region, preventing the concentration of low-income housing in non-regulated jurisdictions and enclaves of privilege in regulated jurisdictions.

Potential Financing Mechanisms

This strategy does not require financing mechanisms.

Timing

Implementation		
Short-term	**Medium-term**	**Long-term**
	√	

Key Partner(s)

State	Region	Local
Department of Conservation of the California Geological Survey *Jurisdictions can obtain the most updated hazard maps and guidelines from the California Geological Survey's Department of Conservation.*	Association of Bay Area Governments (ABAG) *ABAG could help coordinate regional standards for disclosure, ensuring that jurisdictions with disclosure policies in place do not lose substantial housing and residents to unregulated jurisdictions.*	Tenant's rights NGOs and property owner associations *Housing advocacy organizations such as Tenants' Rights NGOs and Property Owner associations could provide local political support and expertise for the development of a hazard disclosure ordinance for renters.*

Example(s)

The following are examples of natural hazard or hazardous housing conditions disclosures currently in effect.

- California Civil Code Section 1103: ARTICLE 1.7. Disclosure of Natural and Environmental Hazards,

DRAFT

Right-to-Farm, and Other Disclosures Upon Transfer of Residential Property

http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=CIV&sectionNum=1103.

- Natural Hazards Disclosure Act, as described by California Geologic Survey

  http://www.conservation.ca.gov/cgs/shzp/Pages/shmprealdis.aspx

- City of Berkeley Soft Story Ordinance

  - The City of Berkeley passed a mandatory Soft Story Retrofit Ordinance in January 2014. However, the City began inventorying soft story buildings in the late 1990's, and in 2005, passed an ordinance requiring a) engineering evaluations of all buildings on the inventory list; b) placing signs around the building entrances of all buildings on the inventory list; and c) disclosure to renters that the building is on the inventory list.

  - 19.39.060 Owner and tenant obligations.
    A. Obligation of Owners to Notify Tenants and Post Notice regarding the status of the building. Once the Building Official's determination is final, owners of buildings on this inventory shall do the following:
    1. Within 30 days, notify each tenant in writing, using the Notice to Tenants form provided by the Building and Safety Division, and notify each prospective tenant prior to a change of tenancy, that the building is included on the inventory. Thereafter, the Rent Stabilization Board may provide such notice on an annual basis.

    The complete ordinance can be found on City of Berkeley website:

    https://www.cityofberkeley.info/uploadedFiles/Planning_and_Development/Level_3_-_Building_and_Safety/2013-12-03%20Item%2003%20Ordinance%207318(1).pdf

DRAFT

earthquake and hazards program
Association of Bay Area Governments

Adapting to Rising Tides

Minimum design requirements for new small-scale residential building foundations in liquefaction zones

Amend the local building code to require enhanced foundation design requirements for new small-scale residential development (e.g. single or two-family dwellings) and for significant modifications to existing small-scale residential development to limit foundation damage due to liquefaction.

Lead			**Key Partner(s)**		
State	*Region*	**Local jurisdiction**	**State**	**Region**	*Local*

Target Development Type		**Community Vulnerability Addressed**					
Existing	**New**	**Community-wide**	*Age*	*Language & Ethnicity*	*Cost Burdened*	*Housing Tenure*	*Access to Resources*

Hazard Addressed			**Vulnerable Housing Type Addressed**			
Ground shaking	**Liquefaction**	*Flooding*	*Cripple Wall*	*Soft story or House over garage*	*Unreinforced Masonry*	*Non-ductile concrete*

Description

Small-scale residential development is typically designed and constructed in accordance with the California Residential Code (Title 24, Part 2.5). Foundation design according to this code doesn't always provide sufficient performance in earthquake-induced liquefaction unless the local building official requires a project-specific evaluation of these issues (typically triggered by being located in a California Geologic Survey Zone of Required Investigation) that is more in line with the California Building Code's (CBC) Title 24, Part 2.5, section R401.4, which provides higher performance levels for foundations in liquefaction-prone areas. Insufficient foundations may crack or fail if subject to liquefaction, often rendering the home uninhabitable and unrepairable.

This strategy proposes adopting municipal revisions that enhance the requirements for the design of residential foundations of new small-scale residential development in areas deemed susceptible to liquefaction (through State mapping, see strategy: Complete seismic hazard mapping of urban and urbanizing areas, or through local mapping efforts, see strategy: Develop locally-specific seismic hazard maps). The enhanced foundation design requirements may also apply to existing small-scale residential development for which significant alterations are proposed and which trigger mandatory seismic upgrades in accordance with the California Residential Code (Title 24, Part 2, Chapter 34) or local building code modifications. Enhanced foundation design can be implemented through voluntary or mandatory policies or programs. Enhanced foundation requirements may be based on generalized liquefaction hazard zones or site-specific investigation, depending on the amount of available local data and the certainty of jurisdictions about liquefaction susceptibility areas.

A standard approach should be developed that provides a range of enhanced foundation options that respond to both the size of the building and the severity of the expected liquefaction. Enhanced foundation types could consist of a grillage of tied grade beams, a mat foundation or piles. Soil grouting may also be a possible solution where the liquefaction layer is shallow and of appropriate composition. Other possible solutions could be proposed at a local level or developed in collaboration with local structural engineering professional organizations. These enhanced foundation types would minimize the risk of severe, unrepairable damage to residential structures subjected to liquefaction.

Governance/ Implementation issues:

This strategy will require revisions to local government building codes where applicable, along with appropriate training for local building officials, so that they understand the new requirements and limits of application. The revisions should be included in plan check-lists to ensure proper enforcement.

DRAFT

Implementing this strategy requires an assessment of liquefaction risk at a local scale. Cities may use CGS liquefaction maps (available for the South Bay, Peninsula, and East Bay) or USGS liquefaction susceptibility studies. Jurisdictions may require additional site-specific soil investigations to determine actual liquefaction susceptibility to trigger enhanced foundation requirements.

Local governments may also consider developing external reference documents for developers and contractors to ensure more uniform application across the region. Given that local governments have exclusive jurisdiction over their building codes, this strategy does not require collaboration among local governments and regional agencies, but can certainly benefit from collaboration to implement even standards across the region and to assist smaller jurisdictions which may not have the resources to develop the ordinance locally. For example, ABAG could potentially facilitate the development of model code language for this strategy, such that it is accessible to all communities.

Initial implementation is likely to occur within large, individual jurisdictions that have the resources to fund implementation. The implementation approach developed by early adopters may be used as a template for other locations, or may be passed up to the state level for wider access. This strategy may also be phased, beginning with voluntary compliance and moving towards mandatory compliance as buy-in is developed.

Potential Financing Mechanisms

Given that this strategy is aimed at ensuring safe execution of small-scale residential development through enhanced construction requirements, it is expected that for new development, as well as retrofits to existing development, any additional costs resulting from more stringent requirements would be borne by the individual property owners, and in limited cases, developers. For individual property owners, the primary financing mechanism would be individual loans, and for developers, the financing mechanism will likely be development/construction loans. The jurisdiction could also offer incentives or assistance for existing homeowners.

Timing

Implementation		
Short-term	**Medium-term**	**Long-term**
√		

Key Partner(s)

State	Region	Local
State and federal agencies such as the California Geologic Survey and U.S. Geologic Survey are crucial partners to identify high liquefaction susceptibility zones.	For standardized requirements and implementation across a region (e.g., the Bay Area) local bodies with experience coordinating this type of effort, such as Association of Bay Area Governments (ABAG), could be engaged. Structural engineering associations may also be partners in developing consistent standards.	*No local partners are required for this strategy.*

Example(s)

- Code Amendments on Foundation Design requirements, Los Angeles County, CA
    - Los Angeles County in CA has amended its building code to make foundation design requirements more stringent than normal under the California Residential Code. Los Angeles County has adopted a standardized approach to foundation design

DRAFT

requirements, based on building size. For example, Table 1809.7 in Section 1809 of the Los Angeles County, California, Code of Ordinances, Title 26 – BUILDING CODE, CHAPTER 18 – SOILS AND FOUNDATIONS indicates increasing width and depth requirements for perimeter foundations depending on the number of stories. The developer can override these prescriptive requirements with a site-specific geotechnical investigation. See: https://library.municode.com/HTML/16274/level2/TIT26BUCO_CH18SOFO.html

- Enhanced Foundation Design Specifications, City of Christchurch, New Zealand
    - After the earthquakes of 2010 and 2011 that caused widespread liquefaction damage to the residential sector in Christchurch, the government did a comprehensive assessment of future liquefaction risk in residential areas. They developed three technical categories based on liquefaction risk, and developed requirements for enhanced foundation design based for each technical category. See: http://canterburyresidentialrebuild.govt.nz/tc3/foundation-guidelines.

DRAFT

earthquake and hazards program
Association of Bay Area Governments

Adapting to Rising Tides

Reduce flood risk through integrated shoreline and watershed management

Develop a program to work with public and private landowners to decrease the risk of flooding by advancing engineered and nature-based shoreline protection improvement projects in coordination with watershed management projects that reduce and/or store runoff during rainfall events, including the installation of green infrastructure and Low Impact Development (LID) practices, and improve the condition in the floodplain, for example through floodplain restoration or improvement.

Lead			**Key Partner(s)**		
State	*Region*	**Local jurisdiction**	*State*	**Region**	*Local*

Target Development Type		**Community Vulnerability Addressed**					
Existing	**New**	**Community-wide**	*Age*	*Language & Ethnicity*	*Cost Burdened*	*Housing Tenure*	*Access to Resources*

Hazard Addressed			**Vulnerable Housing Type Addressed**			
Ground Shaking	*Liquefaction*	**Flooding**	**Cripple Wall**	**Soft story or House over garage**	**Unreinforced Masonry**	**Non-ductile concrete**

Description

This strategy recommends developing an integrated program to manage shoreline and riverine flood risks using a combination of engineered and nature-based shoreline improvement projects in coordination with watershed management approaches such as the installation of green infrastructure, use of Low Impact Development (LID) practices, and improving the condition of the floodplain through restoration or maintenance. This strategy will help to protect both existing and future housing located in riverine or coastal floodplains as well as adjacent low-lying areas that will be susceptible to flooding during storm events as sea level rises.

This strategy recommends building on the existing California Regional Water Quality Control Board's Municipal Regional Stormwater Permit to requiring all new development and redevelopment projects over a certain size conform to a set of LID requirements that will help reduce downstream flood risks. In addition, watershed management action plans could be developed to reduce risks to existing housing through the use green infrastructure retrofits and/or engineered strategies that reduce the amount of rainfall runoff, improve drainage system capacity, and address the current and future interaction of riverine and storm surge flooding risks.

Low Impact Development (LID) is a land development and redevelopment approach that focuses on site layout and natural landscaping to increase infiltration and retention and minimize rainfall runoff. LID includes the use of both green infrastructure as well as carefully developed site layout to balance green space with housing density goals. In some cases, developments that take advantage of LID can save money by reducing or eliminating the need for traditional stormwater infrastructure, and can dramatically reduce the footprint of infrastructure needed (such as detention ponds).

Depending on the existing neighborhood context and housing types, a variety of green infrastructure retrofits may be feasible including rain gardens, planter boxes and vegetated swales to infiltrate rainfall; cisterns to retain rainfall; and green roofs, permeable pavements and pavers to decrease impervious surfaces and increase infiltration.

Guidelines referenced in this strategy include the following:

- Municipal Regional Stormwater NPDES Permit (MRP) *Final Order* (see http://www.swrcb.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2009/R2-2009-0074.pdf)could also be supplemented with education and financing incentives.

Governance/ Implementation

There are a variety of implementation options and strategies that could be pursued to advance this strategy including a local ordinance that would require all sites over an acre (or some other threshold-#of units or density of units) to comply, or that would provide a density bonus option, which is zoning

DRAFT

issues:

tool that allows a developer to exceed allowable density requirements in exchange for providing a public benefit.

This strategy could also be implemented through regulations or incentives by regional or state agencies, including the San Francisco Bay Regional Water Quality Control Board, or by ABAG and MTC including these requirements in SCS guidance on developing high density residential and mixed use area, or by prioritizing funding to jurisdictions that incorporate these strategies, or possibly through a CEQA incentive or reduced requirement.

Potential Financing Mechanisms

- EPA SF Bay Area Water Quality Improvement grant funds
- CA Department of Water Resources Integrated Regional Water Management (IRWM) Program grant funds
- Matched and leveraged funds from participating municipalities in the form of in-kind staff time

Timing

Implementation		
Short-term	**Medium-term**	**Long-term**
	√	

Key Partner(s)

State	Region	Local
There are no state partners needed for this strategy.	San Francisco Bay Regional Water Quality Control Board, Bay Area Storm Water Management Agencies Association, BCDC, MTC, adjacent jurisdictions *While this strategy can be implemented locally, the strategy is greatly improved if jurisdictions coordinate with regional agencies and adjacent jurisdictions to manage watersheds holistically.*	*There are no local partners needed for this strategy.*

Example(s)

The following are examples of local watershed management policies currently in effect.

- San Jose City Council Policy 6-29: Post-Construction Urban Runoff Management
    - In San Jose, all new development or redevelopment projects that create 10,000 SF or more of impervious surface are required to comply with a set of LID requirements, supplemented by more quantitative numeric sizing criteria. The City has also developed an Urban Runoff Management Policy that requires developers to demonstrate compliance with performance standards early in the planning process. Before development or redevelopment projects are accepted, all new development or redevelopment projects that meet the impervious surface thresholds defined in the Municipal Regional Stormwater Permit must submit a Stormwater Control Plan. Stormwater Control Plans must illustrate how the project will integrate site design, source control measures, and treatment control measures to comply with appropriate performance standards. The SJ Department of Planning reviews development applications before granting permits and inspects approved projects during construction to verify compliance. See:

DRAFT

http://www.sanjoseca.gov/clerk/cp_manual/CPM_6_29.pdf

- San Francisco Public Utilities Stormwater Design Guidelines
    - The San Francisco Public Utilities Commission (SFPUC) and the Port of San Francisco (Port) partnered to develop the San Francisco Stormwater Design Guidelines. The Guidelines require new development and redevelopment disturbing 5,000 square feet or more of the ground surface to manage stormwater on-site. The Guidelines show project applicants how to achieve on-site stormwater management using low impact design (LID) strategies, also known as green infrastructure. These strategies include vegetated roofs, swales, rainwater harvesting, and rain gardens. The Guidelines protect San Francisco's environment by reducing pollution in stormwater runoff in areas of new development and redevelopment and by reducing the wet weather burden on San Francisco's combined sewer. See: http://www.sfwater.org/modules/showdocument.aspx?documentid=2779

DRAFT

earthquake and hazards program
Association of Bay Area Governments

Adapting to Rising Tides

Increase standards in local floodplain management ordinances beyond the minimum requirements of FEMA's NFIP program

Adopt a floodplain management ordinance that exceeds the minimum requirements of the NFIP to reduce potential risk from flood events that exceed the 100-year (1% annual chance) event. A strong floodplain management ordinance will ensure that land use decisions account for current flood risks based on available information and assessments and consider more extreme events and/or future flood risk associated with sea level rise.

Lead			**Key Partner(s)**		
State	*Region*	**Local jurisdiction**	**State**	*Region*	*Local*

Target Development Type		**Community Vulnerability Addressed**					
Existing	**New**	**Community-wide**	*Age*	*Language & Ethnicity*	*Cost Burdened*	*Housing Tenure*	*Access to Resources*

Hazard Addressed			**Vulnerable Housing Type Addressed**			
Ground shaking	*Liquefaction*	**Flooding**	*Cripple Wall*	*Soft story or House over garage*	*Unreinforced Masonry*	*Non-ductile concrete*

Description

Currently, most communities at risk from existing coastal or riverine flooding have regulations in place that meet minimum federal and state requirements. Local jurisdictions can adopt floodplain management ordinances that are more stringent than minimum federal and state requirements to reduce risks both from current extreme flood events that could have wide-ranging and costly consequences (e.g., the 500-year event), as well as from increased risk of coastal and riverine flooding that will accrue as sea level rises.

Federal requirements set by FEMA are based on existing coastal and riverine flood hazards studies, many of which are decades out of date and therefore do not take into account recent changes in sea level or precipitation patterns. Currently, FEMA is in the process of conducting detailed coastal engineering analyses and mapping of the San Francisco Bay shoreline, which will result in revised and updated Flood Insurance Rate Maps (FIRMs) for each of the nine counties. However, studies of many riverine floodplains are out of date and are not included in the current FEMA study. In addition, while FEMA is in the process of studying future impacts to coastal floodplains from sea level rise, this effort is in the pilot stage and is not currently available.

Recognizing the limitations of FEMA guidelines, FEMA requires all local governments that participate in the NFIP to adopt floodplain management ordinances that either meet or exceed the minimum NFIP requirements. Currently, all Bay Area counties participate in the NFIP program. This strategy proposes that local governments participating in the NFIP adopt floodplain ordinances that exceed NFIP requirements.

Local floodplain management ordinances govern construction practices within the floodplain, including special flood hazard zones and high hazard zones. For example, the floodplain management ordinances requires first floor elevations of structures to be at or above the FEMA base flood elevation (BFE), which is calculated based on the 1% annual chance (100-year) flood elevation as shown on a Flood Insurance Rate Map (FIRM).

Minimum NFIP requirements allow the first floor elevation to be at the BFE, however FEMA recommends elevating the first floor elevation by 1 foot above the BFE. Local governments could increase the requirement to 2 feet above the BFE which would reduce flood insurance premiums, provide greater protection to those living in the structure, and would likely reduce the impacts from mid-century projected sea level rise. If this particular requirement is implemented, current building

DRAFT

height restrictions in place may need to be revised to accommodate an increase in the first floor elevation (see strategy: Revise minimum building elevation standards and maximum building height-limits for new development).

Under this strategy, all new development and substantially improved structures would be required to meet the more stringent floodplain management ordinances. "Substantially improved" generally means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the start of construction associated with the improvements. If a building is substantially improved, it would need to be brought into compliance with the floodplain management ordinances, including elevating the first floor of the structure above the BFE by the adopted amount. Federally funded programs such as the Hazard Mitigation Grant Program (HMGP) provide financial assistance to states and local governments to implement long-term hazard mitigation strategies that reduce or eliminate losses from future disasters. Such programs could be an important resource for providing financial assistance to those unable to afford the costs associated with increasing structure elevations, as such costs can quickly escalate beyond affordability.

When updating floodplain management ordinances, jurisdictions need to consider the tradeoffs between potential cost burden on low-income property owners and the affordability of rental units with the increase in public safety and reduction in insurance premiums. This strategy has community benefits because it will improve the ability of those living in the structures to shelter in place (see strategy: Revise local plans and development codes to allow temporary land uses to facilitate and expedite post-disaster recover) and also has economic benefits through reduced flood insurance premiums. If the jurisdiction participates in the Community Rating System (CRS) program (see strategy: Participate in FEMA's community rating system), all structures within the community, regardless of their first floor elevation, may receive reduced flood insurance premiums once the community adopts requirements that exceed the NFIP requirements.

Codes/Standards Referenced in this strategy include the following:

- FEMA floodplain management ordinances. See: https://www.fema.gov/national-flood-insurance-program-2/floodplain-management-ordinances
- FEMA Community Rating System. See: http://www.fema.gov/national-flood-insurance-program-community-rating-system

Governance/ Implementation issues:

FEMA requires all communities to participate in the NFIP and adopt floodplain management ordinances that meet or exceed the minimum NFIP requirements. Adopting ordinances that exceed the minimum NFIP requirements may result in concern from developers as the costs associated with construction may increase although this may be balanced against lower flood insurance premiums. Jurisdictions may be more successful in adopting more stringent floodplain ordinances if they work with FEMA and neighboring jurisdictions to develop consistent ordinances that balance competing needs and encourage a reduction in potential flood damage. Adopting ordinances that exceed minimum NFIP requirements links directly with FEMA's Community Rating System (CRS), which could result in additional insurance premium reductions for participating communities.

Potential Financing Mechanisms

Minimal funding is required to develop and implement this strategy, although the city or county will need to have a plan or program in place to review compliance, which may be incorporated within existing permit compliance programs. The cost burden for compliance with the floodplain management ordinances will be placed on developers and property owners. The cost of development would likely be financed by development/construction loans or individual loans. Grants, such as the Hazard Mitigation Grant Program, or subsidized loans may be needed to make compliance feasible for properties in the affordable housing pool.

DRAFT

Timing

Implementation		
Short-term	**Medium-term**	**Long-term**
√		

Key Partner(s)

State	Region	Local
FEMA *FEMA can assist communities in developing and updating floodplain management ordinances. Jurisdictions across the region can work together to develop consistent ordinances, which can improve both the effectiveness of ordinances and create more predictability for developers that plan and design projects in different jurisdictions*	*There are no regional partners needed for this strategy.*	*There are no local partners needed for this strategy.*

Example(s)

The following are examples of communities that have adopted a floodplain management ordinance targeting new development in flood hazard zones, with requirements that are slightly above NFIP requirements.

- California's City of Chula Vista Climate Action Planning
  - Requires all new development to be designed to accommodate 50 years of sea level rise within coastal and tidally-influenced areas
  - The City Engineer is also required to revise the Subdivision Manual every five years to define new sea level rise estimates and set minimum requirements for adaptation and mitigation. http://www.chulavistaca.gov/clean/PDF/ClimateActionPlanUpdate_Nov13ProgressReport_FINAL.pdf
- The City of Boulder, Colorado, Boulder Revised Code – Chapter 9.3 – Overlay Districts
  - For new residential construction and substantial improvement of residences located in the City of Boulder, the lowest floor and associated structures must be constructed a minimum of two feet above the 100-year flood elevation. http://www.colocode.com/boulder2/chapter9-3.htm#section9_3_2 and http://www.colocode.com/boulder2/chapter9-16.htm
- California's Central Valley Flood Protection Plan, State Plan of Flood Control Descriptive Document
  - Adopted a goal of using at least the 200-year flood event as the flood protection elevation for urban areas by the year 2016
  - Communities unable to make the 2016 goal must be able to certify that they are making adequate progress on an annual basis and will meet the 200-year event protection level by 2025.

DRAFT

http://www.water.ca.gov/cvfmp/docs/SPFCDescriptiveDocumentNov2010.pdf

- North Carolina's Charlotte-Mecklenburg Storm Water Storm Water Services Flood Mitigation Program
    - In addition to the floodplain based on existing 100-year event, Community (Future) Floodplains were developed to project continued growth within the County and increased runoff during large events.
    - Implementation of a more conservative Floodway that is 45% wider than the FEMA minimum further restricts development in a floodplain, further reducing loss of life and property to large storm events.
    - A Floodplain Buyout Program was established to allow homeowners to voluntarily sell homes and businesses located in the regulated floodplain. After purchase, these buildings are removed and the property is restored to its natural state to be used as wildlife habitat, parks, or community green space. http://charmeck.org/stormwater/regulations/Documents/Floodplain%20Documents/Floodplain%20Technical%20Guidance%20Document%2003_08.pdf

- Richmond Code of Ordinances, Article XII – Public Works, Chapter 12.56 – Flood Damage Prevention. https://library.municode.com/HTML/16579/level2/ARTXIIPUWO_CH12.56FLDAPR.html

- The following is an example of resources provided by FEMA on the benefits of adopting a freeboard requirement for first floor elevations above the BFE (which could be one possible element of an enhanced floodplain management ordinance).

  http://www.fema.gov/media-library-data/20130726-1537-20490-8154/fema499_1_4.pdf

DRAFT

earthquake and hazards program
Association of Bay Area Governments

Adapting to Rising Tides

Create a community capacity inventory

This strategy recommends developing a community capacity inventory by first defining the elements that should be included (such as critical facilities and community services), and then developing and sustaining standardized, transferrable procedures for collecting and managing data. Partnerships with NGOs such as Code for America could yield an open-source, collaborative format for collecting and sharing this information.

Lead			**Key Partner(s)**		
State	*Region*	**Local jurisdiction**	*State*	**Region**	**Local**

Target Development Type		**Community Vulnerability Addressed**					
Existing	**New**	**Community-wide**	*Age*	*Language & Ethnicity*	*Cost Burdened*	*Housing Tenure*	*Access to Resources*

Hazard Addressed			**Vulnerable Housing Type Addressed**			
Ground shaking	**Liquefaction**	**Flooding**	*Cripple Wall*	*Soft story or House over garage*	*Unreinforced Masonry*	*Non-ductile concrete*

Description

This strategy recommends developing a community capacity inventory to identify and address gaps in local emergency capacity to prepare for, respond to, and recover from a natural hazard disaster. In order to determine which elements should be included in the inventory, a jurisdiction may need to first establish criteria for the types of organizations, services and facilities that serve to build community capacity. Selection of criteria should include consideration of the particular characteristics of communities in the jurisdiction that decrease resilience to, and opportunities to recover from, natural hazards. The type of elements that could be in the inventory include the name, type, location and services provided by community-based organizations, emergency response NGOs, faith-based groups and any other non-traditional actors that have facilities, offer emergency resources or services, or have existing relationships with community leaders that could enhance the coordination of response and recovery efforts.

In addition to these organizations, the type, location and services provided by critical facilities will be a major component of the inventory. Critical facilities are those that are vital to emergency response activities or critical to the health and safety of the public before, during, and after an event, such as hospitals, emergency operations centers, police stations, fire stations, nursing homes, schools, vehicle and equipment storage facilities, shelters, etc.). In addition, there are certain facilities that if damaged would make response and recovery to a natural disaster more challenging. These include transportation facilities, facilities that store hazardous materials, facilities that generate or distribute power, water utilities, and wastewater treatment plants.

Creating and maintaining a community capacity inventory in an open, publicly shareable format can help community members access services and resources both before and after a natural hazards disaster or other type of emergency. Such a database can also help jurisdictions, organizations and agencies prepare for and respond to natural hazards and other disruptions, allowing for better communication with communities prior to, during and after an event and more effective use of all community assets during the response phase.

Governance/ Implementation issues:

Initiating the strategy would require the jurisdiction to define the elements it will include in the inventory and consideration of how to develop and sustain standardized procedures for collecting and keeping data up to date. Implementing the strategy would require notifying the participating organizations and may also include contracting a partner to develop the necessary software.

Potential Financing

The strategy could be financed through state and federal hazard mitigation assistance grant programs.

DRAFT

Mechanisms

Timing

Implementation		
Short-term	**Medium-term**	**Long-term**
√		

Key Partner(s)

State	Region	Local
There are no state partners needed for this strategy.	Association of Bay Area Governments (ABAG), Metropolitan Transportation Commission (MTC), San Francisco Bay Conservation & Development Commission (BCDC) *Jurisdictions could leverage partnerships with regional organizations such as ABAG, MTC and BCDC to garner support for the creation of a community capacity inventory.*	Private and NGO partners *Partnerships with private companies and NGOs such as Code for America could facilitate the development of a database in an innovative format that is cost effective and publicly shareable.*

Example(s)

The following are examples of community capacity inventories currently in development by jurisdictions.

- Town of Littleton, New Hampshire's Model Community Project
    - The Town of Littleton received a model community grant under New Hampshire's Real Choice Systems Change Initiative to develop and maintain an infrastructure to remove barriers preventing persons who are aging and others with disabilities from fully participating in community life. Key to this project is identifying and inventorying community assets and capacity including individual talents, knowledge, and skills of local residents including elders and persons with disabilities. The idea is to build on existing relationships to enhance, coordinate, facilitate, and develop support for assistive technology, transportation, employment, greater public access, personal assistance, information and referral, and integration of services between individuals, associations, local government, public institutions, and the private sector. One of the primary goals is to promote the value of every resident through a capacity inventory and an educational and outreach campaign focused on inclusive principles so that all residents are able to maintain, increase, and maximize personal choice and independence to lead full and productive lives. See: http://www.golittleton.com/littleton_model_comm.php
- PlaNYC's A Stronger, More Resilient New York - Community Preparedness and Response Initiative #2: Launch a Pilot Program to Identify and Address Gaps in Community Capacity
    - The City of New York learned from Superstorm Sandy that neighborhoods with higher community capacity tended to prove more resilient. Subject to available funding, the City of New York will conduct a pilot community needs assessment in one to-be-identified Sandy impacted community. Upon selection of the applicable community, OEM and the City's Center for Economic Opportunity (CEO) will work with local residents to identify

DRAFT

community strengths and needs and develop a set of recommendations for improving local preparedness and response capacity to extreme weather events. Following this "gap identification process," the City and the community subsequently will develop and implement a plan—as well as seek philanthropic and other potential funding sources—to address identified needs. See:
http://s-media.nyc.gov/agencies/sirr/SIRR_singles_Lo_res.pdf

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