Building Standards Code Update Project (BSCUP)

Public Meetings

April 13, 2009 – Merced
April 14, 2009 – Sacramento

www.water.ca.gov/BuildingCodeUpdate

Agenda

- Welcome and Introductions
- Building Standards Code Update Project (BSCUP)
  - Background and Purpose
  - Process and Strategy
- Proposed Building Standards Code Update
- Discussion on Proposed Update
- Recap: Interactive Discussion
- Identify Action Items and Next Steps

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BACKGROUND AND PURPOSE

Historical California Flooding

Since 1954, Statewide statistics: Injured or killed: >1,000, Costs: ~ $100 billion, Declarations of flood disasters: 9 to 28 times in every 58 counties

Year	Sacramento River Basin Floods	San Joaquin River Basin Floods
1955	X	X
1964	X	
1967	X	X
1969	X	
1970	X	
1974	X	
1983	X	X
1986	X	X
1995	X	X
1997	X	X
2006	High Water/Localized Flooding Only	High Water/Localized Flooding Only

Sources: California Emergency Management Agency and U.S. Army Corps of Engineers

Health and Safety Code §50465

50465. (a) On or before January 1, 2009, the **Department of Water Resources shall propose for adoption and approval by the California Building Standards Commission updated requirements to the California Building Standards Code for construction in areas protected by the facilities of the Central Valley Flood Protection Plan where flood levels are anticipated to exceed three feet for the 200-year flood event.** The amendments to the California Building Standards Code shall be sufficient to reduce the risk of flood damage and protect life, safety, and the construction in those areas.

(b) Before the department proposes the amendments to the California Building Standards Code required pursuant to subdivision (a), the department shall consult with the Central Valley Flood Protection Board, the Division of the State Architect, and the Office of the State Fire Marshal.

BSCUP in FloodSAFE California

Major Programs and Projects

Reduce the Chance of Flooding

- Emergency Repairs (multiple)
- Early Implementation Projects (multiple)
- Improvement of Operations and Maintenance
- Federal/State/Local Implementation Actions

- Statewide Flood Management Planning
- Central Valley Flood Management Planning Program
- Ecosystem Conservation Strategy
- Central Valley Local Assistance Program
- Levee Evaluation Program
- Central Valley Floodplain Delineation and Evaluation Program
- Levee Flood Protection Zone
- Flood Hydrology Update

Reduce the Consequence of Flooding

- Building Code Amendment
- Emergency Responses
- Flood Risk Notification
- Federal/State/Local Implementation Actions

CALIFORNIA BUILDING STANDARDS CODE UPDATE PROJECT

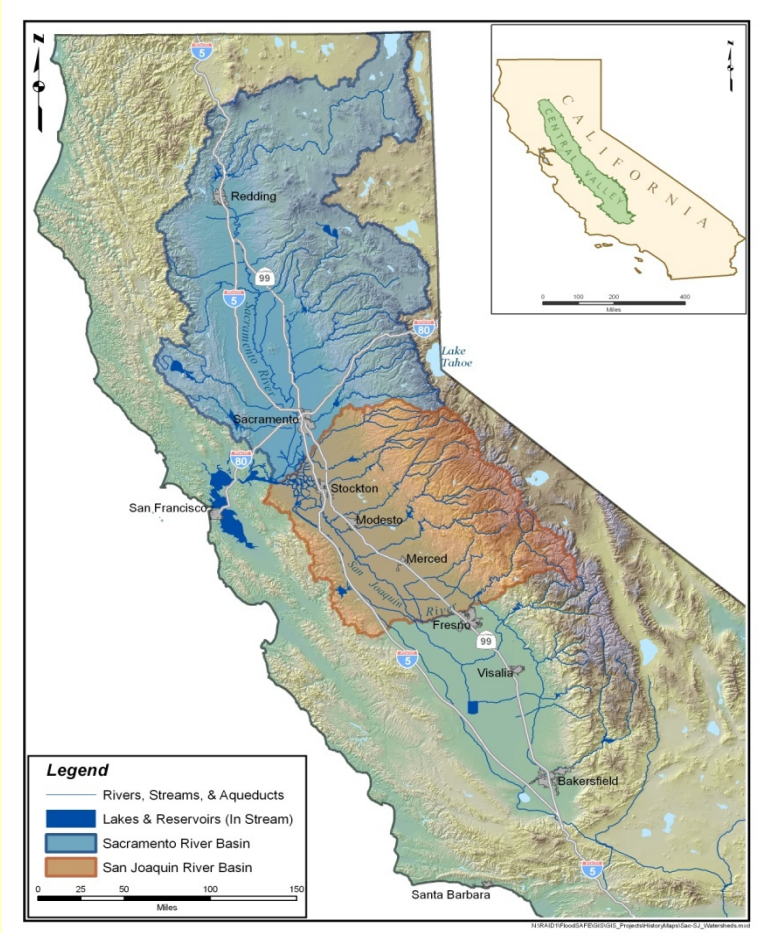
FloodSAFE CALIFORNIA

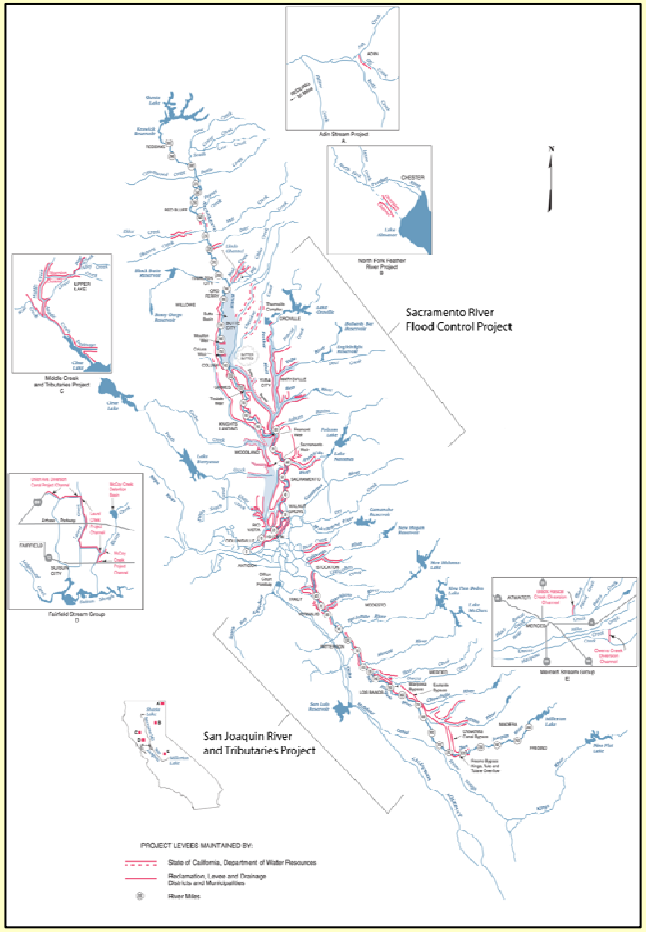
Programs/Actions Within FloodSAFE California

Programs/Actions Outside of FloodSAFE California

Project Study Area

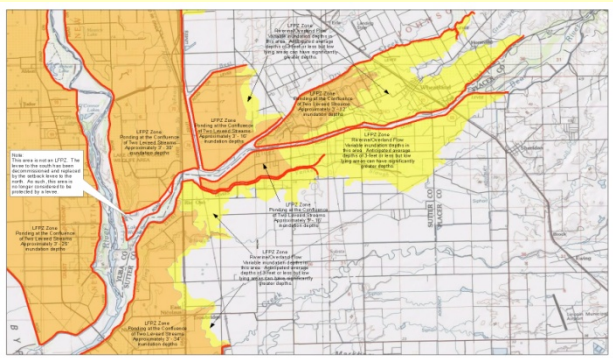
Consistent with the Area in the Central Valley Flood Protection Plan



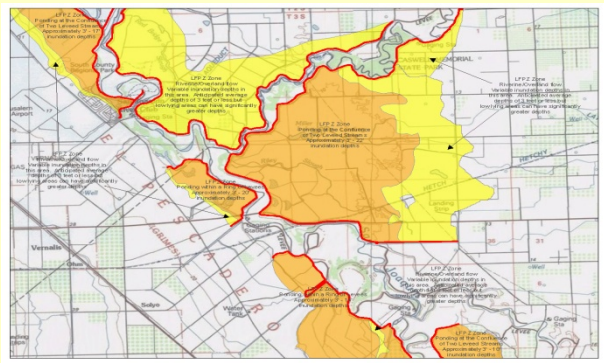


Areas May be Affected by Code Update

- Key reference: 200-year floodplain map
  - Definition of 200-year floodplain
  - Preliminary map available; revision is underway
- LFPZ maps for illustrative purposes only
  - Definition of Levee Flood Protection Zone
  - Inferences for the building code update



Example: Lower Sacramento River



Example: Lower San Joaquin River

100-year and 200-year Floods

- 100-year flood
  - It is not a flood that occurs once every 100 years. Instead, it is the flood level that has a 1 percent chance of being equaled or exceeded each year.
  - For that reason, 100-year floods can occur more than once in a relatively short period of time. The average owner in a 100-year flood area has around a 25% percent chance of being flooded during the life of his or her 30-year mortgage.
- 200-year flood
  - 200 year flood is one that has a ½ percent chance of occurring in any given year.
  - It is NOT defined as a flood twice as big as a 100 year flood or half the size of a 400 year flood.
  - The amount of flooding in a 200 year flood may or may not be very similar to a 100 year flood.

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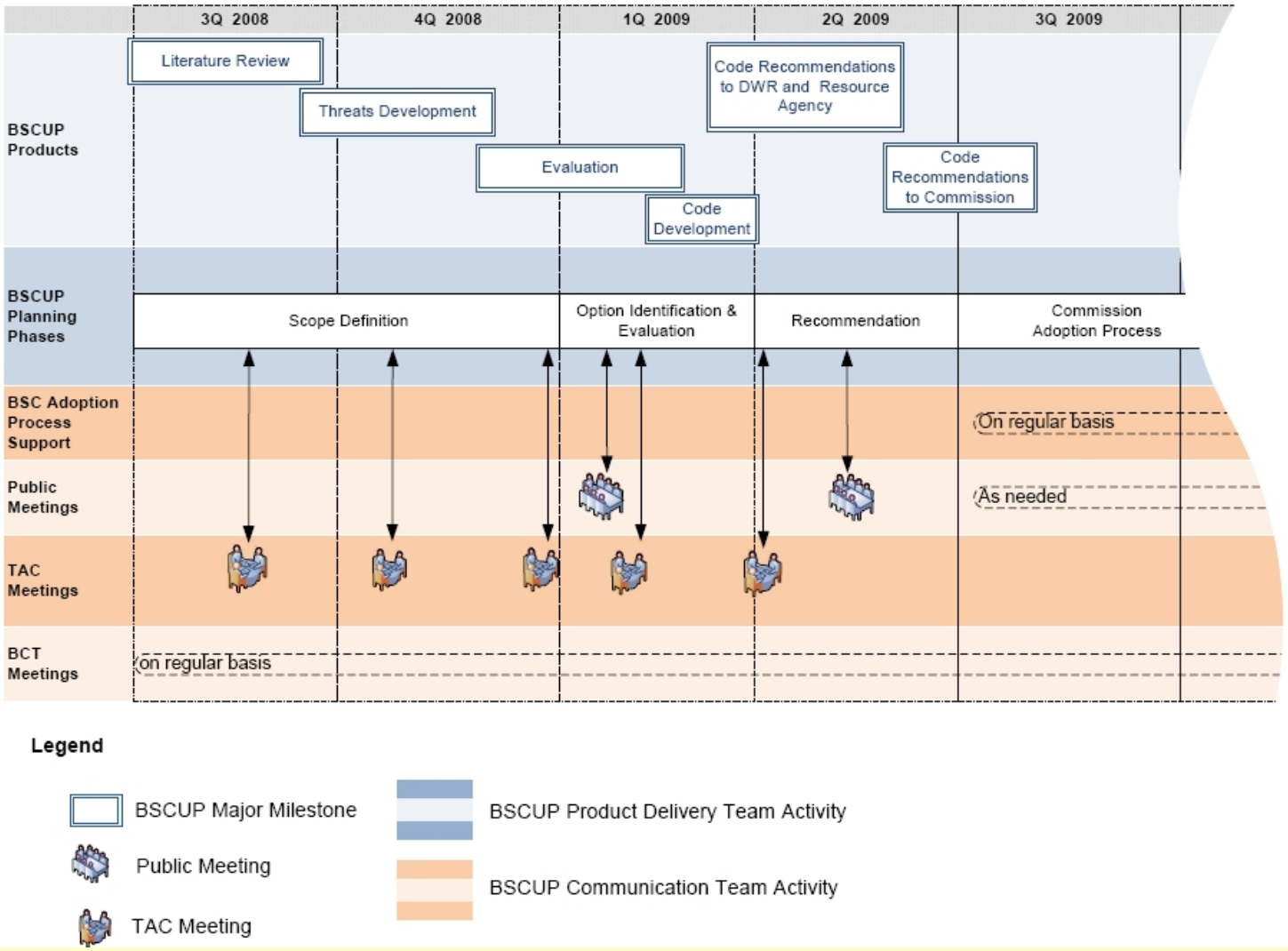
PROCESS AND STRATEGY

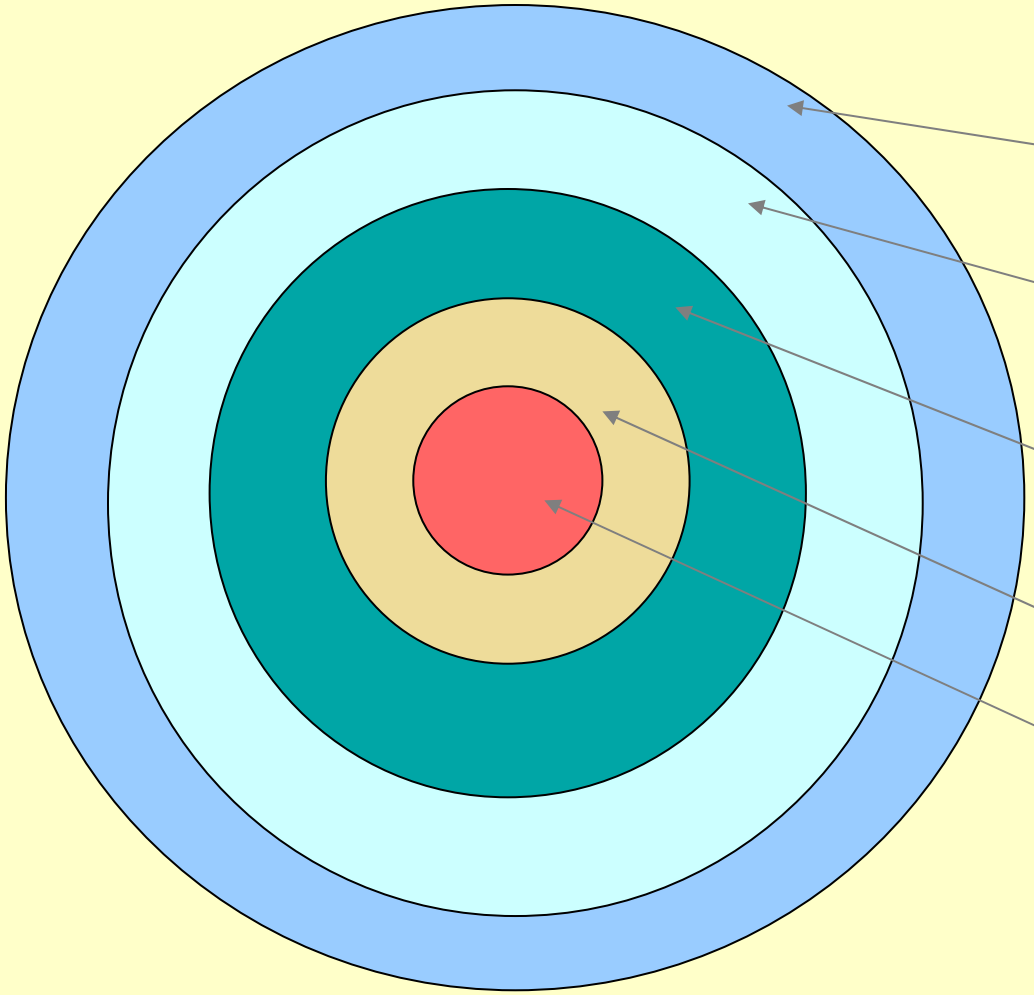
Building Standards Code Update Process



Technical Advisory Committee (TAC) Participants

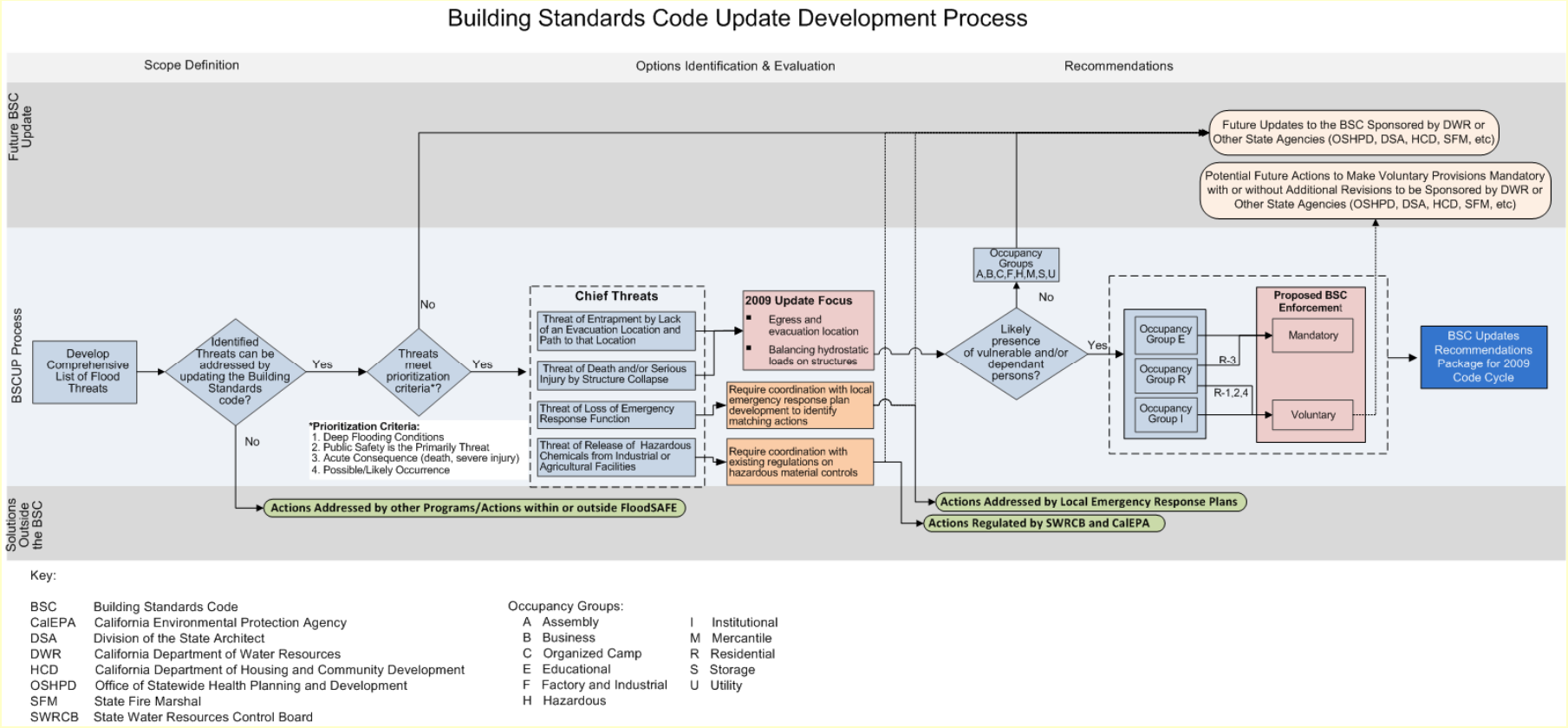
- **CVFPB** (Central Valley Flood Protection Board)
- **DSA** (Division of the State Architect)
- **SFM** (Office of the State Fire Marshal)
- **HCD** (Department of Housing and Community Development)
- **BSC** (Building Standards Commission)
- **SWRCB** (State Water Resources Control Board)
- **CBIA** (California Building Industry Association)
- **AIA** (American Institute of Architects California Council)
- **SEAOC** (Structural Engineers Association of California)
- **OSHPD** (Office of Statewide Health Planning and Development)
- **FMA** (Floodplain Management Association)
- **USACE** (U.S. Army Corps of Engineers)
- **NFPC** (National Flood Proofing Committee)
- **NFIP** (National Flood Insurance Program)
- **MWH** Consulting
- **PBS&J** Consulting
- **IWC** (Inter-West Consulting)
- **CSBC** (City of Stockton Building Division)
- **SJBD** (San Joaquin Building Department)
- Other organizations and agencies were contacted

Building Code Threat Refinement



1. Adverse effects from floodwaters (i.e., mitigation required)
2. Immediate threats to human life and major property damage
3. Threats Reasonably Reduced by Building Code Amendment
4. Factoring Likelihood of Threat Occurrence
5. Prioritized likely occurring threats that can be reasonably resolved by BC amendment and supported by the public and State

Prioritization for 2009 Code Cycle



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2009 PROPOSED CODE UPDATE

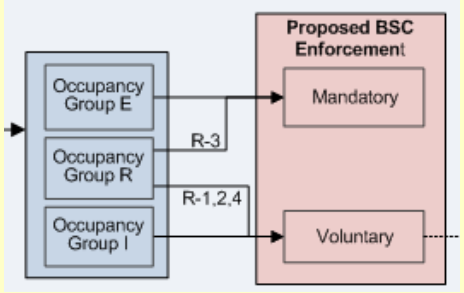
CALIFORNIA BUILDING STANDARDS CODE UPDATE PROJECT

FloodSAFE CALIFORNIA

April 13-14, 2009

2009 Proposed Code Update

- Focus on evacuation location and route, and keep building from collapsing due to flood waters
- Focus on vulnerable and dependent demographics
- Occupancy Groups and requirements



E: Educational
R: Residential
I: Institutional

- Focus on new construction and existing structures with trigger(s)
- Delayed effective date until the reference map becomes available

What Types of Buildings are Included? [§2]

Note: Refers to Narrative document section with corresponding material

- Mandatory
  - Schools (Group E)
  - Single family homes (Group R-3)
  - Residential care facilities with 6 or fewer clients (Group R-3.1)
- Voluntary
  - Medical, care facilities, and assisted living facilities (Group I)
  - Remainder of Group R, such as hotels and apartments

What are the Triggers for Existing Buildings? [§4]

- Triggers:
  - When the owner proposes to do substantial improvements, (50% or greater of market value of structure)
  - Changes in occupancy group designation
- The required improvements for compliance may not be significant or costly, depending on the height of the building, and anticipated flood depth

Future Code Cycle(s)

- DWR plans to develop additional Code update to fully address the mandate in the HSC §50465
  - Public Safety
  - Reduction in risk of flood damage to construction
- Building on the work in 2009 cycle
  - We have developed a comprehensive set of potential flood threats
  - We will address remaining flood threats that cannot be addressed in the first cycle

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PROPOSED 2009 CODE UPDATE
DETAILED DISCUSSION ON EVACUATION LOCATION

CALIFORNIA BUILDING STANDARDS CODE UPDATE PROJECT

FloodSAFE CALIFORNIA

April 13-14, 2009

What is an Evacuation Location?

- A place above the predicted water surface for the "200-year" flood event where people in a building can go to be rescued when the structure is flooding
- Examples
  - Spaces within buildings, such as rooms, hallways, foyers, and attics
  - Decks and balconies,
  - Terraces, platforms, and relatively flat, non-slippery roof

What is an Evacuation Location?

(Cont'd)

- Requirements:
  - Must be accessible (i.e., cannot be locked); however, door can be alarmed to prevent unwanted entrance
  - Must have means for occupants to move from the Evacuation Location for rescue, such as a window or door that opens
  - For rooftops, must be shallow-sloped or flat depending on accessibility requirements

What is an Evacuation Location?

(Cont'd)

- Size requirement [§6]
  - 7 square feet per occupant
    - An average space requirement to accommodate individuals lying down, in wheel chairs, or standing
  - The total size of the Evacuation Location is 7 square feet multiplied by number of occupants of the space/floor(s) below the anticipated water surface level of a 200-year flood. Occupants that normally use the area must not be neglected in the design calculations

How will Accessibility be Addressed in Evacuation Location? [§5]

- If a building is already required to be accessible, then accessibility also applies to:
  - The route to the Evacuation Location,
  - The Evacuation Location, and
  - If the Evacuation Location is inside the building, the means for occupants to move out of the building to be rescued must be accessible.

Evacuation Locations in Homes that Meet Proposed Requirements

Example 1: Water depth is at least 3-feet above ground surface, or “grade”, or higher. A raised-floor is the solution.

WSEL200: Water Surface Elevation for the “200-year” Flood Event

1 Evacuation Location is on the ground floor of a raised-floor single story. Occupants move through the front door to rescue vehicle.

Example 2

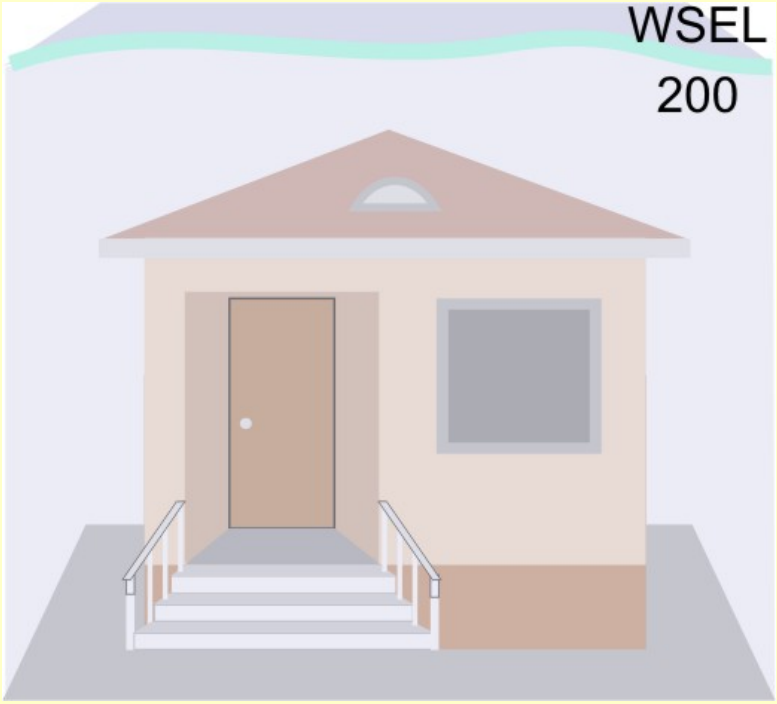
Example 2:

Water depth is significantly deep for one-story home.

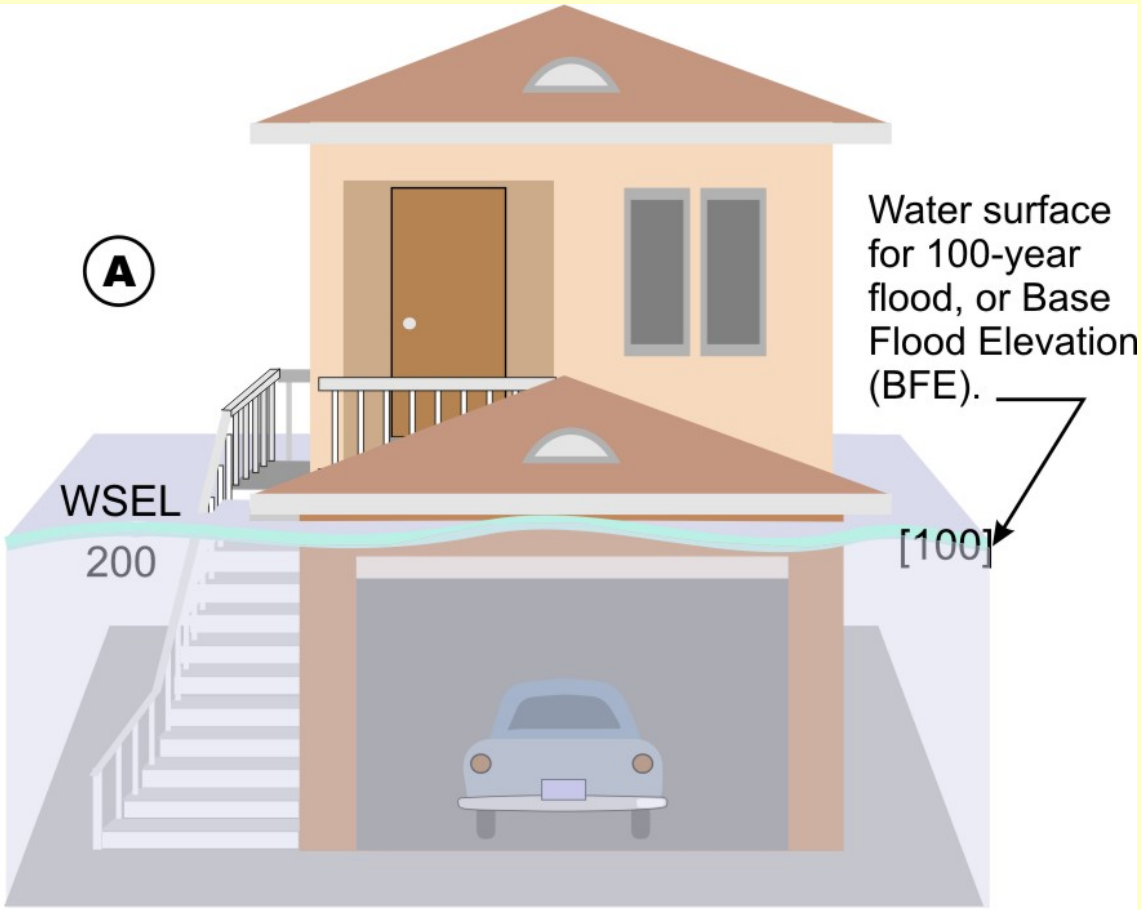
One Solution: go to two-story home. Note that the lower floor is flooded.

(2) Evacuation Location is interior of the second floor.
Occupants move through a door to a balcony or deck to rescue vehicle.

But what if the Flood Water Depths Inundate a One-Story Home?



At Least Three Options To Consider



Evacuation Location is within interior of the second floor. Occupants move through the front door to rescue vehicle.

Elevation was required for FEMA/NFIP 100-year requirements. This building is located in area where additional elevating to be above the WSEL 200 is minimal.

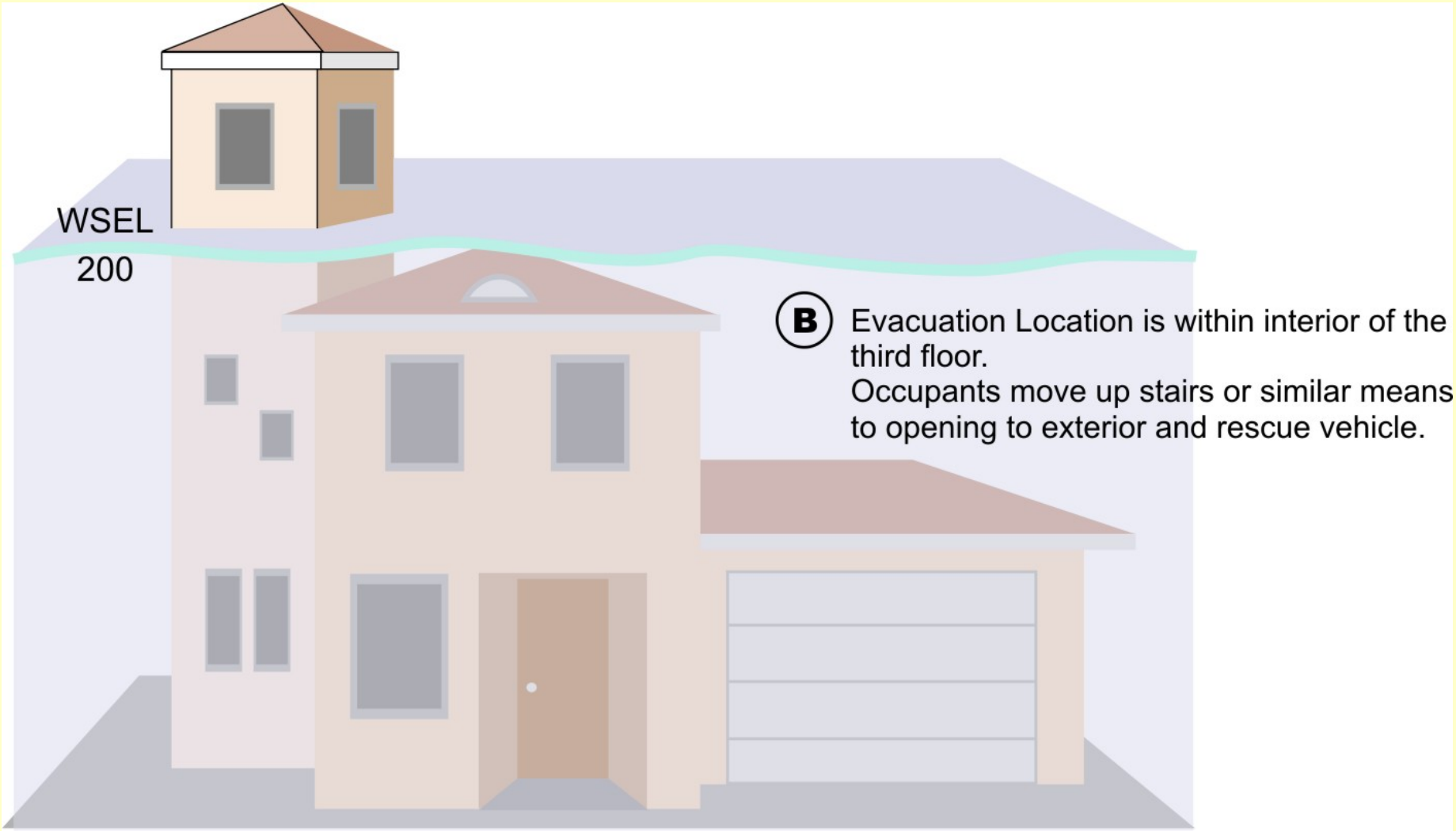
Option A

"Elevate" one-story home above a garage or storage space. Technically, this is a two-story. This is FEMA/NFIP approach.

Threat to persons (who could not evacuate region & had to be home) and damage to home is significantly minimized

Option B

Design the Evacuation Location to be minimally sized.
If flood depths are lower, the “tower” could be lower.



Option C
(When You Want a Single-Story but it Would Be Fully Inundated)

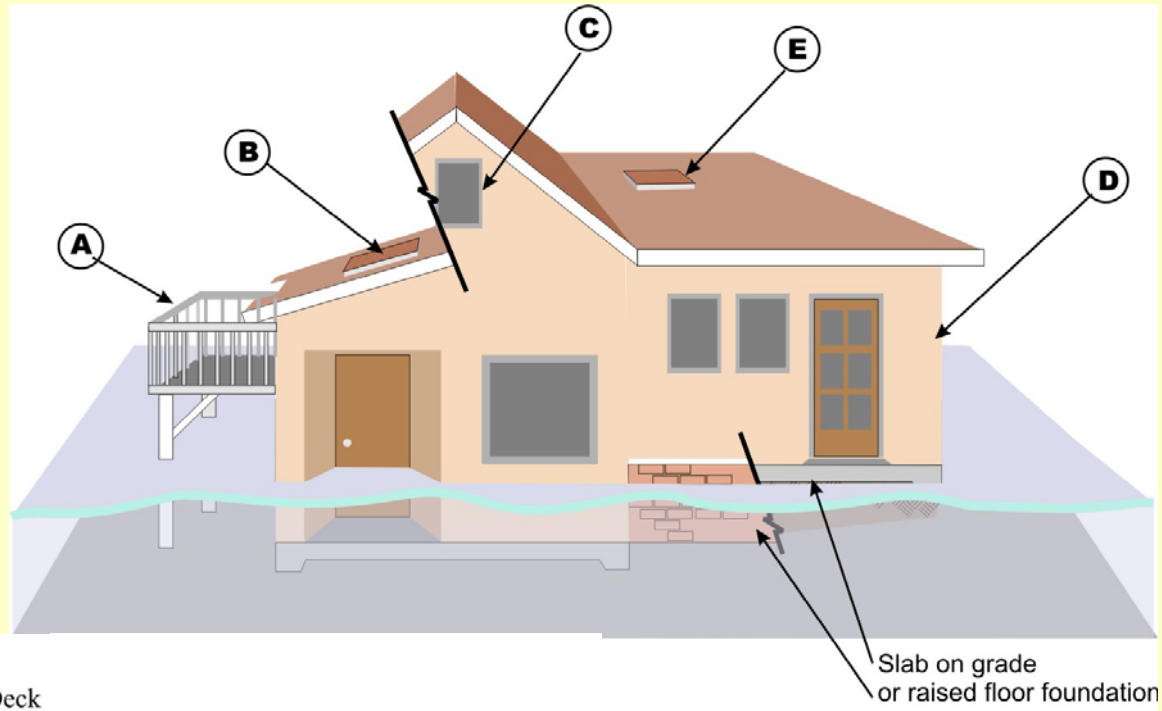
If local Building Official and other necessary officials sign off on Alternate Means of Protection offered by Owner/Developer of a Single-Story Planned Community, for example, then a Multi-Story Community Center may serve as the Evacuation Location.

Some Considerations:

- Not close to levee
- Homes are close to Community Center

Example 3

Single Story Residential with Five More Options, Depending on Flood Water Depth (at a Particular Site)



(A) Evacuation Location is Super Deck.
Occupants move via stairs or similar means to the Super Deck

(B) Evacuation Location is low pitch roof.
Occupants move through the attic via fixed ladder or similar means to a hatch in roof to the roof.

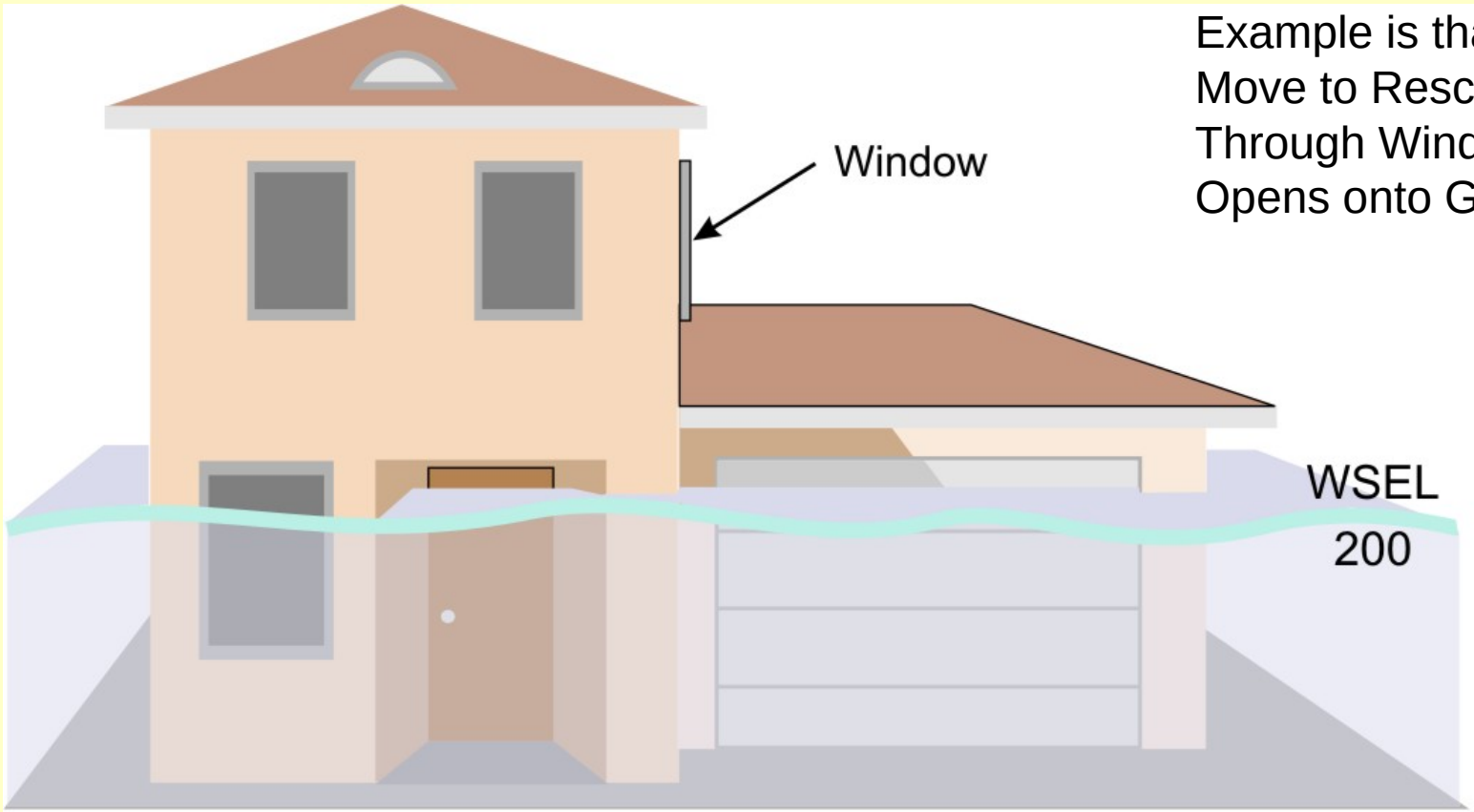
(C) Evacuation Location is the attic.
Occupants move up stairs, fixed ladder, alternating tread device, or similar means.

(D) Evacuation Location is upper level of house.
Occupants move up 1/2 flight of internal stairs to upper level of home.

(E) Evacuation Location is roof of split level.
As shown, occupants move through roof hatch to roof. For other roof options, see rooftop figures.
This rooftop Evacuation Location on top of upper level of split level can accommodate WSEL 200's up to 13 or 14 feet above natural grade..

Example 4

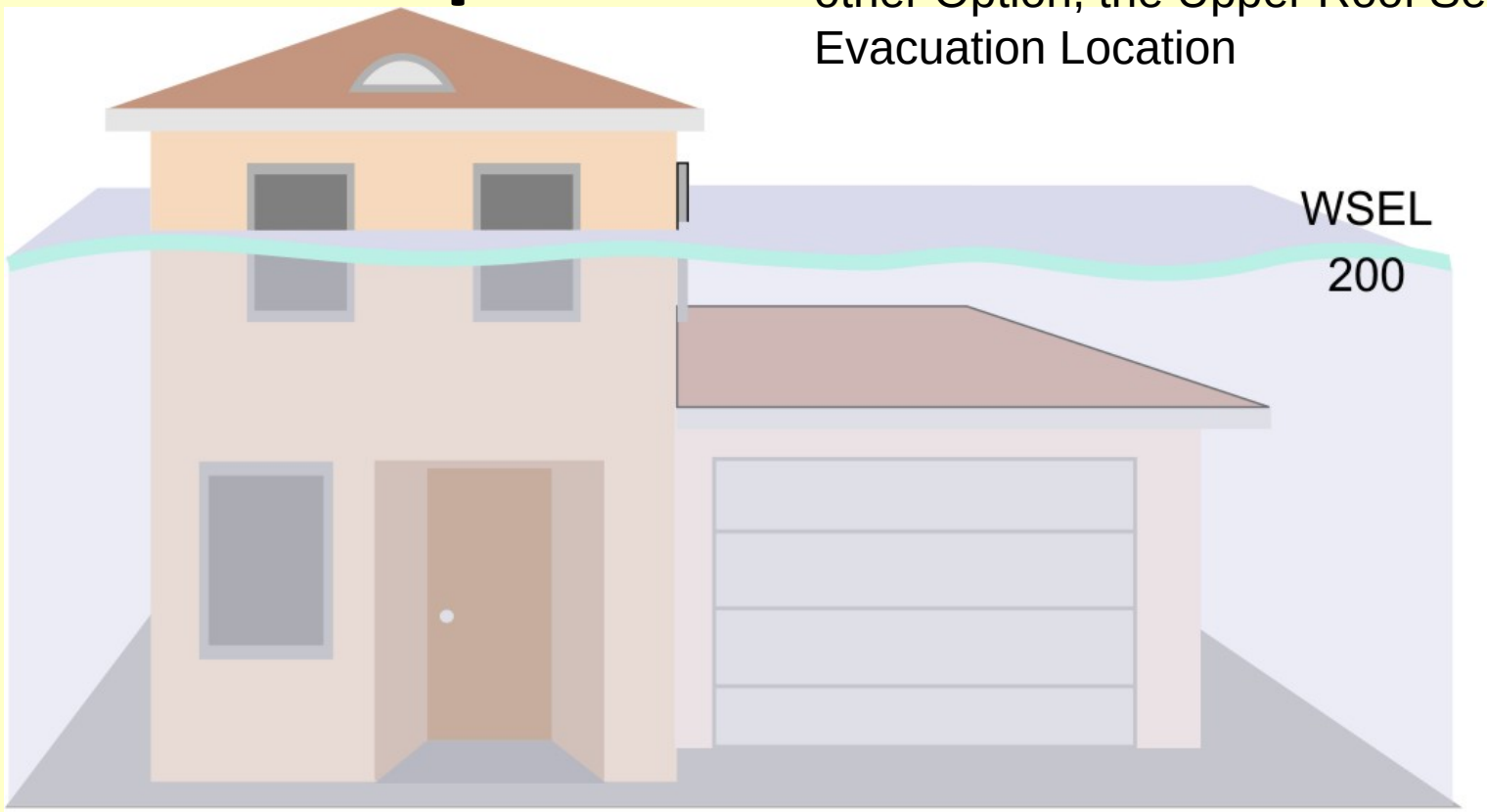
Point to Make in This Example is that Persons Move to Rescue Vehicle Through Window that Opens onto Garage Roof



4 Evacuation Location is interior of the second floor.
Occupants move through a window to the garage rooftop to rescue vehicle.

Example 5

Rather than Designing a Third-Story Tower or other Option, the Upper Roof Serves as Evacuation Location



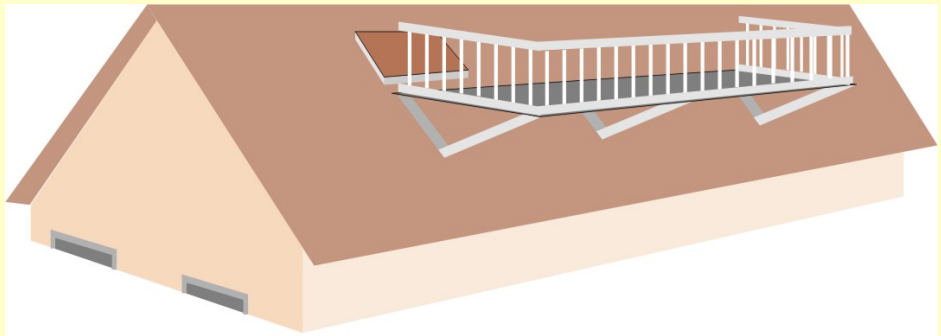
(5) Evacuation Location is the roof.
Occupants move through the attic and roof hatch to roof. See rooftop options for variations.

Example 6

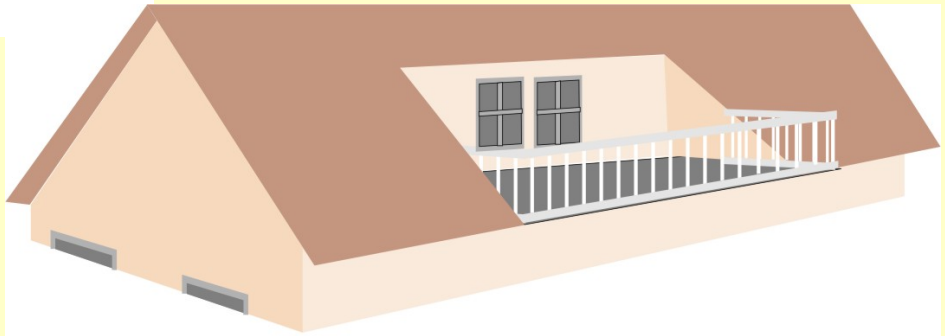
6 Evacuation Location is a balcony or deck with access from interior.

Same Conditions as in Example 5. However, the Owner May Feel More Comfortable Evacuating to a Flat Terrace or Balcony

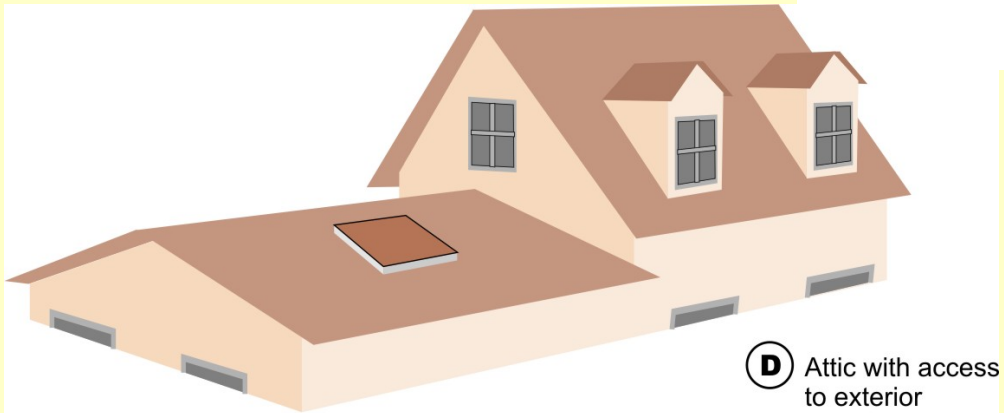
Example: Evacuation Location on Residential Roofs



A Platform on steep roof



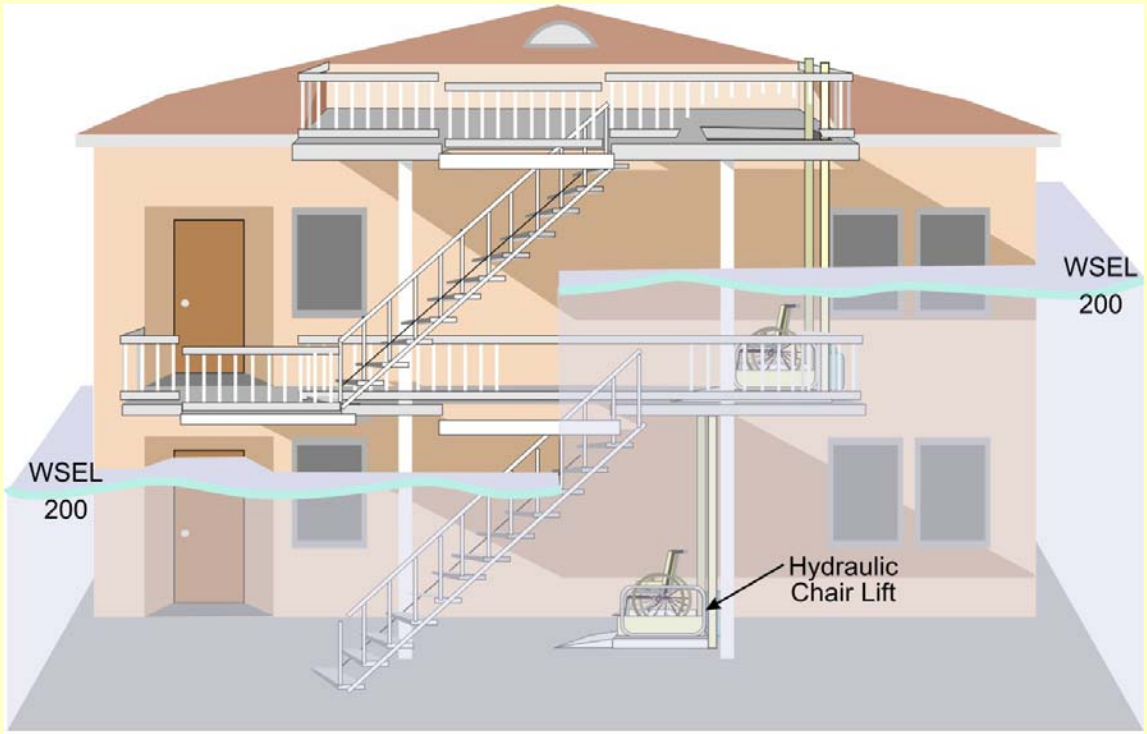
B Inset terrace



D Attic with access to exterior

C Shallow roof pitch

Example 7: Evacuation Locations in Multi-Unit Buildings (Apartment, Hotel, etc)

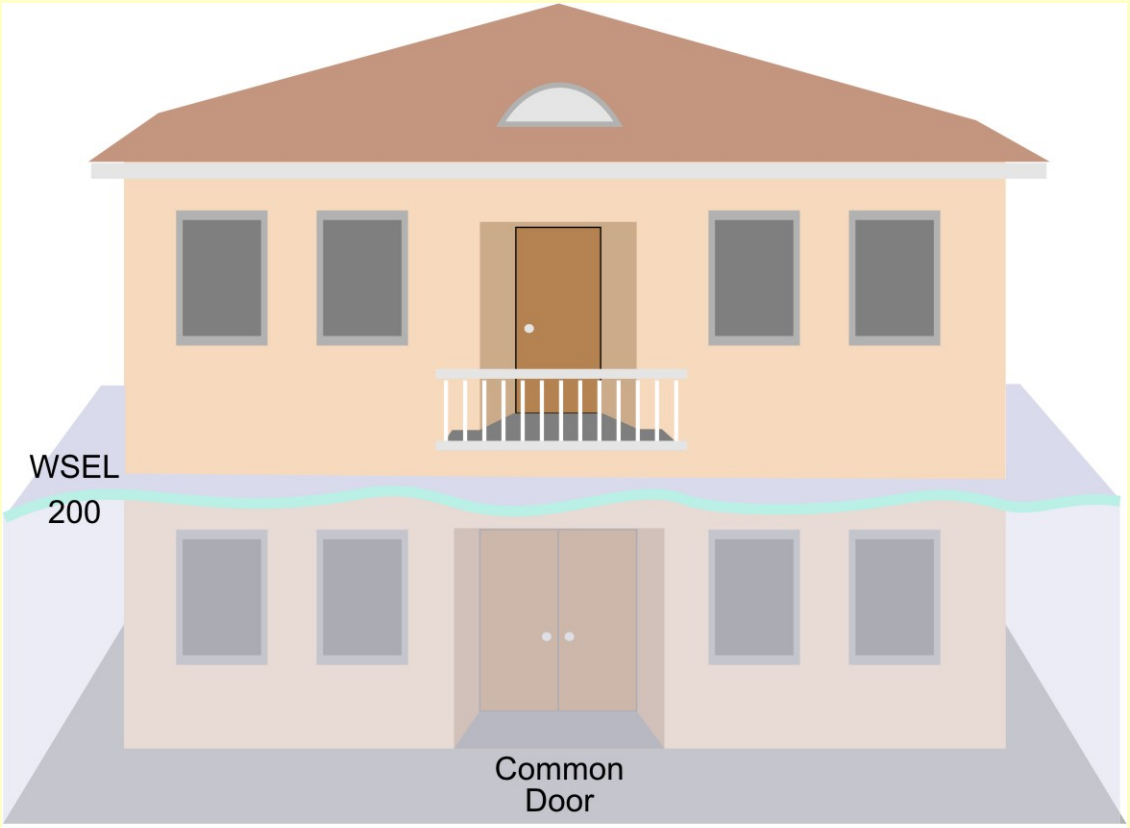


Multi-Unit Apartment Building or Hotel/Motel-type - No Elevator

If WSEL 200 is below second story floor, Evacuation Location is on the second floor common area. If the WSEL is into the second floor, the Evacuation Location is the roof deck.

Occupants move up stairs or by other means, (e.g. wheel chair lift.)

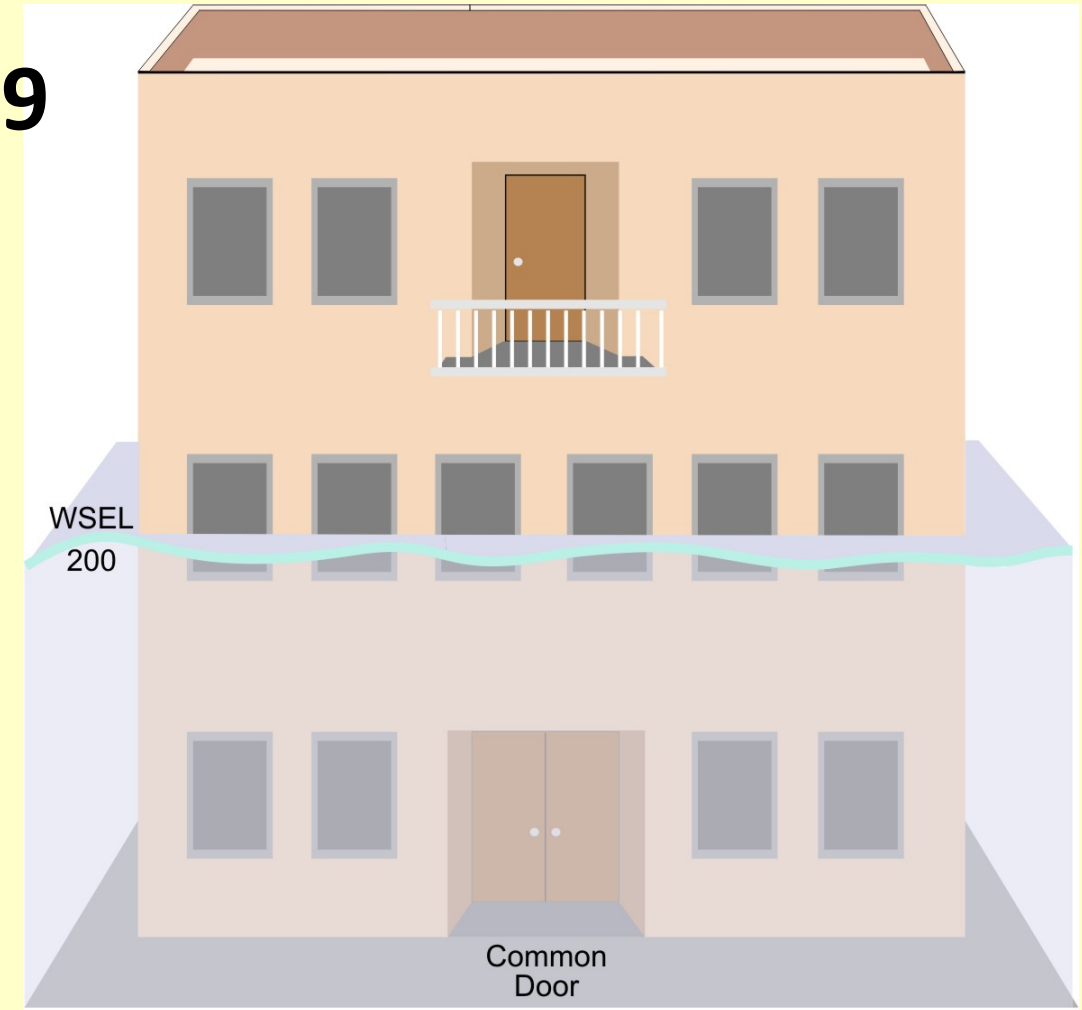
Example 8



10 Multi-Unit Building

Evacuation Location is interior of common space of the floor above WSEL200. Occupants move through door to a balcony or deck to rescue vehicle.

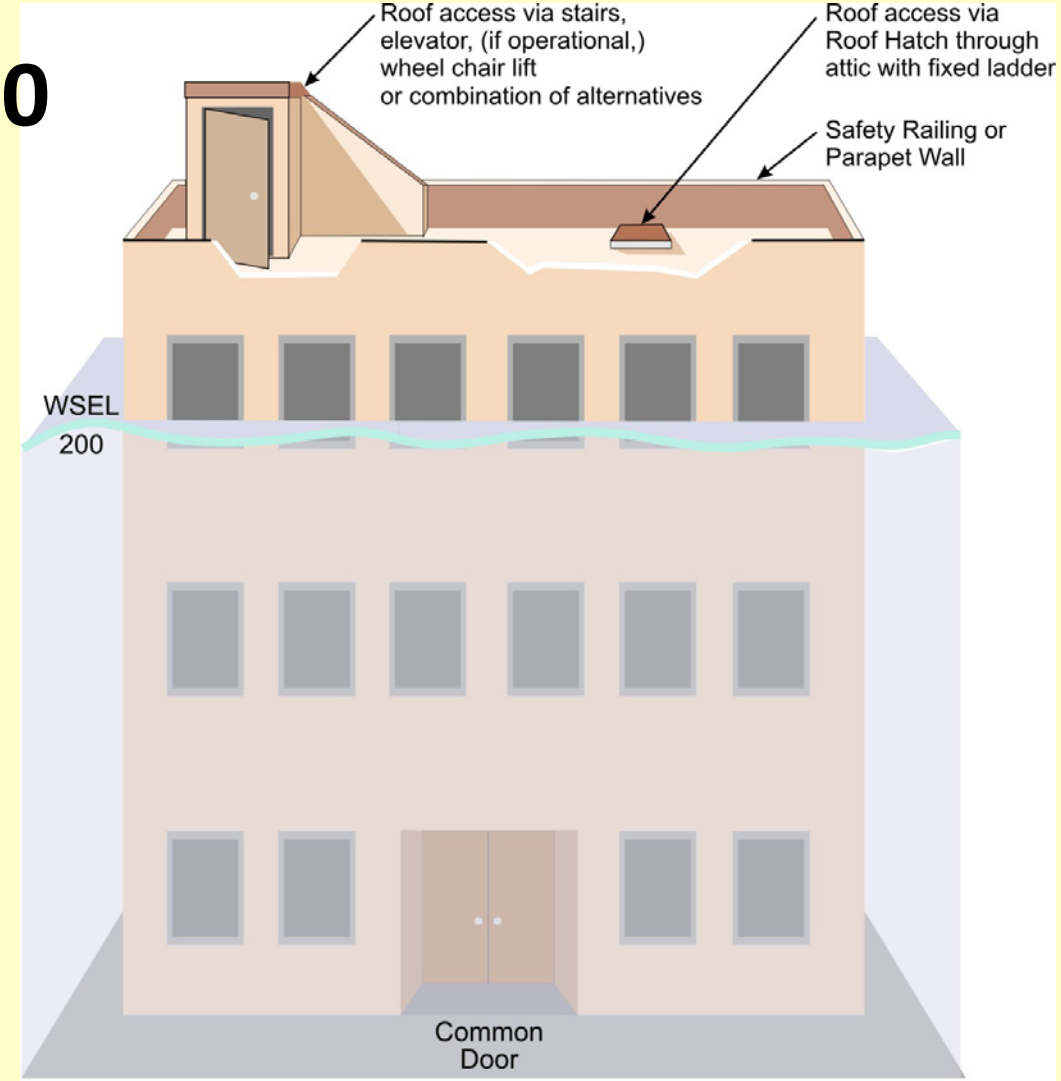
Example 9



Multi-Unit Building

Evacuation Location is:
Common space within interior of the third floor.
Occupants move through a door to a balcony or deck to rescue vehicle.

Example 10



Multi-Unit Building with Flat Roof

Evacuation Location is on the rooftop as described above.

On Super Decks and Balconies [§8]

- A super deck or balcony does not have to be at the same level as a floor within a building
  - Allowing the owner/designer not elevating most or all of the building
  - Access and egress requirements per existing Code requirements

On Rooftop Evacuation Location [§9]

- Shallow sloped roofs use the minimum slopes per roof material manufacturer.
  - This slope may be too steep for safety purposes when wet.
- Buildings with accessibility requirements must have portions of rooftop Evacuation Location that are flat.
  - Not applicable for R-3
- Roof hatches designed to meet California energy requirements

On Rooftop Evacuation Location

(Cont'd) [§10]

- Current Code requires handrails/ guards for rooftop terraces, balconies, and decks.
  - Many flat roofs have parapets
- Proposal shall require that all occupancies except R-3 (single family houses) and R-3.1 rooftop Evacuation Locations must have fall protection guards

Alternate Means of Protection [§16]

- The proposed Code update allows meeting the requirements through Alternate Means of Protection
- Possible concept (but not limited to):
  - Stand alone decks
  - Community center in community development
    - **Review and approval:** Building Officials, local emergency management authority, and obtain appropriate flood control agency (e.g., a levee district)

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PROPOSED 2009 CODE UPDATE
STRUCTURAL STABILITY

CALIFORNIA BUILDING STANDARDS CODE UPDATE PROJECT

FloodSAFE CALIFORNIA

April 13-14, 2009

Structural Stability

- Proposal with public safety focus, although reduction in structural damage is also possible.
  - A stable building will not collapse or trap the people waiting to be rescued, or float away during the flood.
  - Proposed Code requirement on balancing the hydrostatic pressures inside and outside of the building. Allowing water in actually helps the building from collapsing

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ADDITIONAL CODE UPDATES UNDER CONSIDERATION

Under Consideration: Notification or Signage [§14]

- **Measure:** Signage that directs the occupants of non single-family structures to the Evacuation Location.
  - Audible and/or visual alarms are also under consideration.
- **Pros:** Providing critical information for persons that do not know the Evacuation Location exists or where it is located
- **Cons:** Overlooked by regular attending occupants; not all occupants can read sign.

Under Consideration: Emergency Equipment Box at Evacuation Location [§15]

- **Measure:** an emergency equipment storage *container* with signage explaining intended use. Contents are difficult to require.
- **Pro:** Emergency equipment and supplies can be critically important for safety and well being during flood crisis
- **Cons:** Code cannot regulate most removable objects (blankets, food, etc.); safety equipment (inflatable boats) that are not maintained may not work when needed

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RECAP

Next Steps

- Submit review comments by April 24th
  - Fax to 916-574-1480
  - Email to BldgCodeTeam@water.ca.gov
- Thursday, April 30th, Disability Access Workshop
  - 12 p.m. to 3:30 p.m.
  - Sacramento Convention Center, Room 130
- Additional agency and stakeholder coordination
- Complete proposal package to Commission by June 30, 2009

Website: www.water.ca.gov/BuildingCodeUpdate