PALO ALTO'S 2016 SEISMIC RISK MANAGEMENT PROGRAM ADVISORY GROUP

SUMMARY REPORT ON PROCESS, DISCUSSIONS, AND OUTCOMES

November 21, 2016

OVERVIEW

On December 9, 2014, the Policy and Services Committee of the Palo Alto City Council recommended the City Council authorize a Request for Proposal (RFP) to develop information for use in updating the City's Seismic Hazards Identification Program (Ordinance 3666). The City Council approved the recommendation, an RFP and scope of work was prepared, and a consulting team led by Rutherford + Chekene was selected to develop summarize relevant state and local seismic mitigation legislation, obtain detailed information on Palo Alto's existing building stock, develop conceptual retrofits for vulnerable buildings, make loss estimates of expected damage to the building stock, and work with a City Advisory Group to develop policy recommendations for consideration by the Council.

From an initial meeting in December 2015 through a final meeting in August 2016, the City of Palo Alto (COPA) staff and consultants from Rutherford + Chekene hosted six meetings of a Seismic Risk Management Program Advisory Group. The purpose was to discuss needs and potential directions for COPA leaders to consider going forward in updating the city's seismic mitigation programs. The convening of a stakeholder advisory group was an essential element of a the project to collect and analyze earthquake risks in Palo Alto's existing building stock (primarily multi-family and commercial) and narrow in on promising policy alternatives.

Over the course of twenty hours of face-to-face information exchange, non-staff participation ranged from seven to 20 persons. Attendees included people with a range of relevant expertise and interests from interested citizens, earthquake risk and engineering experts, local developers and owners, and representatives of various community groups. COPA departments represented included Building, Planning, Fire, Office of Emergency Services, and Public Works.

The process was informed by an extensive technical assessment of the earthquake risk landscape in Palo Alto's existing buildings (excluding single-family and two-family residences). Consultants completed a document review, a street survey of a large sample of buildings, and a loss estimation analysis with and without seismic retrofitting, as well as a comprehensive review of other jurisdictional best practices and the state policy context. Advisory Group members received in-depth briefings on the inventory and loss estimation methods and results. That information formed the basis for clarifying and exploring a range of policy options.

This memo summarizes the process, discussions, and outcomes of the City of Palo Alto's Seismic Risk Management Program Advisory Group efforts. The process was not aimed at creating a consensus document or ratification by majority vote. The end goal was a summary—reflected by this document—of the range of issues and opinions expressed by interested parties who participated. All Advisory Group members had the opportunity to review this memo prior to

final submittal by the Consultants to COPA staff. The information herein will be provided to the City Council later in the first quarter of 2017 as they consider potential revisions to the City of Palo Alto's current seismic risk management program and seismic hazard identification ordinance.

POLICY OPTION DISCUSSIONS

Scope of the Seismic Risk Problem in Palo Alto

Palo Alto's existing seismic mitigation program, one of the first and most innovative of its kind, focuses on three categories of buildings based on age of construction and structural type and occupancy. Category I is for unreinforced masonry (URM) buildings with more than six occupants and more than 1,900 sf. Category II is for buildings built before 1935 with over 100 occupants. Category III is for buildings built before August 1, 1976 with over 300 occupants. In the 12/9/14 COPA staff report, there were 47 buildings in Category I, 19 in Category II, and 23 in Category III. The program required owners to do a seismic evaluation, but left them the choice of whether to actually perform a retrofit. Owners and developers were offered a Floor Area Ratio (FAR) bonus in exchange for completing basic retrofit work. This tactic was successful for addressing the majority of the Category I, II, and III buildings either by seismic retrofitting or by demolition. Currently, approximately ten Category I, four Category II, and nine Category III buildings remain standing without seismic retrofitting. The modest overall scope of the ordinance left many other vulnerable building types unaddressed.

The current technical assessment covered a much larger set of buildings with a wider array of potentially vulnerable structural systems. The findings showed that the estimated losses to Palo Alto buildings and contents in a major event will be significant, on the order of $2.4 billion. Furthermore, this figure does not include implications such as lives lost, business disruption, or ripple effects in the local economy or real estate market. Much of this loss will not be insured.

Loss Estimates and Cost Benefit Assessments of Local Inventory

Generally, buildings designed to a more recent building code are expected to perform well. Older buildings built before milestone improvements in code provisions can be more seismically vulnerable. Among the building type categories of highest concern in Palo Alto besides the three categories covered by the COPA ordinance are pre-1977 soft-story wood frame (with approximately 294 buildings), pre-1998 tilt-up concrete (99 buildings), pre-1977 concrete soft-story (37 buildings), pre-1998 steel moment frame (35 buildings), and other pre-1977 concrete construction (170 buildings). Participants generally agreed that addressing building types known to be potentially hazardous and with large numbers of buildings will lead to the greatest reduction in losses. It was also nearly unanimous that Palo Alto should seek out ways to resolve the approximately 23 cases of Category I, II, or III buildings that have not yet been addressed.

The technical assessment revealed that the potential reduction in damage costs from retrofitting is significant. Some building categories have greater benefits than others in terms of loss

reduction relative to estimated retrofit costs, with a low of approximately 1:1 to a high of approximately 11:1. Two scenarios earthquake events along the San Andreas Fault developed by the United States Geological Survey were used in the loss estimates: a major M7.9 event, and a strong M6.7 event. For a more accurate estimate of costs and benefits, all future earthquakes would need to be considered. It made sense to participants to use the estimated retrofit benefit-cost ratio as one factor (among many) in considering which categories of buildings COPA should address first. Other factors could include loss of life, business disruption, and displaced residents, though these estimates were not within the scope of the loss estimate.

Approaches to Address Seismic Retrofitting Used by Other Jurisdictions

The policy and best practices reviews showed that a wide range of policy options are being used in other jurisdictions to address vulnerabilities similar to those faced by Palo Alto. Potential policy mechanisms include: inventory only, notify only, voluntary retrofit, disclosure approaches, mandatory screening, mandatory evaluation, and mandatory retrofit, with either a fixed timeline or when triggered (for instance, at time of transfer). Mitigation programs often consist of a package of policy mechanisms for different building categories, and use several mechanisms at the same time for different building categories or in phases. Participants were also informed about precedents for a variety of incentives that can be offered for some or all affected owners to ease the process of program compliance.

Bundled Options with Increasing Regulatory Strength

The Advisory Group, together with COPA staff, received detailed briefings on the above findings, asked questions, and discussed potential community responses and concerns. Half way through the process, consultants introduced to participants a range of specific policy options to frame the conversation about the most needed and viable policy approaches. The aims were to identify areas of general agreement, specific approaches that were either favored or not, and issues needing further information or discussion. Six possible options were suggested as follows:

Option 1—Status Quo. Existing program (Palo Alto Municipal Code Chapter 16.42) ordinance with its mandatory evaluation, voluntary retrofit approach would remain in place without changes.

Option 2—Increase Scope but Retrofit Remains Voluntary. Additional categories of structures would be added to the mandatory evaluation requirements beyond those of the current ordinance.

Option 3—Increase Scope with Additional Disclosure Measures. Like Option 2, this option would target a larger set of building categories than the current ordinance and make use of disclosure measures such as prominently posting the building list on the City website, notifying tenants, requiring signage, and/or recording notice on the property title.

Option 4—Increase Scope with Some Categories Voluntary and a Few More Categories Mandatory, with Enforcement by a *Trigger Threshold*. This option would require retrofitting for some building types whenever certain future events take place, such as *when a building is sold or undergoes substantial renovation above a set threshold such as cost*.

Option 5—Increase Scope with Some Categories Voluntary and a Few Categories Mandatory, with Enforcement on a *Fixed Timeline*. This option would be similar to Option 4, but retrofitting is required *according to a fixed timeline*.

Option 6—Increase Scope, Retrofit is Mandatory for More Categories. Retrofitting would be required on a fixed timeline for additional categories.

The possibility of having different requirements or timelines for residential compared to non-residential properties was identified. The group was also open to using location, occupancy type, and/or number of occupants as part of the criteria for selecting a structural type to be included in the updated ordinance, and/or as a basis for setting appropriate timelines, prioritization, tiers, or phasing. In general, mandatory evaluation was seen as a way to make sure building owners and the City are properly informed about existing risks, and as a way to motivate more voluntary retrofit work. Triggered upgrades were also discussed favorably, though some felt this kind of uncertain timeline was not appropriate for risks that city leaders have concluded are unacceptable. There was support for using combinations of the options for different building types, so that some building types would have more stringent requirements than others. Many members of the Advisory Group, though not all, were positive about including mandatory requirements for some building categories (Option 5).

PERSPECTIVES ON DISCLOSURE MEASURES AND INCENTIVES

Along with these options, the group discussed how COPA could utilize a variety of disclosure measures and incentives.

Disclosure Measures

Once introduced to the rationale and precedents for use of disclosure measures, the group supported the idea of making the list of buildings affected by the current and any future ordinance update more prominent and available to the public. The group regarded the City's website and possibly tenant notification as the best ways to do this, while they had less interest in community education efforts. There was some concern that placing notice on the title would not be worth the initial and ongoing efforts necessary to keep such information current. The group discussed extensively but ultimately expressed relatively low support for signage or placarding, unless this tactic was used later in a program as a penalty for failure to comply in a timely manner.

Incentives to Undertake Seismic Retrofitting

The group was eager to discuss possible incentives, from the standpoint of both facilitating prompt action and easing the burden on owners. Incentives were viewed as particularly important to the success of any voluntary program. Most of the group were in favor of the City offering modest financial help in the form of City fee waivers or expedited permitting, but acknowledged that these measures may not significantly help the property owner lessen project costs.

Therefore, there was wide agreement that these should not be the only types of incentives offered. There was interest in having Palo Alto join the small but growing number of jurisdictions that have joined statewide PACE[1] loan financing programs, though it is not clear how many potentially affected property owners would benefit from or actually take advantage of this kind of help.

The group expressed minimal interest in pursuing ways to offer owners deep financial assistance, such as declaration of special district or passage of bond measures. Opinions were split about the effectiveness of using transfer of development rights (TDR)[2], floor area ratio bonuses, and parking exemptions. Some participants felt their constituencies would not benefit, or would be negatively impacted, by these measures. Others felt that such concessions on the part of the City would be a very effective way, as they have been in the past, for motivating earthquake improvements without issuing heavy mandates. Relaxation from parking provisions for example, could be seen as a helpful incentive to commercial property owners, but it would less desirable for tenants and others seeking parking in congested parts of the city such as the downtown area. Allowing conversion of a portion of ground story parking to occupied residential space as an incentive to spur retrofitting of soft-story wood frame buildings was discussed, as this is being considered in other jurisdictions. It was noted that parking is a desirable feature to renters and this may not be strong incentive if rental rates are reduced due to lack of parking. Some policy incentives, especially the complicated TDR, might be administrative challenging to implement and will require deep cooperation with Planning Department and coordination with the City's general plan.

PREFERRED POLICY DIRECTIONS

Discussions with the Advisory Group revealed little to no support for maintaining the status quo. Strong support did exist for:

- ⇒ Implementing retrofit of buildings already in the current program, particularly URM buildings.
- ⇒ Addressing more building types, particularly soft-story wood frame and older concrete tilt-up, that would affect the most people.

<u>Completion of the City's Current Seismic Program</u>

For buildings under the current ordinance, the Advisory Group generally thought a mandatory retrofit requirement would be feasible and fair. Three decades later, market forces alone have not

[1] With a Property Assessed Clean Energy (PACE) loan, first pioneered for solar panels by the City of Berkeley in 2008, owners can apply for 100 percent financing for seismic retrofit work at competitive fixed rates over the useful life of the improvements, to be repaid over up to 20 years with an assessment added to the property's tax bill.

[2] TDR allows owners to transfer unused development rights that are comparable to the value of the retrofit to another property in the community. In other words, in exchange for completing certain seismic rehabilitation work, additional development rights are gained elsewhere. This is a common measure used for historic structures.

been enough to motivate upgrade of these structures. Because the barriers to retrofit work for these properties are not known, case-by-case management by COPA staff may be necessary. There was hesitance, however, about extending or increasing incentives for owners that had not voluntarily taken advantage of the FAR bonus available in the past.

Extending the Seismic Program to Other Potentially Vulnerable Building Types

In the discussion of expanding the scope of the City's seismic program, the goal was to focus on a subset of categories that seemed to have high potential to benefit the owner, occupants, and the broader community. Consultants briefed the group on structural types generally known to be vulnerable that are common or significant to Palo Alto and estimated to have reasonable loss reduction to retrofit cost ratios. Detailed conversations took place about other building category priorities and policy features that could be incorporated into Options 3, 4, and 5.

The group showed high interest in addressing multi-family residential earthquake risks, in particular by starting a soft-story wood frame program as many other California cities have done. One soft-story wood frame program approach discussed was to have two phases, where owners would first be given several years following notification to do a voluntary retrofit, along with more generous incentives. Later, a mandatory timeline would kick in and incentives would be phased out. The group discussed that exemptions such as parking requirements, permission to add other unit(s), or the ability to transfer development rights for additional square footage would likely be attractive and useful incentives for this building type.

Other building categories of concern were reviewed at the last meeting. Regarding pre-1998 tilt-up concrete buildings, there are a modest number in Palo Alto, but group members noted that their uses are changing. Many of what previously might be warehouses are now being repurposed for use as office space, and the higher occupant density increases the safety stakes of any seismic deficiencies. There is currently no policy or code requirement to address earthquake vulnerabilities if other upgrades and build out are being done but there is no significant impact or revision to the structural system. A renovation trigger was discussed, where substantial renovation work would trigger a mandatory seismic upgrade. The trigger could be based on whether a ratio is exceeded of the cost of the renovation work to the replacement value of the building. This has been done in some jurisdictions in the past. The replacement value could be based on a standardized set of costs per square foot for different occupancy types. It should be noted that some individuals in the group expressed concern that a renovation trigger might discourage owners from upgrading or renovating their buildings, depending on the trigger threshold and the cost of the retrofit.

POTENTIAL ISSUES FOR FUTURE STUDY

For some issues, based on Advisory Group discussions, additional information may be beneficial to help in refining a new strategy and to better understand potential impacts on key stakeholders

and community concerns. These issues are primarily economic and are outside the scope of the current study. The City Council may wish to direct staff and/or outside consultants to investigate some of these items in more detail as the seismic risk management program effort proceeds. Issues include the following:

- *Occupants and tenants*
  - How much would a typical retrofit add to the monthly rent of a multifamily soft-story wood frame apartment tenant?
  - Would some tenants be unable to afford a rent increase and seek housing elsewhere in Palo Alto or move outside the city (and if so, how many might be displaced)?
  - If soft-story wood frame apartments in Palo Alto are retrofitted in time before the next major earthquake, how much less displacement of residents would occur as a result of the earthquake?
  - What categories of buildings are most important to address in order to help maintain the commercial viability and vitality of the City's core business districts and tax base?
- *Property owners, developers, and business owners*
  - What are the characteristics of property owners that would be affected?
  - How might small businesses be affected compared to larger ones?
  - How many property owners are in need of lower cost capital or other substantial financial assistance to fund retrofitting?
- *City departmental resources and budgets*
  - What would be the loss in revenue to the Building Department if fee waivers were offered?
  - What would be the staffing and budgetary needs over time to administer an expanded program that addresses additional building types?
  - What kinds of interdepartmental cooperation and staff resources in other departments are necessary to ensure effective implementation and coordination with other city planning and public safety efforts?
- *Overall community economic health*
  - What kind of benefits could accrue to Palo Alto in terms of maintaining community function and ability to recover if various building categories are retrofitted in time before the next major earthquake?
- *Other related issues*

- It was brought up that the Building Department needs flexibility and authority to take steps to get tough seismic mitigation projects done. One idea was to grant the Building Official the ability to classify certain projects (with well-specified criteria) as warranting a kind of "seismic safety" or "earthquake resilience" fast tracking, with COPA departments agreeing to coordinate on a specified accelerated project review timeframe.
- Although outside the formal scope of this planning effort, several Advisory Group members commented that it would be desirable for the City to do some kind of assessment of any earthquake mitigation needs in public buildings and facilities serving the City.
- Advisory group members recommended the community be informed of Palo Alto's overall potential seismic risk by providing a summary of potential impacts on the City's website, including the expected performance of vulnerable buildings.
- The group also had a high degree of support for recommending that the City initiate and nest future earthquake mitigation programs within a broader disaster or community resilience initiative, as cities such as Los Angeles, Berkeley, and San Francisco have done. This could be incorporated in the update of the City's Comprehensive Plan Safety Element. There was insufficient time in the project's six advisory group meetings to consider potential initiatives to assess risks for cell phone towers, water supply, facades, private schools, post-earthquake shelter facilities, and/or other assets important to community recovery.

SUMMARY OF RECOMMENDED POLICY DIRECTIONS

There was broad consensus that the City's seismic program should go beyond the status quo by increasing the number of building types that are included and the associated requirements. The following table summarizes the City's current seismic risk management program features, and it provides recommended policy directions for different types of building categories, both for those in the current program and those proposed to be added to the program, including the approximate number of affected buildings, construction type and date, evaluation report and construction completion deadlines, potential preferred disclosure and incentive options, and whether retrofitting remains voluntary, is triggered by a sale or a substantial renovation, or is mandatory. The following summarizes the key issue of whether voluntary, triggered, or mandatory approaches were preferred.

- There was broad consensus that seismic retrofitting for the remaining URM buildings (Category I) should be made mandatory.
- There was general agreement that soft-story wood frame buildings (Category IV) and somewhat general agreement that older tilt-up buildings (Category V) should require

strengthening either by a sale or substantial renovation trigger or on a mandatory fixed timeline.

- There was less of a consensus on whether the older higher occupancy buildings in the current ordinance (Category II and III) should be converted to use a mandatory approach, though a triggered approach may represent a reasonable middle ground.
- There were supporters, but no clear consensus, for voluntary, triggered, or mandatory approaches to addressing older soft-story concrete buildings (Category VI) and older steel moment frame buildings (Category VII).
- Other older nonductile concrete buildings (Category VIII) were discussed, but due to the lack of inexpensive analytical methods for reliably identifying the worst of these buildings, inclusion of this building category in an updated ordinance is not recommended at this time. Such buildings could be included in the future when such analytical methods have been developed in the engineering community.

Summary of Recommended Policy Directions

Category	Approx. Number	Building Type	Date of Construction	Occupants	Evaluation Report	Voluntary, Triggered, or Mandatory Retrofit[1]	Deadlines for Evaluation Report and Retrofit Construction (years)[2]	Disclosure	Potential Incentives
Current Program (Potential Revision in *Italics*)									
I	10	Un-reinforced masonry	NA	Over 6 (and over 1,900 sf)	Required	*Mandatory*	Report: Expired Construction: *2-4*	*Website listing and tenant notification*	*Fee waiver, expedited permitting, FAR bonus/ transfer of development rights (TDR)*
II	4	Any	Before 1/1/35	Over 100	Required	Voluntary *or Triggered*	Report: Expired Construction • Voluntary: Not required • *Triggered: At sale or renovation*		
III	9	Any	Before 8/1/76	Over 300	Required	Voluntary *or Triggered*			
Expanded Program									
IV	294	Soft-story wood frame	Before 1977	Any	Required	Triggered or Mandatory	Report: 2-4 Construction • Triggered: At sale or renovation • Mandatory: 4-6	Same as above	Fee waiver, expedited permitting, TDR, parking exemptions, permission to add units
V	99	Tilt-up	Before 1998	Any	Required	Triggered or Mandatory	Report: 2-4 Construction • Triggered: At sale or renovation • Mandatory: 4-6	Same as above	Same as Categories I, II and III
VI	37	Soft-story concrete	Before 1977	Any	Required	Voluntary, Triggered or Mandatory	Report: 2-4 Construction • Voluntary: Not required • Triggered: At sale or renovation • Mandatory: 6-8	Same as above	Same as Categories I, II and III
VII	35	Steel moment frame	Before 1998	Any	Required	Voluntary, Triggered or Mandatory			
VIII	TBD	Other older nonductile concrete	Before 1977	Any	Not rec. at this time	Not recommended at this time	Report: NA Construction: NA	NA	NA

[1]Voluntary: Retrofit is voluntary.
Triggered: Retrofit is triggered when the building is sold or undergoes substantial renovation.
Mandatory: Retrofit is required per a fixed timeline.

[2]Deadlines provide a potential range. Timelines would vary depending on tiers or priority groupings of different subcategories.