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Resilient Washington State Workshop

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Final Summary Report

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Introduction

The Washington State Seismic Safety Committee (SSC) initiated a project to study and prepare a policy paper with the purpose of providing a framework for improving Washington's resilience when earthquakes occur. Such a framework includes more effective seismic mitigation policies and recommendations for legislation and policy changes to improve and enhance statewide seismic safety. The document will be used to facilitate long-term implementation of seismic risk reduction policies across the state with the goal of making the state resilient in a 50-year time frame. To complete this effort, the SSC formed a subcommittee called the Resilient Washington State (RWS) subcommittee.

The RWS subcommittee has been formulating a plan of action to complete this effort since the start of 2010. For the initial inspiration, the subcommittee looked to a similar effort undertaken for the City of San Francisco by the San Francisco Planning and Urban Research Association (SPUR). The final SPUR documents for the Resilient City project in San Francisco can be found at http://www.spur.org/resilient_city. Unlike the SPUR document, the RWS effort will be focused on statewide impacts.

In order to draw upon the expertise of key stakeholders and solicit their input and involvement in this project, the RWS subcommittee facilitated the Resilient Washington State Workshop on September 17, 2010. This one-day event was held at Gould Hall at the University of Washington in Seattle. Forty-five people—representing local, state, and federal agencies, university departments, and private businesses—attended the workshop. In addition, a number of those who were invited, but who were unable to attend the workshop, expressed interest in participating in subsequent meetings of the workgroups.

Objective of the Workshop

The primary objective of the workshop was to allow the members of the subcommittee to begin working with key experts and stakeholders to:

- Evaluate the current condition of infrastructure in the state relative to earthquake resilience.
- Develop targets for the desired level of performance.
- Develop target timeframes for the restoration of services.
- Prepare recommendations for statewide action to achieve desired targets. (These recommendations will be presented in a clear and concise document.)

The discussions begun at this workshop will continue over the next several months as the participants continue to meet in their workgroups to address these points. A second workshop is

planned for the spring of 2011. This will bring all the participants together again for the purpose of further refining and synthesizing their work.

Overview and Organization of the Workshop

Prior to the workshop, the Resilient Washington State subcommittee developed a definition of resilience, a set of values to guide deliberations related to resilience, and an outline of the sectors and components that make up the critical infrastructures of the state.

The RWS subcommittee defined a resilient state as one that maintains services and livelihoods after an earthquake. In the event that services and livelihoods are disrupted, recovery occurs rapidly, with minimal social disruption, and results in a new and better condition. The values that the subcommittee identified in accordance with this definition are:

Property Protection: Public and private property within the State of Washington should be built, retrofitted, or rebuilt to minimize earthquake-induced damage. This includes proper design and construction of both structural and non-structural elements.

Economic Security: Residents and businesses within the State of Washington should have access to income opportunities to meet basic needs before and soon after an earthquake. This includes sufficient employment opportunities, market access, distribution capacity, and supplier access.

Environmental Protection: The natural resources and ecosystems of Washington State should be managed in such a way as to minimize earthquake-induced damage. This includes the use of proper growth management, accident response capacity, and industrial safety measures.

Life Safety and Human Health: Residents of the State of Washington should not suffer life-threatening injuries from earthquake-induced damage or develop serious illness from lack of emergency medical care after an earthquake. This includes enforcing and updating building codes, eliminating non-structural hazards, and ensuring continuity of emergency health care.

Community Continuity: All communities within the State of Washington should have the capacity to maintain their social networks and livelihoods after an earthquake disaster. This includes prevention of social-network disruption, social discrimination, and community bias.

At the workshop, the participants were given these definitions and were assigned to one of four workgroups. Each workgroup was assigned one of the sectors of Washington's infrastructure (the sectors and their components are listed below).

Utilities

- Drinking water
- Wastewater
- Electricity
- Fuel
- Information and communication technology

Critical services

- Law enforcement
- Emergency response
- Hospital care
- Education
- Sheltering
- Government administration

Transportation

- Roads and bridges
- Airports
- Seaports
- Rail
- Transit

Housing and economic development

- Finance and banking
- Commerce (commercial facilities)
- Real estate and construction
- Manufacturing (industrial facilities)
- Planning and community development
- Housing

Welcome & Introduction:

Mr. Jim Mullen, Director of Washington State Emergency Management, provided the welcome and opening remarks to workshop participants. Mr. Mullen noted the importance of this new initiative and discussed some of the successes and challenges in implementing effective seismic mitigation, but highlighted its benefits as experienced by Seattle Public Schools and other organizations during the 2001 Nisqually Earthquake.

Mr. Mullen highlighted the work that has been accomplished by the Seismic Safety Committee, which was reconstituted in 2008. He also discussed current efforts underway by the National Emergency Managers Association, Mitigation Committee and a whitepaper they authored, which has gained acceptance from many prominent organizations.

In conclusion, he noted that no other group is attempting to tackle these issues through such an open, collaborative approach and thanked the participants for their dedication to improving public safety in Washington State.

Facilitated Break Out Sessions:

After the introductory session of the workshop, during which the participants were presented with overviews of the work of the Seismic Safety Committee, the earthquake hazards affecting the state, and the Resilient Washington State Initiative (see Appendix C), the participants were asked to separate into their workgroups and to take part in breakout sessions. Each breakout session was facilitated by a member of the RWS subcommittee and each followed the same basic agenda and facilitation guidelines.

The questions used to guide discussions in the breakout sessions included the following:

- In what ways are the Resilient Washington State values important to the state's resilience? (Each group was asked to consider this specifically in relation to the sector the group was assigned.) How do the values relate to the restoration of critical sectors and components?
- Considering the RWS values, what additional components should be included in the sector that your group was asked to consider? Are there any components that should not be there?
- What are the externalities (outside sectors and components) that influence restoration of the components within the breakout group's sector? How do these externalities influence restoration?
- Is our state's capacity to restore the sector and its components adequate? Why or why not?
- Considering the scenario ground motions, what is the current capacity for restoration (expressed in days, weeks, or months) of the particular components and of the sector? What information or studies are needed to make such an assessment?
- What are the restoration targets (expressed in days, weeks, or months)?
- Considering the current restoration capacity and the restoration targets for each RWS value (either qualitatively or quantitatively), discuss what is required to get current capacity to match each target (assuming the target exceeds the current capacity).

These were followed by questions designed to help participants begin to assess and conclude their discussions:

- What issues stood out?
- What were you most surprised or concerned to realize?
- What does this mean for the State of Washington, its residents, and its businesses?
- What should or can be done?

In addition, each workgroup was asked to select a leader to help organize and facilitate the group's subsequent meetings and discussions.

The workshop participants reassembled in a final wrap-up session at the end of the afternoon. This allowed them to present to the larger group the key points of each workgroup's discussions and to make additional observations and comments. At the conclusion of the workshop, the participants were invited to continue their discussions at a social hour sponsored by Degenkolb Engineers.

Summary of Discussions

During the workshop, breakout sessions allowed participants to work together in four groups, each of which was focused on one of the sectors that make up the state's infrastructure. These sectors are *utilities*, *critical services*, *transportation*, and *economic development*.

Workgroup #1: Utilities

FACILITATOR: SCOTT MILES		NOTE TAKER: ALEXIS BLUE
1.	Mark Anderson	WA Department of Commerce
2.	Cale Ash	Degenkolb Engineers
3.	Don Ballantyne	MMI Engineering
4.	Tamra Biasco	FEMA RX
5.	King Chin	GeoEngineers Inc.
6.	Rick Forschler	WA Association of Sewer and Water Districts
7.	Charlene Hails	MRP Engineering
8.	John Labadie	Seattle Public Utilities
9.	Jerald Lavassar	WA State Dept. of Ecology, Dam Safety Office
10.	Luke Meyers	City of Bellevue Office of Emergency Management
11.	Scott Miles	Resilience Institute, Western Washington University
12.	Irving Ogi	Seattle City Light
13.	Tony Perez	City of Seattle—Dept. of Information Technology
14.	Ned Worcester	Seattle Public Utilities

After introductions, the participants in this workgroup discussed issues related to the RWS values.

Discussion of the Values

It was remarked that retrofitting all facilities within 50 years is a "pipedream."

The workgroup identified their top three priorities as *Life Safety*, *Property Protection*, and *Economic Safety*. While *Environmental Protection* was considered important, some thought it best not to include it officially.

It was observed that a risk-based approach is not mentioned in connection with the RWS initiative. Many participants in this group agreed that the initiative and policy document should be risk-based.

The participants also noted that there are lots of interrelationships among the RWS values and sectors.

Additional questions included: Where do preparation and advanced preparation fit into the values? Where do education and training fit into the values?

It was observed that the state cannot minimize risk down to zero percent. We need to do what makes sense based on cost-effectiveness.

It was argued that *Cultural Resources* need to be included either in the RWS values or in the sectors. Some believed this fits best as part of the values, maybe under *Environmental Protection* or *Community Continuity*.

It was noted that continuity of government is not called out in the values. Is ensuring government operations a value? A goal? Most considered it a goal and thus suggested that it be fitted into the RWS sectors (i.e., as part of government administration under the critical services heading).

Another question discussed was how do the values relate? Does it make sense to have different capacities and targets for each value? Do the values apply to all sectors? Some values play larger roles and apply varyingly, but overall, the values make sense and are applicable to different capacities and targets for each sector.

It was noted that timeframes (or phases) strongly relate to different values. For example, short-term planning might be associated with property protection, and long-term planning with community continuity; however, there is not a one-to-one relationship between a particular value and a particular timeframe.

It was noted that priorities and values will differ depending on the viewpoint of different stakeholders—companies and jurisdictions will not have the same priorities and values as the state. How do we integrate or account for this? How does the state influence stakeholders to meet the states' targets, particularly if these targets are not the same as the stakeholders' targets? It is important to build into the RWS initiative ways for both the private and public sectors to plug into it.

It was observed that many people articulate the idea that environmental protection is a priority, but this sentiment is not always reliable, and the priority of environmental protection is not always demonstrated. In an emergency, many will use or do *whatever* is necessary to maintain health/life, regardless of the environmental impacts.

Participants also asked how values of life safety (or urgency) and building-back-better or pre-event mitigation can be reconciled. How could this be facilitated or incentivized for the private sector (versus the public sector)? An example is getting power back quickly by re-hanging lines

versus burying power lines. Should buildings be built back to code or to a higher level of performance? Should this be required and for what stakeholders (e.g., public vs. private)?

It was suggested that the RWS subcommittee needs to rank the values. This led to additional questions and discussion: How should agencies and organizations balance or prioritize the RWS values? Should different values have different priorities during different timeframes after an event? Should there be public education about the values so that people understand when one service or one area is prioritized over another during a disaster?

How do we create resilience?

- Rebuilding better after?
- Mitigate before?
- Respond more efficiently?
- Faster recovery?
- Redundancy?
- Increase adaptive capacity?
- Top-down? Bottom-up?

Does the RWS or state have a preference for types of resilience strategies?

It was suggested that one of these lenses (above) be used to filter the RWS initiative. Most participants in this group preferred to increase the capacity of resilience from the very beginning—mitigation and preparedness—rather than improve response and recovery.

It was also suggested that the RWS project should take a consequence-based approach; and it was noted that the RWS initiative will need to balance demand between the public and the politicians.

General Discussion of Sectors and Components

It was suggested that the list of sectors makes it unclear whether the RWS initiative is focused on infrastructure or services. Both should be included and be articulated.

It was observed that "food supply network" (both emergency food and the day-to-day system) is missing from the sectors on the list. It was suggested that "food network" be added as a component of the *critical services* sector.

It was suggested that the sector assigned to this workgroup be changed from *utilities* to *utility lifelines*. This same suggestion might be applied to *transportation* (i.e. *transportation lifelines*).

The group further suggested:

- Changing the *drinking water* component to *domestic water supply* so that it includes both potable water and the water supply for fire-fighting.

- Changing the label of the *health care* component to *hospital care*.
- Breaking down the *fuel* component by type: natural gas, liquid fuel, and renewables.
- Adding *drainage* to *wastewater* so that the component is called *wastewater and drainage*.
- Adding *waste management/solid waste* as a component of the *utilities lifelines* sector.

The group noted that there is no mention of flood controls or levees in any of the sectors. The facilitator suggested adding *flood control* as a component. There seemed to be some agreement, but not overwhelming support. Inclusion of levees seemed to be clearly supported. Dams could be associated with components like electricity or flood control.

The group also discussed classifying components by their intended or actual end use. For example, energy could be broken down by residential, industrial, and transportation. Potentially, all utilities could be classified into types of residential, industrial, and transportation, or other uses.

Major interdependencies for the utility sector include the need for functioning roads and bridges so that electricity providers can make repairs.

Many in the group pointed out that infrastructure vulnerability analysis and interdependency analysis has been done by the private sector and by some local, state, and federal agencies. Someone suggested that the state has done some kind of infrastructure analysis and prioritized the infrastructure: Transportation was considered the first priority; energy was the second.

It was noted that the state has restoration teams, including law enforcement, an energy team, debris removal, and so on. Debris removal and management is not explicitly listed within the RWS sectors. The participants assumed that this is part of emergency services, but if not, they thought it should be explicitly included.

It was observed that employees' concerns about their families constitute a significant externality for restoring utilities. If employees do not know their families are okay, they may not show up for work. Family should be included somehow in the list of sectors.

It was noted that several utilities agencies reference ISO standards, but that this is different for each region; these standards cannot be (or are not) required.

Finally, it was asked: What is an okay level of service delivery for each component and with respect to each value after an event?

Discussion of Capacity and Targets

The capacity for restoration is really the capacity of the world. That is, restoration does not depend exclusively on the capacity of the affected area, but on the actions of outside actors and our ability to mobilize this greater capacity to assist the affected area. We do not have complete

control over this capacity. What can we influence and be aware of? Access to the "capacity of the world" becomes a function of transportation and contractual devices.

It might be wise to separate out a Cascadia scenario from a crustal scenario, because these scenarios affect the "capacity of the world" (nearby areas for mutual aid) dramatically differently.

Capacity is related to communication. Thus, the interoperability of information communications and of technology is a major concern. Also, communication capacity can be hindered by a silos-based approach. A wireless mesh network would be a resilient communication solution. Of course, interoperability is a major theme of many other efforts.

Some suggested that the restoration capacity for electricity is adequate. One participant mentioned that restoration should be about 50% of the population back online each day after a disruption (on average). Others disputed this and questioned whether it was derived from events in California or from non-disaster disruptions. There was agreement that restoration of electricity is dependent on post-disaster demand. The question becomes whether demand will outstrip supply in different timeframes after the event. The same hazard that reduces supply potentially reduces demand.

Any utility or services dependent on pipelines will be compromised in areas of liquefiable soils. This includes water, fuel, and natural gas.

It was asked whether the state knows the vulnerability of the different components of the utilities sector. Some stakeholders must have done some analysis. The state needs to determine what has been done and compile it. Another question posed was, how will the state get vulnerability analysis results from private sector stakeholders, who likely have the information, but who may not want to provide access to it? The state can focus on the major players in the sector and determine if an analysis has been done, what the analysis revealed, whether they have a plan in place, how fast they expect to restore service, and whether or not they have and perform restoration simulations/exercises. However, if the focus is just on major players, the state may miss important small ones. For example, without dry cleaners, hospitals may not be able to provide adequate services.

It was observed that building codes are only relevant to buildings; thus, in theory, buildings are resilient with respect to the life safety value. For the utilities sector, the most important parts of the infrastructure are special structures like pipes, towers, and sub-stations.

It was asked whether it is possible to require the public sector to have co-op plans? Big agencies/services should already be required to have them.

In the short term, alternative systems or strategies can be used instead of repairing damaged infrastructure. Water for fire can use alternative systems that are put in place, rather than replacing old pipes. City Light might use rolling black outs. Evacuation could be a possibility if services are not adequate.

For restoration targets, it was asked whether one should think about where the most good can be done. That is, where can limited resources do the most good? Someone will always say, “Why was I not the first?” It is therefore necessary to weigh the community benefit first.

It was also observed that meeting restoration targets means facilitating jurisdiction and agency coordination; and it was noted that it is hard economically to require stakeholders to meet performance standards.

Workgroup 2: Critical Services

FACILITATOR: STACY BARTOLETTI		NOTE TAKER: KYRA NOURSE
1.	Stacy Bartoletti	Degenkolb Engineers
2.	Tom Carver	Office of Superintendent of Public Instruction (OSPI)
3.	Chuck Duffy	WA State Fire Marshal
4.	Carol Dunn	City of Bellevue Emergency Management
5.	John Erickson	WA State Department of Health
6.	Rebekah Green	Western WA University: Resilience Institute
7.	Michael Mociulski	Seattle Public Utilities
8.	Martin Mueller	OSPI
9.	Mark Pierepiekarz	MRP Engineering LLC
10.	Jon Siu	City of Seattle, Dept. of Planning & Development
11.	Barbara Thurman	OSPI
12.	Chuck Wallace	County of Grays Harbor, Emergency Management
13.	Tim Walsh	WA State Dept. of Natural Resources (Geology)

After introductions, the participants in this workgroup discussed issues related to the RWS values.

Discussion of the Values

In connection with the value *Life Safety and Human Health*, the participants suggested including the concept of community well-being; also the need to guide a community-wide response toward recovery following an earthquake. Particular mention was made of the "psychology of disaster": people do not behave normally after a major disaster—they experience severe stress and anxiety and stay in "fight or flight" mode. Some of the anticipated consequences include a greater need for foster care, an increase in domestic violence, and a higher divorce rate. There was debate about whether to include this discussion under *Life Safety and Human Health* or under *Community Continuity*, and it was noted that there is overlap between the categories. It was noted that, in this state, disaster mental health falls under the Department of Social and Health Services (DSHS). This drew the discussion toward the list of sectors and components—the participants suggested making public health and human services a separate component (not the same component as *Hospital Care*).

It was noted that emergency response is multi-tiered—not just medical, fire, and police (see the list of sectors and components). The participants asked whether emergency response/preparation should be built more explicitly into the values. They suggested that the outline should somehow capture the full spectrum of all services that must be engaged in response. No one piece will operate by itself.

In relation to *Community Continuity*, the participants also anticipated a culture shift as a result of the highly stressed response of people following a destructive earthquake. They considered general agriculture and the macro-level of market access (getting produce to market). The participants debated the relative merits of community action versus a top-down approach: For some, the ideal is to move toward community-led change—the community defines resilience.

In relation to *Economic Security*, the participants stressed the need for business continuity plans to help community emergency response. They thought it important that businesses/industries/organizations be encouraged to identify in advance what they will need in order to function following a disaster.

In the discussion of *Environmental Protection*, it was noted that "growth management" should be clarified. It was anticipated that this will be a challenge politically. Some also wanted to clarify that "accident response capacity" is primarily about Hazmat response (e.g. wastewater spillage, leaking fuel lines, and so on). One suggestion was to add explicit language to the values to address the concept of *restoration* of the environment following disaster—that is, ecological restoration (accept that the natural environment will in some respects change permanently, but that we should restore what can be restored and plan to rebuild in a way that is "green").

Moreover, it was noted that most emergency response is set up for more limited disasters; it will be necessary to build capacity overall.

General Discussion of Sectors and Components

The Critical Services Workgroup suggested that *food* be added to the list of components and that natural gas be added to the *fuel* component.

Some participants suggested referring specifically to non-governmental organizations (NGOs) in connection with sheltering and emergency services (NGOs cross sectors). They also suggested adding a reference to managing spontaneous volunteers—that is, listing volunteer management separately as a component. Another thought was to refer to or incorporate the "cluster process" used by the UN. (A lead agency, such as a UN agency or the Red Cross, is appointed for each cluster; there are clusters for things like shelter and for vulnerable populations. The lead agencies come up with unified processes/standards/objectives to coordinate the NGOs and emergent volunteers.)

One participant asked why earthquakes were being addressed and not other hazards. This arose specifically in connection with the agricultural sector, because it might be more impacted by hazards other than earthquakes. Other participants observed that a major earthquake will impact agriculture, especially transportation and the movement of produce.

The participants continued the discussion by looking at the range of scenarios that could impact the state at a state-wide level:

Issues Related to Emergency Response. The group anticipated that emergency response will be variable across the state: In some areas it is already very good, while in others it is non-existent. They thought concerns should include the physical structures of fire stations (will they stand up to an earthquake and remain functional?); staffing (firefighters must be rotated during an emergency response); road access (how to get trucks around); water supplies for fighting fires; and the means of shutting off utilities systems. It was noted that most fire fighting systems are set up to fight one fire at a time and that it will be necessary to extend capacity via collaboration; to do this, we need to set up plans and agreements in advance.

The group also discussed communications during emergency response; responders need access to:

- A map that is set up early on to indicate the locations and extent of damage.
- A system of communication among responders and access to information.
- In-state mutual aid agreements.

As part of planning and preparations, the group agreed that it is necessary to identify and define the players.

Issues Related to Sheltering. The group asked whether this component should instead be called *mass care*, of which sheltering is a part. Most of the time, "sheltering" will only be needed for a percentage of the population—emergency planning usually assumes 10% will require temporary emergency shelter. (The long-term goal of resilience planning is to have permanent housing that is designed to withstand earthquakes, so 10% might then be an accurate estimate. Currently, it is likely that more than 10% of the population of a given area will require shelter).

Sheltering should be understood to include temporary housing, mass feeding, mass care, and alternate care sites. Currently, sheltering/mass care falls under ESF 6: the Department of Health and Human Services (DSHS) is the lead agency. DSHS is going to need additional funding to be able to perform this role (the Red Cross used to be the lead organization for sheltering/mass care, but this is no longer the case). The group suggested investigating further what ESF 6 does to prepare for response now—how does this look across the state? It was predicted that there will be a lot of variability from one local site to another.

It was also noted that many people with pets will not go to shelters at which pets are not allowed—this means there is a need for shelters that do permit pets.

On the whole, the points related to sheltering looked fairly well defined (federal—state—local—NGO), and the facilitator reminded the group to look at the big picture for resilience: What is in place now? What is missing? It was observed that many of the sheltering issues must be mandated to get small jurisdictions to implement them. The participants agreed that it is necessary to make rational, comprehensive policy recommendations.

Another question that was asked was whether the state has a well-thought out plan for mass evacuation. While evacuation is planned in the case of tsunamis and volcanic eruptions, it is not planned for earthquakes, for which there is too little advanced warning.

Issues Related to Hospitals: The participants recommended revising the list of sectors and components: Under the *critical services* sector, replace the component *hospital care* with the following two components: (1) *health and medical care* (this includes hospitals) and (2) *social services*.

Following a major earthquake, hospitals will be overloaded, but a lot of strengthening is currently going on. To function, hospitals need good buildings, transportation access, utilities (stand-by generators), and staffing. (All components need these things, but maybe not to the same degree or within the same time periods during recovery.)

Hospitals are overloaded now. Because capacity has already been reached, an emergency situation will require access to alternative facilities. A lot of other parts of the state (and beyond) depend on west-side (King County) hospitals. One question was whether or not this jurisdiction should purchase portable hospitals. (Some states have done this, but Washington has not.) Washington does have military resources to help provide medical care, but this is not sufficient to address the level of need following a major earthquake affecting King County facilities. We do not have hospital capacity to address certain scenarios—e.g. Seattle area impacts. Another big issue is staffing—getting people to show up. Emergency responders and medical staff may be cut off or have other obligations (e.g. family) that draw them away from work.

Because access to hospitals will also depend on the clearing of debris, someone asked how this will be handled. King County and the City of Seattle have debris removal in their plans: pre-approved places for dumping debris. How fast this can be done depends on other infrastructure.

Just-in-time supplies also constitute an issue of concern for medical facilities—the systems that deliver supplies are commercial, and there is no way to insist that these private businesses retrofit, make plans, etc.

Gap in care: There are some segments of the population that will need special assistance/care following a scenario earthquake, but that fall between what the Red Cross volunteer care shelters can deal with and what the other medical facilities will be able and willing to accept. (There was some discussion about whether to attempt to address gaps in care that affect a relatively small number of people or to focus resources on planning and response aimed more broadly at caring for the majority.)

It was also noted that mortuary services will have to be addressed. Responsibility for this is divided between coroners, medical examiners, and local public health. Some participants thought mass casualties should be added to the list and addressed under the heading *critical services*.

Issues Related to Education. The red-tagging of school buildings after an earthquake will lead to day-care crises for parents, and this in turn will have economic impacts. Communities will need alternate facilities so parents have the ability to return to work and kids will experience no gap in their education. Schools must be rebuilt or the neighborhoods they serve will not recover from the disaster. Some schools serve as shelters in the event of a disaster: often this is by agreement with the local government. It is necessary to consider how a shelter-school will be returned to its primary purpose as a school. Before- and after-school care facilities are also necessary for many parents to continue working. These programs may need to take on more responsibility—they need to have plans (currently, most lack plans).

A mental health issue is also involved in the quick return of kids to school. Moreover, it was noted that schools are a critical service/care center for kids: For many children, schools are a key source of food. Schools are also a place where it is possible to keep tabs on kids who are at risk.

Schools are funded to provide 180 days of education per year. Because of the nature of this funding, schools are disposed to shut down rather than attempt to provide education in a partial or ad hoc way. Communities can get FEMA funds for impacted schools, but it is necessary to educate school administrators regarding the process required to get these funds.

Also important to schools is the transportation infrastructure—a means of bussing kids to school. Some areas have plans to redistribute kids to schools. Such plans may be based on students' physical access to schools (ability to walk or be transported to more accessible schools).

If schools are not damaged, how quickly can kids be returned to school? The participants agreed that we need to arrive at a current estimate.

Another question that was raised was whether home rule is an obstacle to resilience, though it was also remarked that RCW 38 52 does give the governor extraordinary power in an emergency. One compromise may be to get neighboring districts to work out agreements with relevant state agencies regarding emergency response planning/preparation.

Emergency response planning should also address earthquake drills. Currently, drills are conducted when kids are in their classrooms. Drills should also be conducted when the students are being transported to and from school on the bus. Bus drivers should be trained, informed, and supplied to ensure they have what they need to look after kids in this event.

Issues Related to Government Administration. Key functions include keeping financial records to track what is spent during the response to the event; also, facilitating and leading the recovery efforts. This involves the interplay of functions and agencies, and continuity of operations planning. Some aspects of emergency planning still need to be worked out: For example, some agencies have attempted to plan what to do about their personnel following a

disaster, but the agencies often lack authority to implement such decisions (e.g. authority to allow personnel to work from home).

One suggestion was to engage policy makers in mitigation policies ahead of time. It was observed that political leaders often do not attend or participate, and many are not well informed about disaster planning and emergency response issues.

Government needs to provide consistent, accurate, and timely communication with the public. To ensure that the messages they give to the public are consistent, agencies should have a person with authority sign-off on information for official public announcements. Part of the challenge is that most agencies are spread thin—they do not have enough personnel to cover all functions.

Continuing the Critical Services Discussion

The goal is to engage in four or five meetings over the next five months to continue discussions and develop input.

The breakout group agreed to begin this process by having participants input their ideas to a Sharepoint (or comparable) structure. They will then arrange to have a face-to-face meeting to discuss the work and make revisions. Rebekah Green volunteered to set up the structure; the other participants agreed to fill in the structure.

Workgroup #3: Transportation

FACILITATOR: DAVE NORMAN		NOTE TAKER: CAMERON MCDONALD
1.	Terry Lundeen	Coughlin Porter Lundeen
2.	Alfredo Medina Jr.	Port of Seattle
3.	Dave Norman	WA State DNR—Geology
4.	David Swanson	Reid Middleton
5.	Dale Tabat	WSDOT
6.	John Vidale	University of Washington
7.	Steven Winecoff	Community Transit, Everett
8.	Eric Holdeman	Port of Tacoma

The participants in this workgroup began their discussion by identifying key gaps that affect the state's resilience. They also articulated a set of goals for the *transportation* sector and discussed what is needed to meet those goals.

Gaps Affecting the State's Resilience

- The state currently lacks a comprehensive plan to make Washington more resilient.
- The seismic safety of Washington's schools needs to be improved.

Goals of the Transportation Workgroup

- Seek development of a long-term planning document aimed at improving the state's resilience
- Fill in the gaps (see above)
- Build on past work
- Stress the importance of ports and the connectedness of systems
- Develop tools and assess resources
- Stress the importance of moving freight and create detours for trucks
- Begin drafting a framework to initiate policy

Discussion of What Needs to Be Done to Achieve Resilience

- Make a specific timeline that includes costs.
    A. Create a timeline (similar to that outlined in the SPUR reports) for bridge and road repair during the response phase. For example, the repair of high-traffic bridges, such as SR 520, should be a much higher priority than small county bridges for which detours are possible. Assess location, usage, population and other important factors to help create this timeline.

B. Such a timeline is important for both mitigation and response.

C. Prioritize the importance of a given road or bridge.

- Develop a culture of safety in Washington: Use education to move beyond what is now merely a general awareness of the state's seismicity. Start with schools and promote awareness amongst friends, family, and community.

- Incentivize mitigation.

  A. Develop the economic vitality incentive:

     - The standard of living is very high in Washington; we want to keep it that way.
     - A disaster situation can result in the loss of Washington's economic standing. This happened to Kobe, Japan, after it suffered a devastating earthquake: Prior to this disaster, Kobe was the world's 6th largest port; now, it is only the 15th. Kobe can never regain its previous economic standing. Such a scenario can be a substantial incentive for politicians.
     - Sustain livelihoods.
     - Create jobs.

  B. Develop the social incentive:

     - Utilize existing parts of the community, such as churches and volunteer groups, to promote and build awareness of disaster risk reduction (DRR).
     - Develop resiliency at the neighborhood level.
     - Publish policy pamphlets and "what to do" scenarios.
     - Work on creating stronger regional social bonds and incorporate new stakeholders.

  C. Incentivize through connectedness of systems:

     - Stress that Alaska is reliant on Washington for food; this constitutes a national incentive.
     - Note that if the gas pipeline breaks, SeaTac can potentially shut down for days.
     - Point out that King County relies on one bus station for communication with the entire fleet.
     - Stress that, because everything is interconnected, an earthquake will affect many stakeholders.

- Recognize the need for unified communications.

  A. Should a large hazard event occur, our reliance on cell phones and the internet for communication could be problem: The use could exceed the capacity of these systems.

B. We should create a common radio station, website (Twitter, Facebook), or some type of communication that we can rely and depend on if other systems fail.

- Utilize existing information: We must collate and adapt past studies and research on subjects related to earthquakes, seismic safety, and resilience. (For example, WSDOT has existing information about the vulnerabilities of roads in different counties.) Once such existing information has been compiled and synthesized, it can be used to create the policy framework.
- Develop more research on the logistics of debris removal and the movement of large trucks and emergency vehicles in the period following a hazard event.
- Identify options in the event of particular transportation system failures.
- Identify challenges related to mitigation, paying particular attention to regional capacity (e.g. King County holds all of our medical capacity).
- Emphasize the need for science-based decisions. (The nature of earthquakes is uncertain in a world that has come to expect certainty; this creates a stronger need for science-based decisions.)

General Discussion about the Transportation Sector

The workgroup noted that transportation underlies all factors and values, because all services depend on it.

- The functionality of transportation will be crucial during the response to an earthquake:
    A. The transportation system is important for the movement of emergency vehicles and people, and for the removal of debris.
    B. Emergency management personnel (EMOs) and disaster risk reduction (DRR) specialists must be able to get home to their loved one before they start working on response.
    C. The state is heavily reliant on I-5 and I-90.
- The major ports of Seattle, Tacoma, and Everett are all exposed to faults (the Seattle, Tacoma, and Whidbey Island faults respectively).
- WSDOT has a strong inventory of bridges and roads. We must utilize this capacity and continue to build on and compile these past works.
- Washington's pipelines and ferries should be considered part of the transportation sector.
- A breakdown of the supply chain will cause the post-earthquake recovery to halt.

The participants also discussed the following general observations and questions:

- We need to begin with inspections and damage assessments, and then create a needs assessment.
- During the Seattle fault scenario, would we have the capacity to feed the city? Would the city need to be evacuated?
    A. We must develop more hazard scenarios.

B. We must check our capacity.

- We should use social media, such as Facebook, to increase interest and raise awareness.
- If healthcare is currently at full capacity, how can we deal with a large-scale hazard event?
- Resilience starts with mitigation.
- The way to influence elected officials is through influencing their constituents.
- Do the RWS values need to be prioritized?

Workgroup #4: Housing and Economic Development

FACILITATOR: JOHN SCHELLING		NOTE TAKER: HEATHER DALKE
1.	J. Daniel Dolan	Washington State University
2.	David Gonzalez	Degenkolb Engineers
3.	Kurt Hardin	WA State Emergency Management Division
3.	Gary Mansell	Boeing
5.	Anindita Mitra	CREA Affiliates
6.	John Schelling	WA State Emergency Management Division
7.	Joan Scofield	WA Office of Insurance Commission
8.	Helen Sinclair	(Massey University, GNS Science, New Zealand)
9.	Nate Wood	USGS

John Schelling welcomed the group and thanked members for participating. The group members introduced themselves and provided overviews of their backgrounds and expertise.

During the introduction phase of the breakout session, the group discussed the current readiness of the state to prepare and respond to damaging earthquakes that will strike Washington and the effects such earthquake will have. The group then compared the current status to what an ideal, effective mitigation process—aimed at reducing dramatically the resources needed for response—might look like. Such mitigation will facilitate a much more rapid recovery and ensure a greater overall resilience to these events.

Issues to Be Considered

The group then cited issues that need to be considered as part of the Resilient Washington State Initiative process.

1. Economic Restoration and Recovery Project
    - It is important to restore social areas first (jobs, housing, schools) as this will permit a sense of new normalcy and allow people to get back to work.
    - It is important during this time not only to keep public and private areas safe, but also to ensure that people feel safe, as the perception of safety is as important as actual safety.
2. Land-use Management: What is important for the community?
    - Health impacts and other public health issues need to be considered within the context of this process. Ensuring utility services during and after earthquakes will be essential to reducing the potential for health emergencies and outbreaks.

- Pre-planning should occur and can be incorporated into existing land use and zoning regulations, as well as building codes, to maximize effectiveness.
    1. A key component of this will require an increased emphasis on educating the public as to what their risks are and what they need to do personally to become more prepared for these events.
    2. There also needs to be recognition that response will be slow due to the fact that needs will exceed capabilities immediately following a damaging earthquake.

3. Insurance: Recovery
    - Banks and insurance are essential after a disaster to get the economy back on track and to permit people access to financial resources. Without access to money, people cannot recover effectively. These groups need to be heavily engaged in the process.
    - Some financial institutions have mobile branches that can be made available so people can get access to cash and deposit insurance payments, when applicable.
    - It will be important through this planning process to determine how financial resources get handled after a disaster and what can be done to ensure effective use of these resources to speed recovery.

Dr. Nate Wood noted that the state and the communities themselves need to know how vulnerable they are to earthquakes. In addition to the earthquake component of a disaster, it is also important to understand the potential issues from tsunamis that will impact the state and local jurisdictions.

Gary Mansell and Dan Dolan discussed various options for mitigating structures to improve their performance in various earthquakes. They noted that this is primarily accomplished through effective earthquake design of buildings and structures, which is part of the adopted building codes.

It was also noted, however, that several issues arise in connection with this approach: Codes can quickly become outdated and there is always new scientific information that comes in. It can be difficult to keep up with the new seismic information, and then there is inevitably a lag in getting that information approved and adopted into better seismic provisions in the building codes.

Discussion of Values

In considering *Property Protection*, the participants in this workgroup stressed the importance of private industries for the recovery of communities. They considered it critical not only that the buildings survive the event, but also the valuable things inside the buildings. The loss of the contents of the buildings is especially hard on the manufacturing sector, which must deal with the high cost of replacing damaged equipment and stock.

As they discussed *Community Continuity*, the participants in this workgroup emphasized the importance of quality of life. In connection with this, they considered the following questions:

- If one survives a disaster, what will one's life be like after the event?
- Will communities be divided or will they come together?

Key facets of *Community Continuity* include the swift recovery of communications and education—specifically, schools. The participants discussed how people are likely to respond to the challenge of being without power and communication systems. They noted that the restoration of schools following an earthquake is the way to kick-start community continuity. The closing of schools significantly impacts the recovery of the community, because many parents will be unable to go to work while their children are out of school. As a result, the community will lose critical employees (nurses, etc.) and key services (such as healthcare).

The group also discussed the need for statewide land planning. As an example, they looked at the town of Hamilton in Skagit County, a tight-knit community that was devastated by flooding. It was suggested that the risks faced by communities can be translated into opportunities for the rejuvenation and economic development of those communities.

As part of the discussion of land planning, the group also considered the issues involved in long-term versus short-term mitigation strategies. For example, should a community that is at risk due to the effects of climate change (such as rising sea levels) merely build a bigger wall or invest in moving a vulnerable neighborhood?

The group discussed how best to achieve social equilibrium and to get various facets of the community back on their own.

The workgroup discussed the question of who has the authority to say whether or not to "rebuild" and who makes it happen. It was noted that after the Nisqually earthquake, Boeing chose to demolish damaged buildings in Renton rather than repair them. This was because of the estimated cost of the repairs. This resulted in some loss of the community's manufacturing capacity, although it came back in time. It was remarked that businesses will spend some additional resources, but that they need assurances that other sources will be available.

Also in connection with the issue of rebuilding, the group noted the following questions and ideas:

- There must be follow-through on the part of elected officials and state agencies. Several examples were cited in which groups should: "walk the talk or don't talk."
- Does the political will exist to address the hard issues, such as whether or not rebuilding should occur in some places following a disaster?

- Learn from mistakes: We need to change behavior or mitigate the environment.

The need for strong government was noted, but it was also observed that recovery will depend upon the resilience of the community and that the members of the community should be encouraged to depend on themselves and not on the government. The workgroup proposed the inclusion of a 6th Value: a *Culture of Resilience:* People have to think they are resilient. Such a culture of resilience enables the other five values. It involves a paradigm shift, a belief that people within the state will adopt this value.

Most people currently have an expectation that "they should be taken care of." This expectation should be replaced with the belief that everyone needs to take personal action. People also need to believe that such action will have a positive result: "If I do this, then it can help the outcome." It is necessary to convince folks that making improvements will help enhance resilience when a hazard occurs.

Currently, there is no incentive for homeowners to undertake mitigation. It was noted that many of those whose homes are damaged in a disaster expect a check from the government to compensate for their losses. It should be made clear that a check after the event does not help a homeowner recover his/her quality of life (a little bit more money does not bring back happiness after losing a home).

Discussion of Other Key Issues

The group identified the following as key issues to consider in connection with the recovery of a community after a disaster (i.e. an earthquake or tsunami):

Timeframe. What is the right timeframe for recovery? This will depend upon market changes, improvements, building codes, and the extent of compliance with those codes. The participants also discussed whether a quick recovery is really best. They observed that it can sometimes be unsafe for people if it is too fast. In particular, demolition work can cause safety issues.

Several of the engineers discussed the reliability and availability of the health care sector and their associated facilities to withstand damaging earthquakes and be available for response and long-term recovery.

It was noted that the resiliency of people in the recent Chilean earthquake was quite remarkable and that it was due in part to the political climate, past history of damaging earthquakes within the area, and the type of government that exists within Chile. However, there are many valuable lessons that can be learned in the United States from that event and the mitigating measures that were implemented after the 1960 earthquake.

Differing Responses throughout a Community. The participants discussed the importance of bridging the gaps between different segments of the community, such as between homeowners

and renters and between the wealthy and the poor. They asked whether all members of the public will respond to the event in the same way. The response and resiliency of individual neighborhoods may differ, and a particular neighborhood's sense of community will affect its restoration. In addition, resilience tends to be better for those individuals who are well off; there is a corresponding decline in resilience among those with fewer resources. It was also noted that those who live alone may be more vulnerable, as they may lack the support of a social network.

The group discussed what the public's first step should be after an earthquake. Individual action was again emphasized, as it was suggested that people should plan to check on their neighbors and help care for others.

Discussion of RWS Sectors and Components

In addition to emphasizing the importance of cultural resilience as a value, the participants observed some of the challenges associated with planning for resilience. For example, the social and economic structures of a place affect rebuilding after disasters. These structures change from community to community and so will make it difficult to anticipate the reaction to the event. Another issue is the scale at which we consider resilience: The state as a whole may be resilient, but certain towns may not be.

The participants thought that all the RWS sectors and components on the list are necessary for the resiliency of the *housing and economic development* sector. For example, the infrastructure that supports the supply chain must be resilient if businesses are to maintain access to suppliers and clients. As noted in the discussion of values, schools and daycare facilities are necessary if employees are to be available to work. The larger recovery of the economy is likewise dependent on these employees earning paychecks and spending their money on goods and services. The revival of the tourism industry is also dependent on the quick recovery of the other sectors and components. Many coastal communities depend on tourism, and this industry would be seriously impacted by an earthquake affecting Seattle.

The participants thought that two additional components, *communication* and *social services*, should be added to the *critical services* sector. They also suggested that critical services should encompass both emergency response and recovery.

Another observation was that the public's trust of the government can itself create a feeling of relief. In the example of Amsterdam, this trust in the government helped to create a culture of resilience. It was suggested that there is no such trust here in the state of Washington.

The group also suggested that all sectors should list the media as partners.

Since earthquakes generate a lot of debris, it is critical to take stock of current debris management strategies and plans that exist within the state. A common goal and operating

picture of this must be created and shared with various stakeholders to ensure all organizations are on the same page.

In discussing issues relating to building standards, the participants observed that many new codes are based on the impacts of Hurricane Katrina, but this is not a good example for Washington. In addition, there is a cost associated with everything, including the codes. In making changes to the codes, it is necessary to consider the financial burden. The cost of the design will differ according to whether the intended performance level is life safety during the event or the ability to use the building to shelter in place after the event.

The group went on to discuss the creation of high density in urban places. They discussed the relative merits (in terms of resilience) of tall condos versus short condos and of single family homes versus multi-family residences. In general, hazard/risk assessments tend to be better for newer and taller buildings. (It was observed, however that in some instances older buildings are safer.)

The participants also considered social standards—that is, what is "up to code" for individual people. For example, a residential building might technically be safe, but people may still not want to live there because of their perceptions (e.g. things like broken plaster create the impression that the building is unfit).

Workgroup participants noted that the landscape affects resilience. Several cities and other groups are planning on 'islands' or concentrated areas for response as compared to a dispersed population.

In contrast to high-density development, the group also looked at building urban areas outwards (sprawl). They concluded that this increases the hazardous areas.

In their discussion of rebuilding, the participants again focused on the issue of cost: seismic requirements are often too expensive, and the machines and other non-structural features inside the buildings are also expensive. Decisions must be made with care, because they will have huge effects on some businesses. It was noted that just the thought of a threat is causing businesses to leave some areas. For this reason, mitigation is extremely important. Increased resilience can make the state more attractive to outside companies.

There must be a shift in the perception of builders and homeowners to ensure that people understand how their homes are capable of responding to earthquakes. Educating homeowners about their risk and what they can do to reduce it is part of effective mitigation.

Further Discussion of Issues Relating to Housing and Economic Development

Finances. Everyone is now more dependent on e-banking. Communication systems are needed to process ATM transactions and transactions made with debit/credit cards. Banks have mobile branches, but for this also communications are needed.

The recovery of the housing sector is also dependent on the availability of disaster assistance (including loans), on insurance coverage and payments, and on the ability of people to return to work and earn paychecks.

External Business Competition. If ports lose business during the recovery period, some of that business may not return later, because external competitors will have succeeded in luring it away.

Communication. Working communications will be needed in order to assess what is going on.

Law enforcement. Law enforcement needs to be included in the process.

Transportation. Ports and rail are essential and key components of getting the economy back on track. For example, Boeing uses rail extensively in its operations, and an extended disruption in service would impact the company.

How Can One Judge the State's Ability to Restore the Housing and Economic Development Sector?

Financial Institutions. The capacity to restore functions will depend on the size of the event. The U.S. Securities and Exchange Commission (SEC) requires banks and other entities that offer financial services to have back-up plans and to test them in terms of data transmission.

Private Businesses. Many businesses say they have back-up plans, but will they actually work?

Rural Areas vs. Urban Areas. The group noted that since most of the larger media organizations are located within Seattle and other metropolitan areas, their coverage may divert resources from smaller, rural areas. However, smaller rural areas may already be more resilient to earthquakes because of their community makeup. For example, some noted that eastern Washington may be more resilient than western Washington, because the former is more rural.

The group discussed the ability to prepare and respond, not the capacity due to region or scale.

Discussion of Where We Are TODAY

In general, the participants thought that the restoration of the financial sector (banking) would take weeks, although they again noted that this will depend on the type, intensity, and length of the earthquake. A Cascadia event would be crippling, but in other scenarios the sector would be more resilient.

Also, they thought it would take the ports a long time to recover from a Cascadia earthquake, and they might never fully recover. One estimate was that it could take a minimum of three years to get back to work if the port goes down. In the meantime, more goods would have to be imported, and the region would experience a loss of jobs and manufacturing.

Although they thought that I-5 would be all right, the participants suggested that some earthquake events would cause many bridges to fail, and they anticipated that the repairs would be expensive and time consuming. This would also mean an increase in travel time and a corresponding increase in the cost of delivering goods and services.

They noted that if people's needs are not supplied during the recovery period, many people will leave.

Many in the group said they simply do not know the current capacity for recovery: Some components and some parts of the state will be resilient; some won't be. They indicated that this capacity depends to some extent on the stability of businesses prior to the disaster. They suggested that more research needs to be done to address the question of current capacity.

The participants suggested that construction will be resilient and will recover right away, but that real estate will take a long time to recover. They considered residential and commercial real estate as two different categories and estimated that the recovery of commercial real estate is likely to be quick, while that of residential is likely to be slow.

Construction of buildings is dependent on the recovery of other parts of the infrastructure, such as transportation. Damage to rail lines, for example, will negatively impact construction.

The group anticipated that the manufacturing sector would take weeks-to-months to recover, and that the recovery of housing would be variable: In some cases, it might take only days, but in the case of multifamily housing, it could take weeks. The group anticipated that the needs of renters may be ignored, and higher-income renters may just choose to leave. Other issues related to housing included the following:

- Several of the engineers noted that current building codes may not account for the duration of earthquake waves, such as long period waves from a subduction zone earthquake like the one that occurred in Chile. They noted that frames on buildings have changed and deal with earthquakes differently.
- In terms of victims, it was identified that previous research discovered that during disasters, the most deaths tend to occur among elderly males who live alone.

Answers to Concluding Questions

What stood out most?

- A high number of externalities influence the resilience of the *housing and economic development* sector.
- It is necessary to develop a "culture of resilience" (recommended as the 6th RWS value).

Is the sector better off or worse off than you anticipated?

- In regards to the Southern Whidbey Island Fault, many sectors may be worse than anticipated, because this is new information that was not previously considered by the building codes.
- The current building codes are not up to par.
- Things (maps) need to be updated.

Are we on the right track?

- People are not very prepared (rural vs. urban; business vs. rural; and population). By the same token, the sector is not totally under prepared: We have a base for now.

Concluding Session

Towards the end of the afternoon, the participants concluded the breakout sessions and reassembled in the main meeting area for the final session of the workshop. At the beginning of this session, the facilitator called on the spokesperson of each breakout group to present a summary of his/her group's discussions.

Summary of Discussions (Breakout Groups)

Critical Services

The participants discussed the Resilient Washington State values and then examined the sectors and components. In the afternoon session, they did a more detailed walk through of the components of the *critical services* sector.

The participants thought that emergency preparation and response might need to be expressed more explicitly in the values. They suggested including ecological restoration in the description of *Environmental Protection*, and perhaps addressing the concept of restoration in all the values. They discussed the psychological impact of a disaster on a community and suggested the need to look at community well-being when considering *Life Safety and Human Health* as well as *Community Continuity*. This led to the suggestion that the components of the *critical services* sector be adjusted: The participants wanted to replace "hospital care" with two new components: (1) *health and medical care* (this includes hospitals) and (2) *social services*.

The participants looked at emergency response from a number of angles and identified key points that will affect the performance of most critical services following an earthquake:

- Performance of physical structures that house services (e.g. fire stations)
- Transportation access
- Utilities
- Staffing

They also discussed the need for in-state mutual aid agreements.

Hospitals in King County currently provide care to people from all over the state (and beyond). Because hospitals are at capacity now, we can expect them to be overloaded following a disaster. Washington can look to military resources for some assistance, but this may not be sufficient.

Concerning education, the participants noted that many schools will serve as temporary shelters, but that they will have to be returned to their primary function if the education of students is to be rapidly restored. (It was also noted that schools serve as sources of nutrition and oversight for

many children.) Another challenge is the way that schools are funded: this funding system means schools are disposed to shut down rather than attempt to provide education in a partial or ad hoc way, as might be necessary following a disaster.

Sheltering and mass feeding/care are fairly well defined as critical services. It will be necessary to look at the big picture to address resilience.

Particular points raised in connection with government administration included the need to educate elected officials concerning the issues of disaster preparation and response and the need to provide the public with information and a consistent message during the response.

The participants plan to continue the discussion by having participants input their ideas to a Sharepoint-type structure. They will then meet face-to-face to discuss the work and make revisions. Rebekah Green volunteered to set up the structure.

Housing and Economic Development

The participants identified the following as the interdependencies and externalities:

- The "neighborhood effect" (knowing one's neighbor and developing emergency plans within neighborhoods)
- Capital markets
- Competition (If the ports are down, where will business go?)
- Communications (The participants discussed social networks and the way generation gaps impact modes of communication.)
- Transportation lines
- Building standards (in particular, the difference between standards aimed at life safety and standards that would go beyond this to permit people to shelter in place following an earthquake)

The participants also looked at the Resilient Washington State values, sectors, and components, with particular attention to:

- The quality of life necessary for continuing communities
- Schools—A rapid recovery is necessary so parents are free to return to work and to help in the recovery across the community.
- Tying values together with the idea of a culture of resiliency (trust).
- Critical services—Military bases and national security should be added to the list of components.
- Recovery should also be added to the *emergency response* component
- Media should be added as one of the components of *critical services.*

The participants also discussed timeframes for returning to the "new normal." They proposed the following general estimates:

- For finance/banking, days to months
- For retail, weeks in some cases, months to years in others
- For commercial real estate, months to years
- For manufacturing, weeks to months

The group concluded that the *housing and economic development* sector needs more people to contribute to subsequent discussions and work.

Transportation

Among their major findings, the group determined that the network is very interdependent and that this great complexity makes it hard to chart.

The participants recognized that it is important to have a policy plan in place—the elected officials need it. They also advocated the "be lazy" approach: Make use of the work and the studies that have already been done or are currently underway. The effort should focus on rounding up such existing materials and distilling this information. This will not only draw in the assistance of those with expert knowledge, it will help to get buy-in from the agencies and organizations that sponsored or produced the studies.

The participants observed that elected officials come and go, but that legislative staffers are often around for a long time. It would be a good idea to focus on educating them, because they can help provide some continuity.

In relation to economic continuity, the participants suggested pointing to the earthquake that struck Kobe, Japan. Talking to elected officials about the impacts of such a quake and stressing the issue of economic security may be a good way to persuade them.

The participants suggested adding ferries, locks, and pipelines to the list of components of the *transportation* sector. They also thought it was important to get the military involved.

The participants discussed using new media/social media (Facebook and Twitter) as a way to reach the younger generation, but also thought face-to-face contact was essential.

They discussed the need for an earthquake clearing house, as well as the need for an intensive, continuous marketing campaign to educate the public and teach preparedness. (It was suggested that this be approached in the way that Coca-Cola approaches advertising.)

The participants discussed the need for a comprehensive plan and a science-based decision-making package.

To continue with the work of the breakout session, the participants thought it was important to involve representatives from the Washington State Department of Transportation, particularly at the local level.

Utilities

At the beginning of their discussion, the participants found it necessary to rank the values; they recommended this to the other sectors as a way to provide an overall guide to the larger discussion. For the *utilities* breakout group, the values were ranked from most important to least important as follows:

1. Life Safety and Human Health
2. Property Protection
3. Economic Security
4. Community Continuity
5. Environmental Protection

They also suggested that some attention should be given to preserving cultural resources, but had not decided whether this should be part of the values or incorporated into the list of sectors and components.

They suggested changing the name of the sector to *utilities lifelines* and revising the list of components for the sector so that:

- *Drinking water* is changed to *domestic water supply*.
- *Drainage* is added to *wastewater*.
- *Fuel* is qualified to include all forms of energy/fuel (e.g. liquid fuel, natural gas, renewables).
- *Levies and flood control* is added to the list.
- *Solid waste* is added to the list.

They suggested adding *food supply systems* to the list of components under *critical services*. They also considered adding *health care* to *hospital care* and considering *debris management* as another component of *critical services*.

They considered transportation to be the most important externality for the *utilities* sector. They also suggested adding "family concerns" as an externality that affects the impact of and response to an earthquake. They thought it important to identify in advance the external resources that will be available to assist in response and recovery efforts (e.g. bulldozers from outside the affected area).

The participants identified the following themes:

- We don't actually know the status of the infrastructure—this must be quantified.

- Interdependencies
- Time-frame questions
- Private vs. public sector—a different approach may be needed for each
- Lack of common standards for things like pipelines
- Services vs. infrastructure
- Gap analysis—what studies have and have not been done already
- Common infrastructure portal
- Identify top three vulnerabilities of each component
- Risk-based approach vs. consequences-based approach

Summary of the Concluding Discussion (All Participants)

The discussion began with the observation that a lot of work related to resilience and earthquake preparedness has already been done, but that this work has not been identified and gathered together. Consequently, we have no clear picture of what has been done, what is currently underway, or who is doing it. Materials related to mitigation planning must be examined and pulled together, and this must be done at a high level to allow mitigation planning that prompts policy recommendations at the state level. Furthermore, because coordination across the state is needed, it is important to get away from the "silos" which have traditionally limited planning efforts. It was noted that studies that have been done end up sitting on a shelf—nobody else knows about them. Studies must be used and plans actually implemented.

It was also suggested that inquiries should be made to determine what it is that is impeding local jurisdictions from implementing mitigation strategies. That is, what at the local level is stopping them from getting to the next level? For example, if they did a study on X, what is it that is now stopping them from doing Y? Moreover, the work done as part of this initiative must consider and address the varied needs of different jurisdictions.

A further suggestion was that the RWS subcommittee consider developing a partnership with the Pacific Northwest Economic Region (PNWER). It would be useful to know what PNWER has done so far on this.

It was observed that work on the RWS initiative will need to be comprehensive: It should include timelines (like the SPUR initiative) and costs.

The initiative will also need champions in the state legislature and in the business community. To develop this, we should implement long-term education for political leaders so that the legislators will understand and champion the policies that come from this work. In addition, we should develop a legislative agenda: Draft the legislation in advance, so that when an event does occur, the political leadership already has this legislation in hand. It would also be a good idea to

prepare op-ed pieces to back-up the legislation, and to have a strategy for publishing and promoting it.

Another suggestion was to develop and implement an on-going public awareness campaign. This should be focused on making sure the public is ready (at the level of home and family). Such a campaign can be done on an "all hazards" basis. The importance of communications for situational awareness and recovery was also noted.

It was noted that it is important to use real examples of earthquakes and recovery efforts in other locations whose seismic and demographic profiles are similar to areas in Washington. By studying the resilience of areas that have experienced an earthquake disaster, it is possible to assess how other communities have succeeded or failed and to apply these lessons in Washington. For example, one can consider Kobe, Japan, in relation to Seattle, and Christchurch, New Zealand, in relation to many of Washington's coastal communities.

Another issue raised in the discussion was the need to deal with the concerns people will have for family and pets when a major earthquake occurs. Response and recovery will depend on the ability of human beings to respond, and this ability will be affected if people are worried about the safety of family members, pets, and so on.

Among the challenges that will have to be addressed is the difficulty involved in accessing information about the capacity of various parts of the infrastructure. Some organizations are reluctant to share information or have reason to limit access to it.

It was suggested that more people should be brought into the discussion to ensure that all sectors are adequately represented. Additional expertise is needed to address all points and questions. One form of expertise that was mentioned was urban planning: Urban planners can help determine what we will need to respond effectively to an earthquake.

Some participants emphasized the importance of focusing on the 50-year time frame. They suggested that we need to move away from making do with what we have now to working on implementing changes over the next fifty years. Another participant reiterated the idea that to achieve resilience, we must prioritize the long term—in other words, resilience means that mitigation and long-term economic viability are the highest priorities, not life safety.

Yet another suggestion was to focus on ITC.

It was noted that implementation involves economic considerations and should be broken down into phases: the near term, medium term, and long term. The near term is constrained by today's budget situation, but the medium term and the long term are not.

Some participants stressed the need for statewide agreements to share services—that is, there is a need for legislation that will enable mutual aid across jurisdictions. To develop such agreements,

it will be necessary to address all the complications that are currently involved in providing this type of mutual aid.

It was also suggested that a command structure be set up so that it is clear who the decision maker is for the response effort. Existing legislation concerning emergency management and continuity should also be examined (e.g. 3185, WAC 118).

Appendix A: Agenda

Agenda

8:30–9:00	*Check-in and Coffee Reception*
9:00–9:30	Welcome & Introduction
9:30–10:30	Resilient Washington State Overview
10:30–10:45	*Break*
10:45–12:00	Breakout Session
12:00–1:00	*Lunch—Sponsored by Cascadia Region Earthquake Workgroup (CREW)*
1:00–2:30	Breakout Session Continued
2:30–2:45	*Break*
2:45–3:45	Breakout Group Reports & Discussion
3:45–4:00	Wrap Up & Next Steps
4:00–5:00	Social Hour—*Sponsored by Degenkolb Engineers*

Appendix B: Participants

	Last Name	First Name	Organization/Affiliation
1	Anderson	Mark	Department of Commerce
2	Ash	Cale	Degenkolb Engineers
3	Ballantyne	Don	MMI Engineering
4	Bartoletti	Stacy	Degenkolb Engineers
5	Biasco	Tamra	FEMA RX
6	Carver	Tom	OSPI
7	Chin	King	GeoEngineers Inc.
8	Decker	Scott	WA State Dept. of Health, Emergency Preparedness Unit
9	Dolan	J. Daniel	WSU, Dept. of Civil & Env. Engineering
10	Duffy	Chuck	WA State Fire Marshal
11	Dunn	Carol	City of Bellevue Office of Emergency Management
12	Erickson	John	WA State Dept. of Health
13	Forschler	Rick	WA Association of Sewer and Water Districts
14	Gonzalez	David	Degenkolb Engineers
15	Green	Rebekah	Western WA University, Resilience Institute,
16	Hails	Charlene	MRP Engineering
17	Hardin	Kurt	Washington State Emergency Management Division
18	Labadie	John	Seattle Public Utilities
19	LaVassar	Jerald	Department of Ecology, Dam Safety Office
20	Lundeen	Terry	Coughlin Porter Lundeen
21	Mansell	Gary	Boeing
22	McDonald	Cameron	Western Washington University, DREP Program
23	Medina	Alfredo	Port of Seattle
24	Meyers	Luke	City of Bellevue Office of Emergency Management
25	Miles	Scott	Western Washington University, Resilience Institute
26	Mitra	Anindita	CREA Affiliates
27	Mociulski	Michael	Seattle Public Utilities
28	Mueller	Martin	OSPI
29	Norman	Dave	WA State Department of Natural Resources, Geology
30	Ogi	Irving	Seattle City Light

31	Perez	Tony	City of Seattle, Department of Information Technology
32	Pierepiekarz	Mark	MRP Engineering
33	Schelling	John	Washington State Emergency Management Division
34	Scofield	Joan	WA Office of Insurance Commission
35	Sinclair	Helen	Massey University, New Zealand
36	Siu	John	City of Seattle, DPD
37	Swanson	David	Reid Middleton
38	Tabat	Dale	WSDOT
39	Thruman	Barbara	OSPI
40	Vidale	John	University of Washington, ESS Department
41	Wallace	Chuck	Grays Harbor Emergency Management
42	Walsh	Tim	WA State Department of Natural Resources, Geology
43	Winecoff	Steven	Community Transit, Everett WA
44	Wood	Nathan	U.S. Geological Survey
45	Worcester	Ned	Seattle Public Utilities

Appendix C: Presentations

The following presentations were given at the beginning of the workshop in order to orient the participants and provide essential background information.

1. *Overview of Washington State Seismic Safety Committee,* presented by John Schelling
2. *Earthquake Threats to Resiliency Hazards in Washington,* presented by Tim Walsh
3. *Resilient Washington State Initiative*, presented by Stacy Bartoletti
4. *Determining Washington's Resilience—Sectors & Components*, presented by Scott Miles