Advisory Committee Meeting
March 23, 2009

Protecting public safety, the regional economy and critical infrastructure.
Agenda Overview

- Committee Business and Updates
  - Committee Chair
  - Committee By-Laws
  - Subregional Opportunity Fund
  - Howard Hanson Dam

- January 2009 Flood Response
- 2009 Capital Adjustments
- 2010 Work Program
Advisory Committee

Business Items and Update

- Committee Chair
- Committee By-Laws
- Subregional Opportunity Fund
- Howard Hanson Dam
Subregional Opportunity Fund

- December 2008: Projects submitted by jurisdictions
- March 2009: Board of Supervisors adopted proposed projects as part of FCD work program
- Next Steps:
  - ILA signed by Executive Director
  - ILA signed by jurisdictions
  - 10% of allocation pre-awarded w/in 30 days of ILA
  - Remainder paid on reimbursable basis
Protecting the Region’s Lifeline
Select Manufacturing and Distribution Centers and Public Facilities in the Lower Green Floodplain
Response to Howard Hanson Dam
Operational Changes

- Open Flood Warning Center earlier in response to major storm forecasts
- Flow thresholds based on dam releases rather than observed flows at Auburn. Result is that thresholds are reached 7 hours earlier
- Reduce Phase 4 threshold to 10,000 cfs
- Increased Flood Patrols (King County, Corps, and City staff)
- Automated callouts for next flood season
  - Subscription list underway; outreach to floodplain residents once system is established
- Incident Management Plan with Green River Valley cities for next flood season
Howard Hanson Dam Planning Group
Operation Action Plan (OAP)

Org Chart

Incident Command
Jim Morrow
Deputy - Ed Reed
Aide - Hillman Mitchell

Liaison Officer
Brian Felczak

Information Officer
Dana Hinman
Deputy Pam Graesser

Operations - OSC
Larry Blanchard
Deputy Greg Reed

Planning - PSC
Dominic Marzano
Deputy Brian Felczak
Deputy Sara Miller

Logistics - F & A
Heather Kelly
DLSC - Tony Cebollero
DFASC Jeff Bowers
January 2009 Flood: Contributing Factors

- Record December snowstorm
- Saturated ground
- Heavy rainfall over 4 days
  - Seattle 2.7”
  - 19-22” Tolt and Snoqualmie Headwaters
- Localized rainfall up to 1”/hr in headwaters
- Warm temps lead to rain and snowmelt in mountains
- Reservoirs filled to capacity, several days of high flows to lower reservoir levels
### January 2009 King County River Flows

*CFS* in Context: How much water is a cubic foot per second (cfs)?

*A flow of 2,000 cfs would fill one semi truck per second*

<table>
<thead>
<tr>
<th>River</th>
<th>Provisional Peak Flow (cfs)</th>
<th>Record Peak Flow (cfs) (Year)</th>
<th>100-Year Flood (based on FEMA Studies)</th>
<th>Average Annual Flow (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cedar (at Renton)</td>
<td>11,600</td>
<td>10,600 (1990)</td>
<td>12,000</td>
<td>662</td>
</tr>
<tr>
<td>Tolt (at Carnation)</td>
<td>17,900</td>
<td>17,400 (pre-dam 1959)</td>
<td>18,800</td>
<td>571</td>
</tr>
<tr>
<td>North Fork Snoqualmie</td>
<td>17,100</td>
<td>15,800 (1932)</td>
<td>18,000</td>
<td>500</td>
</tr>
<tr>
<td>Middle Fork Snoqualmie</td>
<td>31,200</td>
<td>31,700 (2006)</td>
<td>37,100</td>
<td>1,223</td>
</tr>
<tr>
<td>Snoqualmie (at Carnation)</td>
<td>84,100</td>
<td>71,800 (2006)</td>
<td>91,800</td>
<td>3,669</td>
</tr>
<tr>
<td>Green (at Auburn)</td>
<td>11,100</td>
<td>12,400 (1996)</td>
<td>12,800 (Corps target is 12,000)</td>
<td>1,324</td>
</tr>
<tr>
<td>White (Mud Mtn Dam releases)</td>
<td>11,700</td>
<td>11,700 (2006)</td>
<td>12,350 (Corps max target flow)</td>
<td>1,436</td>
</tr>
</tbody>
</table>

Yellow = record peak flows based on provisional USGS data
January 2009 Flood Impacts

- At least $39M in flood facility damages at more than 70 sites totaling over 26,800 feet
- Over 500 damaged homes across King County
- Over 200 homeowners interested in selling or elevating their homes
- Damages to Howard Hanson Dam (Army Corps of Engineers)
How did we respond?
Flood Warning Actions

- Annual **pre-flood season coordination** with cities and first responders in each basin (October 2008)
- **6 days (144 hours)** of continuous flood warning operations (Tues 1/6 thru Sun 1/11; Mon 1/12-Tues 1/13)
- **Priority Call Lists** of citizens, city officials and emergency response agencies as rivers enter Phases 2-4
- **Around the clock** flood patrols until river levels receded
- Flood Warning Center web pages accessed **122,642** times
- New river information hotline accessed by over **1,986** callers.
- Constant coordination with emergency responders and local governments
Flood Recovery Outreach

- Support FEMA Disaster Recovery Center
- Public Meetings – Pacific, Carnation, Cedar River Council
- ‘Kitchen Table’ neighborhood meetings
- Mailings to all floodplain residents
- Field tours and briefings with elected officials and residents
- Howard Hanson Dam Outreach meetings in each valley city
What Worked Well?

- Flood Warning Center and flood patrols
- 24 levee repairs completed summer 2008
- Emergency repairs (e.g., Tolt breaches)
- Home elevations
- Farm pads in agricultural areas
Downtown Snoqualmie
North Bend/Shamrock Park

- S. Fork
  Snoqualmie levee
  overtopped

- Tributaries
  flooded

- Expecting FEMA
  grant to elevate 9
  homes
South Fork Snoqualmie Levee – Marum Residence
SR 202 Fall City
Damaged homes along SR 202
Tolt River Emergency Repairs
Middle Fork Snoqualmie: Mason Thorson Ells Levee Repair 2008
Farm Pads – Jan 2009

- After 11/06 floods, KC made code changes
- Some farmers able to take advantage by building farm pads
- More pads are needed
Elliott Bridge Acquisition and Levee Setback
RM 5 Left and Right Bank

January 2009
Cedar Rapids Floodplain
Reconnection and Levee Setback
RM 7.5 Left and Right Bank

- Flooding reduced for downstream properties.

- Insufficiently ballasted logs moved beyond project area.
Cedar Emergency Repair - Belmondo

Scour threatened the trail, a regional fiber optic line, and SR-169.
Vacated lands safely convey flood
Cedar Grove / Rainbow Bend
Flood Response

- Set up emergency shelter
- Voluntary evacuation
- Protect vital infrastructure
- Repair damages
Rhode Levee
RM 14 Left Bank
Rhode Levee Overtopping

High flows cross neighborhood, cut-off access, and flood several homes
Royal Arch
RM 14.5 Right Bank

Remnant side-channel was reclaimed, cutting off access and flooding up to 11 homes
Royal Arch - Aftermath of Flood

Washed out driveway
Frequently Flooded Properties

Bain Road 2009

Orchard Grove 2009

Byers Bend 2009
Puyallup River Basin

EXPLANATION
△ REAL-TIME SURFACE-WATER STATION
△ NON REAL-TIME SURFACE-WATER STATION

Drainage Areas
Puyallup Basin: 972 mi²
Mud Mountain Dam: 400 mi² (41%)
White River

- Flows controlled by Mud Mountain Dam (Corps’ single-purpose flood control dam)
- 41% drainage area is controlled by MMD
- Primary flow control is Lower Puyallup (< 45k cfs)
- Secondary flood control benefits to the White
- White River flow control target is MMD release of 12k cfs when feasible
- Timing of releases lags behind peaks of non-regulated rivers
# White River Flood Events

<table>
<thead>
<tr>
<th>Flood Event</th>
<th>MM Dam max flow release (cfs)</th>
<th>Auburn gage (real-time)</th>
<th>Auburn Gage (provisional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 2009</td>
<td>11,700</td>
<td>18,000</td>
<td>12,300</td>
</tr>
<tr>
<td>Nov 2006</td>
<td>11,700</td>
<td>19,000</td>
<td>14,700</td>
</tr>
<tr>
<td>Jan 2006</td>
<td>10,400</td>
<td></td>
<td>12,400</td>
</tr>
<tr>
<td>Feb 1996</td>
<td>10,700</td>
<td></td>
<td>15,000</td>
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<tr>
<td>Nov 1995</td>
<td>13,200</td>
<td></td>
<td>15,100</td>
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White River – City of Pacific Flooding

Approximate Area of Inundation shown in Blue
January 9, 2009 at flood peak
January 13, 2009 ~ 9k cfs
Corps Berm along Park
(January 15, 2009)
How Can Our Response Be Improved?

- Enhanced flood warning notification through automated system:
  - Can be made available to public in addition to first responders
  - Faster, less labor intensive

- Sandbags available for pick up at several locations
2009 Flood Damage Repairs and Capital Program Adjustments
Damage Assessments

- Teams dispatched to all major river systems in King County
- Approximately 500 facilities
- Over 120 miles of river
- Over 26,800 linear feet of damages
## Summary of Flood Facility Damages

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<th>Basin</th>
<th>Medium Priority Capital Damages</th>
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<td><strong>Snoqualmie / SF Sky</strong></td>
<td>$1,265,000 (12 projects)</td>
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<td><strong>Cedar</strong></td>
<td>$1,767,500 (9 projects)</td>
<td>$2,372,500 (10 projects)</td>
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<td><strong>Green</strong></td>
<td>$5,265,000 (5 projects)</td>
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<td><strong>Total</strong></td>
<td>$8,297,500 (26 projects)</td>
<td>$30,877,500 (40 projects)</td>
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*NOTE: All numbers approximate as of 3/20/09. Capital facility repair needs only, does not include new acquisition needs, new capital projects, or new programmatic needs*
High Priority: Green R Stoneway Lower - Kent
Emergency Repair to Force Main for Midway Landfill Leachate
High Priority: Green River Ratolo – Tukwila 205
Comm’l and Industrial Development at Risk (potl Corps)
High Priority: Green R. Briscoe – Kent
Comm’l and Industrial Land at Risk (Existing 2009 CIP)
Soames-Dolan / Russell Upper – Kent
Risk to residential and commercial areas, access to S. 228th
High Priority: Cedar River Trail Site 1
Risk to SR 169, fiberoptics, trails
High Priority: MF Snoqualmie, Mason Thorson Extension (Potential Corps) Risk to Residential Area
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Evaluation Criteria:
Project Evaluation Approach

NOTE: This is a conceptual diagram and is not intended to imply clear and distinct thresholds between these categories.
Process and Rationale for Identifying New 2009 Flood Facility Repair Needs

Total Damages $39M+

High Priority Projects Considered for 2009 ($30.8M)

New FCD funding after proposed Corps funding for 8 projects ($17.7M)

New FCD funding not covered by existing 2009 CIP ($10.7M)

New FCD projects ready to proceed - Permits, Design, Contracts ready by June 2009 ($3.1M, 27 projects)

New Repair Needs Added to 2009 Budget

Flood Risk Criteria

Implementation Criteria – Partnerships and Leveraging

Implementation Criteria - Readiness
Identifying FCD Funds that could Address New 2009 Repair Needs

- Project can be delayed due to implementation factors
  - Partnerships and Coordination (e.g. Neal Road $1.5M)
  - Grants and Leveraging (e.g. Lower Tolt Acquisition $893K)
  - Feasibility Studies (e.g. Dorre Don and Maplewood Flood Mitigation Studies $350,000)

- Fund balance for completed project (e.g. Segale Levee $100,000, 2007 Briscoe repair $110,000)

- Total: @ $3.2 million
Timelines for Adjusting 2009 CIP

- March 23 – Executive Committee Review of New Damages
- March 25 – Advisory Committee Review of Damages and Process for Making Adjustments
- April 6 – Recommendations on Specific 2009 Repair Projects, Distribute to BTCs for discussion
- April 16 – Advisory Committee Recommendations on 2009 Adjustments
- April 27 – Recommendations to Executive Committee
- May 4 – Board of Supervisors Adopt CIP Adjustments
External Resources

- **Disaster response funding**
  - FEMA public assistance for repairs (request TBD)
  - FEMA hazard mitigation grants (up to $3M)
  - Economic Development Admin grant (up to $1M)

- **Corps PL 84-99 repairs**
  - Structural Repairs
  - Request “Non-Structural Alternatives” to acquire land and set back levees

- **Stimulus Funding**
  - NOAA floodplain reconnection
  - NRCS floodplain easements
  - Corps of Engineers

- **Annual Grants**
  - Department of Ecology (FCAAP – May)
  - FEMA (Pre-Disaster Mitigation – June)
  - Conservation Futures
Questions for Advisory Committee

“Temperature Read”

- Do you support the approach used to identify 2009 capital repair needs?

- Do you support the process used to identify potential project reallocations to fund these repair needs?

- What additional information would you like to have to make a recommendation in April?

- Do you have any recommendations on how we can strengthen our response in future flood events?
2010 Work Program
Development Process
Flood Risk Reduction Potential

- **Consequences:** What would happen if no action were taken?
  - Critical facilities, residential land, regional economic benefits, etc.
- **Severity:** How serious is the impact?
  - Human injury or death vs little or no damage
- **Extent of Impact:** What is the scale of the problem?
  - Impacts beyond the area of flooding vs. localized
- **Urgency:** How soon will the impacts occur?
  - Next high flow event vs. Risks are not rapidly increasing
Implementation Potential

- Project Readiness – willing landowner, design, permits
- Partnerships / Leverages Funds
- Supports multiple objectives
- Cost-Effectiveness
- Programmatic Activities
  - Community Rating System
  - Meet or exceed NFIP
  - Active CIP program
  - Active O&M program
Evaluation Criteria: Project Evaluation Approach

Implementation Potential

Flood Risk Reduction Potential

- Address Project Constraints or Rescope
- Medium Priority
- High Priority
- Low Priority

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Schedule for 2010 Work Program Recommendations

- November – Board and Council adopt budget
- October – Advisory Committee meeting on 2009 Progress
- August – Advisory Committee recommendations due to Board
- May – King County Budget developed
- May 6 – Advisory Committee Recommendations
- April 16 – Advisory Committee ‘Temperature Read’ on 2010 Work Program and Budget
- March-April – Basin Technical Committee Meetings
Future Agenda Items

- 2009 Capital Adjustments
- 2010 Work Program Recommendations
- 2010 Budget, 6-yr CIP
- Policy Recommendation - Eminent Domain
- National Flood Insurance Program – FEMA Implementation of Biological Opinion
- Levee Vegetation Management Coordination with the Corps of Engineers, NMFS/USFWS, FEMA
Event Timeline

(06:00) News broadcasts show mayor wading through streets of Pacific.

(22:00) Peak outflow from MMD - 11,700 cfs.

(22:00) Mayor reports flooding beyond the park to King County EOC.

(17:20) Mayor reports park flooding to King County EOC.

Decision to hold all inflows at MMD

(09:15) MMD outflow reduced to 6,700 cfs (faulty gage reports ~ 8,000 cfs); flows taper to 8,700 by 13 Jan.

(03:20) Pool 65% filled; initiated release.

Pool ~ 0% filled prior to storm.

(07:00) USACE flood engineer dispatched to Pacific, WA; coordinates sandbag delivery to city.

Peak flow @ Pacific - 12,100 cfs

(09:00) COL Wright observes flooding during overflight; contacts RCC from helicopter and orders flow reduction.

Floodwaters recede from Pacific, WA

King County agrees to construction of flood berm.

COL Wright participates in Pacific, WA town hall meeting.

(07:20) All waters contained w/n banks of White River vic. Pacific, WA.

Precipitation began to wrap up; another storm forecasted for potential impacts on 10-11 Jan

Flood berm construction complete.

Supreme Court issues emergency order for construction of flood berm.

USACE initiates work constructing 800' flood berm.

Col. Wright participates in flood protection meeting.

(13:00) King County notified of intent to release 11,700 cfs.

Flows reduced to 7,500 at MMD.

Pacific, WA town hall; Mayor signs flood berm CA.
Addressing Constraints:
Capital Project Phasing

<table>
<thead>
<tr>
<th>Activity</th>
<th>Yr 1</th>
<th>Yr 2</th>
<th>Yr 3</th>
<th>Yr 4</th>
<th>Yr 5</th>
<th>Yr 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROW</td>
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<tr>
<td>Design</td>
<td></td>
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<tr>
<td>Permits</td>
<td>Out of water</td>
<td>In-stream</td>
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<tr>
<td>Setback</td>
<td></td>
<td></td>
<td>20% of construction cost</td>
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<tr>
<td>Bench</td>
<td></td>
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<td>30% of construction cost</td>
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<tr>
<td>Reconstruct Toe</td>
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<td></td>
<td></td>
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<td>50% of construction cost</td>
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<tr>
<td>Revegetation</td>
<td></td>
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<tr>
<td>Maintenance and Monitoring</td>
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