Collaborative
Flood Risk Reduction Projects in the Greater Sacramento Region

Wilbur Huang, P.E., CFM
Jason Brabec, P.E., CFM

Flood Projects Office
Division of Flood Management
California Department of Water Resources

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Earlier Historic Floods

- Birds-eye view of Sacramento 1857;
- Historic floods of 1861-62 (USGS)
More Recent Historic Floods

Flood of 1986

Flood of 1997

Broken Gate on Folsom Dam (1995)
• Sacramento Floods: **1850, 1852, 1862**
• Sacramento raised almost 15 ft after 1862 flood
• **1880** – First Comprehensive Flood Control Plan developed by William Hammond Hall
• More floods 1902-1909
• **1917** – Plan from 1880 finally accepted – Sacramento Flood Control System authorized by Congress
• **1944** – Folsom Dam authorized – Designed to provide 500-year level of flood protection
• **1951** – Record Flood
• **1956** – Record Flood
• **1964** – Record Flood – Folsom Dam flood protection downgraded to 120-year storm
• **1986** – Record Flood – Folsom Dam flood protection downgraded to 60-year storm!
• **1997** – Record Flood – Definitely a theme...
SPONSORS OF FLOOD RISK REDUCTION PROJECTS

Federal Sponsor:

- United States Army Corps of Engineers (USACE)
  - Project Management by Sacramento District (USACE-SPK)

Non-Federal Sponsors:

- Central Valley Flood Protection Board (Board)
  - Project Management by Department of Water Resources (DWR) Flood Projects Office and Board Staff Coordination

- Sacramento Area Flood Control Agency (SAFCA)
American River Common Features, WRDA 96/99 Sites
ARCF Project Background

- Project Cooperation Agreement (PCA) and Local Project Cooperation Agreement (LPCA) signed in July 1998.

- Under WRDA 96 authorization: 22 miles of cutoff wall was installed along American River, leaving about 32 gaps due to the needs of complex design and construction.

- Gaps include Bridge crossings, Railway line crossings, Pipe crossings, Overhead utility lines, etc.
## ARCF Project Finance

(Estimate)

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td>Total Project Cost</td>
<td>$ 326 million</td>
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<tr>
<td>Federal Share</td>
<td>$ 243 million</td>
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<tr>
<td>Non-Federal Share</td>
<td>$ 81 million</td>
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<tr>
<td>State Cost Share</td>
<td>$ 56 m</td>
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<tr>
<td>SAFCA Cost Share</td>
<td>$ 25 m</td>
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</tbody>
</table>
ARCF
Construction Photos

Work at Howe Ave Bridge

Howe Ave Bridge cutoff wall

Jet Grouting at Watt Ave Bridge

Pipe Crossings at L5A

9/22/2016
ARCF Project Accomplishments

- 25 miles of continuous seepage cutoff wall
- 200-year Level of Flood Protection for more than 500,000 people and several billion dollar worth assets
- Safely passage the 160k cfs release from the Folsom Dam during high water events
- Two ASCE awards (2012 and 2014) for best construction practice
- April 2016 Project Completion
South Sacramento County Streams Project

- Completed Work
- Future Work
- Revised Hydrology
- Removed Work
- Section 104 Work
- Morrison Creek
- Beach-Stone Lake Basin

- 2016 Work
- SR 99
- UPRR
- I-5
- Morrison Creek Stream Group Basin
- Beach-Stone Lake Basin
SSS Project Background

• Final Feasibility report and EIS/EIR completed in March 1998

• Authorized in WRDA of 1999

• Limited Reevaluation Report (LRR), included revised hydrology, and Environmental Assessment completed December 2004

• Project Cooperation Agreement (PCA) and Local Project Cooperation Agreement (LPCA) signed in May 2005
SSS DESIGN & CONSTRUCTION STATUS

- Divided into Phases 1A, 1B1, 1B2, 2A, 2D1

**COMPLETED WORK:**
- Approx. 7 miles of Flood Wall
- Approx. 9 miles of levee improvement
- Approx. 1.5 miles of new levee
- Approx. 200 acre ecosystem restoration

<table>
<thead>
<tr>
<th>Legend</th>
<th>Reach</th>
<th>Contract</th>
<th>Start</th>
<th>Finish</th>
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<tbody>
<tr>
<td></td>
<td>SRWTP Perimeter Levee Improvements</td>
<td>SRCSD</td>
<td>May-96</td>
<td>Oct-97</td>
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<tr>
<td></td>
<td>North Beach Lake Levee (West of UPRR to Sacramento River)</td>
<td>1A</td>
<td>24-Jun-05</td>
<td>27-Jan-06</td>
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<td>Morrison Creek Levee Improvements (East of UPRR to Franklin Boulevard)</td>
<td>1B1</td>
<td>11-Jul-06</td>
<td>13-Nov-08</td>
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<td>Unionhouse Creek Levee Improvement</td>
<td>1B2</td>
<td>26-Sep-07</td>
<td>26-Nov-08</td>
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<td></td>
<td>Morrison Creek along Union Pacific Railroad</td>
<td>2A</td>
<td>27-Sep-11</td>
<td>1-Nov-13</td>
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<td></td>
<td>Florin Creek (To Be Constructed)</td>
<td>2D1</td>
<td>2015</td>
<td>2016</td>
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Florin Creek Construction (2D1)

- Started in Summer 2016; scheduled to be completed in late 2016
- Little over a mile of channel bottom widening and slope flattening
- Low flow concrete invert channel lining
- Approx. 350 feet retaining wall
- Approx. 170 feet sheet pile wall
SSS Construction Photos

Completed section of channel bottom

Slope paving

Rebar installation for retaining wall

Sheet pile installation
SSS Project Finance
(Estimate)

- Total Project Cost - $93 million
- Federal Share - $60 million
- Non-Federal Share - $33 million
  - State Cost Share - $23 m
  - SAFCA Cost Share - $10 m
SSS Project Accomplishments

- Level of flood protection will increase to 100-year for South Sacramento Area
- About 30,000 parcels will be in reduced flood risk
- About 28,000 residential properties are or will be eligible for Preferred Risk Flood Policies (PRP)
- More than 200 acre ecosystem restoration
- Enhance the recreation and restore wildlife habitat
The Folsom Dam Modification Project is a cooperative effort to improve flood damage reduction features, dam safety, and security of the Folsom Dam and its associated facilities to a 200-year or better level of Protection.
JFP Project Background

• Intent of Project was to attenuate peak storms with earlier releases to achieve a greater than 200-year level of flood protection, within rated flow capacity of downstream levees.

• Mass excavation for Phases I & II completed by United States Bureau of Reclamation in January 2011.

• Project was presented at the FMA Conference held in 2012. This presentation will focus on construction updates since that time.

• JFP Project continued in three primary phases:
  – Phase III: Control Structure
  – Phase IV: Step Chute, Stilling Basin, Upper Chute, and Approach Channel
  – Phase V: Site Restoration.
JFP CONSTRUCTION PHASES
JFP Project Finance
(Estimate)

- Total Project Cost: $833 million
- Federal Share: $541 million
- Non-Federal Share:
  - State Cost Share: $204 million
  - SAFCA Cost Share: $88 million
STEP CHUTE & STILLING BASIN

2013

2016
CONTROL STRUCTURE COMPLETE (AUG 2015)
BULK HEAD GATE SIZE
MARINE BLASTING OF THE APPROACH CHANNEL

Blast # Marine TB3
7/30/2015 @ 14:00
Station/Offset:
1+50, left 220' to
3+00 right 230'

Approach Channel - Looking Northwest
## Construction Progress

### Table: Progress by Phase

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<thead>
<tr>
<th>Phase</th>
<th>November 2012</th>
<th>August 2016</th>
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<tbody>
<tr>
<td></td>
<td>Design</td>
<td>Construction</td>
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<tr>
<td>Phase III</td>
<td>100%</td>
<td>34%</td>
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<tr>
<td>Phase IV</td>
<td>100%</td>
<td>0%</td>
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<tr>
<td>Phase V</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Overall</td>
<td>86%</td>
<td>15%</td>
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- 3.8 million cubic yards of rock and soil excavated
- 300,000 cubic yards of concrete poured
- 30 million pounds of steel reinforcing
FUTURE JFP ACTIVITIES

• Construction
  – Approach Channel final excavation
  – Restoration of Site

• Water Control Manual

• Commissioning

• Turn-over
SAFCA PROJECTS IN THE WORKS

• American River Common Features – General Re-Evaluation Report (GRR)

• Habitat Restoration and Ecosystem Improvements (Corridor Management Plan)

• Levee and Channel Maintenance
THANKS!

 Appreciate your Attention
 Questions?

–Wilbur Huang & Jason M. Brabec