SWIF TO THE RESCUE

Patty Robinson
Ike Pace, PE
AGENDA

• USACE Programs
  – PL 84-99 (Rehabilitation & Inspection Program, RIP)
  – Levee Safety Program (Routine, Periodic Inspections, PIs)
  – SWIF (System-Wide Implementation Framework)

• CASE STUDIES
  – Green River SWIF (King County, WA)
  – Santa Clara River SWIF (Ventura County, CA)
USACE Programs

PL 84-99/Rehabilitation and Inspection Program

• Enrollment in the Public Law 84-99 (PL 84-99) Rehabilitation and Inspection Program (RIP) provides federal support during flood events and cost-sharing for specific damages to flood control facilities that result from high-water events.

• A facility must maintain an Acceptable or Minimally Acceptable rating to remain active.
USACE Programs

Levee Safety Program

Assess the integrity and viability of levees and recommend actions to assure that levee systems do not present unacceptable risks to the public, property, and the environment.

USACE Inspections

**Initial Eligibility Inspection (IEI)**
- Non-federal facilities
- 10-year level of protection

**Continued Eligibility Inspections (CEI)**
- Routine annual inspections
- Federal and non-federal facilities

**Periodic Inspection (PI)**
- Comprehensive 5-year inspections
- Federal levees only (to date)
USACE Inspection

ER 1110-2-100

• Levee Embankments
• Flood Damage Reduction Channels
• Floodwalls
• Interior Drainage
• Pump Station
USACE Inspection

- Levee Embankments
- Flood Damage Reduction Channels
- Floodwalls
- Interior Drainage
- Pump Station
USACE RIP Eligibility

- Levee Embankments
- Floodwalls
- Interior Drainage
- Pump Station
USACE System-Wide Improvement Framework (SWIF)

- A SWIF is a plan developed by a levee sponsor and accepted by USACE to:
  - Address complex system-wide issues that extend beyond routine levee operation and maintenance activities
  - Facilitate Interagency collaboration
  - Correct levee inspection items
  - Development of prioritized implementation plan to reduce flood risk
  - Mechanism to maintain PL 84-99 rehabilitation cost-share eligibility during 2-year planning period
USACE System-Wide Improvement Framework (SWIF)

• Examples of issues that may be addressed through the SWIF process
  – Engineering deficiencies such as change in hydraulic conditions that complicate correction of inspection items
  – Multiple levee systems
  – Natural resource considerations
  – Federal laws such as Endangered Species Act
  – Tribal treaty rights
USACE System-Wide Improvement Framework (SWIF)

• Process
  – Letter of Intent prepared and submitted by levee sponsor and approved by USACE specifying issues to be included in SWIF.
  – Acceptance by USACE initiates two year planning period.
  – One year milestone progress check point.

• Products
  – Improvement plan and justification on how the SWIF optimizes flood risk reduction.
  – Plan for interagency collaboration, regional considerations, environmental and Tribal consultation (if applicable)
  – Required agreements for implementation
  – Interim Deficiency Correction Plan & Maintenance
  – Interim Risk Reduction Management Plan
Green River System Wide Improvement Framework (SWIF)

- **Levee Sponsor:** King County Flood Control District
- **Submission to USACE Seattle District (NWS) by King County Water and Land Resources Division and Consultant Team**
- **Consultant Team Providing Planning & Technical Support**
Green River SWIF

Current Condition Assessment

Alternatives Development and Evaluation

King County Tetra Tech Team

Capital Project Concept Design & Prioritization

Interim Risk Reduction Measures Plan
Flood Risk Analysis

- Levee Safety Program shifting to Risk Informed Decision Making
- SWIF Assessment Approach Consistent with USACE Flood Risk and Uncertainty Guidance to the extent possible
Green River SWIF Current Condition Flood Risk and Vulnerabilities Analysis Framework

Geotechnical  Geomorphic  Hydraulic  Economic

Define Modeling Assumptions

Hydraulic Modeling
- HEC-RAS and FLO-2D modeling
- Incorporation of hydrologic, hydraulic, and geotechnical uncertainty
- Inundation mapping and GIS-based datasets

Economic Evaluation
- Multiple models by scenario using HEC-FDA
- Incorporate uncertainty in flow-frequency and stage-frequency curves
- Incorporate uncertainty in economic inputs
- Monte Carlo analysis

Flood Risk Characterization
- Expected annual damage for each scenario
- System-wide expected annual damage
Model Inputs

- **Hydraulics:**
  - Floodplain depth grid via FLO-2D for eight events

- **Geotechnical:**
  - Levee fragility curves for levee sections where breach is modeled

- **Economic:**
  - Physical damages & regional economic impacts
  - Damage functions
Inundation Map Examples

- Overtopping flow for 3 flood events

12,600 CFS
15,100 CFS
18,800 CFS
Inundation Modeling

- Characterize Existing Condition Flood Risk
- Interim Risk Reduction Measures Plan
Santa Clara River SWIF

Ventura County Watershed Protection District

July 16, 2013

Colonel Kimberly M. Coloton
District Engineer
U.S. Army Corps of Engineers
915 Wiltshire Boulevard, 10th Floor
Los Angeles, CA 90037

Subject: Ventura County Watershed Protection District Request for Approval of the System-Wide Improvement Framework Letter of Intent (LOI) for Conditional Extension of USACE P.L. 84-96 Program Eligibility for the Santa Clara River 1 Levee System (SCR1)

Dear Colonel Coloton:

In accordance with the CEQWHS memorandum dated November 29, 2011, Subject: Policy for Development and Implementation of System-Wide Improvement Frameworks (SWIF), the Ventura County Watershed Protection District (District) hereby requests approval of Letter of Intent (LOI) for conditional extension of Public Law (P.L.) 84-96, rehabilitation eligibility while we develop a SWIF for the Santa Clara River 1 Levee System (SCR1). Our SWIF will address system-wide issues, including correction of unacceptable inspection items, in a prioritized way to optimize flood risk reduction.

The attachment contains the information required for the SWIF LOI to demonstrate our commitment to restoring the Santa Clara River 1 Levee System (SCR1) to meet USACE operations and maintenance requirements. Specifically, the attachment includes the following detailed information: 1) levee system(s) identification; 2) a description of deficiencies and/or issues with a justification of how the SWIF will improve and optimize overall flood risk reduction; 3) demonstration of funding commitments; 4) interim risk reduction measures; 5) interagency collaboration, and 6) anticipated permit requirements.

The attachment further justifies how a system-wide approach will optimize flood risk reduction by correcting deficiencies that are complex to correct.

The VCWPD’s proposed funding plan for rehabilitation is summarized in Table 4 below.

<table>
<thead>
<tr>
<th>Funding Component</th>
<th>Funding Amount</th>
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<tr>
<td>VCWPD Funding (O&amp;M)</td>
<td>$1.8 million</td>
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<td><strong>Total for SCR1 (non-critical items)</strong></td>
<td><strong>$1.8 million</strong></td>
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<td>Federal Funding (USACE Section 216 cost share)</td>
<td>$29 million</td>
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<td>VCWPD Funding (CIP)</td>
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<td>State Funding (grants pursued by VCWPD) and other local sources</td>
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<td><strong>Total for SCR1 (critical items)</strong></td>
<td><strong>$45 million</strong></td>
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<td><strong>TOTAL for SCR 1</strong></td>
<td><strong>$46.8 million</strong></td>
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Santa Clara River SWIF

**USACE DECISION PROCESS ROADMAP TO IMPROVE SCR-1: SECTION 216 FEASIBILITY**
((Duration to Perform: Approximately 11-Yrs))

1. County/TT prepare Draft Initial Appraisal Report (Draft Jun 2014)
2. County/TT prepare Draft 905(b) Reopen Report (Draft Aug 2014)
3. County/TT prepare Draft PMP (Sep 2014)
4. LA District and County agree on and approve scope and cost of PMP (Jun 2015)
5. LA District initiates Feasibility Report (Apr 2016)*
7. LA District completes Design and Construction (Aug 2024)**

**KEY PLAYERS AT LA DISTRICT**

- Josephine Axt, Chief, Planning Division
- David Van Dorpe, Chief, Programs and Project Management Division
- Darrell Buxton, Project Manager for the Santa Clara River Watershed Study
- Ed Demesa, Chief, Plan Formulation Branch

**RESPONSIBILITIES**

Funding is a Key Element. County must notify LA District of request to start a study of to include in FY15 budget. Schedule assumes request is made for FY15 budget.

**OUTSTANDING QUESTIONS**

**FUNDING**

*FY16 Funds needed which requires a Congressional add
**Design and Construction required in FY17 and following budgets

**FIGURE 3 – USACE Decision Process Roadmap to Improve SCR1**
Santa Clara River SWIF – Failure Scenarios

- Historical Failures
- Extrapolate to similar locations
Santa Clara River IRRMs – Evaluation Factors

**Structural**
- Reduce Inundation
- Reduce Loading
- No Life Safety Increase
- No Adverse Impacts
- Permanent Solution

**Preparedness**
- Detection Confidence
- Notification Confidence
- Warning Time and Evacuation

**Other**
- Preserve Public Trust
- Problem Understanding
- Other Impacts
- Cost Effectiveness
- Social/Environmental Impacts

*Factors per USACE (ECB 2014-2 (March 5, 2014))
Santa Clara River – Measures (examples)

**Structural**
- Stockpile
- Improve Groins
- Levee Raising

**Preparedness**
- EEP
- Specific O&M Manual
- Visual Markers

**Other**
- Local NLD
- H&H
- Scour
## Santa Clara River IRRMs - Prioritization

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**LEGEND:**
- □ Factor is well addressed by this measure
- ◯ Factor is marginally addressed by this measure
- ○ Factor is not addressed by this measure

Initial measures selected based on number of factors addressed
Additional measures selected based on major factors needing additional support.
Major factors shown as: □