

# Update on the USIBWC's Tijuana River Levee Certification Efforts- Date: 02/16/12



**Presented by:  
Guillermo Martinez, P.E., CFM**

**USIBWC**



# Purpose of Presentation

- Provide the “overall big picture” of the process that the IBWC is currently going through in order to certify the Tijuana North and South Levees within USIBWC Right of Way
- Discuss the challenges that will be a part of the FEMA levee accreditation process
- Discuss the roles and responsibilities among project stake holders

**USIBWC**



# PROJECT LIMITS



SOUTH LEVEE-  
1.9 MILES LONG

NORTH LEVEE-  
2 MILES LONG

INTERNTL.BNDRY

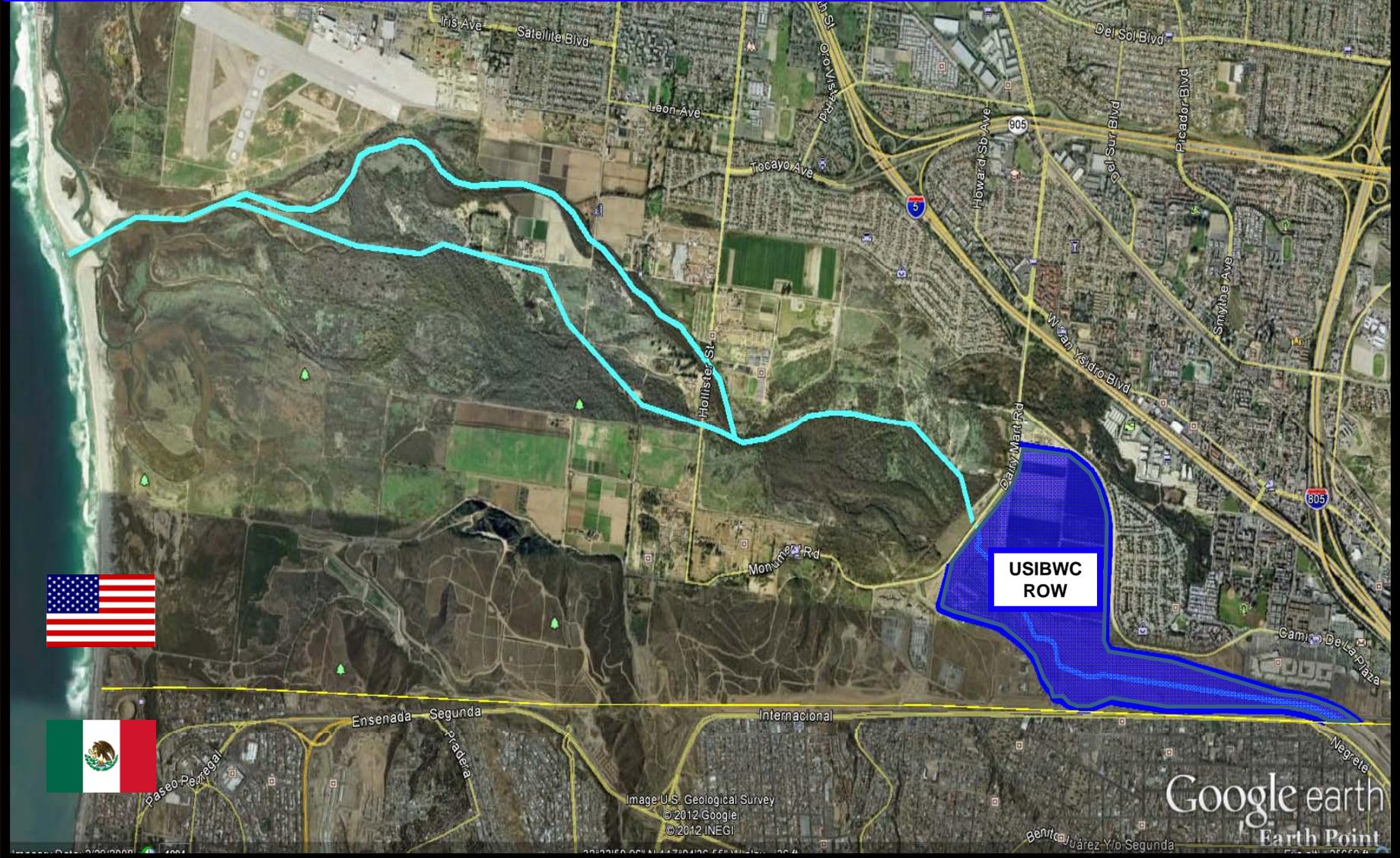


**USIBWC IS RESPONSIBLE FOR FLOOD CONTROL WITHIN USIBWC ROW. APROXIMATELY FROM THE US/MEX BORDER TO DAIRY MART RD. ALONG THE TIJUANA RIVER & WITHIN USIBWC LEVEES.**

**USIBWC**



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## PROJECT STAKEHOLDERS:

### THE RESIDENTS NEAR THE LEVEES!!!

**TJ N.LEVEE**

**SUBDIVISION**

Camino De La Plaza



# International Boundary and Water Commission United States Section

## PROJECT STAKEHOLDERS:



**COUNTY**



**STATE**



**CITY**

# STATUS OF LEVEE CERTIFICATION?

- Since July of 2009, the USIBWC has been moving forward with its task of certifying the levees in accordance with accordance with National Flood Insurance Program (NFIP) requirements as described in Title 44, Chapter 1, Section 65.10 of the Code of Federal Regulations (44 CFR Section 65.10) .
- USIBWC employed a consultant to conduct geotechnical and hydraulic studies on the USIBWC North and South levees in September of 2009 and *the project is still in the “Study Phase”.*
- The results of the studies will provide input on whether the levees meet FEMA levee accreditation criteria.

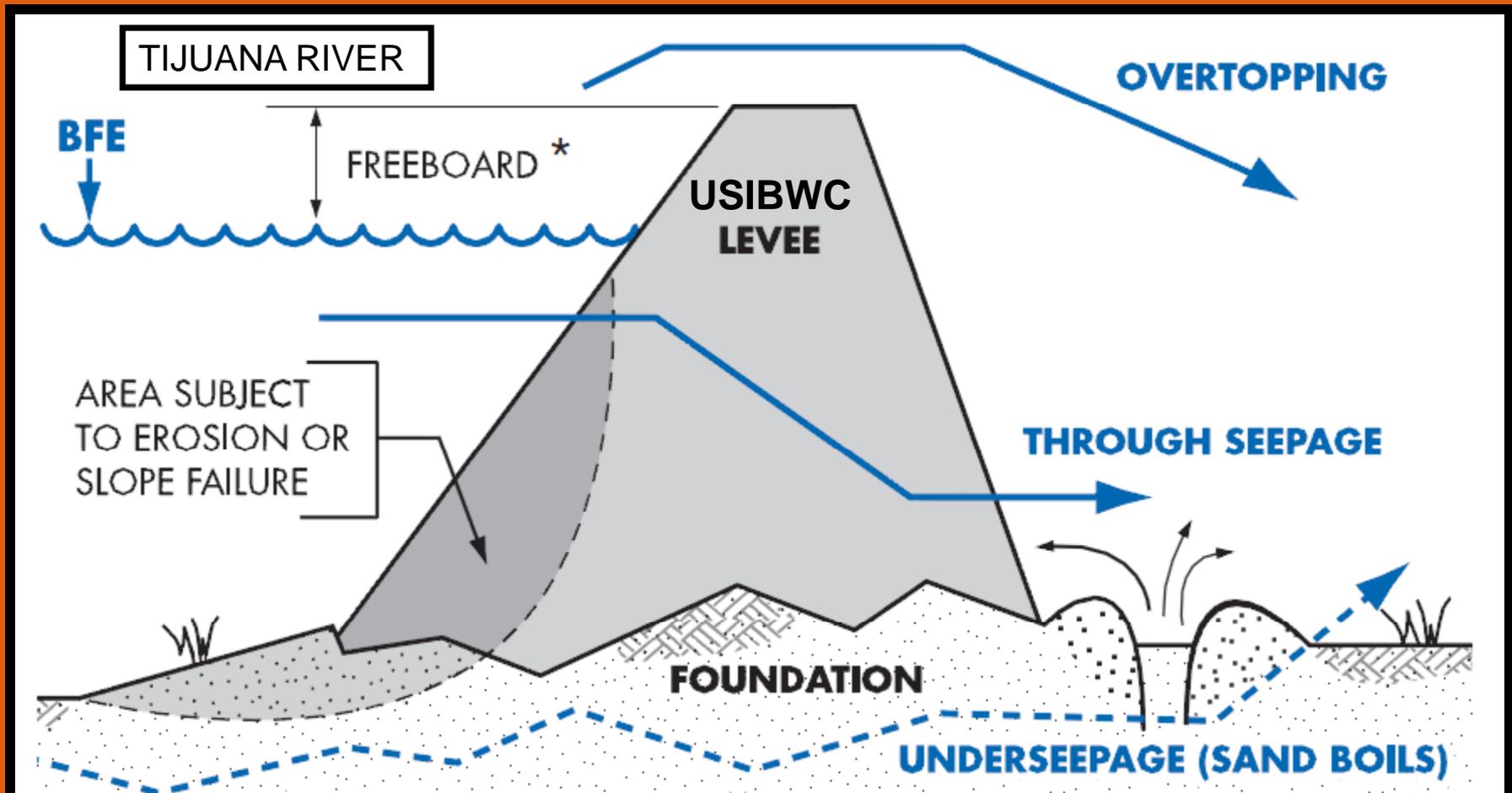
USIBWC





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## USIBWC IS CURRENTLY IN STUDY PHASE OF THE LEVEES



\* Freeboard is the distance between the BFE and the top of the levee; for FEMA accreditation freeboard is usually 3 feet



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**LEGEND**

- Cross Section
- Modified Cross Section
- 321 HEC-RAS Cross Section ID
- North Levee
- South Levee
- Flow Path
- Levee Section Type
  - Concrete
  - Earthen
  - Grouted Riprap
  - Riprap
  - U.S./Mexico Border

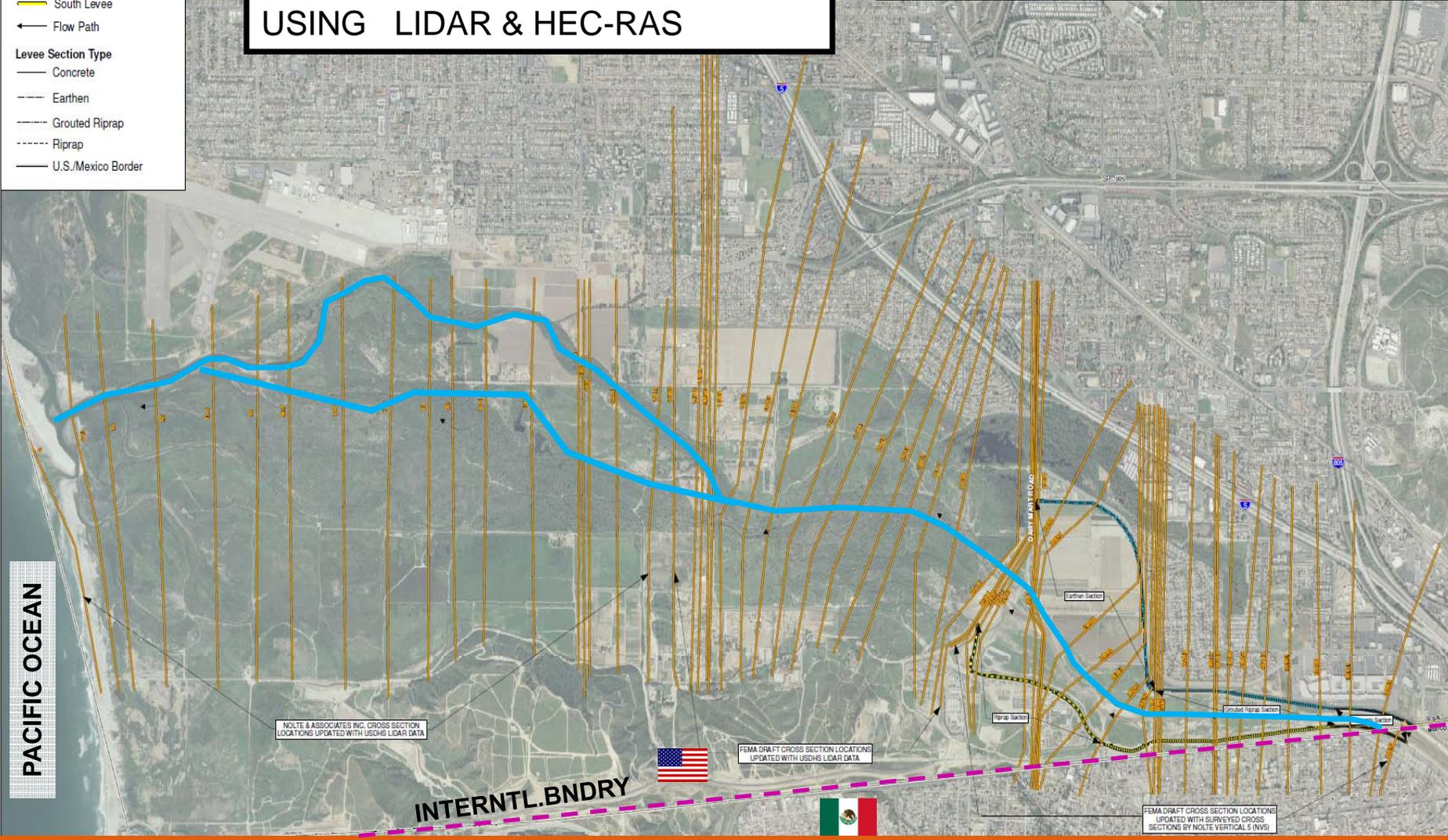
**MODEL IS BEING UPDATED & ANALYZED FROM THE US/MEX BORDER TO THE PACIFIC OCEAN USING LIDAR & HEC-RAS**

SOURCES: Cross Sections (URS, 2012).  
Aerial Photo (Aerials Express, 2010).  
Levees (IBWC, 2009), FEMA cross sections

**REACH AND CROSS SECTIONS  
TIJUANA RIVER  
HYDRAULIC ANALYSIS**

CREATED BY: GN    DATE: 2/13/2012    FIG. NO: 2  
PM: LDH    PROJ. NO: 27661029.00103

URS    850 0 850 1700 Feet  
SCALE: 1" = 850' (1:10,200)  
SCALE CORRECT WHEN PRINTED AT 24X36



PACIFIC OCEAN

MOLTE & ASSOCIATES INC. CROSS SECTION LOCATIONS UPDATED WITH USGS LIDAR DATA

FEMA DRAFT CROSS SECTION LOCATIONS UPDATED WITH USGS LIDAR DATA

FEMA DRAFT CROSS SECTION LOCATIONS UPDATED WITH SURVEYED CROSS SECTIONS BY MOLTE VERTICAL S (NVS)

INTERNTL. BNDRY



# FEMA LEVEL ACCREDITATION CRITERIA-DESIGN



## Design Criteria\*

Section of the NFIP Regulations: 65.10(b)

**Description:** For levee systems to be recognized (i.e., accredited) by FEMA, evidence that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection from the base flood exists must be provided. The following requirements must be met:

## Checklist for Design Criteria:



**Freeboard.** Minimum freeboard required 3 feet above the Base Flood Elevation (BFE) all along length, and an additional 1 foot within 100 feet of structures (such as bridges) or wherever the flow is restricted. Additional 0.5 foot at the upstream end of a levee. Coastal levees have special freeboard requirements (see Paragraphs 65.10(b)(1)(iii) and (iv)).

- **UPDATING HEC-RAS MODEL-limits BORDER TO PACIFIC OCEAN**



**Closures.** All openings must be provided with closure devices that are structural parts of the system during operation and designed according to sound engineering practice.

- **ENSURING THAT GATES HAVE CLOSURES**



**Embankment Protection.** Engineering analyses must be submitted that demonstrate that no appreciable erosion of the levee embankment can be expected during the base flood, as a result of either currents or waves, and that anticipated erosion will not result in failure of the levee embankment or foundation directly or indirectly through reduction of the seepage path and subsequent instability.

- **IBWC CURRENTLY ADDRESSING**

# FEMA LEVEE ACCREDITATION CRITERIA-DESIGN



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**Description:** For levee systems to be recognized (i.e., accredited) by FEMA, evidence that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection from the base flood exists must be provided. The following requirements must be met:

### Checklist for Design Criteria:

	<p><b>Embankment and Foundation Stability Analyses.</b> Engineering analyses that evaluate levee embankment stability must be submitted. The analyses provided must evaluate expected seepage during loading conditions associated with the base flood and must demonstrate that seepage into or through the levee foundation and embankment will not jeopardize embankment or foundation stability. An alternative analysis demonstrating that the levee is designed and constructed for stability against loading conditions for Case IV as defined in the U.S. Army Corps of Engineers (USACE) Engineer Manual 1110-2-1913, <i>Design and Construction of Levees</i>, (Chapter 6, Section II), may be used.</p> <ul style="list-style-type: none"> <li>• <b>IBWC CURRENTLY ADDRESSING</b></li> </ul>
	<p><b>Settlement Analyses.</b> Engineering analyses must be submitted that assess the potential and magnitude of future losses of freeboard as a result of levee settlement and demonstrate that freeboard will be maintained. This analysis must address embankment loads, compressibility of embankment soils, compressibility of foundation soils, age of the levee system, and construction compaction methods. In addition, detailed settlement analysis using procedures such as those described in USACE Engineer Manual 1110-1-1904, <i>Soil Mechanics Design—Settlement Analysis</i>, must be submitted.</p> <ul style="list-style-type: none"> <li>• <b>IBWC CURRENTLY ADDRESSING</b></li> </ul>
	<p><b>Interior Drainage.</b> An analysis must be submitted that identifies the source(s) of such flooding, the extent of the flooded area, and, if the average depth is greater than 1 foot, the water-surface elevation(s) of the base flood. This analysis must be based on the joint probability of interior and exterior flooding and the capacity of facilities (such as drainage lines and pumps) for evacuating interior floodwaters.</p> <p><b>ANALYSIS STILL NEEDS TO BE ADDRESSED. MULTIPLE AGENCY COORDINATION EFFORT.</b></p>

# FEMA LEVEL ACCREDITATION CRITERIA-OPERATION PLAN



## Operation Plan\* Paragraph 65.10(c)(1) of the NFIP Regulations

**Description:** For a levee system to be recognized (i.e., accredited), the operational criteria must be as described below. All closure devices or mechanical systems for internal drainage, whether manual or automatic, must be operated in accordance with an officially adopted operation manual, a copy of which must be provided to FEMA by the operator when levee or drainage system recognition is being sought or when the manual for a previously recognized system is revised in any manner. All operations must be under the jurisdiction of a Federal or State agency, an agency created by Federal or State law, or an agency of a community participating in the NFIP.

### Checklist for Operation Plan:

<input type="checkbox"/>	<p><b>Flood Warning System.</b> Documentation of the flood warning system, under the jurisdiction of Federal, State, or community officials that will be used to trigger emergency operation activities; and demonstration that sufficient flood warning time exists for the completed operation of all closure structures, including necessary sealing, before floodwaters reach the base of the closure.</p> <ul style="list-style-type: none"> <li>• <b>IBWC IS WORKING ON UPDATING ITS PLAN</b></li> </ul>
<input type="checkbox"/>	<p><b>Plan of Operation.</b> A formal plan of operation including specific actions and assignments of responsibility by individual name or title.</p> <ul style="list-style-type: none"> <li>• <b>IBWC IS WORKING ON UPDATING ITS PLAN</b></li> </ul>
<input type="checkbox"/>	<p><b>Periodic Operation of Closures.</b> Provisions for periodic operation, at not less than one-year intervals, of the closure structure for testing and training purposes.</p> <ul style="list-style-type: none"> <li>• <b>IBWC IS WORKING ON UPDATING ITS PLAN</b></li> </ul>
<input type="checkbox"/>	<p><b>Interior Drainage Plan.</b> See below.</p> <ul style="list-style-type: none"> <li>• <b>ANALYSIS STILL NEEDS TO BE ADDRESSED. MULTIPLE AGENCY COORDINATION EFFORT.</b></li> </ul>

# FEMA LEVEE DESIGN CRITERIA-INTERIOR DRAINAGE PLAN

Interior Drainage Plan	Paragraph 65.10(c)(2) of the NFIP Regulations
<p><b>Description:</b> Interior drainage systems associated with levee systems usually include storage areas, gravity outlets, pumping stations, or a combination thereof. These drainage systems will be recognized by FEMA on NFIP maps for flood protection purposes only if the following minimum criteria are included in the operation plan.</p>	
<p><b>Checklist for Interior Drainage Plan:</b></p>	
<input type="checkbox"/>	<p><b>Flood Warning System.</b> Documentation of the flood warning system, under the jurisdiction of Federal, State, or community officials that will be used to trigger emergency operation activities; and demonstration that sufficient flood warning time exists to permit activation of mechanized portions of the drainage system.</p>
<input type="checkbox"/>	<p><b>Plan of Operation.</b> A formal plan of operation including specific actions and assignments of responsibility by individual name or title.</p>
<input type="checkbox"/>	<p><b>Manual Backup.</b> Provision for manual backup for the activation of automatic systems.</p>
<input type="checkbox"/>	<p><b>Periodic Inspection.</b> Provisions for periodic inspection of interior drainage systems and periodic operation of any mechanized portions for testing and training purposes. No more than 1 year shall elapse between either the inspections or the operations.</p>

- **ENTIRE ANALYSIS STILL NEEDS TO BE ADDRESSED. MULTIPLE AGENCY COORDINATION EFFORT**

# FEMA LEVEL ACCREDITATION CRITERIA-MAINTENANCE PLAN

## Maintenance Plan

## Paragraph 65.10(d) of the NFIP Regulations

**Description:** For levee systems to be recognized as providing protection from the base flood (i.e., accredited by FEMA), the maintenance criteria must be as described herein.

### Checklist for Maintenance Plan:



Levee systems must be maintained in accordance with an officially adopted maintenance plan, and a copy of this plan must be provided to FEMA by the owner of the levee system when recognition is being sought or when the plan for a previously recognized system is revised in any manner.

- **IBWC IS WORKING ON UPDATING ITS PLAN**



All maintenance activities must be under the jurisdiction of a Federal or State agency, an agency created by Federal or State law, or an agency of a community participating in the NFIP that must assume ultimate responsibility for maintenance.

- **IBWC IS WORKING ON UPDATING ITS PLAN**



This plan must document the formal procedure that ensures that the stability, height, and overall integrity of the levee and its associated structures and systems are maintained. At a minimum, the plan shall specify the maintenance activities to be performed, the frequency of their performance, and the person by name or title responsible for their performance.

- **IBWC IS WORKING ON UPDATING ITS PLAN.**

# FEMA LEVEE ACCREDITATION CRITERIA-LEVEE AS-BUILTS

Certification	Paragraph 65.10(e) of the NFIP Regulations
<p><b>Description:</b> Data submitted to support that a given levee system complies with the structural requirements set forth in “Design Criteria” (Paragraphs 65.10(b)(1) through (7) of the regulations) must be certified by a Registered Professional Engineer. Also, certified “as-built” plans of the levee must be submitted. Certifications are subject to the definition given in Section 65.2 of the NFIP regulations. In lieu of these structural requirements, a Federal agency with responsibility for levee design may certify that the levee has been adequately designed and constructed to provide protection from the base flood.</p>	
<b>Checklist for Certification Requirement:</b>	
<input type="checkbox"/>	<p>All data submitted is certified by Professional Engineer or certified by a Federal agency.</p> <ul style="list-style-type: none"><li>• <b>IBWC NOT AT THIS STAGE OF THE PROJECT</b></li></ul>
<input type="checkbox"/>	<p>Certified as-built levee plans are included in the submittal.</p> <ul style="list-style-type: none"><li>• <b>IBWC NOT AT THIS STAGE OF THE PROJECT</b></li></ul>



- **What challenges are foreseen in the levee certification/accreditation process?**
  - Requirement to assess interior drainage in the levee certification process. USIBWC's is only authorized to do work on the levees and does not have authority in assessing the interior drainage issues.
  - FEMA timeline to finalize flood insurance maps versus USIBWC levee certification process in San Diego County.



## International Boundary and Water Commission United States Section

# ANTICIPATED SCHEDULE OF STUDY PHASE COMPLETION-MARCH 2012

Subtask	Description	Deliverable	<i>Revised Submittal Date</i>
G.1	Work Plan	Work Plan	7-Oct-11
G.2	Topographic Survey	Survey data and topography	13-Feb-12
G.3	Hydraulic Analysis	Draft HEC-RAS model analysis and report ( <i>Revised to Pacific Ocean</i> )	13-Feb-12
C	South Levee Geotechnical Evaluation	Draft South Levee Geotechnical Memorandum	27-Feb-12
G.4	North Levee Revised Engineering Technical Evaluation	Draft North Levee Revised Engineering Technical Evaluation	27-Feb-12
D	South Levee Engineering Evaluation	Draft South Levee Engineering Technical Memorandum	12-Mar-12
G.5	Dredging Analysis	Draft Dredging Analysis (combined with Engineering Technical Memorandum of the South Levee)	12-Mar-12

**NOTE: BASED ON STUDY CONCLUSIONS, THE USIBWC WILL TAKE PROPER ACTIONS TO ENSURE THAT LEVEES MEET FEMA CRITERIA. USIBWC WILL PROVIDE UPDATE AT NEXT CITIZENS FORUM MEETING.**



## LEVEE CERTIFICATION COMMON QUESTIONS

### **What is USIBWC doing to assist the local community?**

- Meeting and coordinating with City of San Diego, FEMA, and USIBWC since July of 2009.
- USIBWC is aware that the San Diego County is updating their respective DFIRMs
- USIBWC hosts Citizens Forum Meetings once every three months. Stakeholders are invited.



## International Boundary and Water Commission United States Section



### **DFIRM UPDATE?**

- **On 3/17/11 FEMA announced that the agency would discontinue the practice of using “without levee” modeling in the FIRM modernization process.**
- **In a nut shell, what this means is that between March of 2011 to present, FEMA has been working on revising its modeling techniques for mapping levees and has not issued final DFIRMS for the areas near the Tijuana Levees.**



# International Boundary and Water Commission United States Section

**USIBWC**



**QUESTIONS???**