

CONCLUSIONS

The existing levee embankments were constructed over soils that include sands and gravels that are very permeable. Whereas seismic induced settlement (i.e., liquefaction) is considered a relatively low risk issue in these analyses, seepage beneath the existing embankments represents a serious risk to the levee system during a 25-year design flood event. The results of our seepage analyses indicate that the methods available to address underseepage are somewhat limited and are expected to be relatively expensive to address.

Project No. ASA09-120-00
March 26, 2010
Mr. Yen Hsu Chen, P.E., Principal Project Manager
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RE: Geotechnical Investigation
Urban Levee Remediation Design
Presidio Flood Control Levee System
From STA 0+000 to STA 13+500
Presidio County, Texas
USIBWC Contract No. IBM09D0006
USIBWC Task No. IBM10T0008
Technical Memorandum

Sills-

Letter Report: August 2009
Geotechnical Levee Assessment of US IBWC
Levees at Presidio, TX, October 28-29, 2008
and January 6-7, 2009

11. Conclusions. The Presidio Levee System sustained major damage from the September 2008 Flood. The system north of Cibolo Creek is in relatively good condition except for the seepage problems just north of Cibolo Creek near stations 7 + 050 and 7 + 126.29. The sand boil/animal burrow which is located just north of Cibolo Creek is still considered to be the most potentially dangerous area of the system. A significant quantity of water was flowing beneath the levee and into the river during our assessment with a low head of only about one foot. This location is considered very dangerous and represents a significant risk to the public during future high water events. The levee system from Cibolo Creek to near station 8 + 500 is in fair condition considering the magnitude of the loading by the recent flood.

The levee from station 8 + 500 south has numerous large areas of severe river side erosion. Some of this is within the floodplain and some along the riverside of the levee. This erosion is an indication that the system is in need of a series of river side erosion protection projects or a levee setback. A large portion of the southern system was completely overtopped and received severe scour and erosion of the levee crown. A fuse plug area (an area that is slightly below the surrounding levee grade and built to withstand overtopping with minimum damage) within this reach would eliminate this

problem. This would also control the location where flooding could occur in large magnitude events.

The severe seepage/boils that occurred between station 16 + 000 and station 17 + 000 will require major rehabilitation of the levee foundation or possibly will require the levee to be set landward of this seepage problem. Failure to adequately remediate the foundation within this area could result in a failure at a river stage below previously recorded flood elevations for this reach.

4. Due to the large amount of riverside erosion, IBWC should consider setting the levee system back along the United States side of the river. Any setback from station 0 + 000 to 7 + 500 will improve the river flow within this reach. From station 7 + 500 to 11 + 000 (railroad bridge), it is very critical to move the levee landward as far as practical to achieve improvement of the river flow within this reach. The railroad bridge will at some point control the river, and it will not be necessary to set levee back beyond that dimension. The section below 11 + 000 to the spur dike should be setback a minimum of 100 meters.

ENVIRONMENTAL IMPACT STATEMENT FLOOD CONTROL IMPROVEMENTS AND PARTIAL LEVEE RELOCATION USIBWC PRESIDIO FLOOD CONTROL PROJECT PRESIDIO, TEXAS 2-10

Under Alternative 1 (No Action), no further structural levee repairs or levee improvements would be made to the existing levee beyond the emergency repairs north of Cibolo creek already completed to protect the City of Presidio following the September 2008 flood. No repairs to the existing levee would be made to pre-flood conditions in areas where the levee breached or was severely eroded.

2.4 ALTERNATIVE 2 - 25-YEAR FLOOD PROTECTION ALONG ENTIRE LEVEE SYSTEM

Current alignment of the Presidio FCP would be retained along the entire length of the levee system for Alternative 2 (Figure 2-1), as in the No Action Alternative. Under this alternative, three improvement measures are under consideration:

2.5 ALTERNATIVES 3 AND 4: 100 YEAR FLOOD PROTECTION ALONG ENTIRE LEVEE SYSTEM

Two alternatives are under consideration to increase protection from a 25-year flood to a 100-year flood along the entire Presidio FCP levee system. Under Alternative 3, the levee system would be raised in-place, keeping the current levee alignment (Figures 2-2 and 2-3). Under Alternative 4, current alignment would be retained in the upper and middle reaches of the levee system (Figure 2-2), but in the lower reach the levee would be partially relocated along a new offset alignment (Figure 2-3).

2.6 ALTERNATIVES 5, 6 AND 7 – 100 YEAR FLOOD PROTECTION LIMITED TO THE UPSTREAM SECTIONS OF THE LEVEE SYSTEM

Three alternatives are under consideration to raise the levee system along the upstream sections of the levee for protection from a 100-year flood (Figure 2-2), while retaining the current 25-year design for flood protection in the lower reach of the Presidio FCP. The three alternatives require construction of a spur levee connecting the raised levee section to elevated terrain south of the City of Presidio. Figure 2-4 illustrates spur levee alignment under Alternatives 5, 6 and 7. The three proposed spur levees will serve to protect the City of Presidio from a 100-year flood, but will not protect the agricultural lands in the lower reach from a 100-year flood. Therefore, common elements of the three proposed spur levees include the use of flood easements to provide funding for the loss of crops if the agricultural fields are flooded in the lower reach.

2.9 PREFERRED ALTERNATIVE

Alternative 2 was selected as the preferred alternative. Taking into consideration environmental concerns about the proposed new levee locations, comments received from public hearings, meetings with stakeholders, engineering considerations, and preliminary cost assessments, the USIBWC has selected Alternative 2 for implementation. This selection is consistent with the core project mission of flood control, and does not negatively affect agricultural areas in the area, and will avoid or minimize impacts to environmental and cultural resources in the area. Alternative 2 is also the environmentally preferred alternative.