

Reclamation District 799

*PO Box 353 Bethel Island Rd.
Bethel Island, CA 94511*



Phone: 925-684-2398 Fax: 925-684-2399

Board of Trustees:

Chairwoman – Jane Lorie, D.V.M.

& Trustees: Dale Wong, David Dal Porto, Diane Shipway and Joseph Spotts

October 8, 2010

DISTRICT ENGINEER REPAIR MEMO

Subject: Placement of Levee Embankment Fill Material to Repair Localized Slope Failure and Dry Surface Holes or Exposed Voids caused by Small Animals and Rodents

This material and compaction specification is intended for the repair of localized sloughing of the levee embankment slope and dry holes or exposed underground voids caused by small burrowing animals. Conditions of use are as follows:

- Contractor shall contact USA at (800) 227-2600 prior to excavation activities to verify the presence of utilities.
- The area to be repaired shall be excavated the minimum required to remove deleterious material and to construct benching as required below.
- Wet holes (including boils) and dry holes that appear to be caused by leaking pipes should be brought to the attention of the district engineer immediately.
- Dry holes and voids should be excavated and explored to determine their depth and length. Holes and voids with indeterminate length and/or depth shall be brought to the attention of the district engineer immediately.
- Holes and voids that run parallel with and daylight on the levee slope and are less than 2-feet below ground shall be excavated and repaired.
- Reuse of sloughing spoils as levee embankment fill material is not allowed.
- The loose material in the interior slough slope or void shall be compacted to the density of the adjacent undisturbed consolidated embankment material.

Repaired levee slope shall be observed by district representative prior to the placement of rock slope protection. Rock slope protection per district standards shall be applied over the completed slope repair. For any fill placement, the following is required:

- 1) Compaction
 - a) Backfill materials for excavation within the levee section and within 10 feet of the levee toe shall be placed in 8 inch compacted layers, moisture conditioned between 0 and 3% above optimum moisture content, and compacted to a minimum 90% relative

Physical Address: 6325 Bethel Island Rd. Bethel Island, CA 94511

- density as measured by ASTM Method D1557 (testing by others) and a minimum 95% relative compaction for the top 2 feet below the levee crown.
- b) Fill material shall be tied into existing levee embankment (benched) with 8 inch vertical by 8 inch minimum horizontal steps.
 - c) Independent compaction testing of placed fill material, using nuclear methods, shall be performed once every two vertical feet of fill placed.
 - d) Dewater site as required to remove any standing water prior to fill placement.
- 2) Levee Embankment Fill Material
- a) Fill material shall have at least 20% fines (material passing the No. 200 sieve), a maximum particle size of 2 inches, a maximum liquid limit of 45, a plasticity index of between 8 and 40, and no visible organics or deleterious substances. All fill materials shall be thoroughly mixed to avoid uneven concentrations of sand, clay, etc.
 - b) Before placing fill material, all vegetation shall be stripped from the site.

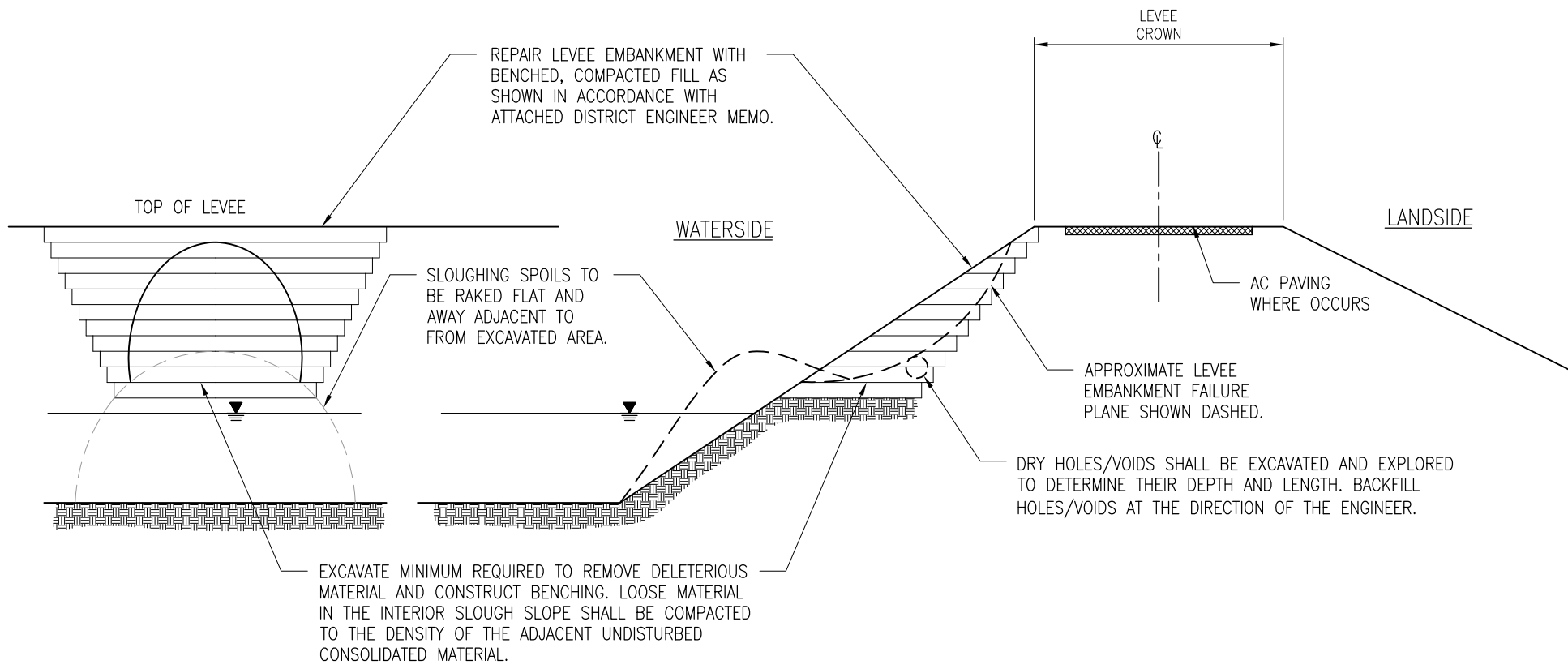
If you have any questions, please feel free to contact myself or Blake Johnson.

Sincerely,



Keith De Lapp, P.E.
HDR Engineering, Inc.
Reclamation District 799 Engineer





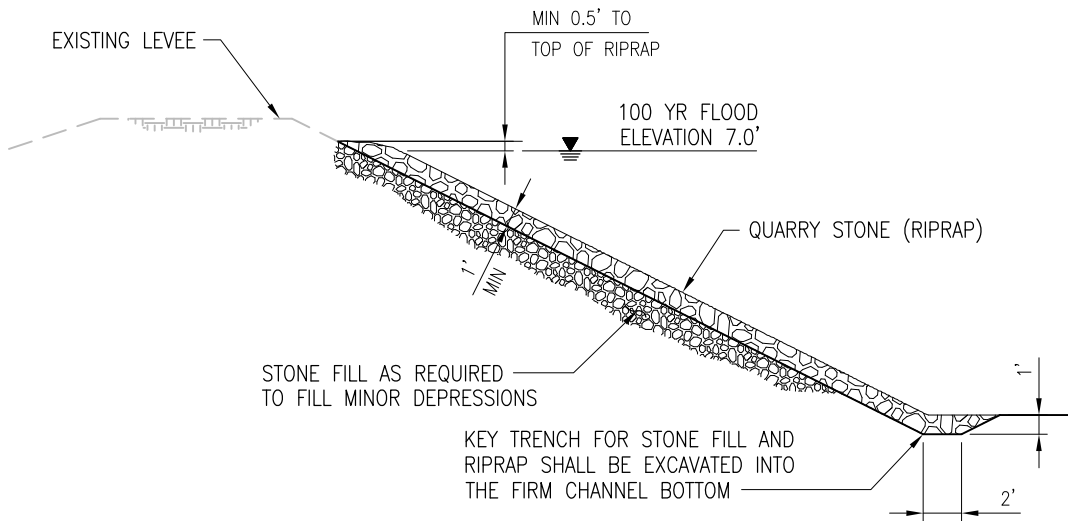
NOTES:

1. STRIP ALL VEGETATION AND ORGANIC MATERIAL AWAY FROM REPAIR AREA.
2. DO NOT REUSE SLOUGHING SPOILS AS LEVEE EMBANKMENT FILL MATERIAL.
3. PLACE ROCK SLOPE PROTECTION ON WATERSIDE LEVEE SLOPE IN ACCORDANCE WITH ATTACHED FIGURE.
4. HOLES/VOIDS THAT RUN PARALLEL WITH AND DAYLIGHT ON THE LEVEE SLOPE ARE LESS THAN 2- FEET BELOW GROUND SHALL BE EXCAVATED AND REPAIRED IN ACCORDANCE WITH THIS REPAIR PROCEDURE.

<p>REPAIR OF EMBANKMENT FAILURE FILL PLACEMENT</p> <p>RECLAMATION DISTRICT 799</p>	<p>DATE:</p> <p>OCTOBER 2010</p>
	<p>FIGURE:</p> <p>LR-1</p>

RECOMMENDED QUARRY STONE GRADUATIONS AND STONE FILL SIZES ARE AS FOLLOWS

QUARRY STONE (RIPRAP)		STONE FILL	
WT OF INDIVIDUAL PIECES (LBS)	% SMALLER BY WT (SSD)	SIEVE SIZE	PERCENT PASSING
200	100	15"	100
100	60-90	12"	90
50	35-65	6"	50
20	10-30	3"	30
5	0-10	1"	20
		#200	2-3



NOTES:

1. PRIOR TO PLACEMENT OF STONEFILL OR STONE PROTECTION (RIPRAP), LOOSE MATERIAL IN THE LEVEE BANK SLOPE SHALL BE COMPACTED TO THE DENSITY OF THE ADJACENT UNDISTURBED CONSOLIDATED MATERIAL.
2. STONE FILL SHALL CONSIST OF BANK RUN GRAVELS, DREDGE TRAILINGS, QUARRY WASTE (OTHER THAN OVERBURDEN AND STRIPPING) AND/OR BANK PROTECTION STONE.
3. QUARRY STONE SHALL BE ANGULAR IN SHAPE. NEITHER THE BREADTH OR THE THICKNESS OF ANY PIECE OF STONE SHALL BE LESS THAN ONE-THIRD ITS LENGTH.

TYPICAL ROCK SLOPE PROTECTION

DATE:

OCTOBER 2010

RECLAMATION DISTRICT 799

FIGURE:

RS-1