

Barclays Official California Code of Regulations Currentness

Title 23. Waters

Division 1. Central Valley Flood Protection Board

Chapter 1. Organization, Powers and Standards

Article 8. Standards (Refs & Annos)

23 CCR § 120

§ 120. Levees.

(a) Levees constructed, reconstructed, raised, enlarged, or modified within a floodway shall be designed and constructed in accordance with the U.S. Army Corps of Engineers manual, "Design and Construction of Levees" (EM 1110-2-1913 dated March 31, 1978, which is incorporated by reference) and as supplemented with the following standards:

(1) Levee construction or reconstruction shall be designed by a civil engineer.

(2) An engineering analysis that evaluates levee embankment and foundation stability shall be submitted to the board with the permit application. The analysis must verify that the levee is adequately designed and will be constructed to remain stable under loading conditions for "Case IV - Steady seepage from full flood stage" as defined in the Department of the Army manual, "Design and Construction of Levees" (EM 1110-2-1913), pp.6-6, 6- 7.

(3) A detailed settlement analysis, using procedures such as those described in the Department of the Army manual, "Settlement Analysis" (EM 1110-1-1904, dated September 30, 1990, which is incorporated by reference), must be submitted to the board.

(4) A copy of all geotechnical studies and tests used in the design determination of the levee shall be provided to the board when applying for a permit.

(5) The applicant shall provide the board with a permanent easement granting the Sacramento and San Joaquin Drainage District all flood control rights upon, over, and across the property to be occupied by the proposed flood control works. The easement must include the area within the proposed floodway, the levee section, and the area at least ten (10) feet in width adjacent to the landward levee toe if the area is not presently encumbered by a board easement. The board may require an easement over a larger area and over any property when it is foreseeable that the proposed activities subject to a permit would be injurious to or interfere with the adopted plan of flood control.

(6) All drains and abandoned conduits shall be removed from the proposed construction site prior to start of

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construction.

(7) Prior to construction or enlargement of the embankment, all holes, depressions, and ditches in the foundation area shall be backfilled and compacted to a density equal to that of the adjacent undisturbed material.

(8) Prior to construction or enlargement of the embankment, all surface vegetation shall be removed from the area to receive fill to a depth of six (6) inches. Organic soil and roots one and one-half (1-1/2) inches in diameter or larger, shall be removed from the area to receive fill to a depth of three (3) feet.

(9) An inspection trench shall be excavated to a minimum depth of six (6) feet beneath levees being constructed or reconstructed to a height of six (6) feet or greater. If necessary to ensure a satisfactory foundation, the depth of the inspection trench may be required to exceed six (6) feet.

(A) The minimum depth of an inspection trench excavated beneath levees to be constructed or reconstructed less than six (6) feet in height must be equal to the height of the design water surface above natural ground adjacent to the levee.

(B) The inspection trench must have a minimum bottom width of twelve (12) feet, and the side slopes must be one (1) foot horizontal to four (4) feet vertical, or flatter.

(C) The centerline of the inspection trench shall be located approximately under the outer edge of the shoulder of the waterside levee crown.

(10) When subsurface explorations disclose a pervious substratum underlying a levee to be constructed or reconstructed, a cutoff trench must be excavated to an impervious stratum, where practical.

(11) Cutoff trenches shall have a minimum bottom width of twelve (12) feet and the side slopes shall be one (1) foot horizontal to four (4) feet vertical, or flatter.

(12) Impervious material, with twenty (20) percent or more of its passing the No. 200 sieve, and having a plasticity index of eight (8) or more, and having a liquid limit of less than (50), must be used for construction of new levees and the reconstruction of existing levees. Special construction details (e.g., 4:1 slopes) may be substituted where these soil properties are not readily attainable. Where the design of a new levee structure utilizes zones of various materials or soil types, the requirements of this subdivision do not apply.

(13) Fill material must be placed in four (4) to six (6) inch layers and compacted with a sheepfoot roller, or equivalent, to a relative compaction of not less than ninety (90) percent per ASTM D1557-91, dated 1991, which is incorporated by

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reference and above optimum moisture content, or ninety-seven (97) percent per ASTM D698-91, dated 1991, which is incorporated by reference and at or above optimum moisture content.

(14) Fill material placed within two (2) feet of a structure must be compacted by appropriate hand operated compaction equipment.

(15) Levee fill material must be free of stones or lumps exceeding three (3) inches in greatest dimension, and must be free of vegetative matter or other unsatisfactory material.

(16) Fill material may only be placed within the area indicated on the submitted plans.

(17) Fill on levee slopes must be keyed into the existing levee section whenever there is substantial fill, as determined by the board.

(18) Each layer of fill material applied on a levee must be keyed into the levee section individually in four (4) to six (6) inch layers.

(19) Density tests by a certified soils laboratory will be required to verify compaction of levee fill and trench backfill.

(20) Ditches, power poles, standpipes, distribution boxes, and other above-ground structures located within ten (10) feet of the levee toe must be relocated a minimum distance of ten (10) feet beyond the levee toes.

(21) Pipelines located alongside and within ten (10) feet of the levee toe must be relocated a minimum distance of ten (10) feet beyond the levee toe.

(22) Construction work of any type may not be done on levees or within the floodway during the flood season (see Table 8.1) unless authorized by the Executive Officer.

(23) The areas adjacent to the levee must drain away from the levee toes for a minimum distance of ten (10) feet.

(24) The finished slope of any project levee construction or reconstruction must be three (3) feet horizontal to one (1) foot vertical, or flatter, on the waterside and two (2) feet horizontal to one (1) foot vertical, or flatter, on the landside of the levee.

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(25) The finished slope of any bypass levee must be four (4) feet horizontal to one (1) foot vertical, or flatter, on the waterside and three (3) feet horizontal to one (1) foot vertical, or flatter, on the landside of the levee.

(26) An existing levee section being reconstructed, realigned, or otherwise altered, and having encroachments that are located within the levee that are to be replaced or changed, must have detailed plans of the proposed encroachment changes approved by the board prior to start of construction.

(27) The board may require the modification, as necessary, of existing pipelines within a levee section that is being raised to accommodate a higher design water surface elevation in order to prevent seepage along the pipeline and to prevent backflow through the pipeline during the design event.

(28) A set of “as constructed” drawings of any levee project shall be submitted to the board, the department and the Corps of Engineers upon completion of the project.

(29) Stone revetment may be required on levee slopes where turbulence, flow, or wave action may cause erosion.

(30) Grasses or other approved ground covers may be required on levee slopes.

(31) The minimum crown width of a levee is normally twelve (12) feet on minor streams and twenty (20) feet on major streams. The levee crown width for a levee on a specific stream is defined by the project document and/or operations manual in current use and must be consistent with minimum width requirements of existing levees on the specific stream.

(32) A levee having a crown width of fifteen (15) feet or less must have vehicular turnouts at approximately two thousand-five hundred (2,500) foot intervals if there is no existing access ramp within that distance.

(33) As used in this section, the term “approved risk-based analysis” means an analysis which uses simulation modeling of river discharge versus probability of occurrence, river stage versus river discharge estimates, and river stage versus flood damage estimates and accounts for uncertainty in these functions to determine the performance of a proposed flood control feature.

(A) All levees constructed or reconstructed must have a minimum of three (3) feet of freeboard above the design flood plane, or a crown elevation no lower than designed using an approved risk-based analysis.

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(B) Unless designed using an approved risk-based analysis, the design freeboard of a levee to be constructed or reconstructed must be appropriately increased when any of the following conditions exist:

(i) High velocity streamflow.

(ii) Excessive wave action.

(iii) Excessive hydrologic, hydraulic, or geotechnical uncertainty in the levee design parameters.

(C) Unless designed using an approved risk-based analysis, levees within one hundred (100) feet of a bridge, or other structure which may constrict floodflows, must have one (1) foot of additional freeboard.

(b) Unreinforced pavement is not permitted on levee slopes.

(c) Pavement for roadways and similar uses is permitted within ten (10) feet of the levee toe.

(d) Pavement within ten (10) feet of the landside levee toe must have appropriate features that intercept seepage and prevent particle migration.

(e) Levee seepage control facilities (e.g., toe drains and toe ditches) must meet the following requirements:

(1) The seepage control facilities must be designed by a civil engineer.

(2) All studies and calculations relating to design and maintenance of the seepage control facility must be submitted to the board with the permit application.

(3) The appropriate rights-of-way for the seepage control facilities must be included in the levee easements.

(f) See Figure 8.01 for illustrated details, dimensions, and terminology for levees and floodways.



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1. New section and figure 8.01 filed 9-30-96; operative 10-30-96 (Register 96, No. 40).
2. Amendment of subsections (a)(5) and (a)(22) filed 12-1-2009; operative 12-31-2009 (Register 2009, No. 49).

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