DEPARTMENT OF THE ARMY
U.S Army Corps of Engineers, Fort Worth District
P.O. Box 17300
Fort Worth, Texas 76102-0300

SWFP 1150-2-1

Pamphlet
No. 1150-2-1

31 October 2003

Local Cooperation
CRITERIA FOR CONSTRUCTION WITHIN THE LIMITS
OF EXISTING FEDERAL FLOOD PROTECTION PROJECTS

1. Pamphlet Purpose. This pamphlet provides guidance to individuals, developers, architect-engineering firms, local project sponsors, and local governmental agencies for the construction of new facilities or the modification of existing facilities within the limits of an existing Federal flood protection project constructed by the U.S. Army Corps of Engineers, Fort Worth District (CESWF) and for which local project sponsors and/or local governmental agencies have the responsibilities for operation and maintenance. The CESWF, in accordance with Title 33 CFR, Section 208.10, retains the right of review and approval on all proposed improvements and/or modifications that are passed over, under, or through the walls, levees, improved channels, or floodways of such projects. The guidance contained in this pamphlet applies to the activities described herein in most cases; however CESWF reserves the right to reconsider this guidance at any time due to unknown or unforeseen circumstances, technological advances, additional information, etc.

2. Applicability. This pamphlet applies to all Federal flood protection projects constructed by CESWF, and for which a letter of assurance agreeing to the operation and maintenance of the flood protection project has been furnished CESWF by the project's local sponsor.

3. Project Purpose. A Federal flood control project is designed to safely carry floodwater within the project and through a developed area. As such, any proposed developments within the project must keep the safe passage of floodwater as the first priority. The roles of the CESWF and the project local sponsor are to maintain the integrity of the project while preventing negative impacts to the passage of the project design flood. The CESWF will not allow the safety of the project to be compromised or the required design carrying capacity of the project reduced.

4. General Criteria for Construction Within a Floodway.

a. As early as possible during the planning process, discuss preliminary proposals with the CESWF and the local sponsor to avoid major revisions or project delay. The local sponsor may make any requirements of this Pamphlet more stringent than those contained herein. Concept proposals may be submitted for review. Submit the proposed construction starting date and the detailed project construction schedule, including sequence of construction prior to initiation of work.

b. Construction may not start until final written contract drawings and plans have been reviewed and approved in writing by both the CESWF and the local sponsor.

c. Furnish five (5) sets of plans and specifications for the proposed work to the CESWF, Operations Division, ATTN: CESWF-OD-M, via the local sponsor sufficiently in advance of proposed construction to allow adequate time for review and approval. A vicinity map shall be included in the plans showing the right-of-way boundaries of the flood protection project with specific levee toe and channel slope limits in the portion of the project being crossed, if applicable.

This pamphlet supersedes SWFP 1150-2-1 dated 15 October 1985.

d. If boring, jacking, or tunneling operations are planned; detailed designs, calculations, and construction procedures must be provided for review. See subsequent paragraphs for additional details and required procedures.

e. Practice approved construction methods and best management practices to minimize erosion at the construction site. All work shall be performed in such a manner as to be as environmentally friendly as possible. This includes making every effort to reduce the turbidity of the water at the site, such as by limiting the amount of time construction equipment is in the water. A storm water pollution prevention plan (SWPPP) must be included in the final project submittal.

f. When construction work is in progress in a project located downstream of a Federal dam, a request from the contractor for changes in regulated releases will be considered on individual cases only. Normally, regulated releases from upstream lakes for evacuation of floodwaters, water supply, recreation, or other purposes considered to be in the best interest of the public will have first consideration. A flood event could occur at any time during construction activities and could affect these activities.

g. Construction equipment, spoil material, supplies, forms, buildings for inspectors, labs, or equipment and supply storage buildings, etc., shall not be placed or stored in the floodway during construction activities. Any item that may be transported by flood flows shall not be stored within the project. Locations of construction trailers and stockpile areas shall be included on project plans and approved by the CESWF and the local sponsor.

h. In addition to other requirements set forth in this Pamphlet, permits may be required under Section 10 and Section 404 for the desired work. These permits require a minimum of 90 days to process. It is recommended that contact with the CESWF Regulatory Branch be initiated in the early planning stages to prevent delays.

i. Repair or replace any maintenance and operation roads disturbed during construction to a condition equal to or better than their condition before construction. All roads must be inspected by the local sponsor prior to completion of the project.

j. Compact all fill and backfill in 6-inch lifts as specified in job specifications approved by the CESWF. Compaction shall be to at least 95 percent of modified density as specified in ASTM D-1557. All backfill shall consist of impervious materials. Reestablish vegetation to its original condition or better. Remove all excess material from the limits of the floodway.

k. Provide scour protection consisting of articulating revetment system protection capable of being re-vegetated at the outfall of stilling basins designed according to the issuing jet velocity. If approved by the local sponsor, riprap, gabions, or concrete paving may be substituted for the revetments.

l. The crown or crest of the levee referred to in this pamphlet is the original or design levee crest elevation. This may or may not be the same as the current levee crest elevation. All modifications shall be based on the higher of the two elevations.

m. Upon request, the CESWF Hydrology and Hydraulics Section may provide applicable hydraulic models to be used for design.

n. Any permanent disturbance of existing recreation facilities must be mitigated.

o. Sump areas adjacent to federal projects are considered an integral part of the federal project and any modifications to them will be reviewed and approved in accordance with this Pamphlet.

5. Crossing Over Existing Levees At Grade.

a. The local sponsor may decide to not allow any proposed crossing over existing levees at grade.

b. No excavation or notching will be performed into or on the levee, or within the levee template.

c. Strip topsoil from the levee and place the line up and over the levee template slopes at grade. This will require rather abrupt line grade changes at the levee crest. Cover the new line by placing new fill uniformly on the slopes and top of the levee to slope away from the line and parallel to the longitudinal axis of the levee. Provide a minimum of 2 feet of cover over the new line. The slope of the fill shall be 1 vertical on 20 horizontal or flatter. Replace the topsoil, reestablish grass on all disturbed areas, and restore any roadways.

d. All valves located within 15 feet of either side of the projected toe of the levee shall be provided in a concrete box enclosure with a manhole type cover. Valve boxes located within the floodway shall be underground and flush with the surface. If the valve box is placed in the levee crest, the bottom of the excavation shall be not lower than one foot above the design water surface elevation. Fill shall be uniformly placed to slope away from the top of the valve box. If possible all valves shall be placed on the landside of levees a minimum of 15 feet from the projected levee toe.

e. Provide water-tight sealed manhole covers for all manholes within the floodway having tops below design water surface elevation. Fasten manhole covers to the manhole structures.

6. Crossing Under Levees with Open Excavation.

a. Provide a temporary ring levee (cofferdam) on the riverside of the existing levee at the location of the subject crossing to the same top elevation as the existing levee. This ring levee shall have a minimum crest width of 10 feet and sides slopes of 1 vertical on 3 horizontal or flatter. Construct the levee of impervious materials according to the provisions specified in Paragraph 4j.

b. When the temporary ring levee is complete, excavate through the existing levee using one vertical on three horizontal cut slopes. The toe of the levee and ring levee shall be a minimum of 20 feet (measured horizontally) from the top edge of the excavation.

c. Generally, sources for borrow materials shall not be located within the limits of the floodway right-of-ways. In addition, depending on the type of soil and whether or not pervious materials or unstable materials exist in the foundation of the existing levee, it may be desirable to limit the depth of excavation or specify a minimum distance from the land-side toe of the levee. All excavated slopes shall be properly designed and the drawings sealed by a registered professional engineer.

d. After the line has been placed, the open excavation will be compacted in accordance with Paragraph 4j. When backfill operations are completed, the entire foundation area to be occupied by the replaced levee fill shall be scarified, plowed, and/or harrowed to a depth of 6 inches, and then compacted by at least 16 complete passes of the tamping roller or 95 percent modified density, whichever is more rigorous.

e. Accomplish levee replacement by placing fill in 6-inch lifts and compacting by not less than eight complete passes of a tamping roller or at least 95 percent modified density. After compaction, the moisture content shall be within the limits of 3 percentage points above optimum to 2 percentage points below optimum moisture content.

f. Determine the in-place moisture content and density of the levee fill on a frequency of about one sample for each 2500 cubic yards of backfill placed in the levee.

g. When the breached levee has been reconstructed to its original grade, remove the temporary ring levee and dress and turf the surface areas of the plugged section.

h. Provide water-tight sealed manhole covers for all manholes within the flood protection project having tops below design water surface elevation. Fasten manhole covers to the manhole structures.

i. For pipelines, install a positive cut-off structure to prevent water from the riverside flowing through the pipeline to the landside. If located on the riverside of a levee, extend the cut-off structure to the levee crown elevation by bridge. This structure must be accessible no matter what flood condition may exist. The closure device must be operational by manpower, if necessary.

j. Provide gravity storm drains discharging into the floodway with automatic flap gate(s) at the discharge end of the line and energy dissipaters, as required. The owner or local sponsor, as per written agreement, shall be responsible for inspection and maintenance to ensure proper operation of the flap gates.

k. Use monolithic conduits or conduits with water-tight joints under the levee and levee template.

7. Crossing Under Levees with Boring or Jacking of Sleeves. The sequence of work shall be as follows:

a. Excavate the boring and jacking pit (must be on the land side outside the projected toe of the levee template slope).

b. Bore and jack the sleeve to a point beyond the projected riverside toe of the levee template slope.

c. If the difference in the diameters of the bore and sleeve exceeds 3 inches, the annular space shall be pressure grouted with bentonite slurry.

d. Place the product line in the sleeve.

e. Pressure grout the product line in sleeve with bentonite slurry.

f. Excavate the pit on the riverside and construct a manhole with gate valve placed on inside face of manhole away from channel. Tie line from sleeve under levee into manhole with gate valve.

g. Tie line from sleeve under levee into a manhole on landside.

h. During work on items a through h, a plug will be required to be placed and braced at the open end of the sleeve and pipe located in the jacking pit at the close of work each day. This plug must remain in place until the gate valve is installed and connections made to ensure protection from flooding from the river.

8. Horizontal Directional Drilling Under Levees and Channels.

a. Detailed contractual drawings, plans, procedures, and engineering calculations shall be provided to CESWF for review. These must include all the requirements of Paragraph 4 above and the following additional items:

(1) Inside diameter of the final bore hole and outside diameter of the product casing.

(2) Detailed description of construction and horizontal boring methods to be utilized.

(3) If the difference in the diameters of the final bore and product casing exceeds 3 inches, provide the method of pressure grouting the annular space between the outside of the product casing and the inside of the bore to prevent seepage under the levee template during maximum river stages.

(4) A profile of the proposed line showing alignment (including location of the river and levees).

(5) Location of entry and exit points, location, elevations and proposed clearances for all utility crossings and structures

(6) Right-of-way lines, property, and other utility right-of-way or easement lines

(7) Depth under the base of the levee, depth of the line under the river channel, and location of both ends of the string. If the proposed depth of the string directly below the base of the levee is less than 30 feet, then detailed engineering calculations sealed by a registered professional engineer shall be provided for review. These calculations must show a minimum 1.5 factor of safety against hydro-fracturing to be acceptable.

b. Develop and provide a quality control plan for the project that includes the maximum allowable drilling pressure, gage calibration method, and responsibility for assuring that the pressure is not exceeded.

c. The minimum clearance distance from the top of the pipe encasement to the original design river bottom elevation shall be 7 feet. Should the existing channel bottom elevation be lower than original design grade, the new line shall be the discussed depth below the existing bottom elevation.

d. Develop and provide a quality control plan for the project that includes the maximum allowable drilling pressure, gage calibration method, and specific responsibility for assuring that the pressure is not exceeded. During the drilling process, the pressure in the borehole must be monitored to ensure that the operational drilling pressures remain within the safe limits to prevent soil fracturing. The name of the party responsible for monitoring the work must be specified.

9. Bridges Crossing Levees.

a. The bottom of low steel of the bridge shall be above the design crest elevation of the levee. No notching into the levee will be allowed.

b. All bents should be located to minimize the number of bents located within the template of the levee. Driving of piles within the template of the levee will not be allowed. Bents at these locations should only be designed as drilled piers.

c. Bridges will not be located where their construction will block maintenance access roads presently located within the floodway.

d. All storm water runoff from bridge decks must be piped to grade to prevent erosion within the floodway.

e. Re-vegetated mat type slope protection must be provided from the top of the levee to the floodway bottom under the shadowline of the bridge.

f. The bridge must be designed to minimize the number of pier bents. If the new bridge is within 500 feet of an existing bridge the new pier bents must be in alignment with the adjacent bridge.

10. Buried Lines Parallel to Levees and Channels.

a. Buried lines parallel with a levee (either on the river side or land side) will not be allowed where the buried lines final location will be within the extended template of the levee. For example, a line buried 5 feet deep must be at least 15 feet away from the toe of a levee with a 1 vertical on 3 horizontal slope.

b. Sumps, ditches, swales, or other project features crossed by the buried line shall be restored to their pre construction condition.

c. Buried lines parallel with the channel bank must be at least 25 feet from the projected river channel slope template.

d. When a buried line crosses a discharge channel, place the line on piers with the piers aligned so as to provide minimal obstruction to flow in the discharge channel and designed so as to catch minimal debris. The preferred alternative would be to place the line under the discharge channel and encase it with concrete. Extend the encasement a minimum of 5 feet beyond the top of the channel side slopes.

11. River and Channel Crossing Criteria.

a. Crossings Under Rivers and Channels by Open Excavation:

(1) Bury the line a minimum of 7 feet below the original design river bottom elevation. Should the existing channel bottom elevation be lower than original design grade, the new line shall be the discussed depth below the existing bottom elevation.

(2) Sufficiently anchor or encase the line to prevent floatation.

(3) Backfill the excavation with material similar to that excavated. If soil is excavated, backfill with compacted impervious fill material and if rock is excavated, backfill with concrete.

(4) No cofferdam fill type crossings shall be allowed in water greater than six (6) feet in depth, and will then only be allowed if geotechnical and structural designs prove that sheet piling would not be a viable method.

b. Crossings Over Rivers and Channels.

(1) Provide a minimum freeboard between the low point of the crossing and the design water surface elevation of three feet or to the top of any levee, whichever is higher.

(2) The obstruction caused by the supporting bridge and its piers shall not significantly reduce the carrying capacity of the floodway. No longitudinal cross bracing will be used.

(3) Submit final plans and hydraulic computations to indicate that the proposed project would not reduce the floodway capacity.

(4) Projects crossing navigable waterways (Trinity River downstream from Riverside Drive in Fort Worth, Texas) shall require a United States Coast Guard permit. Clearances and requirements shall be as directed by the Coast Guard.

12. Roadway or Railroad Crossings.

a. The low steel of a bridge shall have an elevation not lower than the crown of the levee or top of bank or 3 feet above the design water surface, whichever is higher. Contact CESWF for the current design water surface at the location of the proposed roadway crossing. Additional clearances shall be required for fixed spans over navigable waterways.

b. Submit final plans and hydraulic computations to indicate the proposed roadway or bridge would not reduce flows or project capacity. Projects will not be approved that reduce the carrying capacity of the project.

c. Any roadway over a navigable waterway will require a permit from the United States Coast Guard.

d. See Paragraph 9 for special requirements for crossing levees.

e. Hold temporary roadway fill to a minimum to prevent increasing the water surface elevation should a flood occur during the construction period. Construct all temporary ramps from levees going in a downstream direction. This will prevent flows from being directed into the face of the levees.

13. Headwall, Chutes, Gate Valves, Flap (Automatic) Gates, etc.

a. Install headwall, gate valve structures, flap (automatic) gates, and other types of outfall structures in such a manner to prevent obstruction of flow or creation of scouring conditions within the project. All headwalls must transition with the slope and flow discharge points must be at an elevation equal to the bottom of the slope or at the normal water surface. Chutes will not be allowed unless they are the only viable alternative.

b. All structures shall be installed in such a manner so as to not create maintenance problems.

14. Pump Discharge Pipelines Over Levees.

a. The invert of the discharge shall be at the toe of the protective works (levee) and shall be free-vented at the highest point. For very large lines deviation from this criteria may be considered, but under no condition shall excavation be permitted into the levee. See Paragraph 5 for requirements for crossing over a levee on grade.

b. Flap (automatic) gates are not required at the outfall of the discharge lines.

15. Electrical and Telephone Criteria for Overhead Wire Crossings.

a. The local sponsor may require directional boring under the levee as opposed to an overhead crossing.

b. No structure (poles or otherwise) shall be located closer than 15 feet from the toe of any levee.

c. No structure (poles or otherwise) shall be located closer than 15 feet from the top of any channel slope.

d. Provide a minimum vertical clearance of 28 feet between the crown of the levee and the low wire at the low point of the wire at the levee crossing computed under the most adverse conditions (temperature, wind, load, etc.).

e. Provide a minimum vertical clearance of 28 feet between the natural ground and the low wire at the low point of the sag in the area of the project channel, or three feet above the project design water surface level, whichever is higher. (Check Electrical Code for minimum clearance of high voltage lines.)

f. Locate guy wires and anchors in such a manner that they do not interfere with the operation and/or maintenance of the channel, levees, or related structures. No anchors may be placed on the levee.

16. Low Dams or Diversion of Flows.

a. Submit plans, hydraulic and structural computations, and specifications for low dams or other obstructions for review and comments prior to the construction of any type dam structure in a project area. These plans will be reviewed to determine if adverse hydraulic or structural effects would occur within the project as a result of the proposed construction. Prior to an extensive engineering study for any type of water barrier in a project, the CESWF and the local sponsor will review the concept plan, proposed location, and purpose.

b. Diversion of flows into or out of a project area shall be reviewed as to possible adverse hydraulic or structural effects.

17. Process for Abandoning Existing Pipelines.

a. Requests to abandon existing buried pipelines within a project shall be submitted in writing to CESWF and the local sponsor. No buried line within a floodway may be abandoned without the review and approval of CESWF and the local sponsor.

b. As a minimum, the portion of the abandoned pipeline under a levee shall be completely filled with concrete or grout to prevent seepage through the abandoned line during flood conditions.

c. Abandoned buried pipelines that are located on floodway property, but are not located under a levee shall be plugged at each end with concrete or grout.

d. Any structures associated with abandoned buried pipelines, for example, manholes, shall be removed and the resulting hole filled and compacted in accordance with the provisions in paragraph 4j.

e. Above-ground abandoned pipelines shall be removed from floodway right-of-way, including any associated structures.

18. Construction of Recreation Facilities. Submit plans to the CESWF for review and approval on any proposed recreation type facilities to be constructed in an existing or approved Federal project area. Each plan shall include hydraulic computations and will be reviewed for individual and cumulative effects to determine if the proposed construction would produce adverse effects on an existing or approved project area. If adverse effects on the carrying capacity of the project are determined, the project will be disapproved. The local sponsor may construct minor recreation improvements as needed so long as final as-built plans are provided to CESWF.

19. Planting of Trees Within a Floodway.

a. The purpose of a Federal flood protection project is to carry floodwater through an urban area. Anything in the floodway that restricts flow or can catch floating debris will reduce the carrying capacity below its design limits and will not be allowed. The local sponsor is directed to remove all trees on the

levees or adjacent to the channel and also as many other trees and obstructions within the floodway as reasonably possible.

b. Planting of trees on the levees will not be allowed nor approved.

c. Planting of additional trees within existing flood protection projects or adjacent to channels is not encouraged and will be evaluated only on a case-by-case basis. Only trees with deep-type root systems and high canopies may be planted in selected areas of existing flood protection projects. The plantings shall be a minimum of 50 feet away from the toe of the levee or the top of the channel bank. Trees may be placed no closer than at an average spacing of 100 feet, center-to-center. Prune trees to permit mowing immediately adjacent with tractor type mowers. No bush or vine type plants will be permitted. Minimum application of ground cover plants for slope protection will be allowed, subject to approval by the local sponsor.

d. Submit a coordinated planting plan with hydraulic computations for review and approval. This plan must also show all existing trees within 1000 feet of the proposed new trees.

CESWF-EC-DG

CAROL J. SHEAD
Publications Control Officer

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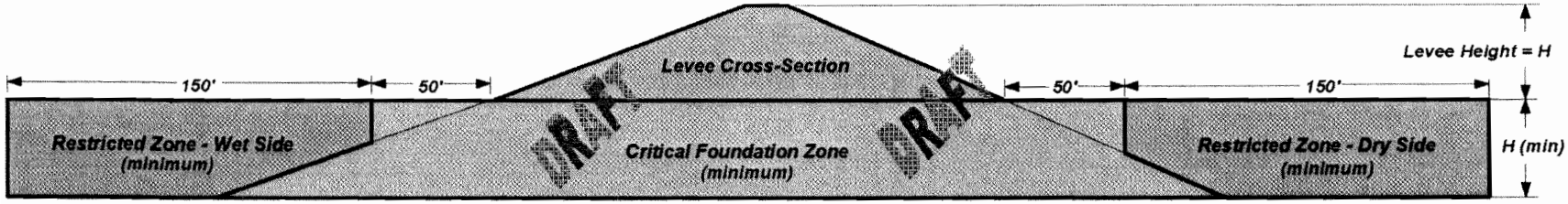
Levee Cross-Section
Levee Height = H
150'
50'
50'
150'
Restricted Zone - Wet Side
(minimum)
RIP
Critical Foundation Zone
(minimum)
RIP
Restricted Zone - Dry Side
(minimum)
H (min)