



VELASCO DRAINAGE DISTRICT
Standard Specification:

Emergency Levee Repair

Revision Control

Revision Number	Date	Revision Author
1.0 – Approved for use	11/28/2011	HSS – District Engineer
2.0	03/22/2016	HSS – District Engineer
3.0	11/07/2017	DBR – Douglas B. Roesler

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1.0 Scope and Discussion

- 1.1 This specification shall govern work associated with emergency levee repair on the Freeport, and Vicinity, Hurricane Flood Protection System (the “federal levee”), maintained by the Velasco Drainage District.
- 1.2 This specification applies to routine levee repairs that do not involve raising the levee (other than a nominal amount for settlement) that does not require approval by the United States Army Corps of Engineers (USACE) as a Section 408 Review.
- 1.3 For projects requiring raising the levee, or other actions which trigger an USACE Section 408 Review as noted above, contact the Velasco Drainage District before detail planning for the work has begun, as permitting and design criteria will require substantial time when compared to a project without USACE Section 408 Review.

2.0 Site Preparation

- 2.1 Remove roots, organic material, asphalt, concrete and other miscellaneous debris from the site.
- 2.2 Contractor shall provide for site drainage and dewatering necessary to complete work in compliance with the specifications.
- 2.3 If over excavation is required (excavation below natural ground) or washouts below natural ground must be filled, fill with select material, free of organics, in 8" (nominal) lifts and compact to required density.
- 2.4 Proof roll subgrade or natural ground if on grade. Remove and replace soft or loose areas. Soils which rut or deflect under moving load shall be undercut and replaced with select fill. Perform proof rolling in dry weather.

3.0 Levee Material

- 3.1 Structural fill for use in levee shall be tested by an acceptable geotechnical laboratory and shall be found to have the following properties.
 - 3.1.1 Clay (classified as CL or CH), free of organic or other deleterious materials; maximum clay lump size less than three inches. Perform material analysis per ASTM D4318 to determine soil classification.
 - 3.1.2 Liquid Limit ≤ 65 , PI ≥ 15 . Perform Atterburg Limit Test per ASTM D4318.
 - 3.1.3 Modify high Liquid Limit soils with lime. Optimum percentage of lime to be

determined by geotechnical laboratory per TxDOT Designation: TEX-112-E.

3.2 Do not use sand or sandy clay soils as levee fill.

4.0 Construction Methods

4.1 Levee fill shall be compacted to at least 95% of Standard Procter maximum dry density as determined by ASTM D 698.

4.2 Place levee fill in maximum lifts of 8" of loose material and compact within the range of -1% to +5% above optimum moisture content value. If water must be added, uniformly apply and thoroughly mix into the soil by disking or scarifying.

4.3 Test each structural lift by a representative of the geotechnical engineer prior to constructing the subsequent lift.

4.4 To prevent a plane of failure between the existing levee and new levee fill, key or bench the repair section into the existing completed levee. "Step" excavation slope at minimum 1H:1V or greater to comply with OSHA safety criteria based on soil classification. See Exhibit 8.

5.0 Sections

5.1 Maintain a maximum side slope, Protected Side of 3H:1V. (3.5H:1V is preferred)

5.2 Maintain maximum side slope, Flood Side of 6H:1V (for levees exposed seaward) or 3H:1V (3.5H:1V is preferred) for levees not subject to wave action.

5.3 Maintain the existing levee top width, reconstructed with similar materials if not earth.

6.0 Construction Documentation

6.1 Prior to Construction

6.1.1 Provide Plan and Cross Section Drawings which adequately identify the areas of repairs on the ground and show limits of work. Note limits of repair, rip rap and other elements of the project. All designs shall have horizontal location based on NAD 88 and NAVD 88.

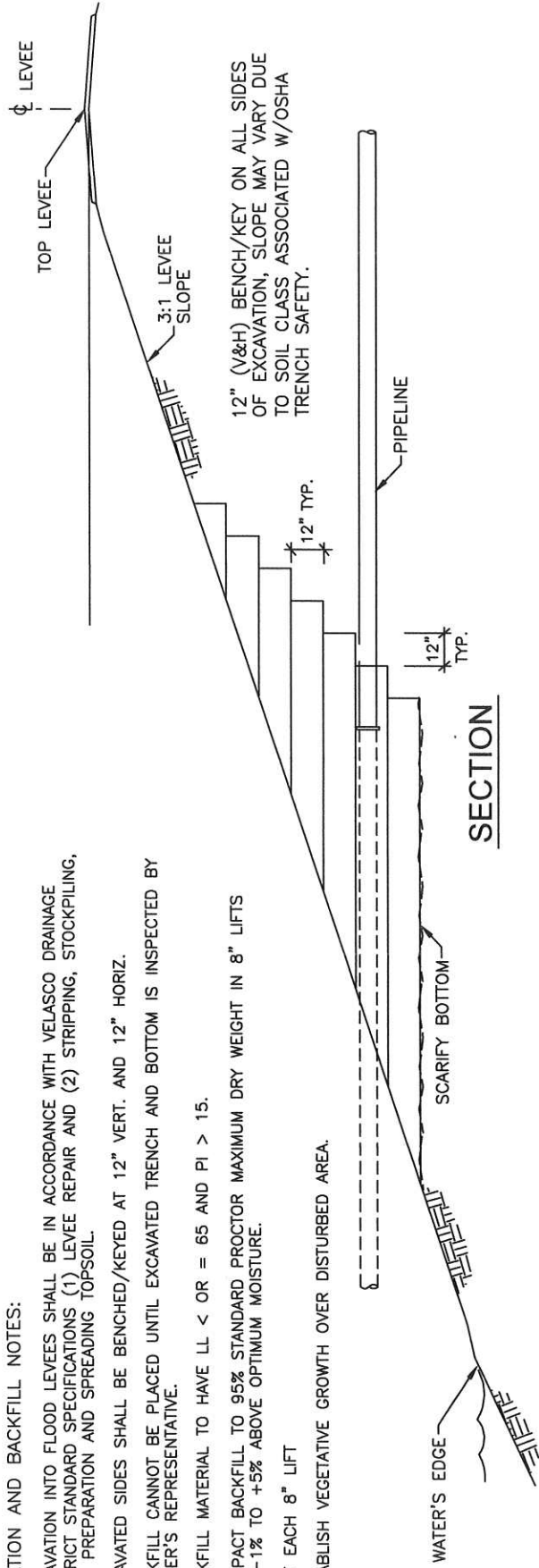
6.1.2 Provide analysis and soil classification (Atterberg Limits) of proposed levee fill from geotechnical laboratory.

- 6.1.3 All data and designs must bear seal of a Licensed Professional Engineer - Texas. (LPE-T)
- 6.2 During Construction:
 - 6.2.1 Provide adequate supervision to accurately document that locations, elevations, etc. are incorporated in required testing and as built documentation and assure that all provisions are complied with during construction
 - 6.2.2 Assure that the selected geotechnical laboratory provides compaction and moisture testing as required by this Specification.
- 6.3 After Construction
 - 6.3.1 Provide as built drawings, note any deviation from planned drawings as needed.
 - 6.3.2 Provide all geotechnical test reports.
 - 6.3.3 Assure that all submittals under Section 6.3 bear the seal of a Licensed Professional Engineer – Texas (LPE-T).

END OF SPECIFICATION

EXCAVATION AND BACKFILL NOTES:

1. EXCAVATION INTO FLOOD LEEVES SHALL BE IN ACCORDANCE WITH VELASCO DRAINAGE DISTRICT STANDARD SPECIFICATIONS (1) LEVEE REPAIR AND (2) STRIPPING, STOCKPILING, SITE PREPARATION AND SPREADING TOPSOIL.
2. EXCAVATED SIDES SHALL BE BENCHED/KEYED AT 12" VERT. AND 12" HORIZ.
3. BACKFILL CANNOT BE PLACED UNTIL EXCAVATED TRENCH AND BOTTOM IS INSPECTED BY OWNER'S REPRESENTATIVE.
4. BACKFILL MATERIAL TO HAVE LL < OR = 65 AND PI > 15.
5. COMPACT BACKFILL TO 95% STANDARD PROCTOR MAXIMUM DRY WEIGHT IN 8" LIFTS AT -1% TO +5% ABOVE OPTIMUM MOISTURE.
6. TEST EACH 8" LIFT
7. ESTABLISH VEGETATIVE GROWTH OVER DISTURBED AREA.



12" (V&H) BENCH/KEY ON ALL SIDES OF EXCAVATION, SLOPE MAY VARY DUE TO SOIL CLASS ASSOCIATED W/OSHA TRENCH SAFETY.

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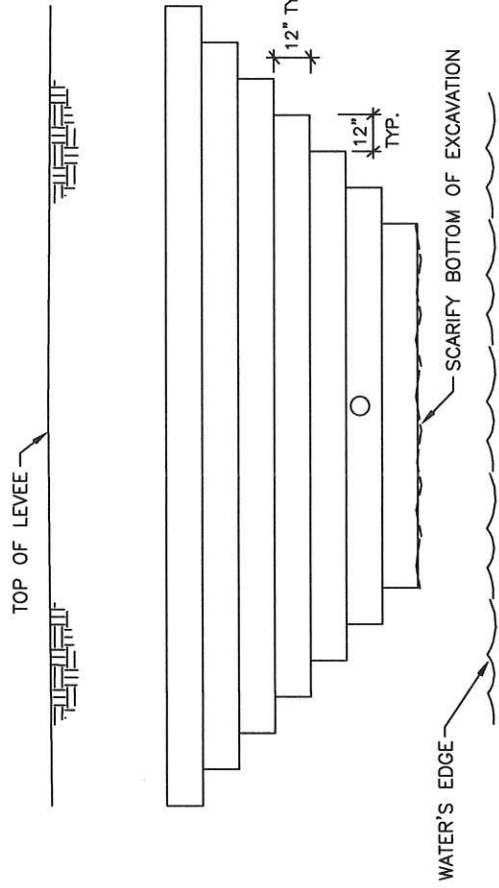
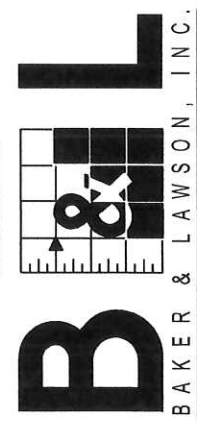


EXHIBIT - 8 (LOOKING INTO LEVEE)

EXCAVATION AND BACKFILL

N.T.S.



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