PEN 1 USACE Railroad Embankment Project Overview

Completed Repairs

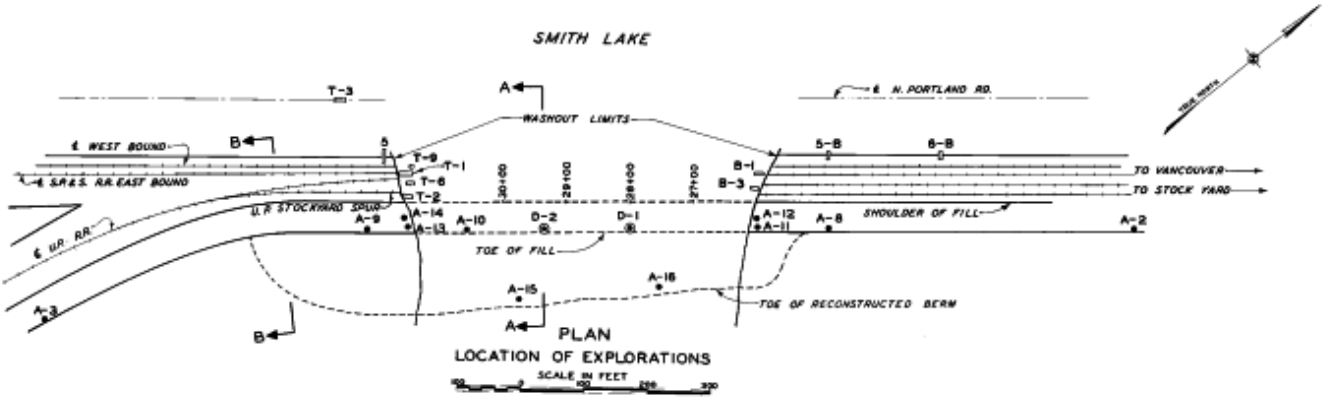
1949 Repair of breached section

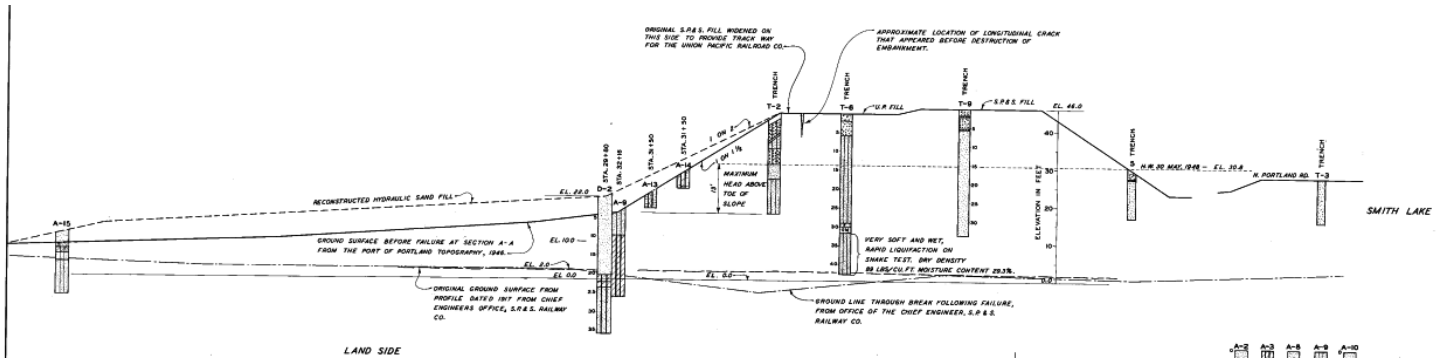
After the 1948 flood breached a section of the railroad embankment USACE repaired the section. This is the only location where work appears to extend to the top of the railroad embankment and may have been within their right of way.

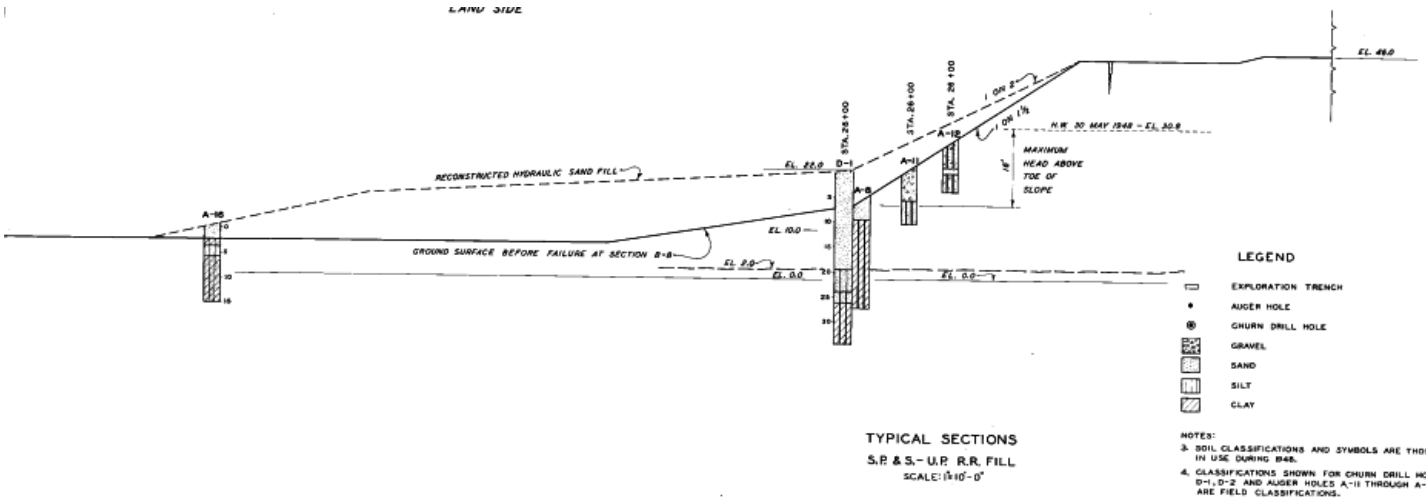
From PEN 1's 1957 Design Memorandum (p 10):

5. Emergency work done following the 1948 flood consisted entirely of repairs and restoration of the previously existing protective system. About 550 linear feet of sand filter and 12-inch drain tile were placed on the District side of the railroad embankment between Stations 86+25 and 91+25, the site of the break which permitted the District to be flooded. Filter and drain were covered with an earth blanket having a top slope of 1 on 20. This blanket consists of sandy silt material and covers the entire area of the former blowout from the restored railroad embankment to the landward ground surface. The work was done by the Corps of Engineers at a cost of $26,970.

Corps drawing CLW 106-11



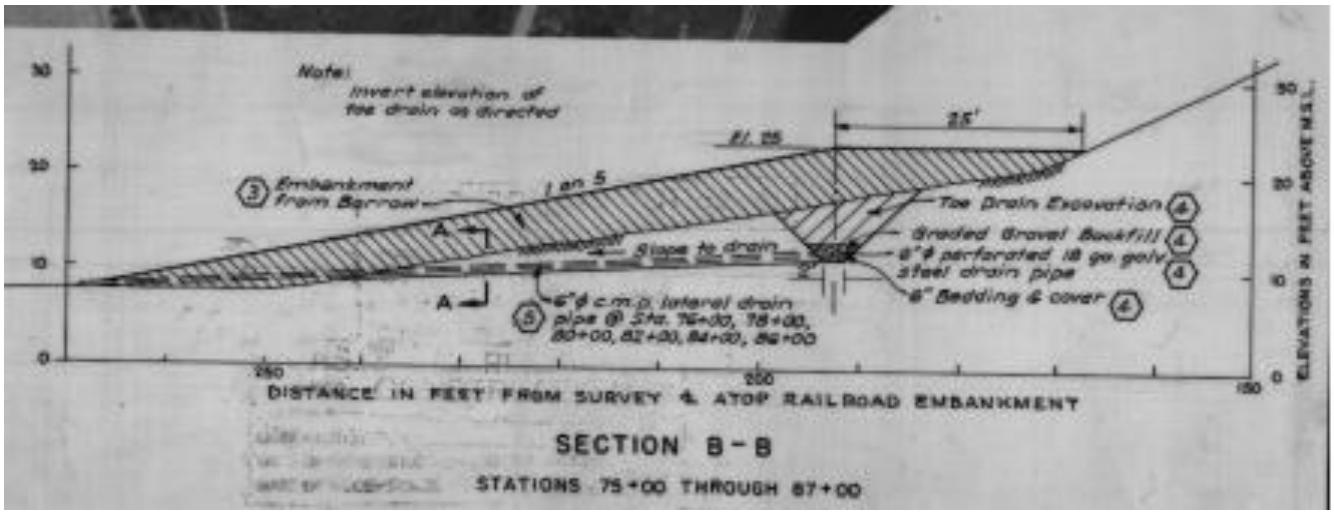




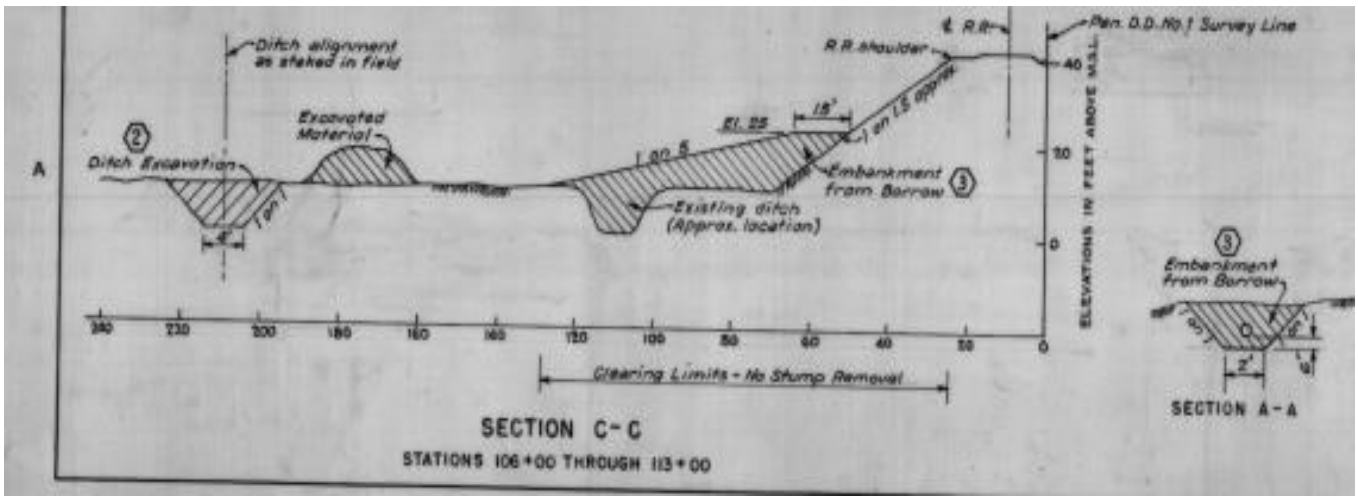
1972 Operation Foresight - CLW 106-16

In 1972, emergency action work was completed in response to expected high water. Toe drains were installed and sand reinforcement was added to reduce seepage along two sections of the levee. A 25 foot wide benched area was created at elevation 25 NGVD (28.5 NAVD88). The added material does not extend to the top of the railroad embankment or to the expected height of the design flood. The plan shows that the work was done from stations 75 to 87+00 and 91 to 113+00, despite the cross sections only listing 106 to 113+00, and a review of existing cross sections seems to confirm this.

Station
75+00 to 87+00



Station
91+00 to 113+00



1997

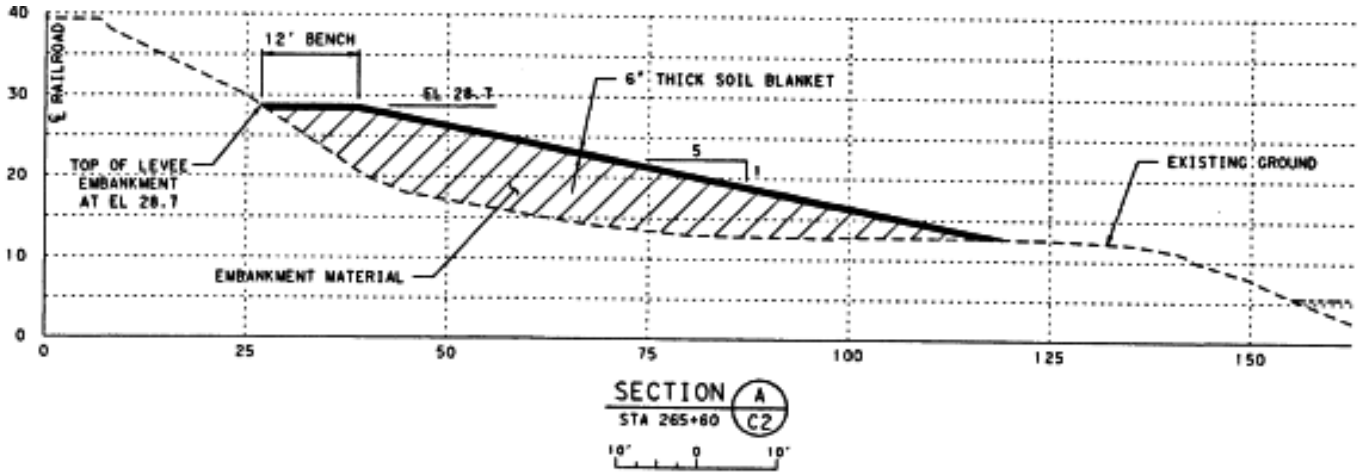
"Peninsula Drainage District No. 1 Detailed Project Report" and set CLW 106-17

In 1997, additional work was done along the railroad embankment to identified address issues from the 1996 high water event. The City of Portland worked with the USACE to evaluate the 50, 100, and 500 year flood risk and costs associated with upgrades to each event. The analysis showed a problem with the southwest corner of the District in withstanding anything above a 10 year event. They chose a 100 year protection level as the fix for the southwest section. The report found that the project done in 1972 to the north was adequate and no additional work was done.

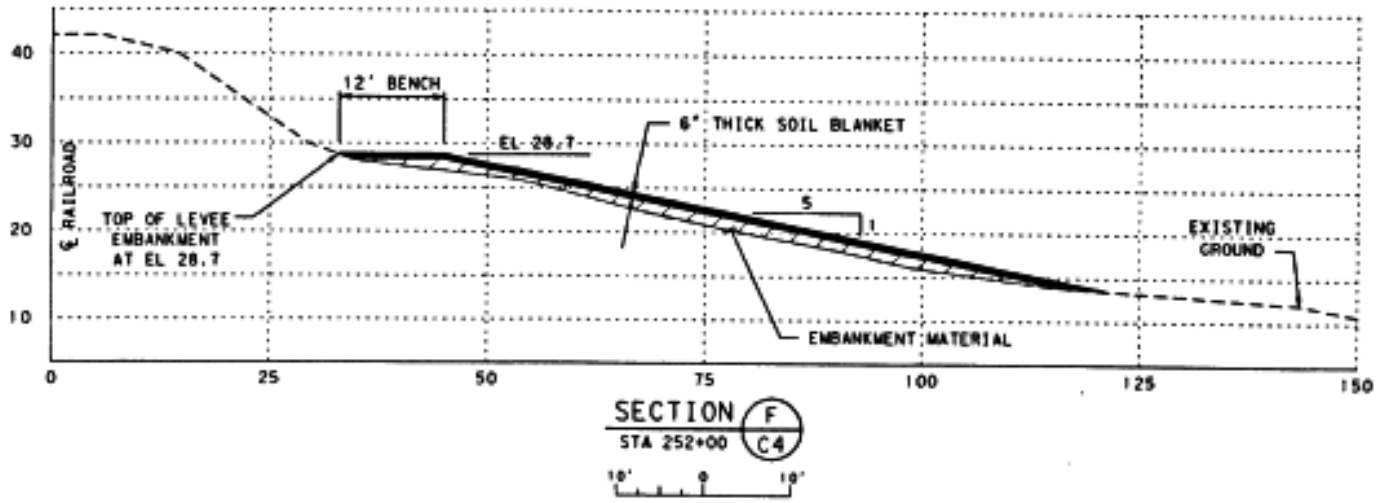
The railroad embankment was reinforced with sand for over 2,000 lineal feet (lf) to reduce seepage during future high water events. The reinforcement started at elevation 30.8 NAVD88. A section of the project overlapped the work done in 1972.

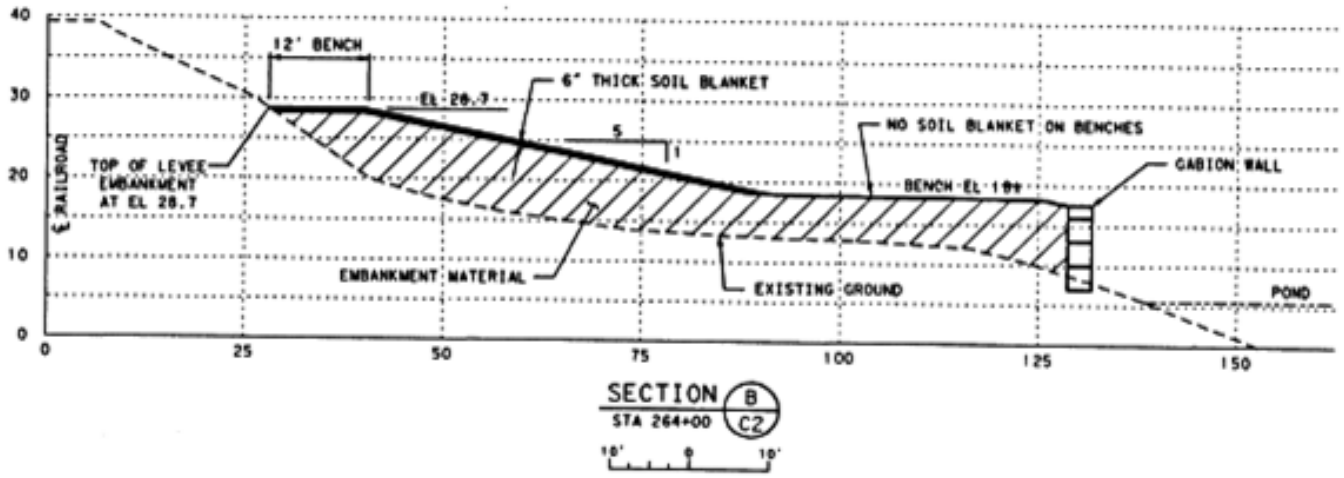
1997 - CLW 106-17-4

Station
~106+00 to 125+00



1997 - CLW 106-17-4





Proposed Work

1957 Design Manual (p 20):

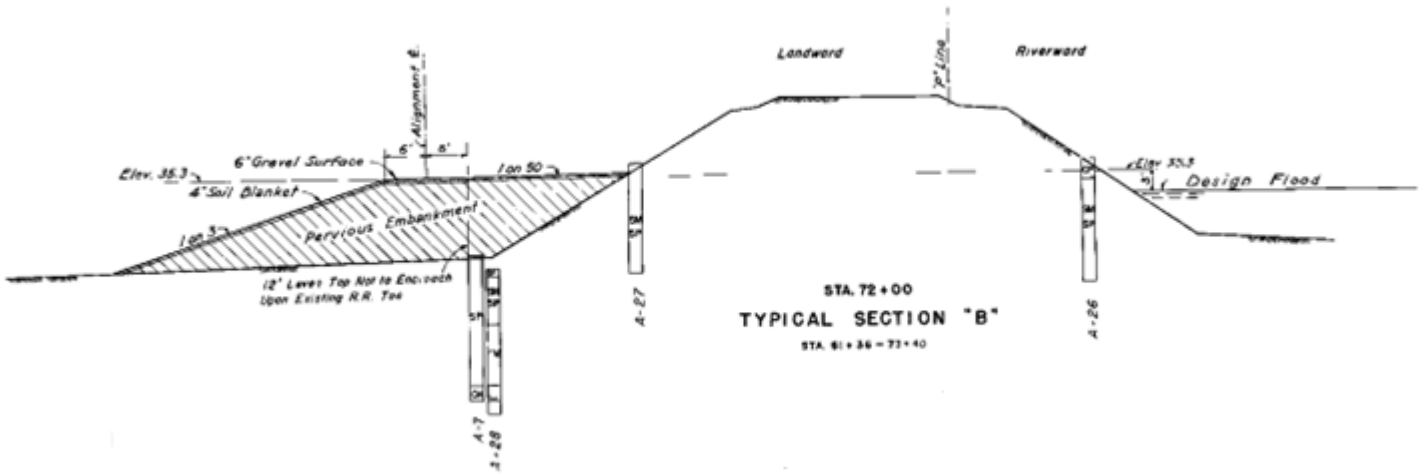
25. Although sections of the Union Pacific Railroad and Spokane, Portland and Seattle Railway embankments along the west boundary of the District are presently included in the levee system, experience in 1948, when a portion of the embankment failed and permitted the flooding of Vanport, proves the inadvisability of attempting to use them as primary levees. Along the riverward toe of the Spokane, Portland and Seattle Railway embankment, no corrective work will be possible because of the proximity of North Portland road. It is proposed that a substantial levee fill be constructed along the District side of these embankments. The questionable value of the embankments as flood-protection works is detailed in appendix "A".

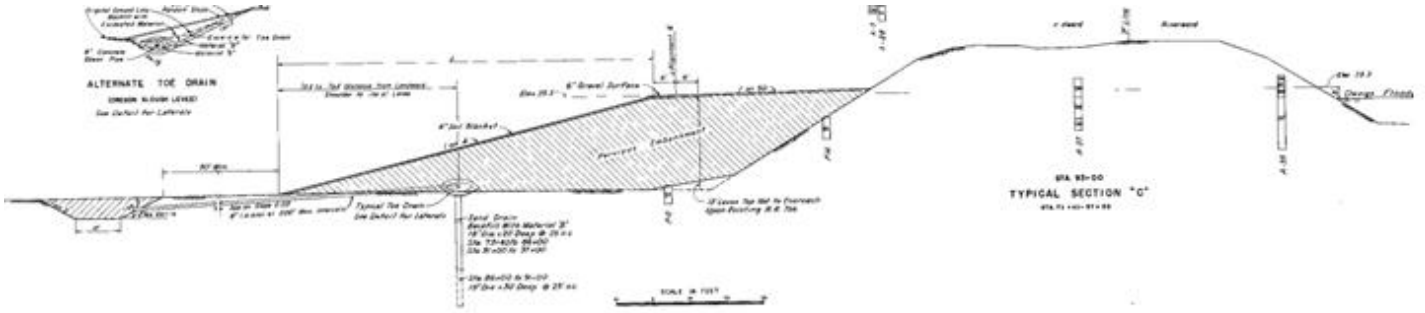
Proposed Work -continued

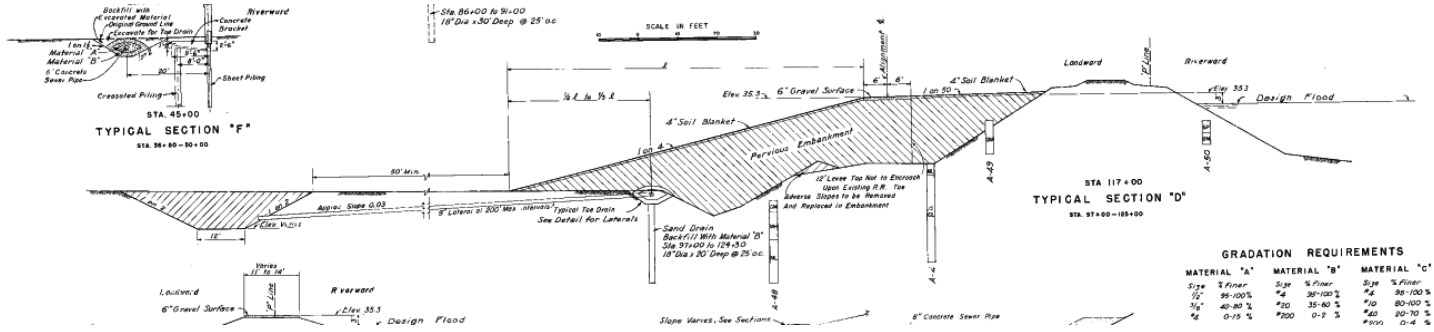
1957 Design Manual (p 26):

38. The combined length of railroad embankment on the west boundary of the District is approximately 6,400 feet. With the exception of the emergency repair work in 1948, there is no record of any flood-control work on these embankments. It is now proposed that a large toe embankment with a top elevation of 35.3 feet above mean sea level, a minimum top width of 12 feet, and a landward slope of 1 on 4 be constructed of dredged material. It would extend from Station 74+00, approximately, to the junction with the Columbia Slough levee, at approximately Station 125+00. North of Station 74+00, the new embankment would have a 1-on-3 landward slope, in recognition of the reduced amount of exposure. A gravel-surfaced roadway with turn-outs every 1,000 feet is to be built on the top of the new levee embankment. Toe drains and vertical sand drains, as shown on plate 3, are proposed.

1957 - CLW 106-13-3 proposed levee sections







1978 – Proposed Work

The 1978 Report "Drainage District Condition Study on Safe Water Surface Levels" suggested additional work to the railroad embankment. This work does not appear to have been completed.

From the "Drainage District Condition Study on Safe Water Surface Levels "(p70):

d. U.P.R.R and BNRR embankments.

Reinforce interior slope with sand fill on a IV on 5H from elevation 33.0 m.s.l. between station 56+90 and 125+00. Location of proposed improvements are shown on Plate 1 and typical improvements sections on Plate 2.

Historic Documentation Regarding Railroad Embankment

Clark v. United States

13 F.R.D. 342 (D. Oregon 1952)

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The Union Pacific fill south of the point of junction with the Spokane, Portland & Seattle Railway Company fill has a crown width of approximately 24 feet, an average height of approximately 30 feet above average inside ground level and slopes of approximately 1 on 1 3/4 to give the fill an average ground level width of 130 feet or more. This southerly fill was constructed between July 1909, and April 1911, by the Oregon & Washington Railroad Company, the predecessor in interest of the Oregon-Washington Railroad & Navigation Company from whom the Union Pacific Railroad Company leases the fill and the tracks which it carries. Under its lease the Union Pacific Railroad Company has full control over the leased tracks and the fill. Prior to the construction of the fill, which began in 1909, the tracks of the railroad were carried over the same site by a trestle. This trestle was constructed between February and September, 1908. The present fill was created by dumping material down through and over the trestle. The stringers of the trestle were removed but the piling was not. According to the best available information the material used to make the fill came from the portal area of the Peninsula tunnel. It was predominantly a sandy loam with some clay content.

North of the point of junction of the Union Pacific Railroad Company fill with the Spokane, Portland & Seattle Railway Company fill, the combined fill continues for a distance of about 1000 feet. At this point a fill supporting tracks of Spokane, Portland & Seattle Railway Company, Union Pacific Railroad Company (as Lessee) and Peninsula Terminal Company begins to turn eastward toward the industrial plants located on the high ground which constitutes the northerly portion of Peninsula Drainage District No. 1. The Spokane, Portland & Seattle Railway Company fill continues in a northerly direction to Oregon Slough.

*352 According to best information now available that portion of the fill supporting the Union Pacific track which constitutes a single structure with the fill of the Spokane, Portland & Seattle Railway Company (and which includes the portion through which flood waters passed on May 30, 1948) was constructed some time between 1910 and 1918 by the same method which was used to construct the southern portion of the Union Pacific fill. The fill was built by dumping material of a sandy nature over and through an existing trestle. The trestle stringers were removed but the piling was not.

This fill rests on land belonging in undivided interests to the Spokane, Portland & Seattle Railway Company and the Northern Pacific Railway Company. Subject to such contentions as may hereinafter be made with respect to the high water period of May, 1948, the fill is and always has been owned, maintained and controlled by one or more of the railroad companies.