Menlo Park SAFER Bay Project
Nature-Based Solutions

The proposed Menlo Park SAFER Bay project incorporates nature-based flood control solutions including tidal marsh-upland transition zone habitat and breeding habitat enhancement. Figure 1 provides an overview of the project alignment and the locations of the nature-based elements; following are detailed descriptions.

Tidal marsh-upland transition zone habitat construction at Pond R2

The South Bay Salt Pond Restoration Project's (SBSPRP's) programmatic environmental impact statement/report (EIS/R) calls for large-scale restoration of tidal salt marsh habitat within the Ravenswood Pond Complex on Don Edwards National Wildlife Refuge (Refuge) lands, where the proposed Menlo Park SAFER Bay Project is located (U.S. Fish and Wildlife Service [USFWS], et al 2007). The SBSPRP's programmatic project includes the creation of broad, gently sloped tidal marsh-upland transition zones; also referred to as horizontal levees. The created transition zones/horizontal levees are a critical feature of the SBSPRP's large-scale tidal marsh restoration for the following reasons:

- Natural transition zone habitat has been nearly eliminated from the landward edge of tidal marshes in the SF Bay due to development.
- Broad transition zones are essential for the survival and recovery of the endangered salt marsh harvest mouse (*Reithrodontomys raviventris*) and California Ridgway's rail (*Rallus obsoletus obsoletus*) because they provide refugia from predators during high tides (USFWS 1984; Shellhammer 2012; USFWS 2013; Goals Project 2015). Transition zones are most critical during extreme high-tide events when tidal marshes are inundated and predation pressure is highest.
- Transition zones provide essential habitat for endangered marsh plants, including salt marsh bird's beak (*Chloropyron molle* ssp. *molle*) and California sea blight (*Suaeda californica*), and foster high plant and animal community diversity (USFWS 2013; Goals Project 1999).
- Transition zones increase the habitat diversity and biodiversity (including a higher number of species) of the tidal marsh edge because multiple plant and animal communities overlap along the hydrologic gradient provided within a broad transition zone.
- Transition zones provide accommodation space for the landward transgression of tidal marsh with sea-level rise (Goals Project 2015).

The SAFER Bay programmatic project is well integrated with the SBSPRP to provide the flood protection necessary to restore tidal salt marsh at Ponds R1 and R2 (**Attachment – SAFER Bay Public Draft Feasibility Study, 2016**). A prior East Palo Alto SAFER Bay project funded under a previously

awarded grant will design, permit, and construct approximately 516 acres of tidal salt marsh ecosystem restoration at Ponds R1 and R2 (Figure 2). This prior project will also construct approximately 25 acres of low-elevation transition zone habitat along the upland edge of Pond R2 adjacent to the PG&E Ravenswood Substation.

The prior project's transition zone habitat will consist of a gently sloped fill berm that is actively revegetated with native tidal marsh-upland ecotone vegetation. However, the prior project's low elevation transition zone will only be constructed to an elevation of ~13 ft. (NAVD88), suitable to maintain the existing level of flood protection once tidal action is restored to Ponds R1 and R2 via breaching of the pond's bayward levees

Therefore, the prior project does not provide for the resilience of the restored large-scale tidal marsh to sea-level rise; as sea level rises, high tide refugial habitat on the low elevation transition zone would diminish, thereby reducing important habitat for the Ridgway's rail and salt marsh harvest mouse; moreover, additional flood protection would be needed to protect adjacent infrastructure.

The proposed Menlo Park SAFER Bay Project will solve both issues by constructing a horizontal levee to provide 100-year flood protection adjacent to the PG&E substation (Figures 3a, 3b). The horizontal levee will include a broad, gently sloped (30H:1V) habitat transition zone that would increase the surface area of transition zone habitat from 25 acres (prior project) to 50 acres and increase the vertical extent of transition zone habitat (Figure 4). This action will substantially improve the sea-level rise resilience of the transition zone habitat and the broader restored tidal marsh.

Tidal marsh-upland transition zone habitat construction at Pond R4

The SBSPRP is in the process of restoring approximately 300 acres of tidal salt marsh and associated transition zone habitat in Pond R4 (USFWS et al 2016). Like Pond R2, at Pond R4 the SBSPRP will construct a low elevation transition zone and maintain the existing level of flood protection along with breaching Pond R4 levees to restore tidal marsh.

The Menlo Park SAFER Bay Project proposes to construct a horizontal levee along an approximately 800-foot-long reach adjacent to tidal marsh restored in Pond R4 by the SBSPRP (Figures 5a, 5b). Comparable to the above proposal for Pond R2, the horizontal levee in Pond R4 will consist of a broad, gently sloped (30H:1V) habitat transition zone that would provide approximately 7 acres of additional transition zone habitat and increase the vertical extent of transition zone habitat. This action will substantially improve the sea-level rise resilience of the transition zone habitat and the broader restored tidal marsh.

Western snowy plover breeding habitat enhancement at Pond R3

Within San Francisco Bay, the federally threatened western snowy plover nests almost exclusively within non-tidal salt pannes, or depressions, of dried salt ponds and managed ponds, and on associated levees and islands. The western snowy plover is known to breed in Pond R3 within the

project site (Pearl and Chen 2018; Pearl et al. 2019) and the Refuge manages the hydroperiod of Pond R3 to support breeding plovers.

The proposed project will enhance approximately 4.8 acres of snowy plover breeding habitat in Pond R3. This enhancement effort will more than compensate for the impact of the project's engineered levee on approximately 1.6 acres of low-quality snowy plover breeding habitat that occurs along the landward/developed edge of Pond R3.

The project's approach to breeding habitat enhancement will leverage results of a large-scale oyster shell habitat enhancement study at the Eden Landing managed ponds conducted as part of the SBSPRP (Attachment – San Francisco Bay Snowy Plover Monitoring Report, 2014). The study goals were to increase the amount of camouflage and cover for nesting western snowy plovers and thereby increase nesting and fledging success. The study found that five to eight oyster shells/square meter resulted in increased western snowy plover nest abundance and success (San Francisco Bay Bird Observatory 2014).

The project proposes to import and place oyster shell or similar material (e.g., pea gravel) totaling 4.8 acres within Pond R3; this may be within a single 4.8-acre patch or within several patches totaling 4.8 acres depending upon USFWS recommendations. In the 4.8-acre area, shells will be spread to cover approximately 3% of the ground surface (Figure 6).

The choice of materials (oyster shell vs. pea gravel) will depend upon commercial availability and input from the USFWS, which has previously studied the benefits of using oyster shells and has considered studying the use of pea gravel, which is more readily available than oyster shells. The precise locations of enhancement work will be determined in collaboration with the USFWS using the latest data on snowy plover nesting locations within Pond R3.

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Figure 1: Project Map Showing Locations of Proposed Transition Zones at Pond R4 (Reach 2) and Pond R2 (Reach 5); and Location of Proposed Oyster Shells Placement in Pond R3 (Reach 3).

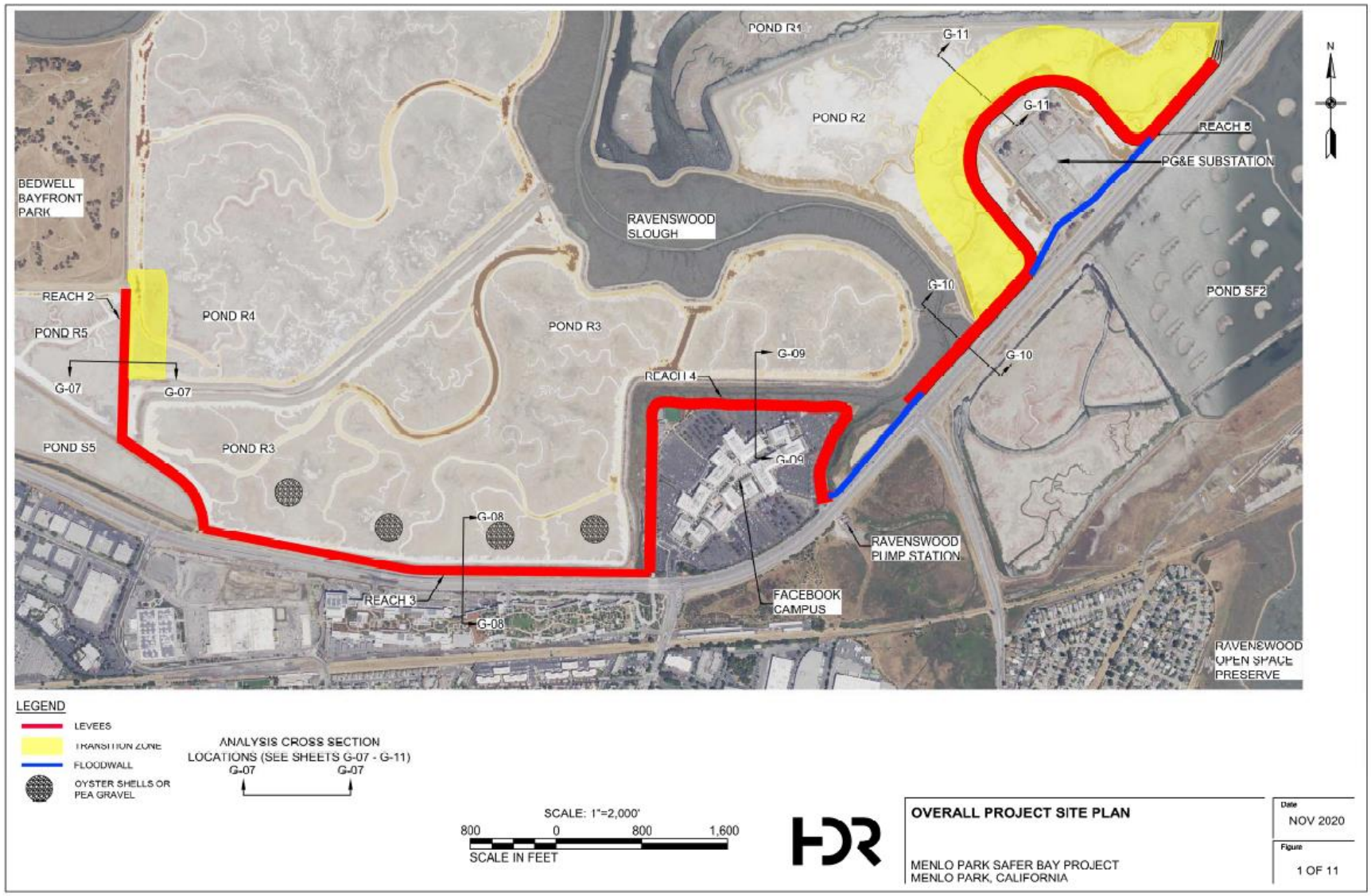

Figure 2: Previous Project Ponds R1 and R2 Conceptual Restoration Design, With Transition Zone to Provide Existing Level of Flood Protection.

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Figure 1. Ponds R1 and R2 Conceptual Restoration Design
SAFER Bay Project Wetland Impact / Mitigation Technical Memorandum (3550-03)
February 2020

Figure 3a: Plan of Proposed Project Levee and Transition Zone at Pond R2 (Reach 5).

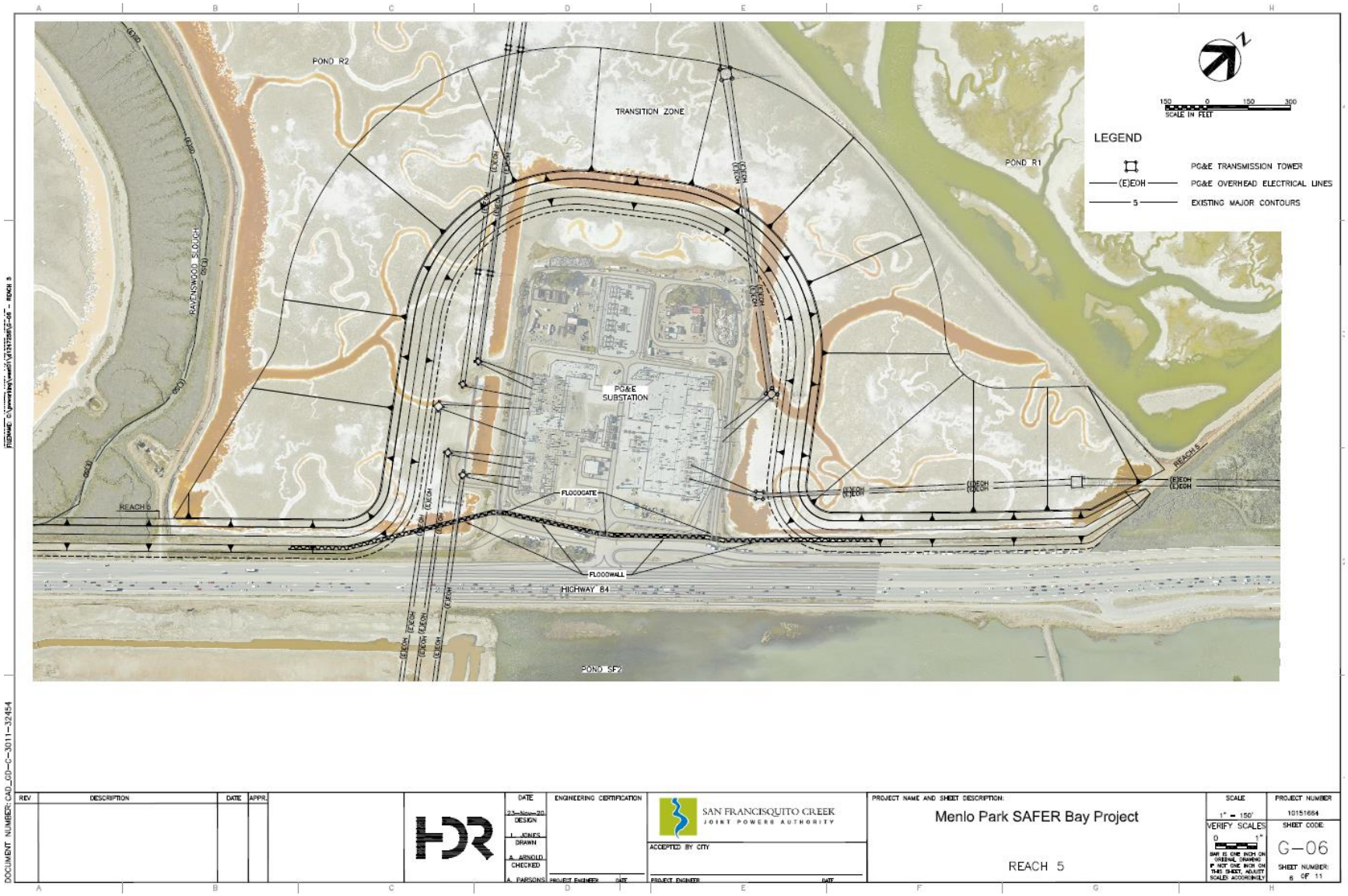

Figure 3b: Cross Section of Proposed Project Levee and Transition Zone at Pond R2 (Reach 5). Note previous transition zone fill to elevation 13 ft. (solid white fill) and proposed additional transition zone fill to elevation 21 ft. (hatched brown fill).

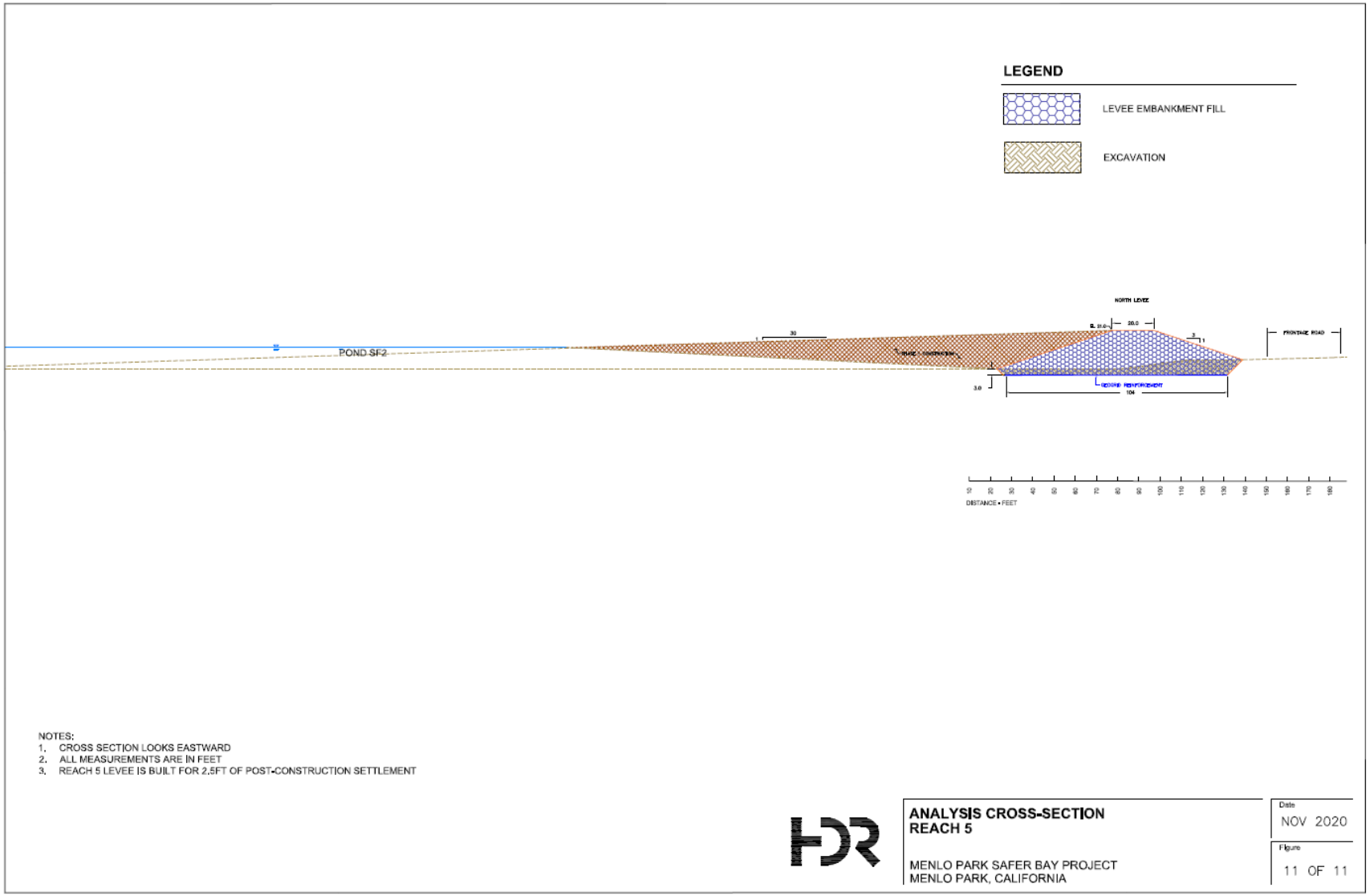

Figure 4: Transition Zone Habitat Features.

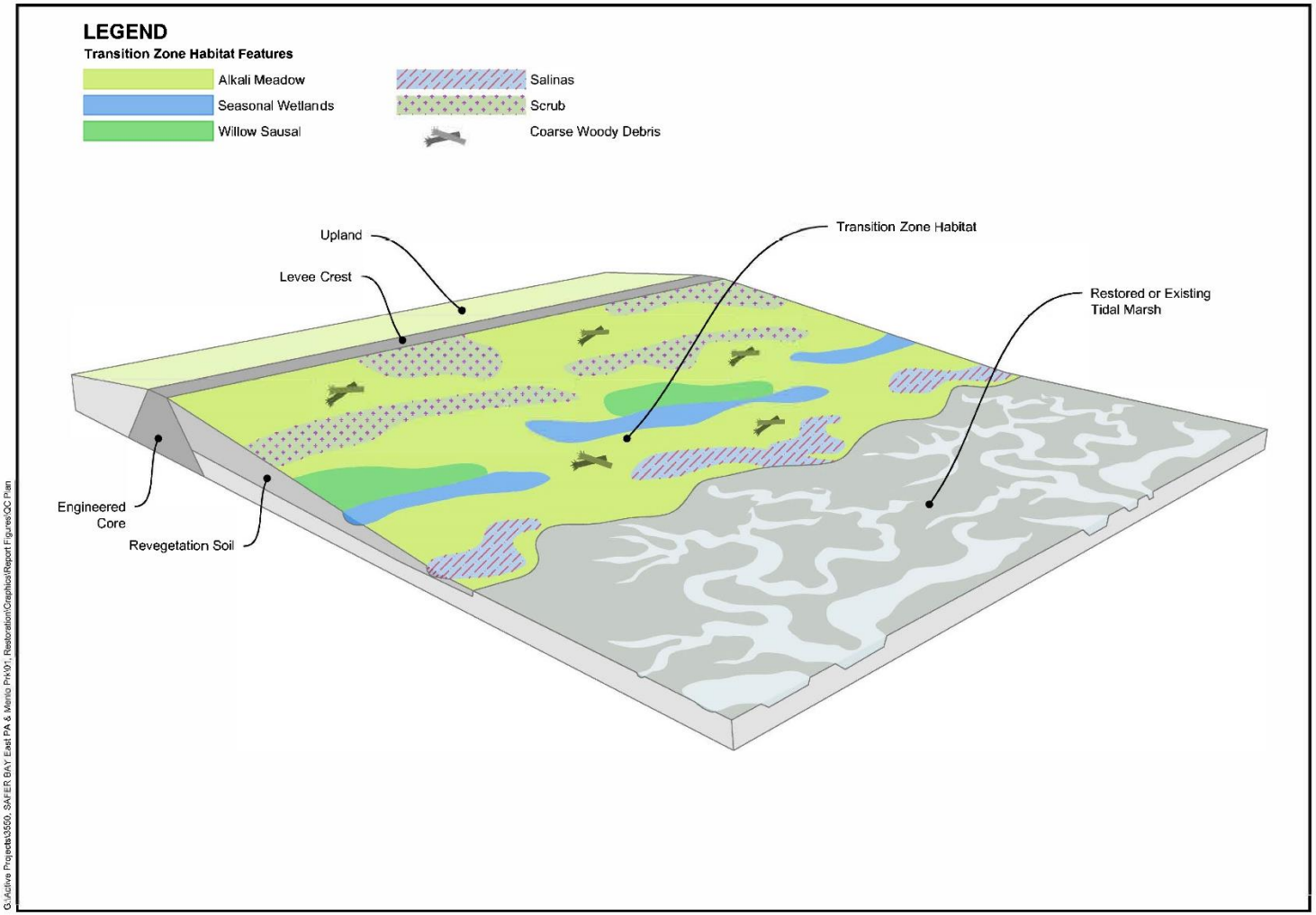

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Figure 2: Transition Zone Habitat Features
SAFER Bay Project (3550-01)
August 2014

Figure 5a: Plan of Proposed Project Levee and Transition Zone at Pond R4 on Reach 2.

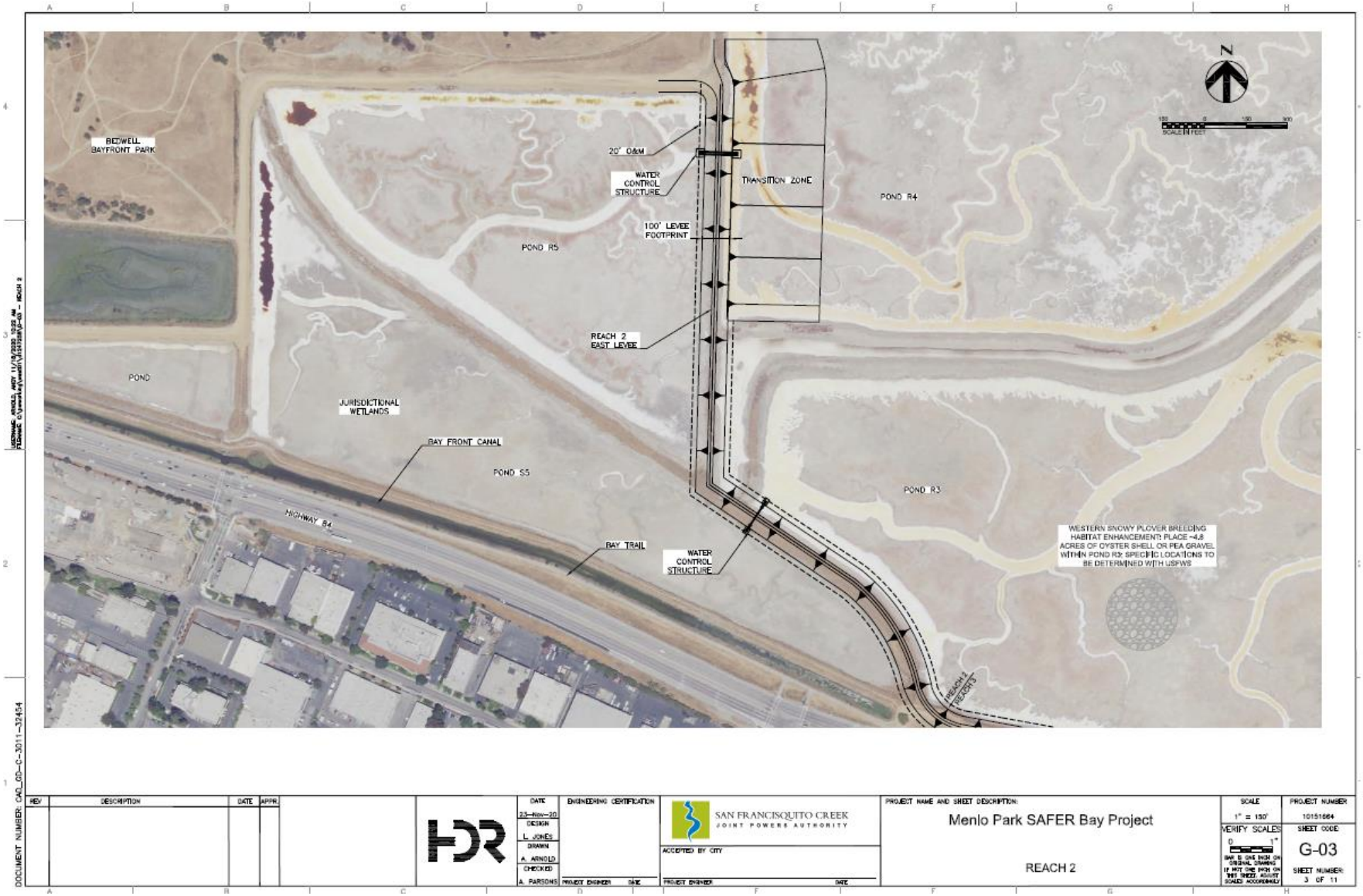

Figure 5b: Cross Section of proposed project Levee and Transition Zone at Pond R4 on Reach 2.

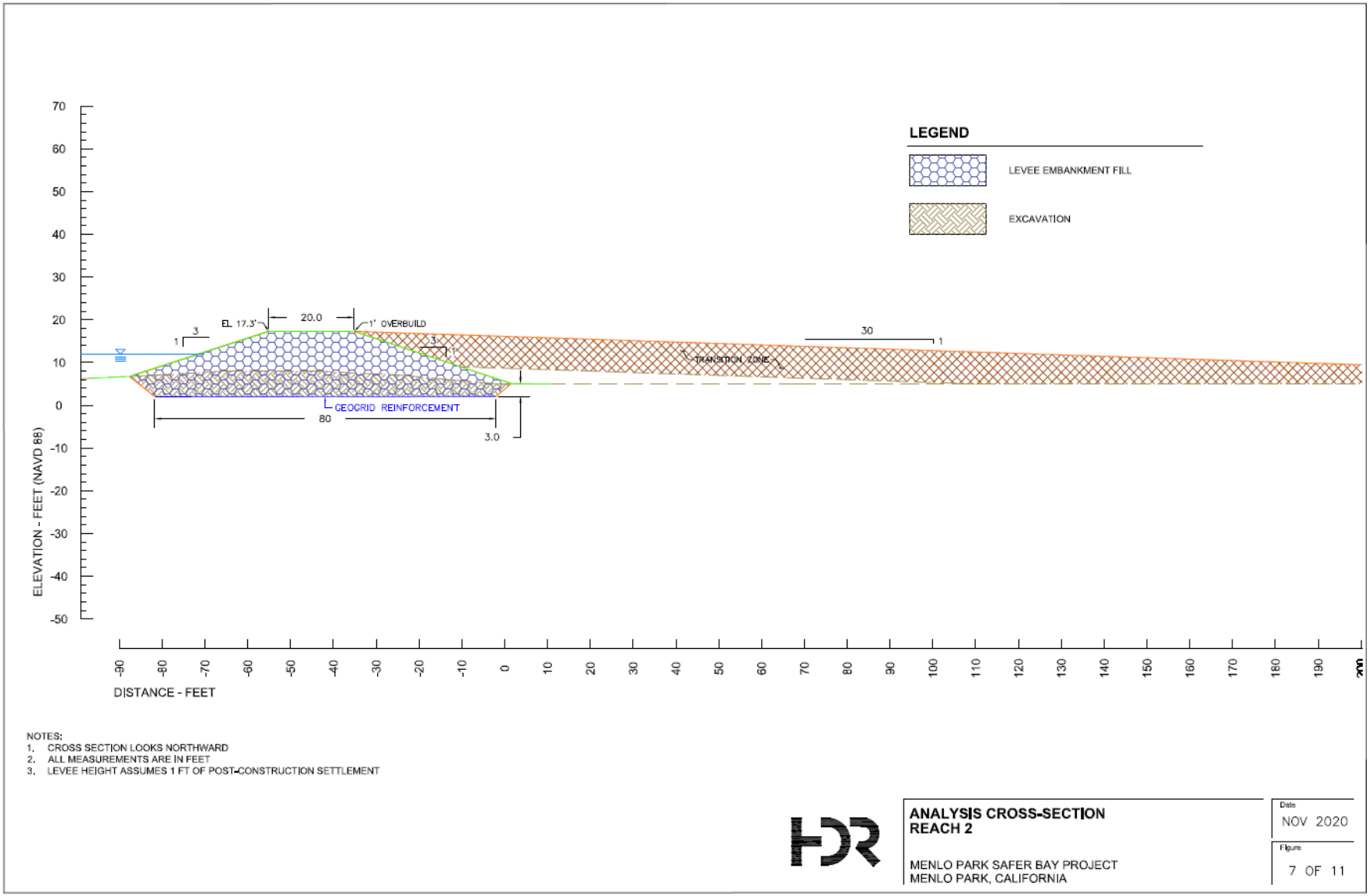

Figure 6: Plan of Proposed Project Oyster Shell or Pea Gravel Habitat Enhancement at Pond R3 on Reach 3.