SUMMARY PROJECT DESCRIPTION
FOR THE
SAFE HAVEN VERTICAL EVACUATION PROJECT

Please be aware this summary reflects thinking at the time the description was developed, several years ago. This summary description does not reflect any preference the City has regarding design.

SYNOPSIS

The intent of this project is to save human life in the event of a major tsunami. The project is to construct one vertical evacuation hardened earth berm centrally located in Long Beach and adjacent to an elementary school to maximize the opportunity for the most people to reach this artificial “high ground”, and in particular children and their teachers and caregivers.

PURPOSE AND NEED

Long Beach, Washington is a small coastal city located on a peninsula that is an accreted sandbar comprising sediment from the nearby Columbia River. Long Beach is directly east of and proximate to the Cascadia Subduction Zone. That zone is capable of producing a megathrust earthquake (M9 or greater), with resulting landfall of up to 2 meters, severe ground shaking, liquefaction, differential settlement, and tsunami waves of 10 meters at the Washington coastline. The entire city is located within the projected inundation area of such a seismic event. The last known great event on this zone was in 1700, and another great event is predicted to have a 10-14% chance of occurring in the next 50 years. These events are considered low in probability, high in vulnerability, and moderate in risk by the Pacific County Hazard Mitigation Plan.

Long Beach is a visitor-serving city, with its “high” season the summer months between June and October. On any summer day, Long Beach is home to approximately 1,400 permanent residents, 2,100 seasonal, 1,500 seasonal employees, and 5,000 visitors (estimate). In addition, there is an elementary school and a pre-school located in the town, with approximately 350 students and staff on campus at any given time. Therefore, should a major seismic event occur during a summer day, about 10,000 people would be in jeopardy, with no high ground available as a safe haven within a reachable distance. The purpose of the proposed project is to provide a tsunami refuge for approximately 800 people, paying particular attention to providing a tsunami refuge to the town’s school aged children and their caretakers. Another purpose of the project not related to hazards is for the berm to serve as a community recreational feature for adults and children alike.

LOCATION

The project would be located on a parcel adjacent to the Long Beach Elementary and Pre-school, at the eastern end of 5th Street Southeast in Long Beach. This centrally-

located site can be reached quickly not only by school children, but by anyone in the downtown area of Long Beach.

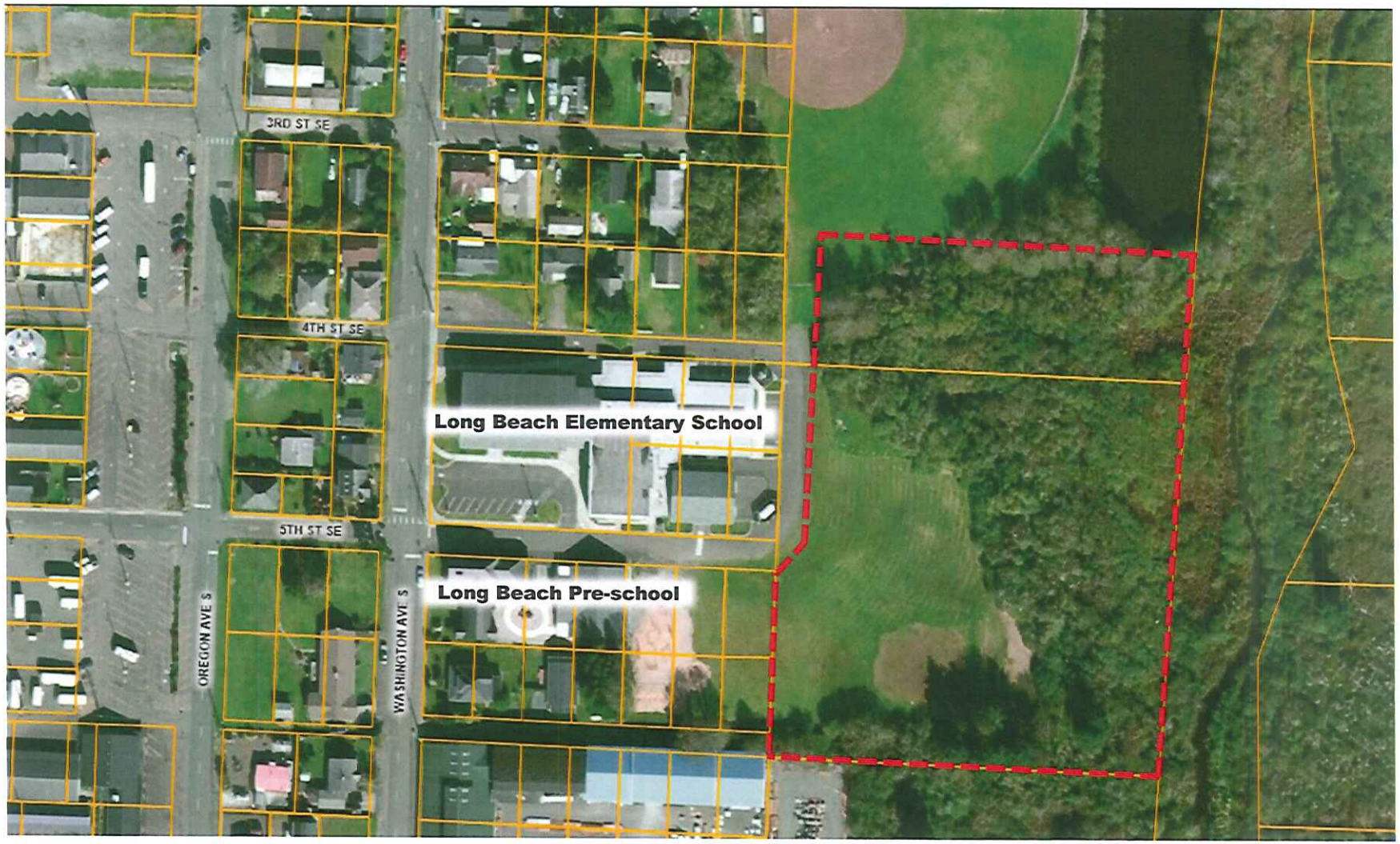
The proposed project site is currently primarily a softball field and partially a wooded parcel located at the eastern limit of the elementary/pre-school grounds. Immediately to the north of and adjacent to the school grounds are three other softball fields, and the loss of the proposed site as a ball field would not put a strain on child activities. The field, while regularly mown and maintained as a recreational facility, is also a low-value wetland. Most vacant 1 acre+ parcels of land on the eastern side of Long Beach where a tsunami structure is best located have wetland characteristics. In addition, while there are other sites available, they are already slated for construction of future elements of the Safe Haven Program. Use of this wetland site will require that mitigation be implemented to compensate for the loss of wetland functions and values.

To the north of the proposed site is Culbertson Park, an active recreation park. East of the site is a drainage ditch, and beyond that are undeveloped woodlands. To the south is a lumber yard and woodlands. To the west is the Long Beach Elementary School and Pre-school, and beyond that downtown Long Beach. To the further west is the Pacific Ocean. Further study is necessary to understand the nature of project site deeper soils and stratigraphy.

DESCRIPTION

The proposed project is the first project slated for construction under the larger Safe Haven Program, comprising 20 proposed tsunami safe haven facilities in Pacific County, Washington. The Safe Haven Program is a research and outreach effort that comprises the planning portion of the proposed project's development. Safe Haven combines academic study of tsunami refuge options with extensive community involvement to develop feasible, effective, and community-supported tsunami refuge facilities.

The proposed project would be an armored, hardened earth berm with an access ramp. The berm would be a "high ground" safe haven for approximately 800 people during a major tsunami event. The berm would be constructed in compliance with the "Guidelines for Design of Structures for Vertical Evacuation from Tsunamis" (FEMA P646, June 2008). The footprint of the proposed project would be approximately one acre, with the sheltering area approximately 8,000 square feet. The height of the berm at 34' was determined by future tsunami run-up modeling conducted by the State of Washington plus the requirements of P646 found at section 5.3: Elevation Considerations. The berm will require a substantial foundation to withstand an estimate M9+ seismic event on the Cascadia Subduction Zone as well as the subsequent tsunami waves and debris flows. Elements of the structure may be purposefully sacrificial.



Berm at Long Beach Elementary School

Preferred Site A