



Estuary LIVE 2003 – A Visit to the Barataria-Terrebonne National Estuary A Picture is Worth a Thousand Words:

Standing Up to the Surge!

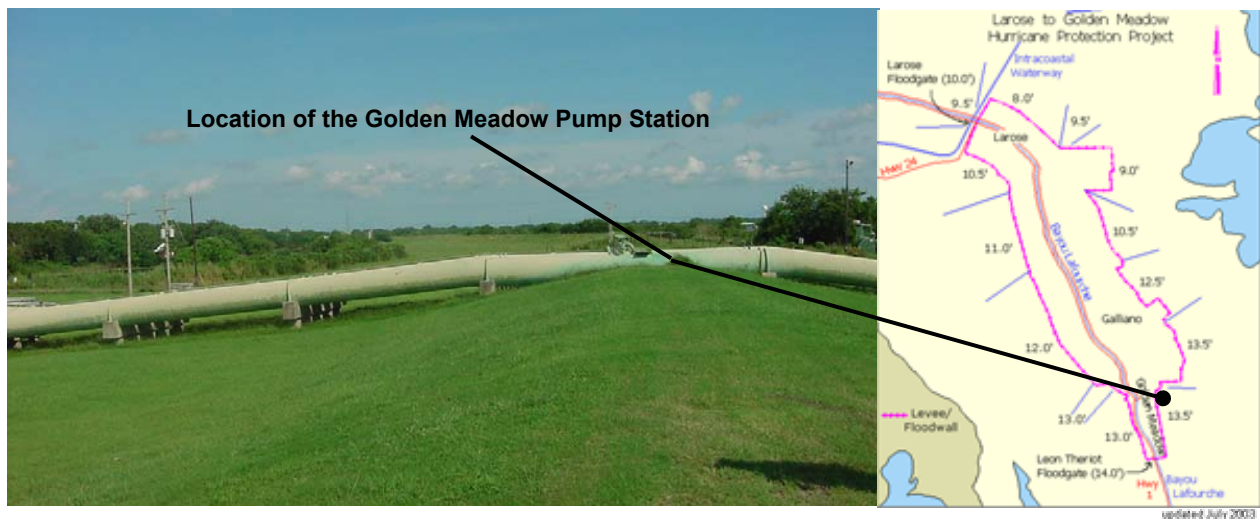
A hurricane protection levee surrounds the most populated areas within the Barataria-Terrebonne estuary. This levee is meant to protect residents from a storm surge of a strong Category 2 hurricane. Category 2 hurricanes typically have winds of 96-110 mph and storm surges of generally 6-8 feet above normal.

From the map, you can see that the height of the Golden Meadow Hurricane Protection Levee is about 13.5 feet at the location of the Golden Meadow Pump Station. The building material used to build this levee system was dug from a borrow canal located just inside the levee. The shape of the levee in cross section resembles an isosceles trapezoid like the one pictured at the left. The flat top of the levee is about 10 feet across and the base of the levee is generally around 7 times wider than its height.



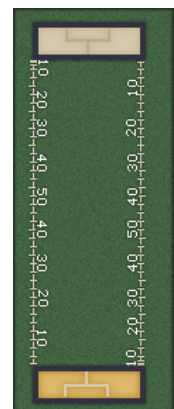
- Using the formula for the area of a trapezoid below, what is the cross-sectional area of the levee near the Golden Meadow Pump Station?

Area of an isosceles trapezoid = $\frac{1}{2}$ (sum of the long and short parallel sides) multiplied by the height.



- What volume of dredged material (in cubic feet) was needed from the borrow canal to build a levee one mile (5,280 feet) long on this part of the Golden Meadow Hurricane Protection Levee?
- How high would this pile of dirt get if the volume were spread out across a regulation football field? (Hint: 48,000 cubic feet of dirt would stand 1 foot high on a football field from goal line to goal line).

That's a whole lot of dirt! Keep in mind that the height of the levees must be maintained after they are built. Often this requires as many as three "recappings" or "lifts", meaning that more dredge material need to be added across the top of the levee to build it back to its required height. This is mainly because the soil, both in and beneath the levee, compacts as the levee gets older and water is expelled from pore spaces between the grains of dirt. Usually after three lifts, the levee is stable and needs only to be checked to ensure that there are no weak spots or breaks.



One last question to ponder... In the picture above, why do you suppose the levee maintenance crews do not allow trees or bushes to grow on the levee itself?