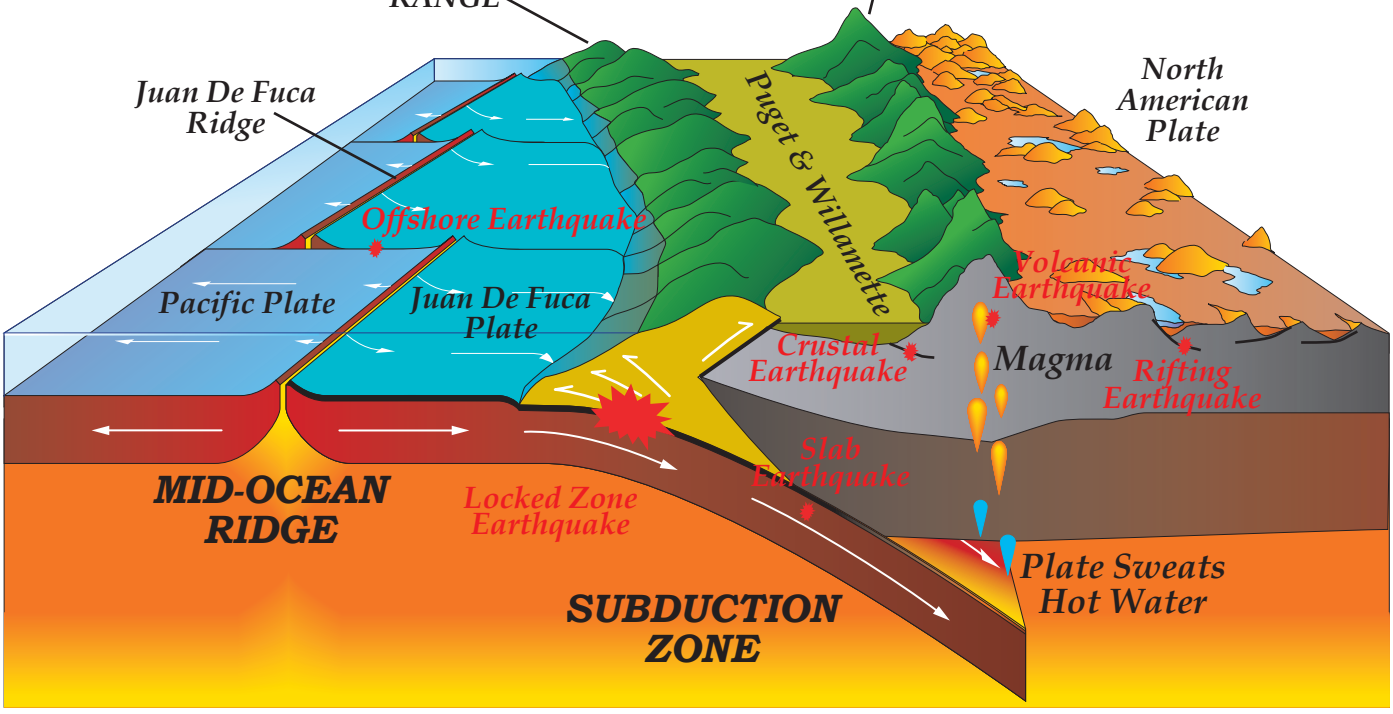
CEETEP Field Trip Guide
August 12, 2014



Cascadia EarthScope Earthquake and Tsunami Education Program (CEETEP)
August 11-14, 2014

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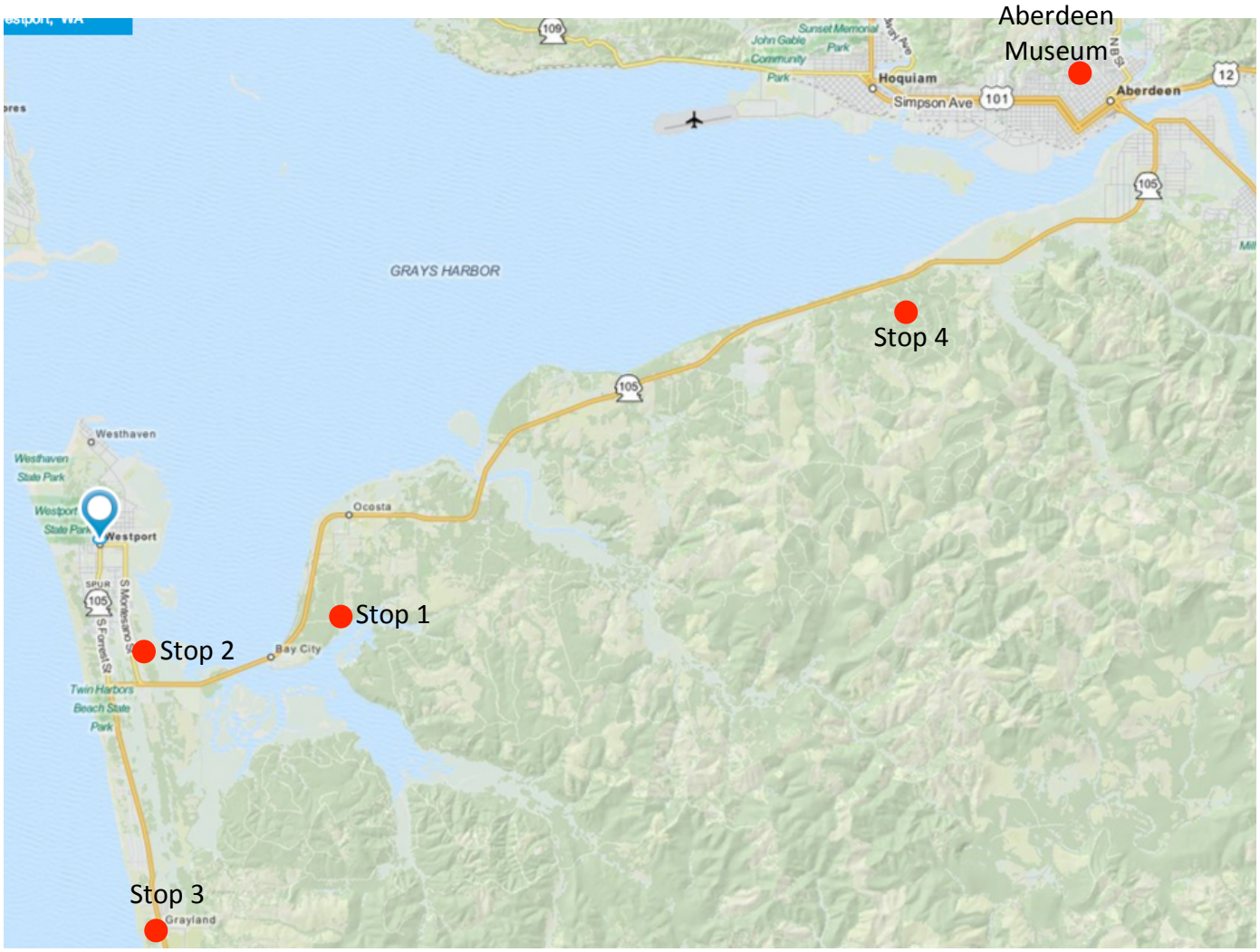
Field Trip Overview Map



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Stop 1 – Tsunami Geology at the Elk River Estuary

Directions – Drive from the Aberdeen Museum to Elk River Estuary access point (Figure 1). We will access the Elk River Estuary tsunami geology site via a dirt road (ER 21) off of SR105 (Figure 2).

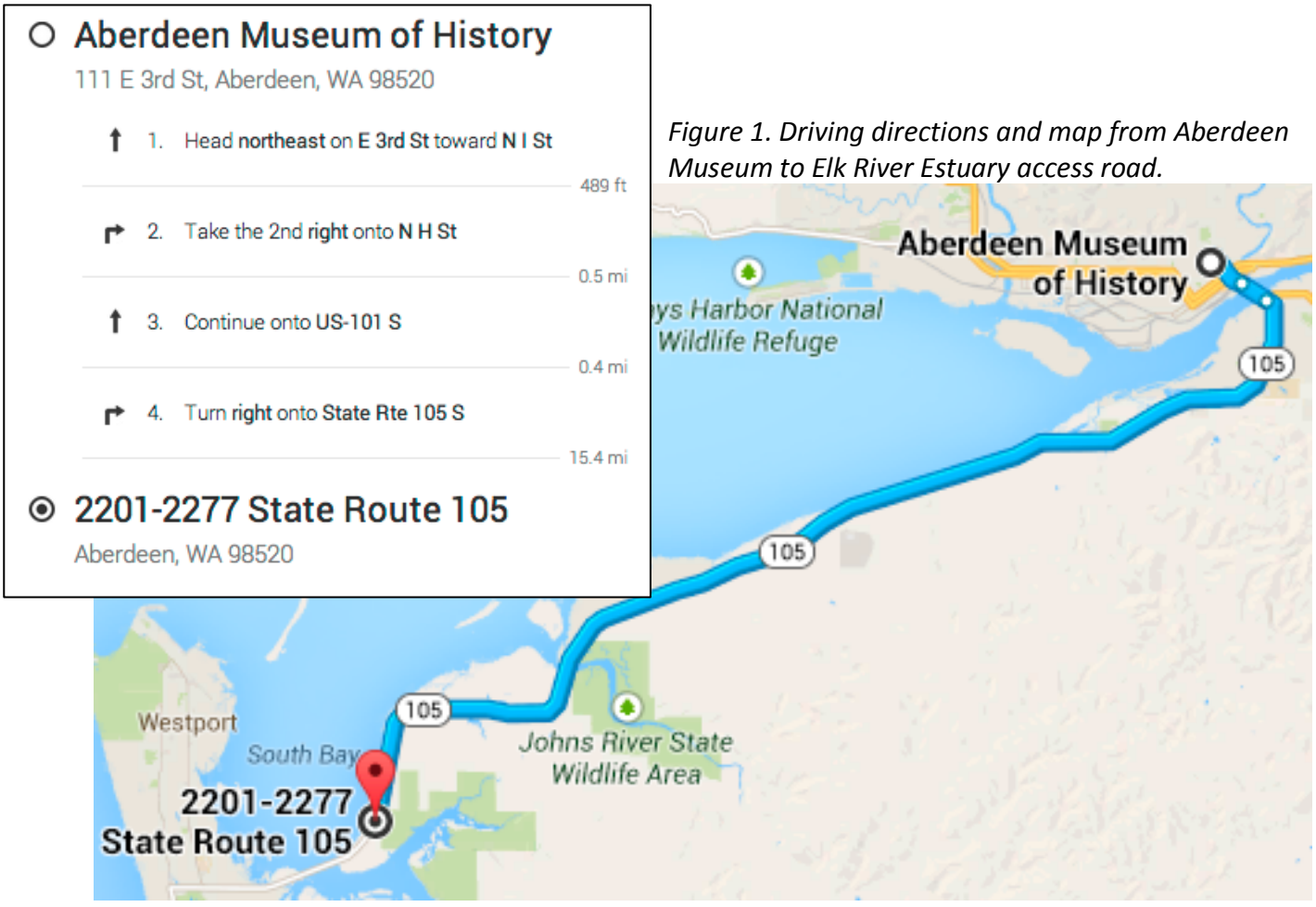


Figure 1. Driving directions and map from Aberdeen Museum to Elk River Estuary access road.

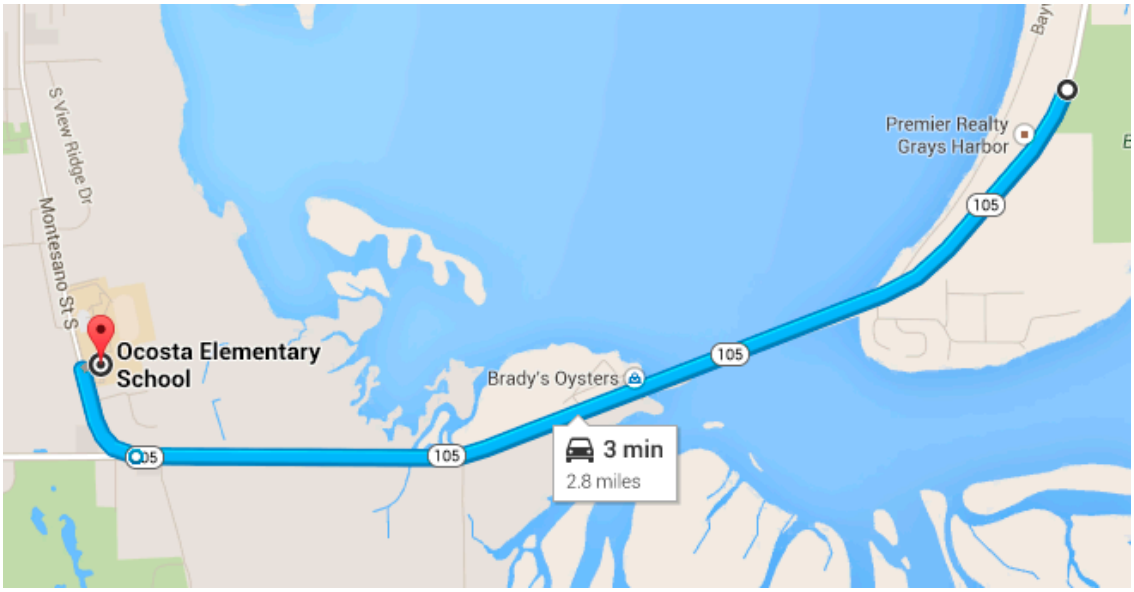
Figure 2. Route from SR105 to the tsunami geology site on the Elk River Estuary.

Topics to consider

1. **What are the different geologic layers observed?**
2. **What sequence of events can explain the observed layers?**
3. **How would you use these geologic observations to engage your audience in earthquake/tsunami science and preparedness?**

Stop 2 – Ocosta Elementary School

Directions – Continuing driving south on SR 105 for about 2.5 miles. Turn right on Montesano St. The school will be on your right.



The new elementary school will be the nation's first tsunami vertical evacuation structure!!

Topics to consider (see also Figures 4-8 for reference)

1. **What are some of the challenges involved in designing and building vertical evacuation structures?**
2. **How might you use the example of this school to engage your audience (students; park/museum visitors; the general public) on earthquake science and preparedness?**
3. **Are vertical evacuation structures needed in your community?**

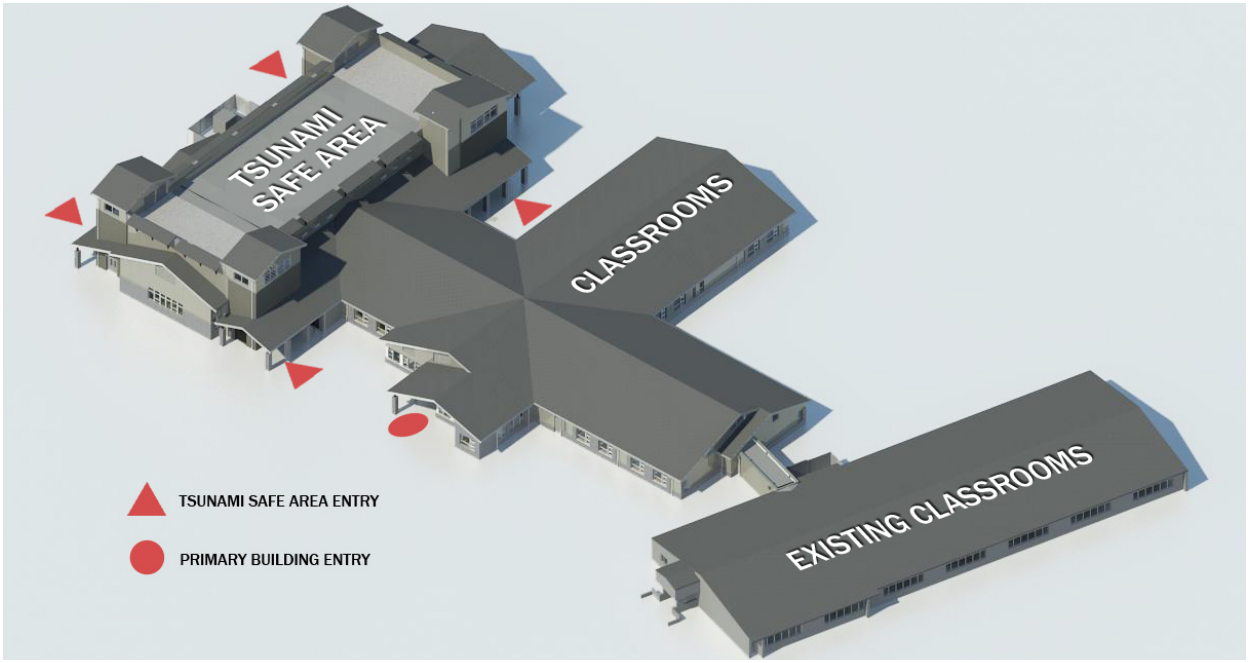


Figure 3. Architectural drawing of Ocosta Elementary School Vertical Evacuation Structure. TCF Architecture, Tacoma.

Figure 4. Washington State's Safe Haven Project community-derived plan for vertical evacuation structures in Westport area.
http://www.emd.wa.gov/hazards/documents/haz_SafeHavenReport_GraysHarbor.pdf

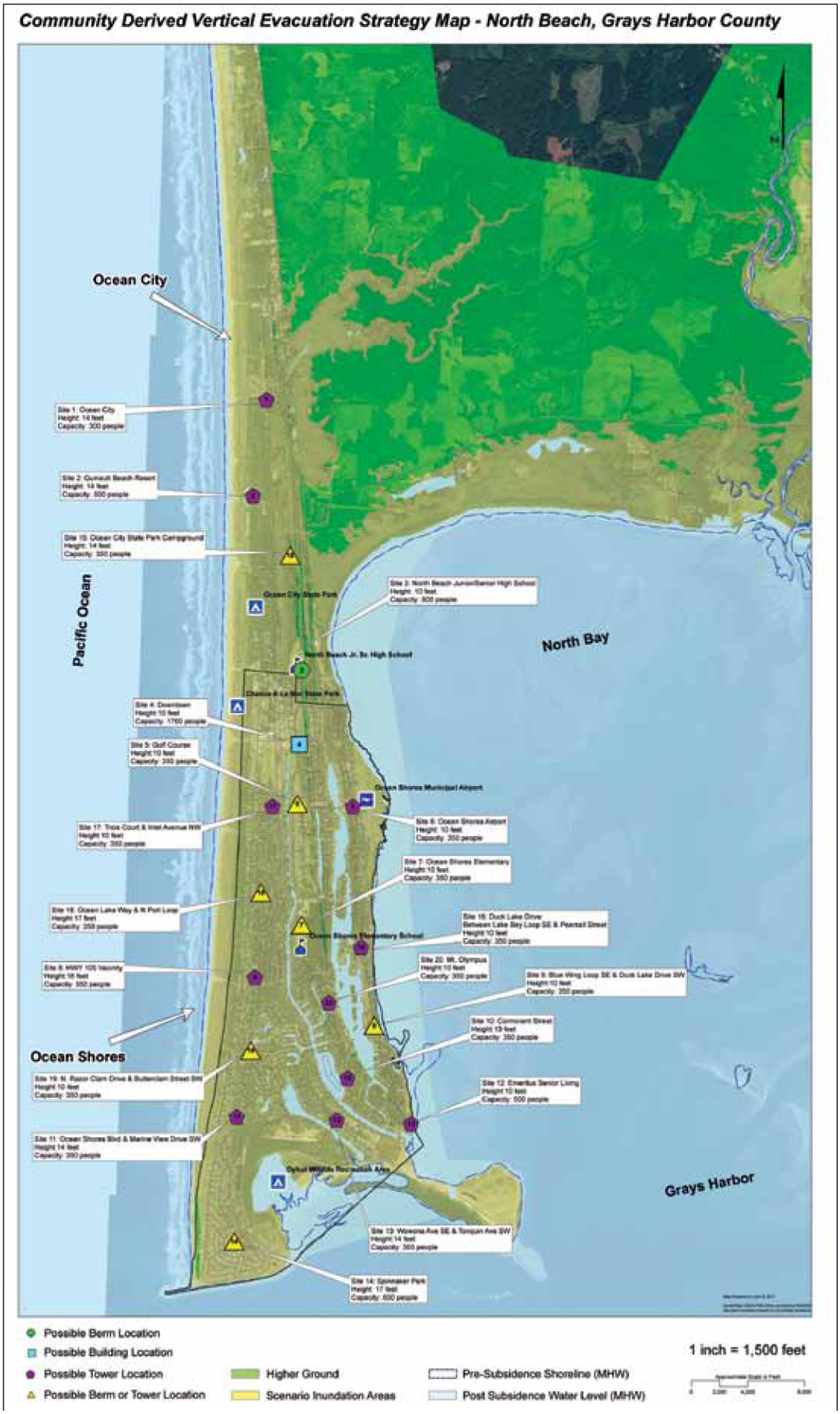


Figure 5. Washington State's Safe Haven Project community-derived plan for vertical evacuation structures in Ocean Shores area.

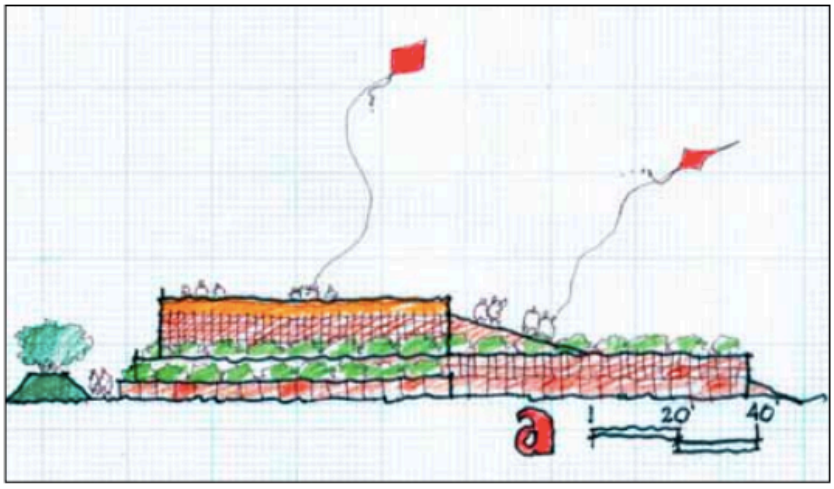


Figure 6. Basic berm conceptual designs. Front view (left) and side view (right). (http://www.emd.wa.gov/hazards/documents/haz_SafeHavenReport_GraysHarbor.pdf)

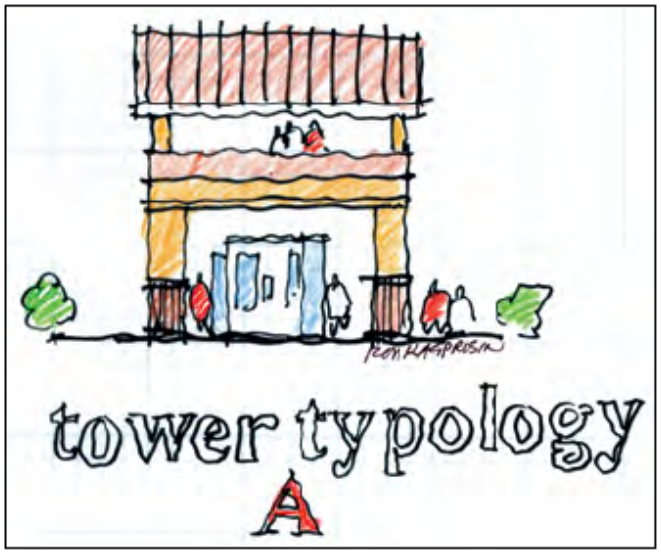


Figure 7. Towers have smaller footprints compared to berms.

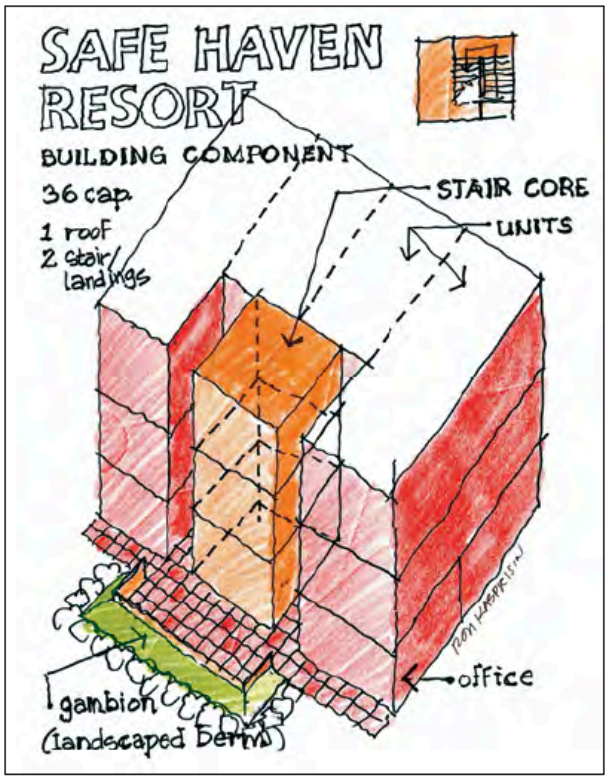


Figure 8. Conceptual design of building with tsunami vertical evacuation capability.

Stop 3 – Grayland Fire Station & Grayland Beach

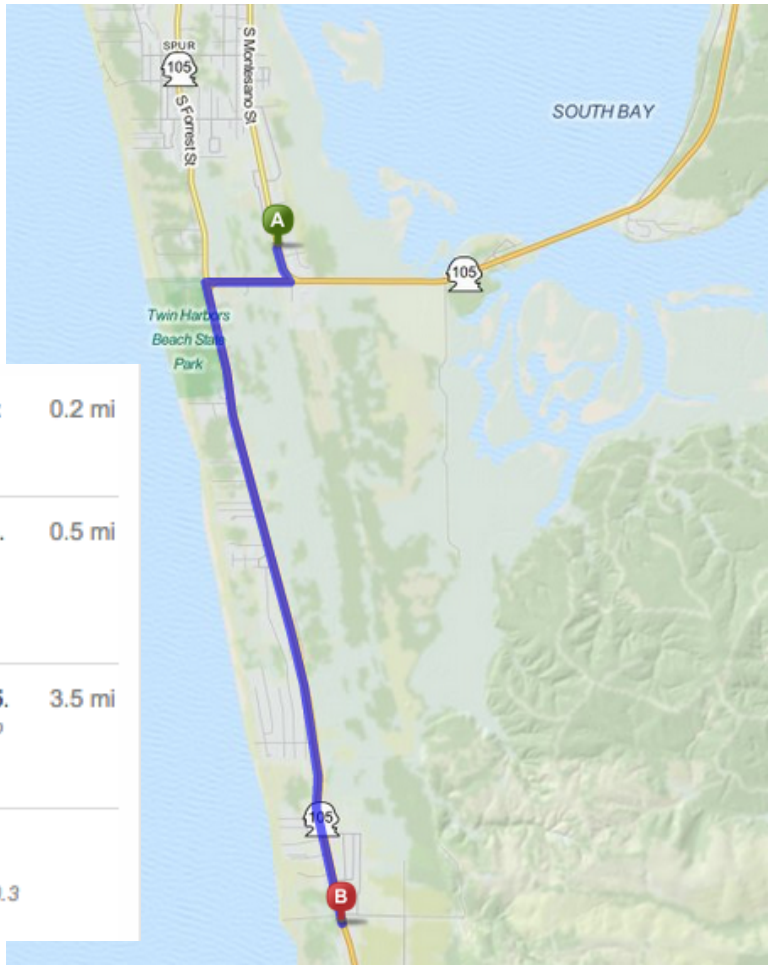
Directions – Turn left (south) onto Monesano St and continue for ¼ mile to SR 105. Turn right (west) onto SR 105, continue for ¼ mile, then turn left (south) on SR 105. Continue for 3.5 miles to Grayland Fire Station (1785 State Route 105).

1. Start out going **south** on **S Montesano St** toward **S Woodhill Ave**. 0.2 mi

2. Turn **right** onto **State Route 105/WA-105**. 0.5 mi
   State Route 105 is 0.1 miles past S Woodhill Ave
   If you reach the end of Roberts Rd you've gone about 0.1 miles too far

3. Turn **left** onto **State Route 105 S/WA-105**. 3.5 mi
   If you reach the end of Schafer Island Beach App you've gone about 0.2 miles too far

4. **1785 STATE ROUTE 105** is on the **right**.
   Your destination is just past Grayland Beach Rd
   If you reach Salmonberry Rd you've gone about 0.3 miles too far



Stop 3a Lunch – Grayland Fire Station or Grayland Beach, depending on weather

Stop 3b Grayland Beach, Beauty and the Beast

Topics to consider (see also the guide cover for reference)

1. **How far offshore is the boundary between the Juan de Fuca and North American plates?**
2. **How deep is the top of the subducting Juan de Fuca Plate beneath Westport?**
3. **If a great earthquake occurred right now, what would you do?**

Stop 3c – Tsunami Evacuation Walk

Directions – We will leave from Grayland Beach, walk Grayland Beach Access Road past the Grayland Fire Station, cross State Route 105, then along Cranberry Road to Turkey Road to McDonald's Track Road, and the Assembly Area on high ground. Although this sounds like a long distance, it is less than 1 mile and typical of the distance many citizens in this region would need to travel to reach higher ground.

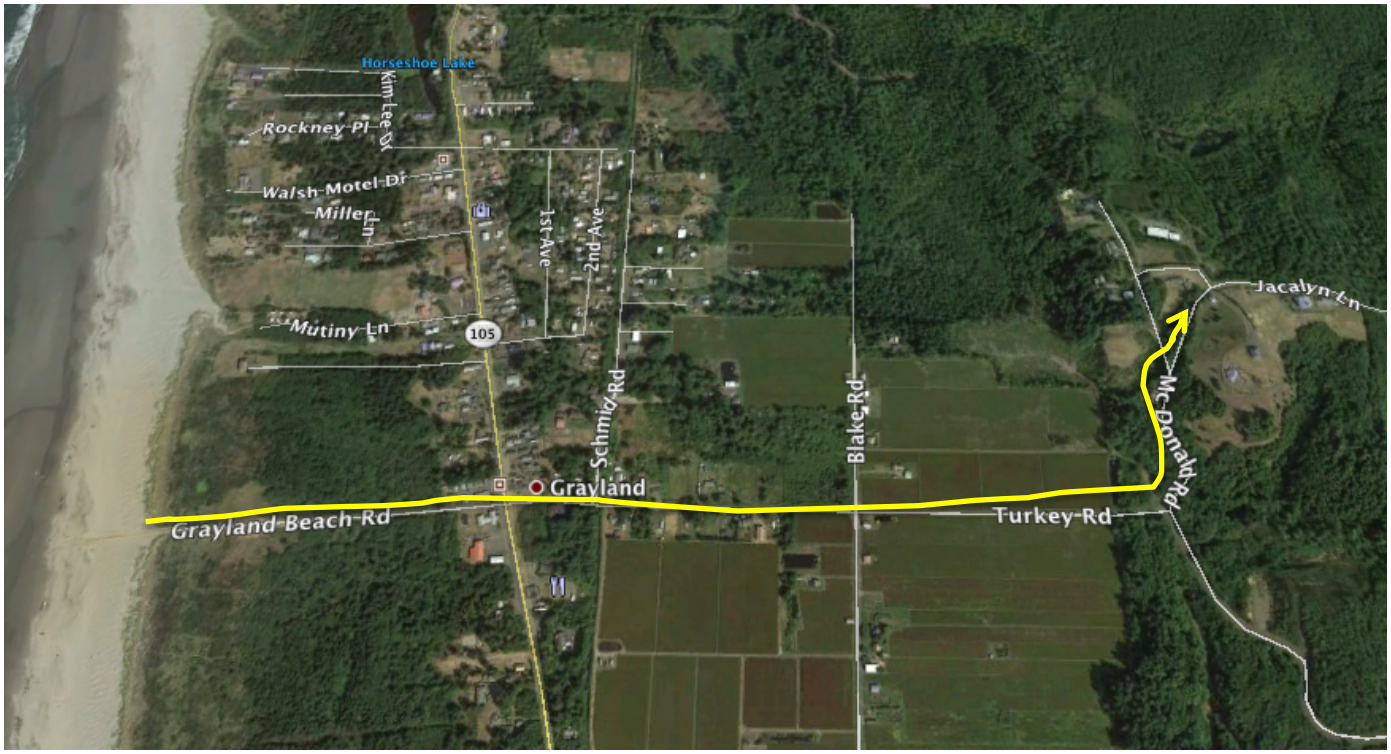
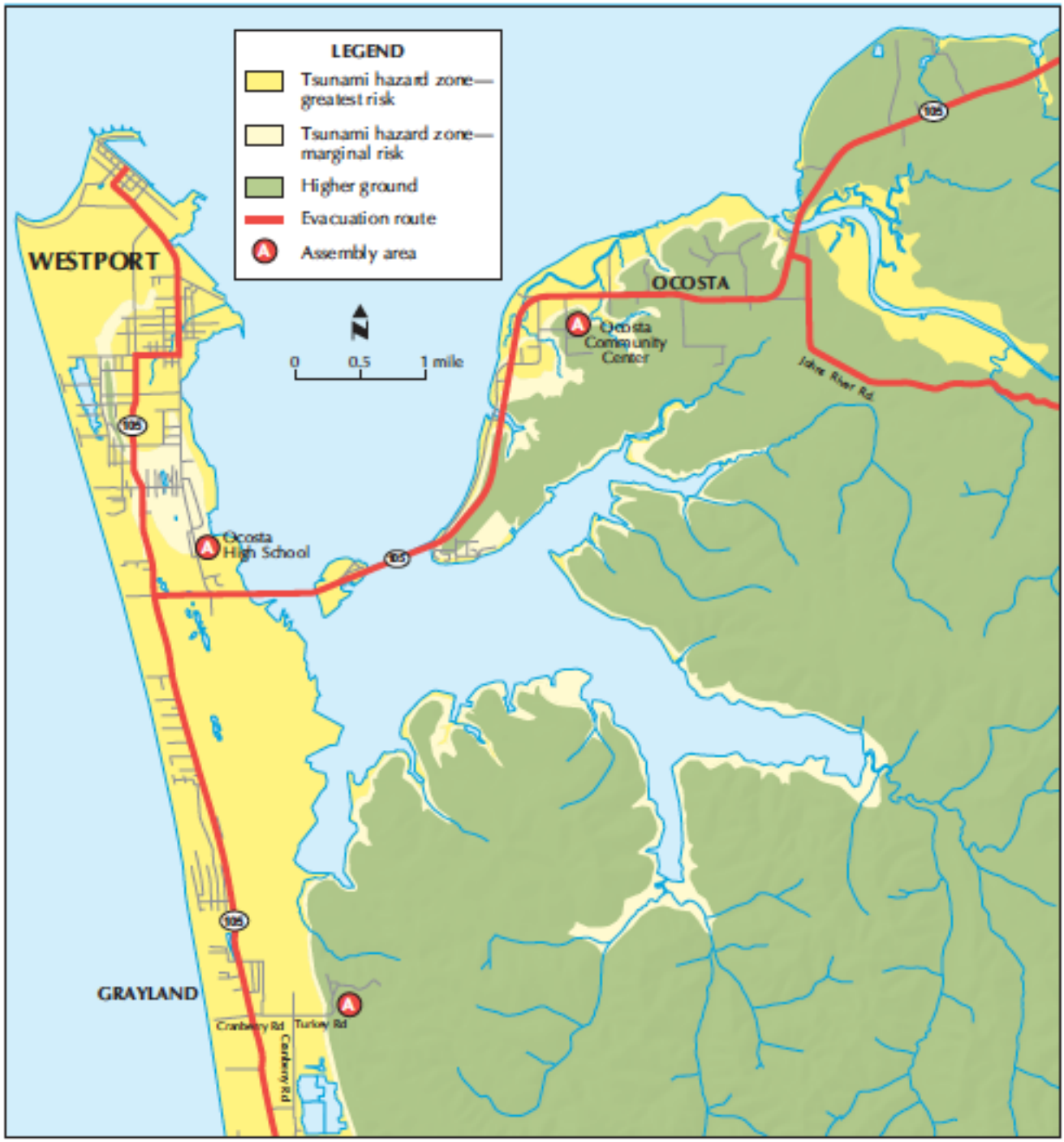


Figure 9. Tsunami Evacuation Walk route

Topics to consider

1. **What sort of signage would you want to see to help you navigate this route?**
2. **What issues come to mind regarding a community Inventory of Hazards?**
3. **How passible would this route be following a great earthquake?**
4. **What could help improve this evacuation route?**


LEGEND
Tsunami hazard zone—greatest risk
Tsunami hazard zone—marginal risk
Higher ground
Evacuation route
Assembly area
N
0
0.5
1 mile
WESTPORT
OCOSTA
Ocosta Community Center
Ocosta High School
GRAYLAND
Cranberry Rd
Turkey Rd
Cranberry Rd
Idaho River Rd
105

Stop 4 – Aberdeen GPS Station (N 46.92578, W 123.91613)

Directions – Backtrack through Westport to SR 105 and drive to the Stafford Creek Corrections Center. Park in the northeast corner of the parking lot.

Figure 10. Driving directions and maps for route from Westport to Aberdeen GPS station on the Stafford Creek Corrections Center grounds.

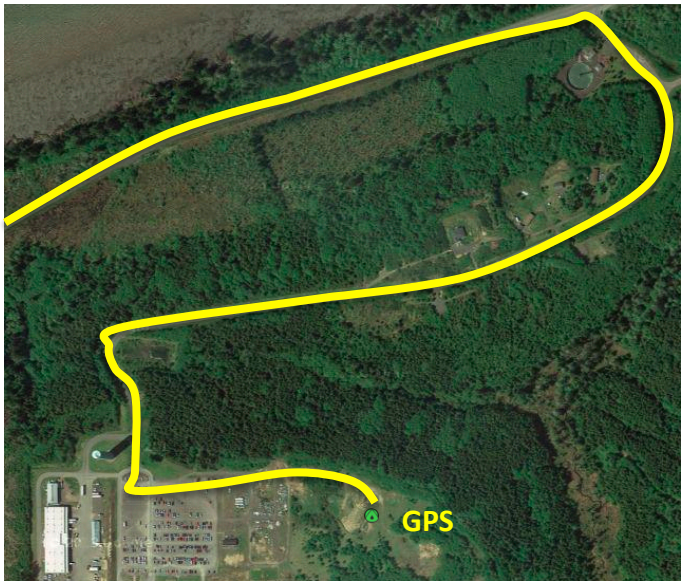
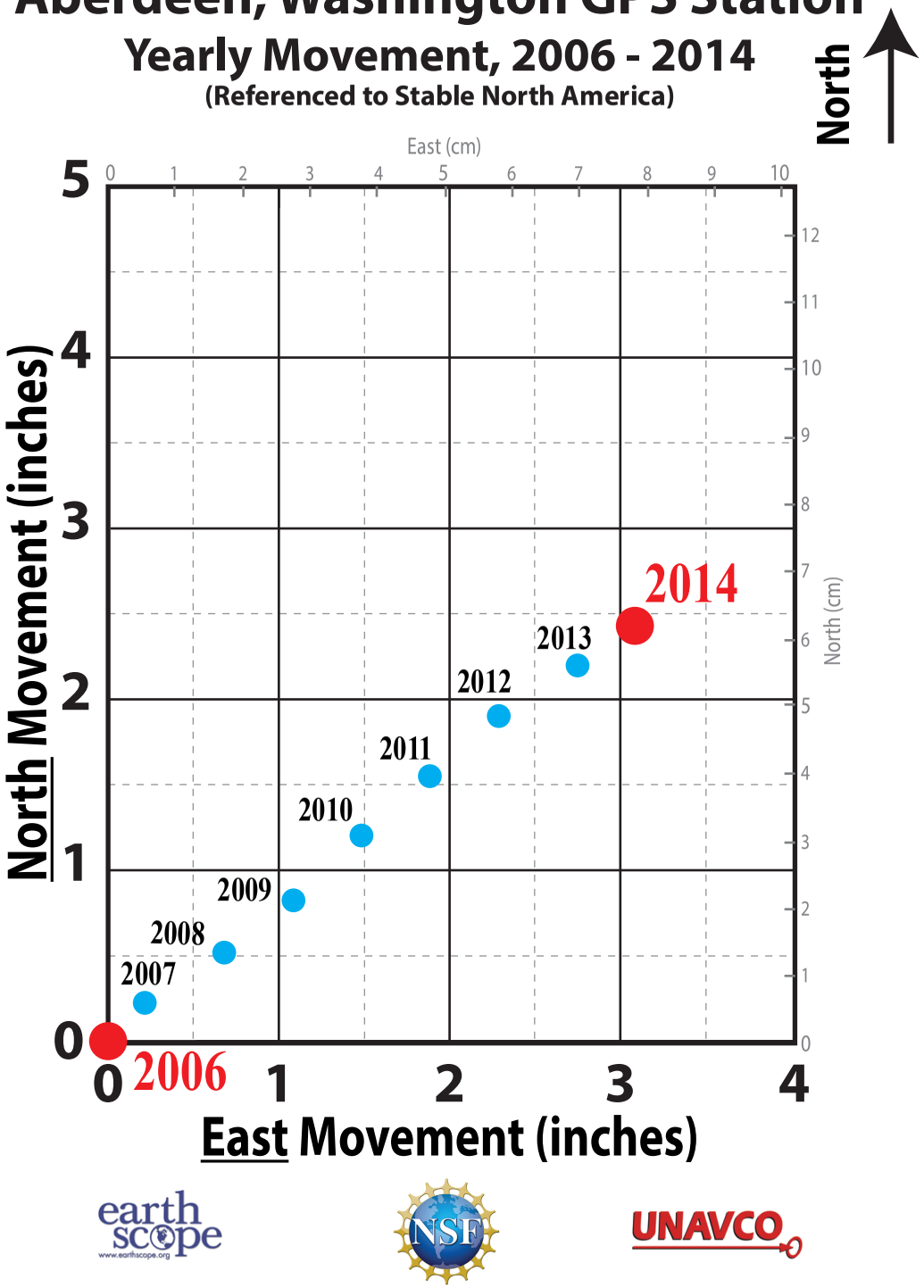


Figure 11. (next page) Aberdeen GPS Station annually-averaged position data 2006-2014.

Aberdeen, Washington GPS Station

Yearly Movement, 2006 - 2014

(Referenced to Stable North America)



Cut Here

The dots on this card show motion of the Aberdeen GPS station over the past nine years. Because the station is anchored into hard rock beneath the soil, the dots represent the year-to-year movement of the Aberdeen region toward the northeast.

Orient this graph toward the north, tape it to the floor, and think about the questions below.

1. How far has the Aberdeen region moved since the year 2004? At what rate (inches per year) is the region moving? At that rate, how far has the region moved since the year 1700?

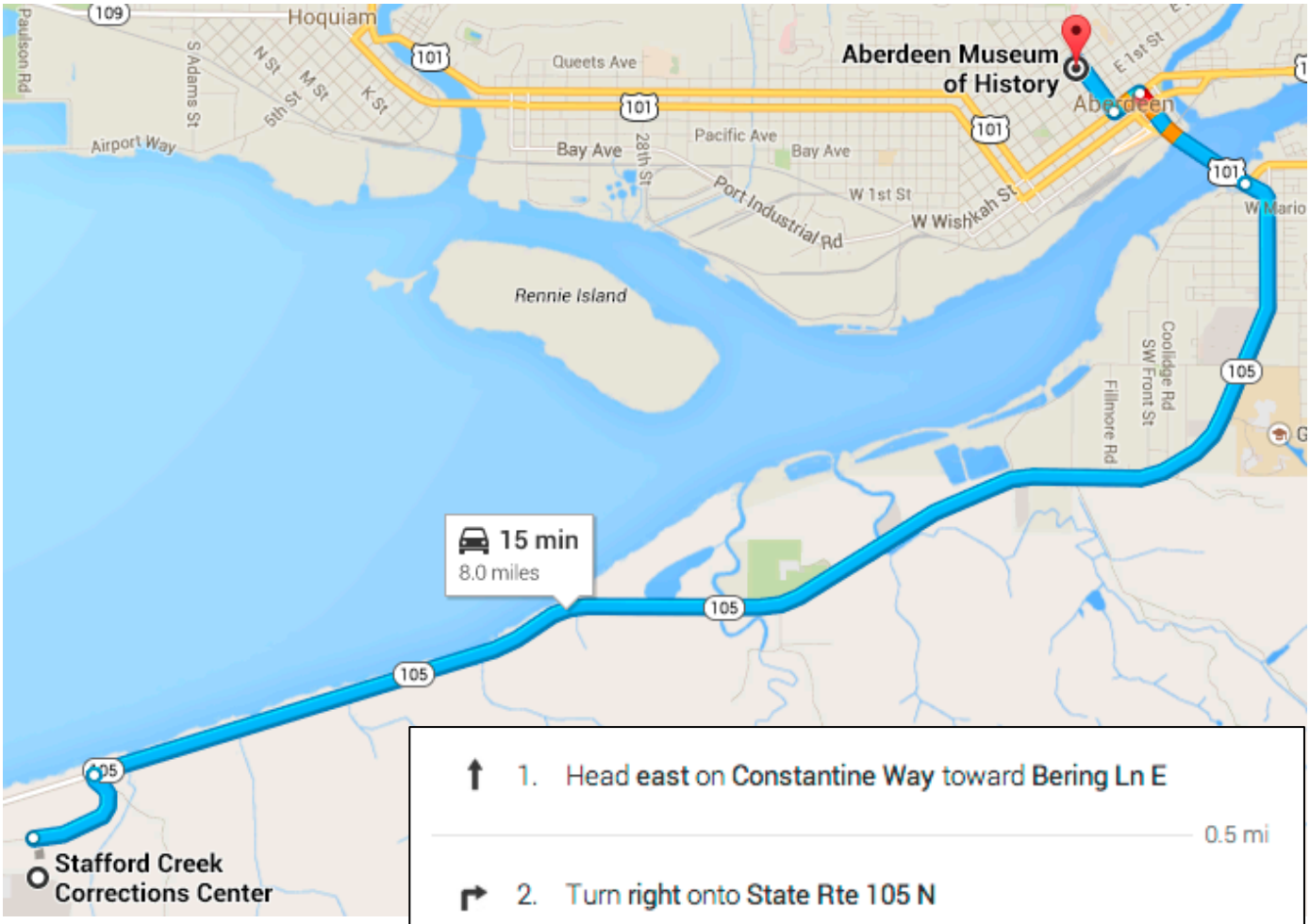
2. Why is the region moving toward the northeast?

3. The last big earthquake in the Pacific Northwest occurred in the year 1700. What will happen to the Aberdeen region when the next big earthquake occurs?

Station P398 from the EarthScope Plate Boundary Observatory (**http://pbo.unavco.org**). GPS time series data provided by UNAVCO (**http://www.unavco.org**). Data as of June 14, 2014.

Card developed by the Cascadia EarthScope Earthquake and Tsunami Education Program (**http://ceetep.oregonstate.edu**). CEETEP is sponsored by a grant from the EarthScope Program of the National Science Foundation (**http://www.earthscope.org**) to Oregon State University, the University of Portland, and Central Washington University.

Return to Aberdeen Museum



1. Head **east** on **Constantine Way** toward **Bering Ln E**
   0.5 mi
2. Turn **right** onto **State Rte 105 N**
   6.4 mi
3. Turn **left** onto **US-101 N**
   0.6 mi
4. Turn **left** onto **E Wishkah St**
   0.1 mi
5. Turn **right** at the 2nd cross street onto **S I St**
   0.3 mi
6. Turn **left** onto **E 3rd St**

Destination will be on the left