

**Vashon Ferry Terminal  
Trestle Seismic Project  
Marine Mammal Monitoring Plan**

December 11, 2014

In accordance with the June 2014, Washington State Ferries Vashon Ferry Terminal Trestle Seismic Project Incidental Harassment Authorization Request, marine mammal monitoring will be implemented during this project.

Qualified marine mammal observers will be present on site at all times during pile driving and removal. Marine mammal behavior, overall numbers of individuals observed, frequency of observation, and the time corresponding to the daily tidal cycle will be recorded.

The conservative 121 dB<sub>RMS</sub> underwater background was used to establish the vibratory driving ZOIs:

- 162 dB<sub>RMS</sub> @ 10 meters (24-inch steel vibratory pile driving/removal, 30-inch concrete-jacketed timber removal) = 5.5 km/3.4 miles to the 121 dB<sub>RMS</sub> background (Figure 1).
- 152 dB RMS @ 16 meters (13-inch timber piling removal) = 2.0 km/1.2 miles to the 121 dB<sub>RMS</sub> background (Figure 1).
- 171 dB<sub>RMS</sub> @ 10 meters (30-inch steel vibratory test pile removal) = 21.5 km/13.4 miles to the 121 dB<sub>RMS</sub> background (Figure 2).

Impact driving of 24-inch steel piles will result in the following ZOEs/ZOI:

- 190 dBRMS pinniped injury threshold is reached within 3.0 m/10 ft.
- 180 dBRMS cetacean injury threshold is reached within 12 m/39 ft.
- 160 dBRMS harassment threshold is reached within 251 m/824 ft.

The more conservative cetacean injury zone (12 m/39 ft.) will be used to set the 24-inch steel Zone of Exclusion (ZOE). The 24-inch steel impact ZOE and ZOI (excluding land) are shown in Figure 3 for one representative pile.

Impact driving of 30-inch steel test piles will result in the following ZOEs/ZOI:

- 190 dBRMS pinniped injury threshold is reached within 4 m/13 ft.
- 180 dBRMS cetacean injury threshold is reached within 19 m/62 ft.
- 160 dBRMS harassment threshold is reached within 402 m/1,319 ft.

The more conservative cetacean injury zone (19 m/62 ft.) will be used to set the 30-inch steel test pile ZOE. The 30-inch steel impact ZOE and ZOI (excluding land) are shown in Figure 3 for one representative pile.

Impact driving of 12-inch timber piling generates 170 dB RMS, which is below the injury threshold, but above the 160 dBRMS harassment threshold, which is reached within 46 m/152 ft. The 13-inch timber impact ZOI is shown in Figure 3 for three representative pile.

During the project, in-water measurements of vibratory pile driving and removal, and impact pile driving will be taken during the project. Project ZOIs/ZOEs may be adjusted based on these measurements.

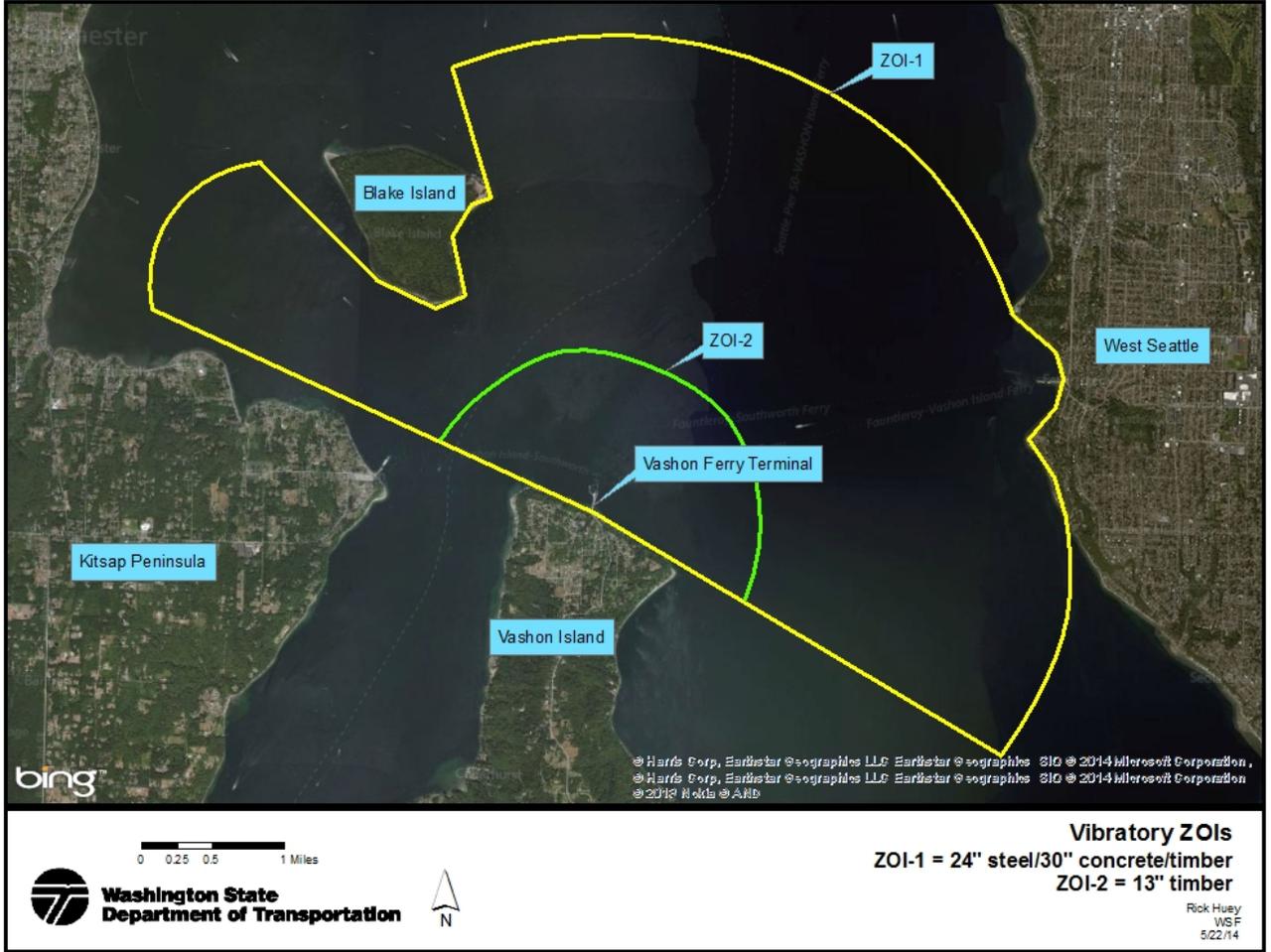


Figure 1 Vibratory ZOIs (121 dB underwater background)



Figure 2 Test pile Vibratory ZOI (121 dB underwater background)



Figure 3 Impact ZOIs/ZOEs

## **Monitoring to Estimate Take Levels and Prevent Level A Take**

WSF proposes the following plan in order to estimate project Level B acoustical harassment take levels in the ZOIs and to prevent Level A take:

- The required monitoring distances will be determined by using a range finder or hand-held global positioning system device.
- The ZOE/ZOIs will be monitored for the presence of marine mammals 30 minutes before, during, and 30 minutes after any pile driving activity.
- Monitoring will be continuous unless the contractor takes a significant break-then the 30 minutes before, during, and 30 minutes monitoring sequence will begin again.
- If marine mammals are observed, their location within the ZOIs, and their reaction (if any) to pile-driving activities will be documented.
- ZOI-1 will be monitored by one land-based biologist at the terminal work site, and one boat with a pilot and a biologist that will travel through the monitoring area (Figure 4).
- ZOI-2 will be monitored by one land-based biologist at the terminal work site, and one boat with a pilot and a biologist that will travel through the monitoring area (Figure 5).
- ZOI-3 will be monitored by five land-based biologists, and one boat with a pilot and a biologist that will travel through the monitoring area (Figure 6)
- ZOI-4 will be monitored by one land-based biologist at the terminal work site, and one boat with a pilot and a biologist that will travel through the monitoring area (Figure 7).
- ZOI-5 will be monitored by one land-based biologist at the terminal work site, and one boat with a pilot and a biologist that will travel through the monitoring area (Figure 7).
- ZOI-6 will be monitored by two land-based biologists from the terminal work site (Figure 7).

## **Monitoring to Comply with SRKW Take Levels**

To ensure that project take does not exceed 5 percent SRKW unintentional take in the ZOIs, the following steps will be implemented:

- The intent of monitoring is to prevent any take of SRKW.
- If SRKW approach the ZOIs during vibratory pile driving, work will be paused until the SRKW exit the ZOIs.
- If killer whale approach the ZOIs, and it is unknown whether they are SRKW or Transient, it shall be assumed they are SRKW and work will be paused until the whales exit the ZOIs.
- If SRKW enter the ZOIs undetected, up to 4 'unintentional' Level B harassment takes will be used. Work will be paused until the SRKW exit the ZOIs to avoid further Level B harassment take.
- The four unintentional Level B harassment takes will be used only if necessary.

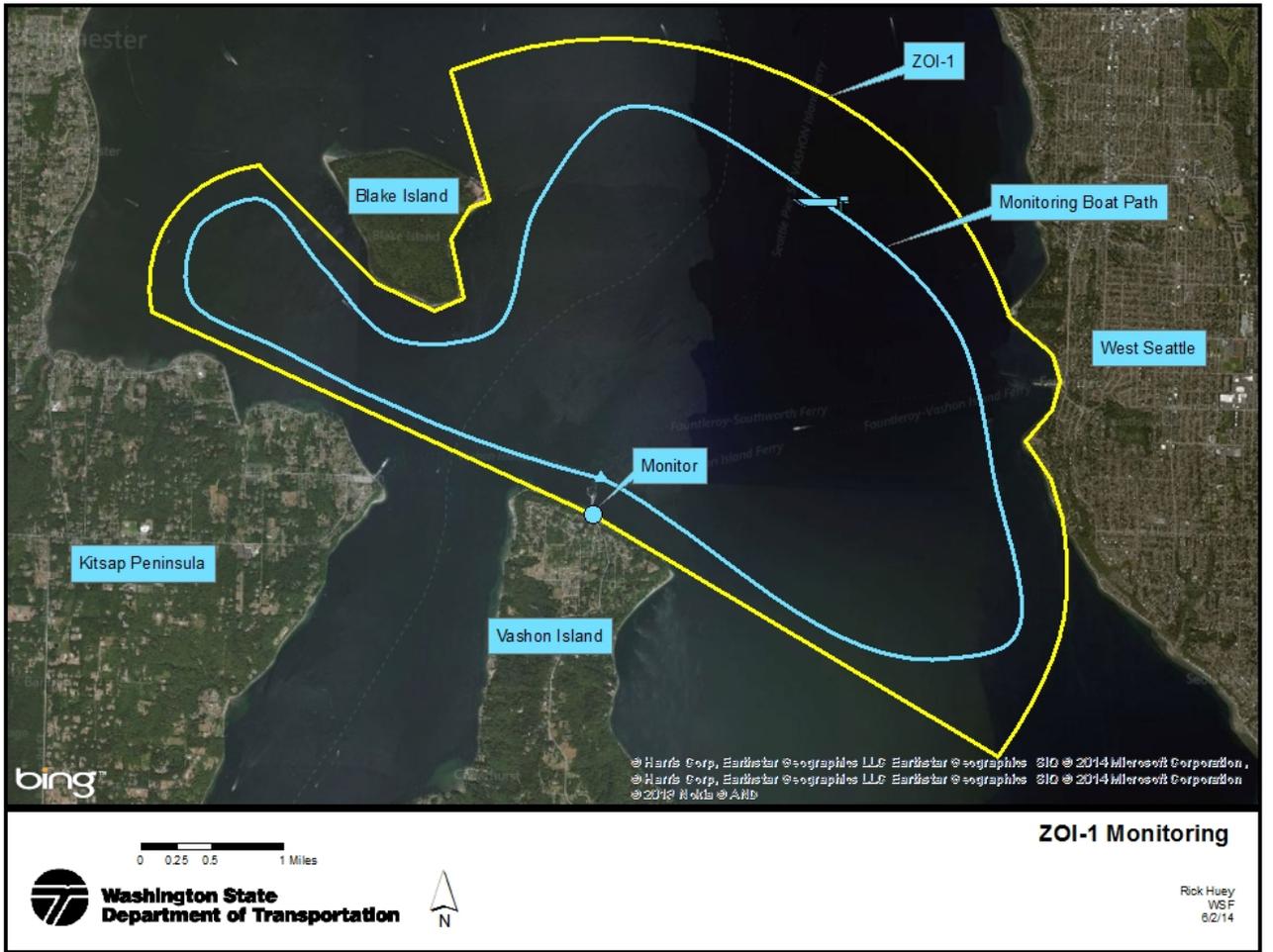


Figure 4 ZOI-1 Monitoring

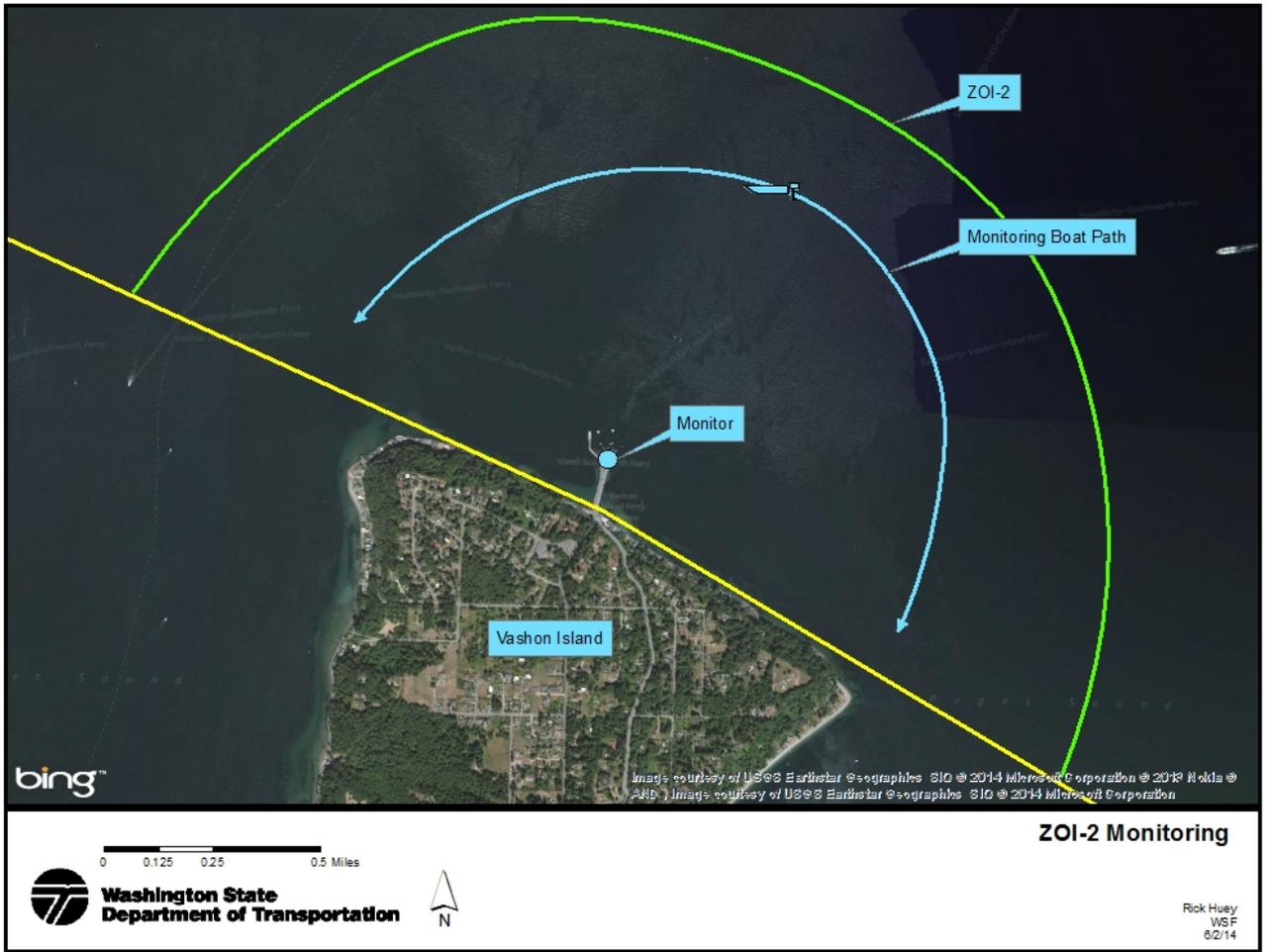


Figure 5 ZOI-2 Monitoring

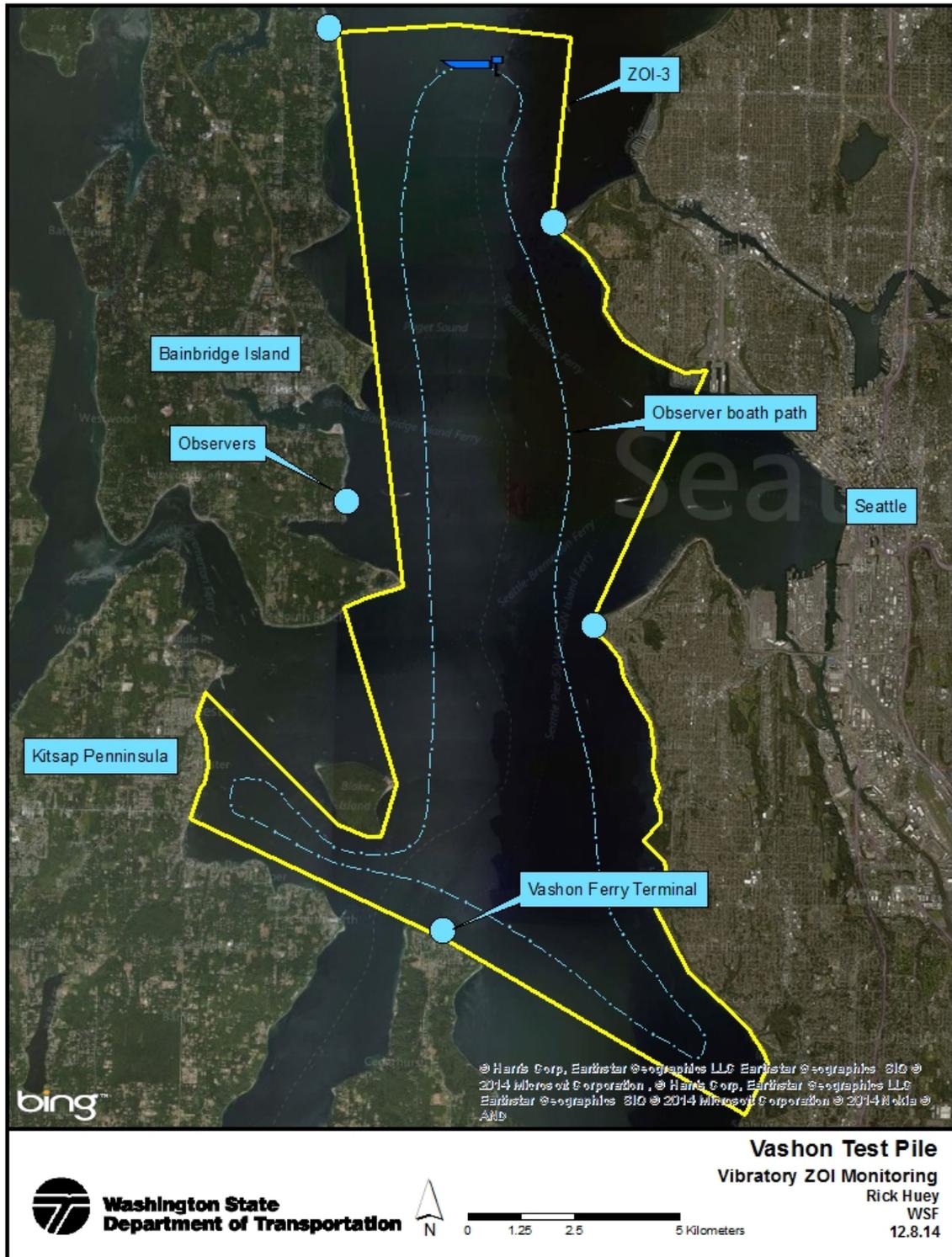


Figure 6 Test Pile ZOI Monitoring

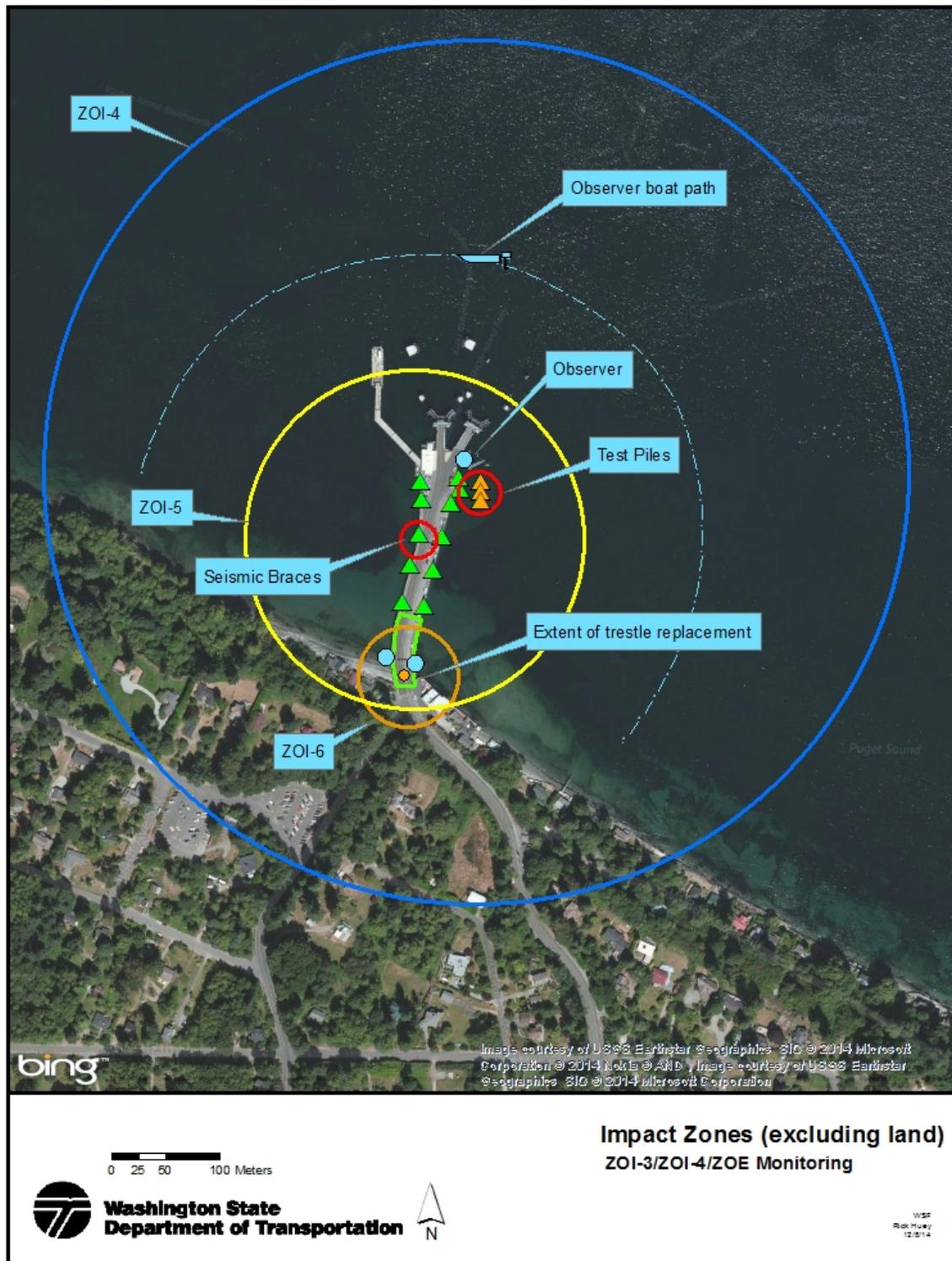


Figure 7 ZOI-4/ZOI-5/ZOI-6/ZOE Monitoring

## **Minimum Qualifications for Marine Mammal Observers**

Qualifications for marine mammal observers include:

- Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance. Use of binoculars may be necessary to correctly identify the target.
- Advanced education in biological science, wildlife management, mammalogy or related fields (Bachelor's degree or higher) is preferred, but not required.
- Experience or training in the field identification of marine mammals (cetaceans and pinnipeds).
- Sufficient training, orientation or experience with the construction operation to provide for personal safety during observations.
- Ability to communicate orally, by radio or in person, with project personnel to provide real time information on marine mammals observed in the area as necessary.
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).
- Writing skills to prepare a report of observations that would include number and type of marine mammals observed; behavior of marine mammals in the project area during construction, dates and times of observations; dates and times when in water construction activities were conducted; dates and times when marine mammals were present at or within the ZOE or ZOIs; dates and times when in water construction activities were suspended to avoid injury from impact pile driving or SRKW take within the ZOIs.