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December 6, 2016

The Honorable Rob Johnson, Councilmember  
City of Seattle Legislative Department  
600 Fourth Avenue, Floor 2  
PO Box 34025  
Seattle, Washington 98124-4025

Dear Councilmember Johnson:

**Subject: Comments on the City of Seattle Environmentally Critical Areas Update**

Hand-delivered and sent by email to: [rob.johnson@seattle.gov](mailto:rob.johnson@seattle.gov); [margaret.glowacki@seattle.gov](mailto:margaret.glowacki@seattle.gov)

Thank you for the opportunity to comment on the City of Seattle Environmentally Critical Areas Update. In short, Futurewise strongly supports the critical areas update. We believe that the update contains many helpful protections for water quality, people, and property. We do have some suggestions to protect these important resources and people and property below.

Futurewise is working throughout Washington State to create livable communities, protect our working farmlands, forests, and waterways, and ensure a better quality of life for present and future generations. We work with communities to implement effective land use planning and policies that prevent waste and stop sprawl, provide efficient transportation choices, create affordable housing and strong local businesses, and ensure healthy natural systems. We are creating a better quality of life in Washington State together. Futurewise has supporters across Washington State, including the City of Seattle.

## Summary of Our Recommendations

Futurewise strongly supports the update to the city's Environmentally Critical Areas regulations because the update includes many improvements over the existing critical areas regulations. For example, we strongly support New Section 14 that adopts new Section 25.09.075 which has improved standards for the application of pesticides and herbicides in critical areas and their buffers. Pesticides and herbicides adversely impact critical areas, such as riparian areas, wetlands, and wildlife habitats.

We do recommend the following improvements to the proposed regulations which are summarized here.

- Update the Seismic Hazard Areas provisions in Section 2 and Section 25.09.012.A.6 to incorporate the Washington State Department of Natural Resources' Liquefaction Susceptibility and Site Class Maps. Please see page 2 of this letter for more detail.
- Update the flood-prone areas provisions in Section 2 and Section 25.09.012B to include areas vulnerable area sea level rise as flood-prone areas and address the flooding, the higher storm surges, and increased erosion resulting from sea level rise. Zillow estimated that for Seattle "1,663 homes

(0.9% of the Seattle housing stock, worth a combined total of \$2.3 [billion], would be under water if sea levels rose 6 feet.”<sup>1</sup> Please see page 3 of this letter for more detail.

- Clarify that clearing, grading, draining, and other wetland impacts will not be allowed before a wetland determination is made. This is necessary to protect wetlands from adverse impacts. Wetlands perform valuable functions such as reducing peak flows during storms.<sup>2</sup> Please see page 5 of this letter for more detail.
- Adopt better protections from landside hazards for people and property. Landslides such as those that occur on Seattle’s bluffs can be deadly.<sup>3</sup> Improved critical areas regulations can reduce these hazards. Please see page 5 and page 10 of this letter for more detail.
- Improve wetland buffers to better protect wetlands and their important functions. Please see page 8 of this letter for more detail.
- Clarify the application of the critical areas regulations to better protect critical areas and people and property. Please see page 9 of this letter for more information.

## Specific Comments on the Environmentally Critical Areas Update

Update the Seismic Hazard Areas provisions in Section 2 and Section 25.09.012.A.6 on page 5 to incorporate the Washington State Department of Natural Resources’ Liquefaction Susceptibility and Site Class Maps.

The Seismic Hazard Areas provisions should be updated to incorporate the Washington State Department of Natural Resources’ Site Class maps.<sup>4</sup> In 2004, the Washington State Department of Natural Resources completed a set of liquefaction maps and maps identifying where the geology is likely to amplify ground shaking, referred to as “Site Class” maps. These maps represent best available science on the occurrence of these hazards which the Growth Management Act requires to the county to include in the development of critical areas regulations.

Adopting these maps and protective provisions for these areas will protect people and property from hazards resulting from earthquakes. The Site Class Map identifies areas where the underlying geology is likely to amplify shaking on the ground surface. This is the most damaging effect of an earthquake. So buildings constructed on areas more susceptible to strong shaking area are more likely to be damaged or destroyed in an earthquake.<sup>5</sup> By identifying these areas and engineering and constructing buildings to

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<sup>1</sup> Krishna Rao, *Climate Change and Housing: Will a Rising Tide Sink all Homes?* ZILLOW “Underwater Homes in Seattle” webpage (8/2/2016) *Id.* accessed on Dec. 5, 2016 at: <http://cdn1.blog-media.zillowstatic.com/3/Seattle-c4cfec.png> and enclosed with the paper version of this letter.

<sup>2</sup> Sheldon, D., T. Hraby, P. Johnson, K. Harper, A. McMillan, T. Granger, S. Stanley, and E. Stockdale, *Wetlands in Washington State – Volume 1: A Synthesis of the Science* p. 2-30 & p. 2-32 (Washington State Department of Ecology, Publication #05-06-006, Olympia, WA: March 2005) on the CAO on CD enclosed with the paper original of this letter on Data CD 1 in the Wetlands directory with the filename “0506006.pdf” and accessed on Dec. 6, 2016 at: <https://fortress.wa.gov/ecy/publications/summarypages/0506006.html>.

<sup>3</sup> Edwin L. Harp, John A. Michael, and William T. Laprade, *Shallow-Landslide Hazard Map of Seattle, Washington* p. 2 (U.S. Geological Survey Open-File Report 2006–1139: 2006) on the CAO on CD enclosed with the paper original of this letter on Data CD 2 in the \Geo Hazards\Landslide Hazards directory with the filename “of06-1139\_508.pdf” and accessed on Dec. 5, 2016 at: <http://pubs.usgs.gov/of/2006/1139/>.

<sup>4</sup> The maps are available at the Geologic Information Portal accessed on Dec. 5, 2016 at: <http://www.dnr.wa.gov/geologyportal> or <ftp://ww4.dnr.wa.gov/geology/pubs/ofr04-20/> and on the CAO on CD enclosed with the paper original of this letter on Data CD 2 in the directory \Geo Hazards\Earthquake Hazards.

<sup>5</sup> Stephen P. Palmer, Sammantha L. Magsino, Eric L. Bilderback, James L. Poelstra, Derek S. Folger, and Rebecca A. Niggemann, *Liquefaction Susceptibility and Site Class Maps of Washington State, By County* pp. 2 – 3 (Washington Division of Geology and Earth Resources, Open File Report 2004-20: Sept. 2004) accessed on Dec. 5, 2016 at:

w withstand this shaking, people and property will be better protected from earthquake damage. We recommend that areas classified as having a site class of “D to E,” “E,” and “F” be designated as geological hazards.

Update the flood-prone areas provisions in Section 2 and Section 25.09.012.B on page 6 to include areas vulnerable area sea level rise as flood-prone areas and address the flooding, the higher storm surges, and increased erosion resulting from sea level rise.

Sea level is rising and floods and erosion are increasing. In 2012 the National Research Council concluded that global sea level had risen by about seven inches in the 20<sup>th</sup> Century and would likely rise by 24 inches on the Washington coast by 2100 including Puget Sound.<sup>6</sup> The general extent of the two feet of sea level rise currently projected for Seattle can be seen on the NOAA Office for Coastal Management Digitalcoast Sea Level Rise Viewer available at: <https://coast.noaa.gov/digitalcoast/tools/slr> (last accessed on Dec. 5, 2016).

The State of Washington Department of Ecology (Ecology) writes that “[s]ea level rise and storm surge[s] will increase the frequency and severity of flooding, erosion, and seawater intrusion—thus increasing risks to vulnerable communities, infrastructure, and coastal ecosystems.”<sup>7</sup> Not only our marine shorelines will be impacted, as Ecology writes “[m]ore frequent extreme storms are likely to cause river and coastal flooding, leading to increased injuries and loss of life.”<sup>8</sup>

A recent peer reviewed scientific study ranked Washington State 14<sup>th</sup> in terms of the number of people living on land less than one meter above local Mean High Water compared to the 23 contiguous coastal states and the District of Columbia.<sup>9</sup> This amounted to an estimated 18,269 people in 2010.<sup>10</sup> One meter, 3.28 feet, is within the projected sea level rise estimates of three to four feet or more for the end of this century.<sup>11</sup>

Zillow recently estimated that 31,235 homes in Washington State may be underwater by 2100, 1.32 percent of the state’s total housing stock. The value of the submerged homes is an estimated \$13.7 billion.<sup>12</sup> Zillow also estimated that for Seattle “1,663 homes (0.9% of the Seattle housing stock, worth a combined total of \$2.3 [billion], would be under water if sea levels rose 6 feet.”<sup>13</sup> Zillow wrote:

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[ftp://ww4.dnr.wa.gov/geology/pubs/ofr04-20/ofr2004-20\\_report.pdf](ftp://ww4.dnr.wa.gov/geology/pubs/ofr04-20/ofr2004-20_report.pdf) and on the CAO on CD enclosed with the paper original of this letter on Data CD 2 in the directory \Geo Hazards\Earthquake Hazards with the filename “ofr2004-20\_report.pdf.”

<sup>6</sup> National Research Council, *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future* p. 5, p. 23, pp. 71 – 72, p. 96, p. 102, p. 156, (2012). Accessed on Dec. 5, 2016 at: [http://www.nap.edu/catalog.php?record\\_id=13389](http://www.nap.edu/catalog.php?record_id=13389)

<sup>7</sup> State of Washington Department of Ecology, *Preparing for a Changing Climate Washington State’s Integrated Climate Response Strategy* p. 90 (Publication No. 12-01-004: April 2012). Accessed on Dec. 5, 2016 at: [http://www.ecy.wa.gov/climatechange/ipa\\_responsestrategy.htm](http://www.ecy.wa.gov/climatechange/ipa_responsestrategy.htm)

<sup>8</sup> *Id.* at p. 17.

<sup>9</sup> Benjamin H Strauss, Remik Ziemiński, Jeremy L Weiss, and Jonathan T Overpeck, *Tidally adjusted estimates of topographic vulnerability to sea level rise and flooding for the contiguous United States* 7 ENVIRON. RES. LETT. 014033, 4 (2012). Accessed on Dec. 5, 2016 at: <http://iopscience.iop.org/1748-9326/7/1/014033/article> This journal is peer reviewed. Environmental Research Letters “Submission requirements” webpage accessed on Dec. 5, 2016 at: <http://iopscience.iop.org/1748-9326/page/Submission%20requirements>

<sup>10</sup> *Id.*

<sup>11</sup> Washington State Department of Ecology, *Preparing for a Changing Climate: Washington State’s Integrated Climate Response Strategy* p. 82 (Publication No. 12-01-004: April 2012).

<sup>12</sup> Krishna Rao, *Climate Change and Housing: Will a Rising Tide Sink all Homes?* ZILLOW webpage (8/2/2016) accessed on Dec. 5, 2016 at: <http://www.zillow.com/research/climate-change-underwater-homes-12890/>

<sup>13</sup> *Id.* accessed on Dec. 5, 2016 at: <http://cdn1.blog-media.zillowstatic.com/3/Seattle-c4cfec.png>

It's important to note that 2100 is a long way off, and it's certainly possible that communities take steps to mitigate these risks. Then again, given the enduring popularity of living near the sea despite its many dangers and drawbacks, it may be that even more homes will be located closer to the water in a century's time, and these estimates could turn out to be very conservative. Either way, left unchecked, it is clear the threats posed by climate change and rising sea levels have the potential to destroy housing values on an enormous scale.<sup>14</sup>

Sea level rise will have an impact beyond rising seas, floods, and storm surges. The National Research Council wrote that:

Rising sea levels and increasing wave heights will exacerbate coastal erosion and shoreline retreat in all geomorphic environments along the west coast. Projections of future cliff and bluff retreat are limited by sparse data in Oregon and Washington and by a high degree of geomorphic variability along the coast. Projections using only historic rates of cliff erosion predict 10–30 meters [33 to 98 feet] or more of retreat along the west coast by 2100. An increase in the rate of sea-level rise combined with larger waves could significantly increase these rates. Future retreat of beaches will depend on the rate of sea-level rise and, to a lesser extent, the amount of sediment input and loss.<sup>15</sup>

A recent paper estimated that “[a]nalysis with a simple bluff erosion model suggests that predicted rates of sea-level rise have the potential to increase bluff erosion rates by up to 0.1 m/yr by the year 2050.”<sup>16</sup> This translates to four additional inches of bluff erosion a year.

Homes built today are likely to be in use 2100. And new lots created today will be in use in 2100. This is why the Washington State Department of Ecology recommends “[l]imiting new development in highly vulnerable areas.”<sup>17</sup>

There is evidence that the potential for increased flood damage is affecting the price of real estate in flood prone areas.<sup>18</sup> So allowing more development in areas likely to flood due to sea level rise puts people, property, and their investments in their homes at risk.

So we recommend identifying the areas likely to flood due to sea level rise over the next 100 years as flood hazard areas and require new development in these areas to take steps to protect the development from flooding. Since single-family homes and other buildings are commonly used for 100 years or more, we believe the standard should be 100 years consistent with the hundred-year flood.

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<sup>14</sup> Krishna Rao, *Climate Change and Housing: Will a Rising Tide Sink all Homes?* ZILLOW webpage (8/2/2016).

<sup>15</sup> National Research Council, *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future* p. 135 (2012).

<sup>16</sup> George M. Kaminsky, Heather M. Baron, Amanda Hacking, Diana McCandless, David S. Parks, *Mapping and Monitoring Bluff Erosion with Boat-based LIDAR and the Development of a Sediment Budget and Erosion Model for the Elwha and Dungeness Littoral Cells, Clallam County, Washington* p. 3 accessed on Dec. 5, 2016 at:

[http://www.coastalwatershedinstitute.org/Final%20Report\\_Clallam%20County%20Bluffs%202014\\_Final%20revised.pdf](http://www.coastalwatershedinstitute.org/Final%20Report_Clallam%20County%20Bluffs%202014_Final%20revised.pdf) and enclosed in a separate email.

<sup>17</sup> State of Washington Department of Ecology, *Preparing for a Changing Climate Washington State's Integrated Climate Response Strategy* p. 90 (Publication No. 12-01-004: April 2012).

<sup>18</sup> Ian Urbina, *Perils of Climate Change Could Swamp Coastal Real Estate* *The New York Times* pp. 3 – 5 of 10 (Nov. 24, 2016) accessed on Dec. 5, 2016 at: [http://www.nytimes.com/2016/11/24/science/global-warming-coastal-real-estate.html?\\_r=0](http://www.nytimes.com/2016/11/24/science/global-warming-coastal-real-estate.html?_r=0) and enclosed with this letter.

Clarify that clearing, grading, draining, and other wetland impacts will not be allowed before a wetland determination is made. Please see Section 2 and Section 25.09.012.C.3 on page 7.

Ecology recommends that “[a]t a minimum, it is important to regulate all activities that would directly impact a wetland and its buffer such as filling, draining, excavating, clearing, flooding, and tilling. Other activities that should be included are herbicide application, stormwater discharges, and water diversions and withdrawals.”<sup>19</sup> So we recommend that proposed Section 25.09.012.C.3 be modified to read as follows:

3. Determination that an area meets the conditions of subsection 25.09.012.C.2.a or 25.09.012.C.2.b shall be made during the evaluation of an application prior to allowing the filling, shading, draining, grading, excavating, flooding, tilling, herbicide application, stormwater discharges, water diversions or withdrawals, or other uses or activities that will adversely impact of such areas.

Better protect people and property from landside hazards. See Section 15, Section 25.09.080, and Section 16, Section 25.09.180, on pages 48 to 57.

The available science documents that “[p]recipitation and earthquake-triggered landslides are a recurring problem on many hillslopes in Seattle ...”<sup>20</sup> “[A]pproximately 9 percent of the area of Seattle has annual exceedance probabilities of 1 percent or greater ...” the same as the 100-year flood.<sup>21</sup>

The Growth Management Act (GMA) requires counties and cities to “adopt development regulations that adequately protect development from ...” geologically hazardous areas including landslide hazards and to assure that any allowed development “does not result in harm to other properties.”<sup>22</sup>

The United States Geological Survey (USGS) report *Shallow-Landslide Hazard Map of Seattle, Washington* documents that Seattle’s landslide hazard areas are dangerous places to build.

Although most of the source areas for debris flows are located near the tops of slopes in the Seattle area, debris-flow sources are scattered among lower parts of the slopes as well. There are enough of these that a runout zone established below susceptible cells based on the mean or maximum runout length from this data set would cover most of the existing slopes. For this reason, we conclude that the runout data indicate that all areas of steep slopes forming bluffs of Puget Sound and along other bluffs in the Seattle area should be considered hazardous. Furthermore, where flat-lying areas exist in Seattle below steep

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<sup>19</sup> T. Granger, T. Hrubby, A. McMillan, D. Peters, J. Rubey, D. Sheldon, S. Stanley, E. Stockdale, *Wetlands in Washington State - Volume 2: Guidance for Protecting and Managing Wetlands* p. 8-11 (Washington State Department of Ecology, Olympia, WA: April 2005, Publication #05-06-008) on the CAO on CD enclosed with the paper original of this letter on Data CD 1 in the Wetlands directory with the filename “0506008.pdf” and accessed on Dec. 5, 2016 at: <https://fortress.wa.gov/ecy/publications/documents/0506008.pdf>.

<sup>20</sup> Jeffrey A. Coe, John A. Michael, Robert A. Crovelli, William Z. Savage, William T. Laprade, William D. Nashem, *Probabilistic Assessment of Precipitation-Triggered Landslides Using Historical Records of Landslide Occurrence, Seattle, Washington* Vol. X ENVIRONMENTAL & ENGINEERING GEOSCIENCE 103 p. 103 (2004) enclosed with the paper original of this letter and accessed on Dec. 5, 2016 at: [http://landslides.usgs.gov/docs/coe/Coe\\_eeeg\\_art.pdf](http://landslides.usgs.gov/docs/coe/Coe_eeeg_art.pdf). Environmental & Engineering Geoscience is a peer reviewed journal. Environmental & Engineering Geoscience Complete Author Instructions p. 1 of 6 (May 8, 2012) accessed on Dec. 5, 2016 at: [http://eeeg.allentrack.net/cgi-bin/main.plex?form\\_type=display\\_auth\\_instructions&j\\_id=100](http://eeeg.allentrack.net/cgi-bin/main.plex?form_type=display_auth_instructions&j_id=100) and enclosed with the paper original of this letter.

<sup>21</sup> *Id.*

<sup>22</sup> *Pilchuck, et al. v. Snohomish County (Pilchuck II)*, CPSGMHB Case No. 95-3-0047c, Order Partially Granting Motions for Reconsideration and Clarification (Jan. 25, 1996), at \*7 – 8 of 16, 1996 WL 650336 p. \*5 – 7.

slopes that are above water and can be occupied, a runout zone based on the mean (60.2 m [197.5 ft.]) or maximum (235 m [771 ft.]) runout length would provide a degree of protection for the runout areas of most of the existing slopes of concern.<sup>23</sup>

SCC 25.09.080 and 25.09.090 only apply to “parcels containing a steep slope erosion hazard area or steep slope erosion hazard area buffer.” But landslides can destroy homes and buildings that are not on the parcel that has a landslide or buffer. As was documented the earlier quote, landslides on the Seattle bluffs have been measured running out 771 ft.<sup>24</sup> The 2013 LedgeWood-Bonair Landslide on Whidbey Island extended approximately 300 feet into Puget Sound.<sup>25</sup> A shallow debris flow that initiated above Rolling Bay Walk on Bainbridge Island, on the same type of bluffs that exist in Seattle, “destroyed the house at the foot of the slope and resulted in four fatalities.”<sup>26</sup> We recommend that SCC 25.09.080 and 25.09.090 apply to any property that can be damaged by a landslide. So we recommend that SCC 25.09.080.A be modified to read as follows with our additions double underlined and our deletions double struck through:

A. This ~~((s))~~ Section 25.09.080 applies to all parcels in or containing a landslide-prone ~~((critical))~~ area and parcels with the potential to be damaged by a geological hazard originating in a landslide-prone area.

For the same reasons, we recommend that SCC 25.09.090.A be modified to read as follows with our additions double underlined and our deletions double struck through:

A. This Section 25.09.090~~((180))~~ and Section 25.09.080 apply to parcels containing a steep slope erosion hazard area or steep slope erosion hazard area buffer and parcels with the potential to be damaged by a geological hazard originating in a steep slope erosion hazard area.

While we recognize that the proposed amendments to SMC 25.09.090.B.2 increase protection from landslide hazards, we recommend that the first sentence of this subsection explicitly require a determination that the proposed development is adequately protected from landslides and that the development will not harm other properties as the GMA requires. Our recommended additions are underlined and our recommended deletions are double struck through. and our recommended deletions

2. ~~((Provided))~~ Development is allowed on steep slope erosion hazard areas if the applicant demonstrates that all ~~((the))~~ other provisions of this Chapter 25.09 and all applicable provisions of Title 23 and Chapters 22.800 through 22.808 are met, ~~((subsection 25.09.180.B.1 does not apply when the applicant demonstrates))~~ that the proposed development is safe from landslide hazards, that no adverse impact on the stability or erosion potential of the steep slope erosion hazard areas will result, that the proposed development will not increase the potential that other properties will

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<sup>23</sup> Edwin L. Harp, John A. Michael, and William T. Laprade, *Shallow-Landslide Hazard Map of Seattle, Washington* p. 17 (U.S. Geological Survey Open-File Report 2006–1139: 2006) on the CAO on CD enclosed with the paper original of this letter on Data CD 2 in the \Geo Hazards\Landslide Hazards directory with the filename “of06-1139\_508.pdf” and accessed on Dec. 5, 2016 at: <http://pubs.usgs.gov/of/2006/1139/>.

<sup>24</sup> *Id.*

<sup>25</sup> Stephen Slaughter, Isabelle Sarikhan, Michael Polenz, and Tim Walsh, *Quick Report for the LedgeWood-Bonair Landslide, Whidbey Island, Island County, Washington* pp. 3 – 4 (Washington State Department of Natural Resources, Division of Geology and Earth Resources: March 28, 2013). Accessed on Dec. 5, 2016 at: [http://www.dnr.wa.gov/publications/ger\\_qr\\_whidbey\\_island\\_landslide\\_2013.pdf](http://www.dnr.wa.gov/publications/ger_qr_whidbey_island_landslide_2013.pdf) on the CAO on CD enclosed with the paper original of this letter in the directory Data CD 2\Geo Hazards\Landslide Hazards with the filename “ger\_qr\_whidbey\_island\_landslide\_2013.pdf.”

<sup>26</sup> Edwin L. Harp, John A. Michael, and William T. Laprade, *Shallow-Landslide Hazard Map of Seattle, Washington* p. 2 (U.S. Geological Survey Open-File Report 2006–1139: 2006).

be harmed, and that the development meets one of the following criteria and the criteria in subsection 25.09.090.B.3.

We are also concerned that the buffers required by SMC 25.09.090.C are too narrow. As was noted above, the USGS recommended runout buffers of between 197.5 ft. and 771 ft.<sup>27</sup> The 2013 Ledgeswood-Bonair Landslide on Whidbey Island extended approximately 300 feet into Puget Sound.<sup>28</sup> So we recommend that SMC 25.09.090.C require the science-based identification of landslide top of slope and slope faces subject to failure and sliding, toe of slope areas subject to impact from down slope run-out, and that science-based top, side, and bottom buffers be required for these areas. The buffers should be based on a site specific evaluation and be peer-reviewed. The Joint SR 530 Landslide Commission recommends identifying “[c]ritical area buffer widths based on site specific geotechnical studies” as an “innovative development regulation[]” that counties and cities should adopt.<sup>29</sup>

It is important to understand that homeowners insurance does not cover the damage from landslides. “Insurance coverage for landslides is uncommon. It is almost never a standard coverage, and is difficult to purchase inexpensively as a policy endorsement.”<sup>30</sup>

None of the Oso landslide victims’ homes were covered by insurance for landslide hazards.<sup>31</sup> And that is common when homes are damaged by landslides.<sup>32</sup> For example, on March 14, 2011, a landslide damaged the home of Rich and Pat Lord.<sup>33</sup> This damage required the homeowners to abandon their home on Norma Beach Road near Edmonds, Washington. Because their homeowners insurance did not cover landslides, they lost their home.<sup>34</sup> This loss of what may be a family’s largest financial asset is common when homes are damaged or destroyed by landslides and other geological hazards.

Landslide buyouts are rare and when they occur the property owner often only recovers pennies on the dollar. The property owners bought out after the Aldercrest-Banyon landslide in Kelso, Washington

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<sup>27</sup> *Id.* p. 17.

<sup>28</sup> Stephen Slaughter, Isabelle Sarikhan, Michael Polenz, and Tim Walsh, *Quick Report for the Ledgeswood-Bonair Landslide, Whidbey Island, Island County, Washington* pp. 3 – 4 (Washington State Department of Natural Resources, Division of Geology and Earth Resources: March 28, 2013). Accessed on Dec. 5, 2016 at: [http://www.dnr.wa.gov/publications/ger\\_qr\\_whidbey\\_island\\_landslide\\_2013.pdf](http://www.dnr.wa.gov/publications/ger_qr_whidbey_island_landslide_2013.pdf) on the CAO on CD enclosed with the paper original of this letter in the directory Data CD 2\Geo Hazards\Landslide Hazards with the filename “ger\_qr\_whidbey\_island\_landslide\_2013.pdf.”

<sup>29</sup> The SR 530 Landslide Commission, *Final Report* p. 31 (Dec. 15, 2014) accessed on Dec. 5, 2016 at: [http://www.governor.wa.gov/sites/default/files/documents/SR530LC\\_Final\\_Report.pdf](http://www.governor.wa.gov/sites/default/files/documents/SR530LC_Final_Report.pdf) on the CAO on CD enclosed with the paper original of this letter in the directory Data CD 2\Geo Hazards\Landslide Hazards with the filename “SR530LC\_Final\_Report.pdf”

<sup>30</sup> Robert L. Schuster & Lynn M. Highland, *The Third Hans Cloos Lecture: Urban landslides: socioeconomic impacts and overview of mitigative strategies* 66 BULLETIN OF ENGINEERING GEOLOGY AND THE ENVIRONMENT 1, p. 22 (2007) accessed on Dec. 5, 2016 at: [ftp://193.134.202.10/pub/TRAMM/Workshop\\_EWS/Literature/Schuster\\_and\\_Highland\\_2007\\_Bulletin\\_of\\_Engineering\\_Geology\\_and\\_the\\_Environment.pdf](ftp://193.134.202.10/pub/TRAMM/Workshop_EWS/Literature/Schuster_and_Highland_2007_Bulletin_of_Engineering_Geology_and_the_Environment.pdf)

<sup>31</sup> Sanjay Bhatt, *Slide erased their homes, but maybe not their loans* *The Seattle Times* (April 2, 2014) accessed on Dec. 5, 2016 at: [http://old.seattletimes.com/html/latestnews/2023278858\\_mudslidefinancial.xml.html](http://old.seattletimes.com/html/latestnews/2023278858_mudslidefinancial.xml.html)

<sup>32</sup> *Id.*

<sup>33</sup> Ian Terry, *Abandoned and trashed after mudslide, Edmonds house now for sale* *The Herald* (Feb. 11, 2015). The house is for sale after the bank who held the Lord’s mortgage took ownership of the home. *Id.* accessed on Dec. 5, 2016 at: <http://www.heraldnet.com/article/20150211/NEWS01/150219829>

<sup>34</sup> *Id.* at p. \*6.

destroyed their homes received 30 cents on the dollar.<sup>35</sup> This is underlines why preventing development in landslide hazards is just plain ordinary consumer protection.

The wetland buffers must better protect wetlands from adverse impacts. See Section 20 and Section 25.09.160 on pages 61 and 62.

The buffers in Section 25.09.160 are not wide enough to protect Seattle's wetlands. The buffers in Section 25.09.160 are narrower for high intensity uses than those recommended by the Washington State Department of Ecology (Ecology) and wider than the buffers Ecology recommends for low intensity uses. For example, Ecology recommends 300-foot-wide buffers for high intensity uses near Category I and II wetlands, the two highest quality wetland classes, with high habitat function, 200 feet wide buffers for moderate intensity uses, and 150 feet wide buffers to low intensity uses.<sup>36</sup> Section 25.09.160 proposes 200-foot-wide buffers for category I and II wetlands with high level of habitat function.<sup>37</sup> High intensity uses include commercial, urban, industrial, institutional, retail sales, and residential uses with a density of more than one dwelling unit per acre.<sup>38</sup> These are the most common uses in Seattle. If the 200-foot-wide buffer is used for a high intensity use, wetland functions and values will be damaged.<sup>39</sup>

The allowance for wider buffers in Section 25.09.160.B.3.b does not compensate for these potential impacts because they do not require, or even allow, the director to increase buffer widths due to the intensity of the uses adjacent to the wetland. In addition, since Seattle last updated its critical areas regulations new science has shown that wider buffers are needed to protect wildlife in wetlands. As Ecology wrote:

If prescribed buffers are to be used to adequately protect wetland wildlife, they will probably have to be larger than what is currently used. Based on the needs of wildlife species found in Wisconsin (some of which are also found in Washington State), the minimum buffer width is about 400 ft, and the optimal width for sustaining the majority of wildlife species is about 900 ft.<sup>40</sup>

So the City should not rely on its existing, narrow buffers as justification for the wetland buffers in the update. We recommend that Ecology's science-based guidance be followed and Table A for 25.09.160

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<sup>35</sup> Isabelle Sarikhan, *Sliding Thought Blog, Washington's Landslide Blog* Landslide of the Week – Aldercrest Banyon Landslide July 29, 2009 accessed on Dec. 5, 2016 at: <https://slidingthought.wordpress.com/2009/07/29/landslide-of-the-week-aldercrest-banyon-landslide/>

<sup>36</sup> Teri Granger, Tom Hruby Ph.D., Andy McMillan, Douglas Peters, Jane Rubey, Dyanne Sheldon, Stephen Stanley, & Erik Stockdale, *Wetlands in Washington State Volume 2 – Protecting and Managing Wetlands* Appendix 8-C Guidance on Widths of Buffers and Ratios for Compensatory Mitigation for Use with the Western Washington Wetland Rating System Modified to use with the 2014 Washington State Rating System for Western Washington pp. 8 – 9 (Ecology Publication No. 05-06-008: Oct. 2014) on the CAO on CD enclosed with the paper original of this letter on Data CD 1 in the Wetlands directory with the filename "0506008part1.pdf" and accessed on Dec. 6, 2016 at: <http://www.ecy.wa.gov/programs/sea/wetlands/pdf/2014Appendix8C.pdf>

<sup>37</sup> SDCI Environmentally Critical Areas Update ORD p. 62.

<sup>38</sup> Teri Granger, Tom Hruby Ph.D., Andy McMillan, Douglas Peters, Jane Rubey, Dyanne Sheldon, Stephen Stanley, & Erik Stockdale, *Wetlands in Washington State Volume 2 – Protecting and Managing Wetlands* Appendix 8-C Guidance on Widths of Buffers and Ratios for Compensatory Mitigation for Use with the Western Washington Wetland Rating System Modified to use with the 2014 Washington State Rating System for Western Washington p. 5 (Ecology Publication No. 05-06-008: Oct. 2014).

<sup>39</sup> Thomas Hruby, PhD, *Update on Wetland Buffers: The State of the Science Final Report* pp. 29 – 30 (Washington State Department of Ecology Publication #13-06-11: Oct. 2013) on the CAO on CD enclosed with the paper original of this letter on Data CD 1 in the Wetlands directory with the filename "1306011.pdf" and accessed on Dec. 6, 2016 at: <https://fortress.wa.gov/ecy/publications/documents/1306011.pdf>

<sup>40</sup> *Id.* pp. 29 – 30.

include buffer widths for high, moderate, and low intensity uses consistent with Ecology's recommendations in *Wetlands in Washington State Volume 2 – Protecting and Managing Wetlands* Appendix 8-C Guidance on Widths of Buffers and Ratios for Compensatory Mitigation for Use with the Western Washington Wetland Rating System Modified to use with the 2014 Washington State Rating System for Western Washington (Ecology Publication No. 05-06-008: Oct. 2014).

Section 21 and Section 25.09.200 on page 77 should prohibit fish barriers for accesses over the riparian watercourses and require that they crossing be able to pass the 100-year flood.

River and stream crossings can create barriers to fish movement that adversely affect habitat for salmon and other fish.<sup>41</sup> They are also prone to being washed out and increasing siltation for fish habitat. So we recommend that the any stream crossing allowed under Section 25.09.200A.2.a not create a barrier to fish passage and that it be large enough to pass the 100-year flow without damage to the structure or the water body. We recommend that the following conditions be added to Section 25.09.200A.2.a.2 with our additions double underlined and our deletions double struck through:

2) the access is provided by a freestanding structure that maintains the natural channel and floodway of the riparian watercourse, can pass the 100-year flow, and will not create a barrier to the movement fish and other aquatic species (~~and that~~);

The development standards for fish and wildlife habitat conservation areas must apply to properties that have fish and wildlife habitat conservation areas or their required buffers. See Section 21 and Section 25.09.200 on page 85.

Fish and wildlife habitat may be adjacent to a property, such as a property abutting a lake, river, or stream or and fish and wildlife conservation buffers may be wider than the property on which the fish and wildlife habitat is located.<sup>42</sup> To adequately protect the habitat, the fish and wildlife conservation standards must apply to properties that both have the habitat or the buffers. But Section 25.09.200.B limits the application of fish and wildlife habitats to “parcels with fish and wildlife habitat conservation areas[.]” We recommend that Section 25.09.200.B apply to “parcels with fish and wildlife habitat conservation areas or buffers” to adequately protect fish and wildlife habitats.

Section 23 and Section 25.09.240 should apply to all properties with critical areas and buffers. See page 91.

For similar reasons, Section 25.09.240 should apply to all properties with critical areas and buffers. Our recommended additions are double underlined and our recommended deletions are double struck through.

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<sup>41</sup> K. L. Knutson and V. L. Naef, *Management recommendations for Washington's priority habitats: riparian* p. 54 & p. 106 (Wash. Dept. Fish and Wildl., Olympia, WA: 1997) on the CAO on CD enclosed with the paper original of this letter on Data CD 1 in Fish & Wildlife Habitat\PSH Management Recs directory with the filename “wdfw00029.pdf” and accessed on Dec. 6, 2016 at: <http://wdfw.wa.gov/publications/00029/>.

<sup>42</sup> For example, the standard buffer for a Great Blue Heron nesting colony is 984 feet wide. Timothy Quinn and Ruth Milner, Great Blue Heron p. 3-7 in E. Larsen, J. M. Azerrad, N. Nordstrom, editors, *Management recommendations for Washington's priority species, Volume IV: Birds* (Washington Department of Fish and Wildlife, Olympia, Washington, USA: 2004) on the CAO on CD Data CD 1 in the Fish & Wildlife Habitat\PSH Management Recs directory with the filename “wdfw00026.pdf.” However, narrow buffers may be appropriate in circumstances where the colony is able to tolerate more noise and disturbance.

A. This Section 25.09.240 applies to all applications for short subdivisions and subdivisions, excluding unit lot subdivisions, on parcels containing any part of a biodiversity area or corridor, riparian corridor, priority habitat or buffer, priority area setback or buffer, wetlands, wetland buffers, or steep slope erosion hazard areas or buffers or landslide-prone areas or buffers, in addition to the standards in Title 23.

If the City chooses to allow a steep slope erosion hazard area variance, a variance should only be approved where there structures on the property will be safe and the development will not increase the potential for damage to other properties include streets and other public facilities. See Section 26 and Section 25.09.290 on pages 103 to 105.

The Growth Management Act (GMA) requires counties and cities to “adopt development regulations that adequately protect development from ...” geologically hazardous areas including landslide hazards and to assure that any allowed development “does not result in harm to other properties.”<sup>43</sup> As was documented above, the landslides that occur on bluffs such as those in Seattle can be deadly. The debris flow above Rolling Bay Walk on Bainbridge Island, on the same type of bluffs that exist in Seattle, “destroyed the house at the foot of the slope and resulted in four fatalities.”<sup>44</sup>

So we recommend that construction not be allowed on landslides, landslide run-out areas, and their buffers even if that means that a lot is unbuildable. Allowing construction in these areas results in the creation of nuisances and so the City of Seattle is not legally obligated to allow construction on these areas.<sup>45</sup> In the *Bayfield Resources Co. v. Western Washington Growth Management Hearings Board* decision, the State of Washington Court of Appeals upheld against a substantive due process challenge and other challenges a rural zoning district that required the deduction of landslide hazard areas and certain other critical areas from the land used to calculate the allowed number of housing units.<sup>46</sup> The Court of Appeals agreed that landslide hazard areas are not to be built on.

So we recommend that Seattle not adopt the steep slope erosion hazard area variance. If the City does authorize these variances, Section 25.09.290.C should require a showing that granting the variance will not increase the damage potential for properties in landslide hazards or their buffers. Our recommended additions are double underlined and our recommended deletions are double struck through.

C. Granting the variance will not be injurious to safety or to the property or improvements in the immediate vicinity in which the property is located including the steep slope erosion hazard and its buffers and setbacks and public facilities such as streets, water lines, sewer lines, and drainage facilities; and

Thank you for considering our comments. If you require additional information, please contact me at telephone 206-343-0681 or email [tim@futurewise.org](mailto:tim@futurewise.org)

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<sup>43</sup> *Pilchuck, et al. v. Snohomish County (Pilchuck II)*, CPSGMHB Case No. 95-3-0047c, Order Partially Granting Motions for Reconsideration and Clarification (Jan. 25, 1996), at \*7 – 8 of 16, 1996 WL 650336 p. \*5 – 7.

<sup>44</sup> Edwin L. Harp, John A. Michael, and William T. Laprade, *Shallow-Landslide Hazard Map of Seattle, Washington* p. 2 (U.S. Geological Survey Open-File Report 2006–1139: 2006).

<sup>45</sup> *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003, 1029 (1992) accessed on May 17, 2016 at: <http://www.supremecourt.gov/opinions/boundvolumes/505bv.pdf>

<sup>46</sup> *Bayfield Resources Co. v. Western Washington Growth Management Hearings Bd.*, 158 Wn. App. 866, 883, 244 P.3d 412, 420 (2010).

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Sincerely,

A handwritten signature in blue ink, consisting of several overlapping loops and curves, positioned below the word "Sincerely,".

Tim Trohimovich, AICP

**Director of Planning & Law**

Enclosures