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As current climate change trends continue, coastal communities all around the world are facing a detrimental degree of sea level rise. While global temperatures continue to rise, the thermal expansion of the water is the main culprit of sea level rise. Whilst traditional methods for dealing with rising sea levels are proving to lack something to be desired, innovative methods to reduce the area of impervious surfaces are proving to be effective. Despite taking steps to protecting your home and valuables, damage can be unavoidable and surpass tens of thousands. This is why communities such as Chalker Beach need to start adopting newer and innovative methods in battling frequent floods.

Potential damage costs in the face of constant flood events can be ruining. With just the roads becoming flooded, salt from the water would corrode the exposed parts. Parts with labor can range anywhere from a few hundred to a few thousand. If damage to integral parts has gone too far, the average cost for a new car in the United States today is around $35,000. If during flood events the water reaches your home, the salt can damage the filters in a water purification system. Replacements systems on average run around $2,750 including labor. Furthermore, these levels of floods can penetrate the septic system. Not only is this potential for ecological damage, but a ruined septic system would cost on average $6,200.

There are multiple ways to reduce your risk of flood damages that do not involve any alterations to the home or property. The simplest way to fully secure your home and financial security is to first evaluate your flood risk using the FEMA Flood Map Service. If you find

yourself in a flood prone area, insurance is the only way to reliably protect oneself from damages. There is no guarantee that your home will be able to withstand a bad storm. About 67% of homeowners say they're ready for a flood however, only 12% of them have flood insurance[11]. Beyond purchasing insurance, FEMA recommends protecting valuables by storing them in elevated and water tight containers. Important documents should be uploaded to some sort of cloud storage or an external drive of some sort. One should also familiarize themselves with where the circuit breaker is located and how to turn it off in order to preserve electrical appliances.

Alternatives that would require cooperation at the municipal level include the transition of traditional roads and sidewalks to more pervious alternatives. On average, Connecticut receives about 50 inches of rain annually. This translates to about 31 gallons of runoff created per square foot of an impervious surface. With pervious pavements/pavers, the runoff would be made available to infiltrate the ground and enter aquifers, rather than runoff into properties. The issue with pervious surfaces is that they are decently more expensive than traditional asphalt. To pave 640 ft^2 (an average driveway) it would cost around $7,360[8]. Where the range of a typical asphalt driveway would run you about $2,933-$6,566[8]. This is because certain materials are more expensive as well as the labor involved. Another effective method to route runoff away from properties would be to install rain gardens in vulnerable areas. Large complex rain gardens can range from $10-40 per ft^2 [10]. In comparison to a conventional lawn, a rain garden can allow for around 30% increased levels of water infiltration[12]. Other traditional municipal actions that can be implemented are of course levees/seawalls but these would require significant research in order to prove whether they wouldn't provide an overall negative ecological impact.

The alternatives that can be applied by individual property owners can have huge implications when trying to improve one's property value. An individual can also install a rain garden into their own property. These individual rain gardens can be constructed to easily

present as a normal garden and are cheaper to install. Proper landscaping can lead to a 100% return on investment up to around 5-15% of your homes value[13]. At a price of only $4 per ft^2[10], rain gardens can be an effective way to not only aesthetically increase the property's value, but also route about 30% more water away than a typical lawn.

Another landscaping alternative to lower the area of impervious surfaces would be to install a "green" roof. These are becoming increasingly popular in countries in Europe as well as areas in California due to their abundance of benefits. They are constructed by placing different layers, of varying function, ontop of eachother with the top layer being a growing medium for a garden. The potential for these gardens to save you money is very valuable. Alongside the general aesthetic value these gardens offer, the garden itself reduces the overall temperature of the surrounding area due to the evapotranspiration of the plants. If your home already has solar panels, the decreased temperature would actually synergize with the panels and allow them to operate more efficiently[7]. As well as utility costs, green roofs tend to protect the integrity of the roof as a whole. The vegetation and layers protects the main structure from the brunt of ecological damage resulting in cheaper maintenance.

Looking forward, we must think outside of the box in terms of climate adaptations in order to properly create a sustainable future. Rather than struggling to find methods to prevent water from entering a basement, there needs to be research into a basement that can take a flood as a last case scenario. Building upon this idea, the future of living with increasing levels of floods has been an important topic of discussion in China. Urban flooding has more than doubled within the past years thus they need a significant alternative to reduce the trend[1]. Chinese engineers have been working to design a city similar to how a sponge retains water. Instead of funneling rain water away, these sponge cities are meant to collect rainwater in a way to meaningfully use a majority of the water.

Sources

[1] https://www.wavin.com/en-en/news-cases/news/10-measures-to-prevent-urban-flooding

[2] https://www.nap.edu/read/18309/chapter/8

[3] https://www.valuepenguin.com/homeowners-insurance/how-to-prevent-home-flooding

[4] https://www.fema.gov/sites/default/files/documents/fema_protect-your-home-from-flooding-broc

Hure_2020.pdf

[5] https://environment.arlingtonva.us/flood-insurance-rate-maps/reducing-your-risk-of-flooding/

[6] https://ecode360.com/8720670

[8] https://www.homeadvisor.com/cost/roofing/repair-a-roof/

[7] https://adcoroofing.com/how-green-roofs-create-value/

[9] https://www.thestreet.com/personal-finance/mortgages/what-a-green-roof-costs-you-on-the-way-to-saving-everything-13161050

[10] https://www.potomacriver.org/resources/get-involved/water/rain-garden/

[11]https://www.iii.org/fact-statistic/facts-statistics-flood-insurance

[12] https://www.groundwater.org/action/home/raingardens.html

[13] https://www.homelight.com/blog/does-landscaping-add-value/