Emerson Hinson and Samantha Cichos
c/o Eastside Preparatory School
10613 NE 38th Place
Kirkland, WA 98033

February 4, 2022

Dear EPS Faculty Member,

Thank you for trusting us to help you determine the water hardness in your area. We have taken the sample you gave us and found the amount of hardness in your water and have some suggestions on how to move forward with the water hardness in your area.

We used 20 mL of your sample and combined it with 40 mL of sodium carbonate, which caused a precipitation reaction. We extracted the resulting precipitate and purified, dried, and weighed it. The solid weighed 0.19 mg, and from this measurement we calculated the water sample to have 47.5 mg/L of $CaCO_3$. However, it is practically impossible to gather all of the precipitate from the reaction, so we assumed our percent yield to be 91.5%, which resulted in a final concentration of 51.9 mg/L of $CaCO_3$.

This concentration falls within the range of soft water. The range of water hardness in which a water softener is recommended is between 120 and 150 mg/L of $CaCO_3$, and the range considered moderately hard (softer) is between 60 and 120 mg/L of $CaCO_3$. Since the concentration of $CaCO_3$ in your water is below even the moderately hard range, your water is considered soft, and you do not need a water softener.

If you are looking to buy a house and you are concerned about water hardness, this area would be a great place to look into. The water is soft – it is well below even the moderately hard range, and you will definitely not need to purchase a water softener. We very much appreciate you choosing us to assist you with your water hardness investigation and hope that our conclusions will be of use.

Sincerely,

Emerson Hinson and Samantha Cichos