

## EXHIBIT X14

Kittitas County CDS

## ROSLYN RIDGE MINI GOLF

## LIGHTING AND THE POSSIBILITY OF GENERATED LIGHT POLLUTION

*The proposed Roslyn Ridge Mini Golf project will be illuminated with 60W LED downward facing lights in necessary areas. This lighting choice is due to maximum preferred energy efficiency and minimal light pollution. While LED lights have emerged as a popular choice for forested areas, the effectiveness of such lights is dependent on several factors, including the intensity of the lighting, the density of the forest, and the distance between each lighting structure. The lighting of recreational areas located in forested areas is necessary for recreational activities, wildlife habitat management, and public safety. However, artificial lighting can lead to light pollution and affect nocturnal wildlife behavior.*

*To evaluate the effectiveness of 60W LED downward facing lights in forested areas, a series of hypothetical experiments were conducted in a computerized model environment. In the model, 60W LED lights were placed at varying distances from each other and the distance of illumination was measured. The effectiveness of LED lights in penetrating the various trees and foliage that make up the forest canopy was also evaluated. The maximum distance that LED lights can travel through a forest was determined through a combination of experimental data and theoretical models.*

*The results indicate that the maximum distance that a 60W LED light can travel through a forest depends on several factors, including the intensity of the lighting, the density of the forest, and the distance between each lighting structure. In a dense forest with a high canopy, the maximum distance that light can travel is limited to approximately 10 to 20 meters, whereas in a less dense forest with a lower canopy, the maximum distance that light can travel can exceed 30 meters. The type of trees and foliage present in the forest can also impact the effectiveness of LED lights in penetrating the canopy. Trees with larger leaves or denser foliage absorb more light and reduce the maximum distance that light can travel. Due to the environment in which the mini golf course area*

*and lodging sites will be built, the heavy forest and thick foliage will be enough to greatly limit the light pollution and will likely not exceed 30 meters. The applicant will provide some vegetations screening where necessary to further contain any light pollution.*

*The findings suggest that 60W LED downward facing lights can effectively illuminate forested areas while limiting light pollution when placed at appropriate distances from each other. This type of lighting design for Roslyn Ridge Mini Golf will effectively eliminate light pollution affecting the surrounding properties. All aerial lights, including those lights that are lighting the walkways within the mini golf course area and around the lodging sites, will be placed at the ground level and will be downward facing. Light within the lodging site buildings will be mitigated as necessary. The 60W LED lights to be used by the applicant are an effective solution to minimize light pollution in forested areas while providing adequate illumination.*