

Kihei High School  
Pedestrian Underpass Analysis Process



To determine the feasibility and safety of using an existing gulch crossing for a pedestrian underpass the following steps are required:

1. An elevated pedestrian crossing is used. The vertical clearance required for a bicycle and pedestrian use is 8 to 10 feet.
2. Ideally, the minimum elevation of the crossing should be higher than the “water surface elevation” for a 100-year storm. Lesser recurrence intervals may be utilized based on engineering judgement.
3. To determine the “water surface elevation” a Hydrologic Study (identifies the volume or amount of water,  $Q=CIA$ , regression equation, stream gauge analysis, etc.) and a Hydraulic Study (identifies the depth of flow, flow velocity, and forces from flowing water, HEC RAS or similar Program) must be completed.
4. Adding non-permeable material such as a raised sidewalk in a channel will decrease the waterway opening for the water flow to pass through. The existing waterway opening must have sufficient area to pass the design flow. Additionally, further analysis is required upstream and downstream to determine possible negative hydraulic impacts, such as flooding caused by the decreased the waterway opening.
5. Kulanihakoi Gulch as-built (1978) provides a 7’ clearance between the stream bed and bridge soffit. This vertical clearance is not sufficient for bicycle and pedestrian clearance of 8 to 10 feet and to pass a 100-year storm.

From the FEMA map there was an analysis makai of the Kulanihakoi Gulch bridge. It shows the 100-year flood is wider than the bridge. Therefore, the proposed pedestrian underpass will be built in the 100-year flood area or footprint.

6. Waipuilani Gulch as-built (1978) provides 11’ clearance between the stream bed and bridge soffit. This vertical clearance is not sufficient bicycle and pedestrian clearance of 8 to 10 feet and to pass a 100-year storm.

The FEMA map shows no analysis for Waipuilani Gulch. However, it is likely similar to Kulanihakoi Gulch since the gulches are in close proximity that serve the same watershed.

7. The pedestrian underpass facility will add a distance of 500 feet for pedestrians, therefore the distance to cross Piilani Highway from the high school to Kulanihakoi Street will be about 2,500 feet at Kulanihakoi Gulch and 2,900 feet at Waipuilani Gulch.
8. HDOT has not conducted an analysis, but from available information it was found that using Kulanihakoi Gulch or Waipuilani Gulch for a pedestrian underpass will not be feasible, is unsafe, and not be used.