

Fire Impact & Risk Evaluation Decision Support Tool F.I.R.E – D.S.T

Oct 2011 - Research Advisory Forum
CSIRO Activities

Justin Leonard

CSIRO – Climate Adaptation Flagship



Australian Government
Geoscience Australia



Australian Government
Bureau of Meteorology

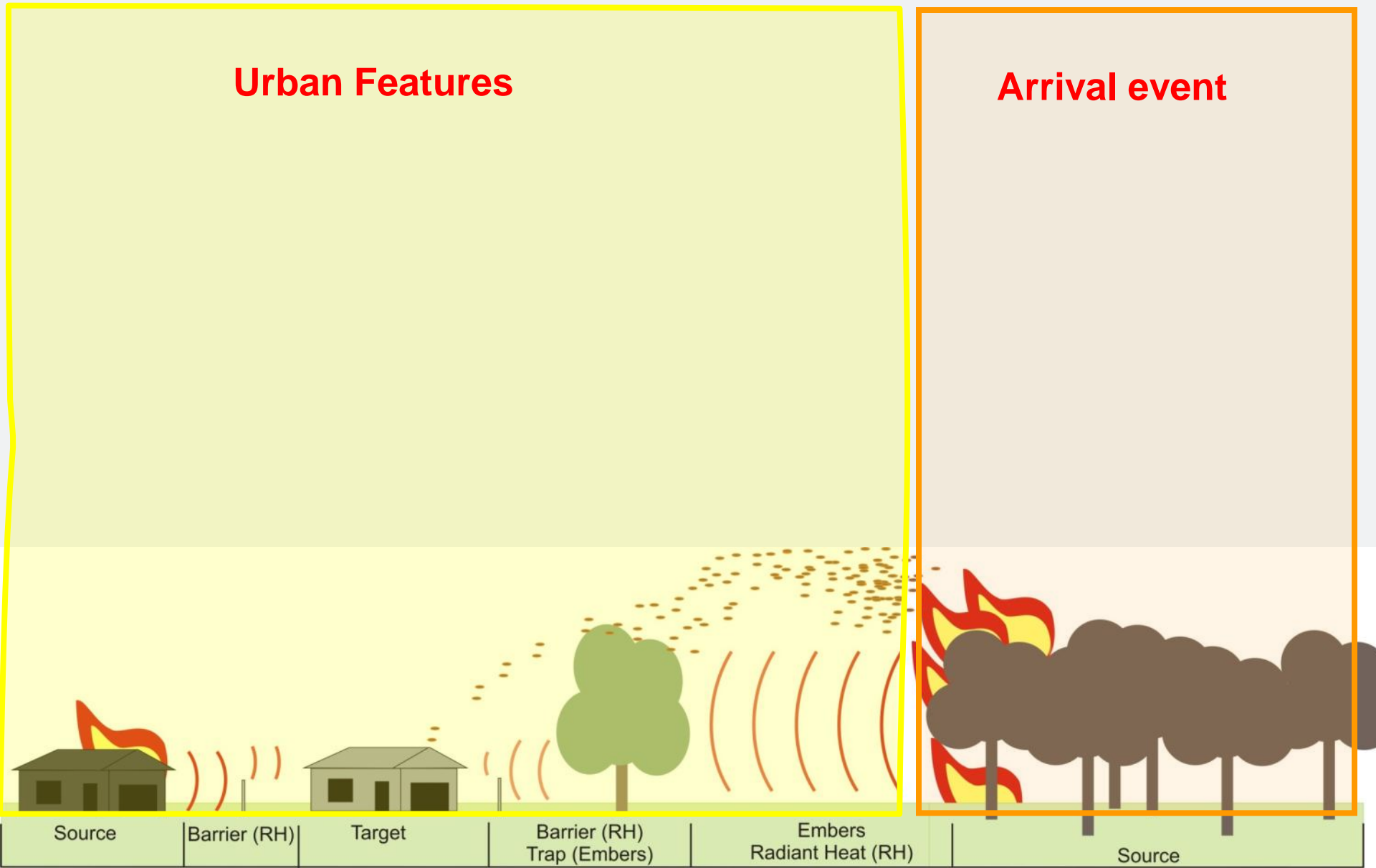


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Urban interface scene

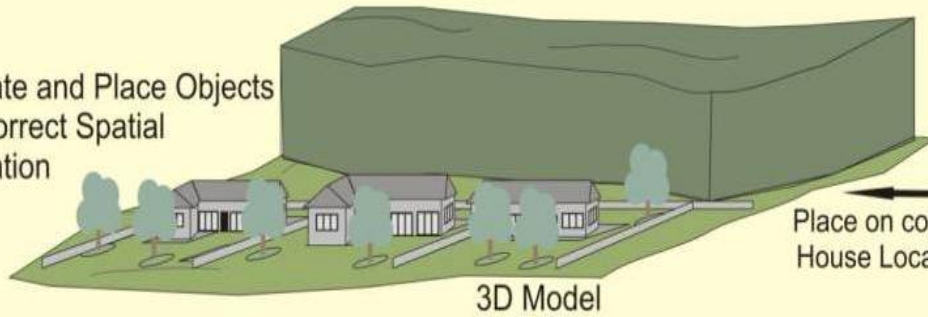
Urban Features

Arrival event



Sketchup

Create and Place Objects
in Correct Spatial
Location



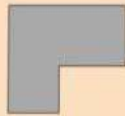
Place on correct:
House Location:



Build House
Model



Match With



House FC

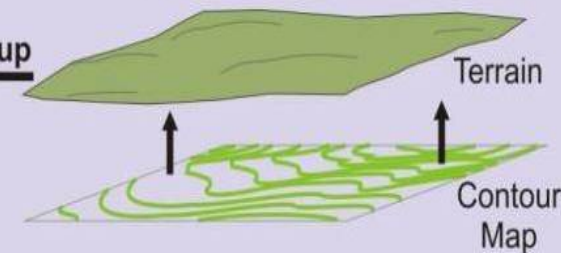
Building 3D Model of House

ArcGIS

Feature Classes

House
Tree
Outbuilding
Fence
Forest

Create Terrain



Export to Sketchup

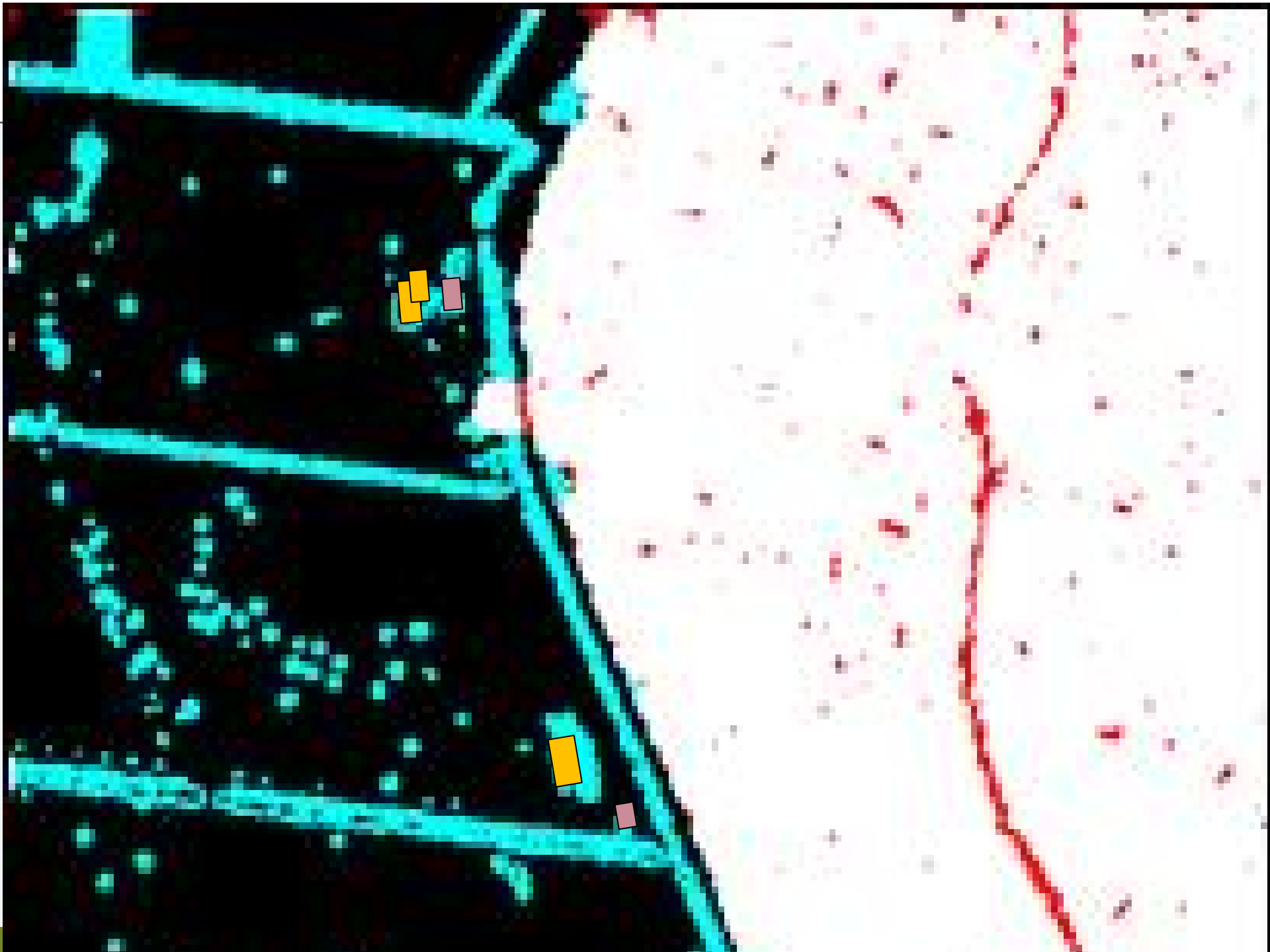
Feature Classes
on Terrain

Feature Classes

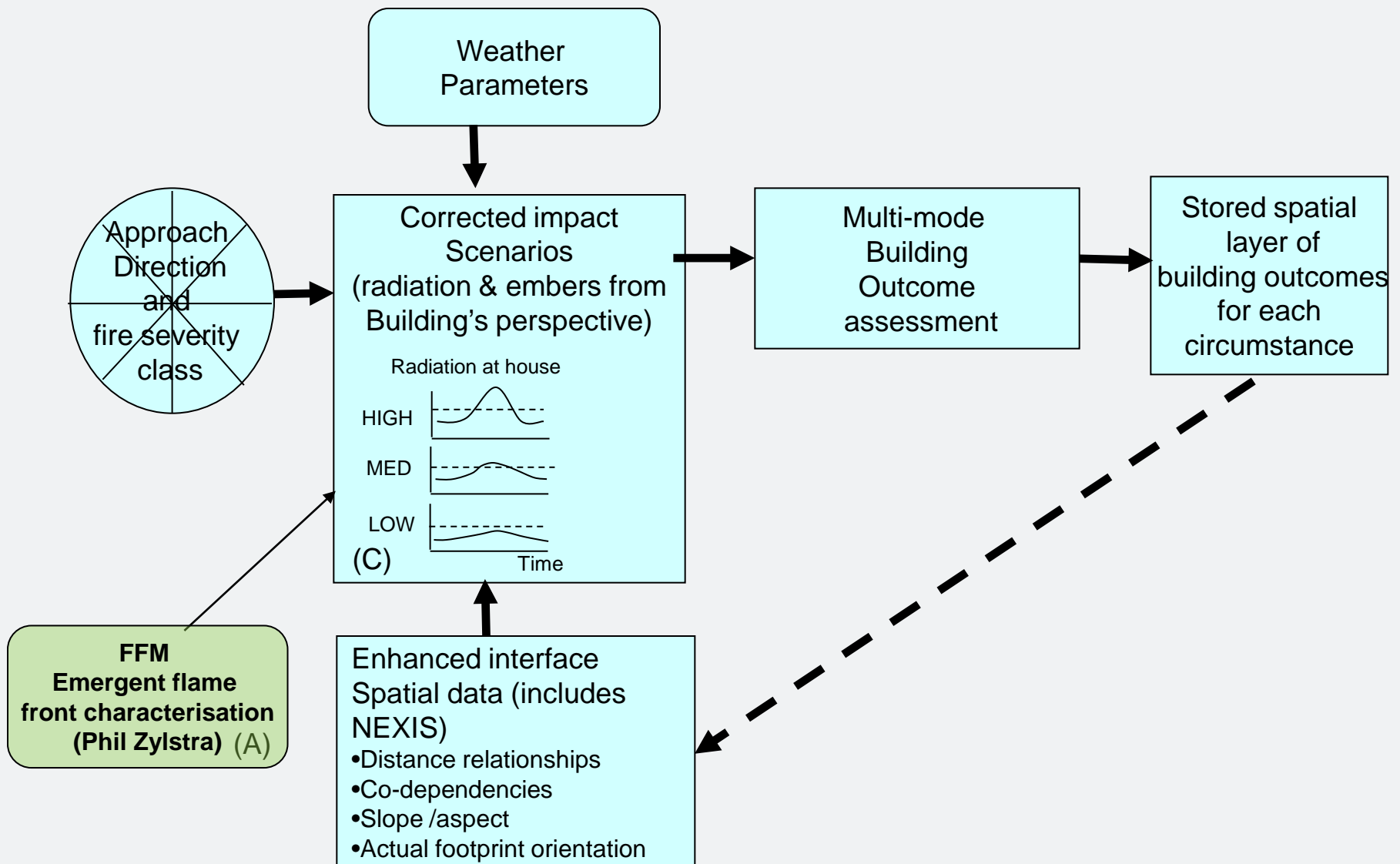
Stamp Feature
Classes on Terrain

Terrain

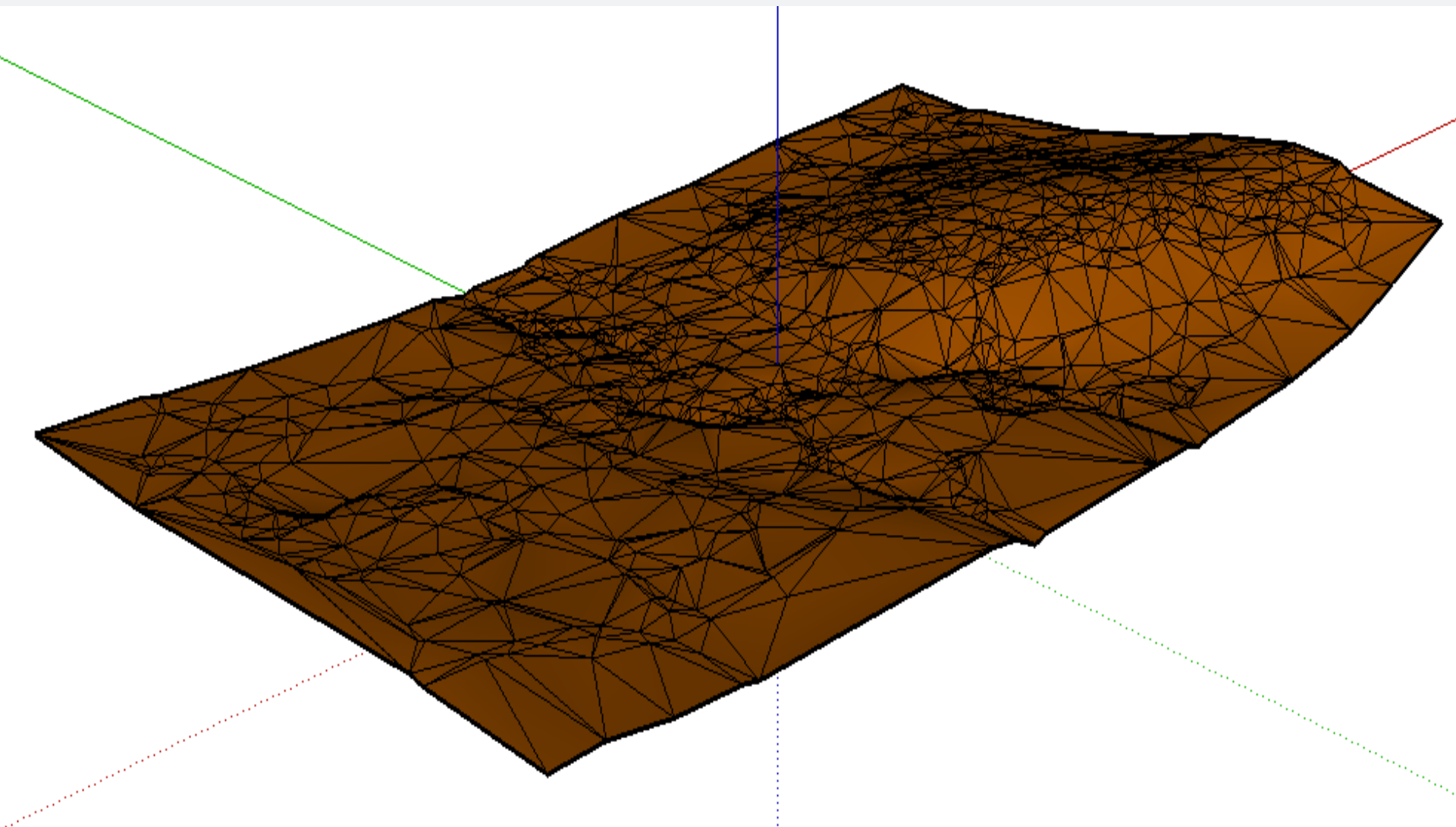


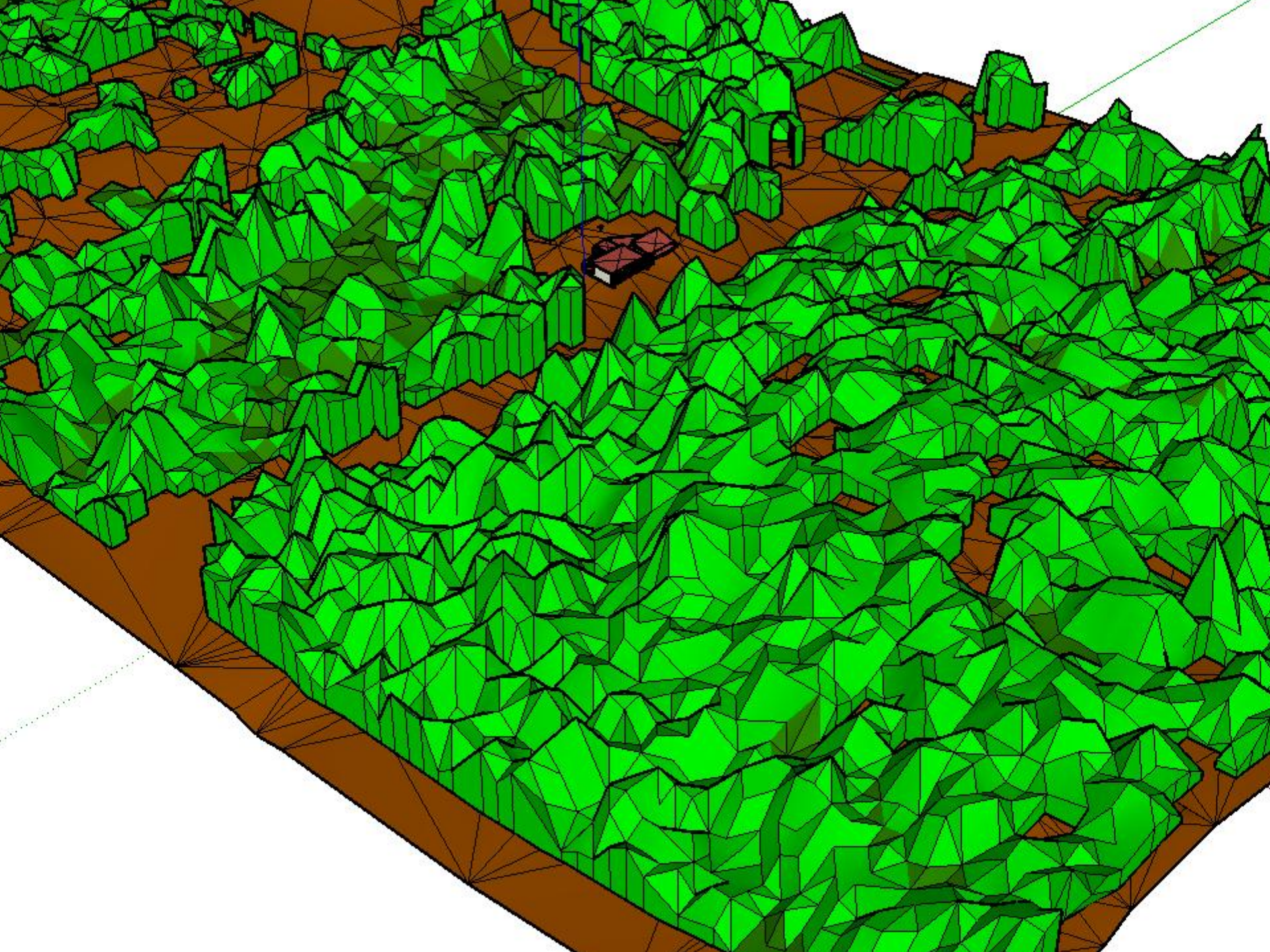


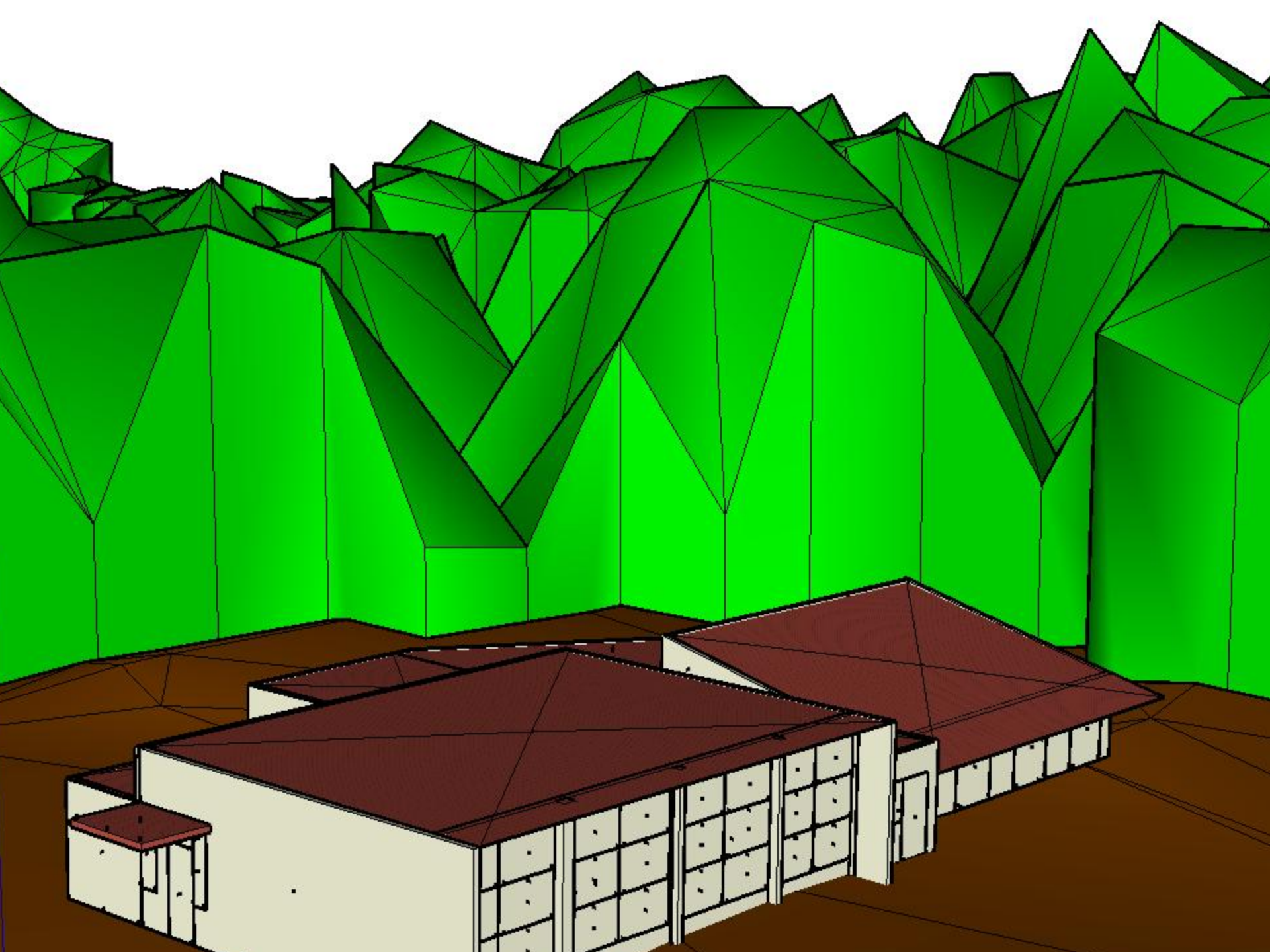
Vulnerability assessment spatial layer

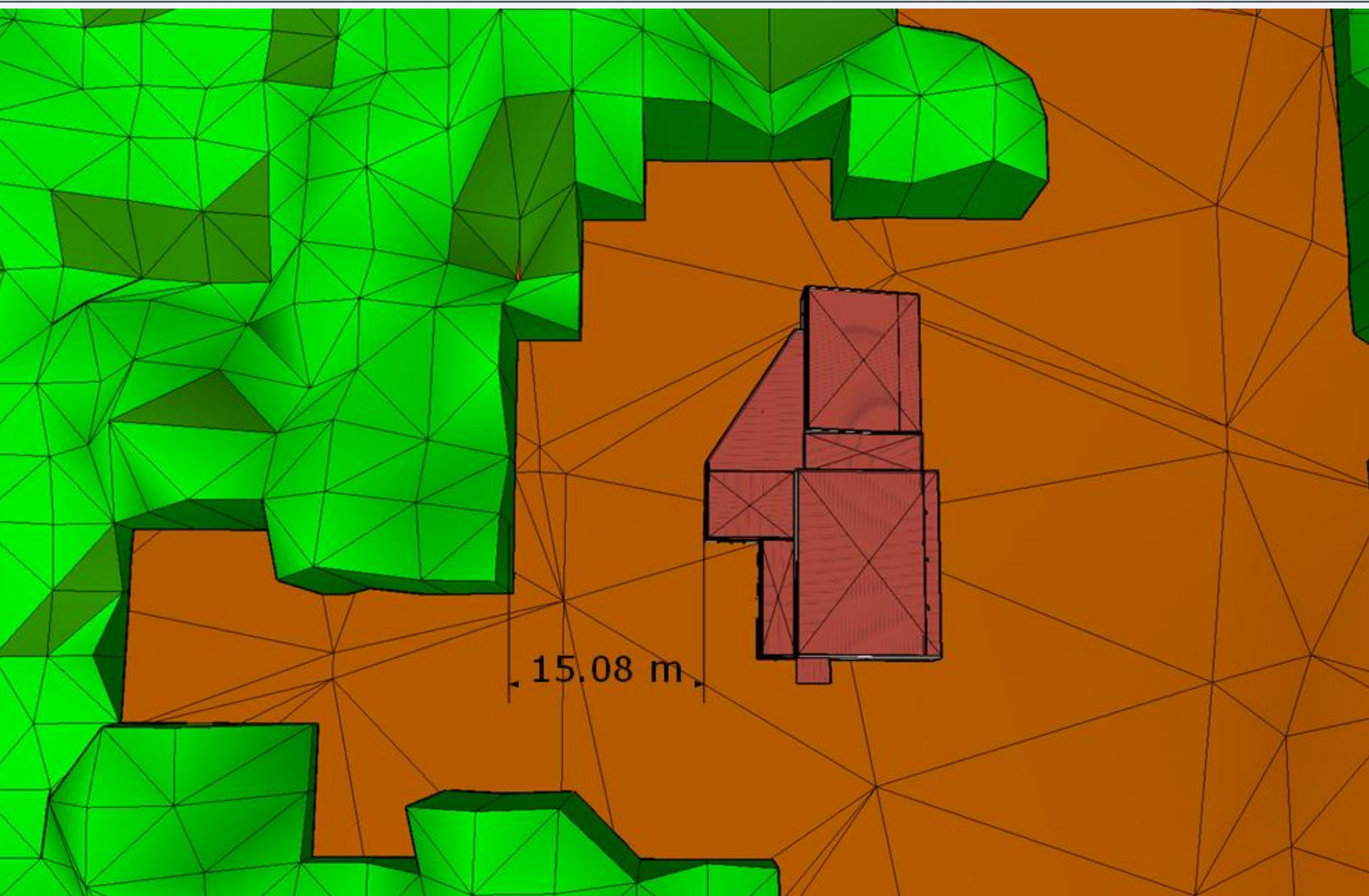


LIDAR derived terrain



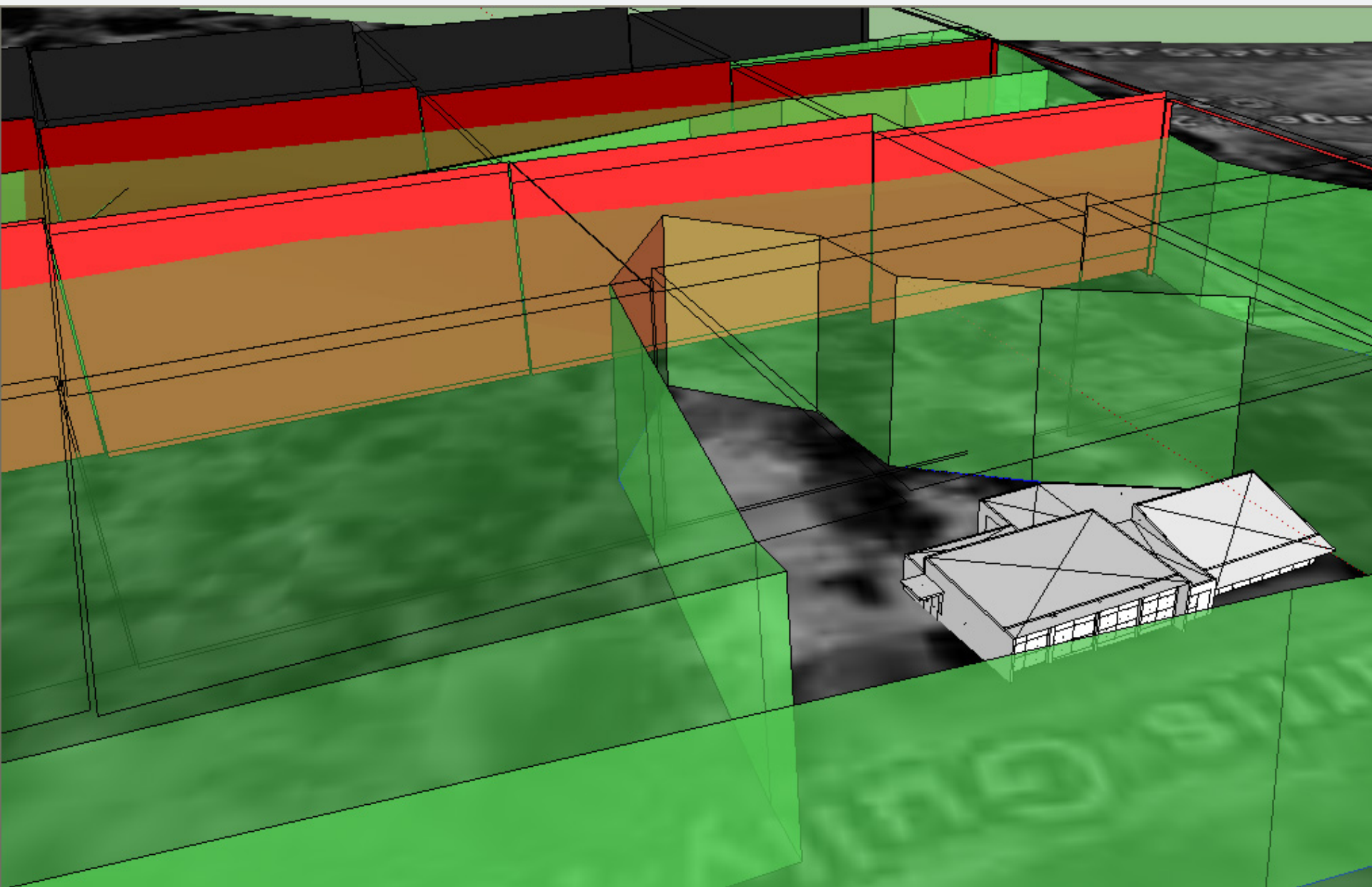




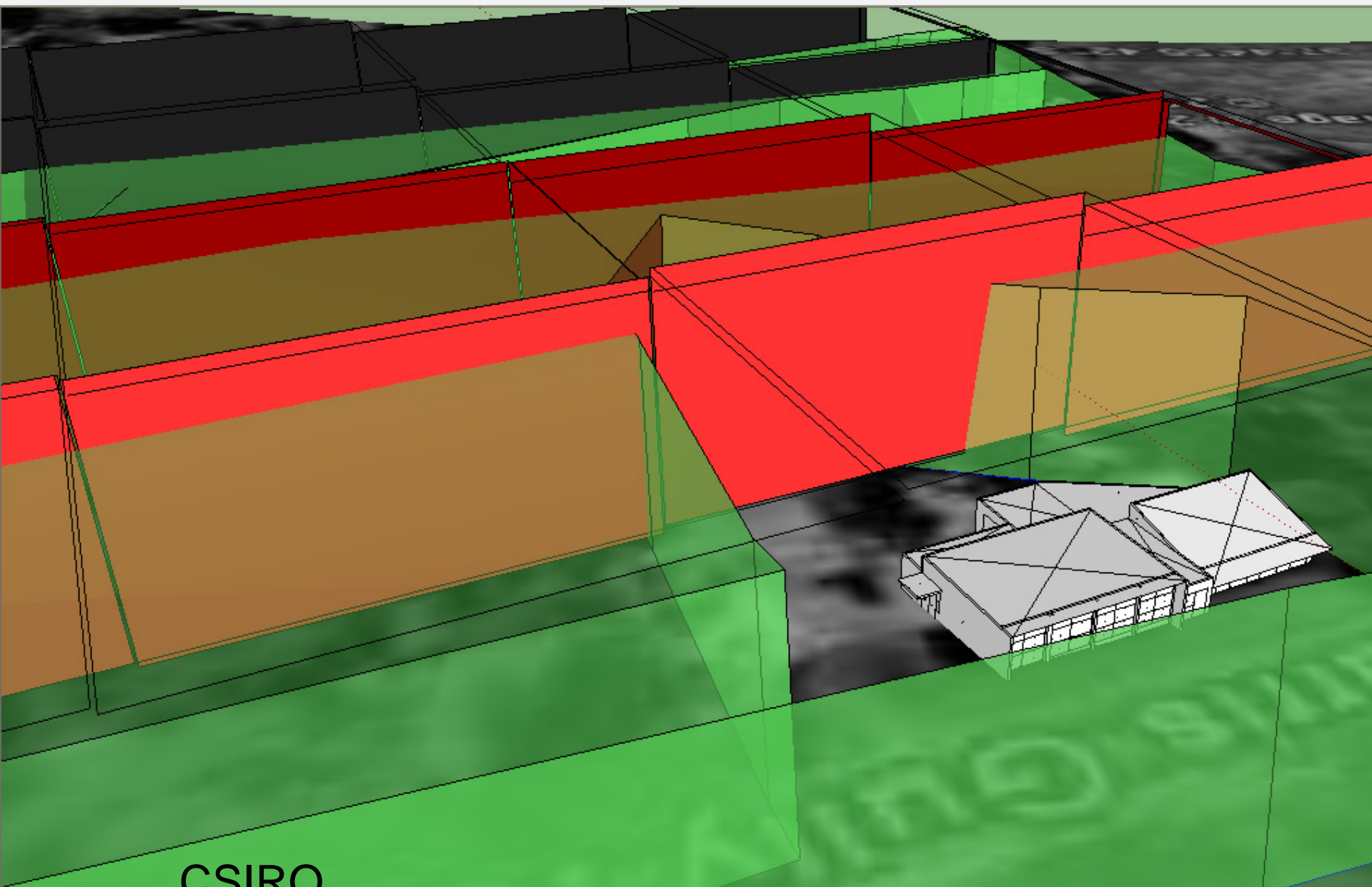




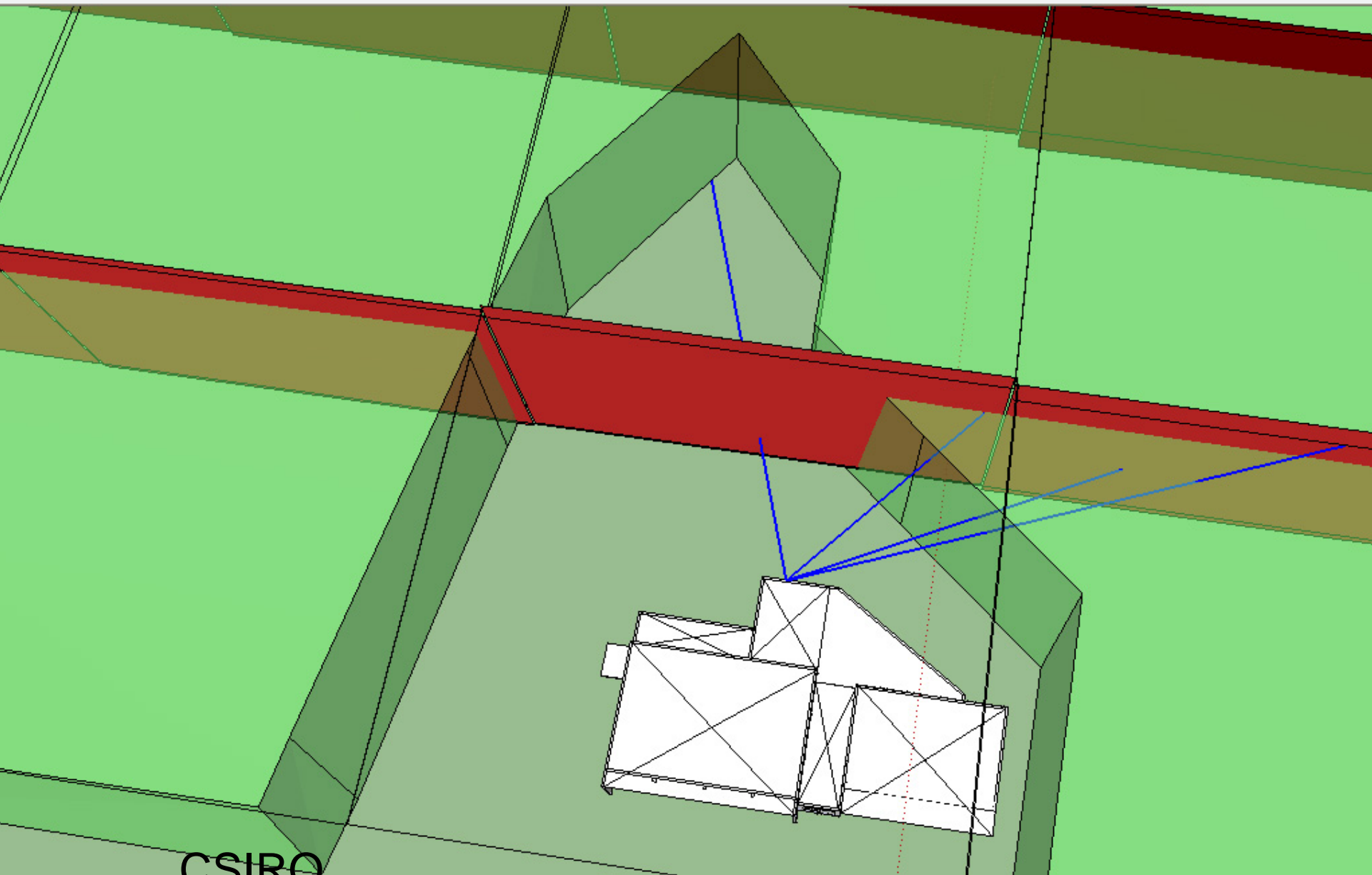
Simple Fire front progression

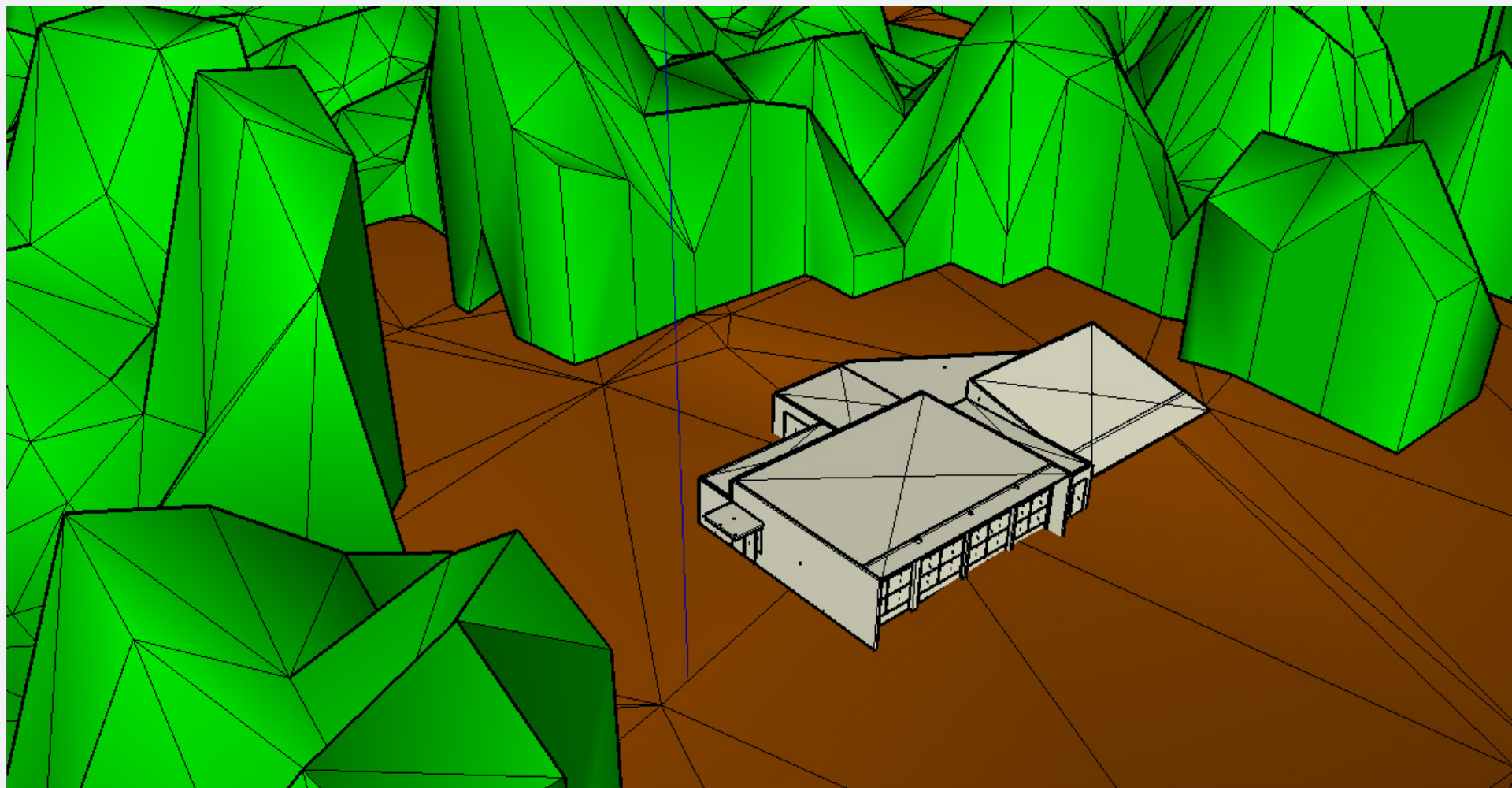


Simple Fire front Progression

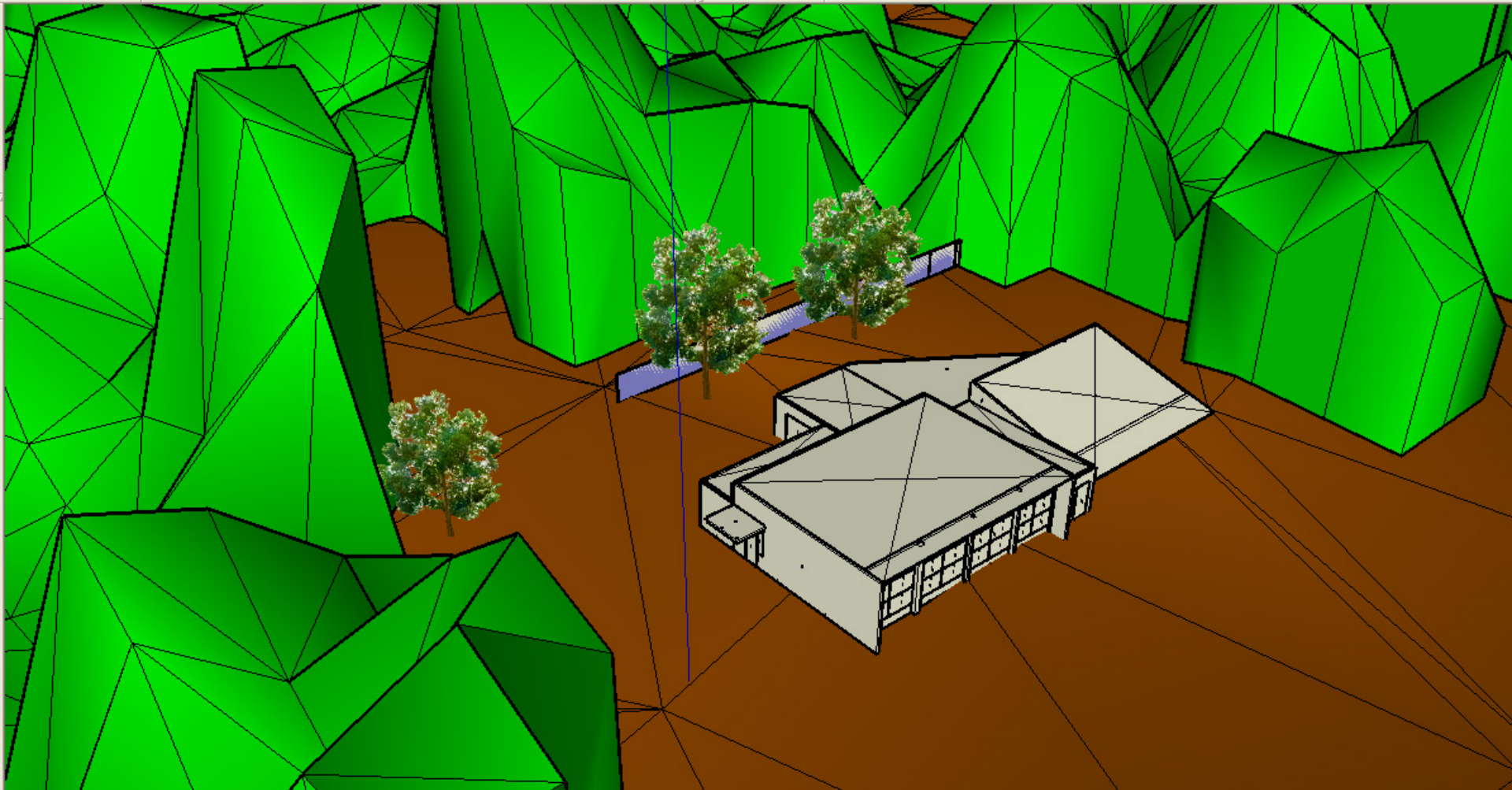


Ray tracing of fire front

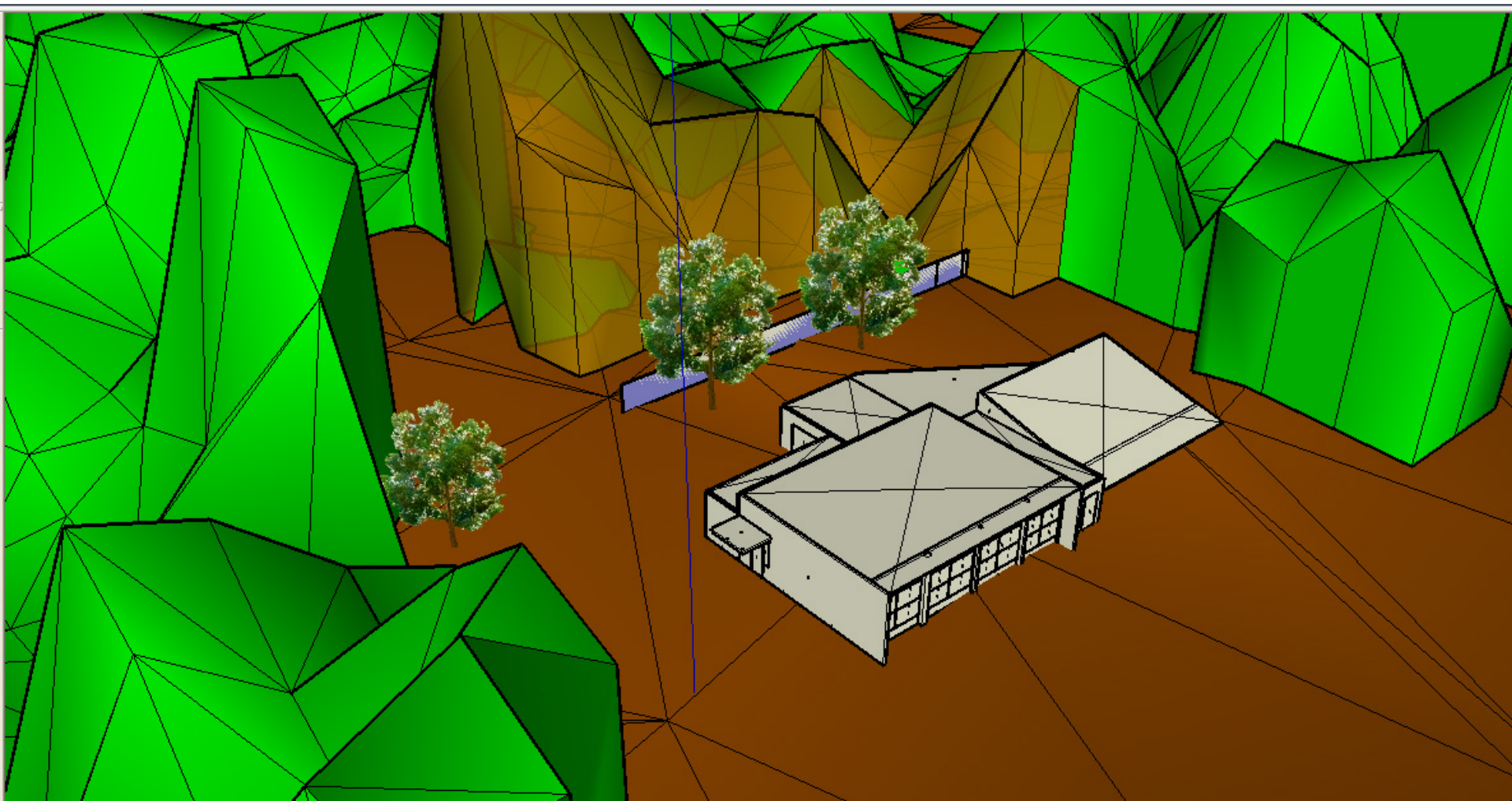




Fence and isolated trees



Fence, isolated trees and Veg management







Literature review - Characterisation of interface fuels pertaining to interface risk

Journal Paper –

Assessing wildfire vulnerability at the wildland-urban interface using airborne lidar

Assessing wildfire vulnerability at the wildland-urban interface using airborne lidar

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Abstract

The wildland-urban interface are those areas where homes intermingle with continuous wildland vegetation. Fires in these areas regularly result in loss of life and the destruction of homes. The distance from a home to continuous and unmanaged wildland is considered a crucial component of vulnerability. We present a method to map wildland vegetation and use this information to assess the vulnerability of homes to wildfire. The method uses a combination of discrete return airborne lidar data to define woody vegetation extent and morphological image processing to subset this woody vegetation into continuous wildland and managed wildland. Distances from the wildland-urban interface to a fire at a Kinglake in Australia in 2007 were assessed. These distances were compared to previously published data for major fire events assessed using manual interpretation of aerial photography and high resolution satellite imagery. Results indicate that the proportion of homes destroyed by wildfire is not directly proportional to the area of wildland fires and that there was an exponential decline in the proportion of homes destroyed as a function of distances to wildland fuel. Although the intensity at Kinglake was higher than these previous fires, the different methods used to delineate wildland fuel in previous studies may also be a source of variation between the studies. This highlights the need for consistent methods to delineate wildland fuel to wildland fuel, providing a reliable input to wildfire vulnerability assessments. In cases where lidar data has been collected prior to a fire event, as presented in this study, the method allows the contribution of wildland fuel to home vulnerability to be quantified. This method allows for comparison of the impact of distance to wildland fuel to be made between fire events.

Keywords: fire, forest extent, managed, morphology, urban, hazard

AFAC / BCRC Poster presentation - Vulnerability and Impact modeling

