MetroWest

Portishead Branch Line (MetroWest Phase 1)

TR040011

9.54 ExA.FI.D6.V1 – Shadow Study – Trinity Footbridge
Applicant: North Somerset District Council

Author: CH2M
Version: 1
Date: March 2021

Shadow Study

1.1 Introduction

1.1.1 The following report documents the process and findings of a shade / shadow study to develop a general assessment of the potential shade impacts of the Trinity School Footbridge on nearby residents. The findings present shade impact graphics at 10:00 am, 12:00 pm, 2:00 pm and 4:00 pm during the Spring Equinox, Summer Soliste, Autumn Equinox and Winter Solstice.

1.1.2 The Shade Study concludes that, in general, the shade impact on the site and surrounding area would be minimal and localised to the north of the structure during December months when shadows encroach across the area towards Tansy Lane.

1.2 Shadow Study Methodology

1.2.1 The method used to generate the shadow impact of the proposal bridge used real world geo-location of the proposed bridge to demonstrate where the shadows were generated at the dates and times specified above.

1.2.2 Initial base information included:

(a) Ordinance Survey Base.

(b) Proposed design for the footbridge drawn straight into the OS Base.

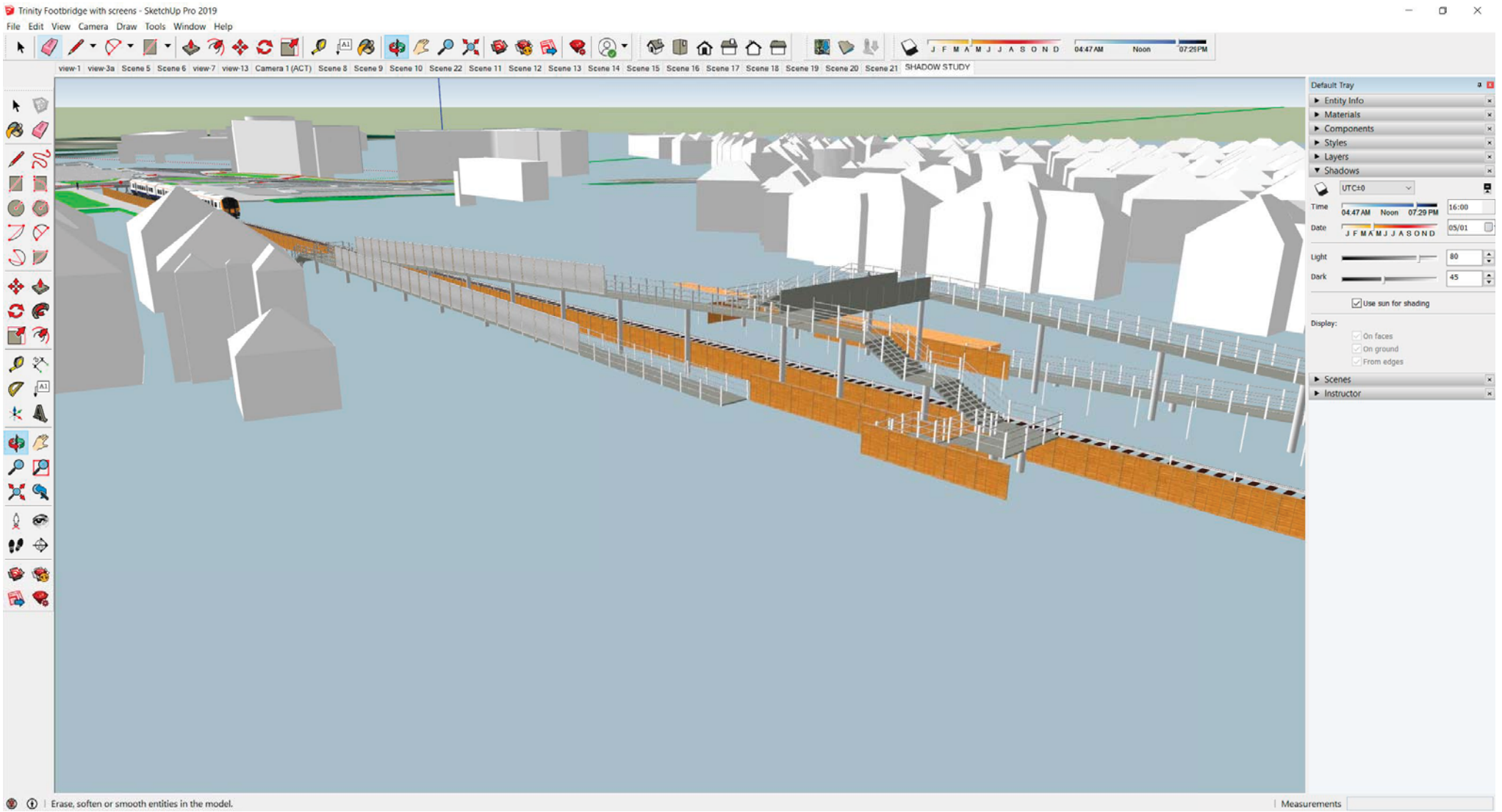
(c) Footbridge model generated using Autodesk Civil 3D software and then exported to Trimble SketchUp.

(d) Site survey data including elevation.

1.2.3 Using the base information, the proposed bridge design was imported into Trimble SketchUp as the basis for a model of the proposal. Existing built form was then modelled so that the extent of the shadows could be seen in the context of the surrounding built form.

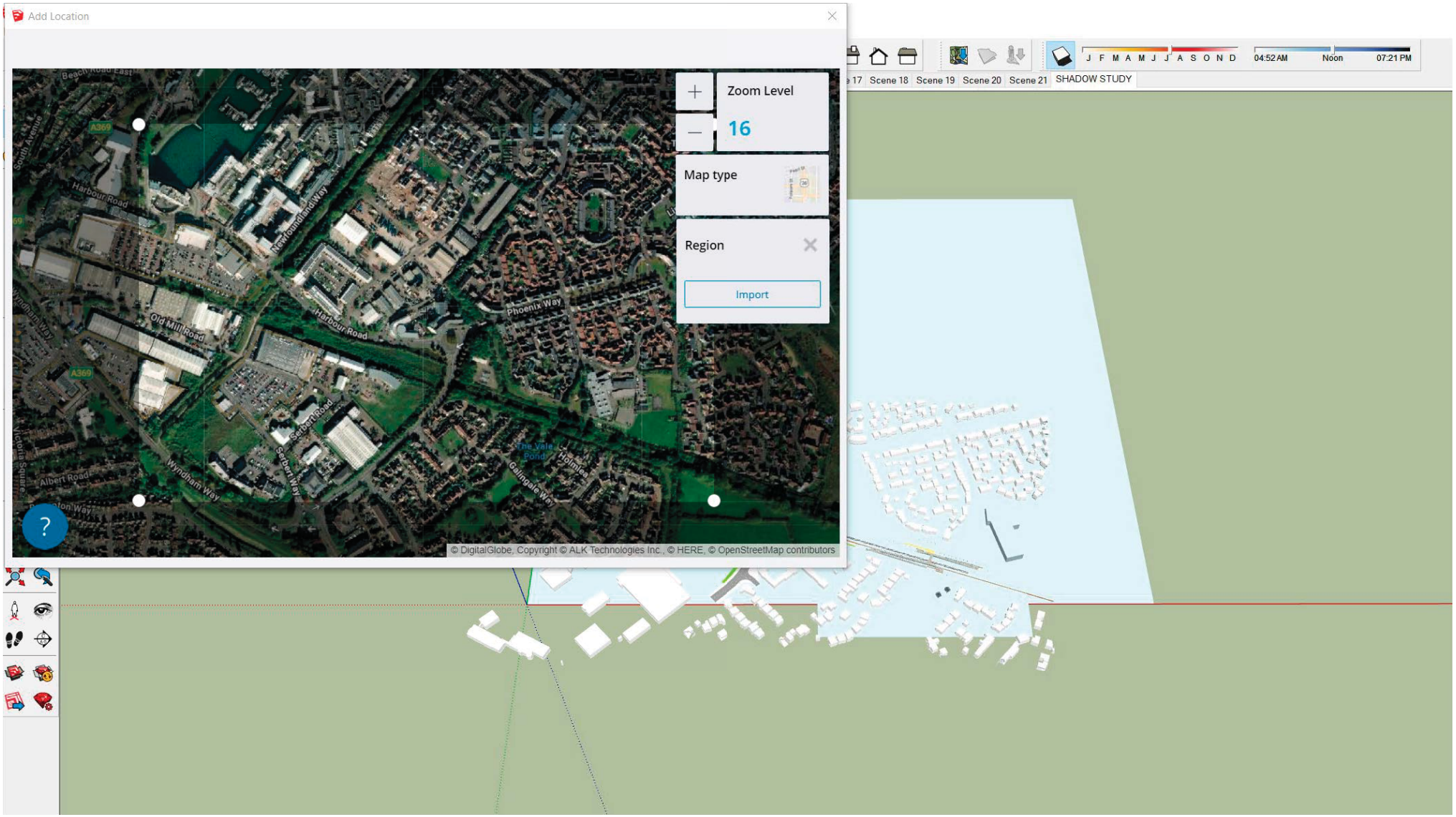
1.2.4 The Shadows feature only provide a general idea of how the sun and shadows will look at a specific location. The time is not adjusted for daylight saving time. If the model is geolocated in an area where time zone lines zigzag rather dramatically, the time zone may be off by an hour or longer. Topography of the site has been modelled indicatively and is not detailed in nature and therefore the shadows may vary slightly in the way they have been portrayed. It is considered at the scale of the study shown that this should not have a great bearing on the results of the study.

1.2.5 The footbridge model was updated with the additional screens added to the bridge to reflect the ongoing design discussion within the Examination.



1.2.6 The image below shows an extract from the 3D digital model of the proposed highway works and station car park at Portishead including the proposed footbridge. The 3D model has been generated using Autodesk Civil 3D software and then exported to Trimble SketchUp. Step one in the process was to group the entire model into one component so that is could be geo-located.

1.2.7 Before casting real-world shadows in SketchUp, the model was geo-located so that the SketchUp software could use real-world information to simulate how the sun will interact with the model in this particular location to simulate sun and shadow orientation using latitude / longitude, time of day and date. Using Trimble SketchUp's Geo-Location tool, the study area model was imported into the model that represents the site and its site-specific attributes.



1.2.8 The model was moved to align with the imported geo-located tile so that shadow analysis can be accurately drawn from real world data and simulation.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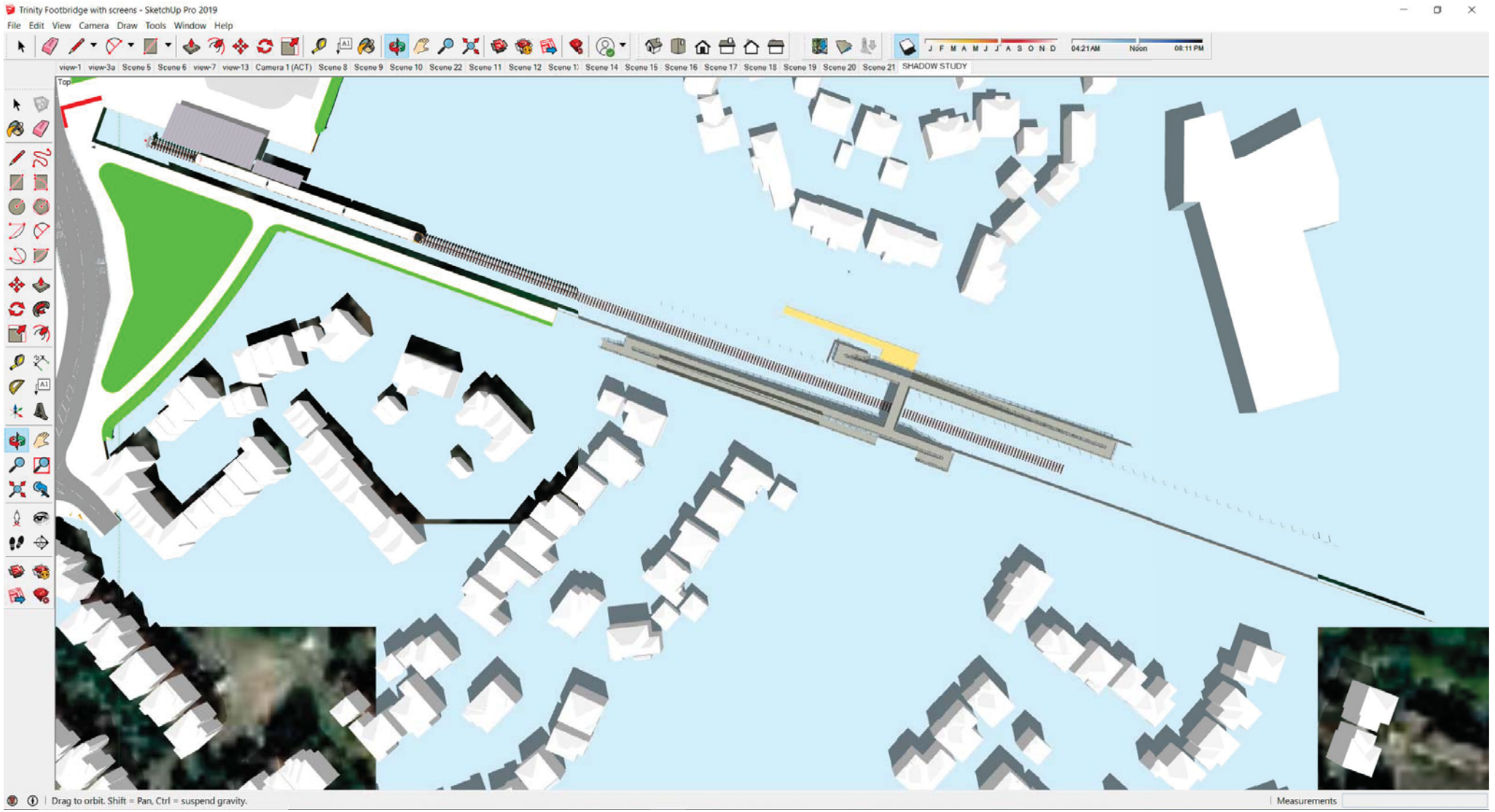
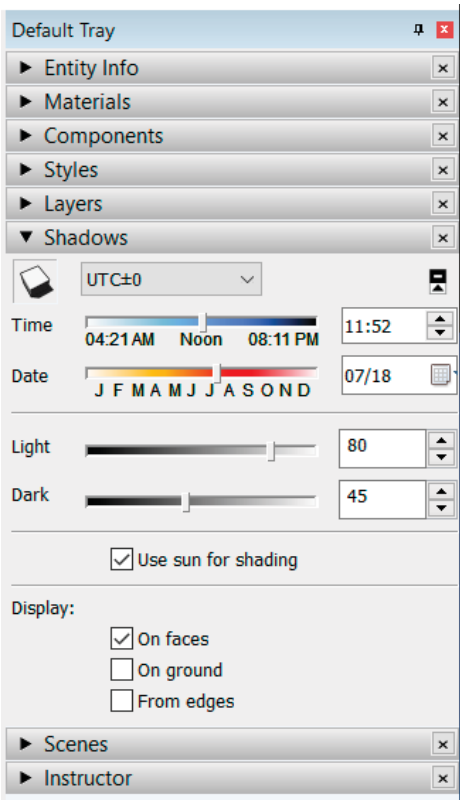
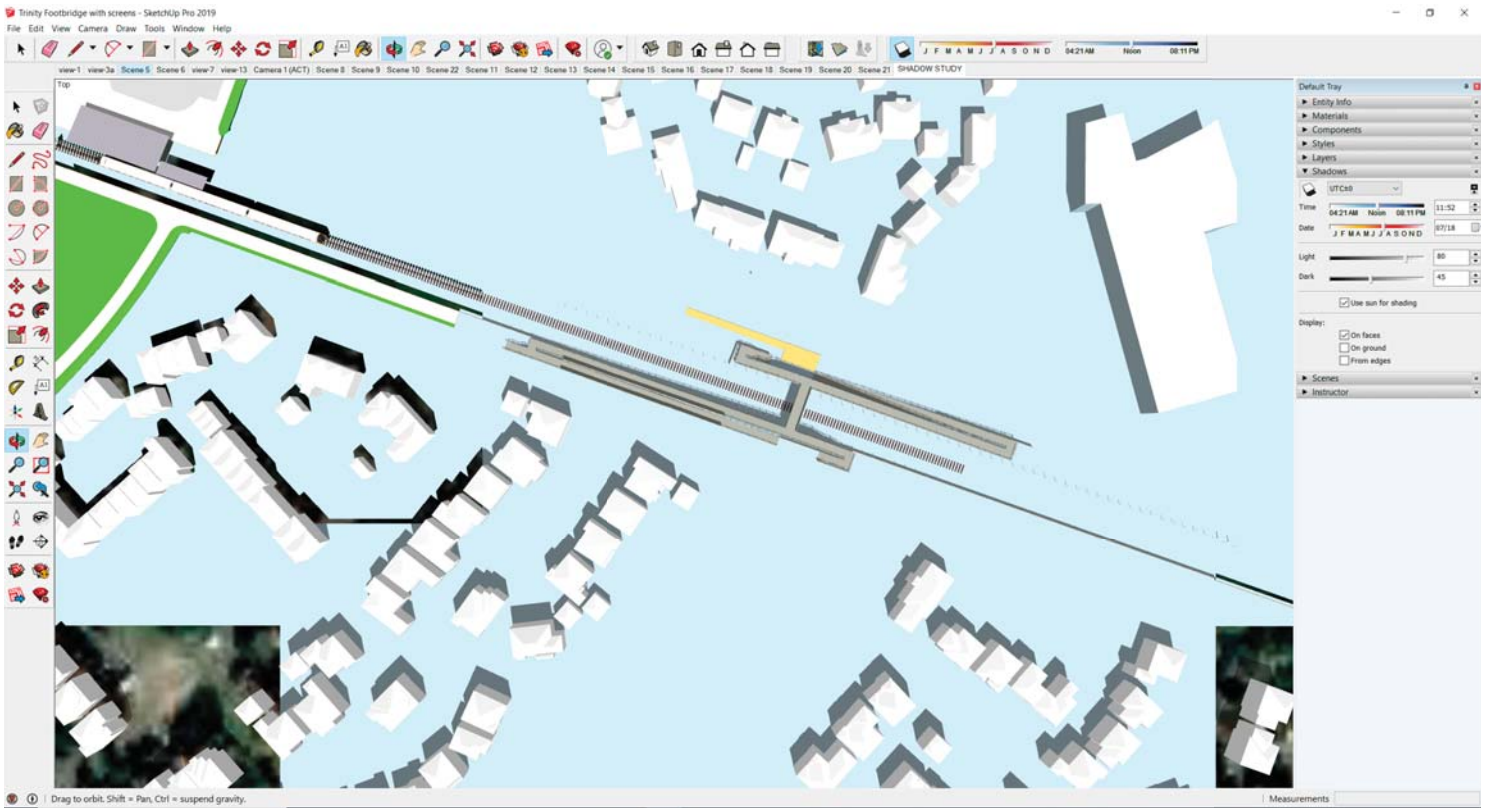
1.2.9 Once the model was positioned within the geo-located extract, the next step was to set up a ‘scene’ (or viewpoint) so that the view is fixed and constant between shadow assessment dates and time. In this case the ‘scene’ is vertical.



1.2.10 Once the ‘scene’ is fixed. the Shadows tool pallet was used to define specific dates and times of the day. SketchUp uses the model latitude and longitude, its time zone, and its orientation to display different shadows in response to a specific time and date.

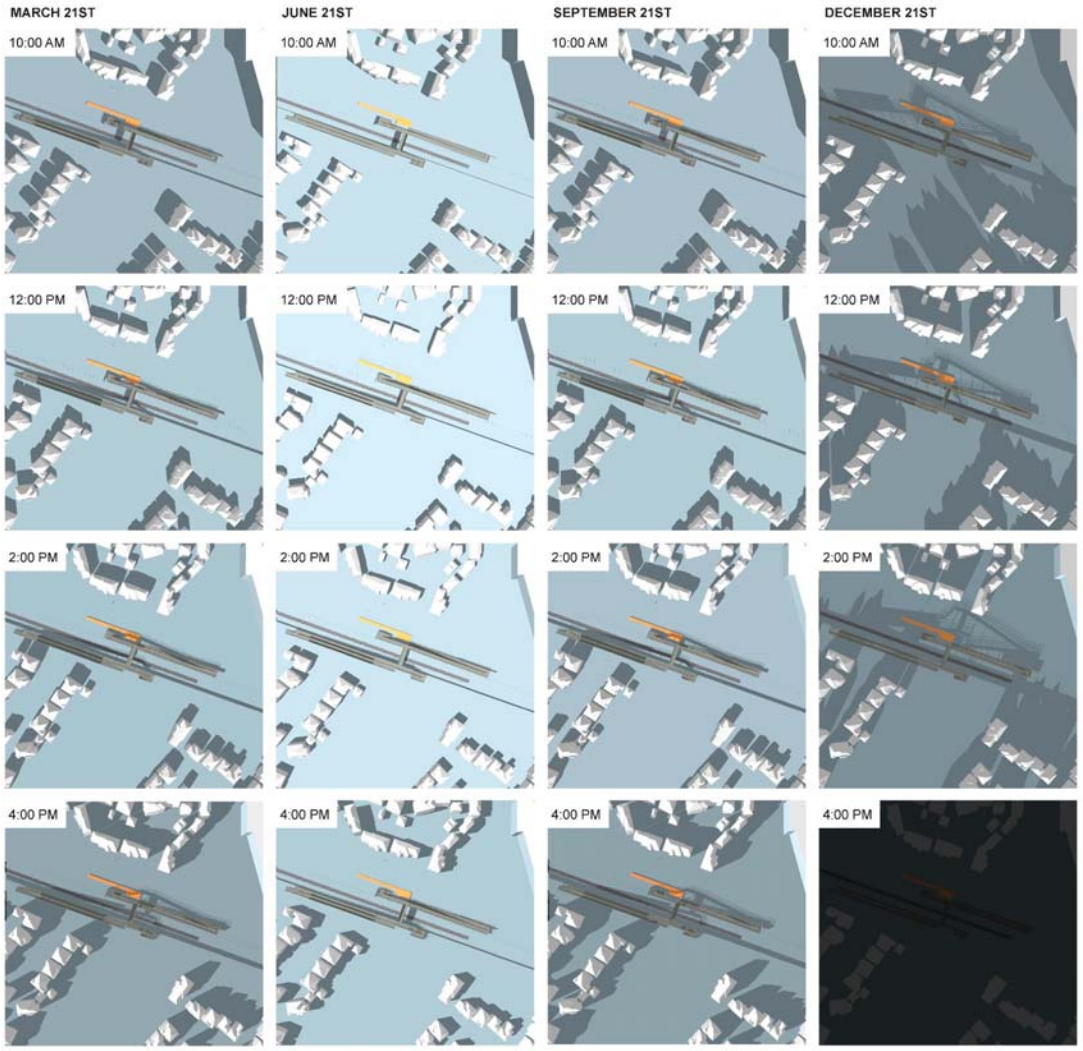
1.2.11 For each study the time and date were amended and the shadows were simulated. The scenes were exported as 2D scenes which can be viewed in Section 1.4 of this report.





1.3 Overview of Results

1.3.1 The following image provides an overview of the study and its results. In general, the study shows that the shade impact on the site and surrounding area would be minimal and localised to the north of the structure during December months when shadows encroach across the open area between the proposed bridge and Tansy Lane.



1.4 Individual Scene Exports

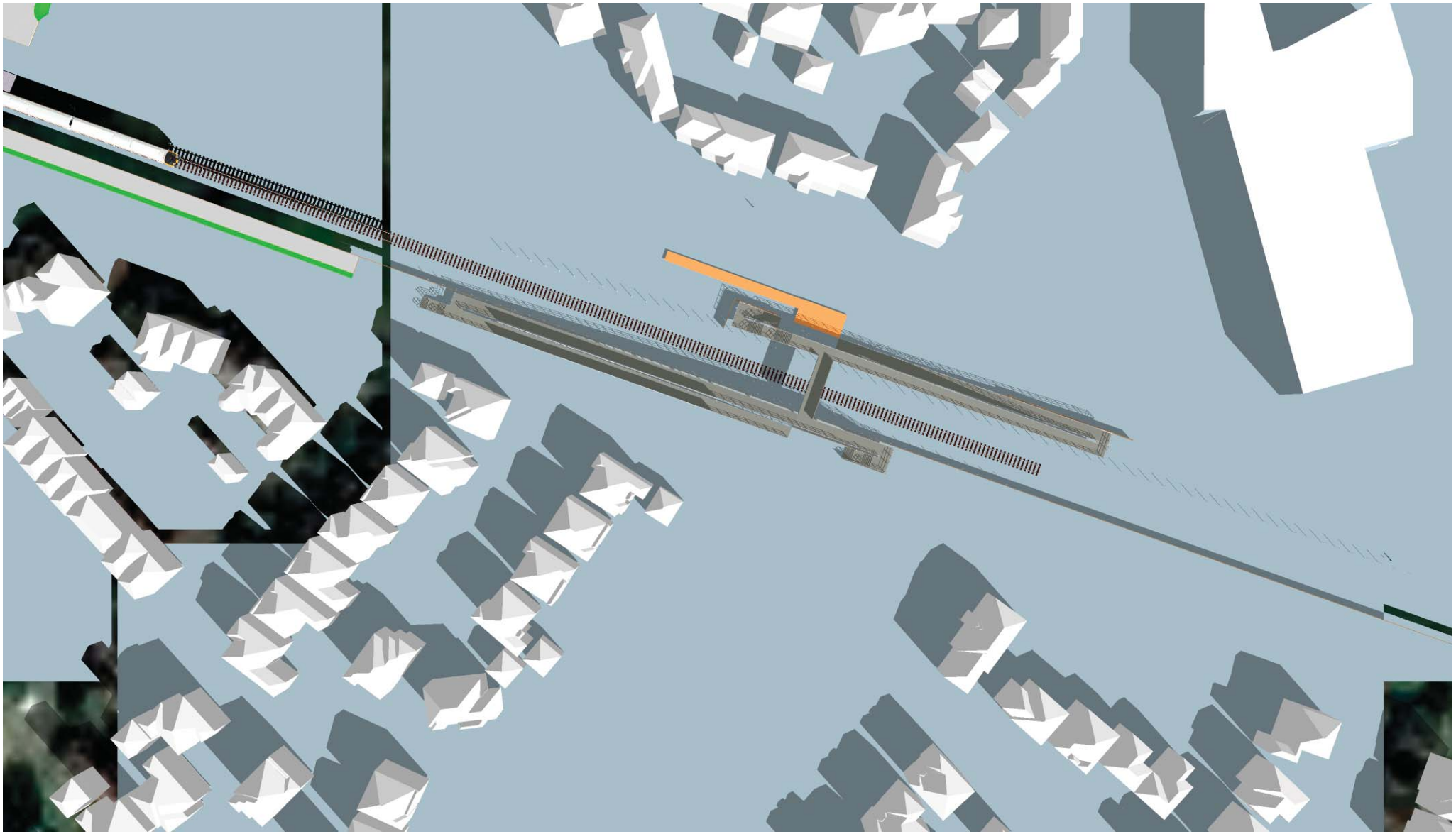


Figure 1: Trinity Footbridge with screens. 21st March 10am

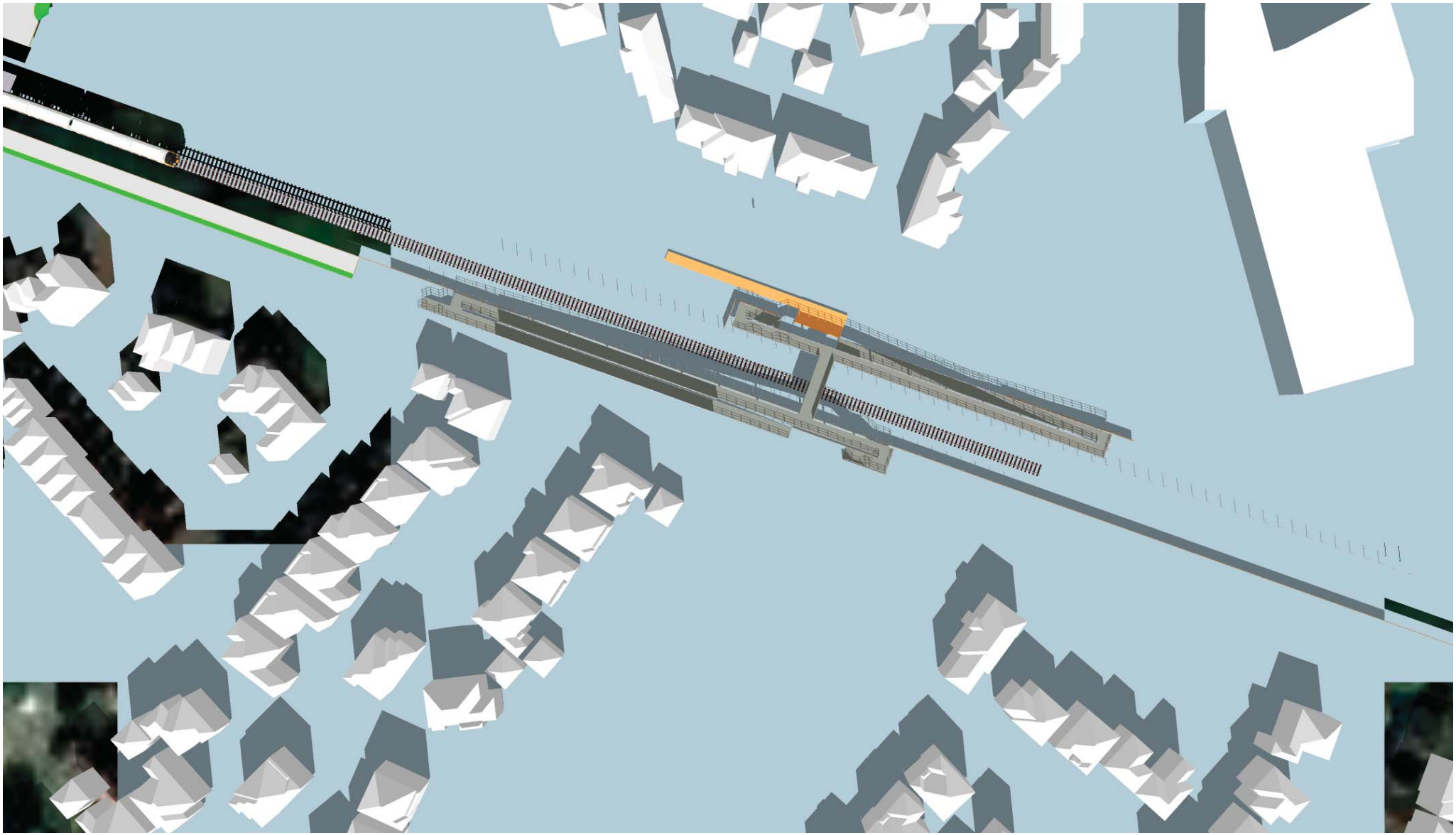


Figure 2: 21st March 12pm

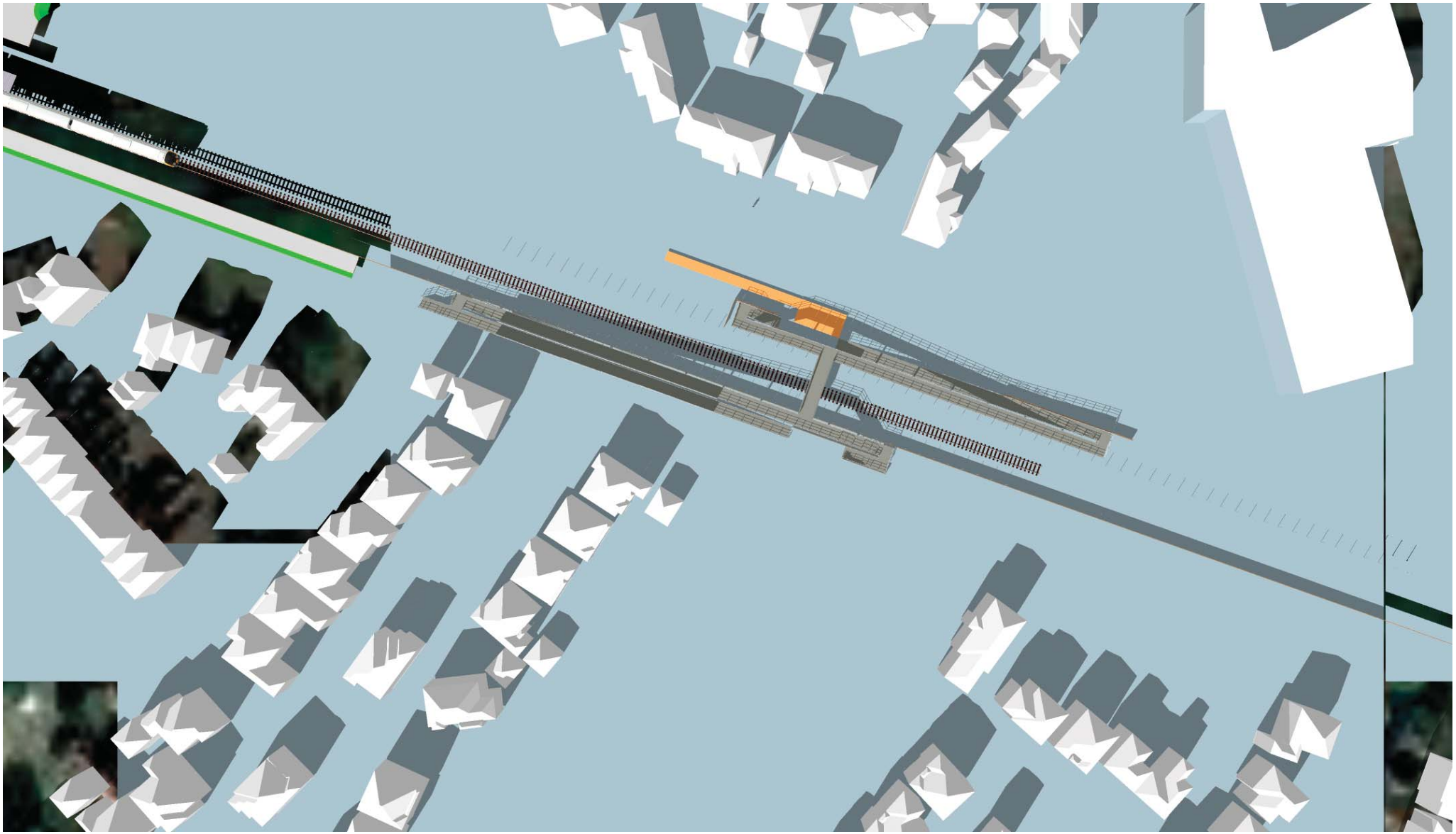


Figure 3: 21st March 2pm

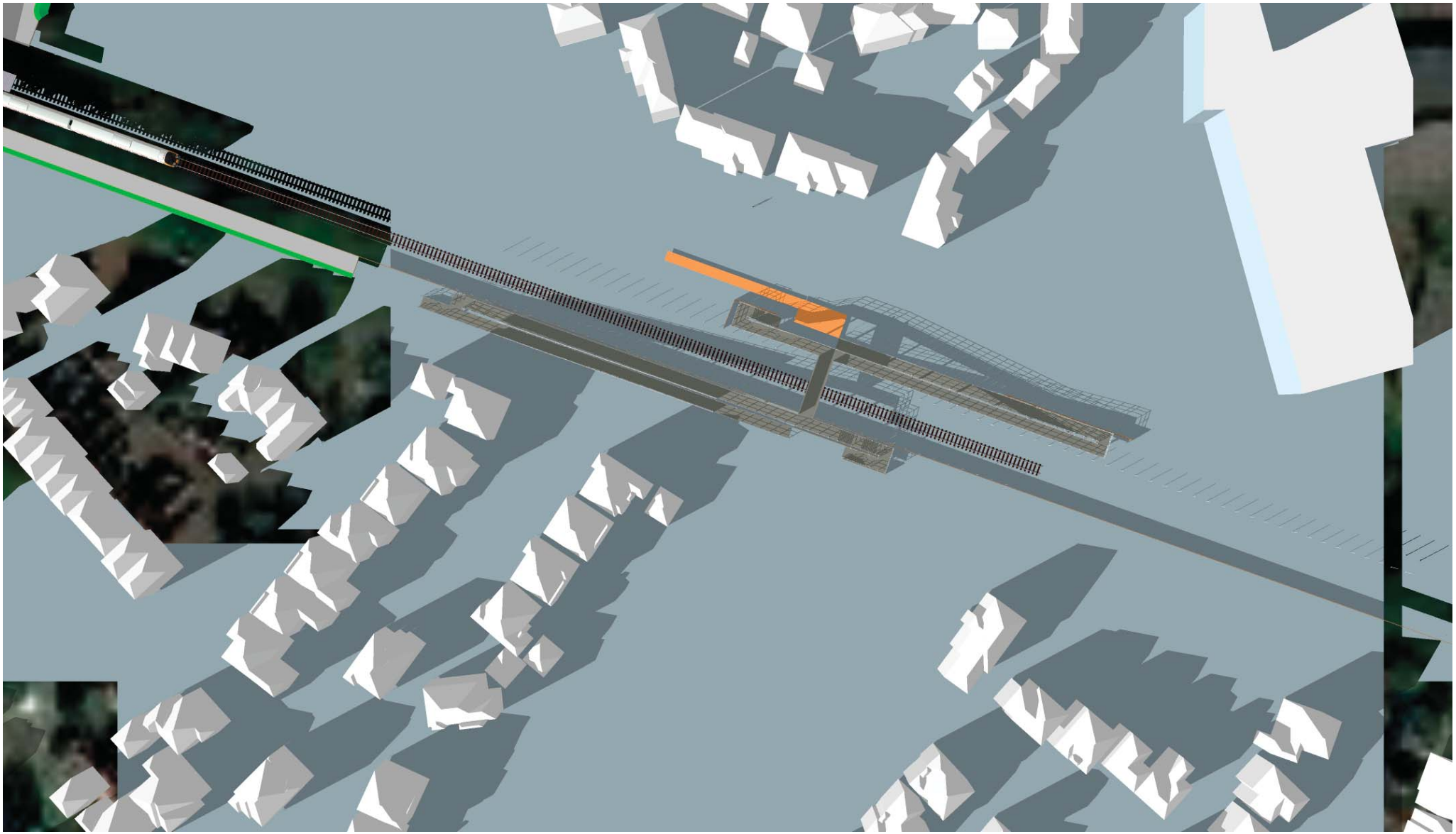


Figure 4: 21st March 4pm

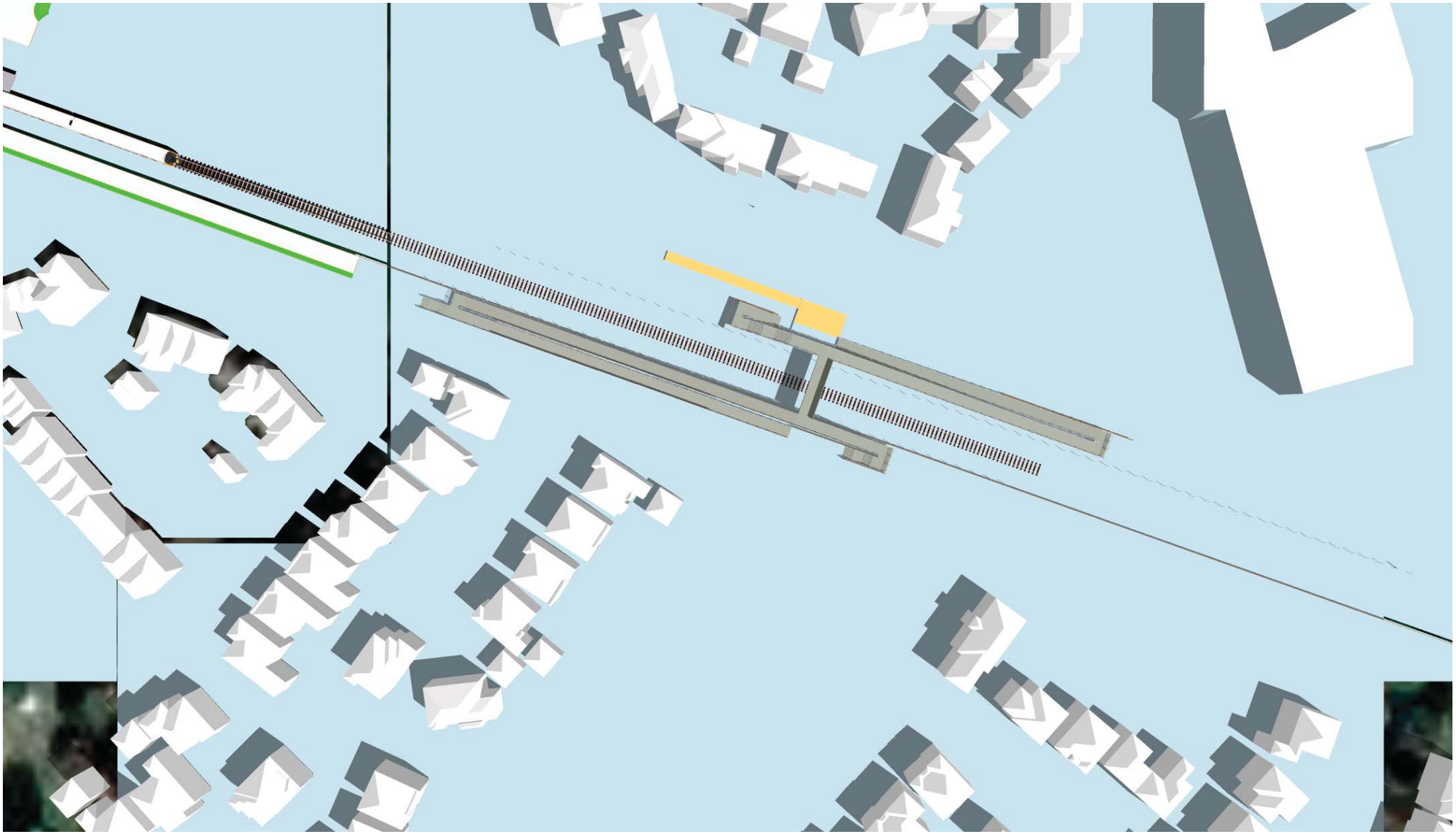


Figure 5: 21st June 10am

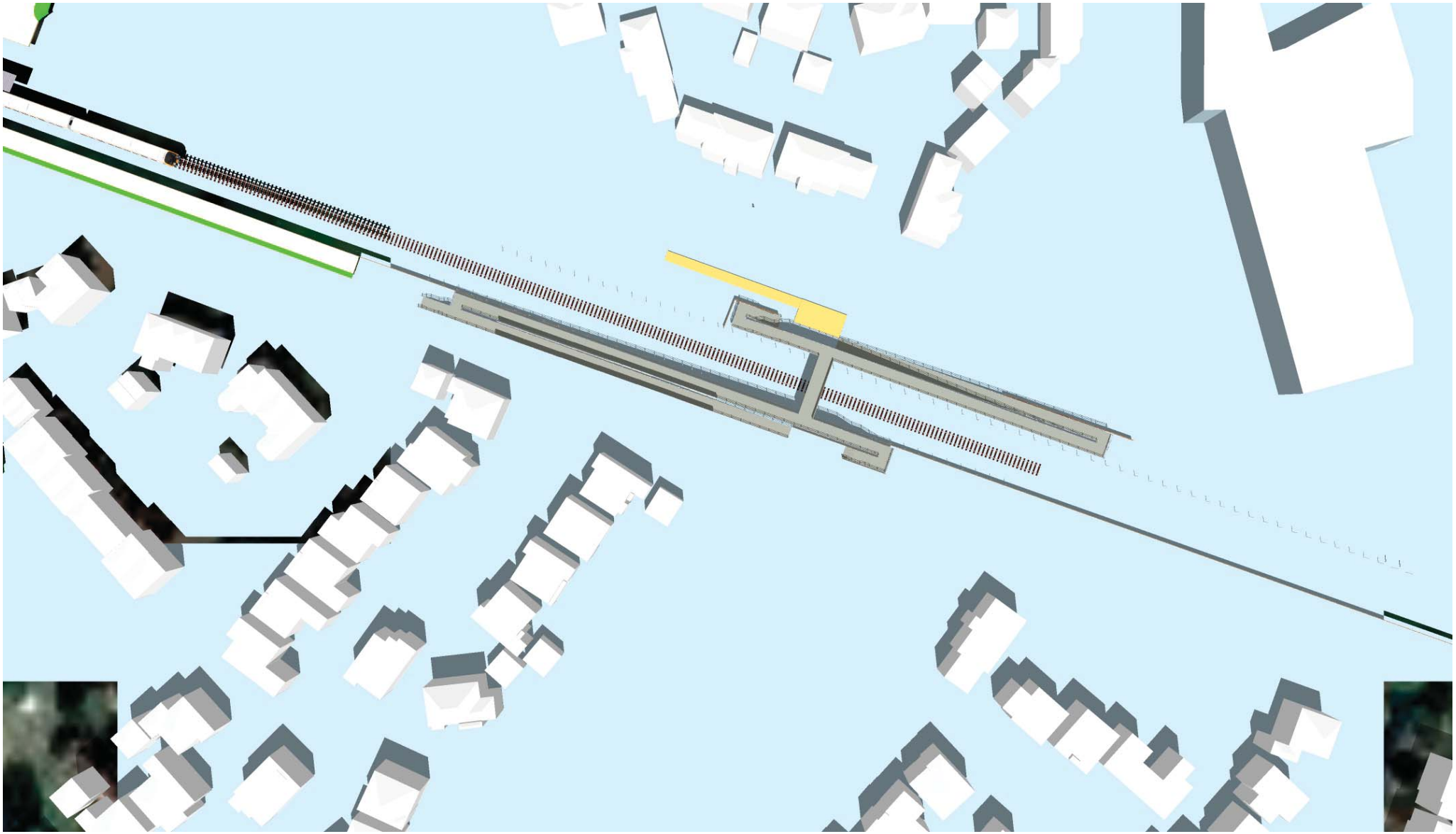


Figure 6: 21st June 12pm

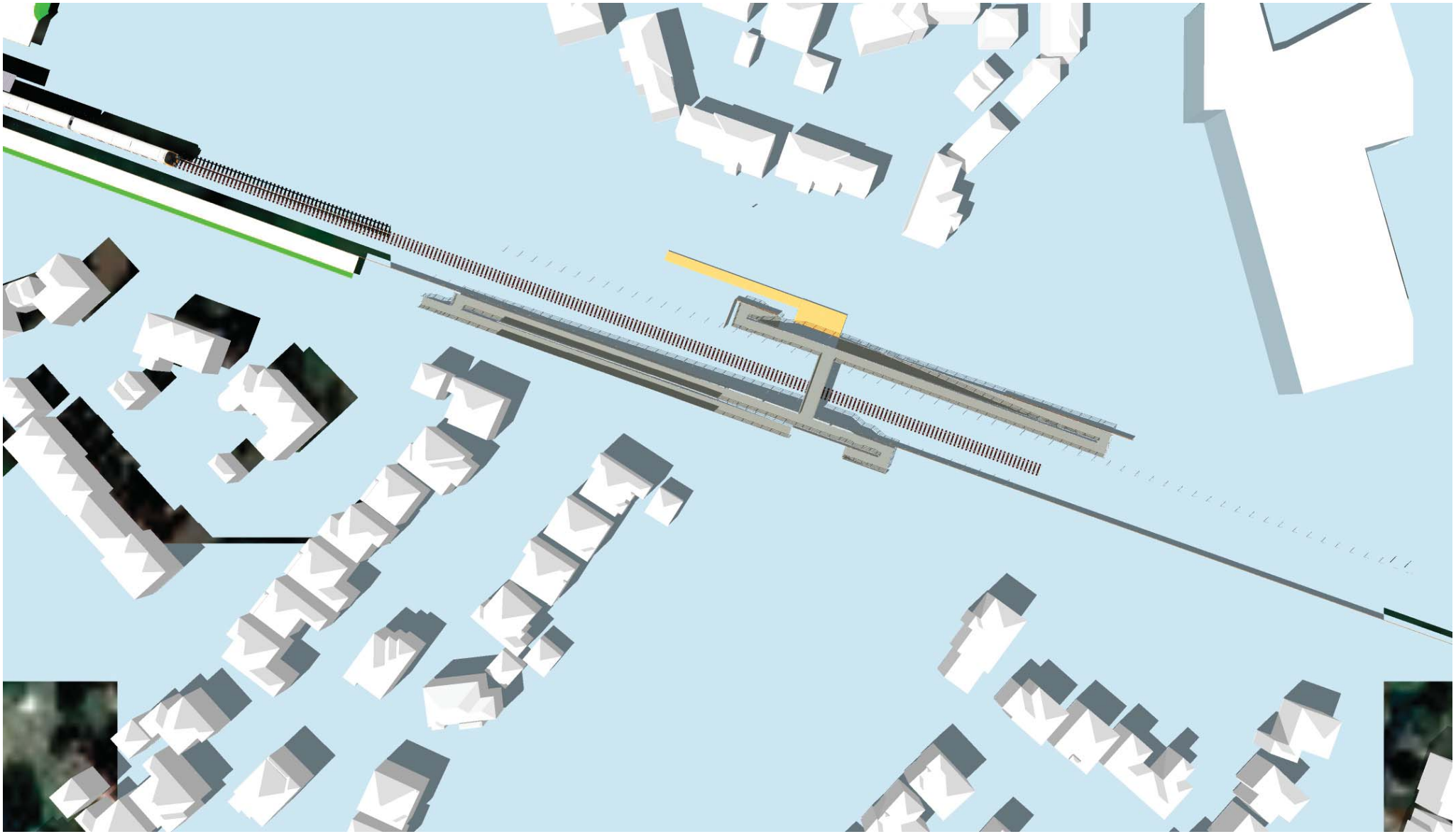


Figure 7: 21st June 2pm

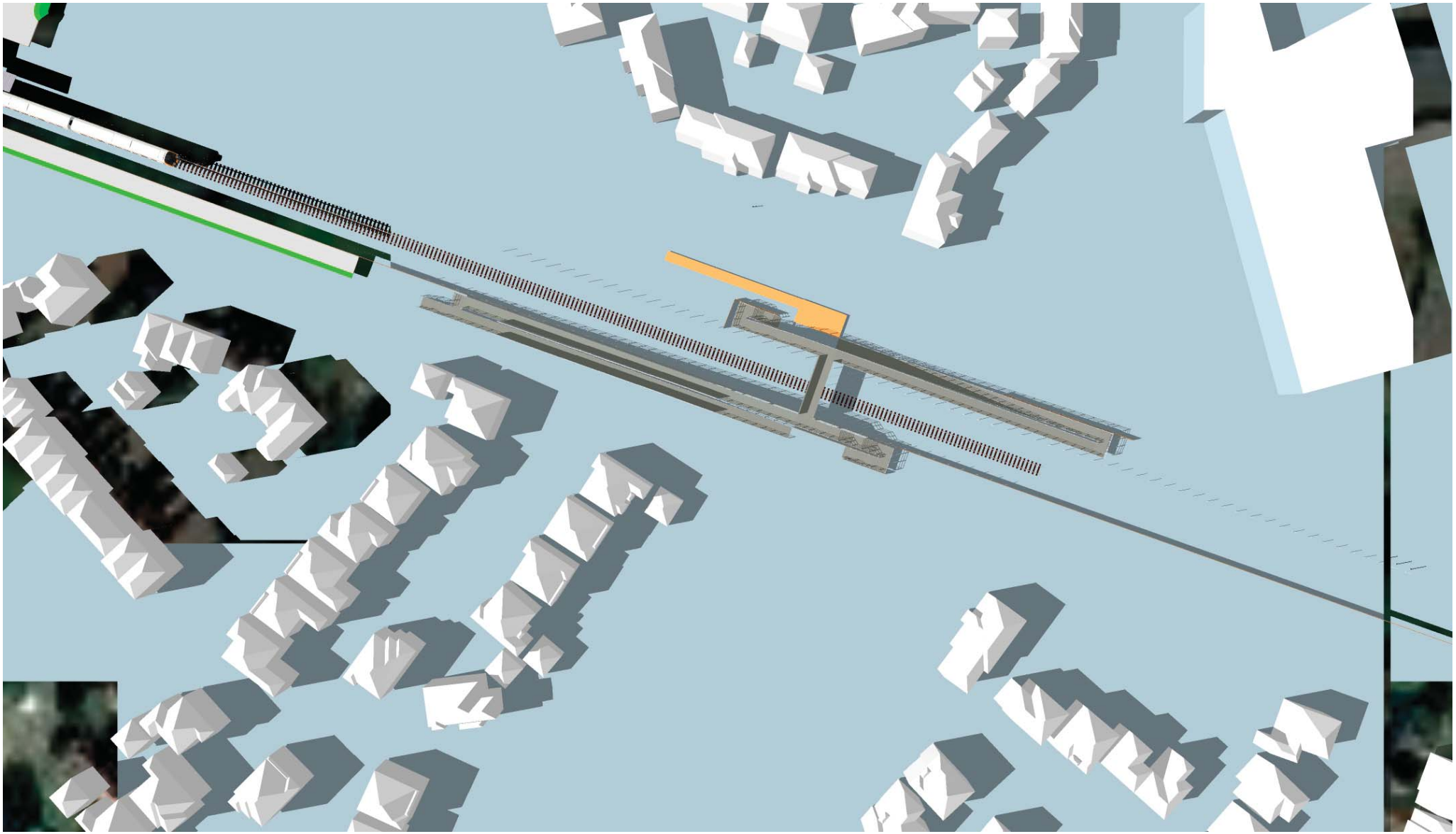


Figure 8: 21st June 4pm

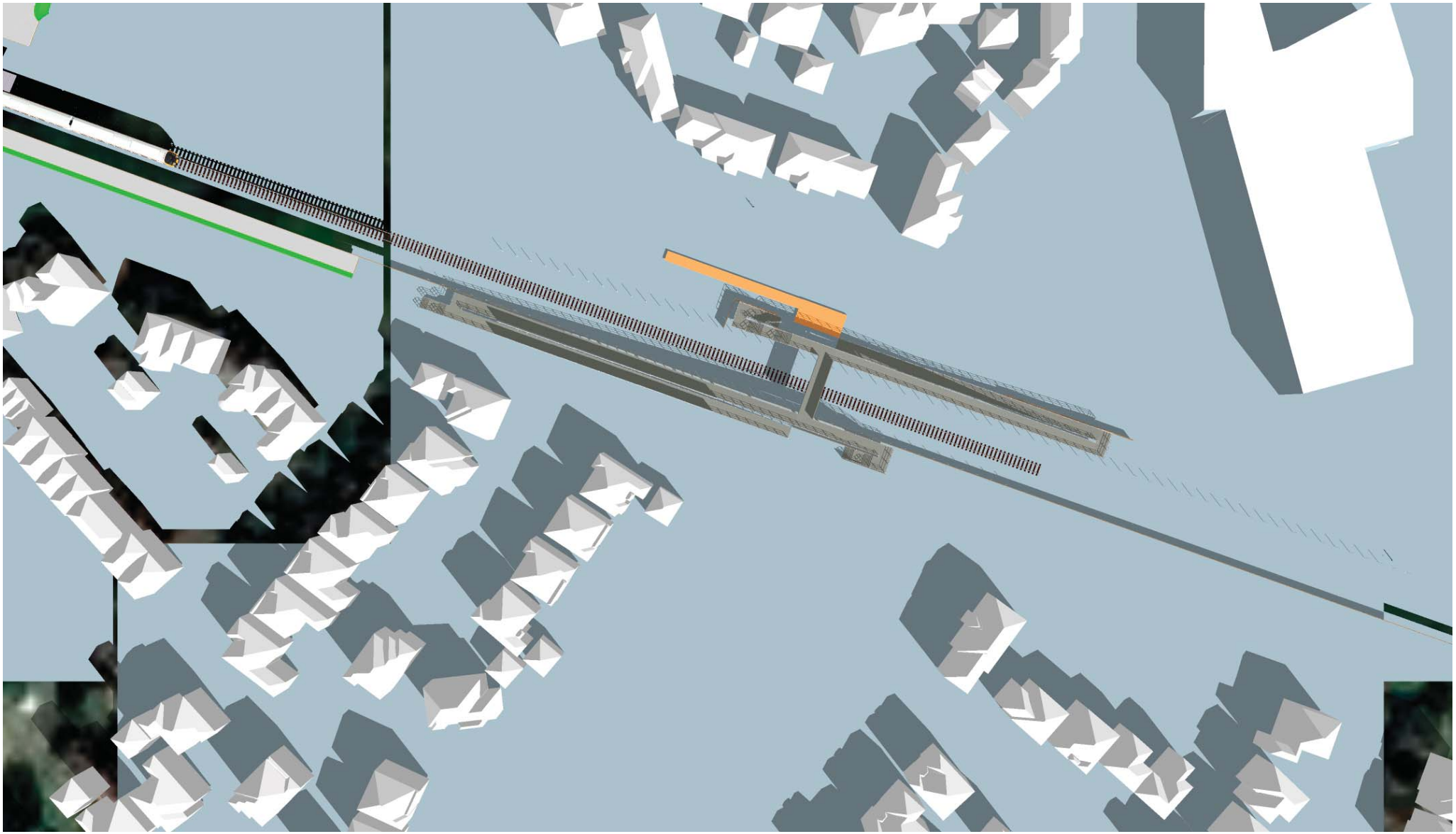


Figure 9: 21st September 10am

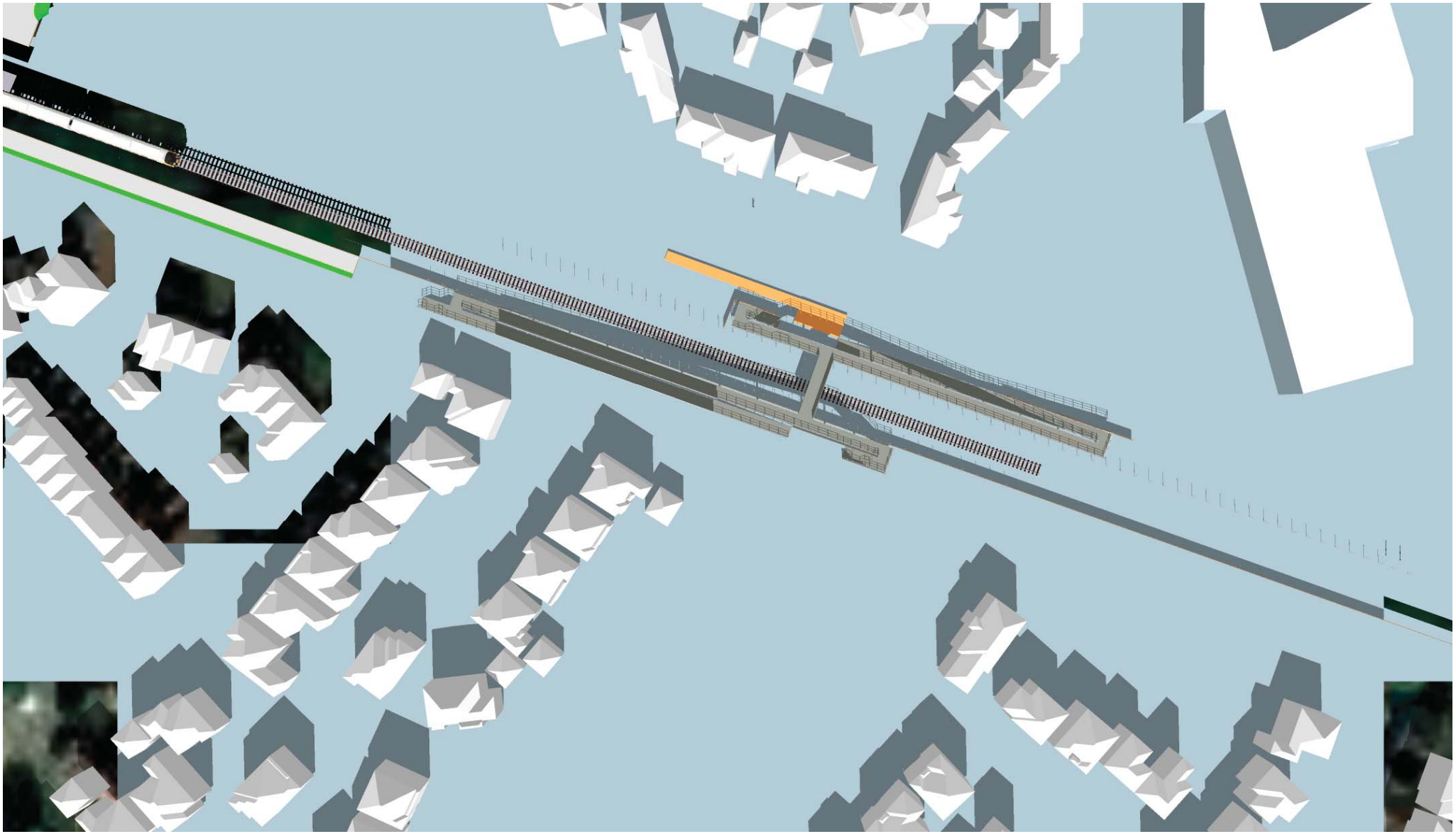


Figure 10: 21st September 12pm

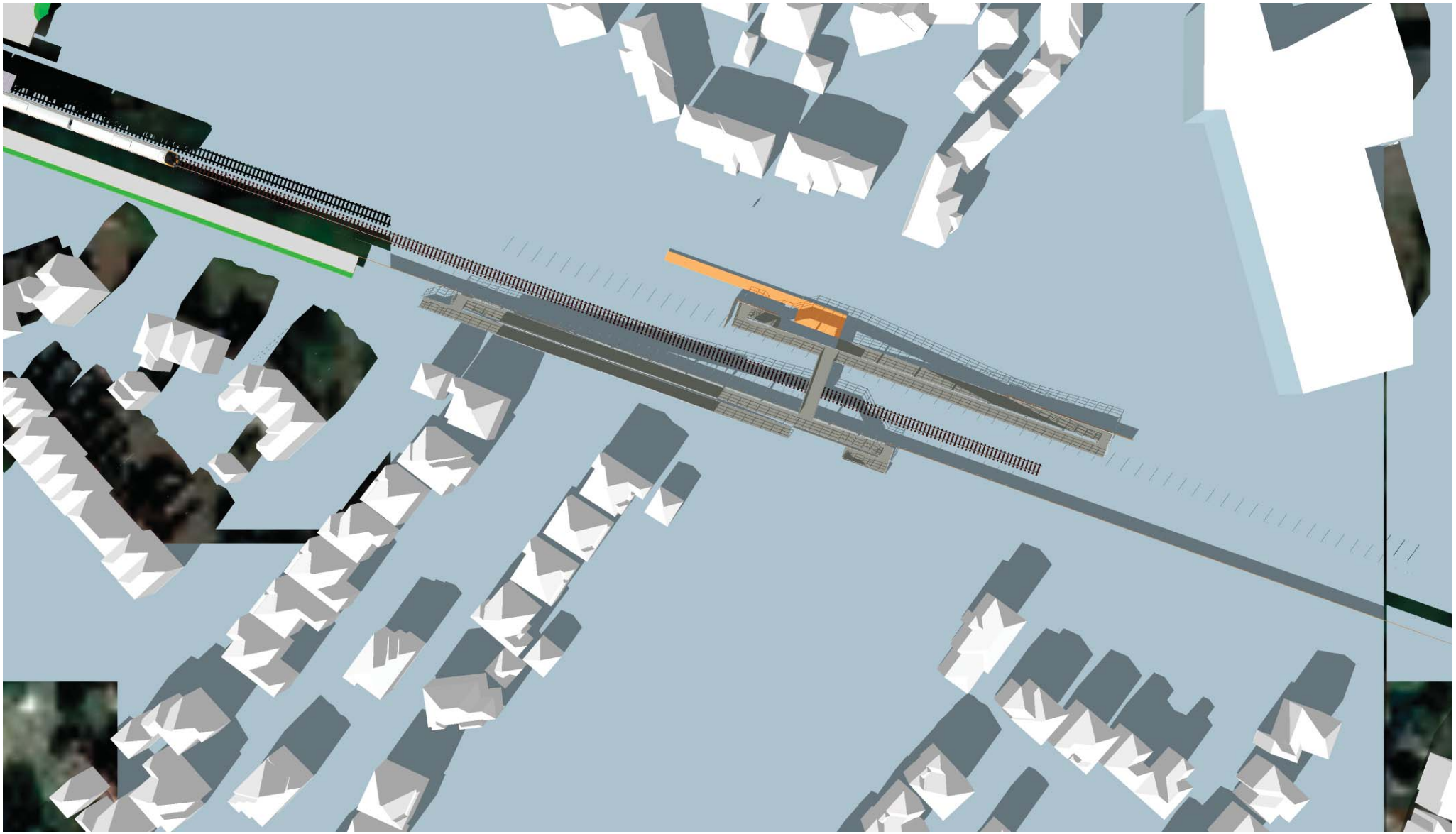


Figure 11: 21st September 2pm

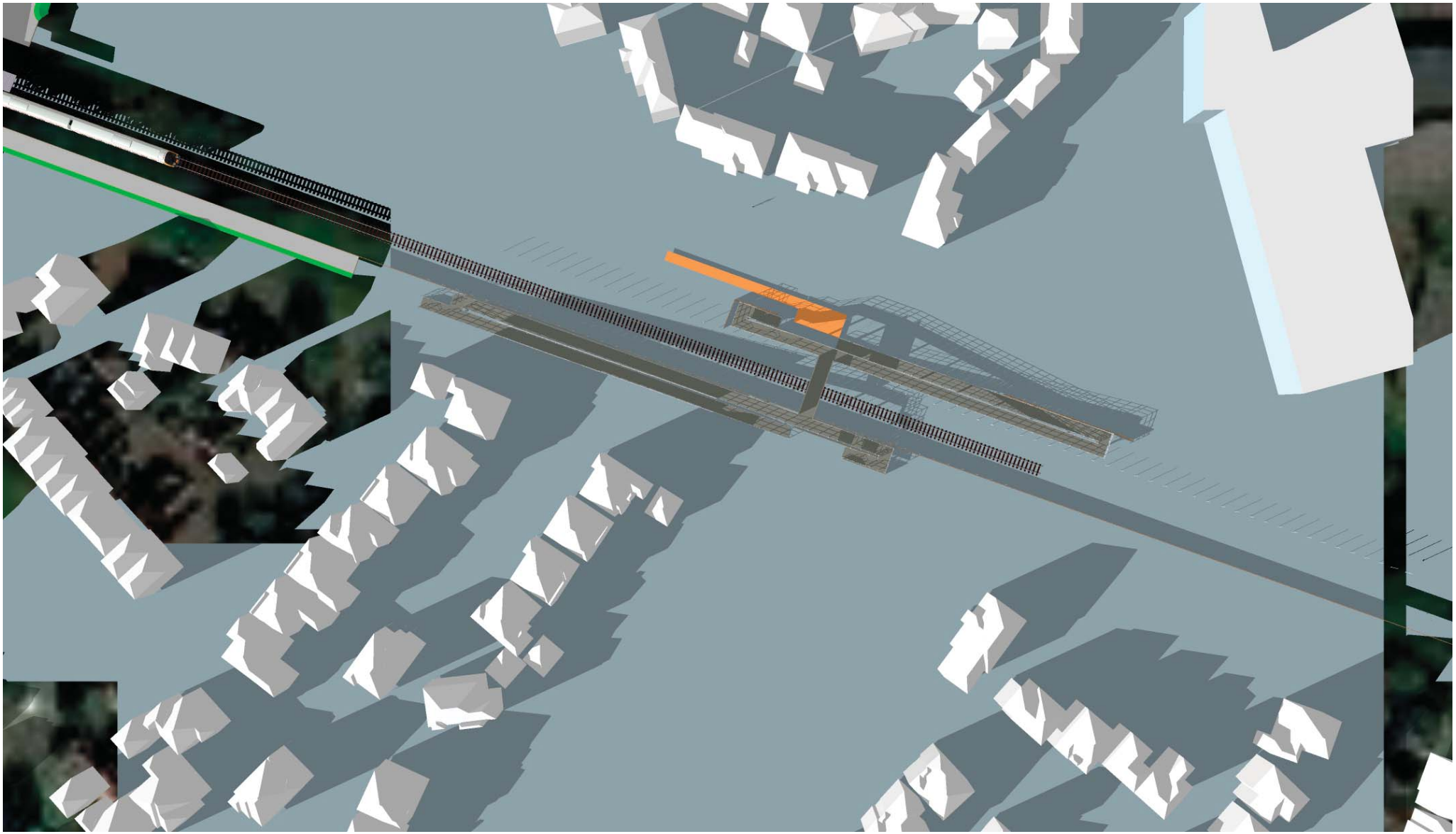


Figure 32: 21st September 4pm

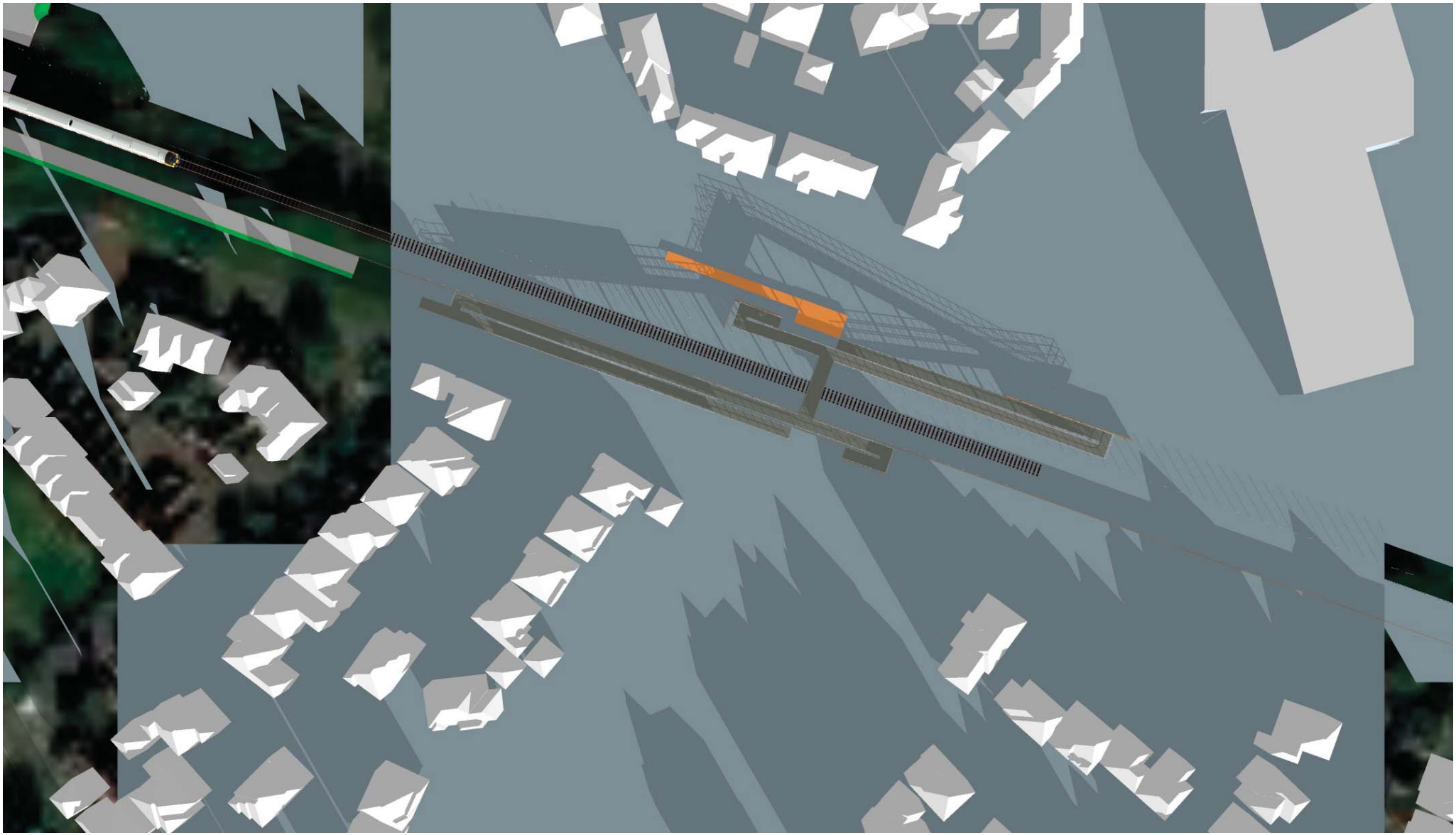


Figure 14: 21st December 10am

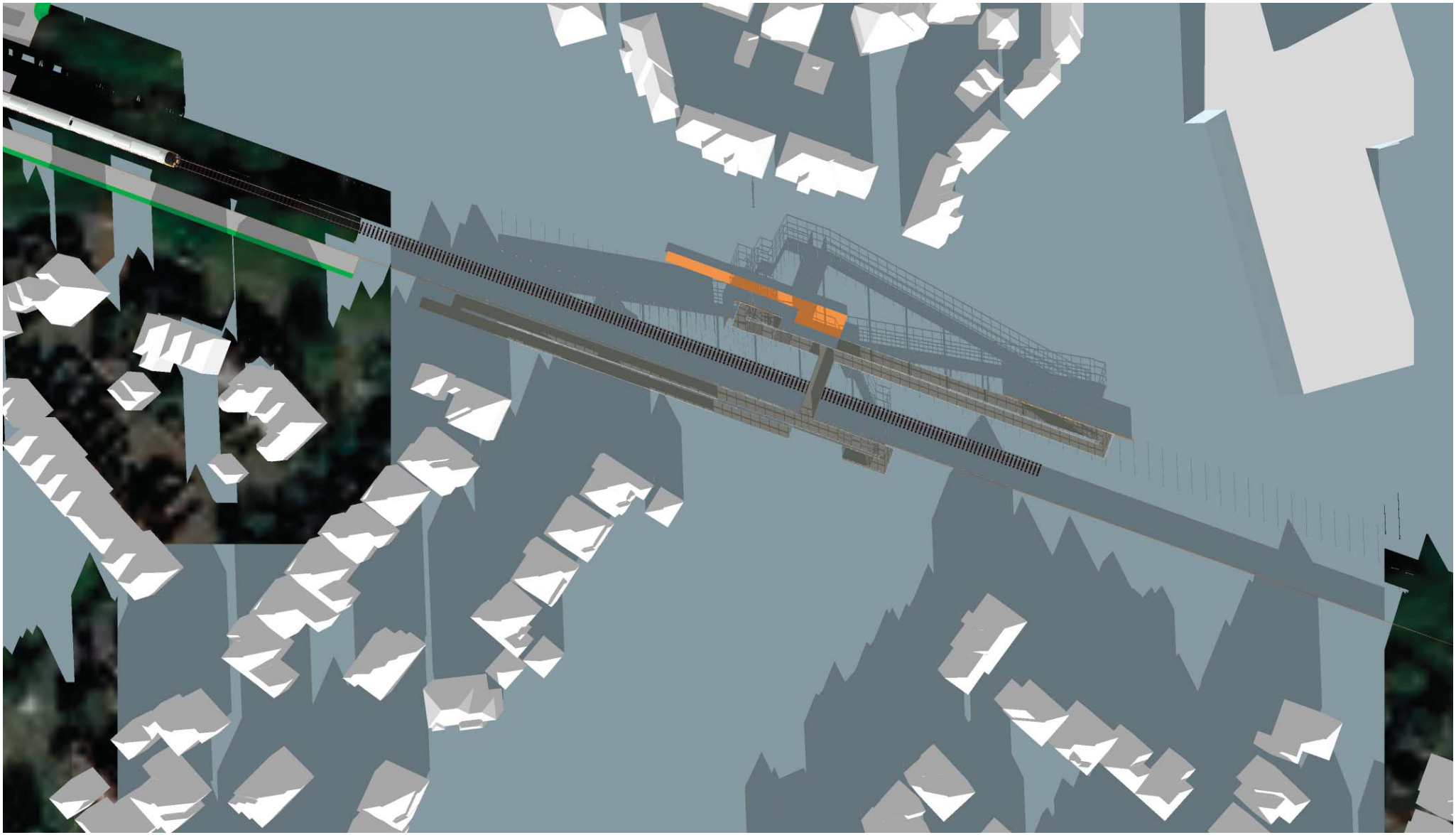


Figure 15: 21st December 12pm

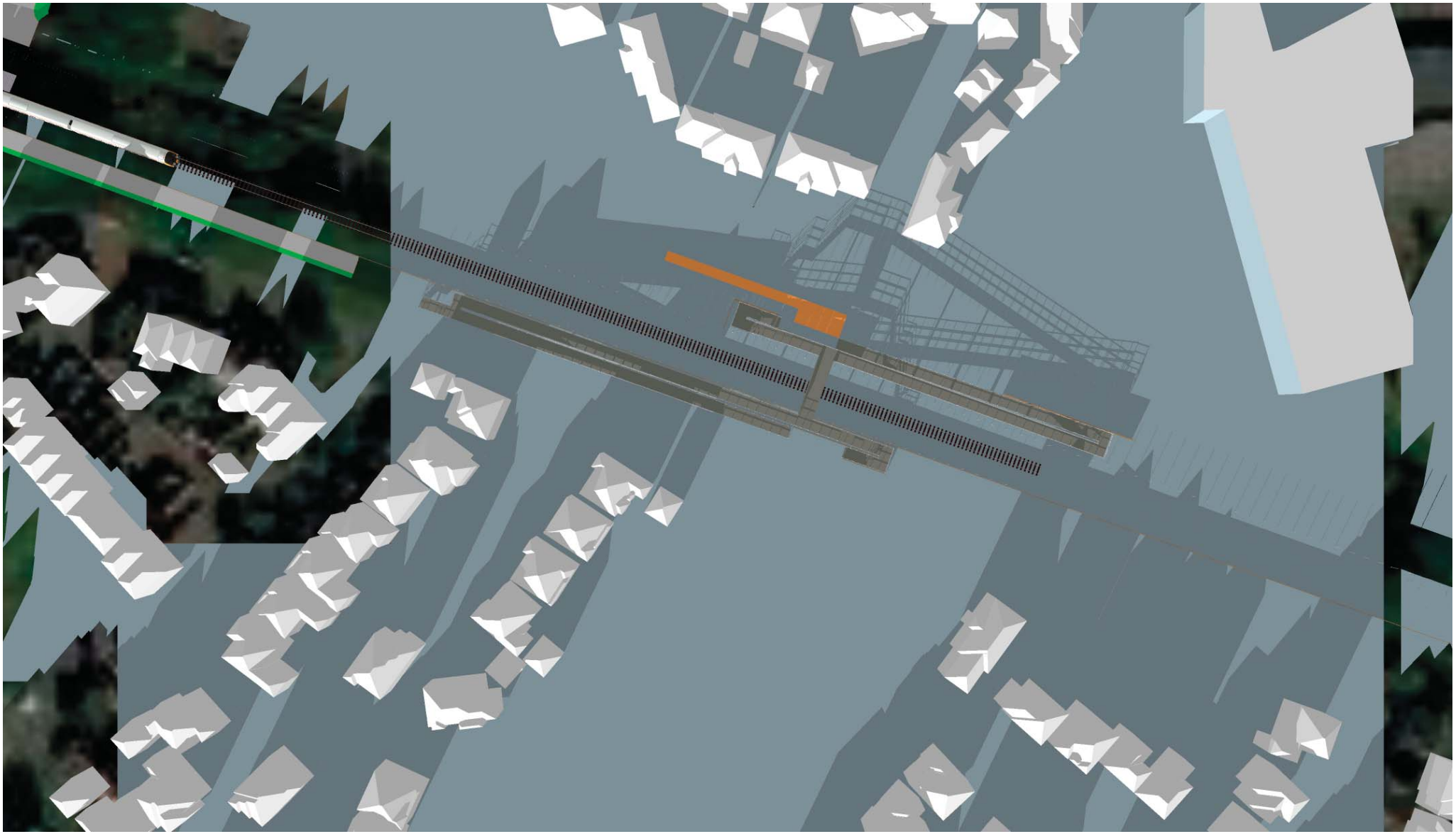


Figure 65: 21st December 2pm

Figure 16: 21st December 4pm