Deployment Plan of a LoRa Mesh Network

Contents

Summary

There will be a two-phase deployment:

1. Phase 1: Test

   Where: One Pool Street building
   How many: 3 points total in OPS.
   Locations: can be found in the last section.
   Until when: getting permission to deploy in the park.

2. Phase 2: Production

   Where: The Olympic Park and One Pool Street building
   How many: 8 points total: 4 in QEOP, 3 in QEOP as a backup (not to be used unless needed), 1 in OPS building.
   Locations: can be found in the last section.
   Until when: dissertation submission.

Node location study

According to the heatmap test I did, LoRa mesh nodes can communicate easily on a line of sight, but when it comes to ground with different heights, things could get more complicated.

Figure 1 – Point-to-point LoRa RSSI test

The main difference between CASA's past deployments and this deployment is the dependence on the industrial gateway positioned on the orbit. This gateway is positioned almost 100 meters above the ground, where in this dissertation, the nodes will be maximum 3 to 4 meters above the ground.

This means a topographic study must be done on the park to ensure the nodes are positioned in the right places to give acceptable coverage, taking in mind the cost factor of course.

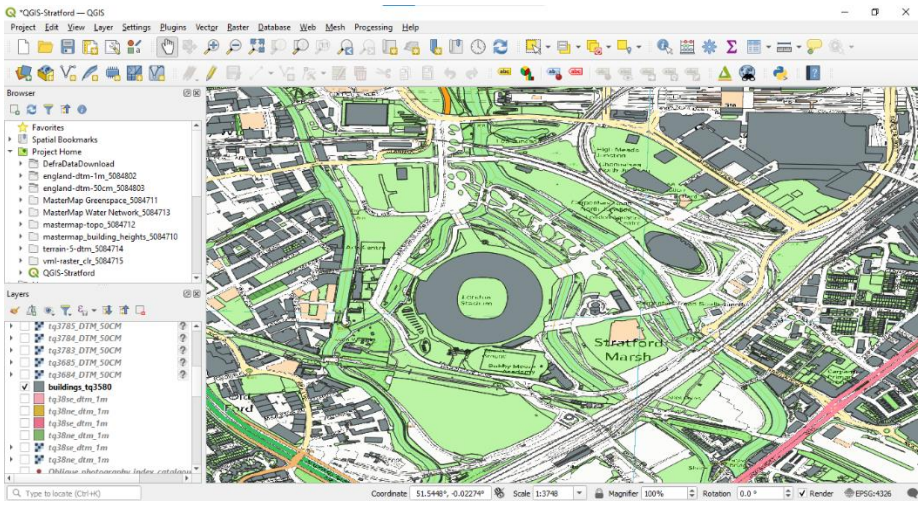

Figure 2 – QGIS program was used to understand building heights.

Figure 3 – A Topographic scan of Stratford and QEOP areas using LIDAR
(**Green** colour is the highest elevation, **Red** is the lowest)

Phase 1: Test phase deployment

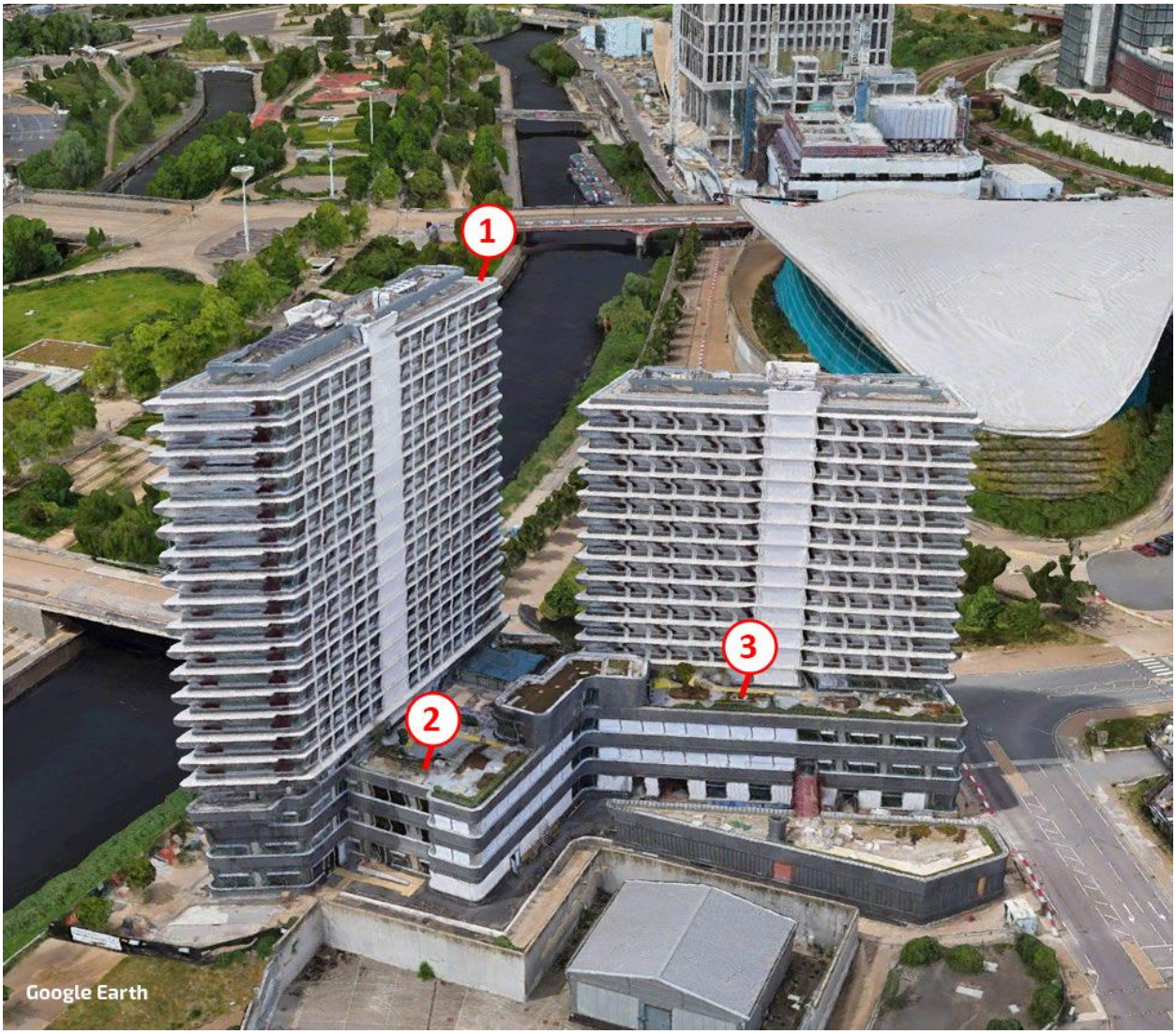

Figure 4 – Test phase deployment in OPS

Point (1)

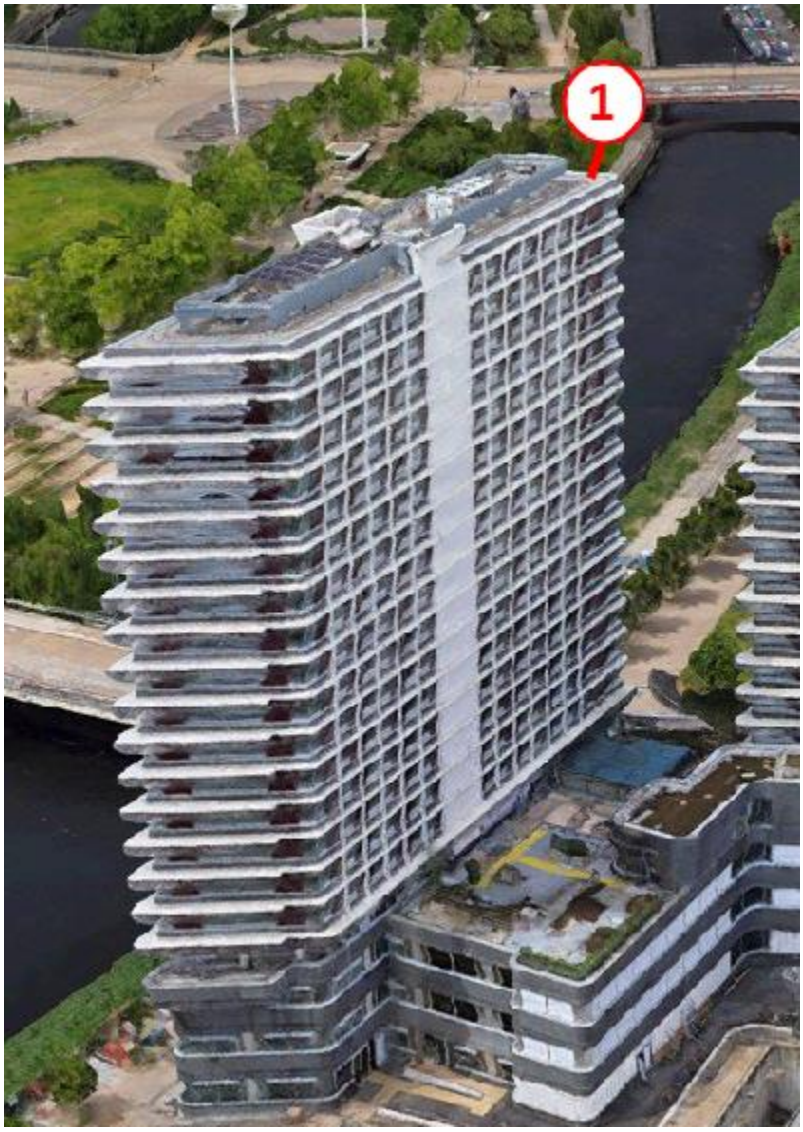

Figure 5 – Point 1 on Tower 1

On the roof of Tower 1, to overcome the elevation challenges. **This node is to be left there during the production phase.**

Point (2)

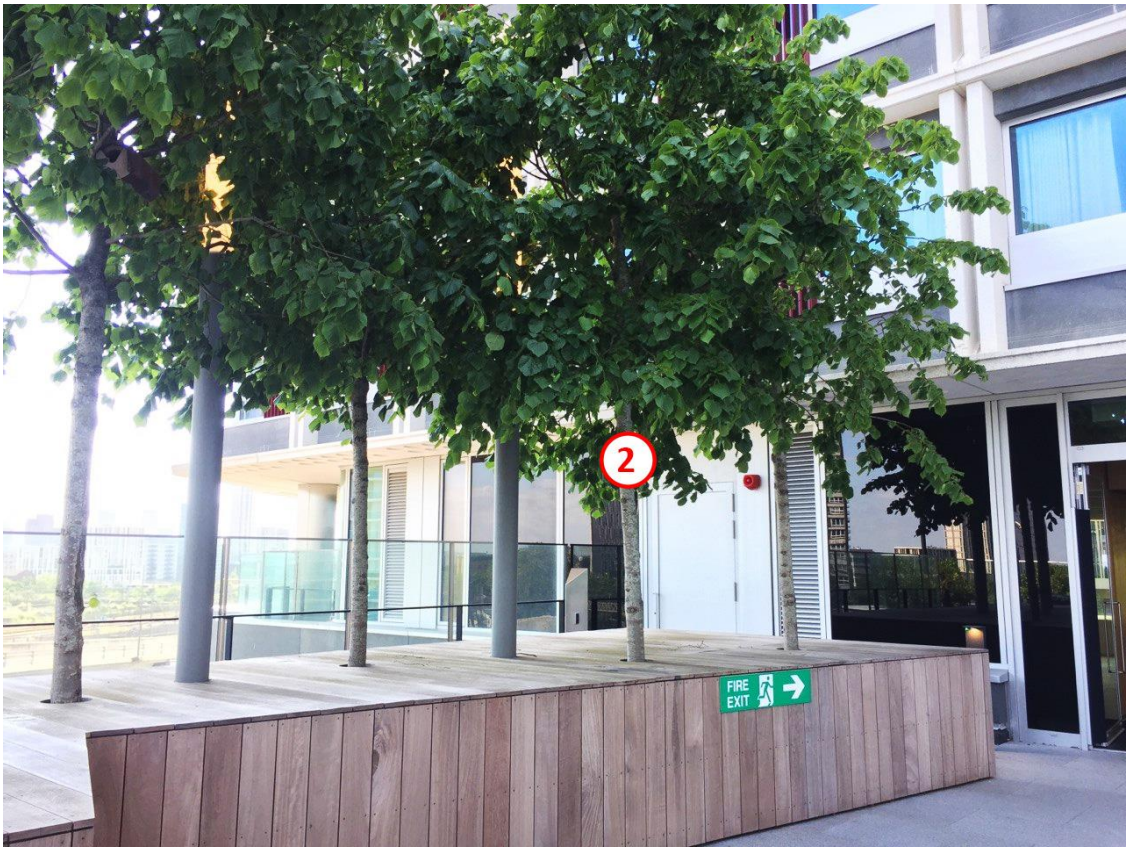

Figure 6 – Point 2 in OPS building on one of the trees in front of Tower 1 entrance.

Point (3)

Figure 7 – Point 3 in OPS building on one of the poles in front of Tower 2 entrance.

Production phase deployment

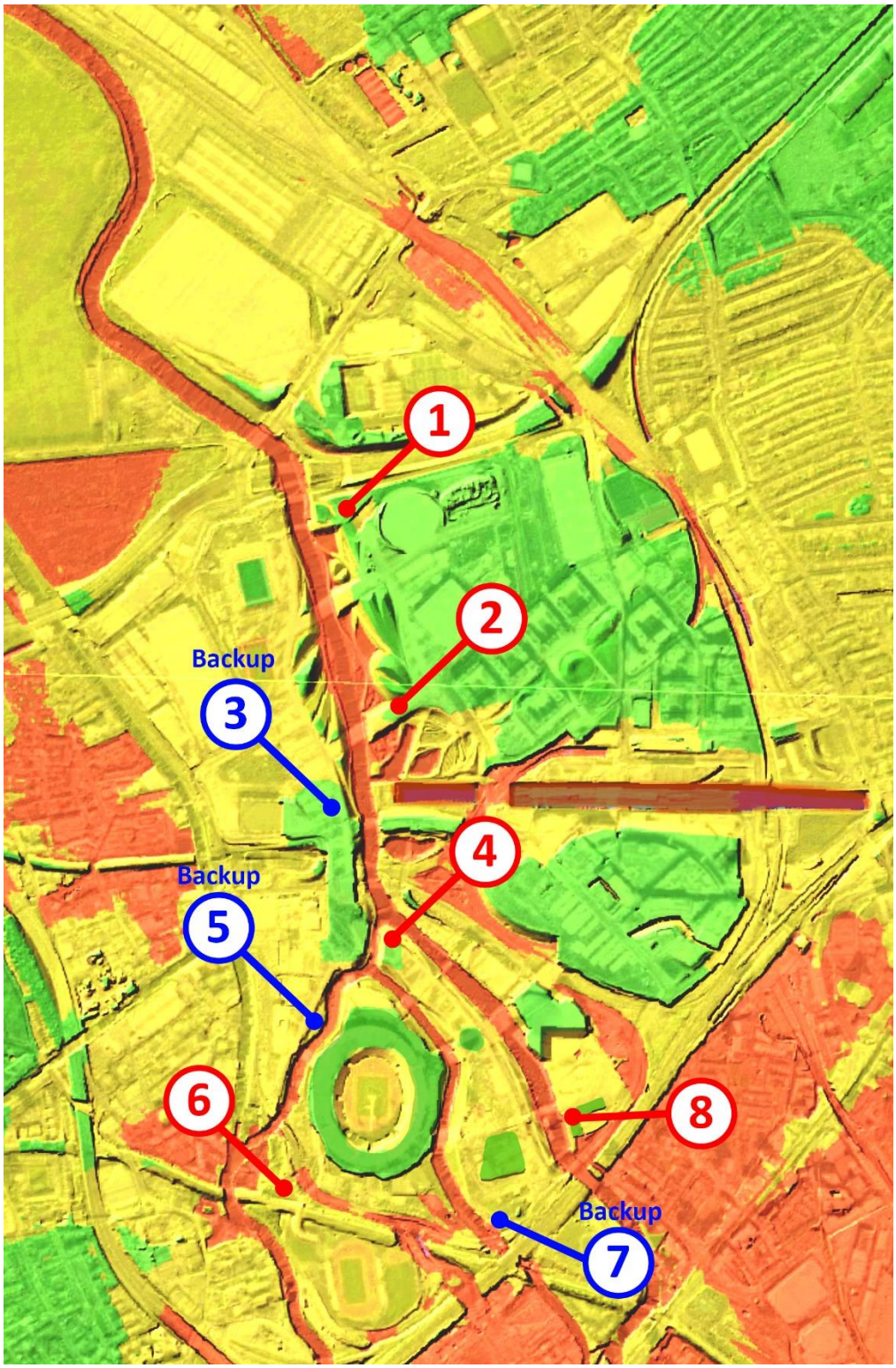

Figure 8 – Production deployment map. **Red**: main nodes, **Blue**: backup nodes (not deployed unless needed)

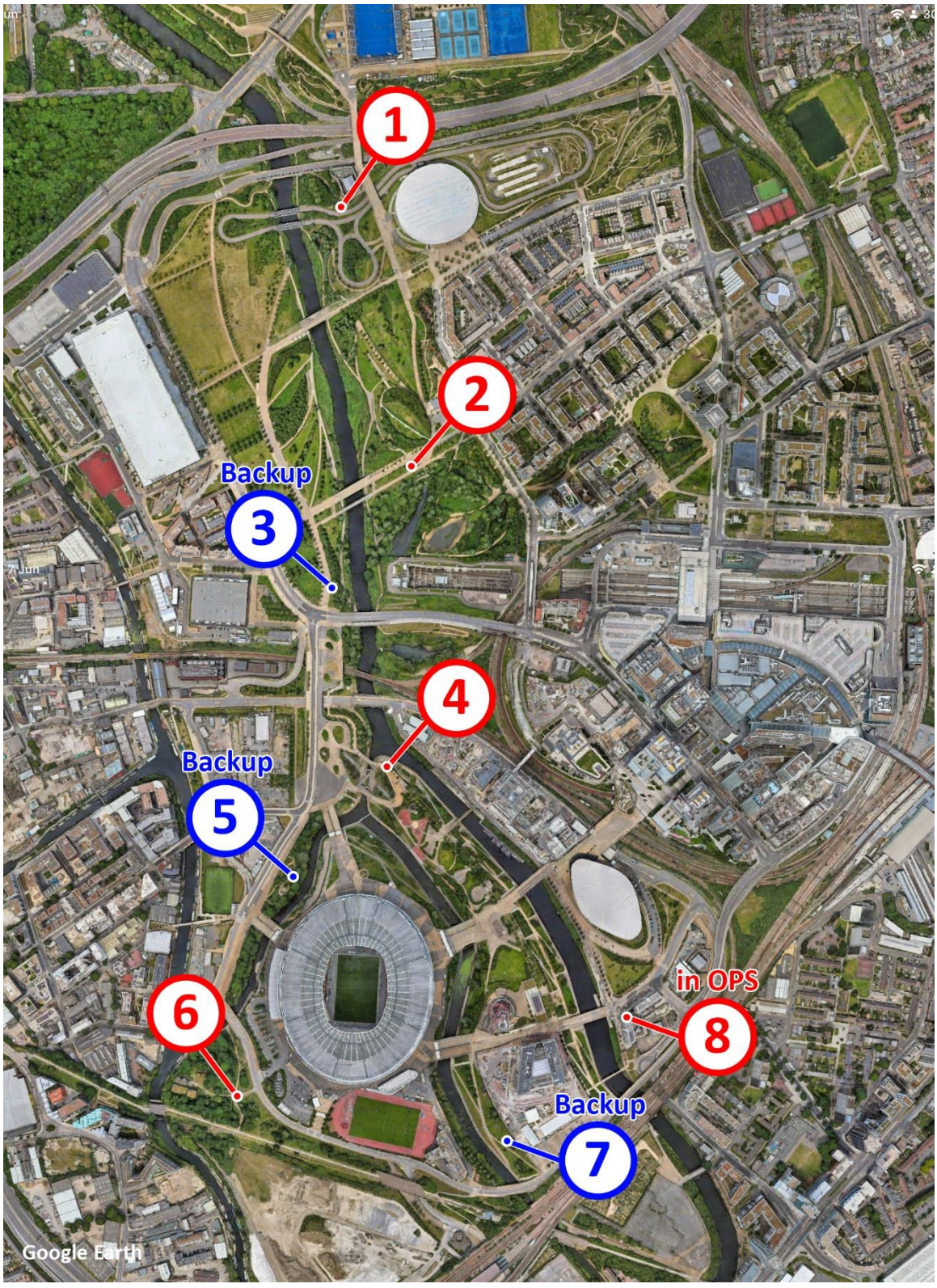

Figure 9 – Production deployment map with satellite view. **Red**: main nodes, **Blue**: backup nodes (not deployed unless needed)

Point (1)

- Location: https://goo.gl/maps/YNMeKN5nr37m1fR5A

Figure 10 – Point 1 location on a pole.

Point (2)

- Location: https://goo.gl/maps/mALEXZ7BXhwmcBoG6

Figure 11 – Point 2 location on a pole.

Point (3) - Backup

- Location: https://goo.gl/maps/Z2oBSPZrigR1RN759

Figure 12 – Backup Point 3 location on a pole.

Point (4)

- Location: https://goo.gl/maps/7PVEuoVChoAWNGfV8

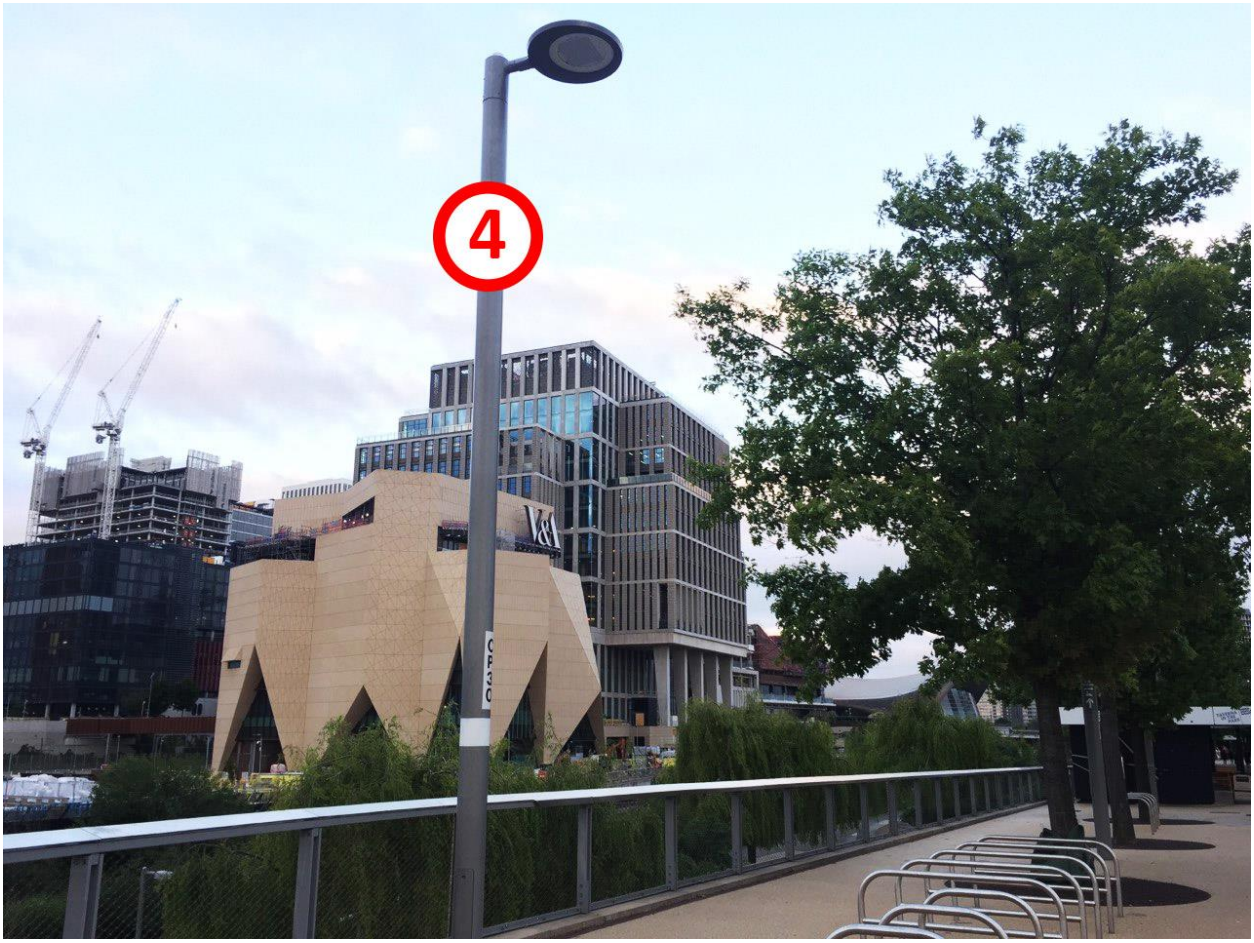

Figure 13 – Point 4 location on a pole.

Point (5) - Backup

- Location: https://goo.gl/maps/dpDjeVB95uoZ5SFZ6

Figure 14 – Backup Point 5 location on a tree.

Point (6)

- Location: https://goo.gl/maps/GrhahYLZUaSXHNdu5

Figure 15 – Point 6 location on a pole.

Point (7) - Backup

- Location: https://goo.gl/maps/U4n7qcVpkv3vwTKt6

Figure 16 – Backup Point 7 location on a tree.

Point (8)

In OPS top floor, same as Point 1 in Phase (1): testing phase.