

SPATIAL INFORMATICS

Fire Rescue Response time Analysis

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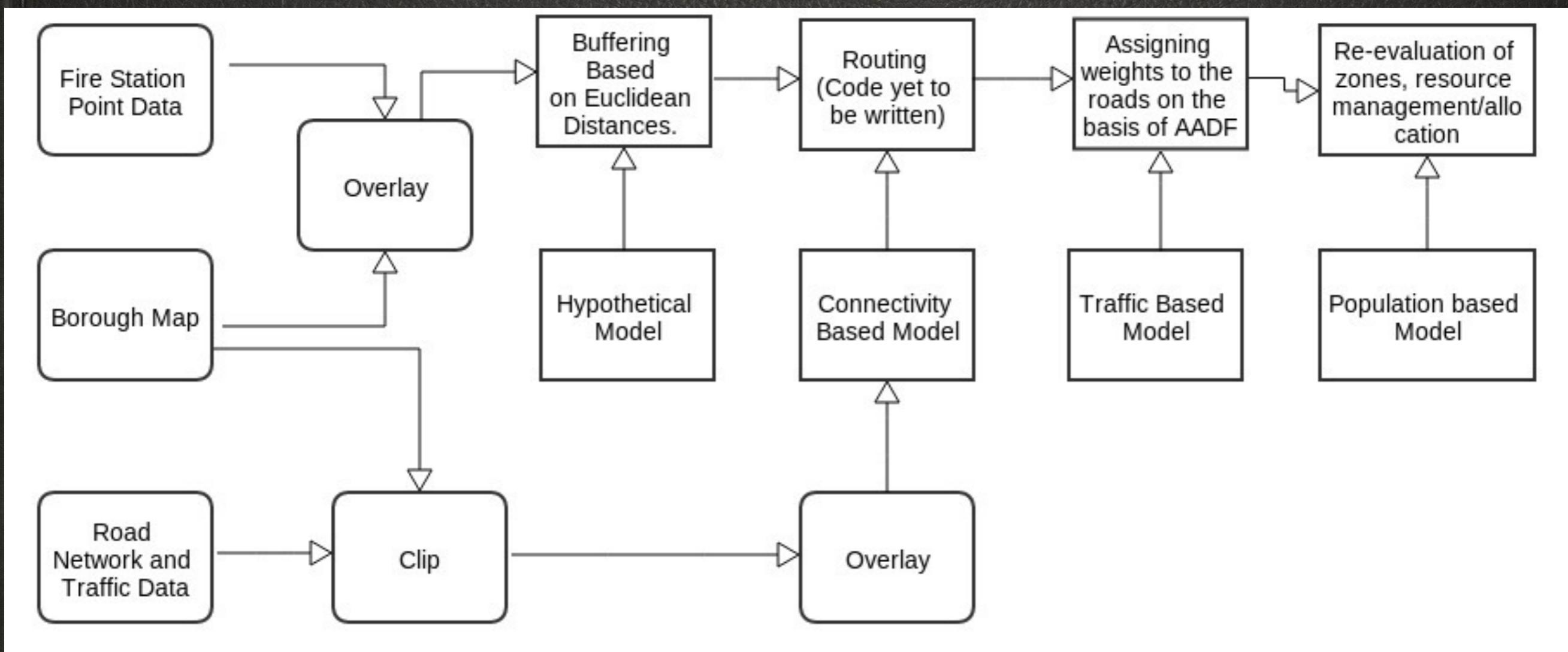
Anubhav Jaiswal - 201102090

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OBJECTIVE

Our project aims to conduct an analysis of the fire rescue response time at the borough level in the city of London and analyze if the present fire system is adequate or not.

FLOW CHART



HYPOTHETICAL MODEL

Development of this hypothetical model is basically based on the following three assumptions:

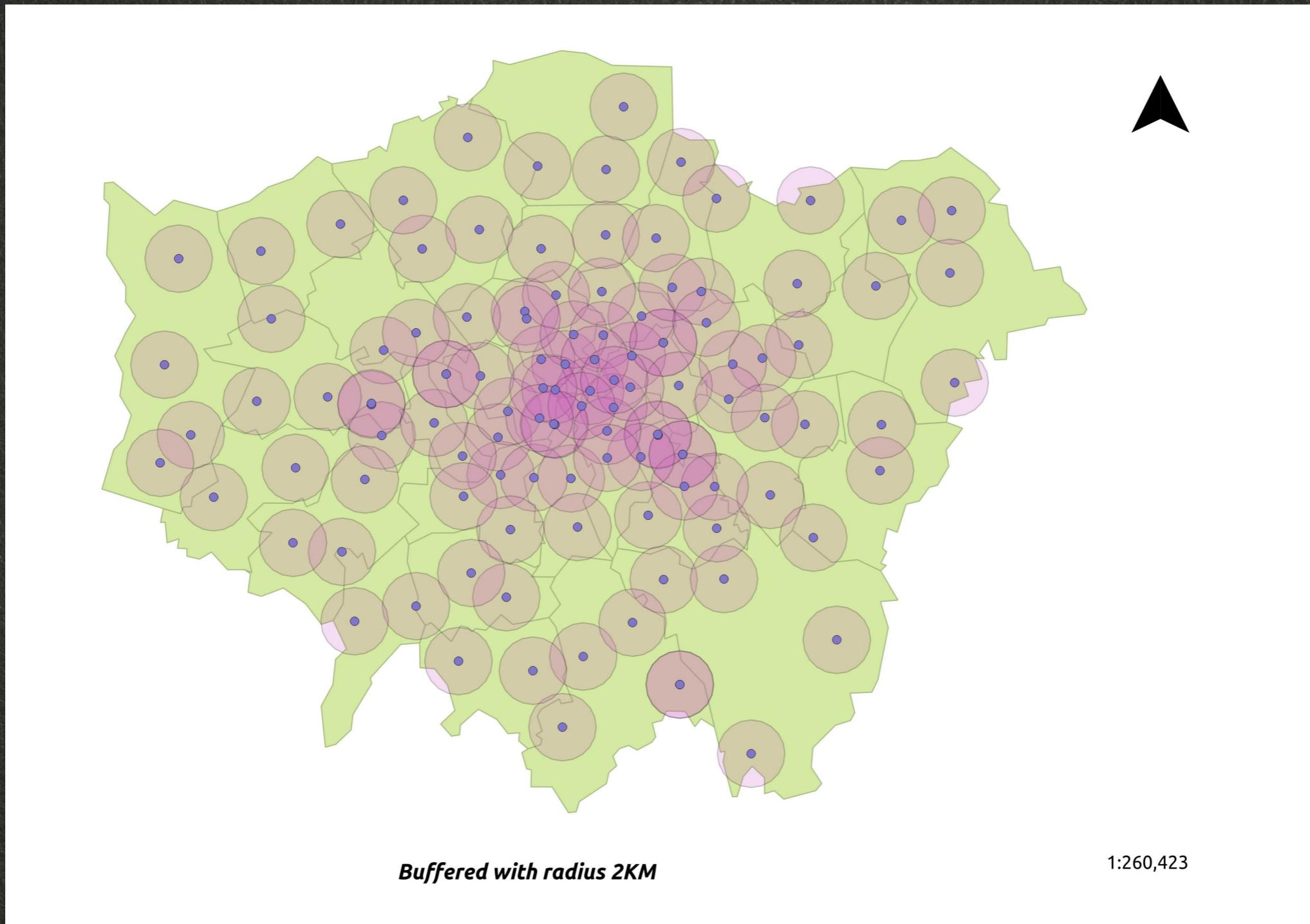
1. The fire response time does not depend on the road connectivity and we can directly take into account the euclidean distances.
2. The road traffic has no effect on the fire response time.
3. The population density has no effect on the fire response time.

HYPOTHETICAL MODEL ...



Assumption: Speed Limit of 40kmph and 5 min response time

HYPOTHETICAL MODEL ...



HYPOTHETICAL MODEL ...

As seen in the above results, the city of London is basically well protected and equipped for the fire accidents.

But this is not the case in the real life as in the above case we are only taking into account the euclidean distances. There are many instances in real life when a euclidean distance of a point from a fire station is very less but the actual road is too long. In those case the concept of **connectivity** comes.

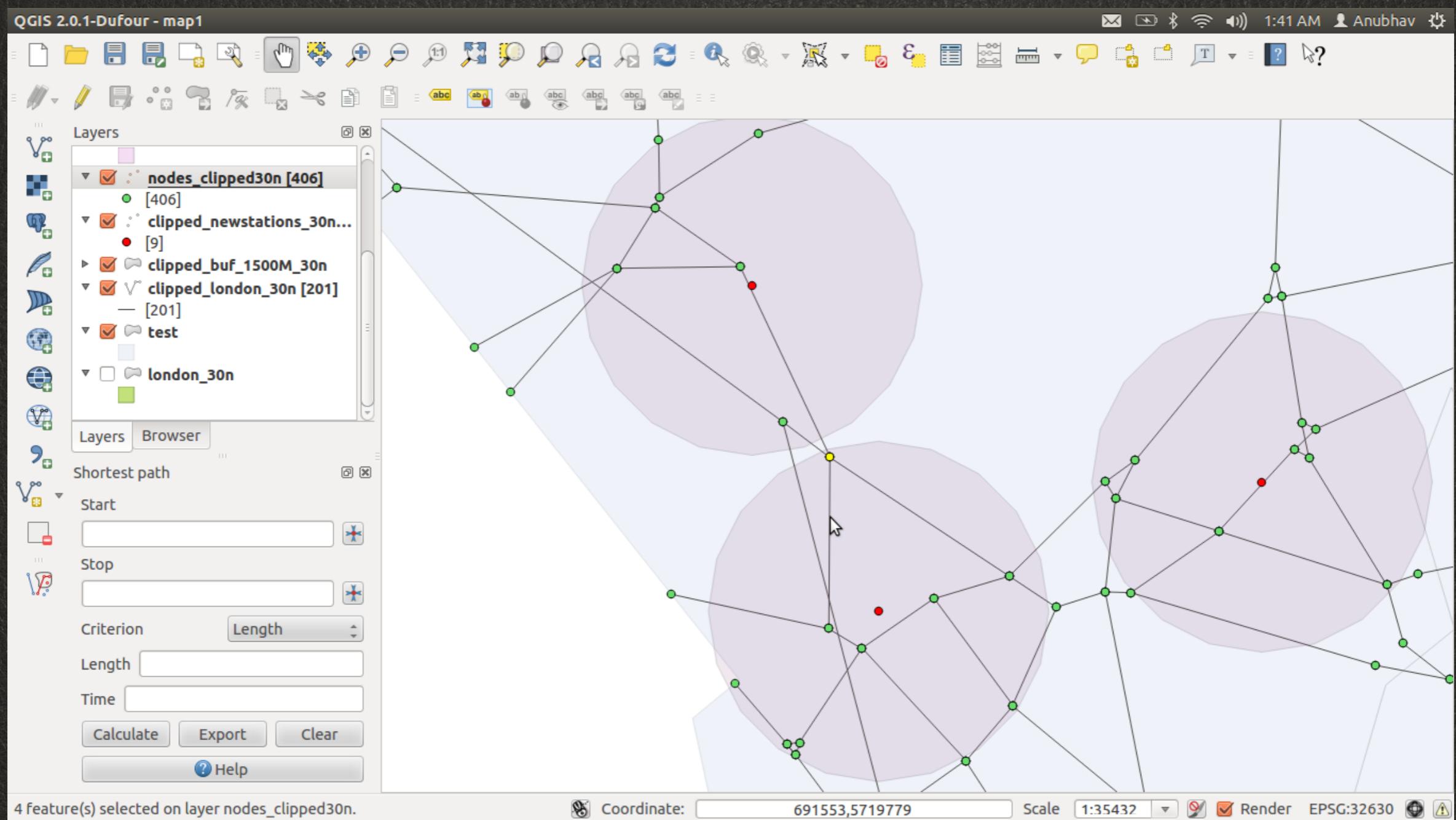
Our next model basically focuses on this aspect.

CONNECTIVITY MODEL

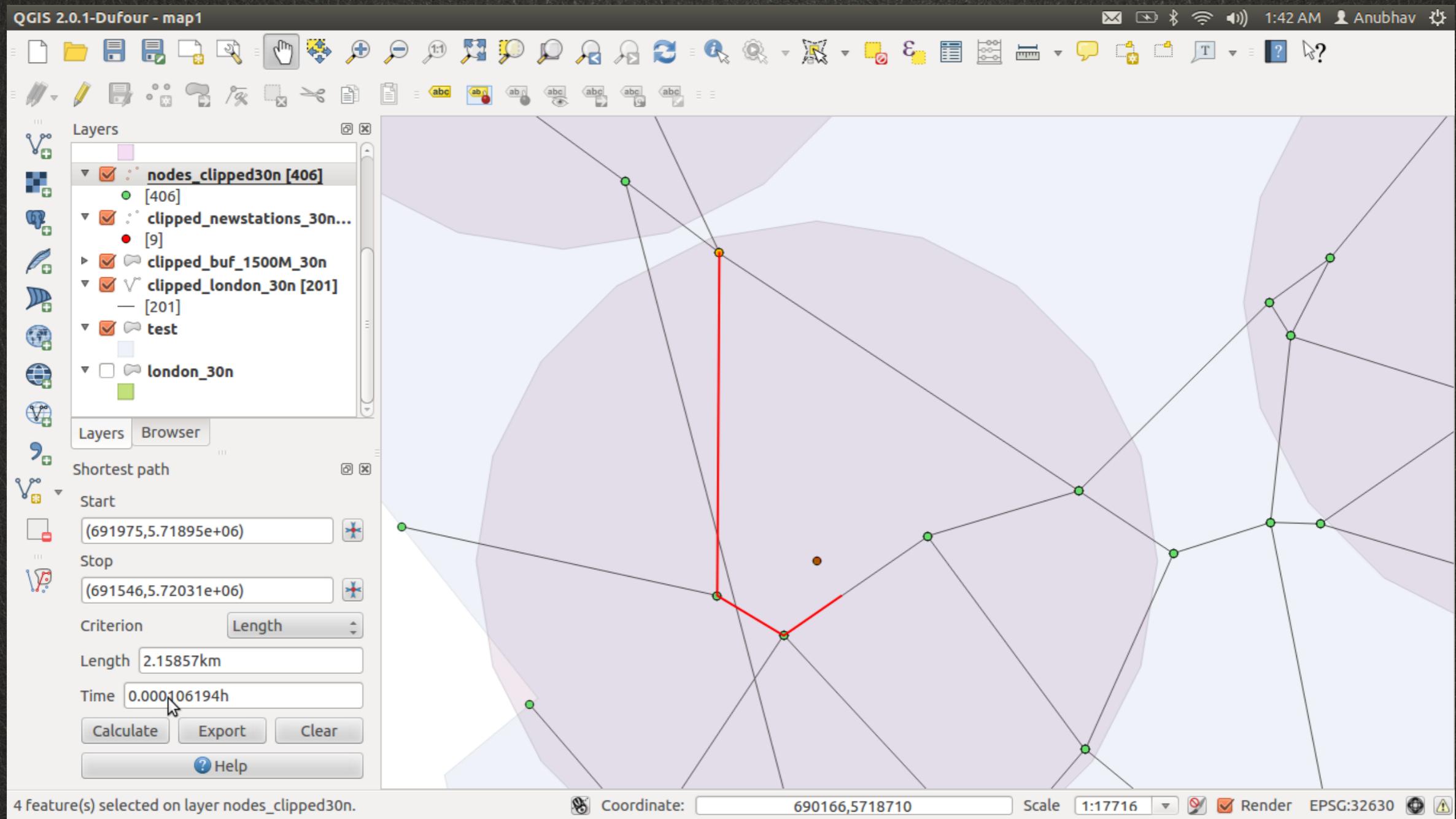
The road to a point from the fire station might not be straight, even though the point might be very close to the fire station. Thus we need to take into account the connectivity aspect i.e. road network analysis also.

This is explained in detail in next slide...

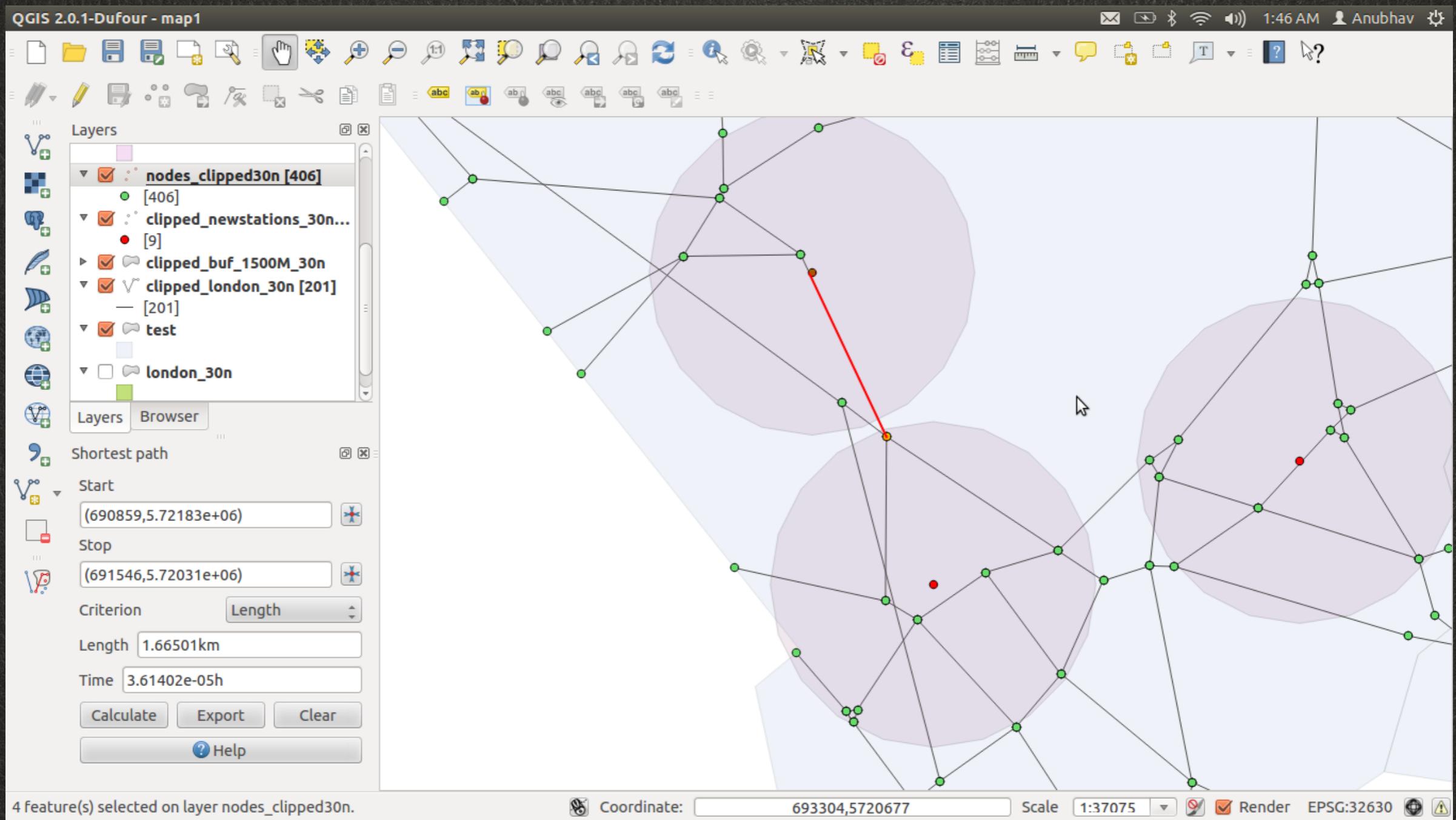
CONNECTIVITY MODEL ...



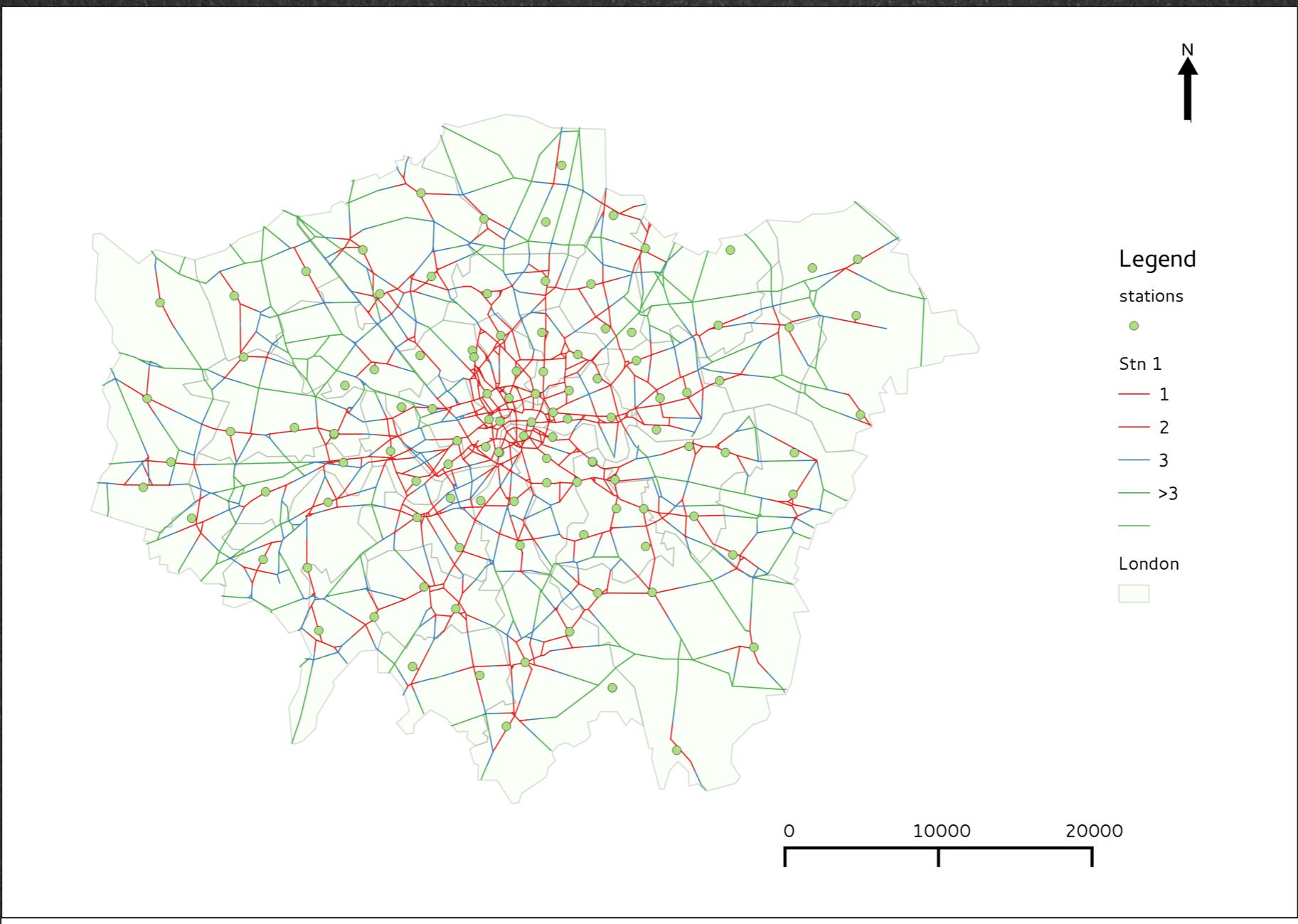
CONNECTIVITY MODEL ...



CONNECTIVITY MODEL ...



CONNECTIVITY MODEL ...



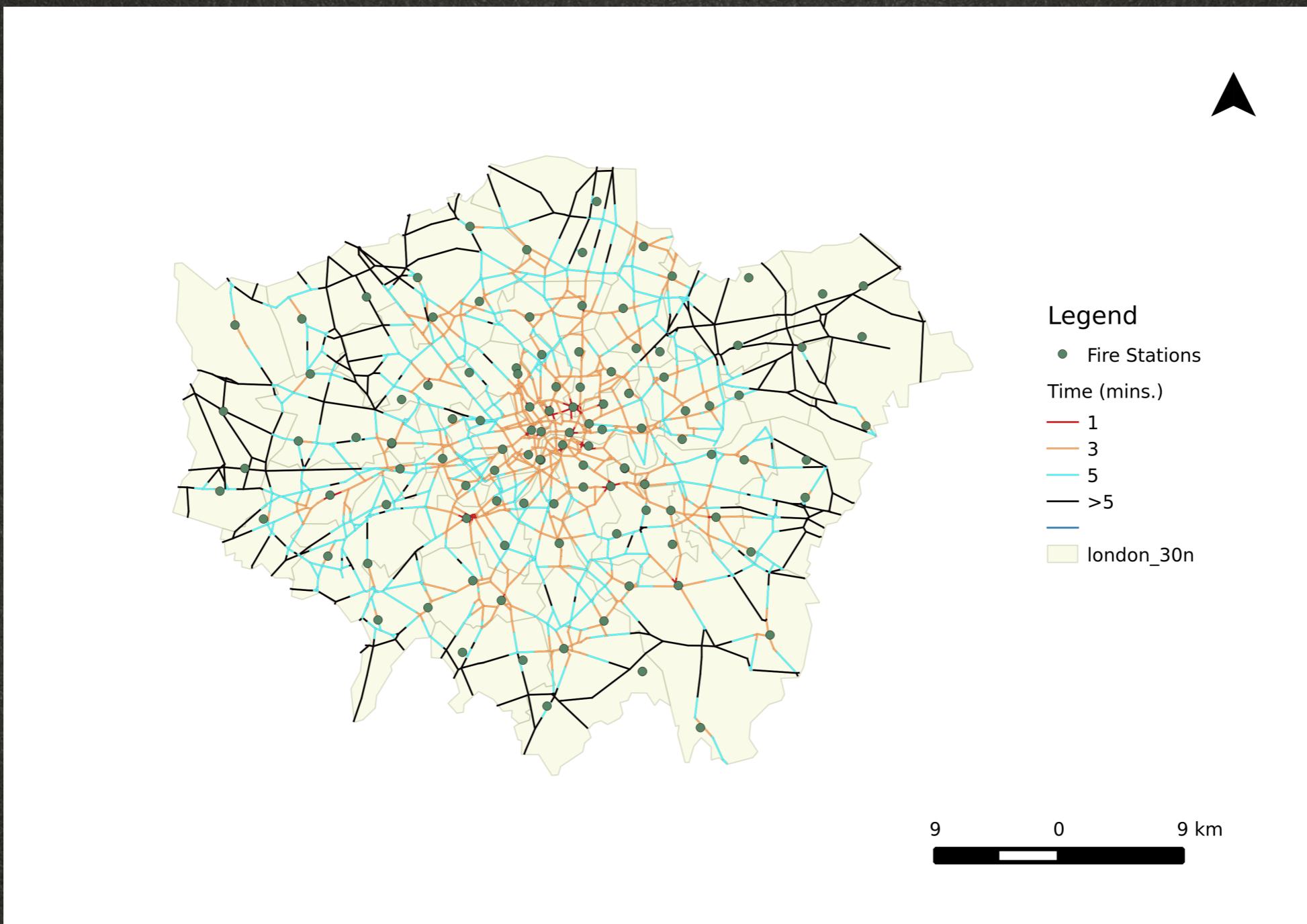
Assumption: No traffic and uniform speed of 60 kmph

TRAFFIC MODEL ...

Assumptions while calculating speed:

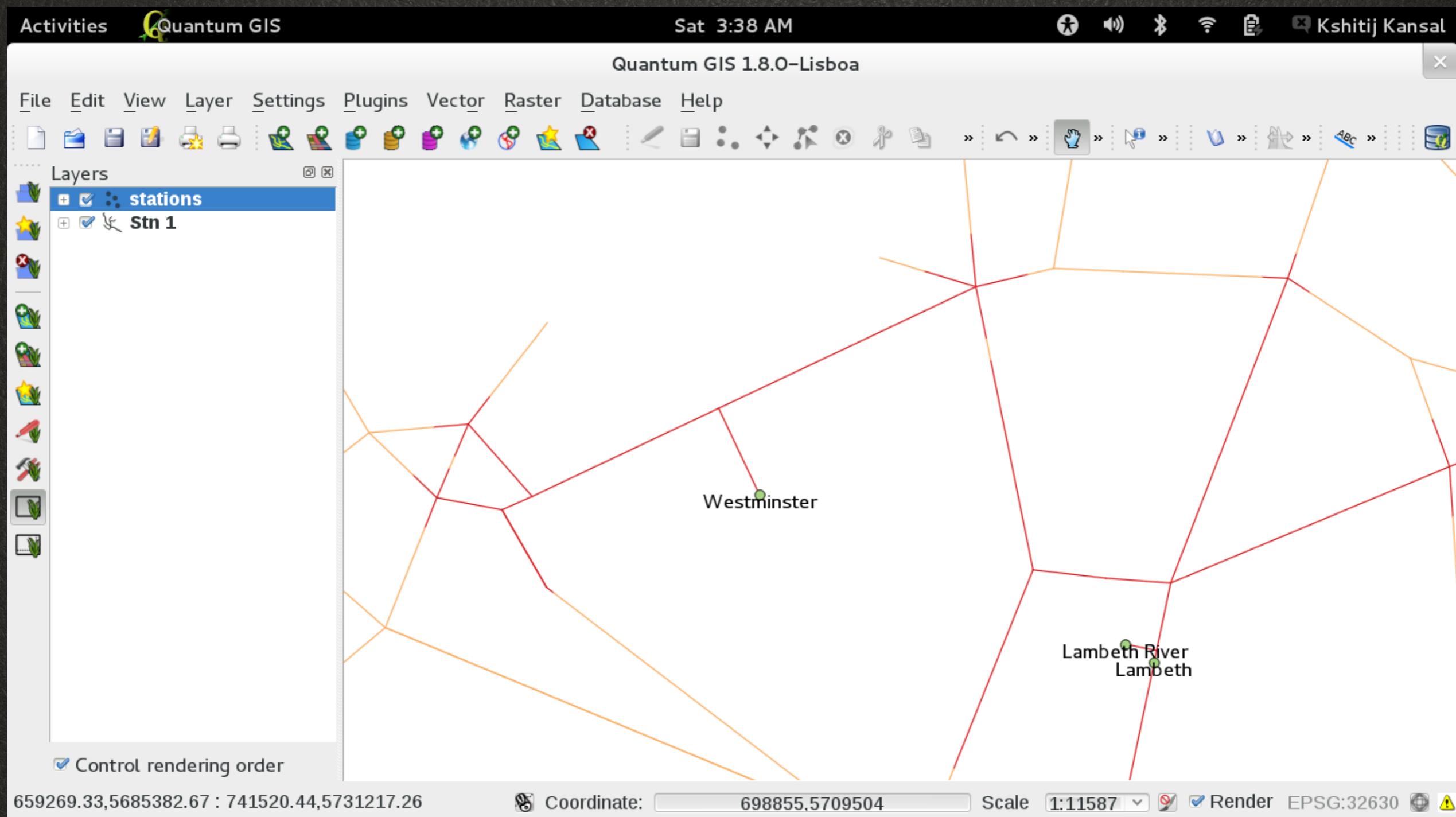
1. AADF < 25000, speed = 75 kmph
2. AADF > 25000 & AADF < 100000, speed = 60 kmph
3. AADF > 100000 & AADF < 200000, speed = 50 kmph
4. AADF > 200000, speed = 35 kmph

TRAFFIC MODEL ...

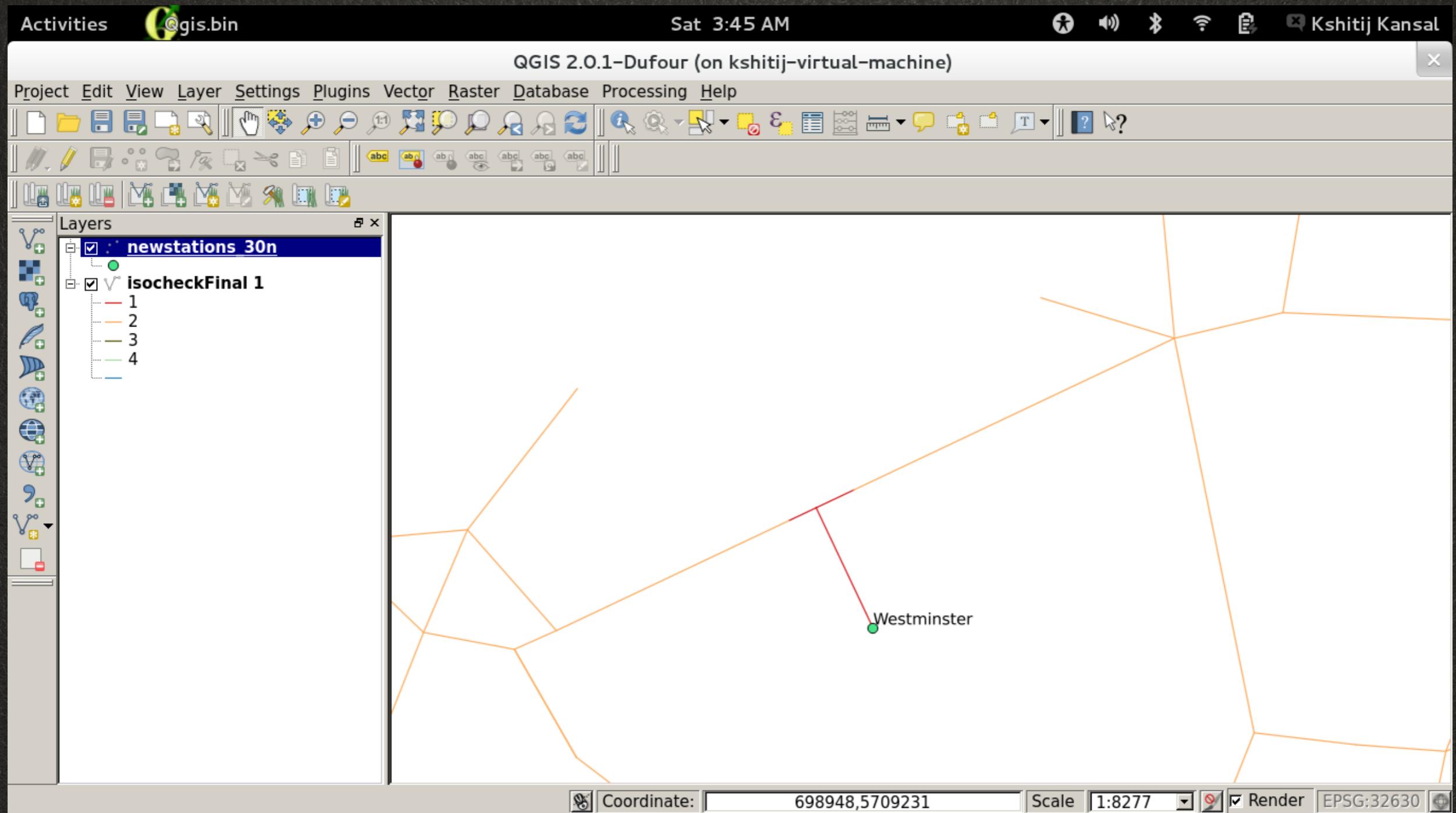


Taking into account the traffic in the city.

TRAFFIC MODEL ...



TRAFFIC MODEL ...



TRAFFIC MODEL ...

We can see that taking into account the traffic in the city, we get an estimate which better represents the actual scenario.

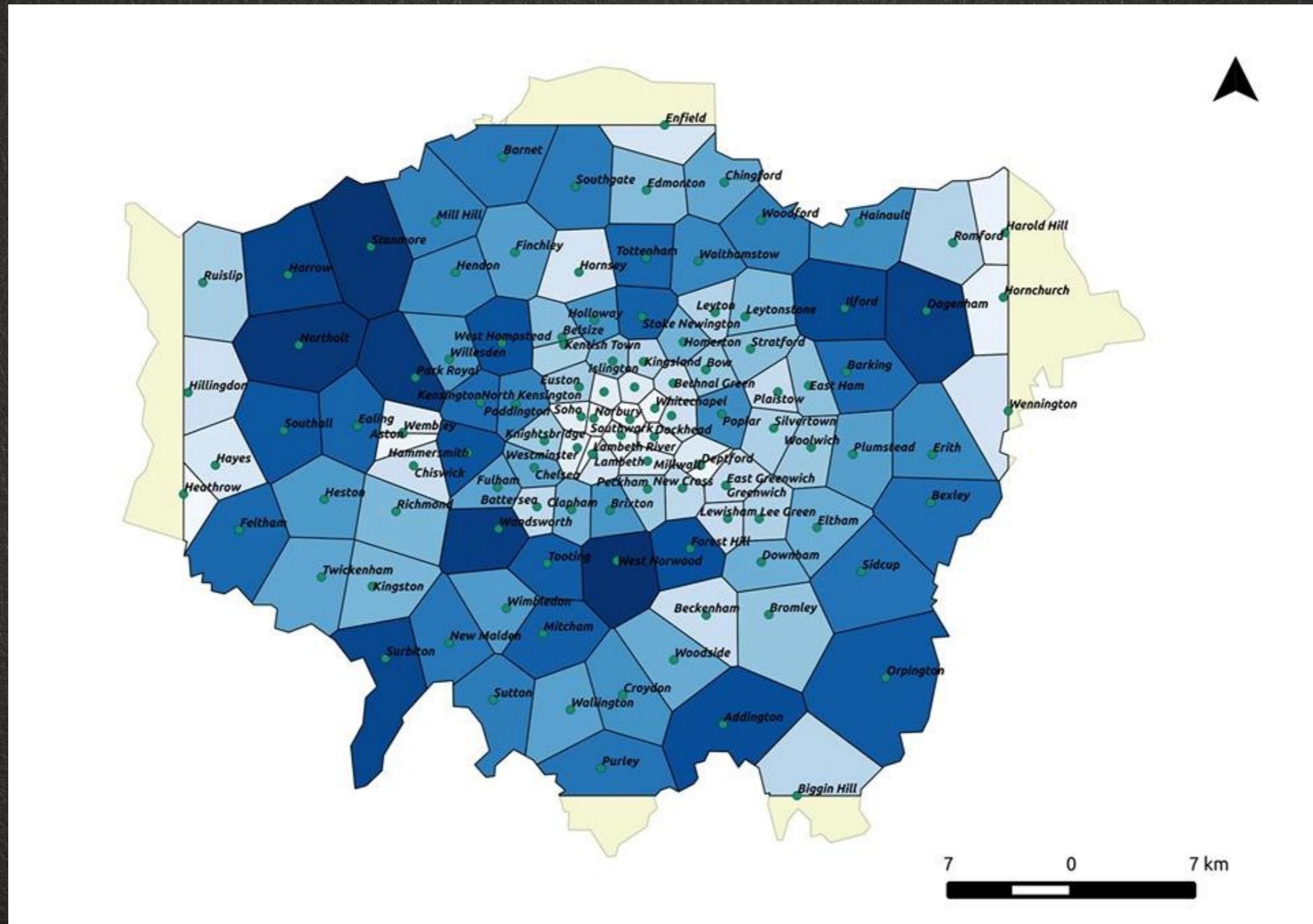
Taking into account the population data, we get our third model **population** model.

POPULATION MODEL

Assumptions:

1. The area served by the fire station is approximately equal to the area covered by its Thiessen Polygon.
2. While calculating the population of the Thiessen Polygon, the population density is assumed to be uniform in each borough.

POPULATION MODEL...



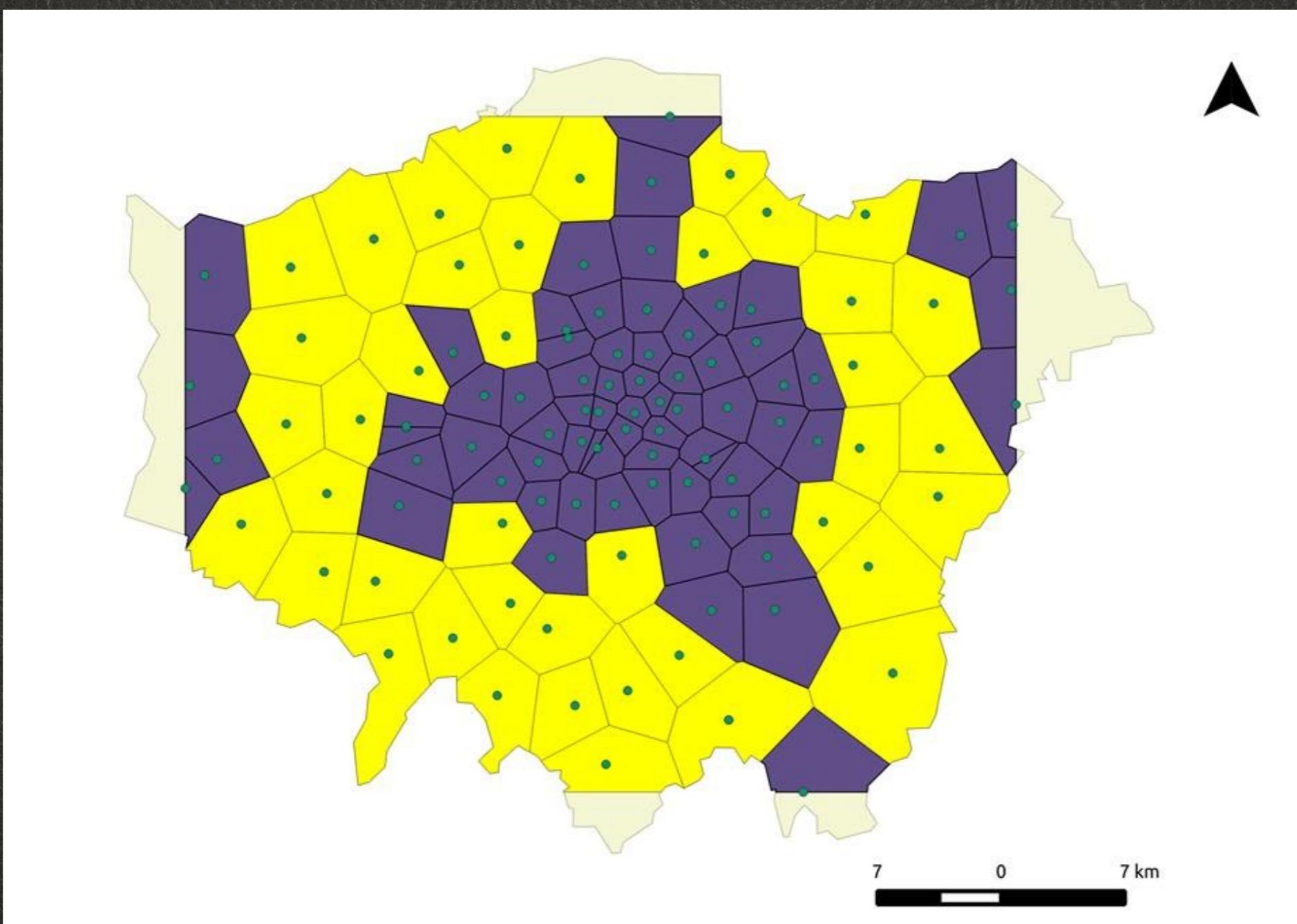
POPULATION MODEL ...

The sample table showing the Thiessen Polygon's area and their corresponding population.

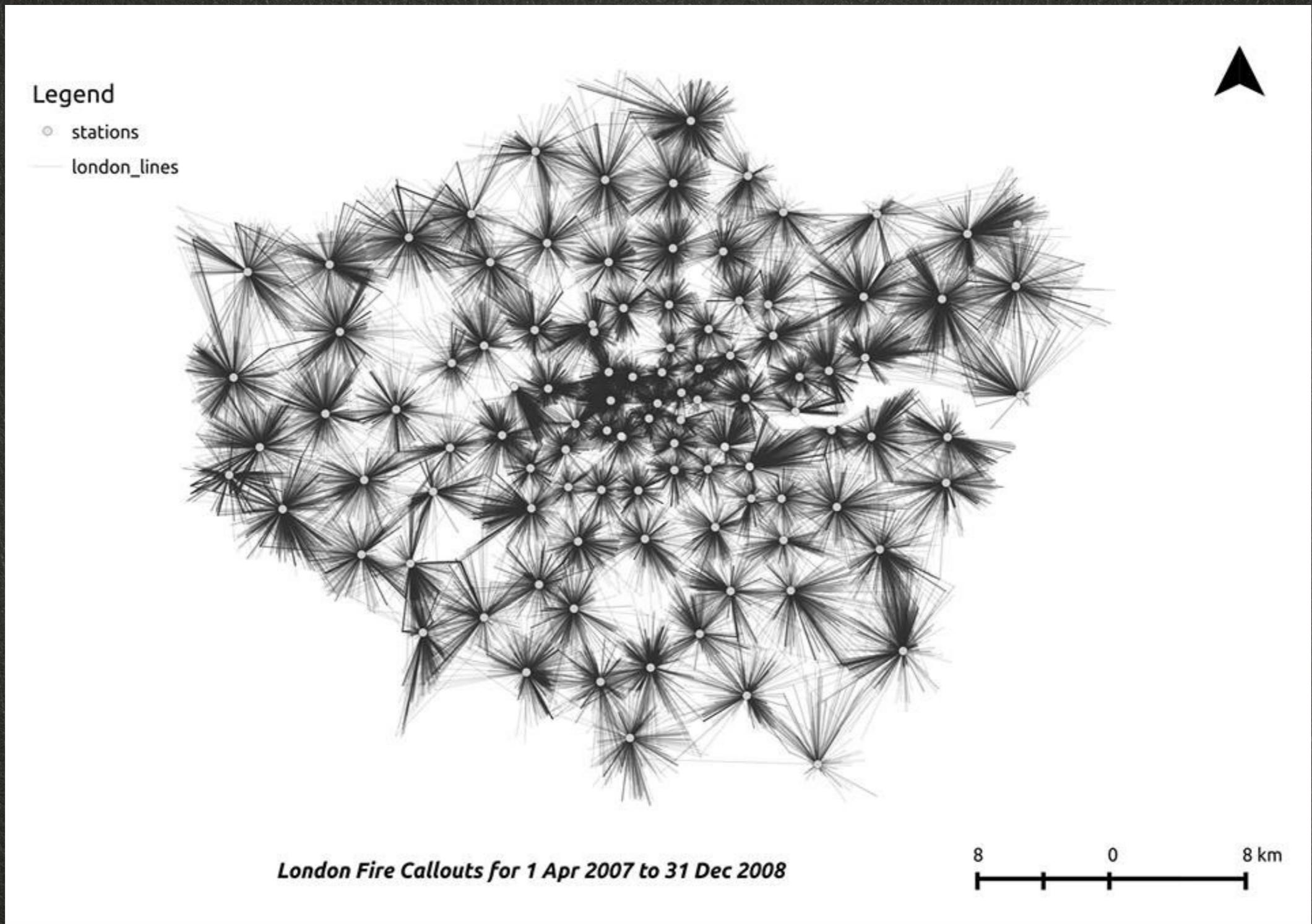
"Stations"	"Population"	"Area(m2)"
"Dagenham"	98979	26137185.1
"Beckenham"	38479	15550862.2
"Tooting"	89938	12237786.8
"Fulham"	68243	7703380.28
"Soho"	25567	3040014.6
"Kingsland"	43249	3975494.96
"Deptford"	14368	1979517.26
"Woodford"	78286	16956476.2
"Romford"	44127	20235423.6
"Leyton"	44338	7175789.42
"Ilford"	97706	22154312
"Lambeth Rive	10173	1194479.52
"Holloway"	72027	6703966.16
"Dockhead"	25485	3076388.37

POPULATION MODEL ...

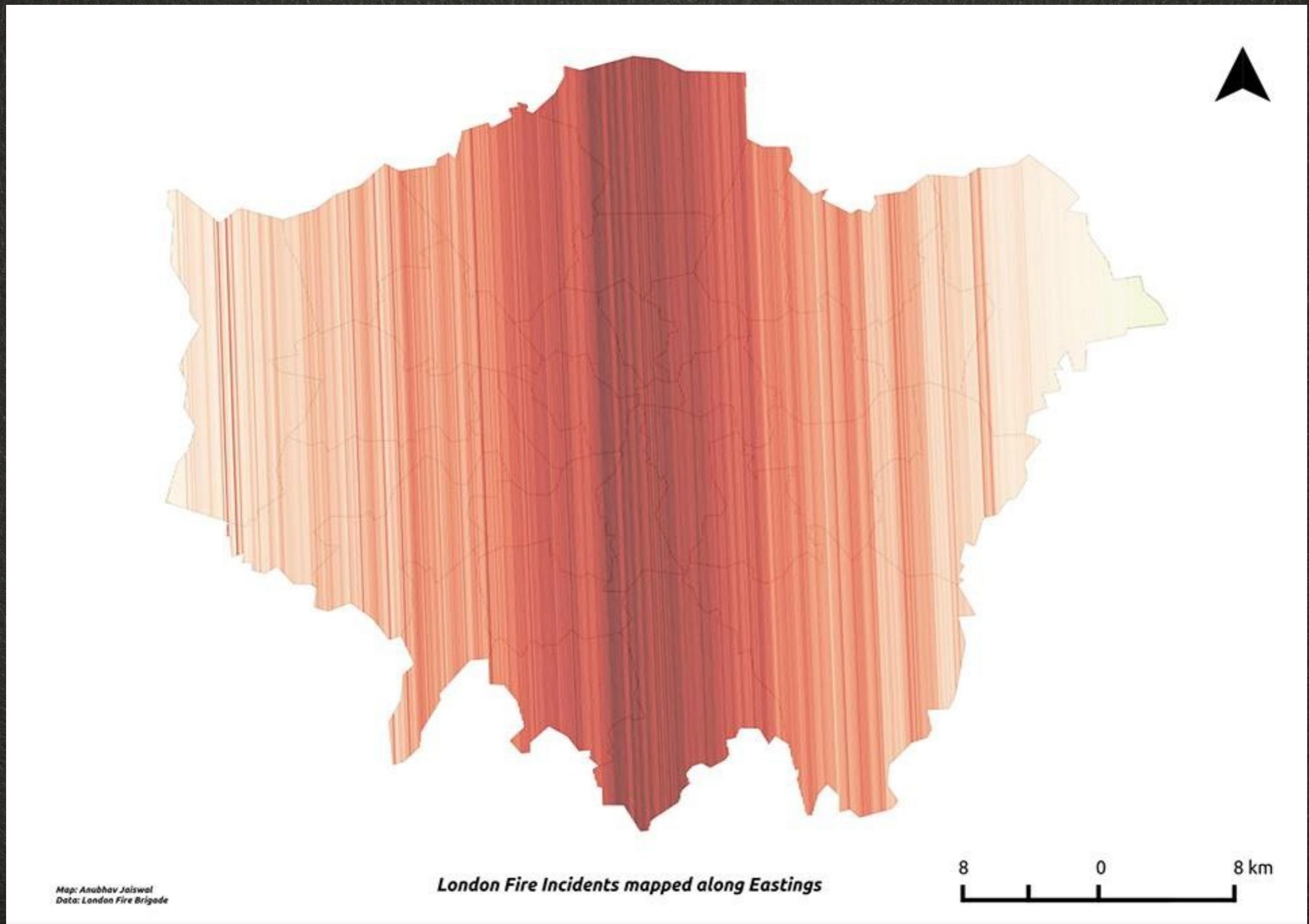
New Stations Criteria



OTHER VISUALIZATIONS



OTHER VISUALIZATIONS ...



OTHER VISUALIZATIONS ...

