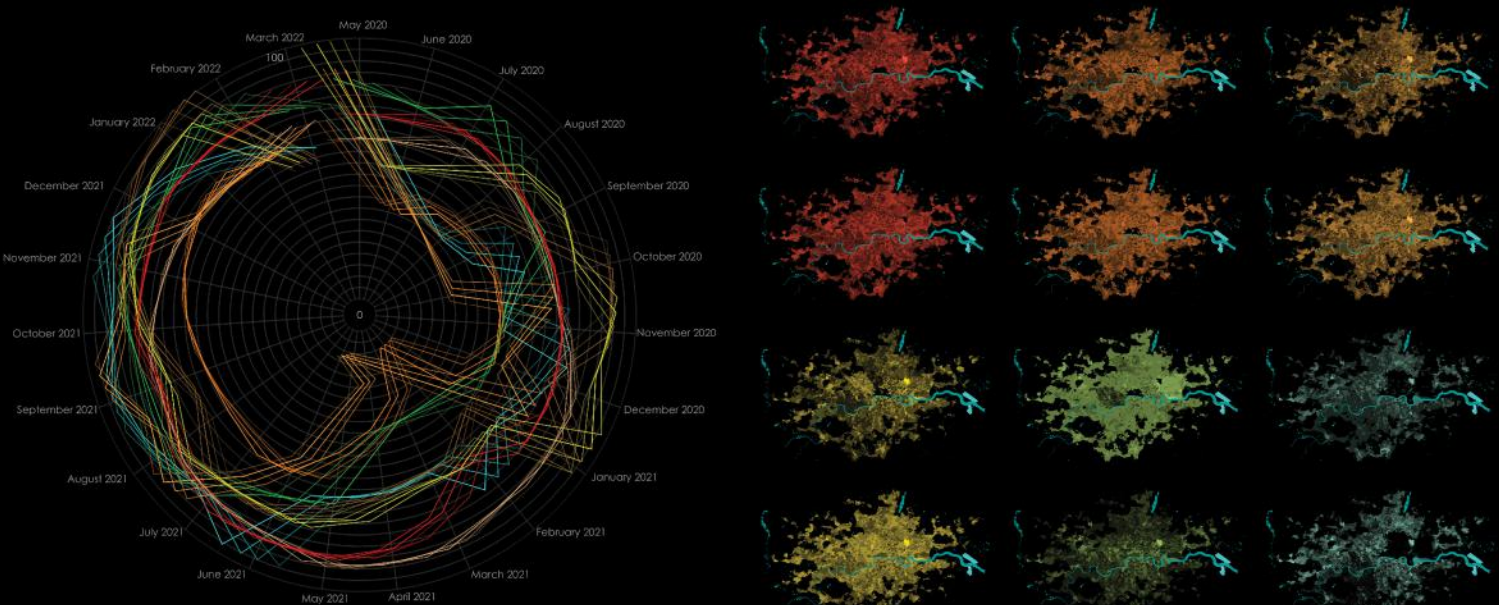## PROJECT BACKGROUND

Based on current growth rates, the predicted proportion of the population living in urban areas by 2050 is 66 percent. (UNDESA, 2018). However, due to the magnitude of population growth, lack of infrastructure and haphazard development, urbanization has become the cause of serious socioeconomic problems leading to the replacement of population from urban/ inner city to rural residential areas. London is one of the prime examples of urbanization but the timeline revealed population decline in the urban core.

Various datasets are examined and a corelation is established by overlaying the results from 2010, 15 and 19 revealing the parts of London facing urban decay.
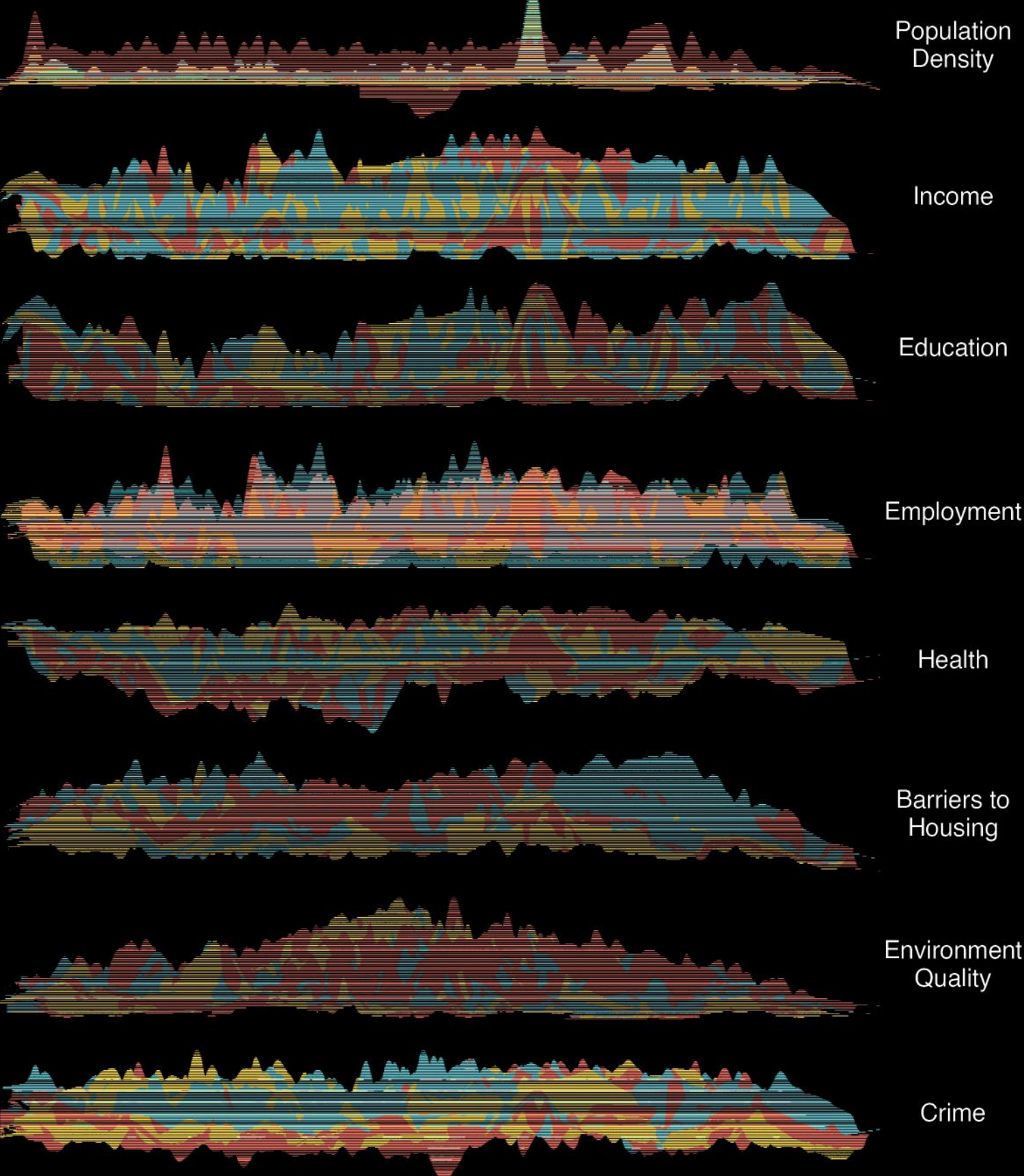
In the recent years, London has been deeply affected on several levels, during and after the Covid-19 Pandemic. A spiking increment has been observed in the usage of green spaces and reduction of retail and commercial footfall.
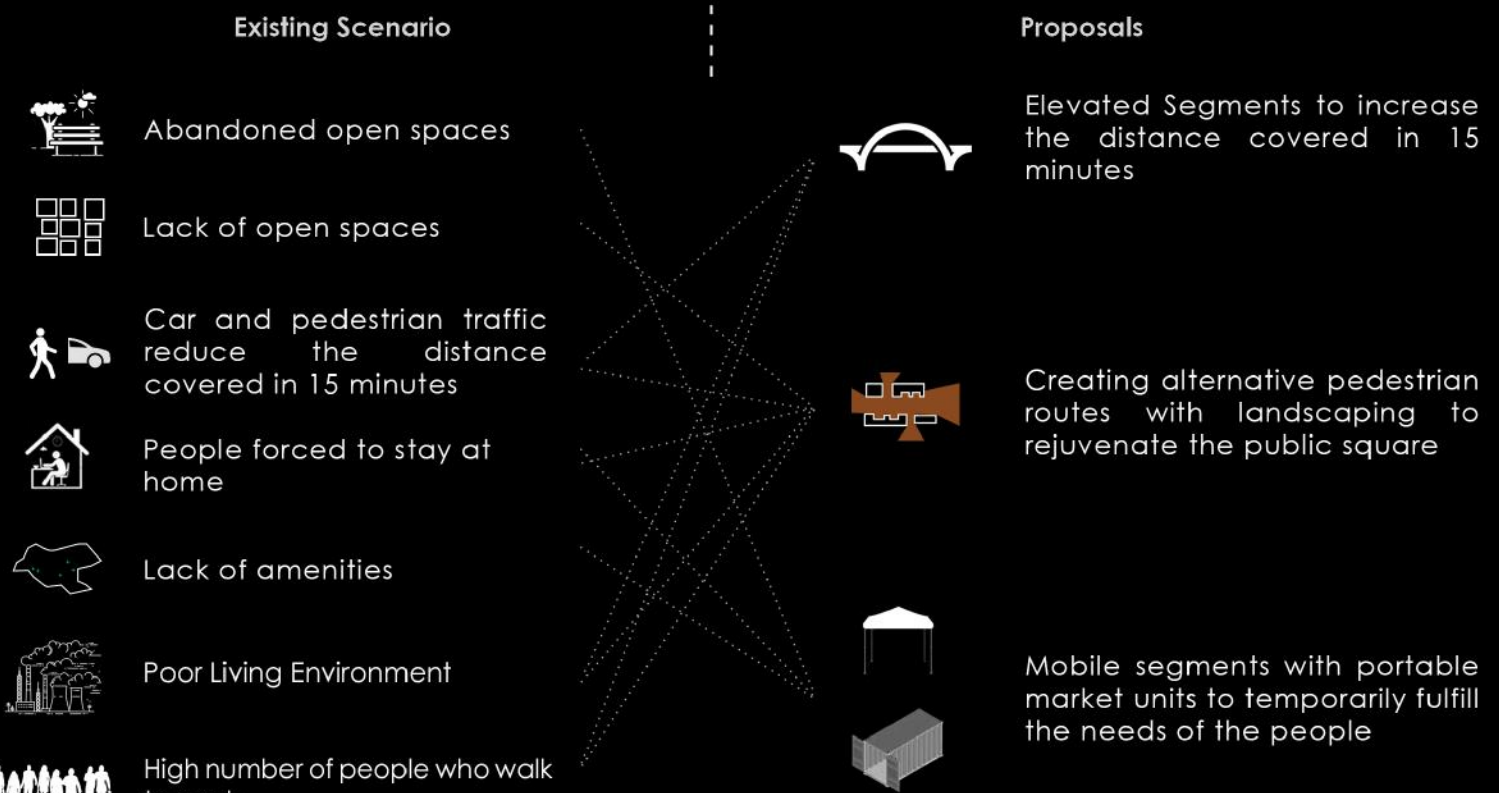

The pandemic has made a major impact on the lives of the "Commuter Group" (25-30 year old) where their hectic lifestyle has taken a backseat and been replaced by increased outdoor activities and work from home.
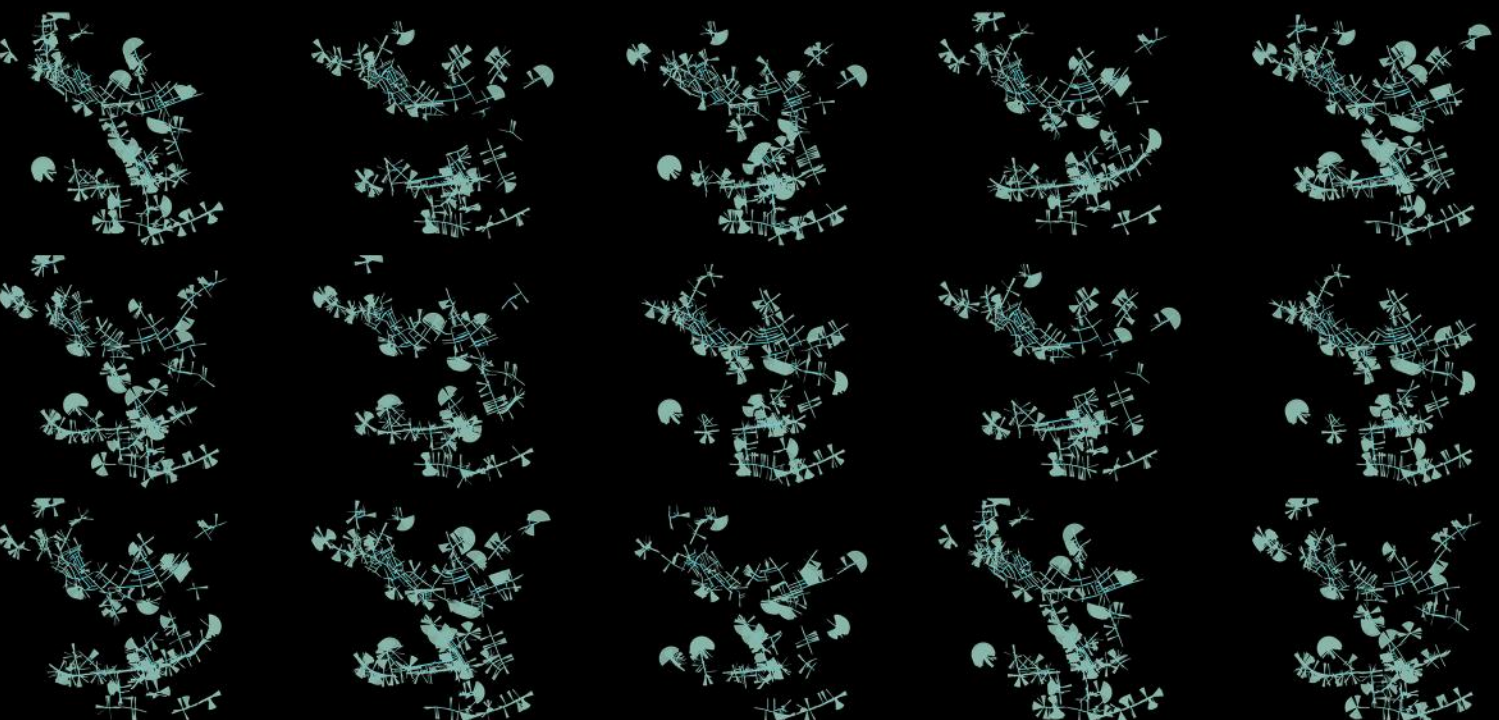
CONCEPT DEVELOPMENT

The climate crisis and global COVID-19 pandemic combined to accelerate consideration and implementation of a 15-minute city. The 15-minute city emphasizes on walkability and accessibility while altering social infrastructure in order to maximize urban functions such as public spaces, schools, parks, and complementary activities for residents. There is also a large focus on access to green space, which may promote positive environmental impacts and encourage sustainability.
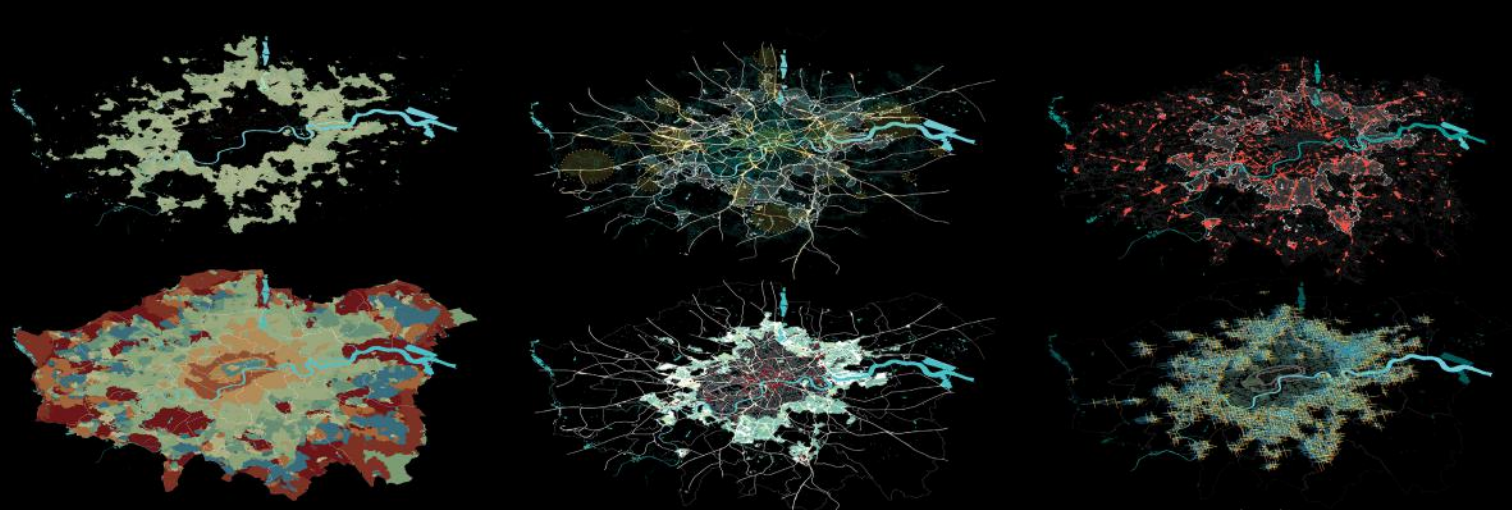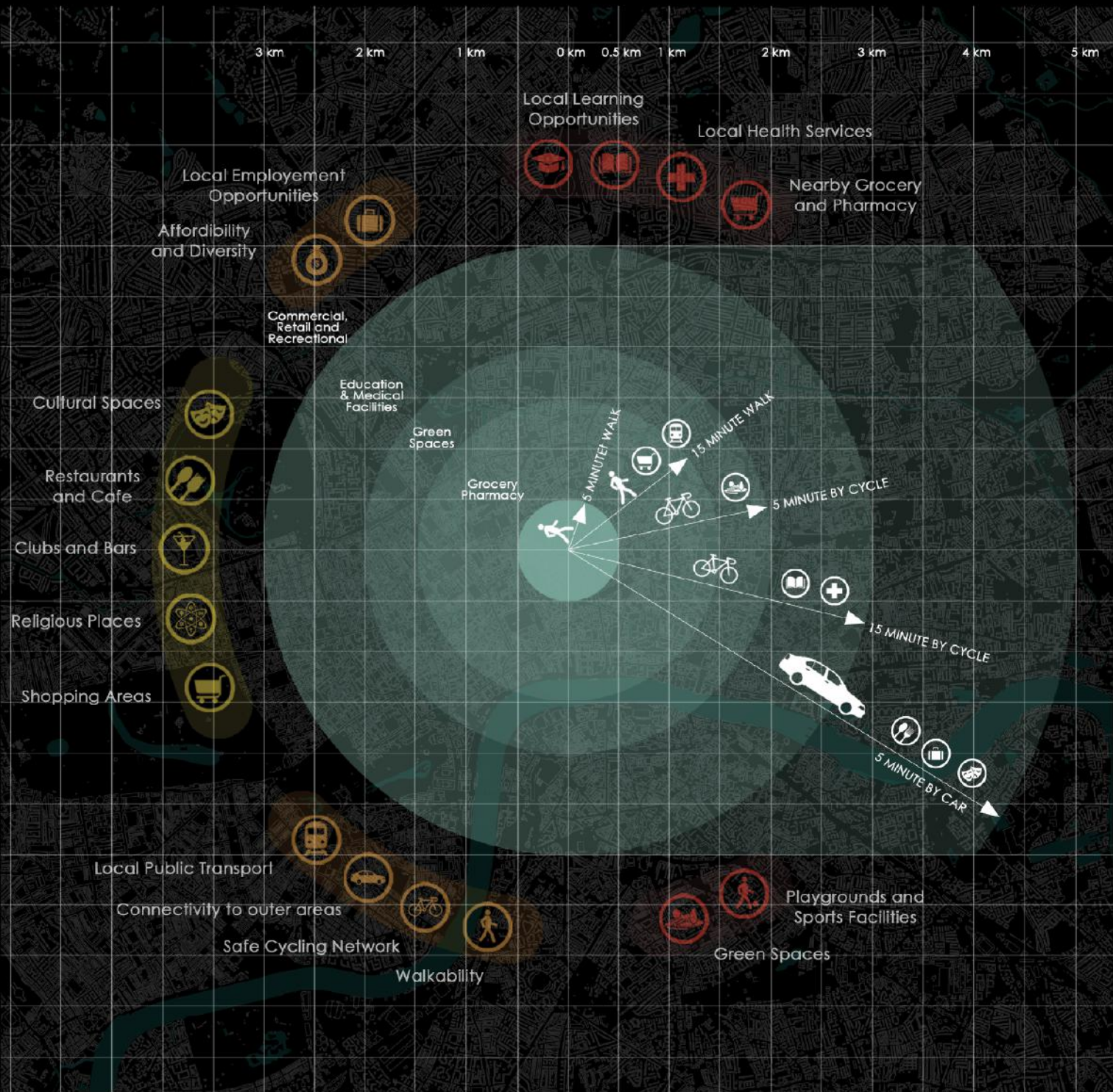
The concept is designed on the highstreets of the dense urban signature which is selected from the spatial signatures created using several parameters such as density, landuse, accessibility, deprivation and connectivity. The design intends to alter the physical aspects and spatial characteristics to achieve a sustainable, inclusive and accessible city which repeats itself at regular intervals.

DATA COLLECTION AND ANALYSIS VIA ML

A grading system is devised which evaluates the focus area around the highstreets of London in the dense urban neighbourhood spatial signature.

Using the data, the areas are each assigned point scores of 1 to 10 (10 being the best) in three categories, access to amenities, spatial qualities and commutability. The amenities and services are scored based on their number and distance from the highstreets. These area scores are then compiled together into a final score. The areas identified are the site of interest.

Result of Grading

Angular Step Depth Living Environment Quality Geographical Influences

Semantic Image Segmentation Sun Exposure throughout the year

DESIGN PROPOSAL

20 Segments derived from Angular Step Depth

4 Selected Segments for Intervention

Interconnected Network overlapping intensification derived from CA

Isochronic generative loop created based on the theoretical background of a 15-minute city

The design proposal constitutes of three types of interventions which aim to restructure existing network centrality to achieve 15 minute city using the Isochronic generative loop.


The emplacement of interventions is obtained by applying a multi objective optimization algorithm which uses spatial quality data to locate street segments with elevated values of predefined attributes.

Masterplan with categorization of interventions

The elevated segments are located on junctions to reduce the time taken to travel linking together the built environment while distancing the pedestrians from vehicular pollution and congestion.

Walkway 1
Walkway 2
Walkway 3

The walkways are envisioned to change their form and connections based on real time GPS data and the area of shadow they cast during the day.

Alterations for Elevated Segment in Harlesden

Void Segments are carved out between residential neighbourhoods to encourage spaces for social interaction while altering the network centrality by reducing angular steps. They are developed using generative spatial modelling process and data extracted from spatial computational techniques to introduce placemaking elements along with interaction spaces and landscaping in residential neighbourhoods while improving accessibility and spatial quality.

Void Segment Design in East Acton

The mobile segments are movable and temporary in nature and are located in areas with poor connectivity and accessibility to amenities. Various functions such as residential utilities, commercial, recreational and retail units are arranged on site through simple geometrical transformations using steady-state island genetic algorithm following the intensification of footfall trends.

Mobile Segment Design in Park Royal

"IN 15 MINUTES" APP

The application can be used by citizens to learn whether they live in one or not by analyzing various functions in the vicinity that define the "15-minute City."

Furthermore, the application allows the users to view the surrounding land use, sunlight exposure along with visibility graph analysis and field of view in real time for their respective area to help them choose a site and transform it to a mobile segment. The app then prompts to select and position a unit from a list of typologies. The user can experience the design area through virtual reality.

IsoChronic City

For more information, scan the QR codes
to see the project portfolio and video