CFG CK: Introduction to Data & SQL

Project: Analyses of London's Quality of Life Indicators

mariana.hiroki@gmail.com | DEC 2022

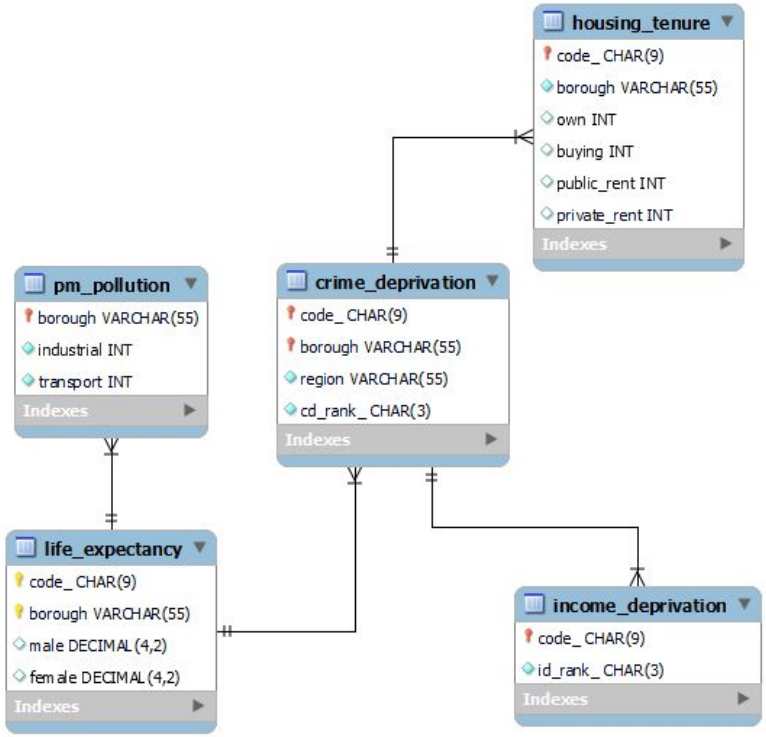
PK | FK

```sql
CREATE DATABASE LondonQL;
USE LondonQL;

CREATE TABLE life_expectancy (
    code_ CHAR(9) NOT NULL,
    borough VARCHAR(55) NOT NULL,
    male DECIMAL(4,2) NULL,
    female DECIMAL(4,2) NULL,
    PRIMARY KEY (borough,code_)
);
CREATE TABLE crime_deprivation (
    code_ CHAR(9) NOT NULL,
    borough VARCHAR(55) NOT NULL,
    region VARCHAR(55) NOT NULL,
    cd_rank_ CHAR(3) NOT NULL,
    PRIMARY KEY (code_,borough),
    FOREIGN KEY (borough,code_) REFERENCES life_expectancy(borough,code_)
);
CREATE TABLE income_deprivation (
    code_ CHAR(9) NOT NULL,
    id_rank_ CHAR(3) NOT NULL,
    PRIMARY KEY (code_),
    FOREIGN KEY (code_) REFERENCES crime_deprivation(code_)
);
```

```sql
CREATE TABLE housing_tenure (
    code_ CHAR(9) NOT NULL,
    borough VARCHAR(55) NOT NULL,
    own INTEGER NULL,
    buying INTEGER NULL,
    public_rent INTEGER NULL,
    private_rent INTEGER NULL,
    PRIMARY KEY (code_),
    FOREIGN KEY (code_) REFERENCES crime_deprivation(code_)
);
CREATE TABLE pm_pollution (
    borough VARCHAR(55) NOT NULL,
    industrial INTEGER NOT NULL,
    transport INTEGER NOT NULL,
    PRIMARY KEY (borough),
    FOREIGN KEY (borough) REFERENCES life_expectancy(borough)
);
```

DB Diagram


housing_tenure
code_ CHAR(9)
borough VARCHAR(55)
own INT
buying INT
public_rent INT
private_rent INT
Indexes
pm_pollution
borough VARCHAR(55)
industrial INT
transport INT
Indexes
crime_deprivation
code_ CHAR(9)
borough VARCHAR(55)
region VARCHAR(55)
cd_rank_ CHAR(3)
Indexes
life_expectancy
code_ CHAR(9)
borough VARCHAR(55)
male DECIMAL(4,2)
female DECIMAL(4,2)
Indexes
income_deprivation
code_ CHAR(9)
id_rank_ CHAR(3)
Indexes

JOINS

- *How is the boroughs' male life expectancy directly related to pollution, income and crime deprivation?*

```
SELECT le.borough,male,industrial,transport,id.id_rank_,cd.cd_rank_
FROM life_expectancy le
INNER JOIN pm_pollution pm
    ON le.borough = pm.borough
INNER JOIN crime_deprivation cd
    ON le.code_ = cd.code_
INNER JOIN income_deprivation id
    ON le.code_ = id.code_
ORDER BY le.male;
```

borough	male	industrial	transport	id_rank_	cd_rank_
City of London	NULL	109	12	280	317
Barking and Dagenham	78.06	102	46	20	21
Lewisham	79.14	23	48	50	50
Lambeth	79.51	73	49	70	26
Southwark	79.55	73	47	54	37
Greenwich	79.60	103	79	57	36
Islington	79.66	51	28	35	13
Hammersmith and Fulham	79.77	71	36	88	58
Hackney	79.78	48	34	19	15
Havering	80.09	56	94	162	97
Bexley	80.11	116	72	170	165
Hillingdon	80.16	339	176	142	83
Hounslow	80.19	260	96	111	55
Tower Hamlets	80.35	136	57	23	28
Newham	80.36	254	76	44	29

STORED FUNCTION

- *Create a stored function to classify pm10 emissions*

```
DELIMITER //
CREATE FUNCTION PMLevel(ind VARCHAR(55))
RETURNS VARCHAR(55)
DETERMINISTIC
BEGIN
    DECLARE PMLevel VARCHAR(55);
    IF  ind <= 50 THEN
        SET PMLevel = 'GOOD';
    ELSEIF (ind > 50 AND ind <= 100) THEN
        SET PMLevel = 'MODERATE';
    ELSEIF (ind > 100 AND ind <= 150) THEN
        SET PMLevel = 'UNHEALTHY FOR SENSITIVE GROUPS';
    ELSEIF (ind > 150 AND ind <= 200) THEN
        SET PMLevel = 'UNHEALTHY';
    ELSEIF (ind > 200 AND ind <= 300) THEN
        SET PMLevel = 'VERY UNHEALTHY';
    ELSEIF ind > 300 THEN
        SET PMLevel = 'HAZARDOUS';
    END IF;
    RETURN (PMLevel);
END //
DELIMITER ;
```

```
SHOW FUNCTION STATUS
WHERE db = 'LondonQL';

SELECT borough,PMLevel(industrial)
AS status_
FROM pm_pollution
ORDER BY status_ DESC;

SELECT borough,PMLevel(transport)
AS status_
FROM pm_pollution
ORDER BY status_ DESC;
```

borough	status_
Barnet	UNHEALTHY FOR SENSITIVE GROUPS
Enfield	UNHEALTHY FOR SENSITIVE GROUPS
Hillingdon	UNHEALTHY
Hounslow	MODERATE
Bexley	MODERATE
Brent	MODERATE
Bromley	MODERATE
Croydon	MODERATE
Ealing	MODERATE
Greenwich	MODERATE
Havering	MODERATE
Newham	MODERATE
Redbridge	MODERATE
Richmond...	MODERATE

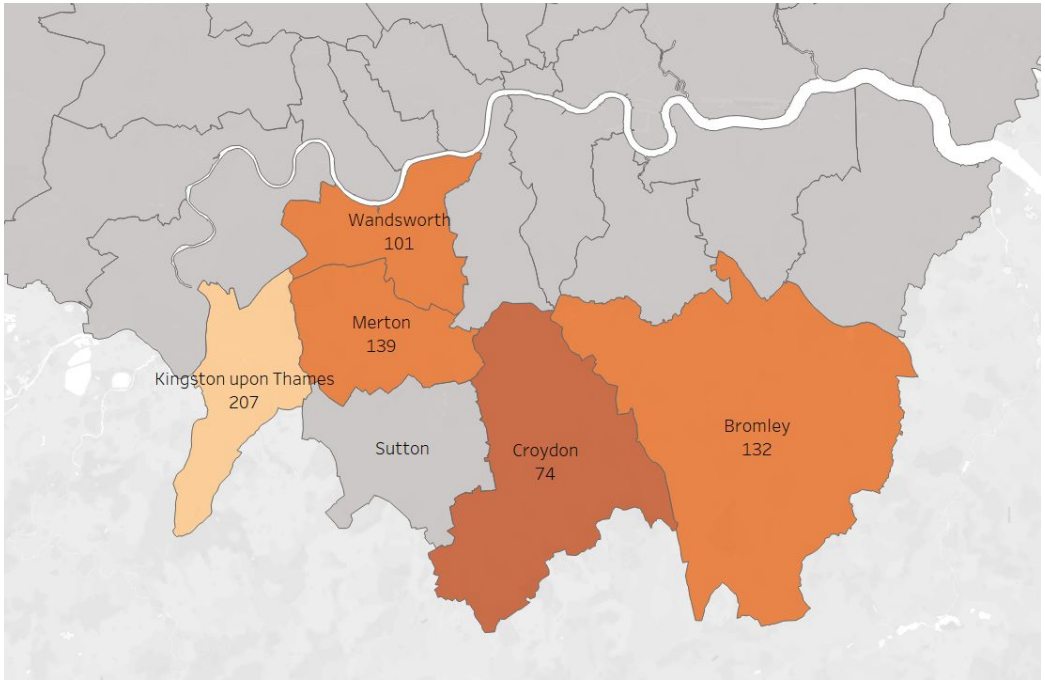
borough	status_
Westminster	VERY UNHEALTHY
Hounslow	VERY UNHEALTHY
Newham	VERY UNHEALTHY
Tower Hamlets	UNHEALTHY FOR SENSITIVE GROUPS
Bexley	UNHEALTHY FOR SENSITIVE GROUPS
Brent	UNHEALTHY FOR SENSITIVE GROUPS
Barking and Dagenham	UNHEALTHY FOR SENSITIVE GROUPS
Greenwich	UNHEALTHY FOR SENSITIVE GROUPS
City of London	UNHEALTHY FOR SENSITIVE GROUPS
Croydon	UNHEALTHY FOR SENSITIVE GROUPS
Camden	UNHEALTHY
Wandsworth	UNHEALTHY
Barnet	MODERATE
Bromley	MODERATE
Ealing	MODERATE
Enfield	MODERATE
Hammersmith and Ful...	MODERATE
Islington	MODERATE
Kingston upon Thames	MODERATE
Lambeth	MODERATE
Harrow	MODERATE
Richmond upon Thames	MODERATE
Southwark	MODERATE
Sutton	MODERATE
Havering	MODERATE
Hillingdon	HAZARDOUS
Hackney	GOOD
Haringey	GOOD

SUBQUERY

- *What would be the safest borough option to live in, considering I want to rent from a private landlord in South London?*

```sql
SELECT borough,cd_rank_
FROM crime_deprivation
WHERE region='South' AND borough IN (
    SELECT borough
    FROM housing_tenure
    WHERE private_rent>20
  )
ORDER BY cd_rank_ DESC;
```

borough	cd_rank_
Croydon	74
Kingston upon Thames	207
Merton	139
Bromley	132
Wandsworth	101



STORED PROCEDURE

- *Create a stored procedure to find the percentage of publicly rented properties from a council*

```
DELIMITER //
CREATE PROCEDURE LondonQL.PublicRentbyCouncil(IN council VARCHAR(55))
BEGIN
    SELECT borough,public_rent
    FROM housing_tenure
    WHERE borough = council;
    END //
DELIMITER ;

CALL LondonQL.PublicRentbyCouncil('Harrow');
```

borough	public_rent
Harrow	8

TRIGGER

- *Create a trigger after updating the emissions concentration in each borough, considering PM concentration over 150.*

```
DELIMITER //
CREATE TRIGGER emission_alert AFTER UPDATE ON pm_pollution
FOR EACH ROW
BEGIN
IF NEW.industrial > 150 THEN
SIGNAL SQLSTATE '45000'
SET MESSAGE_TEXT = 'Levels of emissions are unhealthy';
END IF;
END //
DELIMITER ;
```

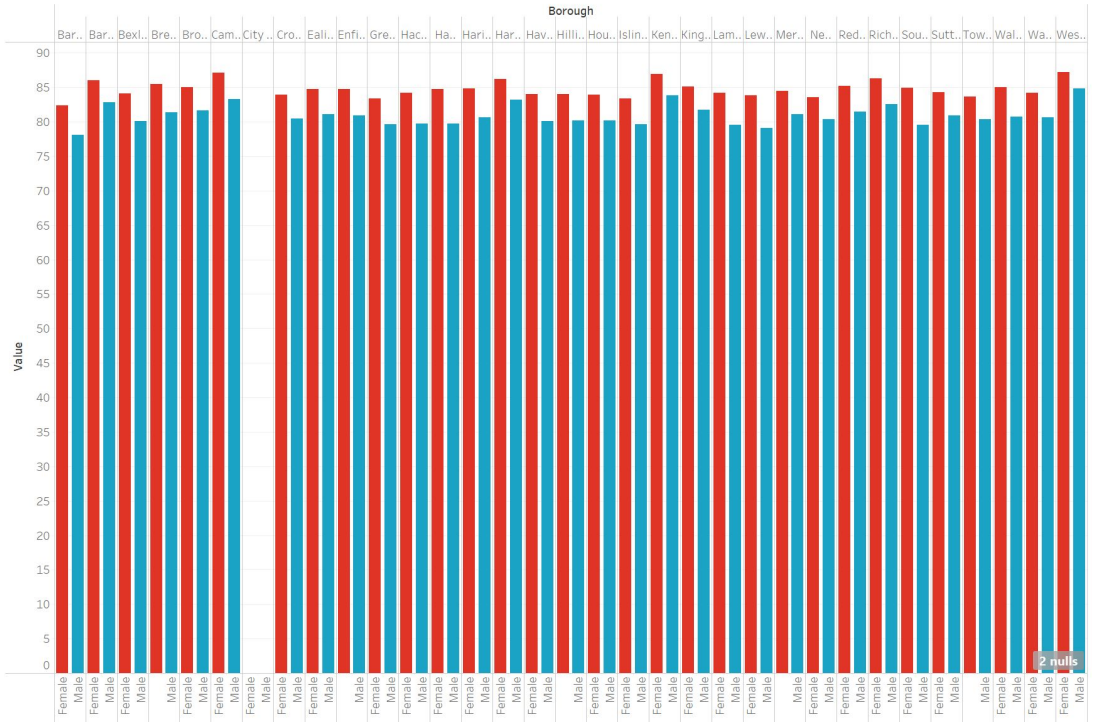
```
UPDATE pm_pollution
SET industrial = 155.4
WHERE borough = 'Wandsworth'; -- Error Code: 1644 - Levels of emissions are unhealthy
```

```
UPDATE pm_pollution
SET industrial = 23
WHERE borough = 'Newham'; -- 1 row affected Rows matched:1 Changed 1 Warnings:0
```

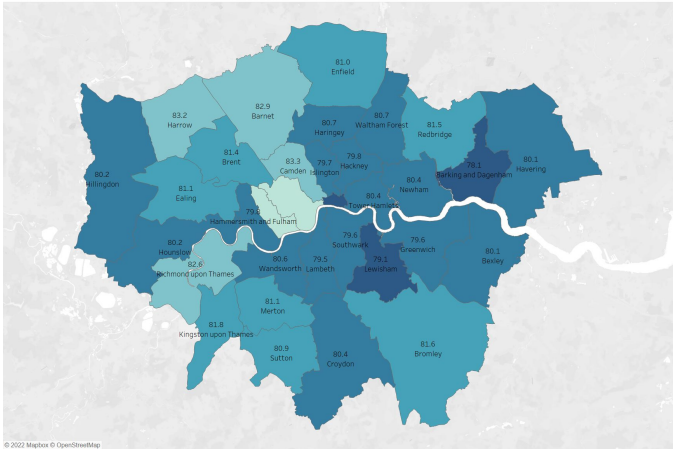
✖	98	21:20:07	UPDATE pm_pollution SET industrial = 155.4 WHERE borough = 'Wandsworth'	Error Code: 1644. Levels of emissions are unhealthy
✔	99	21:20:13	UPDATE pm_pollution SET industrial = 23 WHERE borough = 'Newham'	1 row(s) affected Rows matched: 1 Changed: 1 Warnings: 0

Tableau Visualisations

life_expectancy



le_male



le_female

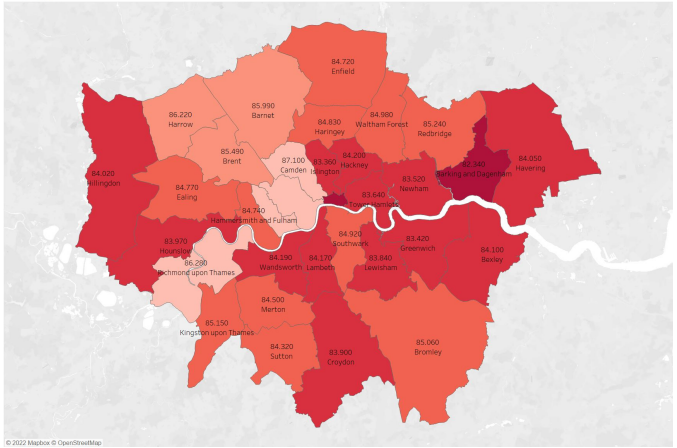
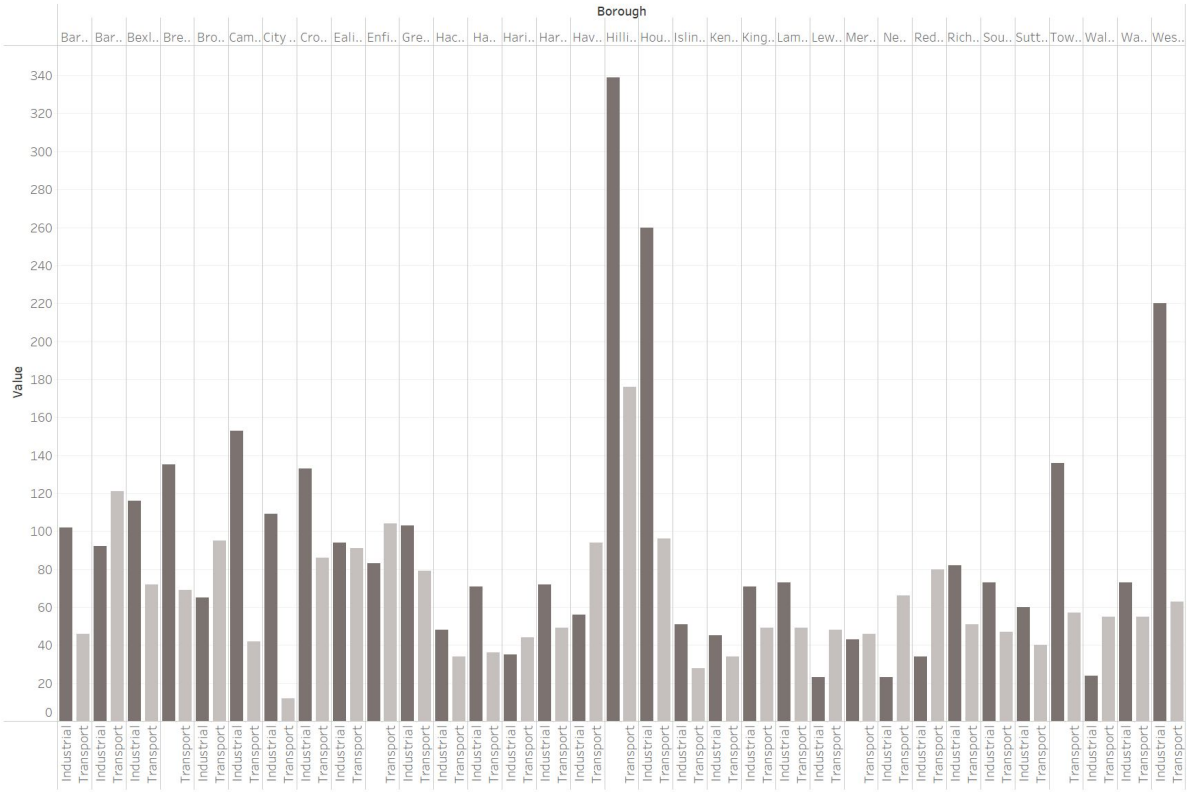
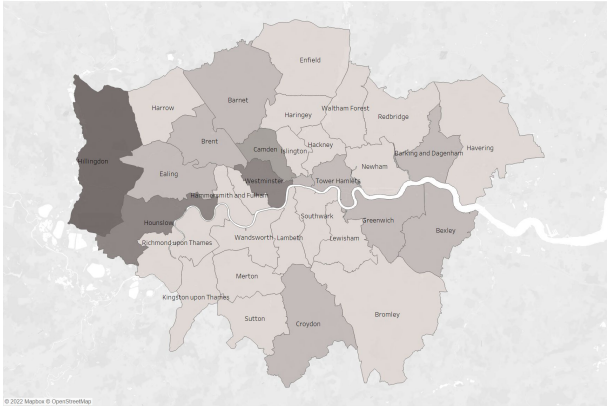


Tableau Visualisations

pm_pollution



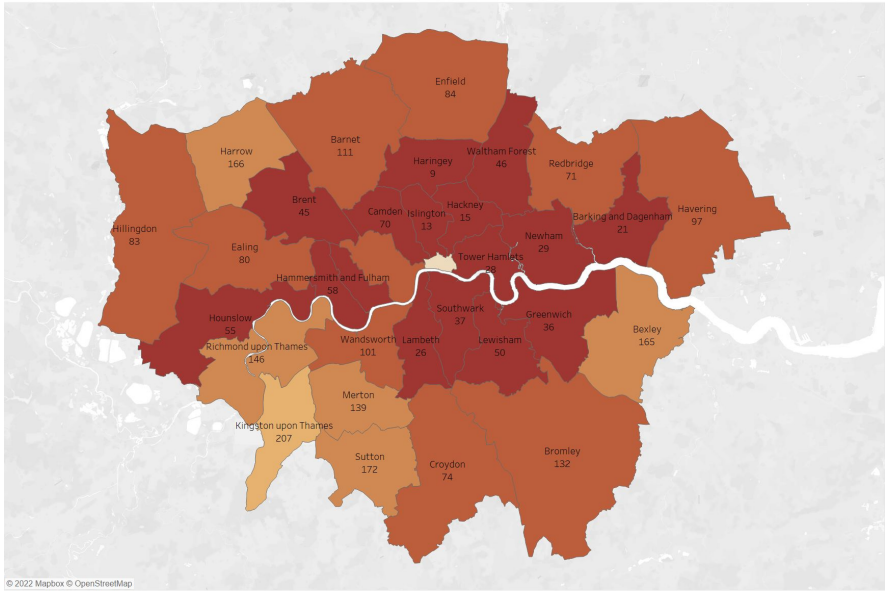
pm_industrial map



pm_transport map

Tableau Visualisations

crime_deprivation



income_deprivation

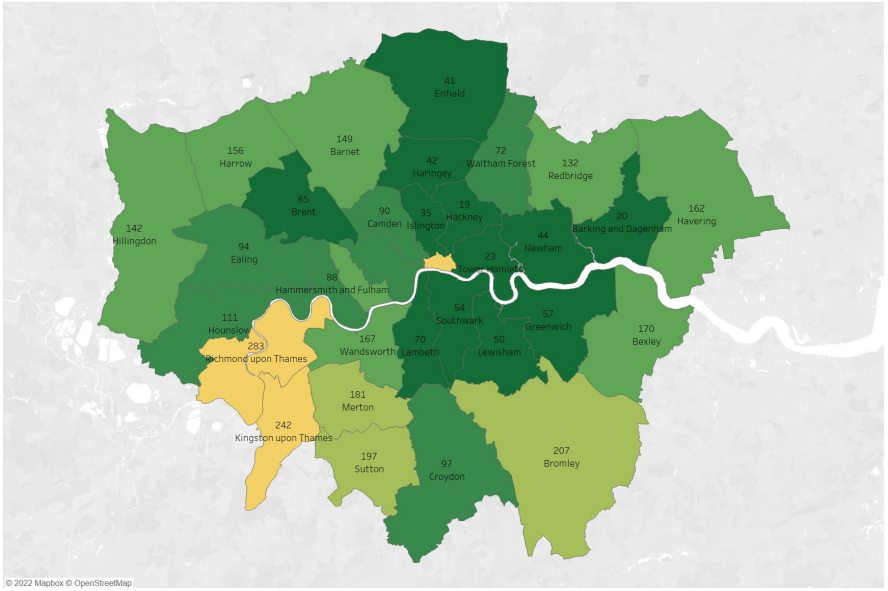
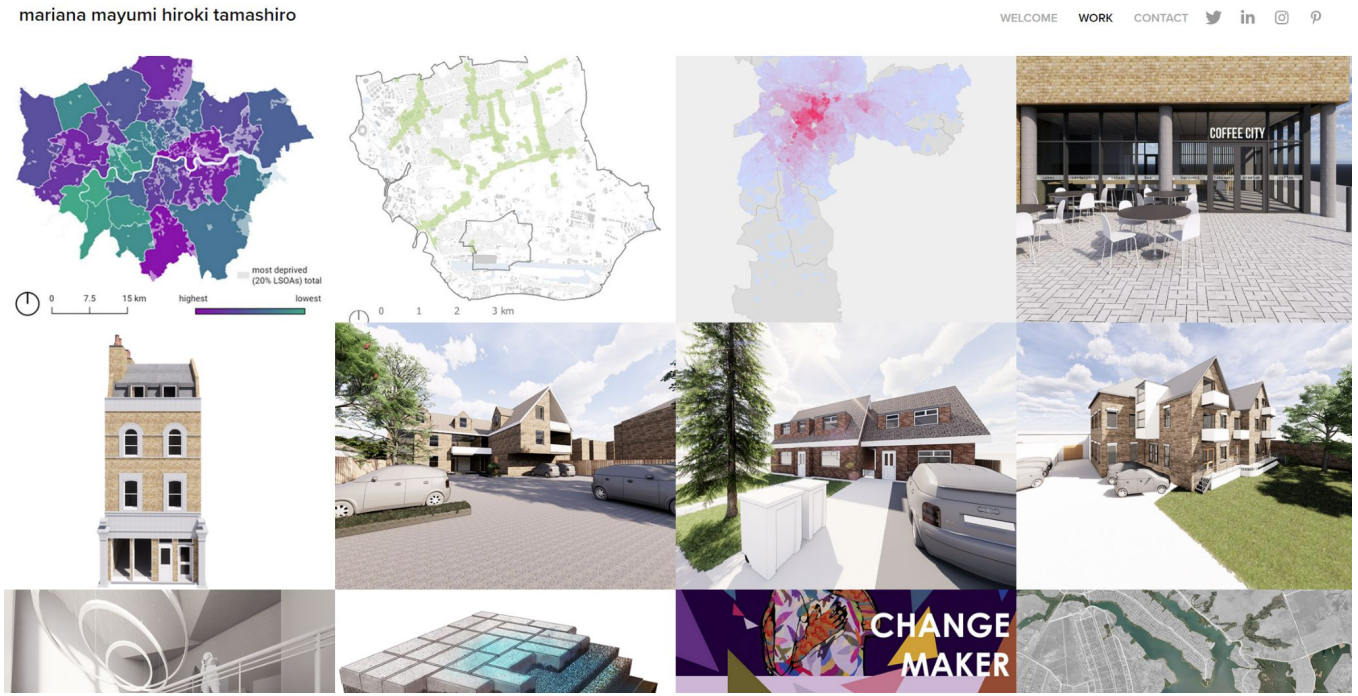


Tableau Visualisations

Thank you!



https://mmht.myportfolio.com/

mariana.hiroki@gmail.com