



The Honorable William "Bill" Edwards, Mayor
The Honorable Catherine F. Rowell, District 1 Councilmember
The Honorable Carmalitha Gumbs, District 2 Councilmember
The Honorable Helen Z. Willis, District 3 Councilmember
The Honorable Naeema Gilyard, District 4 Councilmember
The Honorable Corey A. Reeves, District 5 Councilmember
The Honorable khalid kamau, District 6 Councilmember
The Honorable Mark Baker, District 7 Councilmember

COUNCIL WORK SESSION MEETING AGENDA

- I. Call to Order
- II. Roll Call
- III. Presentations
- IV. Agenda Items
 - 1. Aerotropolis Atlanta Community Improvement Districts Signage and Wayfinding Plan Project Update (City Manager)
 - 2. Policing Beat and Fire Operation Analysis for COSF (Police)
 - 3. Waste Industries Billing Error Update

V. Executive Session (if needed)

When an Executive Session is Required, one will be called for the following issues: 1) Personnel, 2) Litigation or 3) Real Estate

VI. Adjournment of Meeting



CITY OF SOUTH FULTON

COUNCIL AGENDA ITEM

COUNCIL WORK SESSION



SUBJECT: Aerotropolis Atlanta Community Improvement Districts Signage and Wayfinding Plan Project Update

DATE OF MEETING: 1/14/2020

DEPARTMENT: City Manager

ATTACHMENTS:

Description	Type	Upload Date
Aero Wayfinding	Cover Memo	1/7/2020



Aerotropolis ATLANTA

COMMUNITY IMPROVEMENT DISTRICTS

SIGNAGE AND WAYFINDING PLAN

PROJECT UPDATE

January 2020

Kimley»Horn

IN COLLABORATION WITH HUIE DESIGN

Project Overview

AACID Master Plan

- **District Signage and Branding was identified as a priority in the 2017 AACID Master Plan**

- **Goals of Master Plan:**

1. Enhance Brand and Perceptions
2. Foster Economic Development

- **Development of Signage and Wayfinding Plan:**

Simplify the ability to navigate within and across the districts with the use of clear and contemporary vehicular and pedestrian scaled wayfinding and signage

REGIONAL

- Large-scale monuments
- Used to establish gateway entrances to the CIDs
- Located at interchanges and along main corridors
- Generally landmark signage without directional information

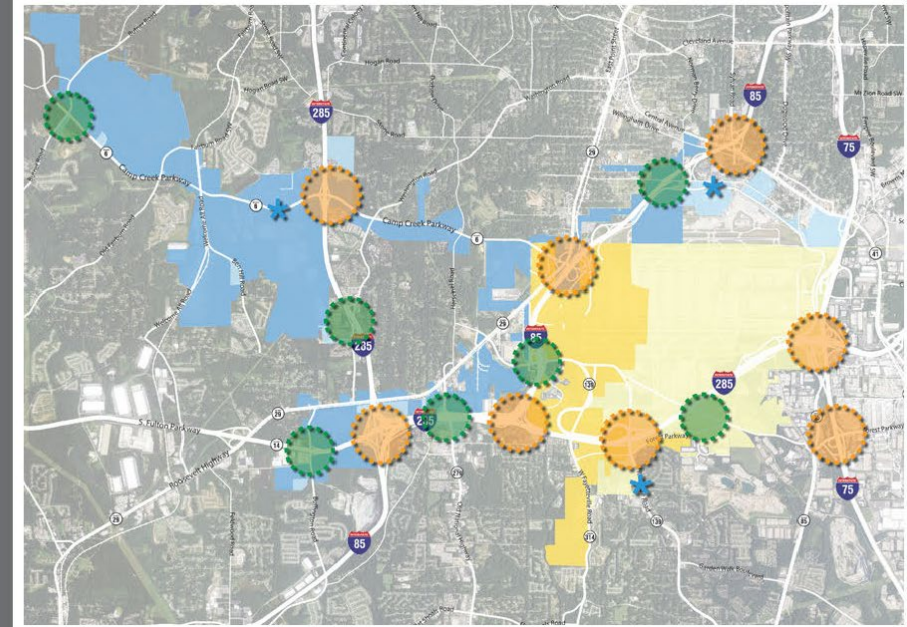
DISTRICT

- Vehicular-scale signs
- Simple directional information to districts and major landmarks.
- Located along arterial roadways

LOCAL

- Pedestrian-scale signs
- Provides directional information, including local landmarks and attractions
- Denotes pathways and key locations for community members and area visitors on foot or bike

POTENTIAL SIGNAGE LOCATIONS



REGIONAL



DISTRICT



LOCAL





PHASE I

DEVELOP AN INITIAL CONCEPTUAL
DESIGN PACKAGE FOR THE CID SIGNAGE
AND WAYFINDING

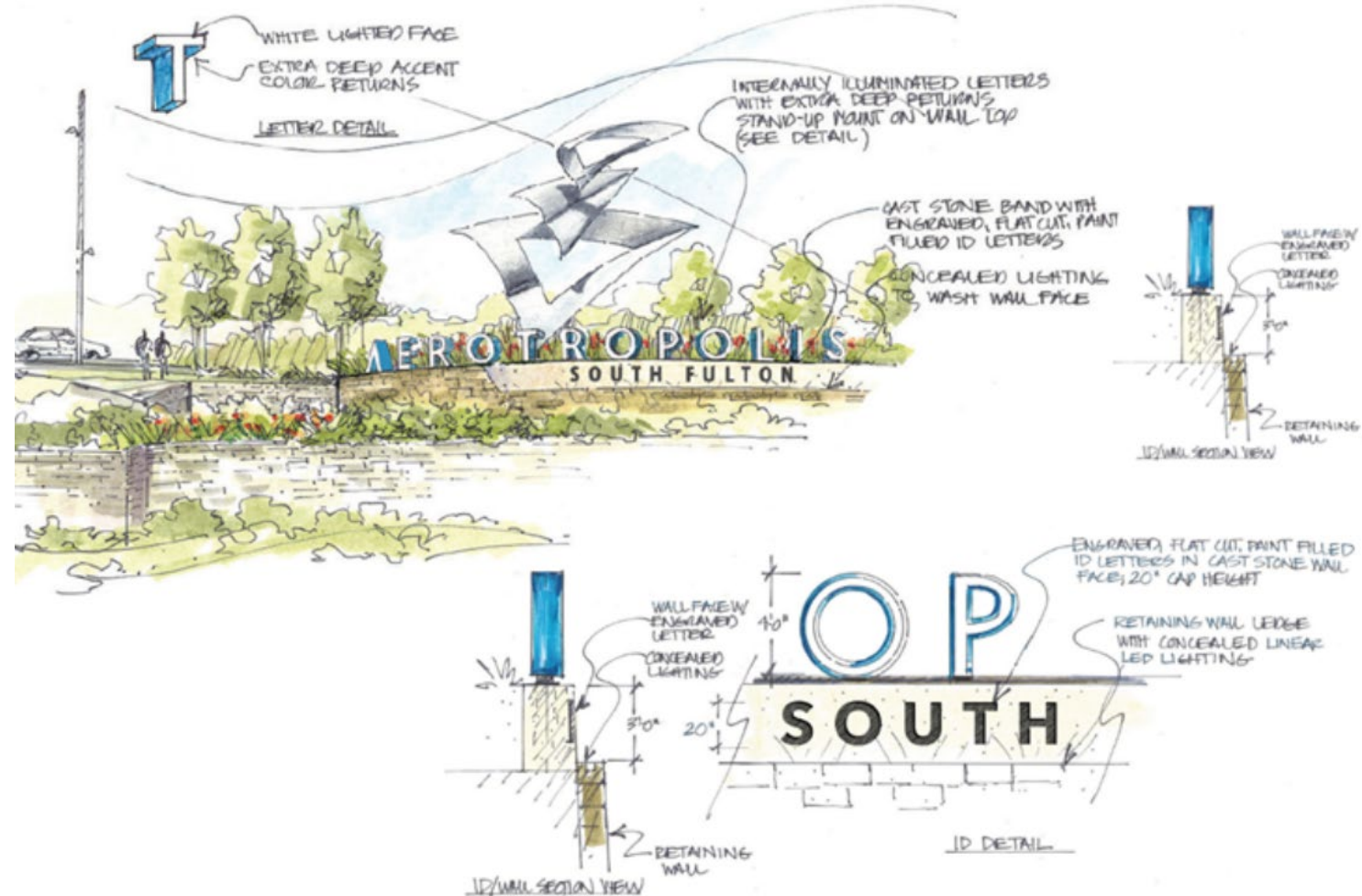
PHASE 2

REFINE AND COMPLETE THE DESIGN OF
EACH SIGN TYPE, AND PREPARE FOR
CONSTRUCTION AND IMPLEMENTATION
OF THE SIGNAGE PROGRAM

Common Questions

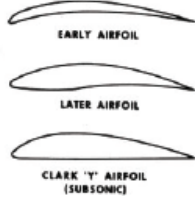
From Municipal/Partner Presentations

- Inclusion of City name on regional signs
- Inclusion of Aerotropolis name on district signs
- Clarify locations
- Funding arrangement for implementation





INSPIRATION IMAGES



Refined Concept

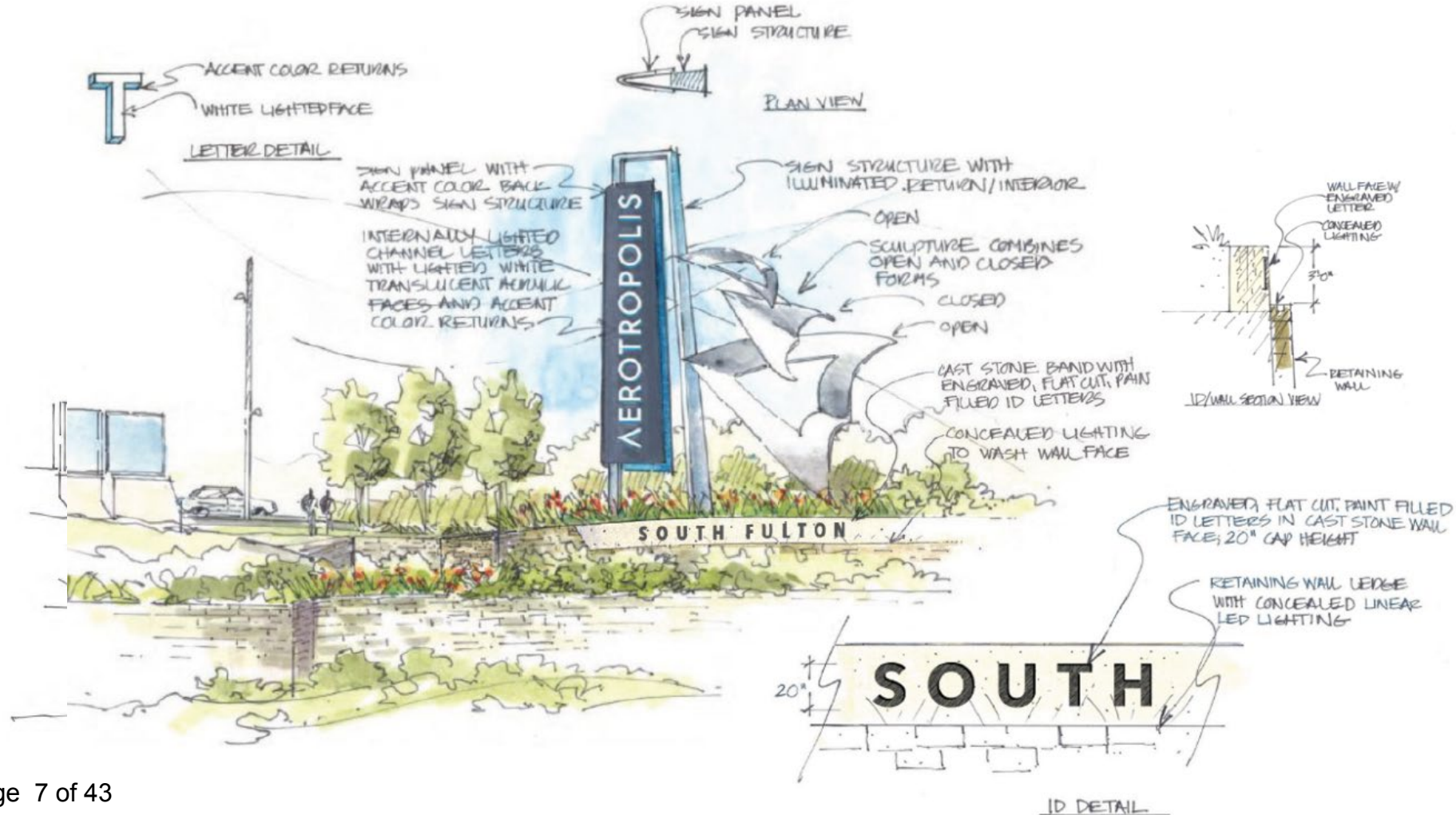
VERTICAL FORM



DAY



NIGHT





INSPIRATION IMAGES

Refined Concept

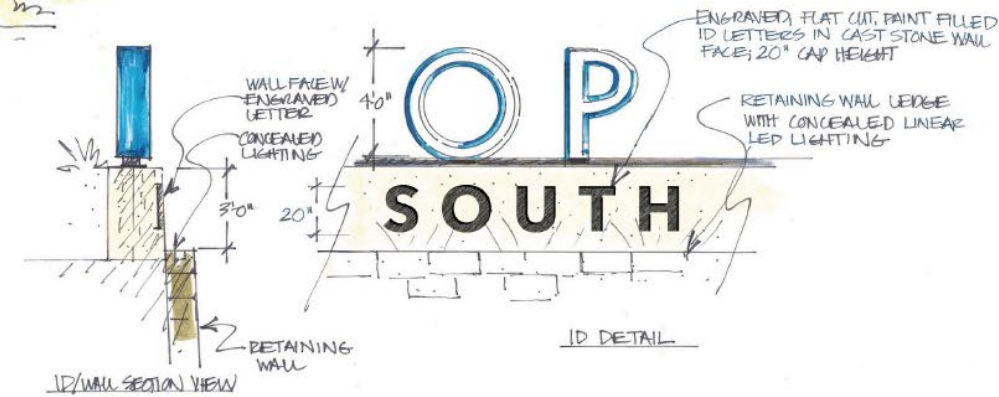
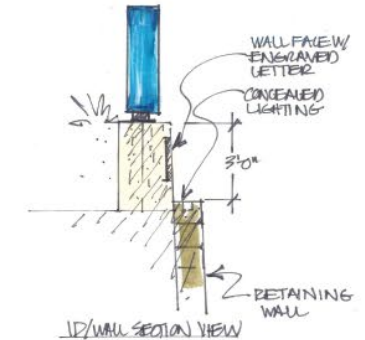
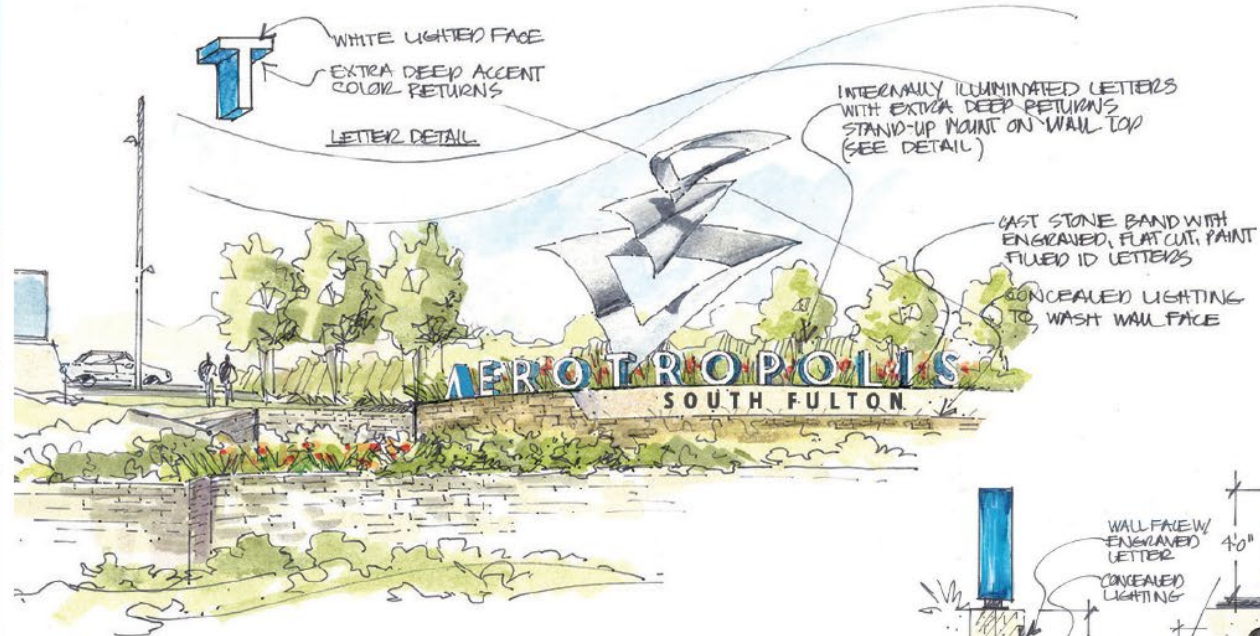
HORIZONTAL FORM



DAY



NIGHT



Refined Concept

DISTRICT AND LOCAL



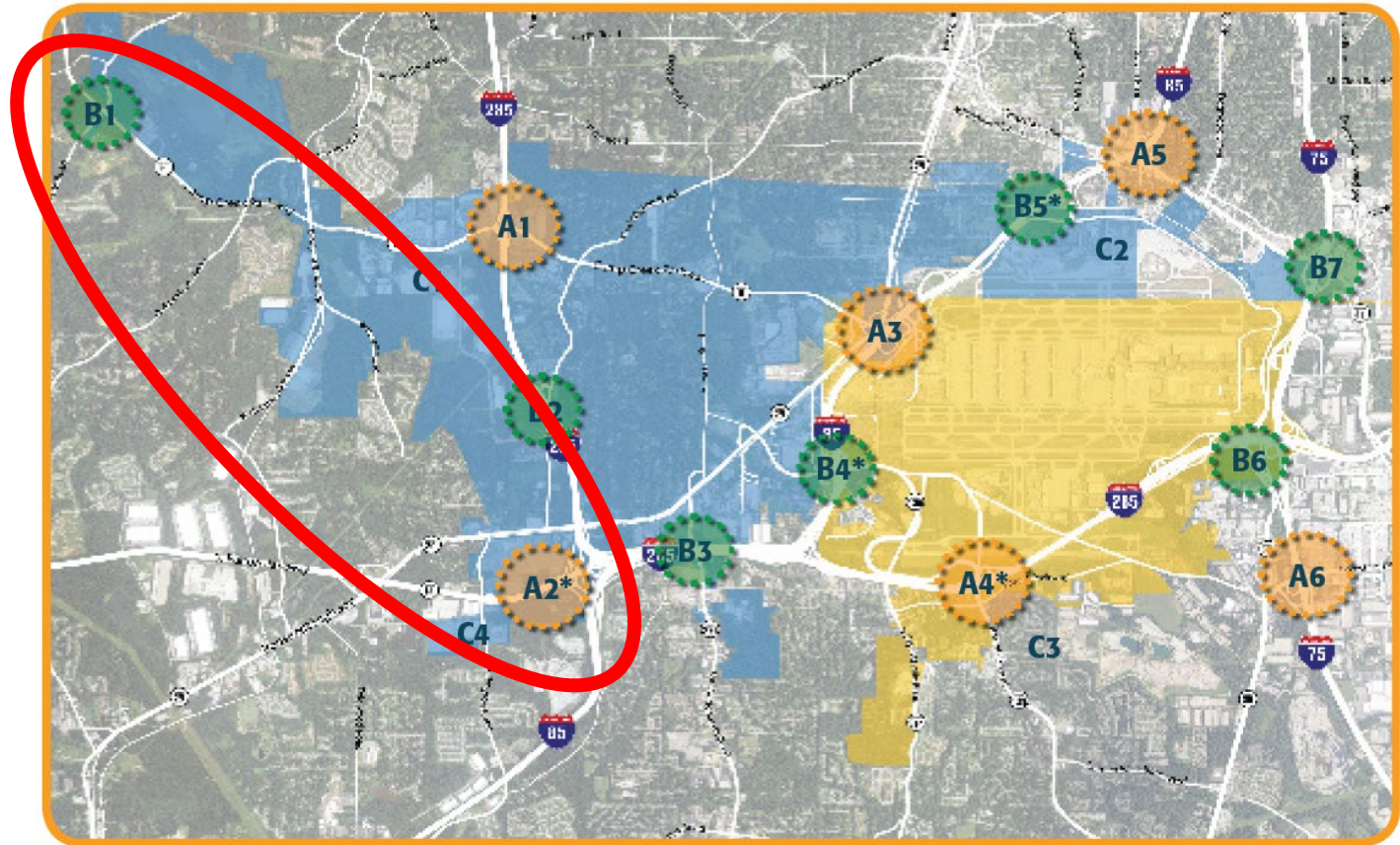
5-Year Implementation

Regional Signage

- A2 – I-85/I-285 at South Fulton Parkway

District Signage

- B1 – Camp Creek Parkway at Butner Road
– Cowart Lake

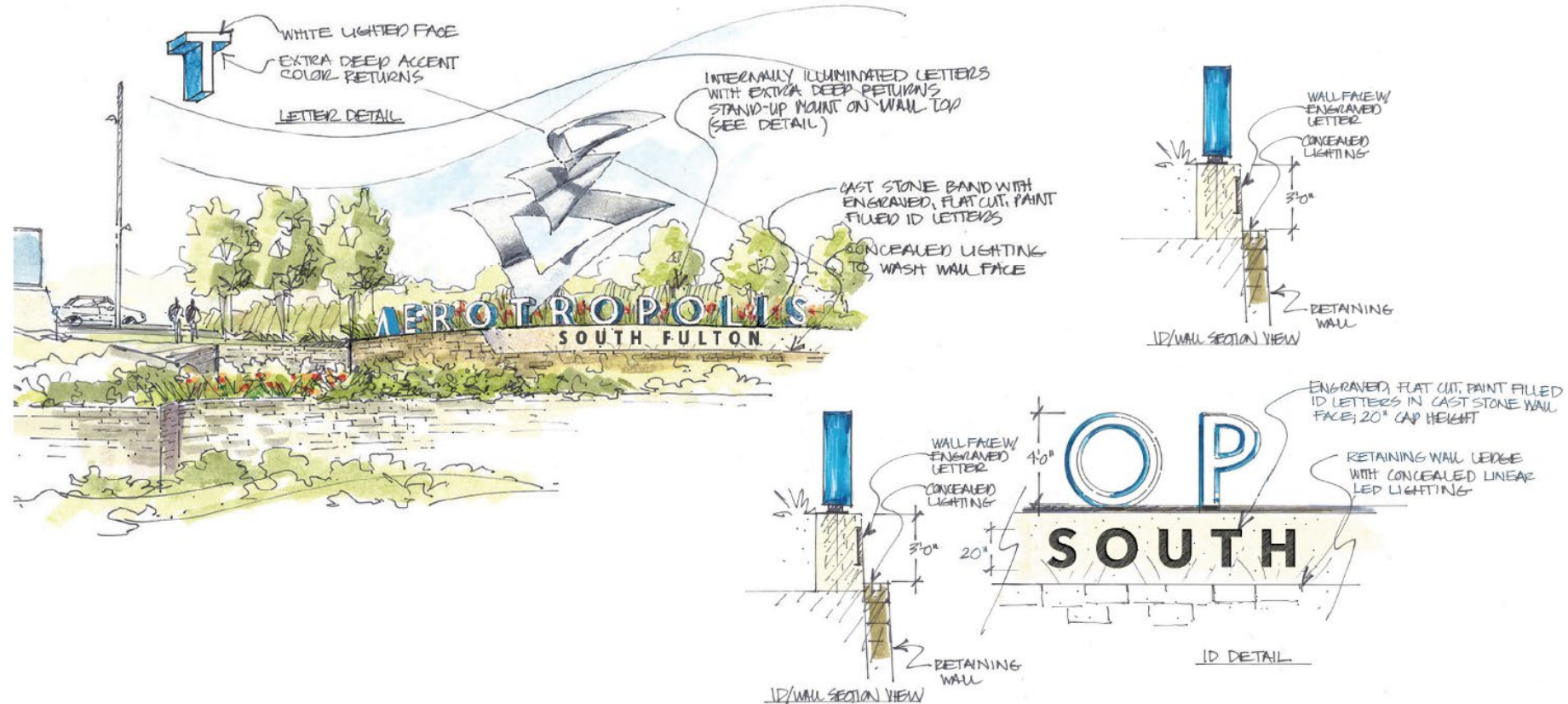


Funding Information

South Fulton – 2 Total Signs

- 1 Regional Sign
- 1 District Sign

A joint meeting will be held in January to discuss funding scenarios





CITY OF SOUTH FULTON

COUNCIL AGENDA ITEM

COUNCIL WORK SESSION



SUBJECT: Policing Beat and Fire Operation Analysis for COSF

DATE OF MEETING: 1/14/2020

DEPARTMENT: City Manager

ATTACHMENTS:

Description	Type	Upload Date
Final Delivery City of South Fulton	Cover Memo	1/7/2020

Policing Beat and Fire Operation Analysis for the City of South Fulton

January 2019

Professor:

Yao Xie

Students:

Shixiang Zhu, Alexander W Bukharin, Le Lu, Yongsuk Lee.



Outline

❑ Data preprocessing and cleaning

- ❑ *Geographical data (geo-atom & zone)*
- ❑ *911 calls-for-service*
- ❑ *Census data*

❑ Analysis

- ❑ *Police Beat redesign*
 - ❑ *Spatial region definition*
 - ❑ *Workload analysis and prediction*
 - ❑ *Optimizing beat boundaries*
 - ❑ *Optimizing number of beats*
- ❑ *Fire station analysis*

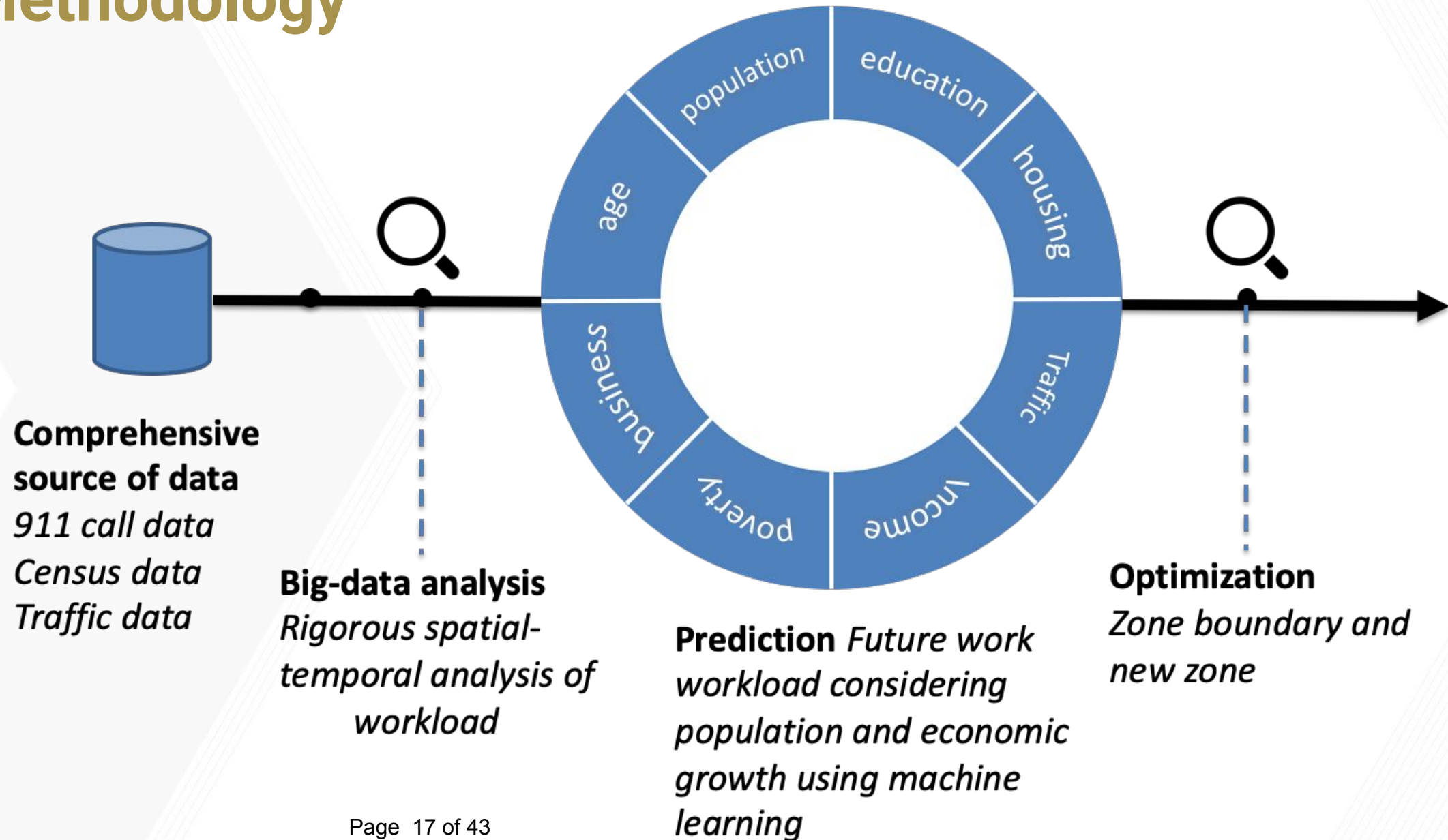
Overview

- **Redesign Zones** for City of South Fulton Police Department, to **balance police workload** among different zones. Consider economic growth, population growth, and many other **external factors**. Use **big-data** analytics, **optimization**, and **machine learning** to achieve optimal design.
- Analyze fire station workload and coverage.

Current status

- Beat configuration has not be been changed since 1970th
- **Police workload** over zones are **unbalanced**
- Changing distribution of workload due to city growth
- Increasing trend of working load for police officers
- **Police staffing** number **limited**

Methodology



Data Sources

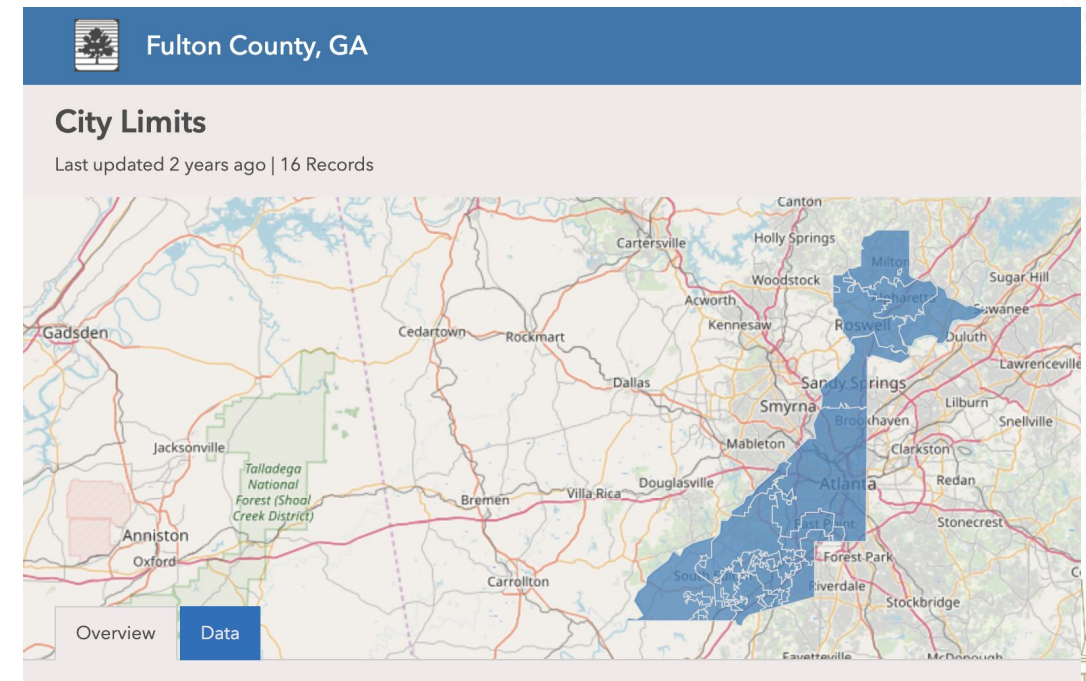
- ❑ Calls-for-service: *First quarter of 2019 from the City of South Fulton Police*

Additional Agency	Business	CallerName	CallTime	CaseID	FirstDispatchTime	IDKey	Latitude	Longitude	Nature	Notes	Secs2Arrive	Secs2LastClear	Service	Street
DIST: 24 ft SFPD		ANON	01/01/2019 00:01:34	201900000	01/01/2019 00:44:54	201900000	33.581317901	-84.46939849	25 DISCH/ UDTs: FIE		2725	3015	LAW	2440 HACKAMORE DR/OLD NAT
DIST: 70.6 SFPD		ANON	01/01/2019 00:03:05		01/01/2019 01:38:14	201900000	33.545955657	-84.53877258	38 ILLEGA CALLER C		0	5990	LAW	7471 TOCCOA CIR
SFPD	SHELL FO	COREY G	01/01/2019 00:06:40		01/01/2019 00:28:41	201900000	33.561882019	-84.46858215	29 FIGHT (UPDATE C		2746	3436	LAW	7100 OLD NATIONAL HWY
(S)REGEN SFPD		ADT-4700	01/01/2019 00:07:26		01/01/2019 00:17:30	201900000	33.709228515	-84.56236267	2 ALARM (UPDATE P		2135	2461	LAW	325 STONECASTLE PASS SW
(S)THREE SFPD		NORTH ST	01/01/2019 00:09:44		01/01/2019 00:14:34	201900000	33.603347778	-84.47864532	2 ALARM (CALLING...		447	829	LAW	135 MEADOW LAKE RD
DIST: 607. SFPD		BLAKE	01/01/2019 00:11:40		01/01/2019 00:27:42	201900000	33.551677703	-84.46538543	25 DISCH/ COMP ADV		1385	2440	LAW	7480 OLD NATIONAL HWY
DIST: 102. SFPD		YUWANA	01/01/2019 00:17:05	201900000	01/01/2019 01:10:44	201900000	33.586616516	-84.52003479	25 DISCH/ rapid s25s		3219	3840	LAW	6210 SHENFIELD LN/SHENFIELD
DIST: 335. SFPD		WOODS, L	01/01/2019 00:22:29		01/01/2019 00:26:31	201900000	33.608974456	-84.47114562	25 DISCH/ ADV S25S		389	747	LAW	5401-312 OLD NATIONAL HWY
SFPD		WILLIAM	01/01/2019 00:25:52	201900000	01/01/2019 00:54:03	201900000	33.645168304	-84.60717010	29 FIGHT (UDTs: SF4		1824	11384	LAW	4070 DEMOONEY RD
DIST: 153. SFPD	PUBLIX	SHARLIA C	01/01/2019 00:30:32		01/01/2019 01:01:15	201900000	33.723548889	-84.50864410	41 AUTOM APD OPR		2635	4095	LAW	3695 CASCADE RD SW
SFPD	CVS PHAF	CVS OP B	01/01/2019 00:32:24		01/01/2019 00:35:03	201900000	33.563800811	-84.46862030	2 ALARM (SF335 ALL		297	464	LAW	7055 OLD NATIONAL HWY
(S)BARRIN SFPD		CAIN	01/01/2019 01:01:45		01/01/2019 04:23:48	201900000	33.687931060	-84.54743957	39 INFORM UDTs: FIE		12123	12397	LAW	345 FREEMAN TER SW

- ❑ Geographical data: *Fulton County GIS website (define the boundary of city)*

- ❑ Census data: *US Census Bureau (Fact Finder)*

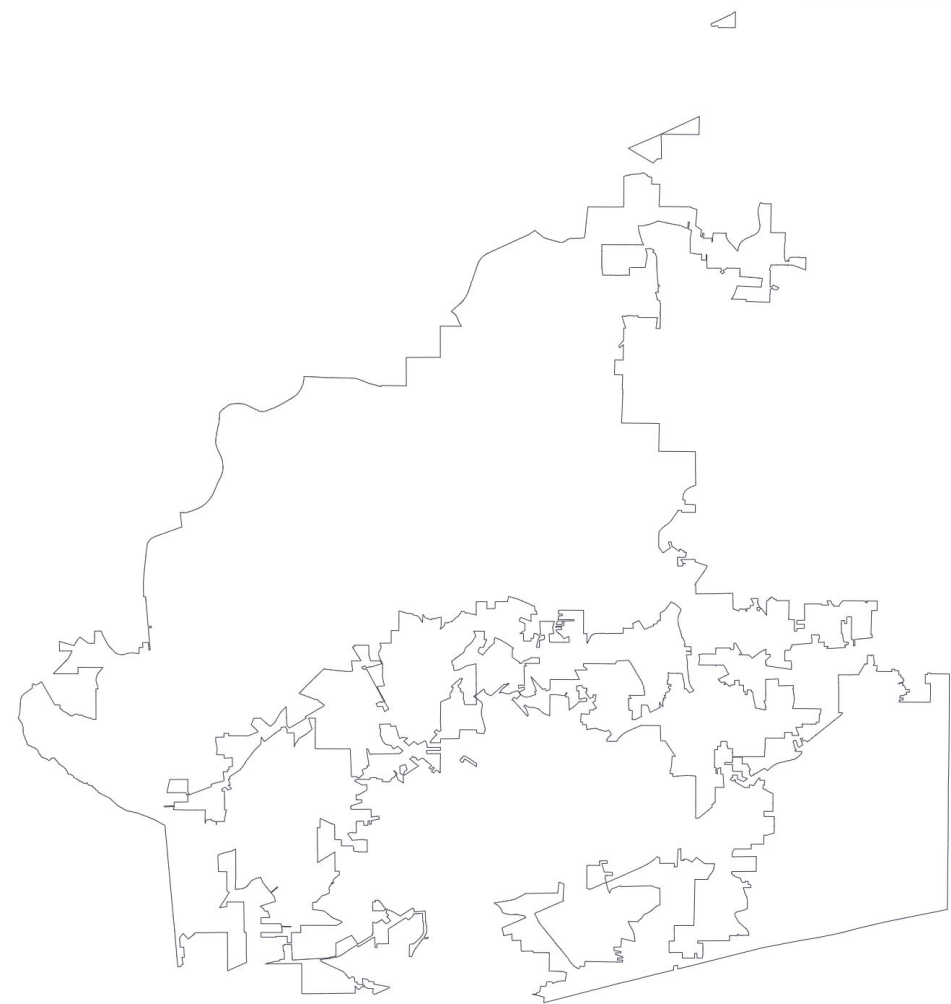
- ❑ Education level
- ❑ poverty
- ❑ household income
- ❑ business establishment
- ❑ etc.



Geographical Data

- ❑ We generate the geographic boundary of the South Fulton City from the Fulton County GIS data
- ❑ The boundary is defined by a set of (latitude, longitude) coordinates.

```
[-84.70655910156924, 33.7905414997510],  
[-84.70155910109831, 33.7905414997589],  
[-84.70155910156323, 33.7855414997312],  
[-84.70655910134511, 33.7855414997429],  
[-84.70655910154627, 33.7905414997507],  
... ..
```



Important to define boundary accurately - highly complex.

Outline

❑ Data preprocessing and cleaning

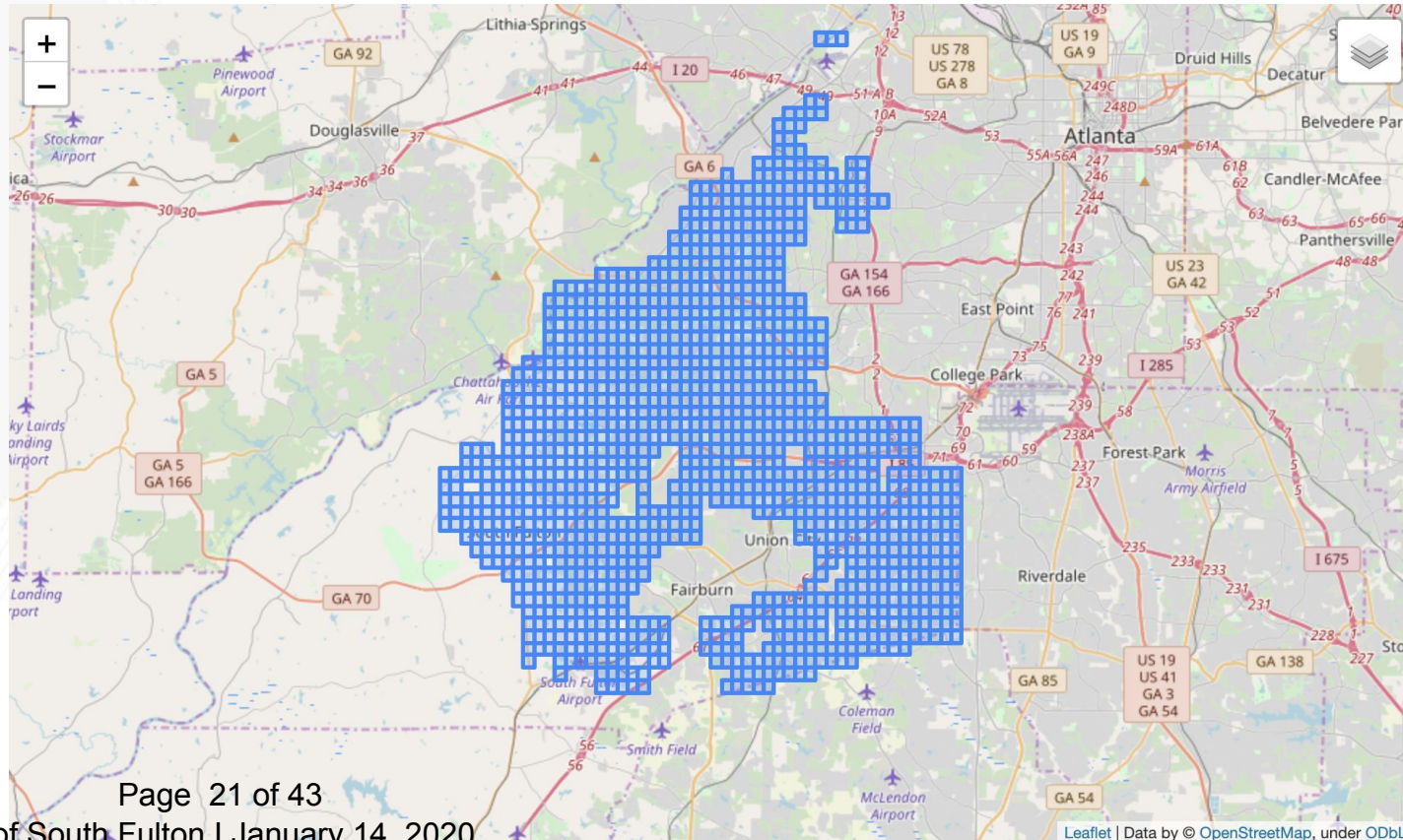
- ❑ *Geographical data (geo-atom & zone)*
- ❑ *911 calls-for-service*
- ❑ *Census data*

❑ Analysis

- ❑ *Police Beat redesign*
 - ❑ *Spatial region definition*
 - ❑ *Workload analysis and prediction*
 - ❑ *Optimizing beat boundaries*
 - ❑ *Optimizing number of beats*
- ❑ *Fire station analysis*

Geographical Data: Grid Block

- Grid Size: 0.346 mile * 0.345 mile
- Information gathering from data: precise workload calculation in each grid
- Decision variable (~1187)

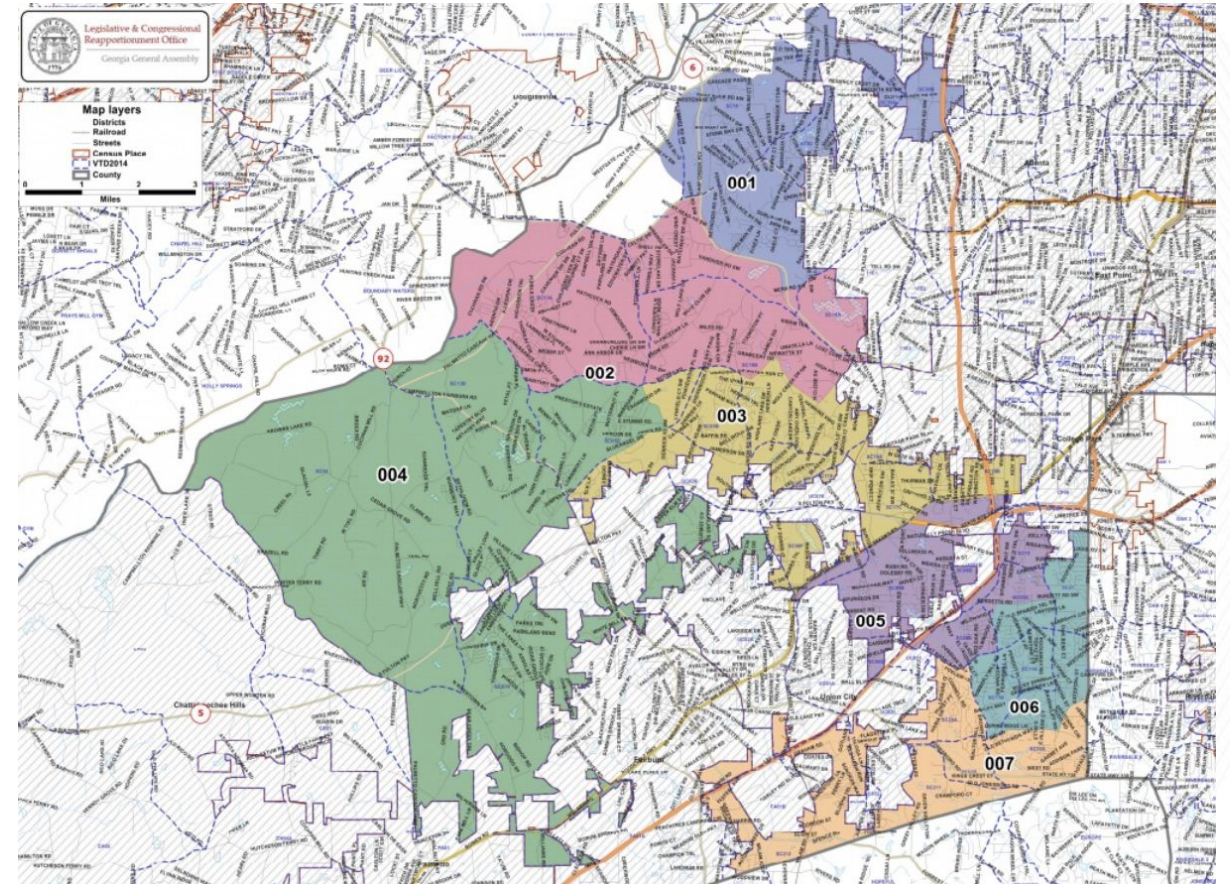


Geographical Data: Zone

Zone is a compact and contiguous region, which consists of a set of connected *geo-atoms*.

From Grid to Zone

We use *Boundary Fill algorithm* to find the existing zone region based on grid blocks automatically.

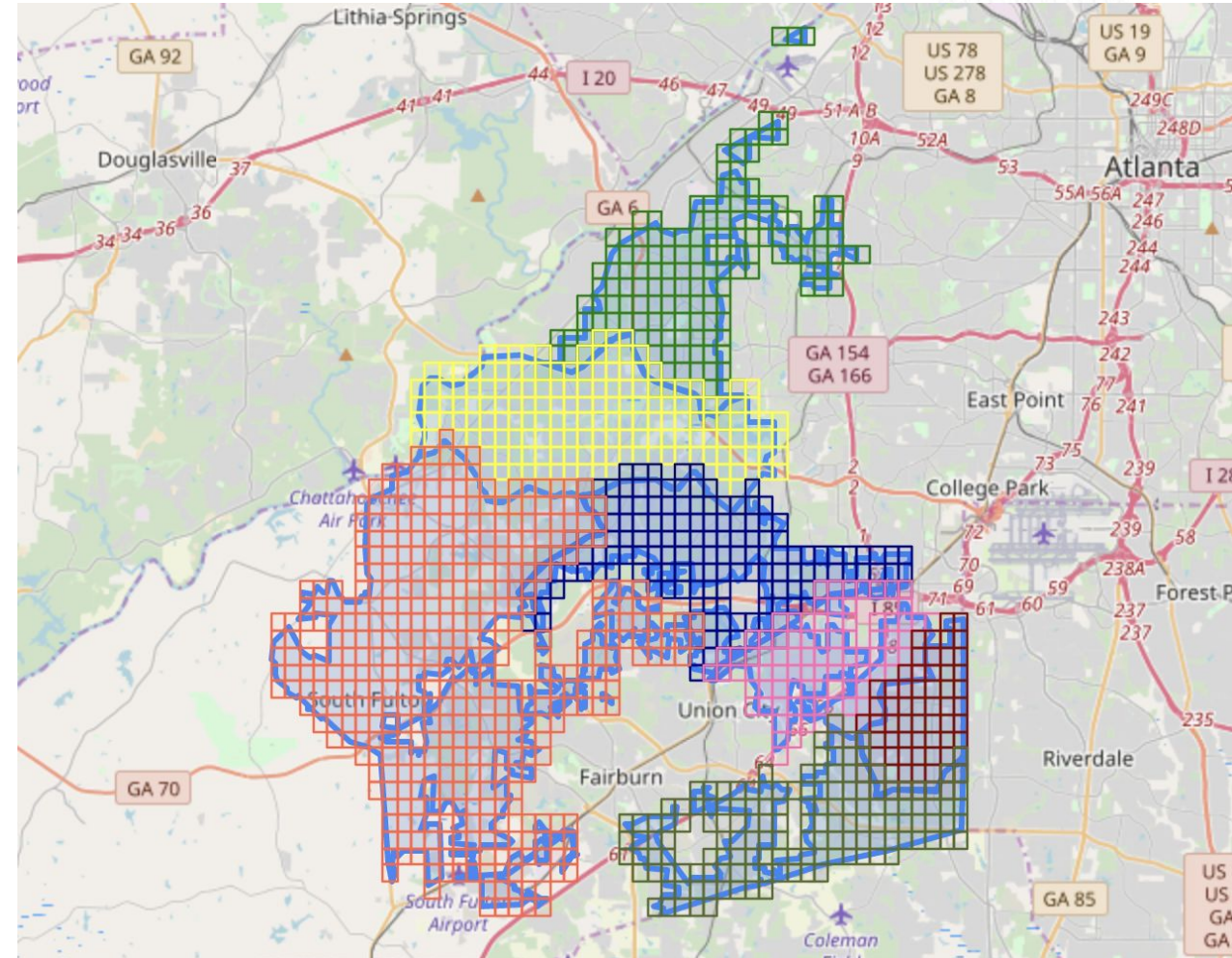


Map grid to beats

Zone is a compact and contiguous region, which consists of a set of connected *geo-atoms*.

From Grid to Zone

We use *Boundary Fill algorithm* to find the existing zone region based on grid blocks automatically.



911 Calls-for-service Data: Determine Workload

- ❑ We used 911 calls-for-service data of the City of South Fulton from ***May 2018 to April 2019***
- ❑ The most important attributes for calculating workload include ***“Call Time”, “First Dispatch Time”, “Latitude”, “Longitude”, “Seconds to Arrive”, “Seconds to Last Clear”***.

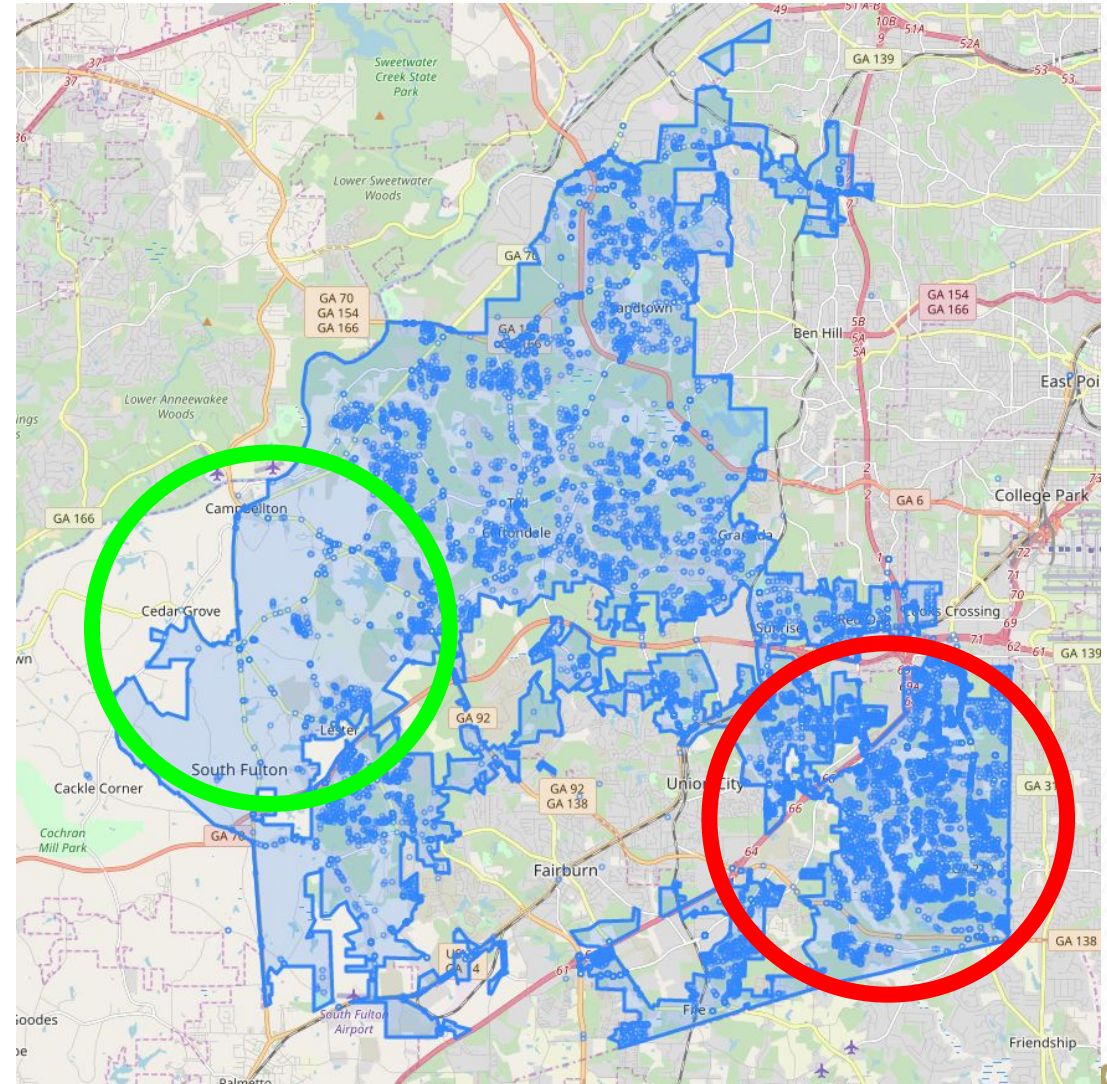
	A	B	C	D	E	F	G	H
1	AdditionalStreet	Agency	Business	CallerName	CallTime	CaseID	FirstDispatchTime	IDKey
2	DIST: 24 ft	SFPD		ANON	01/01/2019	20190000	01/01/2019 00:44:54	20190000
3	DIST: 70.65 ft (S)O	SFPD		ANON	01/01/2019 00:03:05		01/01/2019 01:38:14	20190000
4		SFPD	SHELL FOC	COREY GREG	01/01/2019 00:06:40		01/01/2019 00:28:41	20190000

I	J	K	L	M	N	O	P
Latitude	Longitude	Nature	Notes	Secs2Arrive	Secs2LastClear	Service	Street
(33.58131	-84.469398	25 DISCI	UDTS:	2725	3015	LAW	2440 HA
(33.54595	-84.538772	38 ILLEG	CALLEP	0	5990	LAW	7471 TC
(33.56188	-84.468582	29 FIGH	UPDAT	2746	3436	LAW	7100 OL

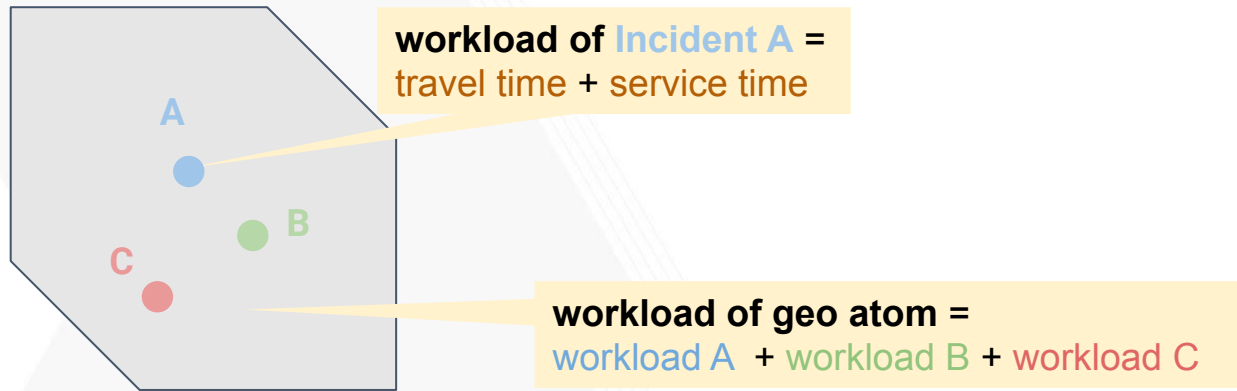
911 calls-for-service data: Workload analysis

The spatial distribution of incidents in South Fulton.

- ❑ ***Some area has more calls than anywhere else***, which indicates the ***imbalance workload*** situation of the city.
- ❑ Next, we need to separate the city into blocks/zones to analyze workload of each blocks/zones.



Workload Analysis: Details



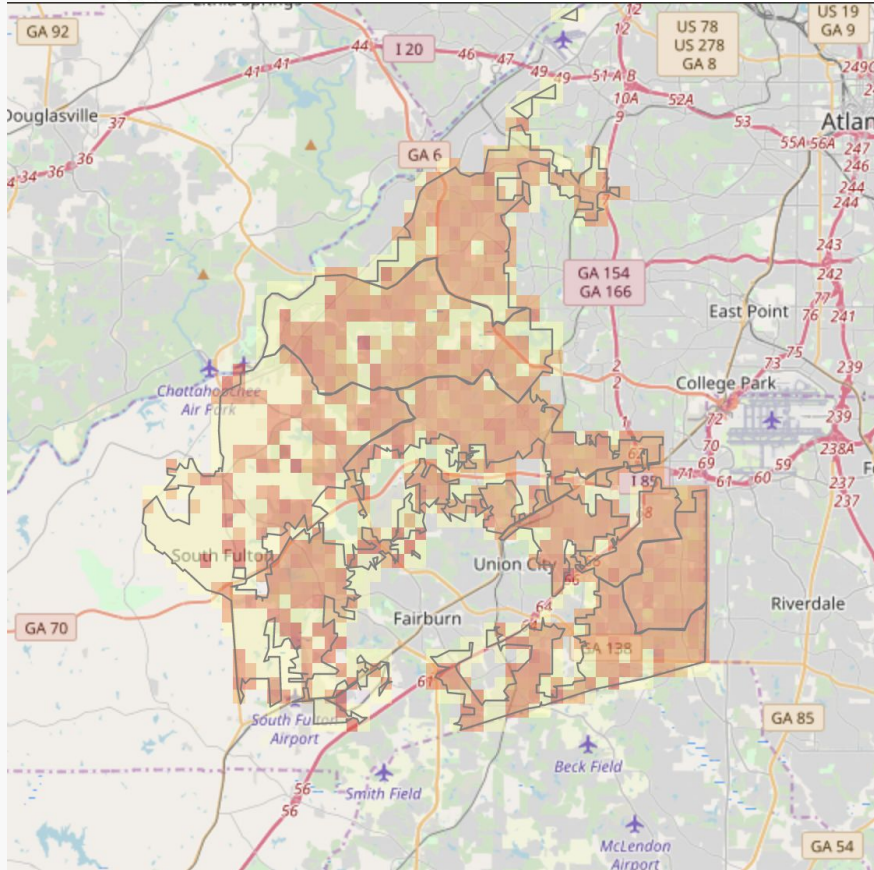
Basic geographical atom
(grid / census block / beat)

Therefore, to calculate the workload of a beat, we have to

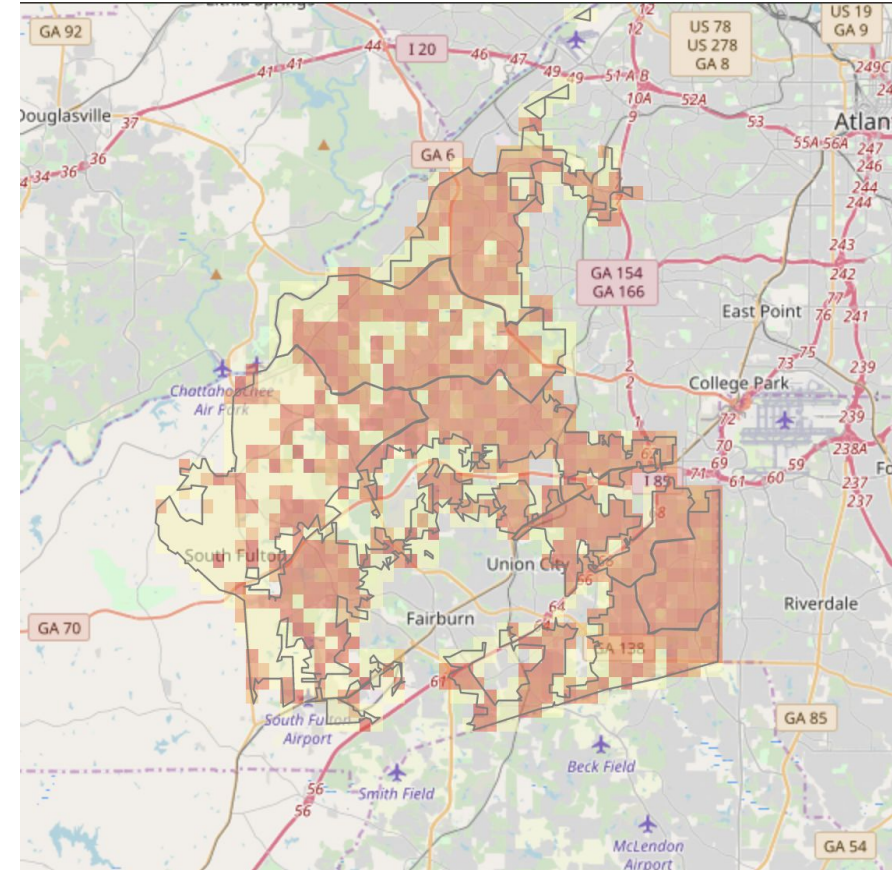
- ❑ calculate all the incidents within a geo-atom,
- ❑ aggregate the workload of all geo-atoms in the same beat.

- ❑ The **workload per incident** is evaluated by the **total time** that each police patrolling unit has spent
- ❑ The **workload per geo-atom** is evaluated by **aggregating the workload** of each incident

Average Workload Analysis



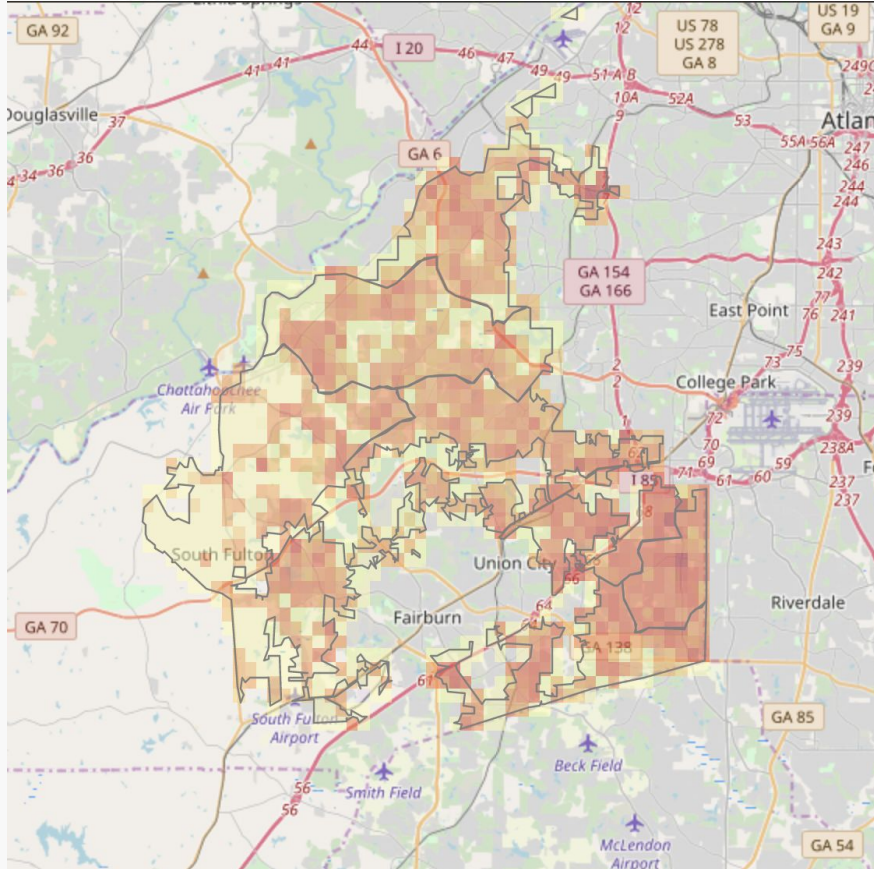
average workload



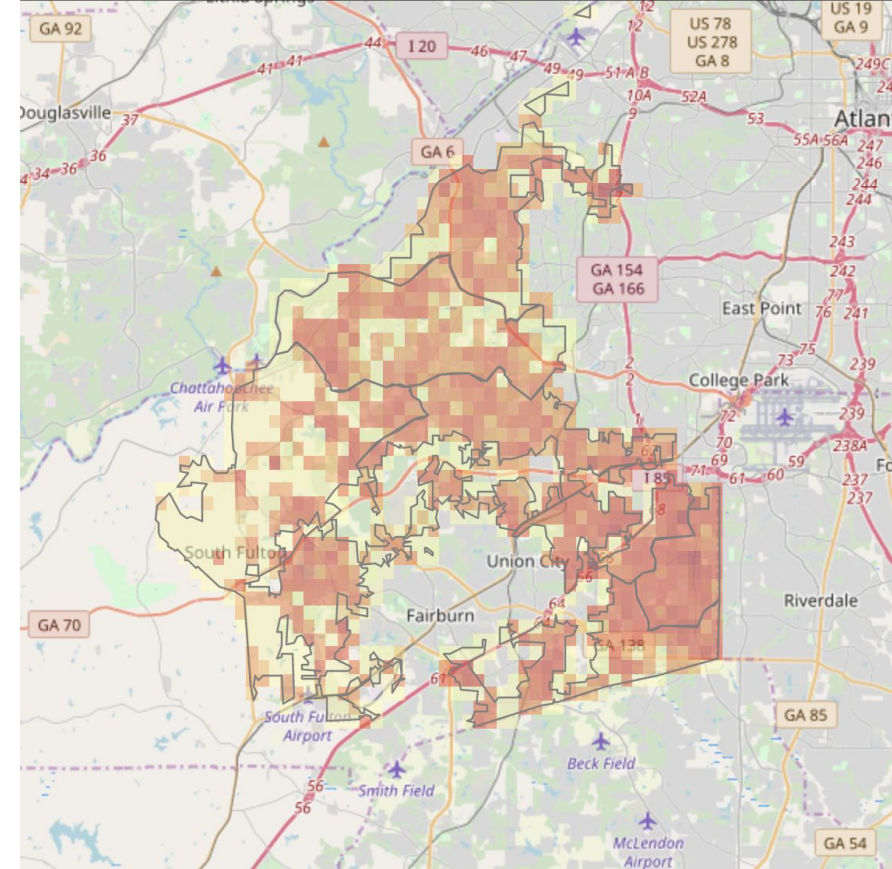
total workload

from 2019 first quarter

Average Workload Analysis



average response time



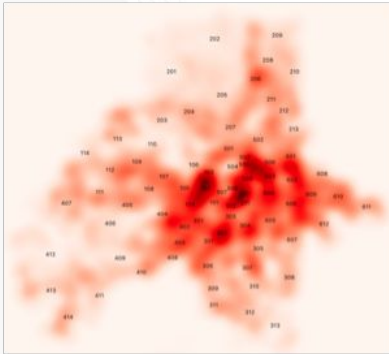
total response time

from 2019 first quarter

Predicting future workload

Big data analytics

911 Call Data



census
data



Population



Employment



Education



Economy

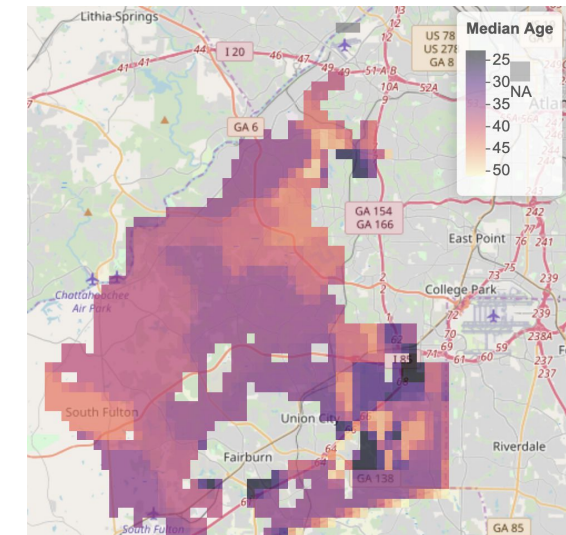
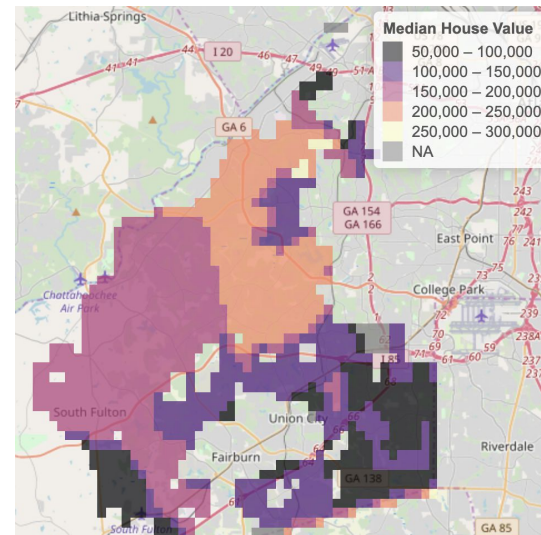
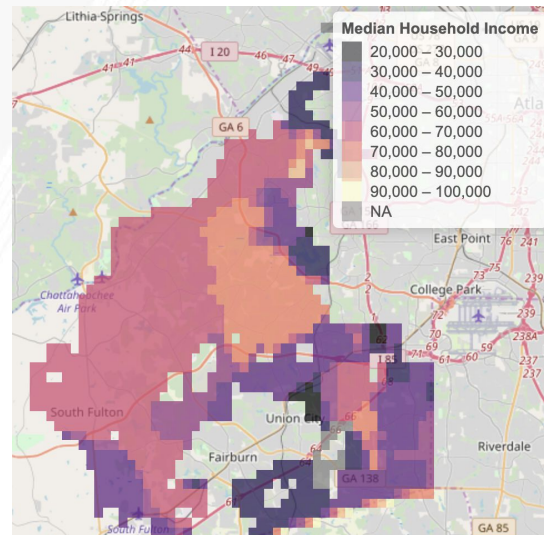
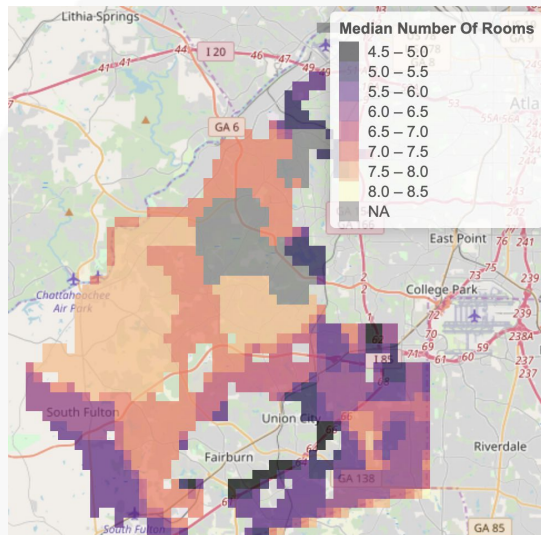
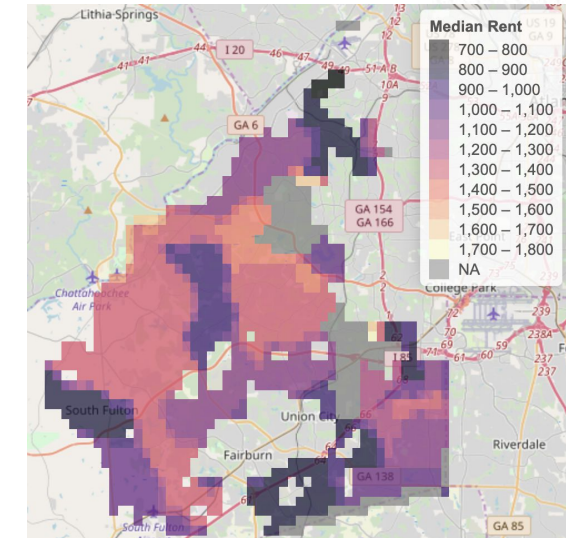
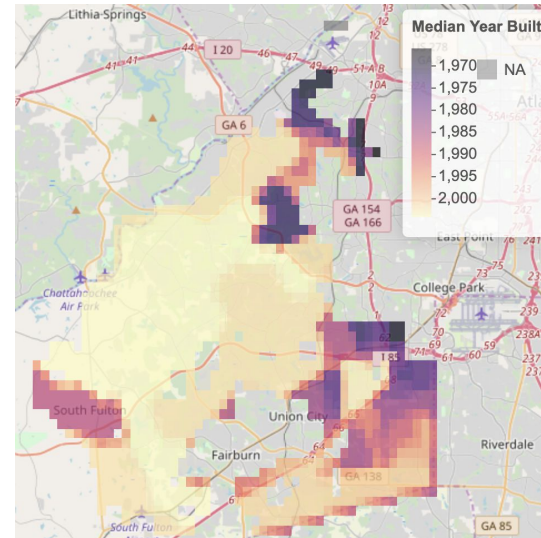
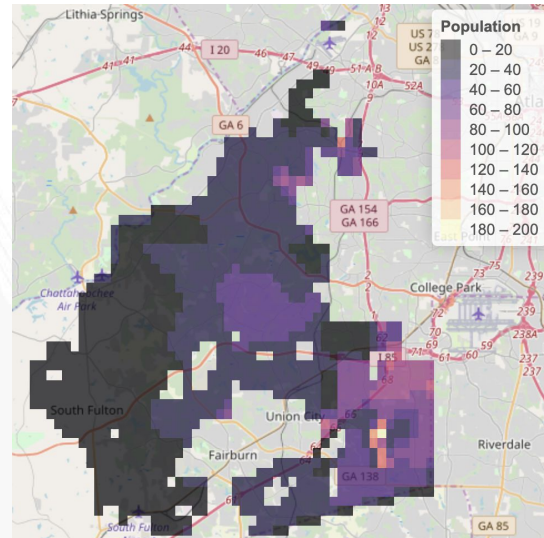
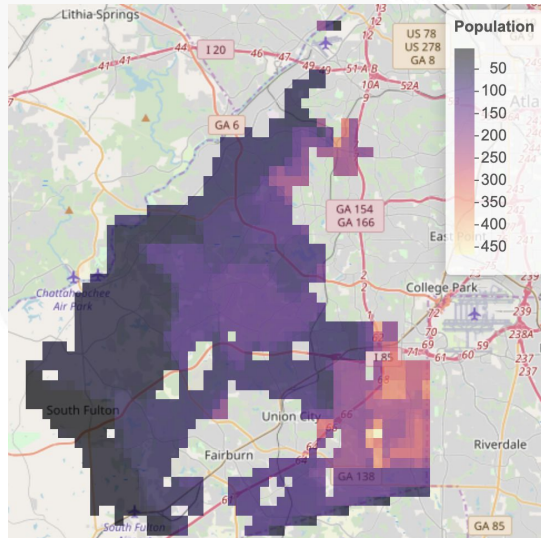
Statistical prediction and machine learning

workload per beat in 2020 =
+ workload in 2019
+ census factors

Optimization zone reconfiguration

Minimize variance across all zones
Subject to contiguity constraint

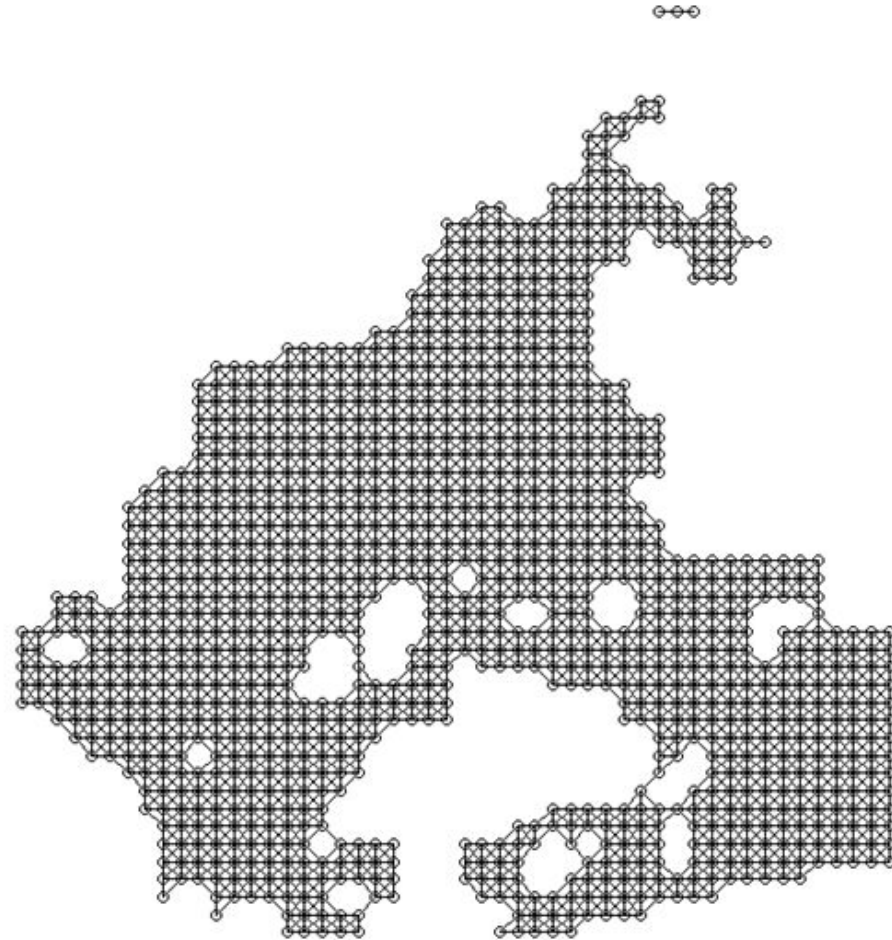
Census Data Preprocessing



Spatial Regression

$$Y = \beta * X + \alpha * W * Y + \phi * W * X + \epsilon$$

- Y = the number of incidents
- X = census factors
- W = adjacency matrix



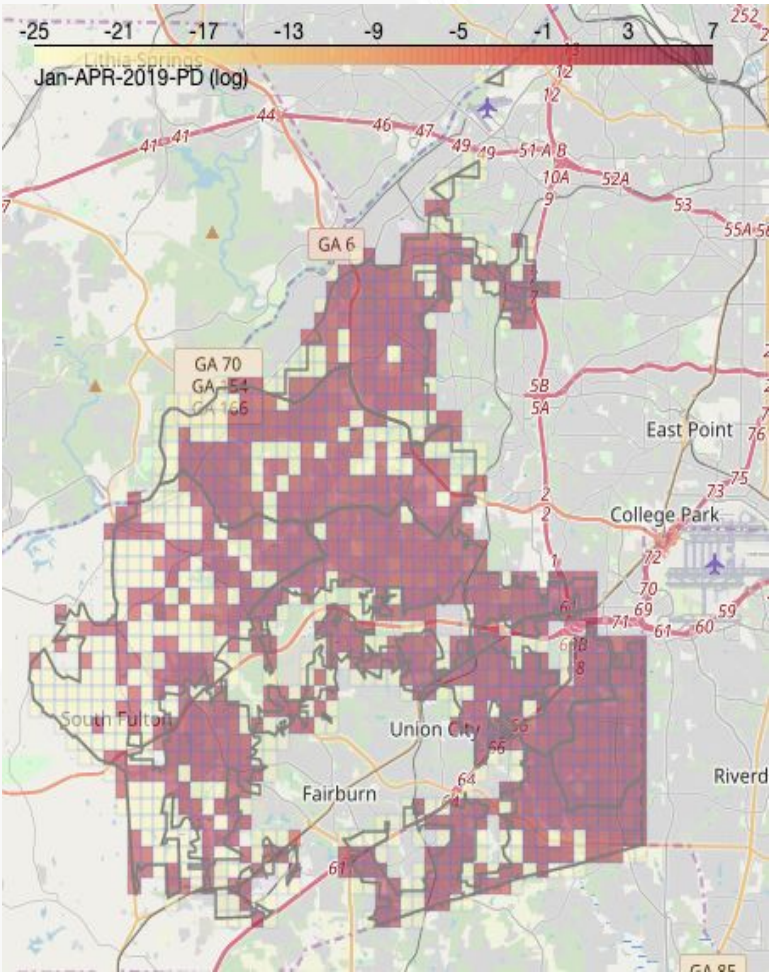
Spatial Regression

OLS Regression Results

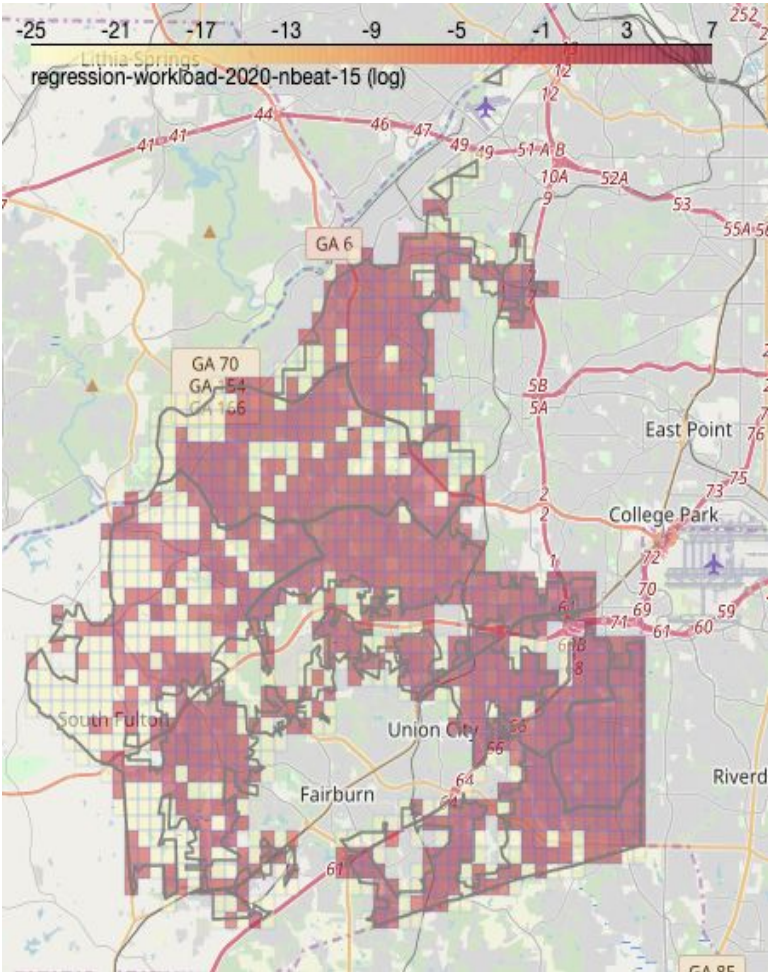
Dep. Variable:	The_number_of_incidents	R-squared:	0.994
Model:	OLS	Adj. R-squared:	0.993
Method:	Least Squares	F-statistic:	1.066e+04
Date:	Tue, 03 Sep 2019	Prob (F-statistic):	0.00
Time:	22:30:34	Log-Likelihood:	-2912.9
No. Observations:	1187	AIC:	5862.
Df Residuals:	1169	BIC:	5953.
Df Model:	17		
Covariance Type:	nonrobust		

	coef	std err	t	P> t	[0.025	0.975]
const	15.1424	0.027	558.317	0.000	15.089	15.196
data.Population	-560.5209	207.512	-2.701	0.007	-967.658	-153.383
data.housing_units	158.4398	67.666	2.342	0.019	25.680	291.200
data.school_enrollment	79.2631	29.756	2.664	0.008	20.882	137.644
data.median_household_income	5.942e+04	1.53e+04	3.896	0.000	2.95e+04	8.93e+04
data.year_built	170.7014	27.415	6.227	0.000	116.914	224.489
data.median_num_rooms	-10.5600	3.810	-2.772	0.006	-18.035	-3.085
data.median_age	-7.2451	2.038	-3.554	0.000	-11.245	-3.246
data.median_house_price	-1.662e+05	3.53e+04	-4.702	0.000	-2.36e+05	-9.69e+04
lag_data.Population	417.7803	162.535	2.570	0.010	98.887	736.674
lag_data.housing_units	-118.5503	52.249	-2.269	0.023	-221.063	-16.037
lag_data.school_enrollment	-58.8317	23.557	-2.497	0.013	-105.050	-12.613
ag_data.median_household_income	-5.126e+04	1.33e+04	-3.846	0.000	-7.74e+04	-2.51e+04
lag_data.year_built	-290.4851	47.723	-6.087	0.000	-384.118	-196.853
lag_data.median_num_rooms	8.4886	3.061	2.773	0.006	2.482	14.495
lag_data.median_age	6.9440	2.039	3.406	0.001	2.944	10.944
lag_data.median_house_price	1.382e+05	2.94e+04	4.696	0.000	8.05e+04	1.96e+05
lag_response	987.8495	0.834	1184.686	0.000	986.214	989.486

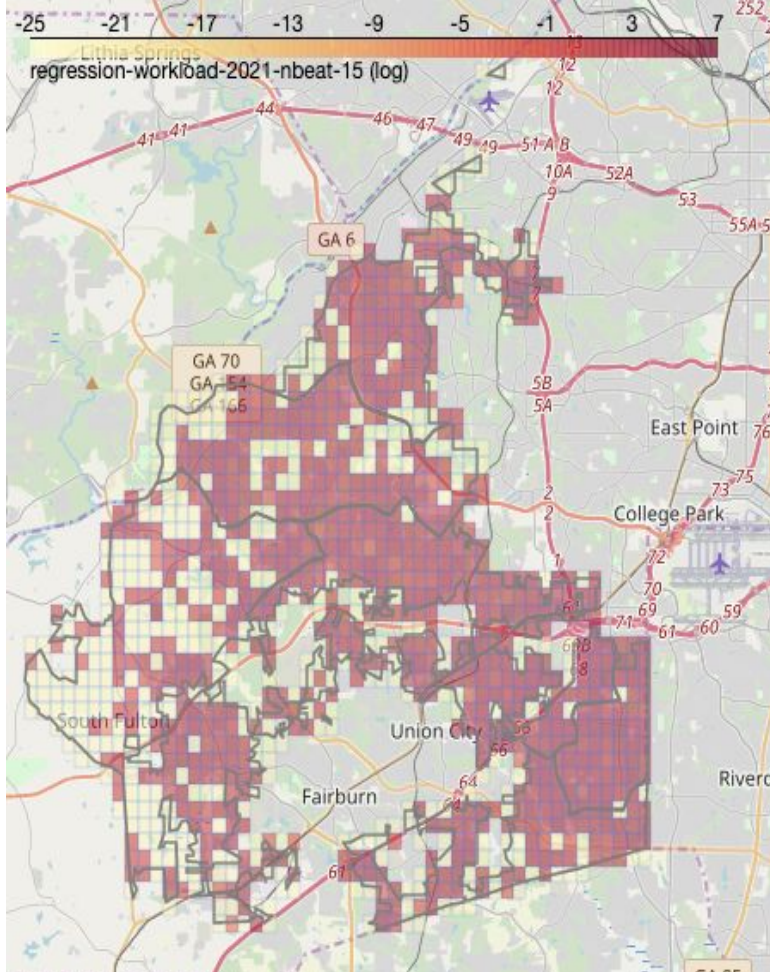
Workload prediction



2019 workload in each grid

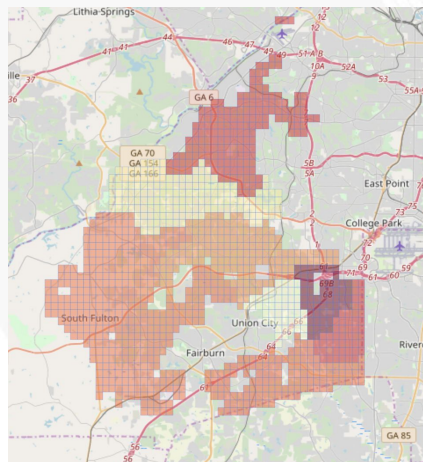


2020 workload in each grid

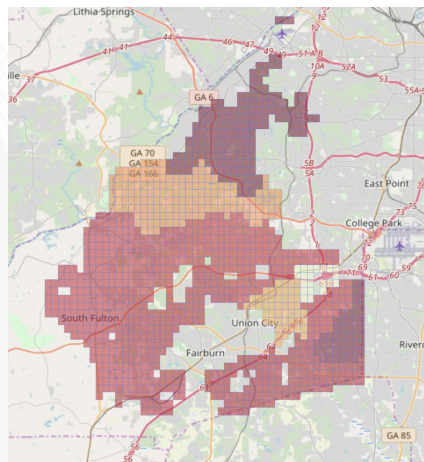


2021 workload in each grid

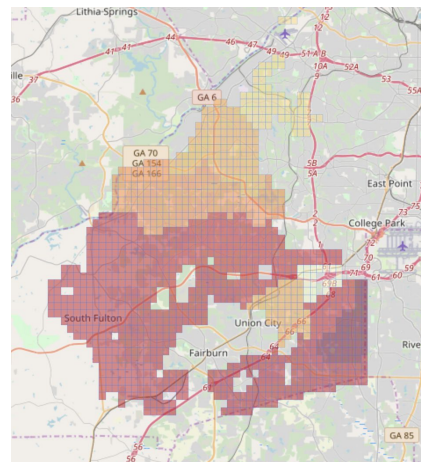
Beat redesign by changing # beats



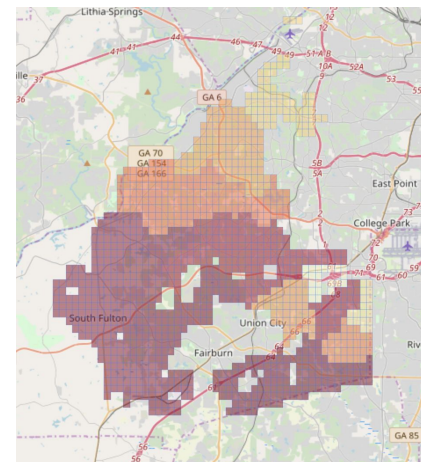
N = 8



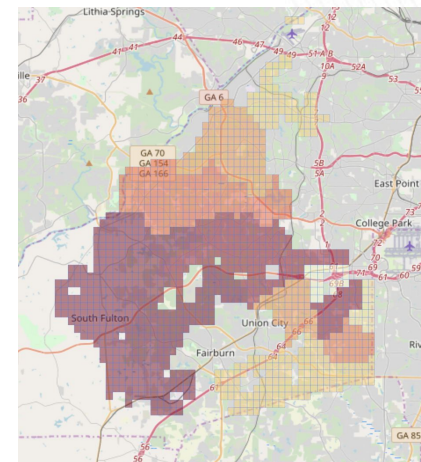
N = 9



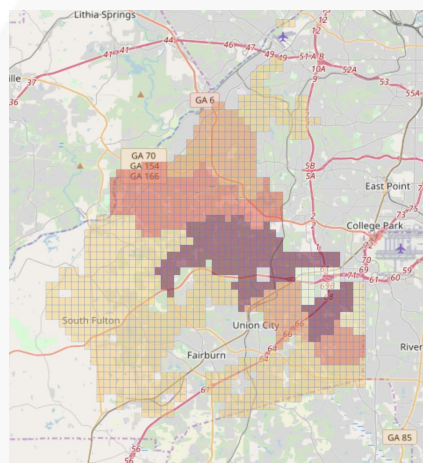
N = 10



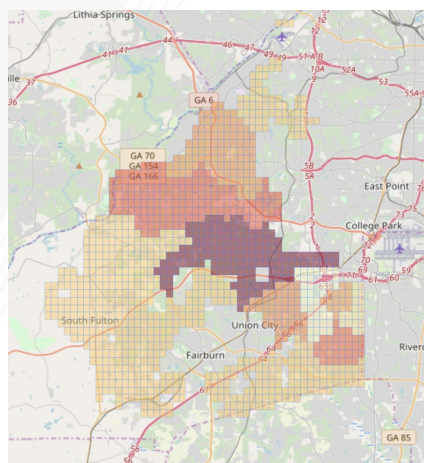
N = 11



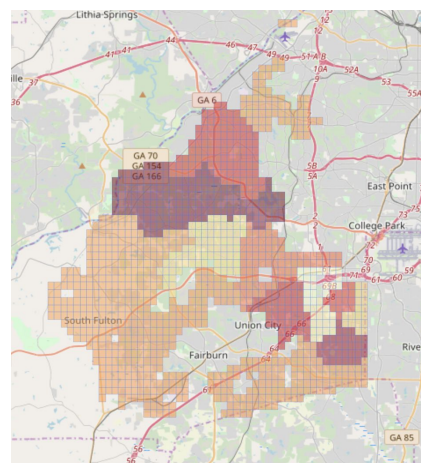
N = 12



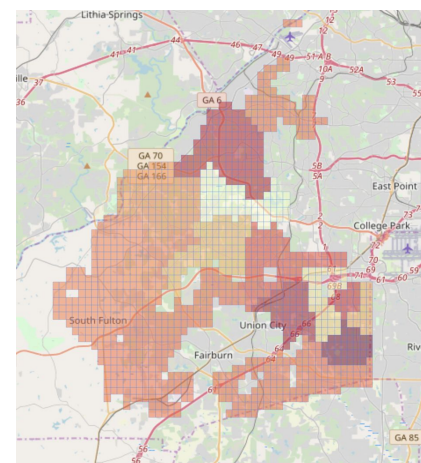
N = 13



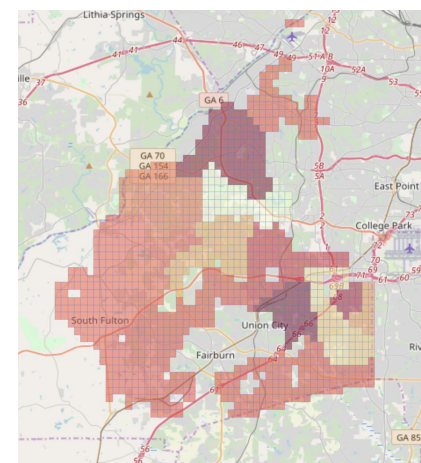
N = 14



N = 15

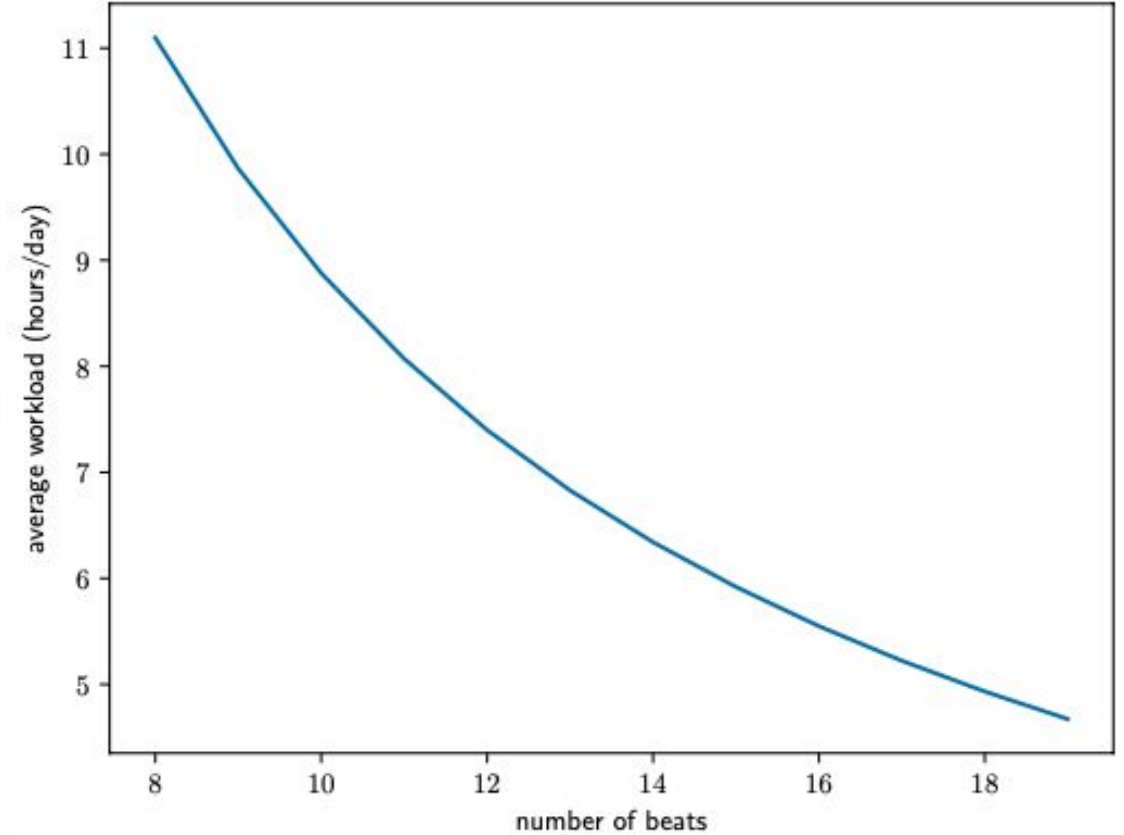
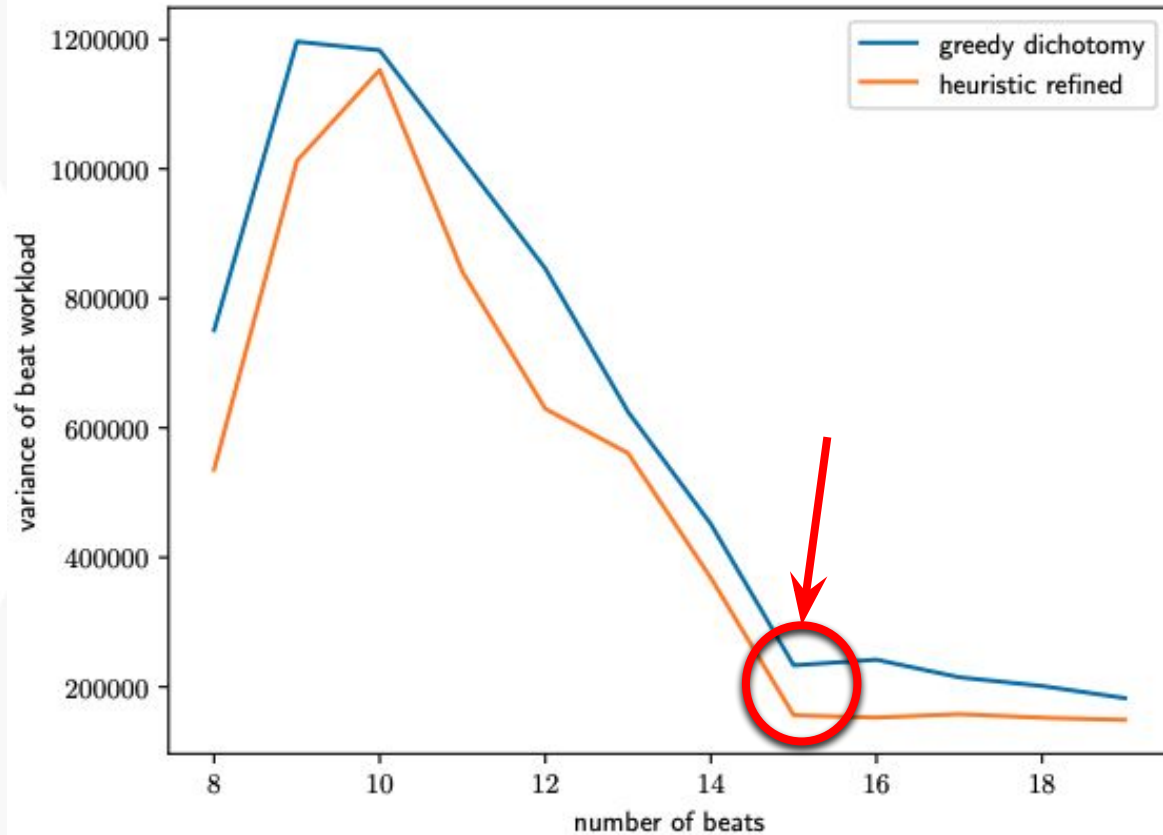


N = 16

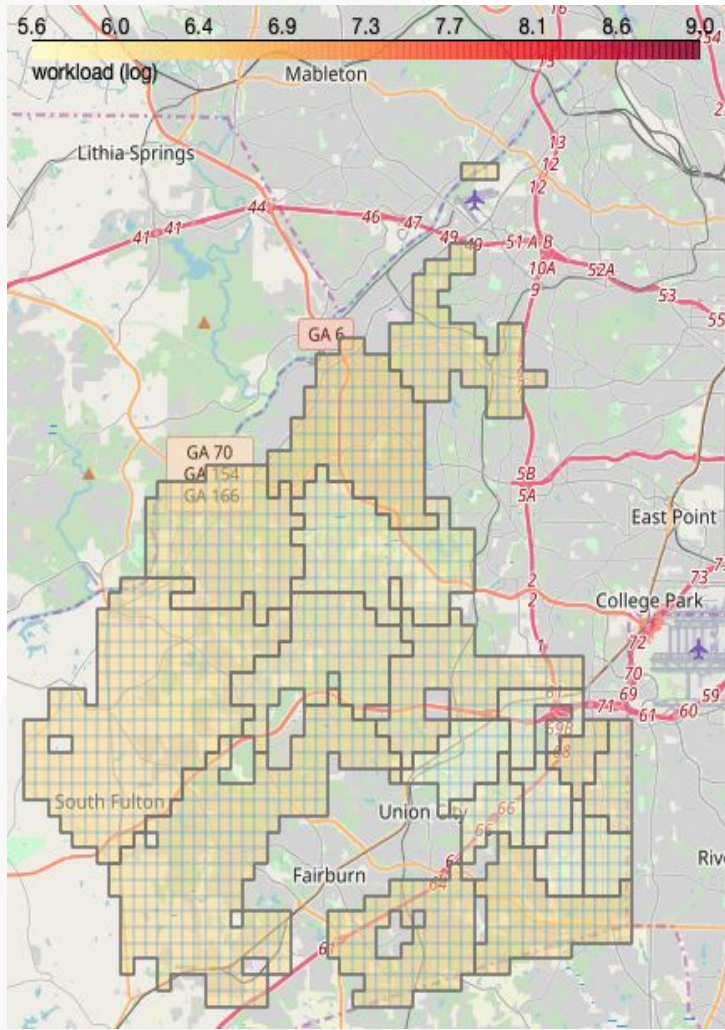


N = 17

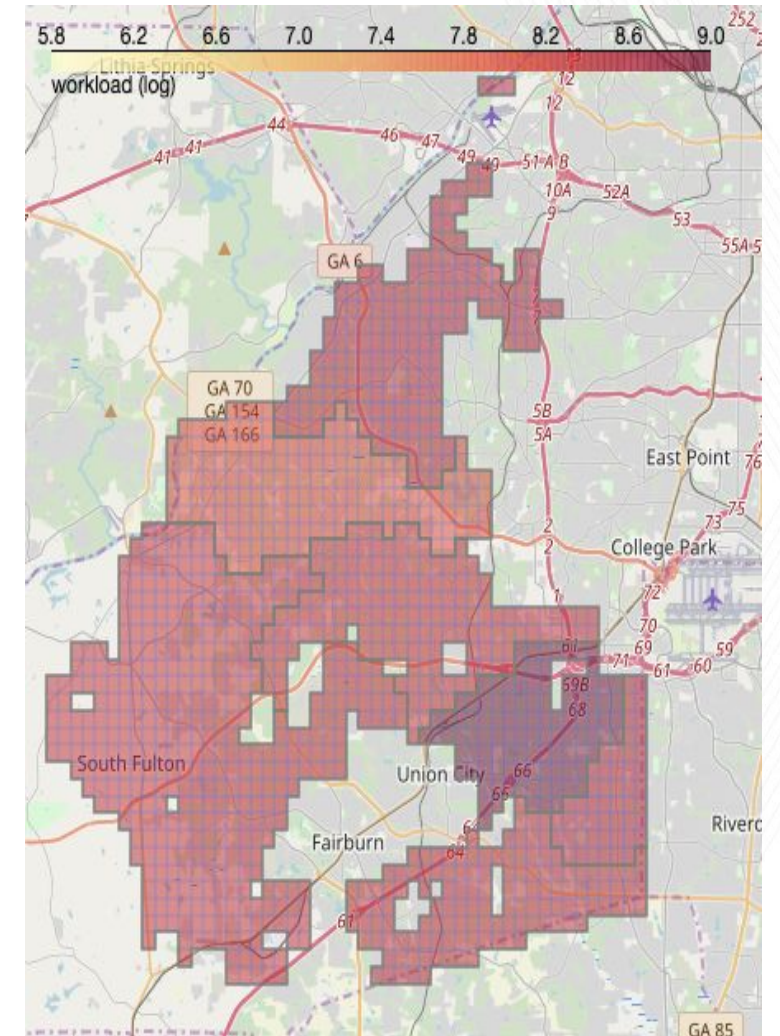
Optimal number of beats analysis



18 Beat redesign using predicted workload in 2021



Redesign with 18 beats



Existing redesign with 7 beats

Details of Optimal Design (based on 2021 Prediction)

Beat No.	Workload (hours/per day)
1	40.34
2	27.09
3	31.10
4	33.52
5	64.15
6	37.95
7	34.12
8	N/A

Beat No.	Workload (hours/per day)	
	Greedy	Refined
1	18.770	18.770
2	9.511	14.179
3	18.229	16.344
4	17.126	17.084
5	8.788	9.468
6	14.592	14.975
7	18.685	18.685
8	11.051	11.051
9	10.680	10.680

Beat No.	Workload (hours/per day)	
	Greedy	Refined
10	23.611	21.653
11	10.158	10.158
12	18.054	18.054
13	18.075	18.131
14	18.623	18.240
15	15.410	15.155
16	18.596	17.609
17	11.793	11.793
18	11.935	11.657

Original variance: 127.202 (100%)

greedy variance: 17.078 (13.4%)

refined variance: 12.464 (9.8%)

Outline

❑ Data preprocessing and cleaning

- ❑ *Geographical data (geo-atom & zone)*
- ❑ *911 calls-for-service*
- ❑ *Census data*

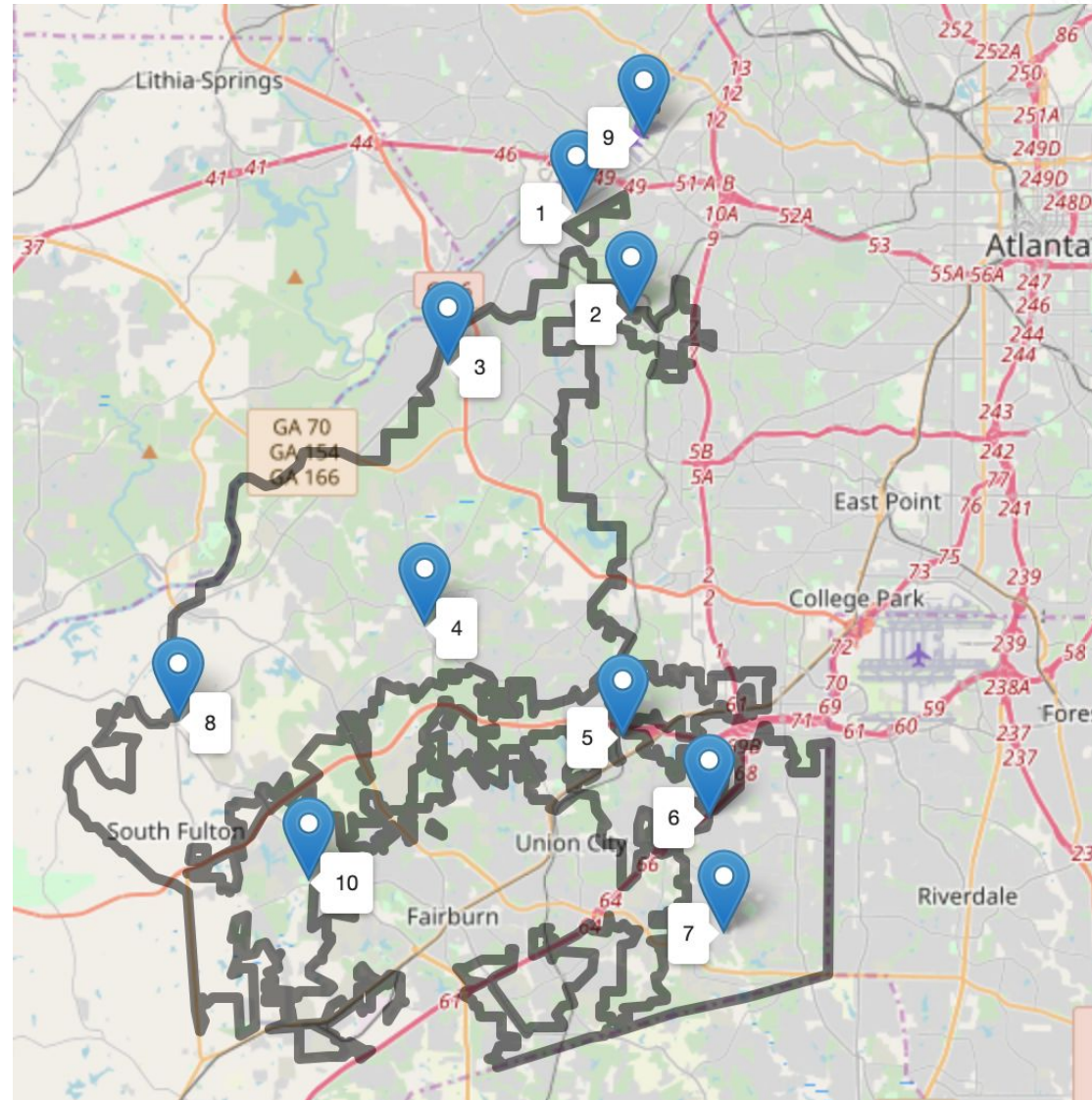
❑ Analysis

- ❑ *Police Beat redesign*
 - ❑ *Spatial region definition*
 - ❑ *Workload analysis and prediction*
 - ❑ *Optimizing beat boundaries*
 - ❑ *Optimizing number of beats*

❑ *Fire station analysis*

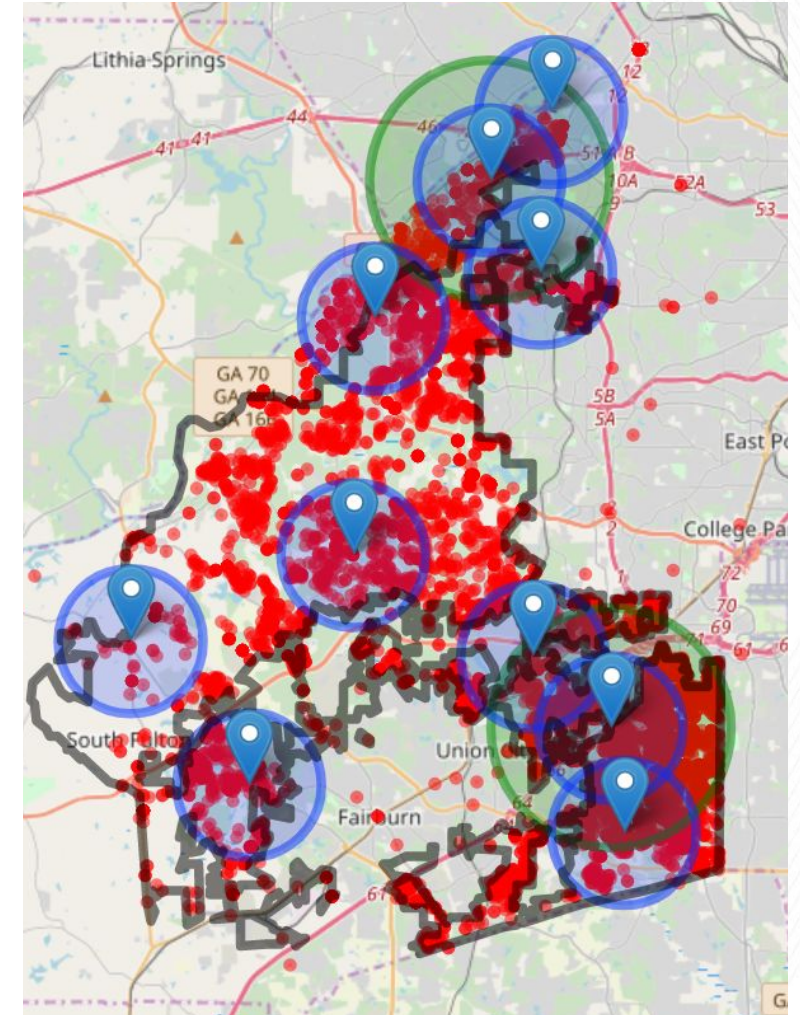
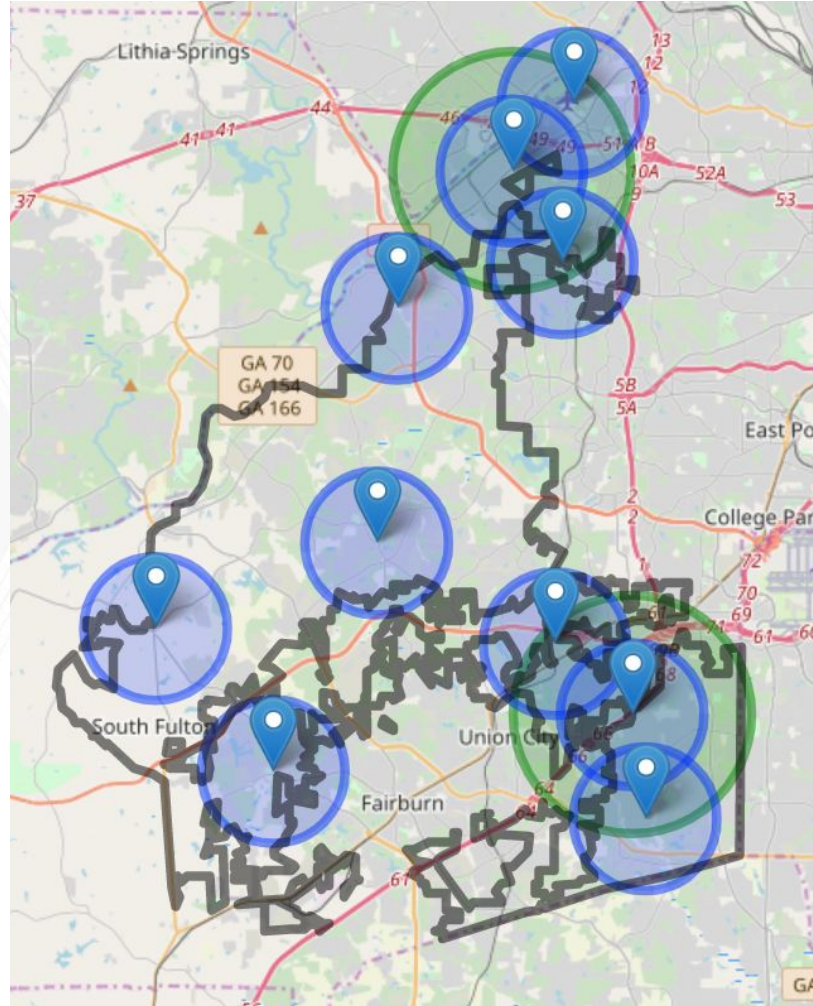
Current fire stations

- Current fire stations indexed from 1-10



Fire station analysis

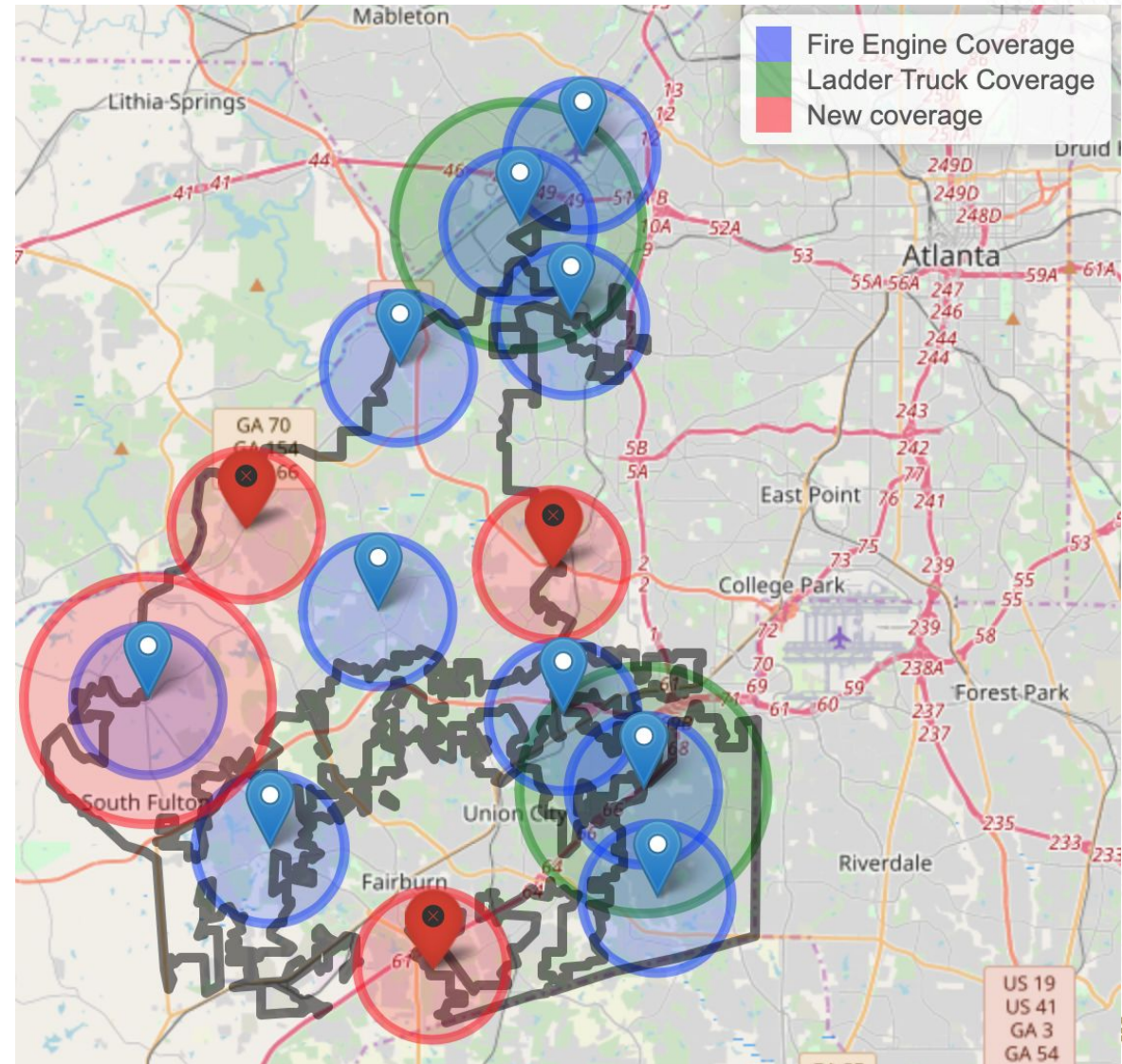
- Stations with Ladder Trucks can cover an area with radius 2.5 miles (Stations 7 and 11, shown in green)
- Every station can cover an area with 1.5 mile radius (all stations, shown in Blue)



Proposed new fire station and coverage

Proposed new stations

1. Oakley Industrial Blvd and Plantation Rd (This address should cover Milam Rd)
2. West Stubbs Rd and Cascade Palmetto Hwy SW
3. Camp Creek Pkwy SW and Old Fairburn Rd SW



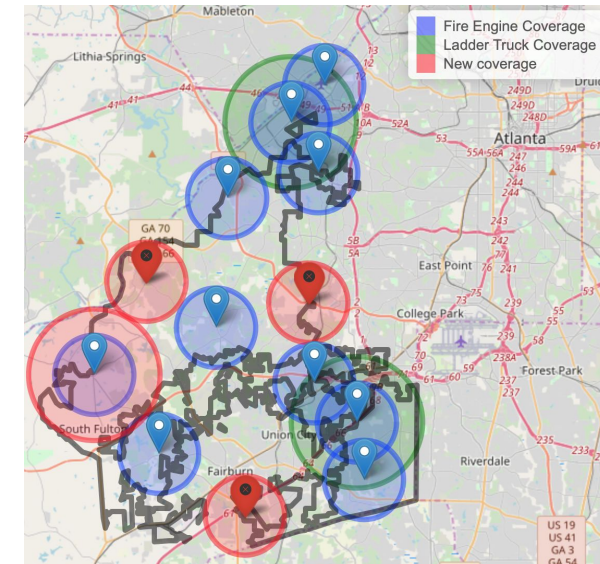
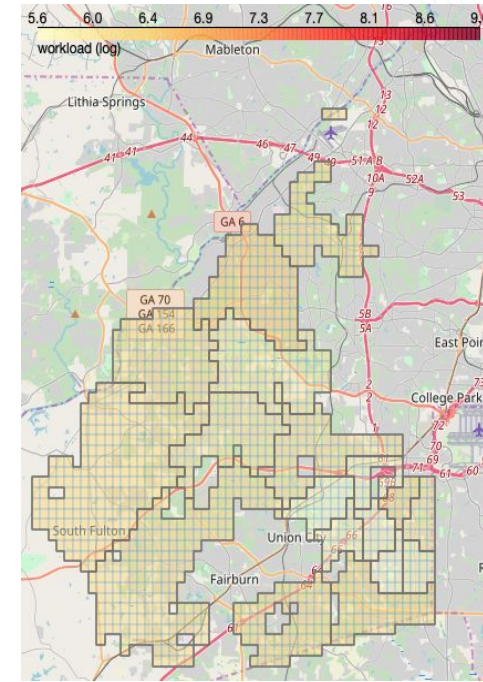
Summary

Police zone redesign

- Optimal number of beats ~ 18
- Optimal beat redesign achieved
 -

Fire operation analysis

- Identified gap in fire station coverage
- Analyzed coverage with new fire stations





CITY OF SOUTH FULTON

COUNCIL AGENDA ITEM

COUNCIL WORK SESSION



SUBJECT: Waste Industries Billing Error Update

**DATE OF
MEETING:** 1/14/2020

DEPARTMENT: City Manager
