Distance to nearest Evacuation Route

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Methodology

- Code was developed with the overall purpose being to calculate the distance from the nearest evacuation zone from each parcel
- Objective: Find the nearest evacuation route from an address
- I chose not to limit to only single family homes
- Using KNN, I was able to calculate the distance from each parcel in the volusia.parcel table to the nearest evacuation route using ST_distance()

Gathering the data

- Download shape file (evacroutes) from http://maps.vcgov.org/gis/download/shapes.htm
  - Or download the .zip file from Github
- Put .shp file into QGIS
  - Layer -> add layer -> New Vector Layer -> Source -> .shp file
  - Right click -> properties
  - Symbology -> change color and width to desire
  - apply

Queries

- We want to add to our parcel table a geometric aspect

```
select AddGeometryColumn ('volusia','parcel','geom','2236','MULTIPOLYGON',2);
update volusia.parcel a set geom = p.geom from volusia.gis_parcels p where a.parid=p.altkey;
```

- We need to add a column for nearest evacuation route
  - Alter table volusia.parcel add nearest_evac_route double precision;

Python Script

- The Python script will automatically go through the parcel table and update each parcel row with the distance to the nearest evacuation route
- Note* be sure to run the following commands on your computer's command prompt before running the script
  - Pip install psycopg2
  - Pip install pandas

Source Code

Source code available on GitHub

```python
# -*- coding: utf-8 -*-
"""
Created on Sat May 01 23:24:45 2021
@author: kingt
"""

import psycopg2
import re
import matplotlib.pyplot as plt
import os
import pandas as pd

# connection to database:
try:
    conn = psycopg2.connect("dbname='spatial' user='postgres' host='localhost' password='pika2323'")
except:
    print("cant connect to the database")

cur = conn.cursor()
cur2 = conn.cursor()
cur3 = conn.cursor()

sql = "select parid::integer from volusia.parcel p where geom is not null"

print('SQL: ', sql)
cur.execute(sql)

i=0
row = cur.fetchone()
while row is not None:
    i = i + 1
    parid = str(row[0])
    sql2 = "select p.parid::integer, p.geom, ST_Distance(p.geom, (select p2.geom from volusia.parcel p2 where p2.parid=" + parid
    + "))/5280  from volusia.parcel p where p.luc='2000' order by p.geom <-> (select p2.geom from volusia.parcel p2 where p2.parid=" + parid + ") limit 1;"
    cur2.execute(sql2)
    row2 = cur2.fetchone()
    parid2 = str(row2[0])
    distance = row2[2]
    sql3 = "update volusia.parcel p1 set nearest_evac_route = " + str(distance) + " where p1.parid=" + parid + ";"
    cur3.execute(sql3)
    if i%100 == 0:
        print(i)
        conn.commit()
    row = cur.fetchone()

#df = pd.
conn.commit()
conn.close()
```

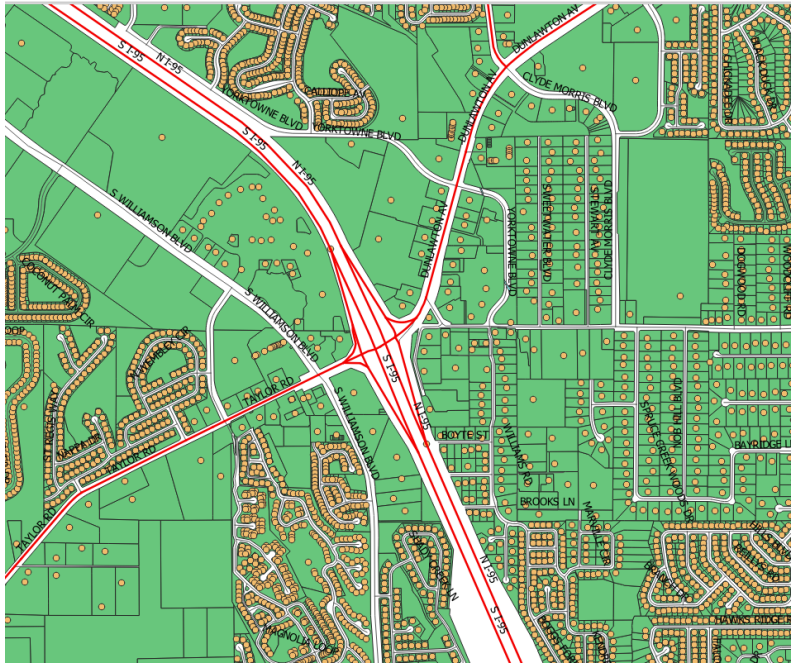
Nearest Evacuation Zone Distance

- Run the following command in SQL:

select parid, luc, luc_desc, nearest_evac_route from volusia.parcel where nearest_evac_route is not null limit 20;

	parid double precision	luc text	luc_desc text	nearest_evac_route double precision
1	2614561	0000	Vacant Residential	6.937521590041854
2	2615281	0100	Single Family	6.780602079674294
3	2615290	0100	Single Family	6.767954045964793
4	2615648	0100	Single Family	6.615889058628569
5	2615966	0100	Single Family	9.51020510775447
6	2616113	0100	Single Family	9.53239128334266
7	2616369	0100	Single Family	9.648602674987897
8	3863046	0100	Single Family	0.7146178488574723
9	3890779	0100	Single Family	0.5403867365102395
10	4023674	0000	Vacant Residential	12.0122248686976
11	4082794	0100	Single Family	1.122945856691624
12	4666028	0100	Single Family	0.2829409384827577
13	4732977	0100	Single Family	3.8842094779957637
14	2616792	0100	Single Family	9.746647299345245
15	3863178	0100	Single Family	0

QGIS



Identify Results

Feature	Value
EvacRoutes	
Name	S I-95
(Derived)	
(Actions)	
Name	S I-95
Alias1	I95
FromStreet	WILLIAMSON BLVD
ToStreet	I-95 SB DUNLAWTON OFF RMP
Mainten...	STATE MAINTENANCE
Classifica	INTERSTATE
EvacRoute	YES
Lanes	6
LZip	32127
RZip	32128
LComm	PORT ORANGE
RComm	PORT ORANGE
Status	VC_FDEM
Shape_S...	4634.19192545000