In [1]:
```python
%matplotlib inline
### import libraries
import numpy as np
import pandas as pd


import matplotlib.pyplot as plt
from matplotlib import style
import seaborn as sns
```

In [2]:
```python
service311 = pd.read_csv ('C:/Users/gh/Desktop/simpllilearn/311_Service_Requests_from_2010_t
o_Present.csv')
```

```
C:\Users\gh\Anaconda3\lib\site-packages\IPython\core\interactiveshell.py:2785: DtypeWarning:
Columns (48,49) have mixed types. Specify dtype option on import or set low_memory=False.
  interactivity=interactivity, compiler=compiler, result=result)
```

In [3]:
```python
service311.head()
```

Out[3]:

	Unique Key	Created Date	Closed Date	Agency	Agency Name	Complaint Type	Descriptor	Location Type	Incident Zip	Incident Address	...	H
0	32310363	12/31/2015 11:59:45 PM	01-01-16 0:55	NYPD	New York City Police Department	Noise - Street/Sidewalk	Loud Music/Party	Street/Sidewalk	10034.0	71 VERMILYEA AVENUE	...	
1	32309934	12/31/2015 11:59:44 PM	01-01-16 1:26	NYPD	New York City Police Department	Blocked Driveway	No Access	Street/Sidewalk	11105.0	27-07 23 AVENUE	...	
2	32309159	12/31/2015 11:59:29 PM	01-01-16 4:51	NYPD	New York City Police Department	Blocked Driveway	No Access	Street/Sidewalk	10458.0	2897 VALENTINE AVENUE	...	
3	32305098	12/31/2015 11:57:46 PM	01-01-16 7:43	NYPD	New York City Police Department	Illegal Parking	Commercial Overnight Parking	Street/Sidewalk	10461.0	2940 BAISLEY AVENUE	...	
4	32306529	12/31/2015 11:56:58 PM	01-01-16 3:24	NYPD	New York City Police Department	Illegal Parking	Blocked Sidewalk	Street/Sidewalk	11373.0	87-14 57 ROAD	...	

5 rows × 53 columns

In [4]:
```python
service311.shape
```

Out[4]: (300698, 53)

In [5]:
```python
service311.columns
```

Out[5]:
```
Index(['Unique Key', 'Created Date', 'Closed Date', 'Agency', 'Agency Name',
       'Complaint Type', 'Descriptor', 'Location Type', 'Incident Zip',
       'Incident Address', 'Street Name', 'Cross Street 1', 'Cross Street 2',
       'Intersection Street 1', 'Intersection Street 2', 'Address Type',
       'City', 'Landmark', 'Facility Type', 'Status', 'Due Date',
       'Resolution Description', 'Resolution Action Updated Date',
       'Community Board', 'Borough', 'X Coordinate (State Plane)',
       'Y Coordinate (State Plane)', 'Park Facility Name', 'Park Borough',
       'School Name', 'School Number', 'School Region', 'School Code',
       'School Phone Number', 'School Address', 'School City', 'School State',
       'School Zip', 'School Not Found', 'School or Citywide Complaint',
       'Vehicle Type', 'Taxi Company Borough', 'Taxi Pick Up Location',
       'Bridge Highway Name', 'Bridge Highway Direction', 'Road Ramp',
       'Bridge Highway Segment', 'Garage Lot Name', 'Ferry Direction',
       'Ferry Terminal Name', 'Latitude', 'Longitude', 'Location'],
      dtype='object')
```

In [6]:
```python
service311['Complaint Type'].unique()
```

Out[6]:
```
array(['Noise - Street/Sidewalk', 'Blocked Driveway', 'Illegal Parking',
       'Derelict Vehicle', 'Noise - Commercial',
       'Noise - House of Worship', 'Posting Advertisement',
       'Noise - Vehicle', 'Animal Abuse', 'Vending', 'Traffic',
       'Drinking', 'Bike/Roller/Skate Chronic', 'Panhandling',
       'Noise - Park', 'Homeless Encampment', 'Urinating in Public',
       'Graffiti', 'Disorderly Youth', 'Illegal Fireworks',
       'Ferry Complaint', 'Agency Issues', 'Squeegee', 'Animal in a Park'],
      dtype=object)
```

In [7]:
```python
service311['Descriptor'].unique()
```

Out[7]:
```
array(['Loud Music/Party', 'No Access', 'Commercial Overnight Parking',
       'Blocked Sidewalk', 'Posted Parking Sign Violation',
       'Blocked Hydrant', 'With License Plate', 'Partial Access',
       'Unauthorized Bus Layover', 'Double Parked Blocking Vehicle',
       'Double Parked Blocking Traffic', 'Vehicle', 'Loud Talking',
       'Banging/Pounding', 'Car/Truck Music', 'Tortured',
       'In Prohibited Area', 'Congestion/Gridlock', 'Neglected',
       'Car/Truck Horn', 'In Public', 'Other (complaint details)', nan,
       'No Shelter', 'Truck Route Violation', 'Unlicensed',
       'Overnight Commercial Storage', 'Engine Idling',
       'After Hours - Licensed Est', 'Detached Trailer',
       'Underage - Licensed Est', 'Chronic Stoplight Violation',
       'Loud Television', 'Chained', 'Building', 'In Car',
       'Police Report Requested', 'Chronic Speeding',
       'Playing in Unsuitable Place', 'Drag Racing',
       'Police Report Not Requested', 'Nuisance/Truant', 'Homeless Issue',
       'Language Access Complaint', 'Disruptive Passenger',
       'Animal Waste'], dtype=object)
```

In [8]:
```python
complaintTypecity = pd.DataFrame({'count':
                                 service311.groupby(['Complaint Type','City']).size()}).res
et_index()
complaintTypecity
```

Out[8]:

	Complaint Type	City	count
0	Animal Abuse	ARVERNE	38
1	Animal Abuse	ASTORIA	125
2	Animal Abuse	BAYSIDE	37
3	Animal Abuse	BELLEROSE	7
4	Animal Abuse	BREEZY POINT	2
5	Animal Abuse	BRONX	1415
6	Animal Abuse	BROOKLYN	2394
7	Animal Abuse	CAMBRIA HEIGHTS	11
8	Animal Abuse	COLLEGE POINT	28
9	Animal Abuse	CORONA	61
10	Animal Abuse	EAST ELMHURST	59
11	Animal Abuse	ELMHURST	38
12	Animal Abuse	FAR ROCKAWAY	89
13	Animal Abuse	FLORAL PARK	2
14	Animal Abuse	FLUSHING	143
15	Animal Abuse	FOREST HILLS	45
16	Animal Abuse	FRESH MEADOWS	45
17	Animal Abuse	GLEN OAKS	5
18	Animal Abuse	HOLLIS	33
19	Animal Abuse	HOWARD BEACH	31
20	Animal Abuse	JACKSON HEIGHTS	42
21	Animal Abuse	JAMAICA	229
22	Animal Abuse	KEW GARDENS	19
23	Animal Abuse	LITTLE NECK	15
24	Animal Abuse	LONG ISLAND CITY	30
25	Animal Abuse	MASPETH	36
26	Animal Abuse	MIDDLE VILLAGE	22
27	Animal Abuse	NEW HYDE PARK	1
28	Animal Abuse	NEW YORK	1525
29	Animal Abuse	OAKLAND GARDENS	19
...	...	...	...
734	Vending	ELMHURST	21
735	Vending	FAR ROCKAWAY	9
736	Vending	FLUSHING	33
737	Vending	FOREST HILLS	10
738	Vending	FRESH MEADOWS	1
739	Vending	GLEN OAKS	18
740	Vending	HOWARD BEACH	5
741	Vending	JACKSON HEIGHTS	78
742	Vending	JAMAICA	20
743	Vending	KEW GARDENS	1
744	Vending	LONG ISLAND CITY	30
745	Vending	MASPETH	6
746	Vending	NEW YORK	2399
747	Vending	OAKLAND GARDENS	2
748	Vending	OZONE PARK	1
749	Vending	QUEENS VILLAGE	2
750	Vending	REGO PARK	3
751	Vending	RICHMOND HILL	13
752	Vending	RIDGEWOOD	8
753	Vending	ROCKAWAY PARK	2
754	Vending	ROSEDALE	16
755	Vending	SAINT ALBANS	2
756	Vending	SOUTH OZONE PARK	5
757	Vending	SOUTH RICHMOND HILL	24
758	Vending	SPRINGFIELD GARDENS	1
759	Vending	STATEN ISLAND	25
760	Vending	SUNNYSIDE	15
761	Vending	WHITESTONE	1
762	Vending	WOODHAVEN	6
763	Vending	WOODSIDE	15

764 rows × 3 columns

In [9]:
```python
service311.groupby(['Borough','Complaint Type','Descriptor']).size()
```

Out[9]:
```
Borough      Complaint Type            Descriptor
BRONX        Animal Abuse              Chained                            132
                                       In Car                              36
                                       Neglected                          673
                                       No Shelter                          71
                                       Other (complaint details)          311
                                       Tortured                           192
             Blocked Driveway          No Access                         9884
                                       Partial Access                    2871
             Derelict Vehicle          With License Plate                1953
             Disorderly Youth          Nuisance/Truant                      7
                                       Playing in Unsuitable Place         56
             Drinking                  After Hours - Licensed Est          10
                                       In Public                          142
                                       Underage - Licensed Est             36
             Graffiti                  Police Report Not Requested          1
                                       Police Report Requested              8
             Illegal Parking           Blocked Hydrant                   1413
                                       Blocked Sidewalk                  1206
                                       Commercial Overnight Parking      1151
                                       Detached Trailer                    73
                                       Double Parked Blocking Traffic     593
                                       Double Parked Blocking Vehicle     830
                                       Overnight Commercial Storage       202
                                       Posted Parking Sign Violation     2342
                                       Unauthorized Bus Layover            49
             Noise - Commercial        Banging/Pounding                   162
                                       Car/Truck Horn                      28
                                       Car/Truck Music                     90
                                       Loud Music/Party                  1490
                                       Loud Talking                       662
                                                                          ...
Unspecified  Drinking                  Underage - Licensed Est              1
             Ferry Complaint           Disruptive Passenger                 1
                                       Homeless Issue                       1
             Illegal Parking           Blocked Hydrant                    222
                                       Blocked Sidewalk                   167
                                       Commercial Overnight Parking       260
                                       Detached Trailer                     3
                                       Double Parked Blocking Traffic     122
                                       Double Parked Blocking Vehicle       3
                                       Overnight Commercial Storage         2
                                       Posted Parking Sign Violation      229
                                       Unauthorized Bus Layover            32
             Noise - Commercial        Banging/Pounding                    67
                                       Car/Truck Horn                      14
                                       Car/Truck Music                     17
                                       Loud Music/Party                   215
                                       Loud Talking                        53
             Noise - House of Worship  Loud Music/Party                     1
                                       Loud Talking                         1
             Noise - Park              Loud Music/Party                    21
                                       Loud Talking                         5
             Noise - Street/Sidewalk   Loud Music/Party                   416
                                       Loud Talking                       173
             Noise - Vehicle           Car/Truck Horn                       5
                                       Car/Truck Music                     38
                                       Engine Idling                       11
             Posting Advertisement     Vehicle                              1
             Traffic                   Truck Route Violation                1
             Vending                   In Prohibited Area                   2
                                       Unlicensed                           5
Length: 288, dtype: int64
```

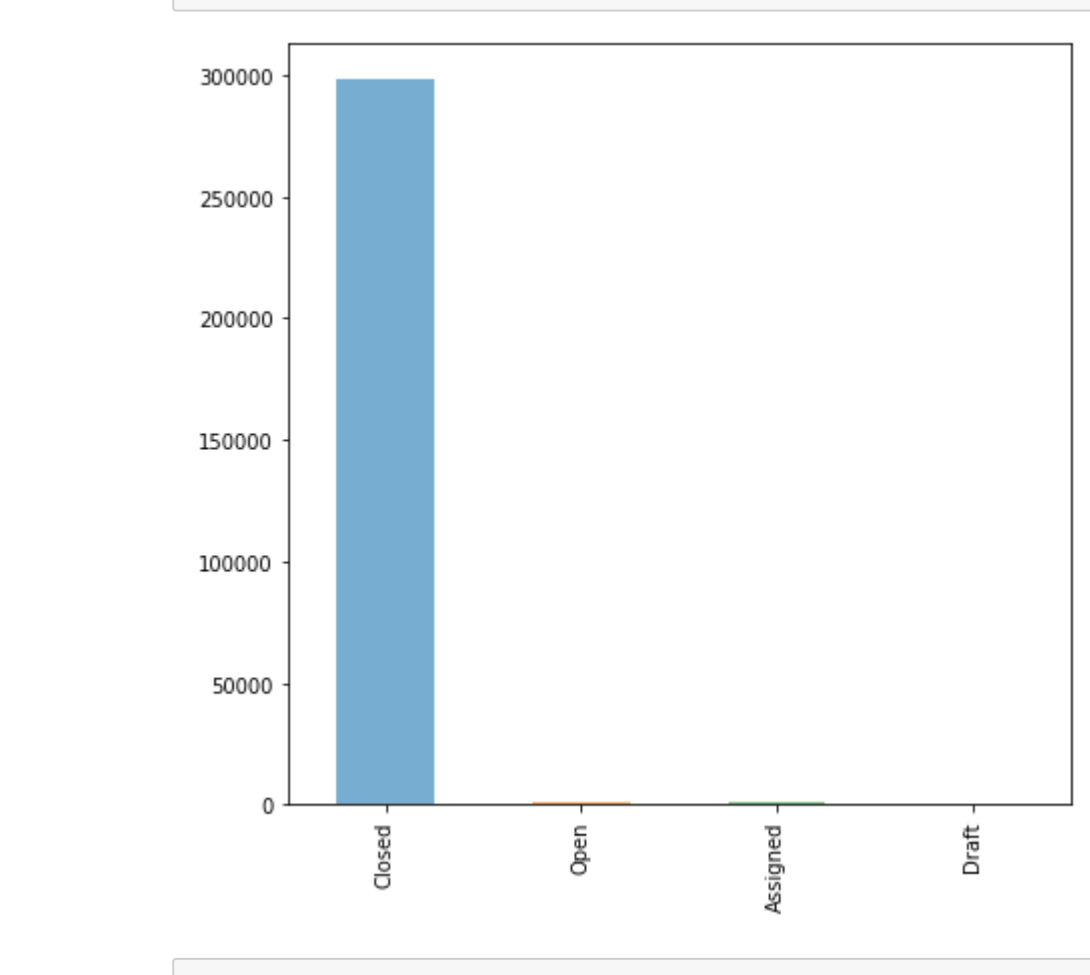
In [10]:
```python
import datetime
```

In [12]:
```python
df = pd.read_csv("C:/Users/gh/Desktop/simpllilearn/311_Service_Requests_from_2010_to_Presen
t.csv", parse_dates=["Created Date", "Closed Date"])
```

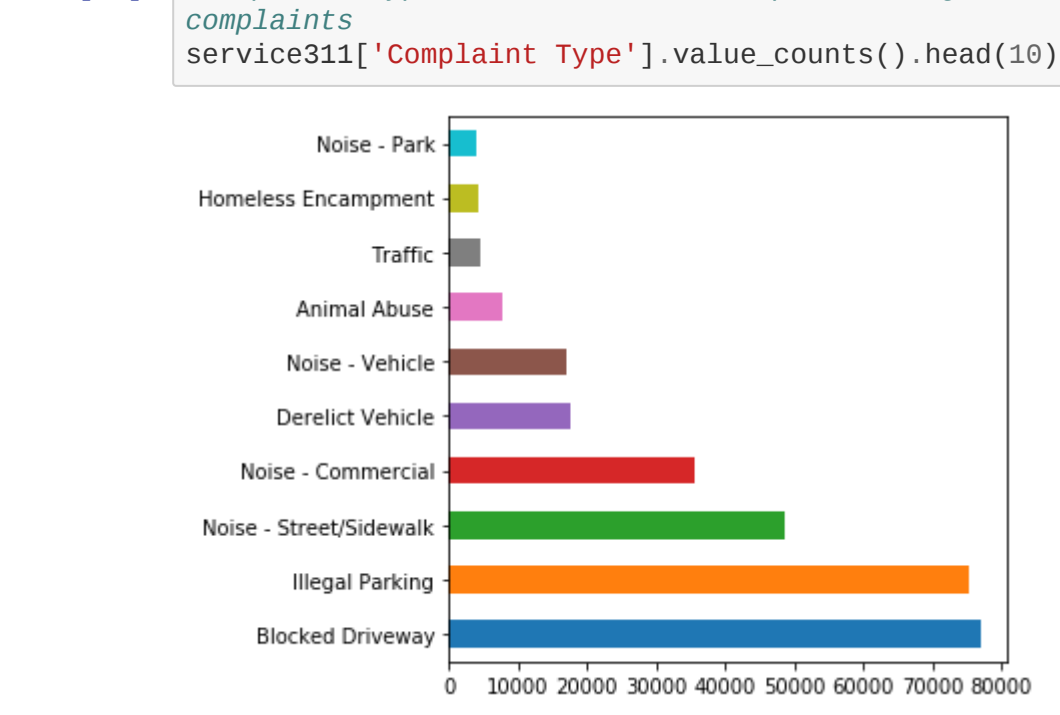
```
C:\Users\gh\Anaconda3\lib\site-packages\IPython\core\interactiveshell.py:2785: DtypeWarning:
Columns (48,49) have mixed types. Specify dtype option on import or set low_memory=False.
  interactivity=interactivity, compiler=compiler, result=result)
```

In [13]:
```python
df["Request_Closing_Time"] = df["Closed Date"] - df["Created Date"]
```

In [14]:
```python
#Have a look at the status of tickets
df['Status'].value_counts().plot(kind='bar',alpha=0.6,figsize=(7,7))
plt.show()
```



In [16]:
```python
#Complaint type Breakdown with bar plot to figure out majority of complaint types and top 10
complaints
service311['Complaint Type'].value_counts().head(10).plot(kind='barh',figsize=(5,5));
```



In [17]:
```python
service311.groupby(["Borough","Complaint Type","Descriptor"]).size()
```

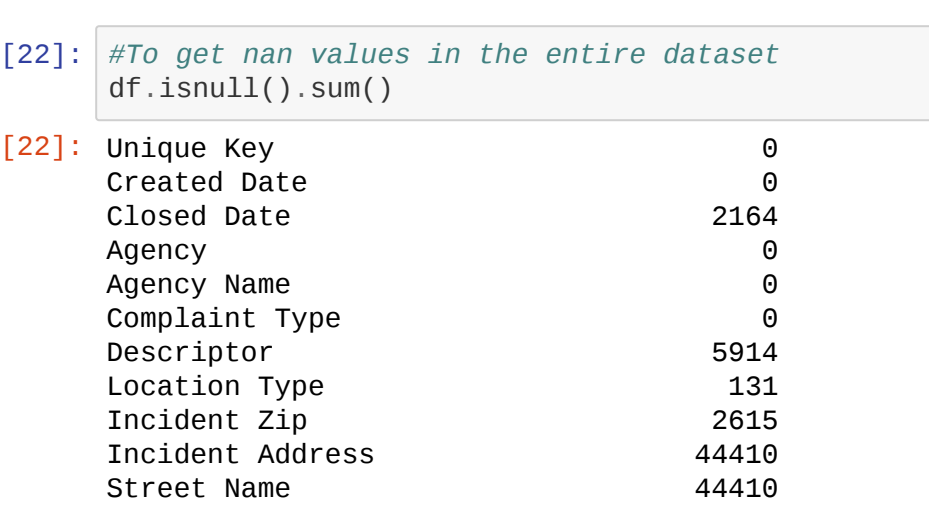
Out[17]:
```
Borough      Complaint Type            Descriptor
BRONX        Animal Abuse              Chained                            132
                                       In Car                              36
                                       Neglected                          673
                                       No Shelter                          71
                                       Other (complaint details)          311
                                       Tortured                           192
             Blocked Driveway          No Access                         9884
                                       Partial Access                    2871
             Derelict Vehicle          With License Plate                1953
             Disorderly Youth          Nuisance/Truant                      7
                                       Playing in Unsuitable Place         56
             Drinking                  After Hours - Licensed Est          10
                                       In Public                          142
                                       Underage - Licensed Est             36
             Graffiti                  Police Report Not Requested          1
                                       Police Report Requested              8
             Illegal Parking           Blocked Hydrant                   1413
                                       Blocked Sidewalk                  1206
                                       Commercial Overnight Parking      1151
                                       Detached Trailer                    73
                                       Double Parked Blocking Traffic     593
                                       Double Parked Blocking Vehicle     830
                                       Overnight Commercial Storage       202
                                       Posted Parking Sign Violation     2342
                                       Unauthorized Bus Layover            49
             Noise - Commercial        Banging/Pounding                   162
                                       Car/Truck Horn                      28
                                       Car/Truck Music                     90
                                       Loud Music/Party                  1490
                                       Loud Talking                       662
                                                                          ...
Unspecified  Drinking                  Underage - Licensed Est              1
             Ferry Complaint           Disruptive Passenger                 1
                                       Homeless Issue                       1
             Illegal Parking           Blocked Hydrant                    222
                                       Blocked Sidewalk                   167
                                       Commercial Overnight Parking       260
                                       Detached Trailer                     3
                                       Double Parked Blocking Traffic     122
                                       Double Parked Blocking Vehicle       3
                                       Overnight Commercial Storage         2
                                       Posted Parking Sign Violation      229
                                       Unauthorized Bus Layover            32
             Noise - Commercial        Banging/Pounding                    67
                                       Car/Truck Horn                      14
                                       Car/Truck Music                     17
                                       Loud Music/Party                   215
                                       Loud Talking                        53
             Noise - House of Worship  Loud Music/Party                     1
                                       Loud Talking                         1
             Noise - Park              Loud Music/Party                    21
                                       Loud Talking                         5
             Noise - Street/Sidewalk   Loud Music/Party                   416
                                       Loud Talking                       173
             Noise - Vehicle           Car/Truck Horn                       5
                                       Car/Truck Music                     38
                                       Engine Idling                       11
             Posting Advertisement     Vehicle                              1
             Traffic                   Truck Route Violation                1
             Vending                   In Prohibited Area                   2
                                       Unlicensed                           5
Length: 288, dtype: int64
```

In [18]:
```python
majorcomplints=service311.dropna(subset=["Complaint Type"])
majorcomplints=service311.groupby("Complaint Type")

sortedComplaintType = majorcomplints.size().sort_values(ascending = False)
sortedComplaintType = sortedComplaintType.to_frame('count').reset_index()

sortedComplaintType
sortedComplaintType.head(10)
```

Out[18]:

	Complaint Type	count
0	Blocked Driveway	77044
1	Illegal Parking	75361
2	Noise - Street/Sidewalk	48612
3	Noise - Commercial	35577
4	Derelict Vehicle	17718
5	Noise - Vehicle	17083
6	Animal Abuse	7778
7	Traffic	4498
8	Homeless Encampment	4416
9	Noise - Park	4042

In [19]:
```python
sortedComplaintType = sortedComplaintType.head()
plt.figure(figsize=(5,5))
plt.pie(sortedComplaintType['count'],labels=sortedComplaintType["Complaint Type"], autopct="
%1.1f%%")
plt.show()
```



In [20]:
```python
#Group dataset by complaint type to display plot against city
groupedby_complainttype = df.groupby('Complaint Type')
```

In [21]:
```python
grp_data = groupedby_complainttype.get_group('Blocked Driveway')
grp_data.shape
```

Out[21]: (77044, 54)

In [22]:
```python
#To get nan values in the entire dataset
df.isnull().sum()
```

Out[22]:
```
Unique Key                             0
Created Date                           0
Closed Date                         2164
Agency                                 0
Agency Name                            0
Complaint Type                         0
Descriptor                          5914
Location Type                        131
Incident Zip                        2615
Incident Address                   44410
Street Name                        44410
Cross Street 1                     49279
Cross Street 2                     49779
Intersection Street 1             256840
Intersection Street 2             257336
Address Type                        2815
City                                2614
Landmark                          300349
Facility Type                       2171
Status                                 0
Due Date                               3
Resolution Description                 0
Resolution Action Updated Date      2187
Community Board                        0
Borough                                0
X Coordinate (State Plane)          3540
Y Coordinate (State Plane)          3540
Park Facility Name                     0
Park Borough                           0
School Name                            0
School Number                          0
School Region                          1
School Code                            1
School Phone Number                    0
School Address                         0
School City                            0
School State                           0
School Zip                             1
School Not Found                       0
School or Citywide Complaint      300698
Vehicle Type                      300698
Taxi Company Borough              300698
Taxi Pick Up Location             300698
Bridge Highway Name               300455
Bridge Highway Direction          300455
Road Ramp                         300485
Bridge Highway Segment            300485
Garage Lot Name                   300698
Ferry Direction                   300697
Ferry Terminal Name               300696
Latitude                            3540
Longitude                           3540
Location                            3540
Request_Closing_Time                2164
dtype: int64
```

In [23]:
```python
#fix blank values in City column
df['City'].dropna(inplace=True)
```

In [24]:
```python
#Shape after dropping nan values
df['City'].shape
```

Out[24]: (298084,)

In [25]:
```python
#count of null values in grouped city column data
grp_data['City'].isnull().sum()
```

Out[25]: 283

In [26]:
```python
#fix those NAN with "unknown city" value instead
grp_data['City'].fillna('Unknown City', inplace =True)
```

```
C:\Users\gh\Anaconda3\lib\site-packages\pandas\core\generic.py:5434: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/indexing.ht
ml#indexing-view-versus-copy
  self._update_inplace(new_data)
```

In [27]:
```python
#Scatter plot displaying all the cities that raised complaint of type 'Blocked Driveway'
plt.figure(figsize=(20, 15))
plt.scatter(grp_data['Complaint Type'],grp_data['City'])
plt.title('Plot showing list of cities that raised complaint of type Blocked Driveway')
plt.show()
```