

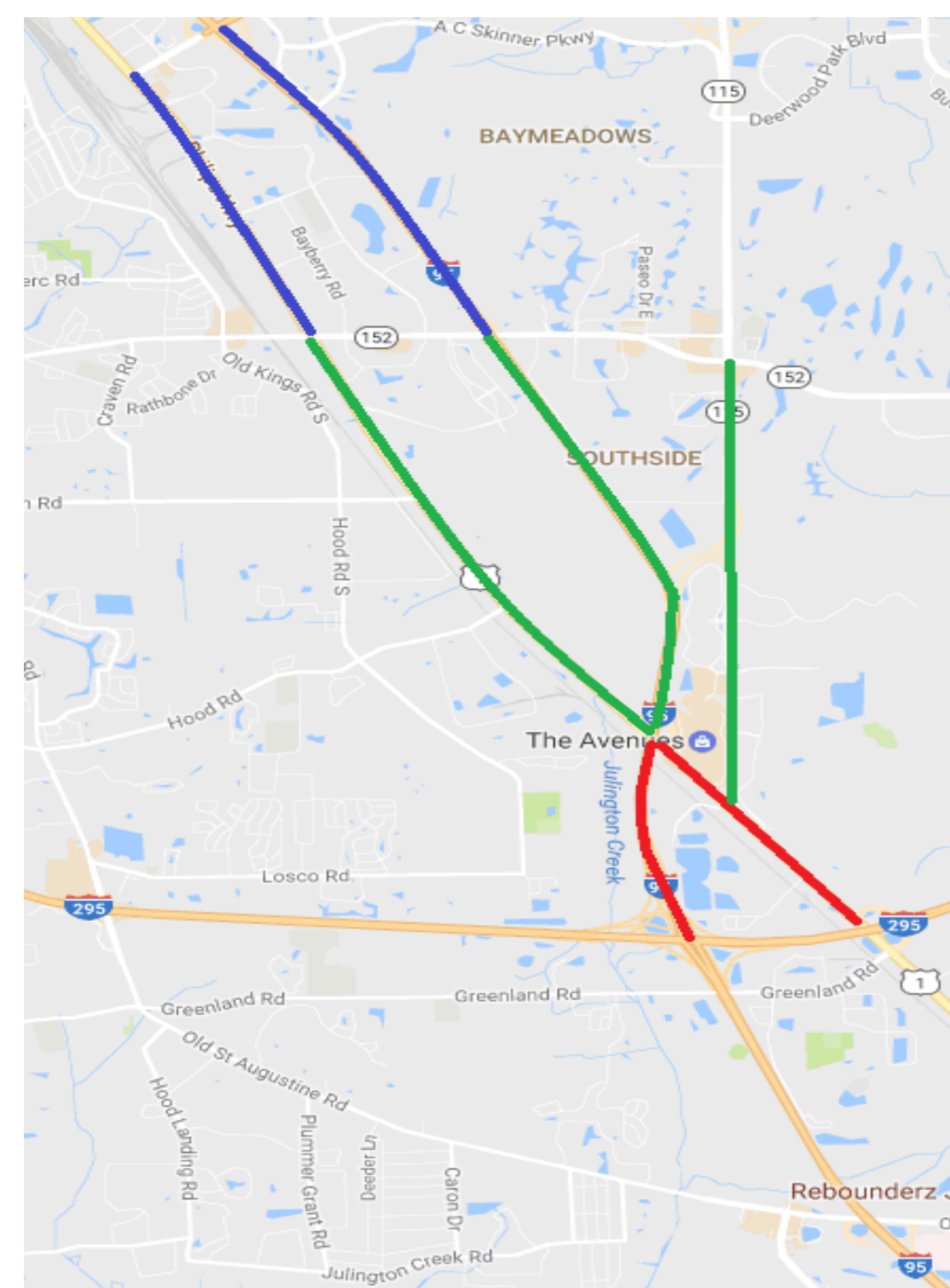
Introduction

Most commuter drivers prefer to use freeways over arterials when traveling long distance. This is due to freeways having higher speed limits and limited access characteristics that help to developed mobility. However, when incidents occur on freeways, some drivers tend to move to arterial that run parallel to freeways causing unexpected congestion. This study examines freeway congestion caused by reported traffic incident. Traffic speed reduction caused by freeway incident is collaborated with the operating speeds on adjacent arterial segments.



Site Description

I-95 Northbound is selected as a main freeway which is divided 7 different segments. Therefore, adjacent arterials that run parallel to I-95 are verified to collaborate speed data in no-incident and incident circumstances.

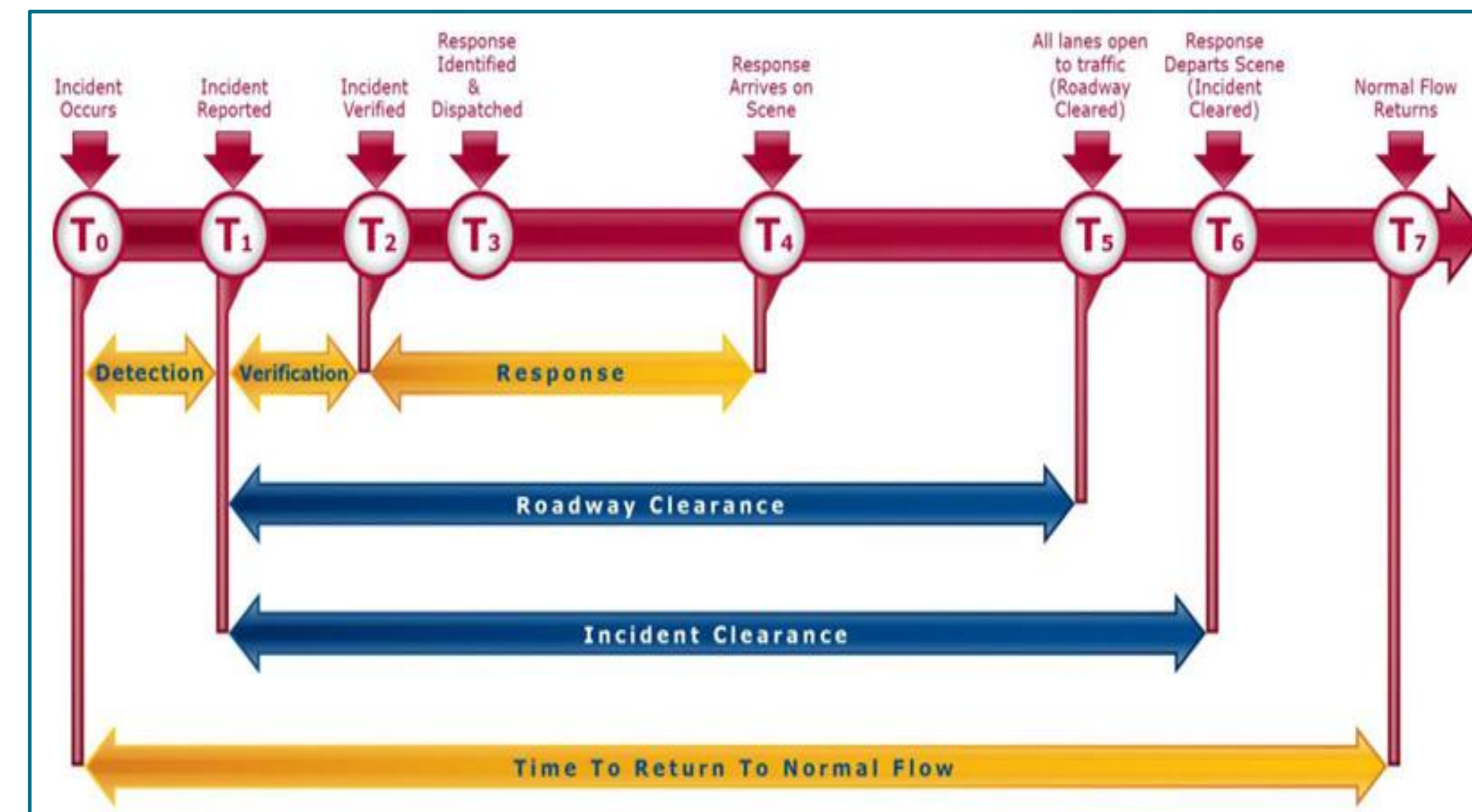


Site layout

Methodology

Data Collection

The speed data extracted from the BlueTOAD's paired devices. The segments were verified according to these pairs. These data are composed of fifteen-minute information such as day, date, time, travel time and speed in two years interval (2015 – 2016). Incident data are mined from the Florida Department of Transportation SUNGUIDE software. It could provide to study opportunity of categorizing incidents based on location and time information for 2015 and 2016.



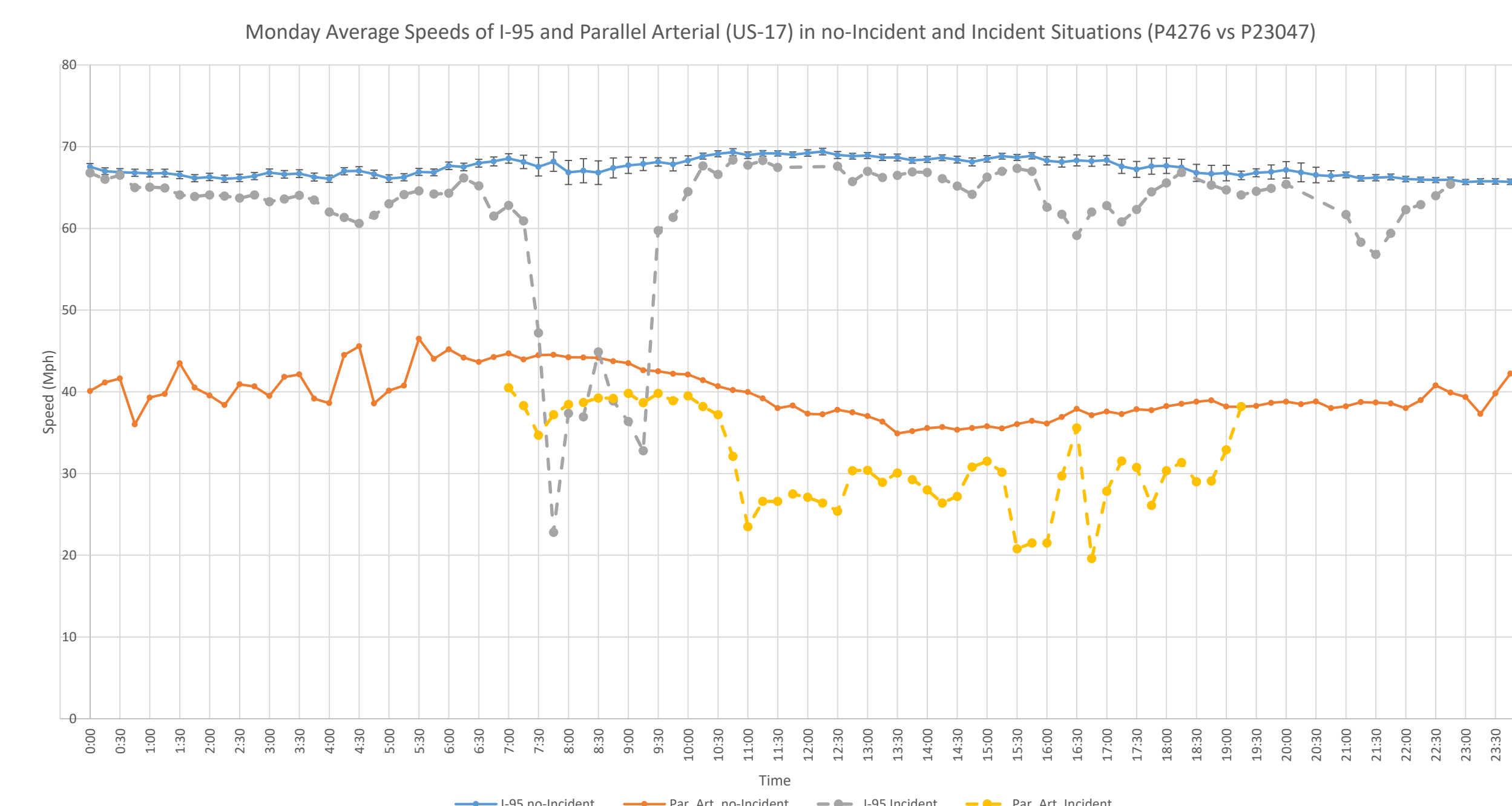
Incident Time Line

Limitations

- Weekends are eliminated

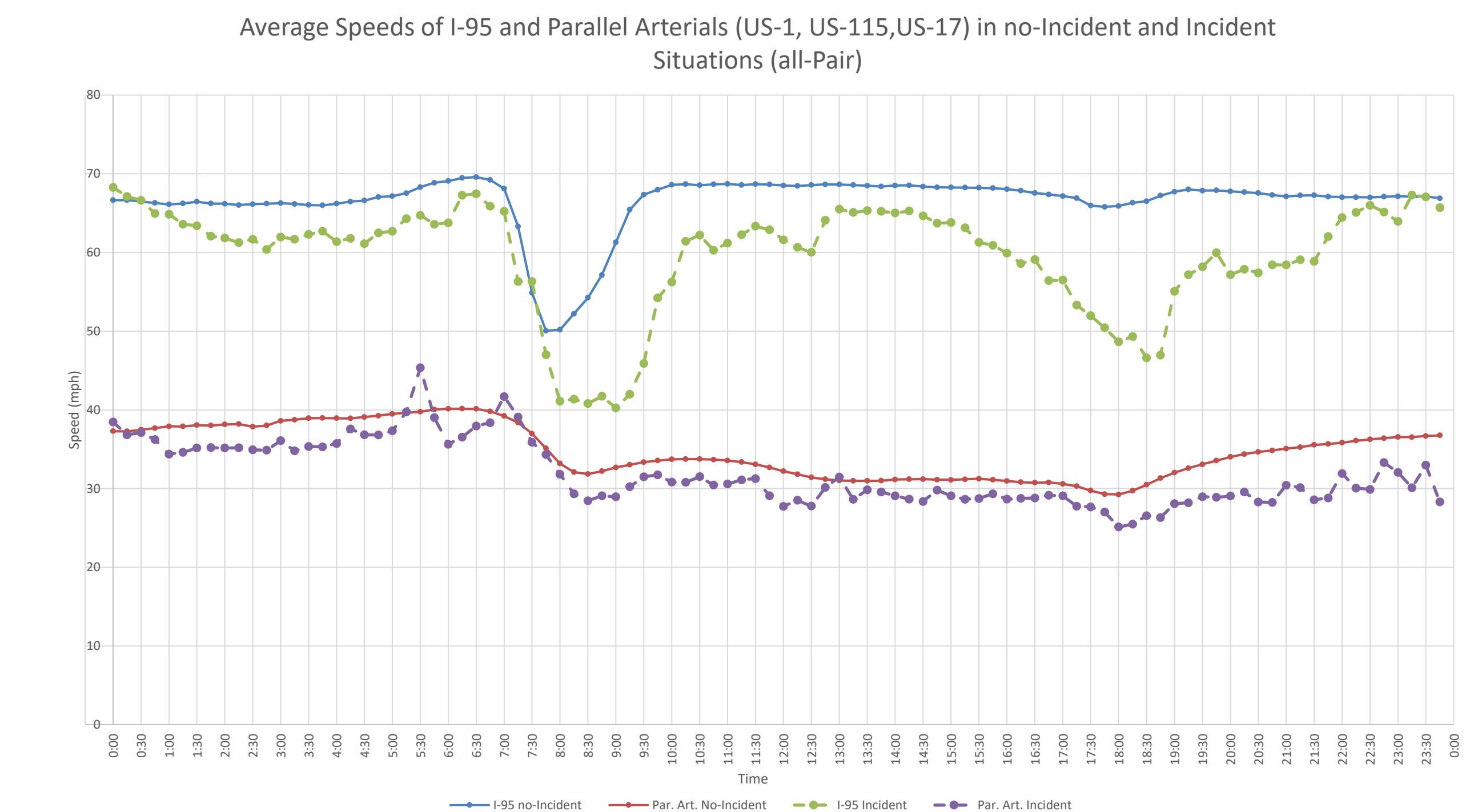
Statistical Analysis

- Every pair was examined according to their average speeds of fifteen minutes and 95% intervals to create no-incident data base
- Out of the 95% interval speed data which are at the time of incidents were used to create incident data base.
- Paired t-Test was applied to both data bases and parallel arterials' speed distribution.



Results

Results obtained are the average of 7 pairs which matched with parallel arterials' pairs.



The figure shows the relationship between I-95 and parallel arterials speed distribution when prevailing and under the effect of incident. Due to freeway incidents, average speed of parallel arterial has 10% reduction.

t-Test: Paired Two Sample for Means

	I-95 incident	Par Art incident
Mean	59.58691799	31.82911604
Variance	47.35425552	16.00702213
Observations	96	96
Pearson Correlation	0.407768597	
Hypothesized Mean Difference	0	
df	95	
t Stat	42.52225011	
P(T<=t) one-tail	6.14868E-64	
t Critical one-tail	1.661051817	
P(T<=t) two-tail	1.22974E-63	
t Critical two-tail	1.985251004	

P values for different T-Tests

Same time P Value	<0.0001
30 min later P value	<0.0001
1 hour later P value	<0.0001
2 hour Later P value	<0.0001

Figure shows speed distributions of freeway and adjacent arterial are significantly different from each other when an incident happened on freeway.

Results show that effects of incident which happened at freeway on parallel arterial increase with time.

Recommendations

- Further statistical analysis should be done to make this study wider.
- Traffic agencies can use this study's results to provide better condition on incident management.
- It is also recommended that traffic engineers should be aware of effects of freeway incidents on parallel arterials for surrogate.