Acquiring Congestion Information Using Smart Phones

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Background

- Region's mandate is:
  - To obtain a measure of congestion patterns on the Regional Road Network
  - To develop a priority list
  - To prepare a response plan

Study Objectives

- Use a Crowd Sourced approach to obtain travel time information throughout the Regional Road network
- Identify and quantify congestion
- Assess the potential to continue with crowd sourced initiatives

Project Overview

- Phase I – Project Setup
- Phase II – Monitor Data Acquisition
- Phase III – Data Analysis

Phase 1 – Project Setup

◦ Region to advertise for volunteers

◦ Customize an existing app

◦ Screen the volunteers

◦ Role out the app

Waterloo's Traffic Tracker App

Waterloo Region's new app tracks traffic congestion on motorists' smartphones

By Staff
Metroland News Service

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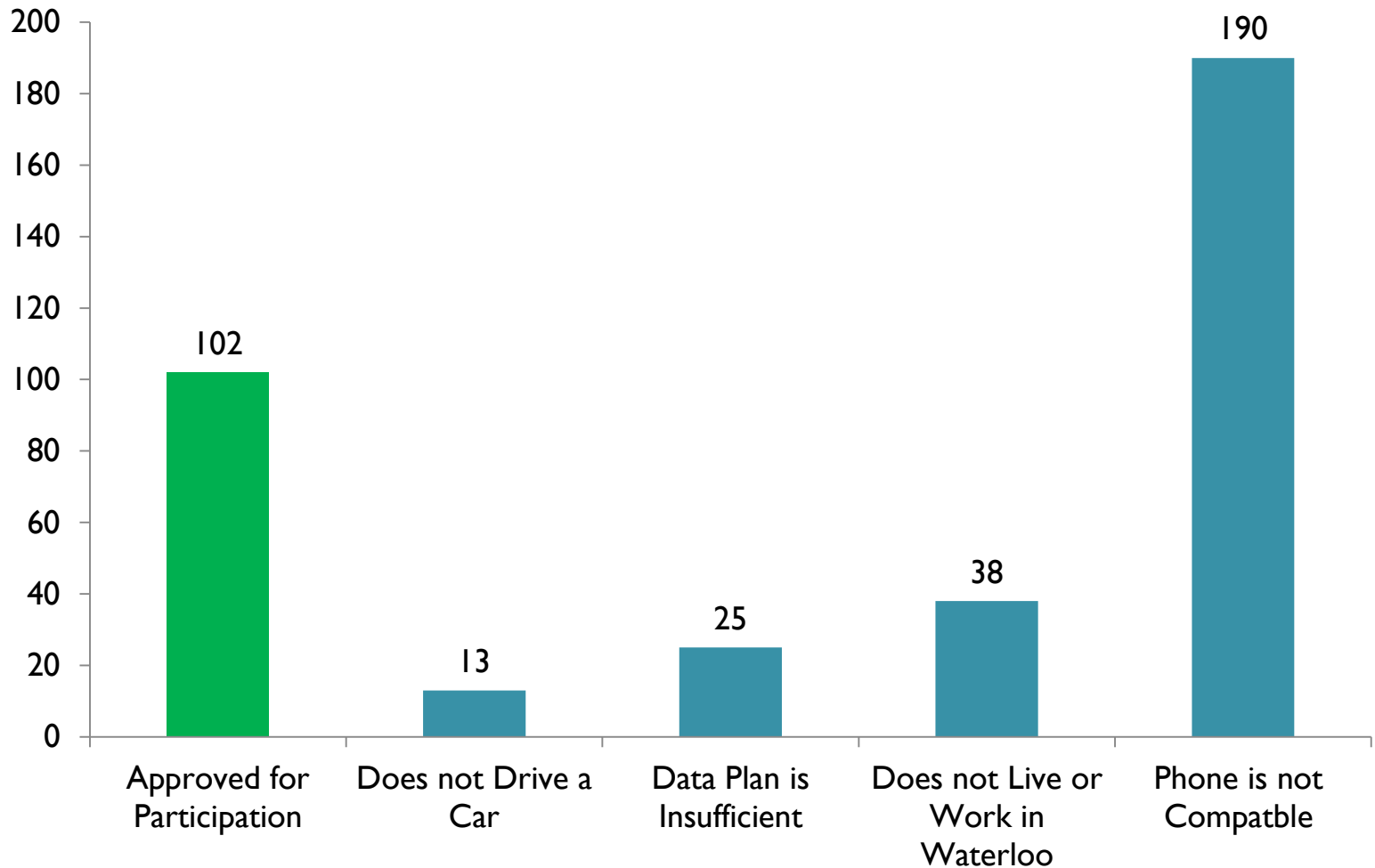Heavy traffic on Franklin Boulevard in Cambridge in 2010.   Metroland News Service

Features

Metro 2064
Rev up your DeLorean and activate the flux capacitor! Metro is taking you 50 years in the future.
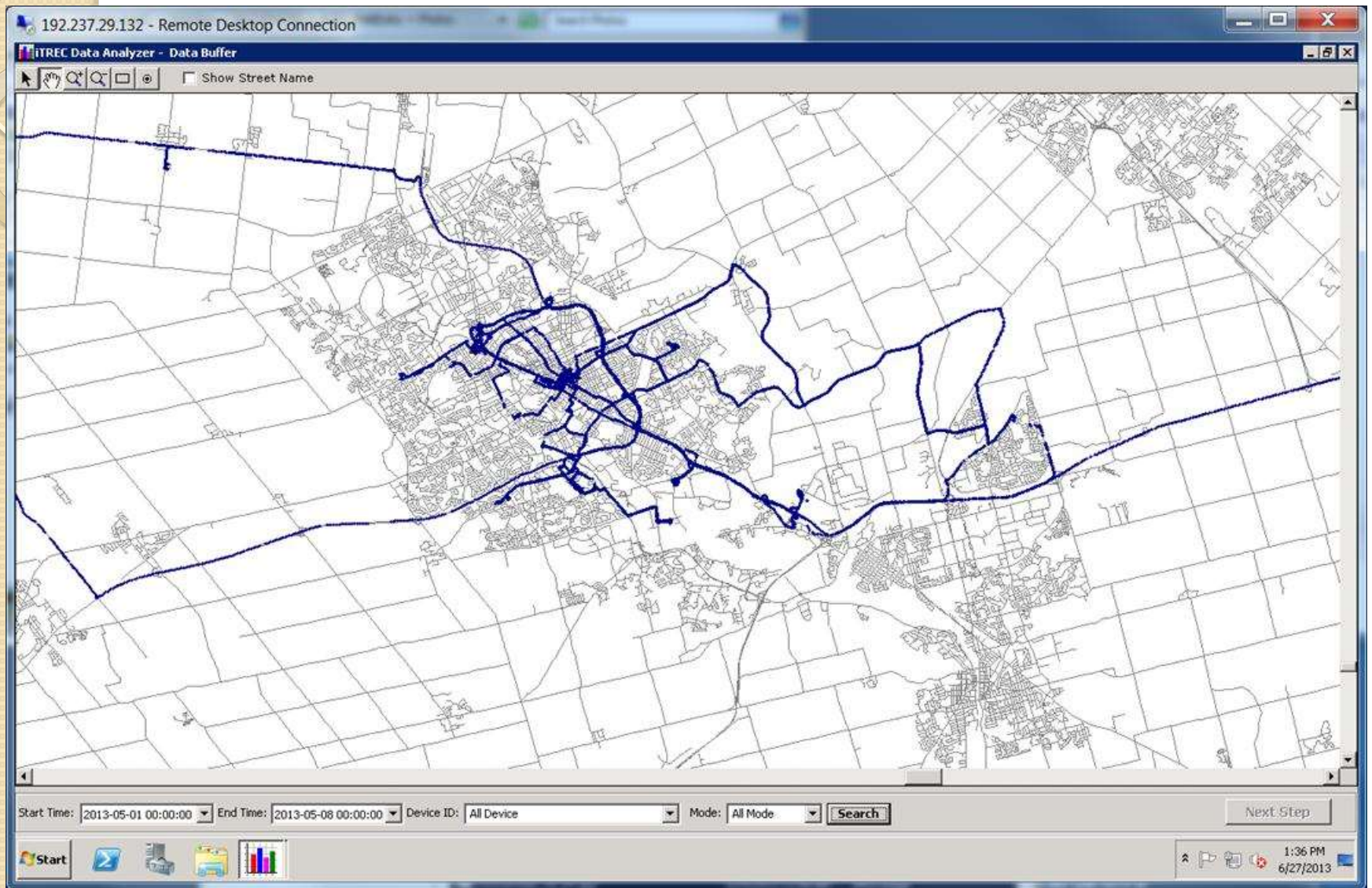
Volunteer Response
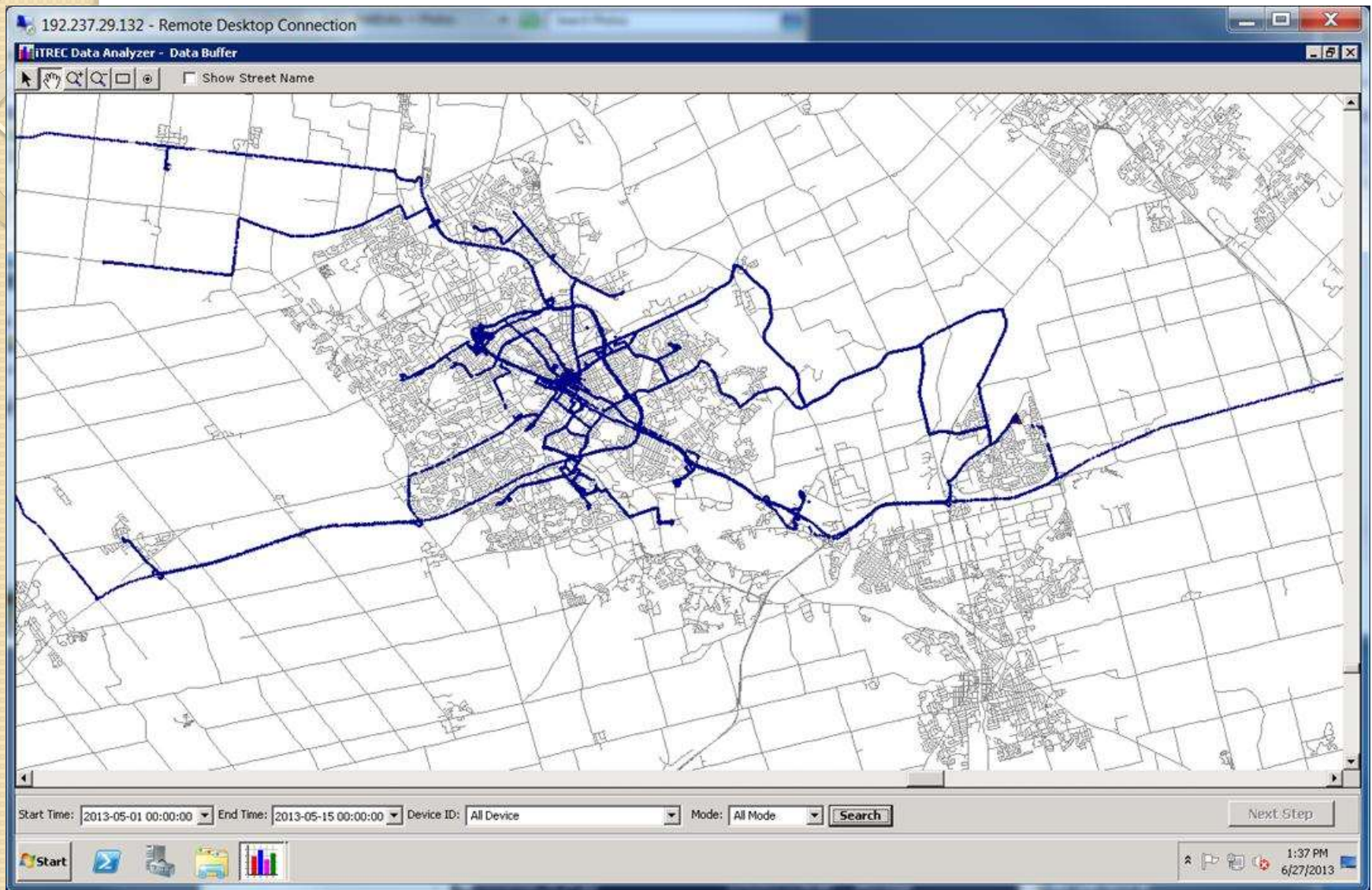
Phase II – Monitor Data Acquisition

- Monitor data acquisition
  - Issue an Interim report
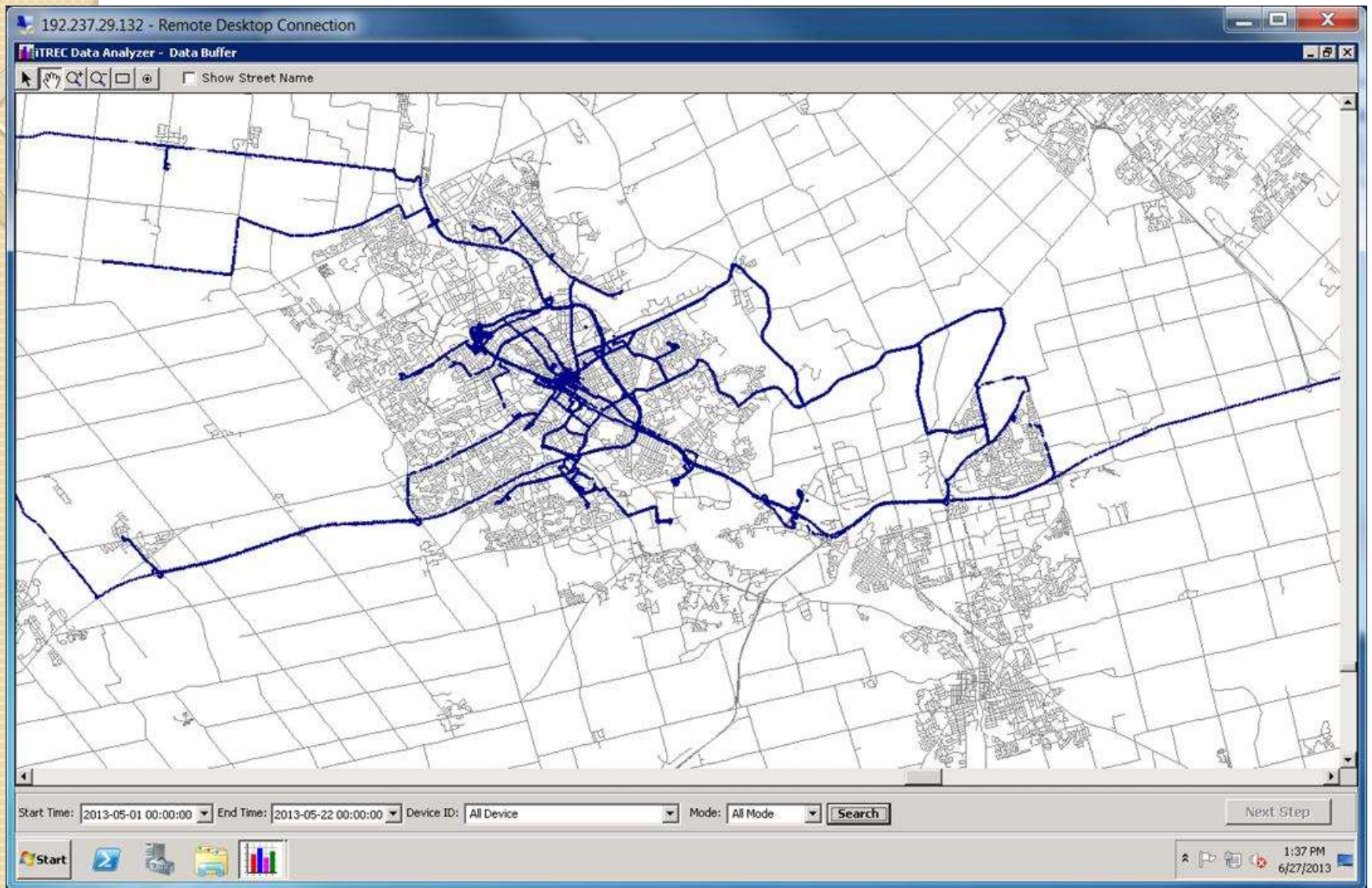 - Close the data collection

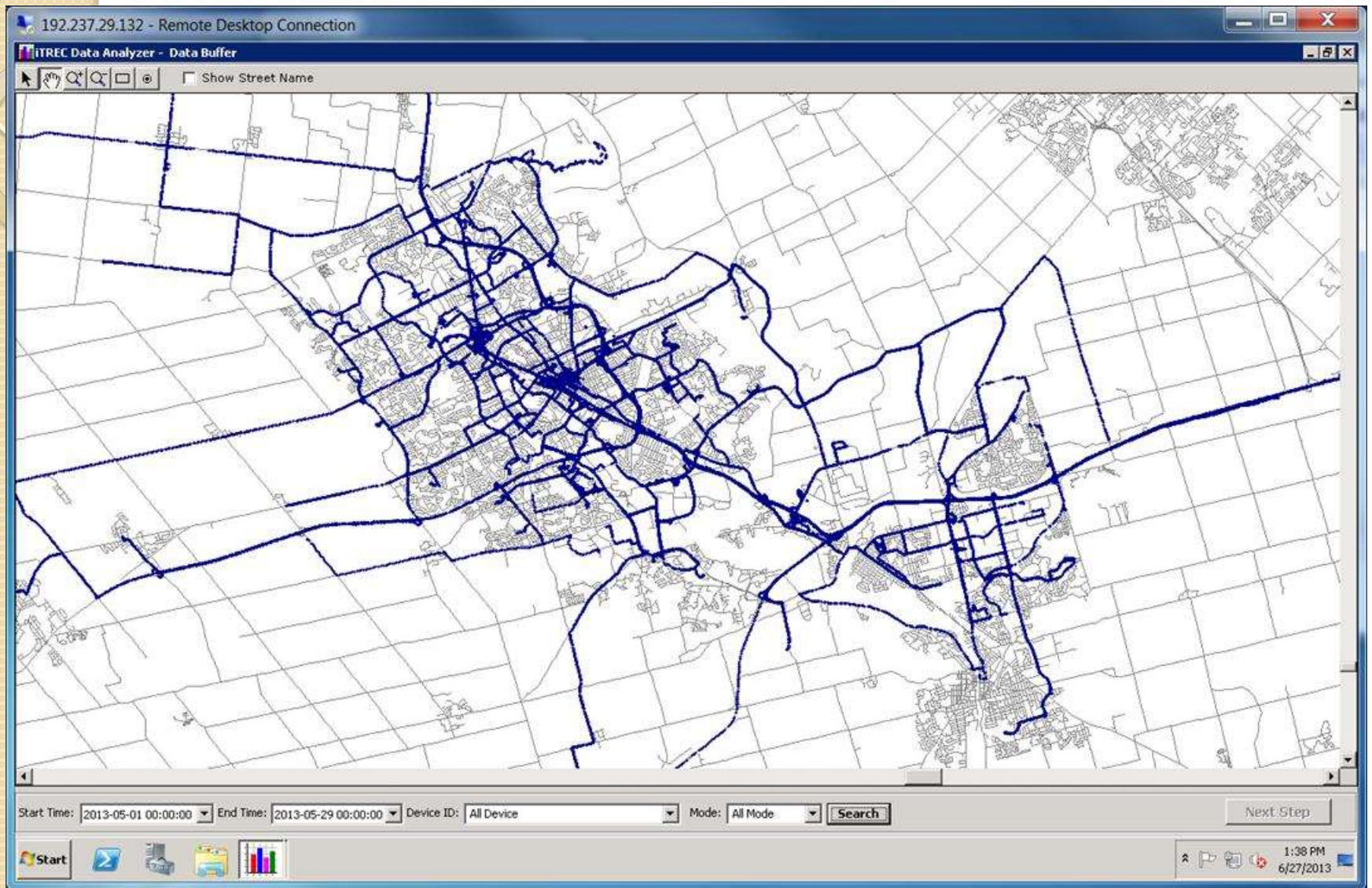1 week from May 1st

2 weeks from May 1st

3 weeks from May 1st
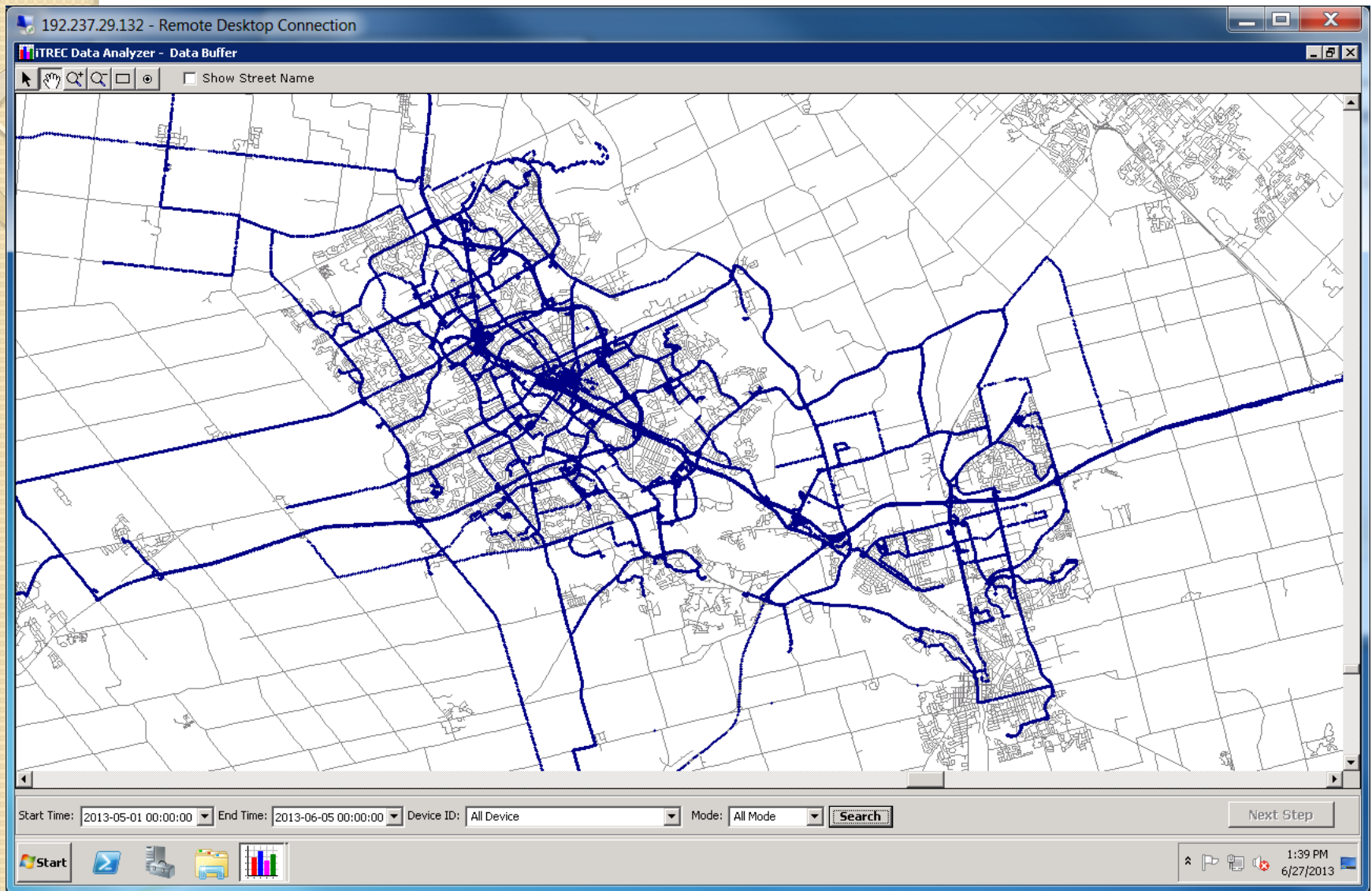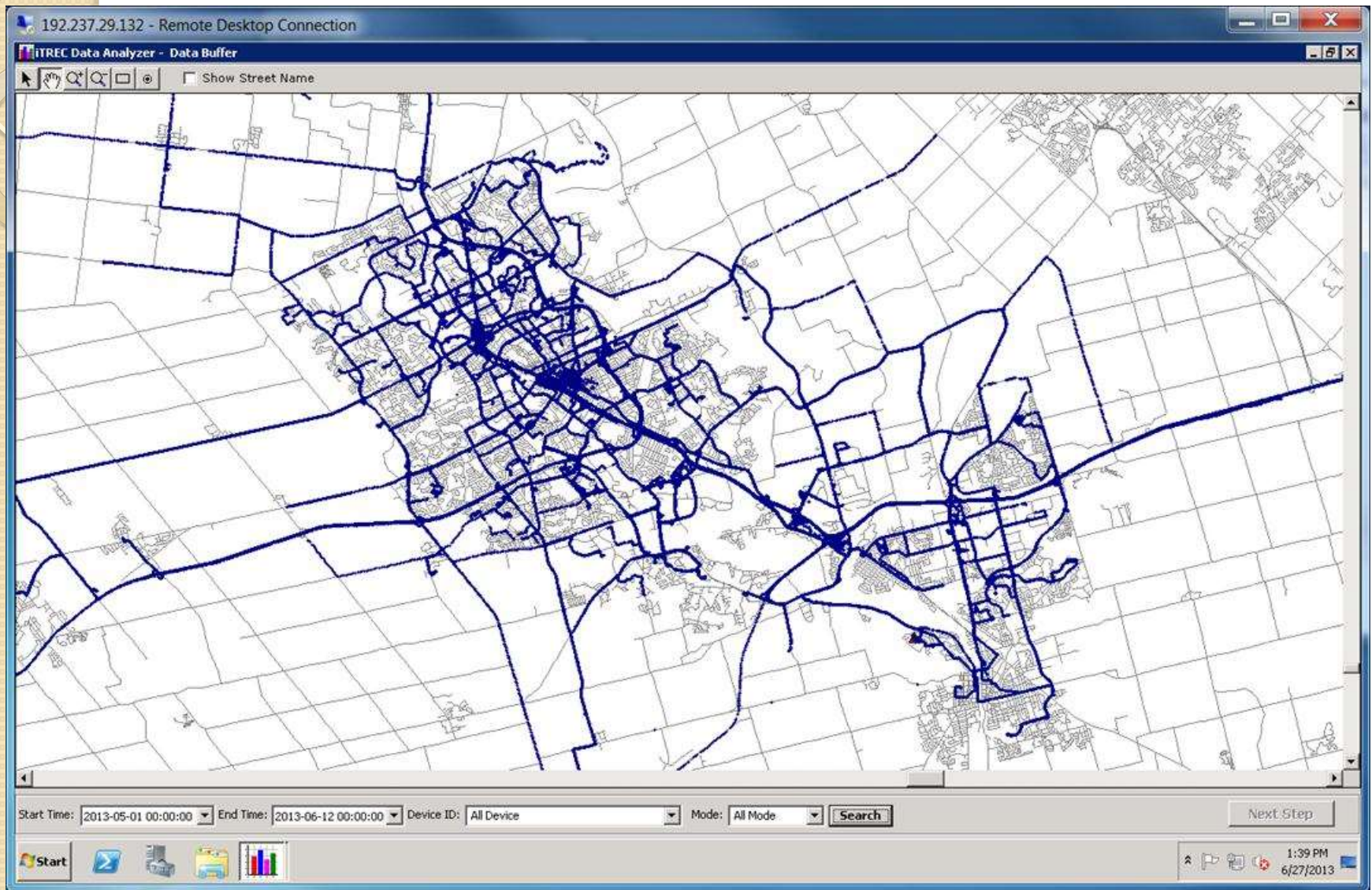
4 weeks from May 1st

5 weeks from May 1st

6 weeks from May 1st

7 weeks from May 1st
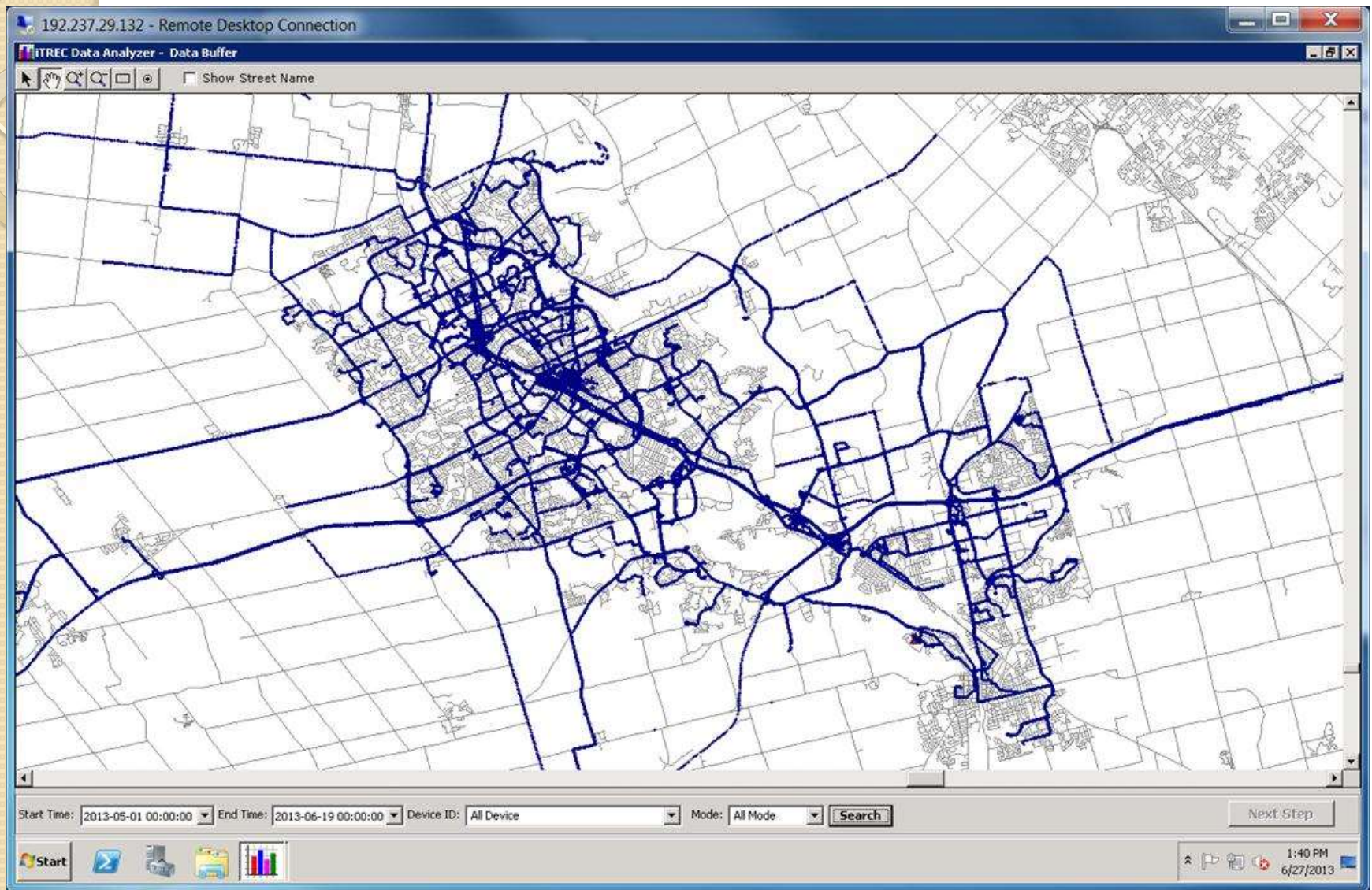
8 weeks from May 1st
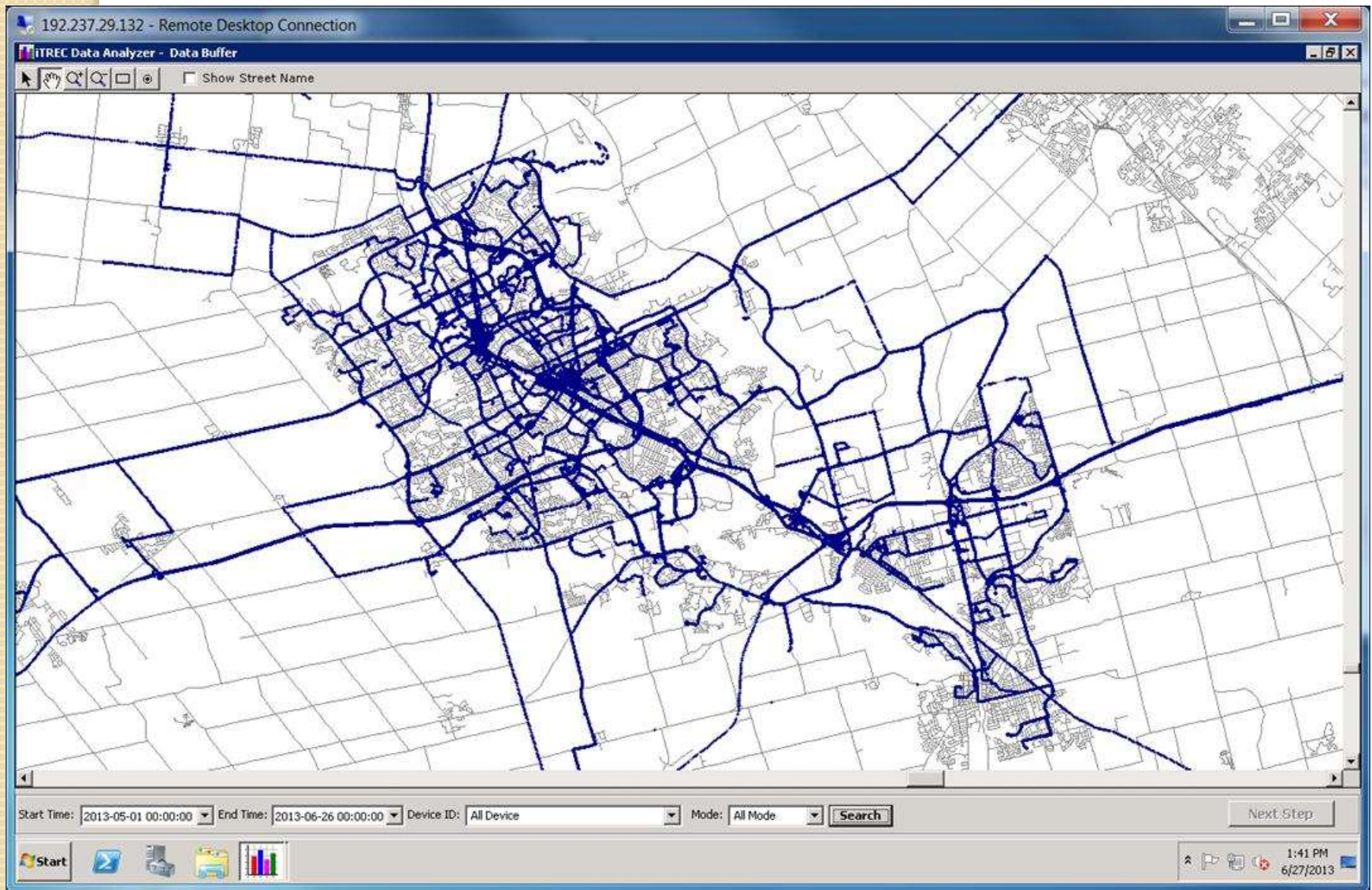
Data Summary
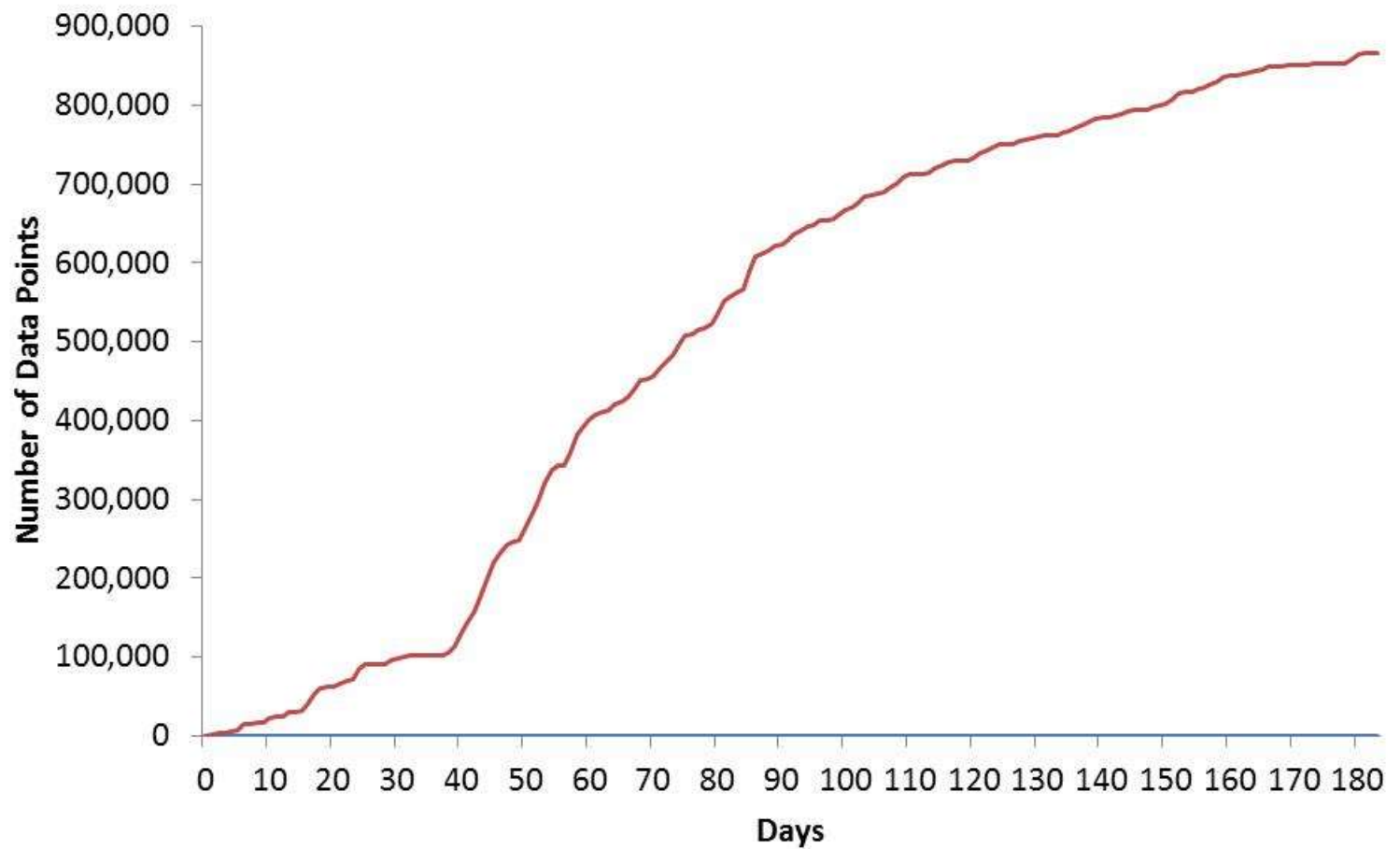
Phase III – Data Review

◦ Filter the data

◦ Assess, summarize and present the data

Data Filter

- Exclude data on weekends
- Establish a 30 meter buffer around the Regional Road network
- Left 29% of original data

Speed Map

Data Summary

Congestion Index

- Selection of Segments – Signal to Signal
- Congestion Index – ratio of measured travel time to uninterrupted flow at speed limit

Congestion Ratio

Results

Table 1: Top Ten Locations from the Congestion Table

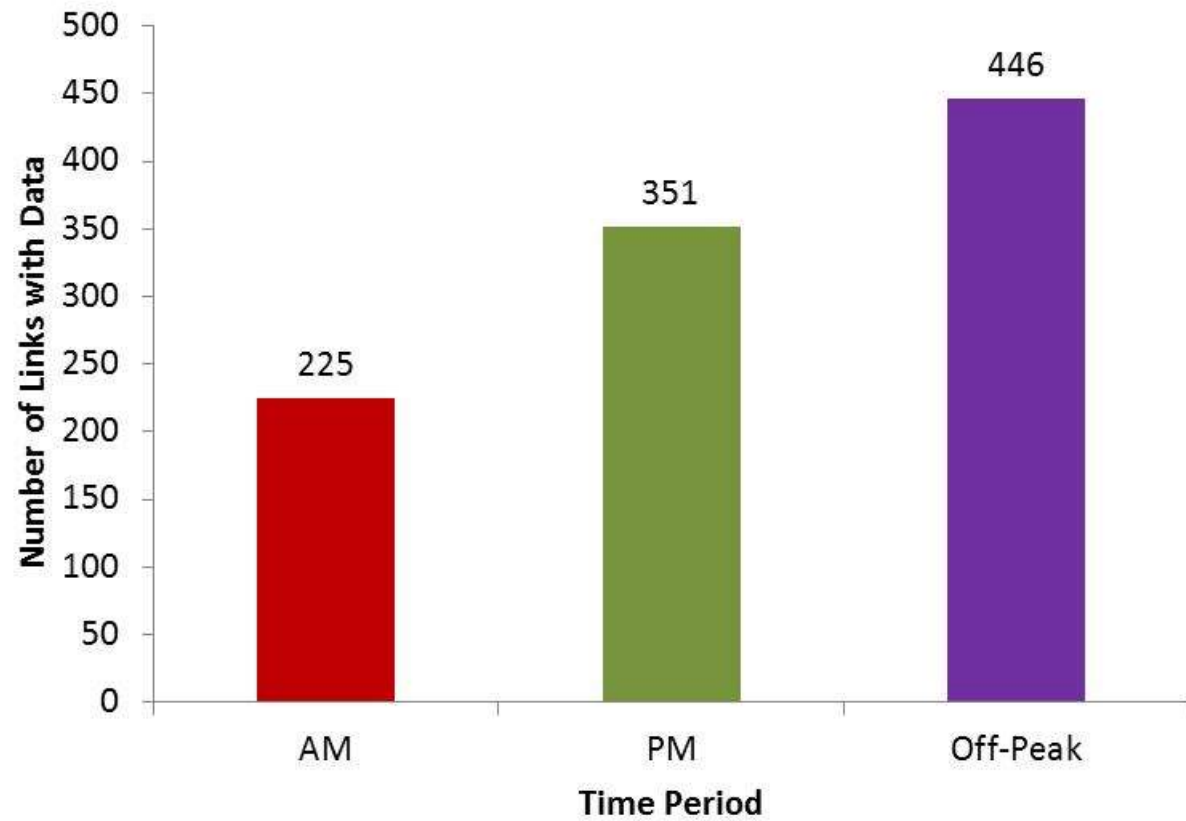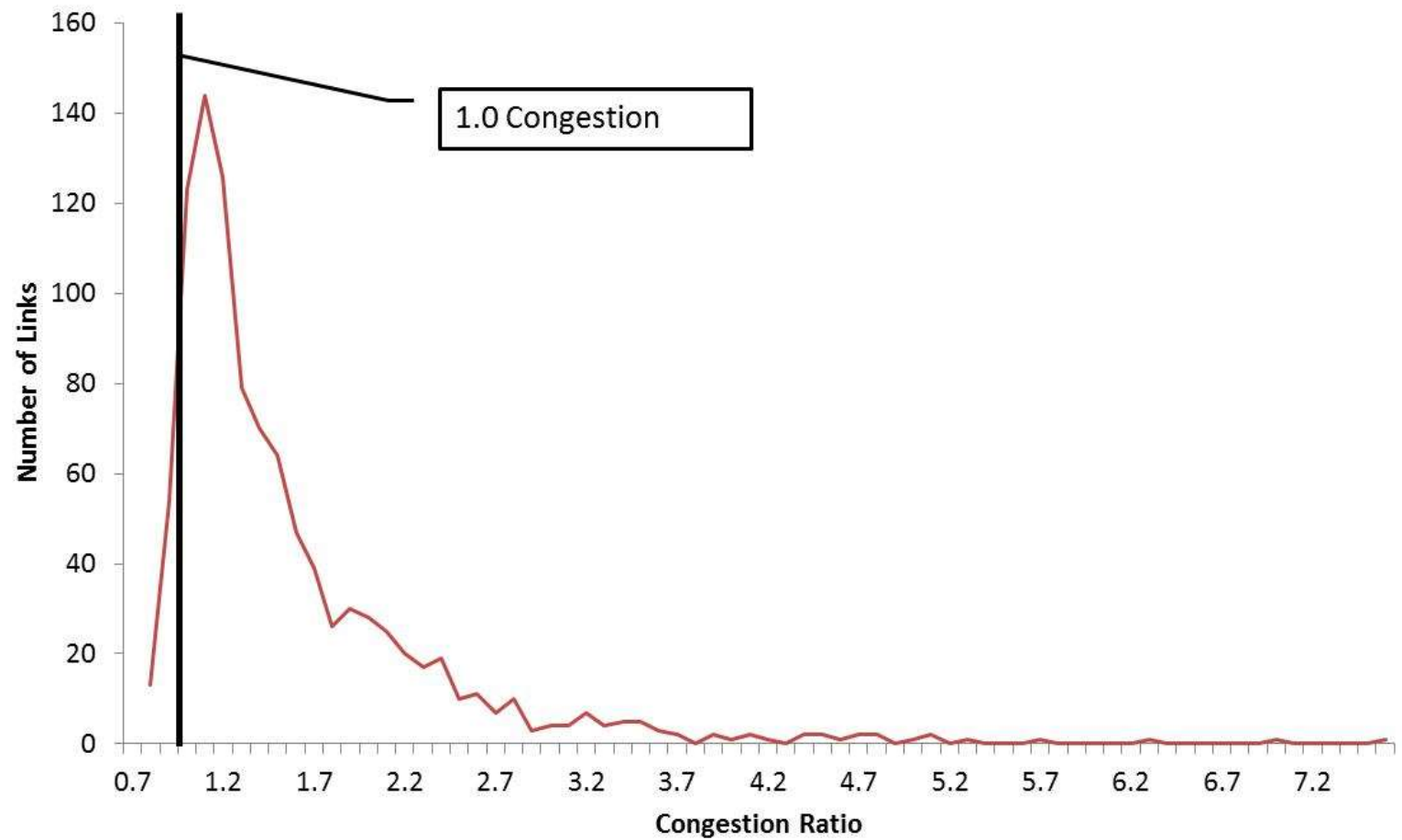| Street	Direction	Period	Number of Runs	Length (km)	Time (s)	Avg Speed (km/h)	Avg Number of Stops	Avg Stopped Delay (sec)	Posted Speed (km/h)	Uncongested (sec)	Ratio
Pinebush Rd between Hespeler Rd and Private Plaza Entrance	EB	OP	1	0.25	114	8.6	1	92	60	15.0	7.600
Franklin Blvd between Hwy 401 EB OFF Ramp and Pinebrush Rd	SB	AM	2	0.1	50	8.9	1	34	50	7.2	6.944
Sportsworld Dr between King St E and King Street Bypass W Int	WB	PM	2	0.37	166	8.9	3	125	50	26.6	6.231
Northfield Drive West between King Street North and Kraus Drive	WB	PM	2	0.15	51.0	11.2	1	34	60	9.0	5.667
Hespeler Rd between Hwy 401 N Int and Hwy 401 S Int	SB	AM	1	0.27	85	11.9	2	36	60	16.2	5.247
University Ave E between Conestoga Pkwy E Int and Bridge St W	EB	PM	2	0.36	110	13.2	2	73	60	21.6	5.093
Franklin Blvd between Hwy 401 EB OFF Ramp and Pinebrush Rd	SB	OP	8	0.1	36	24.6	1	25	50	7.2	5.000

Lessons Learned

- Need app to include all major phone brands
- Design app to be interactive
- Many routes have a limited number of runs
- Most congested roads are covered
- Filtering data is essential
- Other time periods can be analyzed too
- Congestion ratio list is the first step – follow-up observations are needed
- Crowd source travel time data has promise as a low cost alternative