Gainesville Fire Rescue
Traffic Calming and Emergency Responses
April 2004
Deputy Chief William K. Northcutt

Executive Summary:

As a response to neighborhood complaints about traffic speeds over the past several years the City of Gainesville implemented a traffic calming solution consisting of speed humps and speed tables. These speed barriers create concerns in three areas for Gainesville Fire Rescue: potential increases in emergency response times; potential weakening or damage to apparatus and increased maintenance; and increased injury risk for responders.

GFR conducted field tests over both speed humps and speed tables in a variety of neighborhoods. The tests confirmed that the cumulative effects of multiple devices, particularly speed humps, on a roadway segment can increase emergency responses by 30-60 seconds. Multiple connecting roadway segments with the devices can have an additive increase. The additional braking involved and the change in speeds required to travel over multiple devices also creates additional stress on the apparatus and crew.

Potential injury to crewmembers and damage to apparatus are important considerations for GFR, but the most universal impact of speed humps and speed tables is to the rapidity of response to emergencies. With a national time standard of four minutes 90% of the time as a benchmark, devices that slow response by as much as 25% warrant exploration of alternatives. GFR acknowledges the need for neighborhoods to address their concerns. Our goal is to partner with Public Works in identifying feasible alternatives that will meet neighborhood needs without significantly compromising emergency response times.

Introduction:

The average speed of response during fire and medical emergencies often determines whether or not there is a positive outcome for the affected person or property. During serious medical emergencies that include cardiac events and stroke, rapid intervention with appropriate advanced medical procedures is necessary to patient survivability. Over the past few years an increase in traffic density has resulted in a slowed response on some major arteries. At the same time, traffic-calming devices have been installed in an effort to help neighborhoods control vehicle speeds on their roadways. These obstacles have increased travel times for emergency responders, adversely impacting timeliness of advanced life support and fire suppression. They have also affected the length of time it takes to transport patients to the hospital for life-saving intervention. While traffic congestion problems can be mitigated to some degree by available technology, the time gained may be lost when traffic-calming tools that are incompatible with emergency responses are used in the community.

During the mid-1990s the Metropolitan Transportation Organization (MTPO) took action that would provide emergency responders some relief from traffic congestion on major thoroughfares. Because of their action, all newly installed or upgraded traffic signals within Alachua County must include traffic signal pre-emption. The technology that was

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Response Criteria:

The delivery of effective fire and emergency medical services (EMS) depends on rapid response capabilities. The National Fire Protection Association (NFPA) has published a standard (NFPA1710) that identifies a travel time ". . .for the arrival of an engine company within a 4-minute response time and/or the initial full alarm assignment within an 8-minute response time 90 percent of the time" (5.2.3.1.1). Building obstacles that extend the travel time for all responding units challenges emergency service providers to successfully meet this standard. A preliminary comparison of response data for GFR units from 2001 to 2003 shows a negative change of 1% to 2% in the success rate of meeting the NFPA 1710 standards for all units arriving on scene within 8 minutes. More significant is the impact on EMS calls where a response within the 4-minute window can be critical to patient survival. The department has seen a reduction from a 57.4% success rate for EMS responses in 2001 to a 49.7% success rate in 2003. It is predictable that traffic calming, which was implemented primarily between these time periods, has contributed to the increase in response times. (*Appendix A*)

Over the years many studies have been conducted that discuss the impact these devices have on emergency responders. To evaluate the impact these devices have on our response times locally travel times were compared for equal time periods before, during, and after the predominant installation periods for speed humps and tables. In August and December 2003, GFR also conducted field trials to simulate responses on measured thoroughfares.

Measured response trials:

Field tests were conducted in August and December of 2003 to evaluate the impact per device on the variety of emergency response vehicles ranging in size from District Chiefs' vehicles, the size of an SUV, to the tower units, which are nearly the size of a semi-truck. Speed humps and asphalt tables with crossing diameters less than 6 feet were tested as well as speed tables with several feet of concrete between the entry and departure ramps.

Testing resulted in delays ranging from 3-23 seconds per device. This is consistent with studies conducted in the private sector by professionals. Perhaps the most significant observation was the impact to the crew, the apparatus and to the contents within the crew cab. Company members operating the largest vehicle, the tower unit, had to slow to nearly a complete stop when approaching the speed humps to avoid dislodging equipment within the cab. The frequent use of the braking system applied during the approaches to multiple devices created a burning odor after testing. Crewmembers restrained in seatbelts were bounced vertically into the ceiling if an approach speed was too high to maneuver the device safely.

Emergency response speeds in areas affected by traffic calming devices vary between 30 and 40 mph. In an attempt to simulate emergency response conditions, field tests were conducted using these same speeds. In most cases, the apparatus had to slow down to 5-20 mph, significantly lower than the speed limit, to allow safe passage over the humps and tables. In comparison between the speed tables and the speed humps, the testing confirmed that the concrete speed tables with the longer central platforms were easier to cross and produced less jolting effects on the crew, equipment and vehicles.

The field tests demonstrated increased travel times ranging from 25% to over 105% on multi-block courses with multiple devices. Of utmost concern is the cumulative effect that multiple devices in a neighborhood may have on responding apparatus. If a tower unit must travel over three speed humps that unit could be delayed by as much as a minute or more just by those devices. Some neighborhoods have so many devices that a unit might have to negotiate as many as four or five to reach a patient or a fire. Additional time may be lost navigating through unnecessary stops that could be managed by mini-circles and yield conditions. To avoid damage to the apparatus and injury to the crew, responding drivers may be forced to choose less direct routes to their patients or fire scenes causing unnecessary delays. These cumulative effects could conceivably create unacceptable delays of up to a full minute. (*Appendix D*)

APPENDIX A

Gainesville Fire Rescue Traffic Calming Travel Survey November 2003

NFPA 1710 Fire Objectives Related to Travel Times and Impacted by Traffic Calming Devices in the City of Gainesville.

4.1.2.1.1 The fire department shall establish the following time objectives:

(2) Four minutes or less for the arrival of the first arriving engine company at a fire suppression incident and/or 8 minutes or less for the deployment of a full first alarm assignment at a fire suppression incident.

(3) Four minutes or less for the arrival of a unit with first responder or **higher level capability** *at an emergency medical incident.*

(4) *Eight minutes or less for the arrival of an advanced life support unit at an emergency medical incident, where this service is provided by the fire department.*

Total Calls	**174**
Total < or = 8 Min	**140**
Calls > 8 min/1st Unit < 4 min	**12**
Percentage	**87.36%**

Feb – July 2001 Fire Suppression
GFR First Alarm Units

Total Calls	**211**
Total < or = 8 Min	**164**
Calls > 8 min/1st Unit < 4 min	**16**
Percentage	**85.31%**

Feb – July 2003 Fire Suppression
GFR First Alarm Units

Total Calls	**3590**
Total Calls < or = 4 min (First Unit)	**2061**
Percentage	**57.41%**

Feb – July 2001 EMS Calls
GFR Units

Total Calls	**4211**
Total Calls < or = 4 min (First Unit)	**2094**
Percentage	**49.73%**

Feb – July 2003 EMS Calls
GFR Units

Citywide Travel Average Feb-July 2001	4:18
Citywide Travel Average Feb-July 2003	4:49
Citywide Travel Average Feb-July 2003 w/out SW Annexation Area	4:47
Increase in Travel Time After Device Installations	12%

DEVICE INSTALLATION COUNTS

February	2001	7
March	2001	5
April	2001	17
May	2001	8
July	2001	11
September	2001	47
October	2001	7
November	2001	12
December	2001	1
2001	**Total**	115
January	2002	7
February	2002	6
March	2002	14
April	2002	4
May	2002	15
June	2002	6
July	2002	19
August	2002	6
September	2002	1
November	2002	7
December	2002	5
2002	**Total**	90
January	2003	7
February	2003	9
March	2003	1
April	2003	1
May	2003	3
June	2003	3
July	2003	6
2003	**Total**	30
	Grand Total	235

APPENDIX D

Gainesville Fire Rescue Field Testing with Speed Calming Devices

Roadway	NW 68th AV	NW 33rd ST
Course Distance	1000 ft	1000 ft
Day of Week	Tuesday	Tuesday
Weather Conditions	Clear	Clear
Number of Devices	1	1
Device Type	**Speed Hump***	None
Vehicle Speed MPH	Target Speed 35mph	Sustained Speed 35mph
Vehicle Type	Engine	Engine
Vehicle Number	2271	2271
Travel Time MM:SS	0:29	0:26

Increase in Travel Time on Courses With Devices	**0:03**
Increase Per Device in Seconds	**0:03**
Percent Increase in Travel Time on Courses With Devices	**11.54%**

*Low Profile Devices - Travel Rate over Devices 20 mph

APPENDIX D

Gainesville Fire Rescue Field Testing with Speed Calming Devices

Roadway	NW 36th ST	NW 34th ST
Range	W University AV to NW 8th AV	W University AV to NW 8th AV
Course Distance	8 Blocks	8 Blocks
Day of Week	Thursday	Thursday
Time of Day	4:00 PM	4:20 PM
Weather Conditions	Dry	Dry
Number of Devices	3	0
Device Type	**Asphalt Table**	None
Number of Stops	None	None
Vehicle Speed MPH	Target Speed 30	Sustained Speed 30
Vehicle Type	Engine	Engine
Vehicle Number	2504	2504
Travel Time MM:SS	1:28	0:57

Increase in Travel Time on Courses With Devices	**0:31**
Increase Per Device in Seconds	**0:10**
Percent Increase in Travel Time on Courses With Devices	**54.39%**

APPENDIX D

Gainesville Fire Rescue Field Testing with Speed Calming Devices

Roadway	NE 7th ST	NE 9th ST
Range	E University Av to NE 8th Av	E University Av to NE 8th Av
Course Distance	8 Blocks	8 Blocks
Day of Week	Wednesday	Wednesday
Time of Day	2:00 PM	2:20 PM
Weather Conditions	Dry	Dry
Number of Devices	3	0
Device Type	**Asphalt Table**	None
Number of Stops	None	None
Vehicle Speed MPH	Target Speed 30	Sustained Speed 30
Vehicle Type	Tower	Tower
Vehicle Number	2433	2433
Travel Time MM:SS	2:13	1:04

Increase in Travel Time on Courses With Devices	**1:09**
Increase Per Device in Seconds	**0:23**
Percent Increase in Travel Time on Courses With Devices	**107.81%**

APPENDIX D

Gainesville Fire Rescue Field Testing with Speed Calming Devices

Roadway	NW 10th AV	NW 16th AV
Range	NW 2nd ST to NW 12th ST	NW 2nd ST to NW 12th ST
Course Distance	10 Blocks	10 Blocks
Day of Week	Saturday	Saturday
Time of Day	9:55 AM	10:20 AM
Weather Conditions	Dry	Dry
Number of Devices	3	0
Device Type	**Concrete Tables**	None
Number of Stops	None (GPD Stopped Traffic)	None (GPD Stopped Traffic)
Vehicle Speed MPH	Target Speed 40	Sustained Speed 40
Vehicle Type	Engine	Engine
Vehicle Number	2371	2371
Travel Time MM:SS	1:25	1:03

Increase in Travel Time on Courses With Devices	**0:22**
Increase Per Device in Seconds	**0:07**
Percent Increase in Travel Time on Courses With Devices	**34.92%**