EXHIBIT NO. _____

<u>23</u> 3-25-08

City of Alexandria, Virginia

MEMORANDUM

DATE: MARCH 20, 2008

TO: THE HONORABLE MAYOR AND MEMBERS OF CITY COUNCIL

FROM: JAMES K. HARTMANN, CITY MANAGER

SUBJECT: CONSIDERATION OF INSTALLATION OF A TRAFFIC SIGNAL AT THE INTERSECTION OF FRANKLIN STREET AND COLUMBUS STREET

ISSUE: City Council consideration of a recommendation to install a traffic signal the intersection of Franklin Street and Columbus Street.

RECOMMENDATION: That City Council authorize installation of a new traffic signal at the intersection of Franklin Street and Columbus Street pursuant to City Code Section 10-2-7. Following a public hearing the Traffic and Parking Board voted unanimously to recommend installation of the signal.

BACKGROUND: Staff has received a number of complaints from motorists and pedestrians about the intersection of Franklin Street and South Columbus Street. This intersection is located one block west of South Washington Street and two blocks east of Route 1 within the Old Town neighborhoods in Residential Parking Permit District 4. Land uses in the vicinity are primarily residential; however commercial activities are located in both the southwest quadrant of the intersection (convenience store) and the southeast quadrant (funeral home). As Franklin Street is one of the major entrances into the south Old Town area, this intersection has competing demand among motorists, pedestrians, and bicyclists, as well as sight distance limitations.

Franklin Street is one way eastbound, with three travel lanes during AM peak hours (7:00 AM to 9:00 AM weekdays) and parking along the south side of the roadway. At all other times, there are two travel lanes with parking along both the north and south sides of the street. Franklin Street is functionally classified as an arterial roadway and the posted speed limit is 25 mph.

Near its intersection with Franklin Street, South Columbus Street has two travel lanes, one northbound and one southbound, with no median separation. Columbus Street is functionally classified as a residential collector and the posted speed limit is 25 mph.

The closest signalized intersections are South Washington Street at Franklin Street, located 325 feet to the east, and Route 1 at Franklin Street, 650 feet to the west. Alfred Street, located about 325 feet west of Columbus, operates with two-way stop control.

The proposed installation of a traffic signal at Franklin and South Columbus streets was considered by the Traffic and Parking Board at its regular meeting on the January 28, 2008 (Attachment 1). At this public hearing Robert B. McConnell, Viviana Rubiano, Maureen Dugan, and Nathan Macek spoke in favor of this request. No one spoke in opposition of the request. The Board voted unanimously to recommend to the City Council that a traffic signal be installed at the intersection of Franklin Street and Columbus Street.

DISCUSSION: Prior to the installation of a traffic signal, an engineering evaluation is required to determine whether or not traffic signal control is warranted and, if warranted, will it improve traffic operations and/or safety at the intersection. A traffic signal warrant analysis based on the criteria established by the <u>Manual of Uniform Traffic Control Devices</u> (MUTCD) found that traffic signal control is warranted at the intersection of Franklin and Columbus streets. As part of this analysis, existing traffic and pedestrian volumes, safety and delay at the intersection were considered. An in-depth engineering evaluation concluded that traffic signal control would improve operations and/or safety at this intersection.

Twelve-hour vehicular movement counts were conducted between the hours of 7:00 AM and 7:00 PM on Tuesday, November 6, 2007. The counts were conducted on typical weekdays when schools were in session to ensure that representative traffic conditions were evaluated. A total of 10,325 vehicles entered the intersection during the twelve-hour vehicle survey. Of that number, 8,328 vehicles (81%) used the Franklin Street approaches, and 1,997 vehicles (19%) used the S. Columbus Street approaches of the intersection. There were limited safe gaps for pedestrians to cross Franklin Street due to heavy vehicular traffic volumes. Based on the results of the pedestrian survey, 18 pedestrians crossed Franklin Street during the highest hour of pedestrian activity (5:30-6:30 PM).

Traffic accident records for this intersection, obtained from the Alexandria Police Department, show there were 24 reported accidents at that intersection during the period of January 1, 2004 to August 31, 2007. The leading accident type at this intersection is angle accidents. This accident type accounted for approximately 50% of the total accidents. There were five right angle accidents in the year 2004, two in the year 2005, four in the year 2006 and one in the year 2007. The second leading type of accident is sideswipe collisions. Thirty-three percent (33%) of all accidents were sideswipe collisions. Seven of the eight accidents occurred on Franklin Street when vehicles attempting to turn left from eastbound Franklin Street onto northbound South Columbus Street from the center lane were hit by eastbound through vehicles traveling in the left travel lane. There were no reported pedestrian accidents or fatalities at this intersection.

A traffic signal warrant analysis was conducted using the eight warrants detailed in the current edition of the MUTCD. This analysis determined that a traffic signal is warranted at the intersection of Franklin Street and South Columbus Street at this time. The results of the Crash Experience Warrant analysis show that there were five signal-correctible accidents in the year 2004, two in the year 2005, and four in the year 2006. During the period of December 15, 2005,

to December 14, 2006, there were five angle accidents. Angle accidents are considered correctible by the installation of a traffic signal. Both crash occurrence and vehicular volume conditions specified by the MUTCD are satisfied at this intersection.

Peak hour volumes were analyzed using the procedures for stop-controlled intersections, as detailed in the 2000 Edition of the Highway Capacity Manual (HCM). The results show that the major-street approaches of the intersection operate acceptably during both peak periods. However, southbound minor-street approach experiences excessive delays during PM peak hours. Queue spillback was recorded in the right and center travel lanes of Franklin Street due to standing vehicles at the downstream signal of South Washington Street & Franklin Street during AM peak hours. Typically, this spillback persisted for two or more cycle lengths. Installation of a traffic signal at this intersection is likely to reduce or eliminate angle accidents. A traffic signal at this intersection will provide a progression band for the downstream intersection and reduce delays on S. Columbus Street.

The proposed traffic signal will include pedestrian infrastructure. Due to significant fluctuations in the pedestrian volume, pedestrian movements will be actuated. Pedestrian push buttons will be installed on both sides of the mainline to facilitate pedestrians crossing Franklin Street. In addition, the side street vehicular movements of the intersection will be actuated. In the event that no vehicles are present on the side streets, the signal will provide the extra right-of-way (green) time to the mainline movements. In addition, the signal will be coordinated with the adjacent intersections.

If approved by City Council, staff estimates that six to nine months will be required to design, procure equipment, and construct the signal.

FISCAL IMPACT: The cost of installing this traffic signal is estimated to be \$100,000. Capital funding for the installation is included in the department's FY 2009 budget. The annual operating cost for this signal is estimated to be \$2,500.

ATTACHMENT: Traffic and Parking Board Docket Memorandum

STAFF:

Richard Baier, P.E., Director, T&ES Tom Culpepper, PhD., P.E., Deputy Director, T&ES Bob Garbacz, P.E., Division Chief, Transportation Ravi Raut, P.E., Traffic Studies Engineer

Attachment

TRAFFIC AND PARKING BOARD PUBLIC HEARING JANUARY 28, 2008

DOCKET ITEM: 6

ISSUE:	Consideration of a request to install a traffic signal at the intersection of Franklin and South Columbus Streets
APPLICANT:	Old Town Hunting Creek Civic Association
LOCATION:	Intersection of Franklin and South Columbus Streets

<u>STAFF RECOMMENDATION</u>: The Board recommend to the City Council installing a traffic signal at the intersection of Franklin Street and South Columbus Street.

DISCUSSION: In response to a citizen request, a study was conducted to determine if the intersection of Franklin and South Columbus Streets, meets the warrant for the installation of a traffic control signal. A map showing the location of the intersection relative to other roadway facilities in the area is presented on the following page. At this intersection, Franklin Street intersects with South Columbus Street to form a cross intersection. South Columbus Street runs in a north-south direction. Franklin Street runs in an east-west direction. Franklin Street is the major roadway of this intersection.

A traffic signal warrant analysis was conducted using the eight (8) warrants detailed in the current edition of the Manual on Uniform Traffic Control Devices (MUTCD 2003). The results of this analysis show that a traffic signal is warranted at the intersection of Franklin Street and S. Columbus Street at this time.

City Staff met with representatives of the Old Town Hunting Creek and Old Town Civic Associations as well as representatives of the Washington Square condominium unit owners to review the data. There was a general approval to support the signal at this intersection.

<u>ANALYSIS:</u> Twelve-hour vehicular movement counts were conducted between the hours of 7:00 AM and 7:00 PM on Tuesday, November 6, 2007. Peak hour vehicular movement counts were conducted between the hours of 7:00 AM and 9:00 AM and 4:00 PM and 6:00 PM on May 3 and May 4, 2007. The counts were conducted on typical weekdays when schools were in session to ensure that representative traffic conditions were evaluated. An analysis of capacity and accident history, and a traffic signal warrant analysis are presented in the following subsections.



Capacity Analysis

The intersection is two-way stop controlled. Stop signs are installed at each South Columbus Street approach of the intersection. Peak hour volumes were analyzed using the HCM procedures for stop-controlled intersections, as detailed in the 2000 Edition of the Highway Capacity Manual. The results of the capacity analysis are presented below.

	Levels Of Service (LOS)								
	Franklin Street	South Colu	nbus Street						
	Eastbound	Northbound	Southbound						
AM Peak	A	С	С						
PM Peak	A	В	F						

The results show that the major-street approaches of the intersection operate acceptably during both peak periods. However, southbound minor-street approach experiences excessive delays during PM peak hours. Field observations revealed that maximum southbound queues were approximately 20 vehicles and extended to the intersection of Gibbon Street and S. Columbus Street.

Occasionally spillback was recorded in the right and center travel lanes of Franklin Street due to queuing at the downstream signal of South Washington Street & Franklin Street during AM peak hours. On most occasions, the spillback sustained for a couple of cycle lengths.

Accident History and Analysis

The data, which was obtained from the Alexandria Police Accident Listing Report, show that there were twenty-four (24) accidents reported at that intersection during the period of January 1, 2004 to August 31, 2007. A summary of the data is presented in the table below.

	2004	2005	2006	Aug- 2007	Total
Accident Severity					
Fatal	0	0	0	0	0
Injury Accidents	1	0	0	0	1
Property Damage Only	9	2	8	4	23
Accident Type					
Right Angle	5	2	4	1	12
Sideswipe	3	0	3	2	8
Backing	0	0	1	0	1
Other	2	0	0	1	3
Times					
7:00 AM – 10:00 AM	3	1	0	2	6
10:00 AM - 4:00 PM	6	1	5	2	14
4:00 PM – 7:00 PM	1	0	2	0	3
7:00 PM – 7:00 AM	0	0	1	0	1
Conditions					
Daytime	10	2	7	4	23
Nighttime	0	0	1	0	_ 1
TOTAL	10	2	8	4	24

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The leading accident type at that intersection is angle accidents. This accident type accounted for approximately 50% of the total accidents. There were five (5) right angle accidents in the year 2004, two (2) in the year 2005, four (4) in the year 2006 and one (1) in the year 2007.

The second leading type of accidents is sideswipe collisions. Thirty-three percent (33%) of all accidents were sideswipe accidents. Seven (7) of the eight (8) accidents occurred on Franklin Street when vehicles attempting to turn left from eastbound Franklin Street onto northbound South Columbus Street from the center lane were hit by eastbound through vehicles traveling in the left travel lane.

There were no pedestrian accidents and no fatalities recorded at this intersection.

Traffic Signal Warrant Analysis

The traffic signal warrant analysis considered the eight (8) warrants for signal installation in accordance with the 2003 Edition of the MUTCD. A summary of the warrant analysis is presented on the following page.

The posted speed limit at this intersection is 25 mph. As a result, the 70% Volume Warrant Condition specified for isolated communities of less than 10,000 people, or for roadways with an 85th percentile speed in excess of 40 mph was not considered applicable to this analysis.

The results of the Crash Experience Warrant analysis, which are attached, show that there were five (5) signal correctible accidents in the year 2004, two (2) in the year 2005, and four (4) in the year 2006. During the period of December 15, 2005 to December 14, 2006, there were five (5) angle accidents. Angle accidents are considered correctible by the installation of a traffic signal. Volume conditions specified for the warrant are satisfied for 4 of 8 required hours. Other four (4) hours are within the limits of variability in traffic flow and are considered as meeting the warrant conditions. Both crash occurrence and vehicular volume conditions specified by the MUTCD are satisfied at this intersection.

A further evaluation of the intersection conditions show that the Crash Experience Warrant of the MUTCD for the installation of a multiway stop control is presently satisfied. However, installation of a multiway stop control would result in disruption of progression of traffic along Franklin Street and lead to unacceptable delays, as each vehicle will have to stop at this intersection.

Installation of a traffic signal at this intersection is likely to reduce or eliminate angle accidents. Signalization can result in operational issues due to closeness of this signal with the downstream signal at Washington Street and Franklin Street, but a traffic signal at this intersection will provide a progression band and maintain proper platooning for the downstream intersection. The warrant requirement for the installation of a traffic control signal is satisfied.

A follow-up study should be performed at this intersection once the Woodrow Wilson Bridge Project is completed and the Church Street ramp is opened to the traffic, as traffic patterns are expected to change at the study intersection.

		CRITERIA	NO. OF HOURS	WARRANT SATISFIED	
WARRANT	Major Street Volume (VPH)	Minor-street Volume (VPH)	OR CRITERIA OBSERVED		
1A - Minimum Vehicular Volume	600	150	1 hours	NO	
1B - Interruption of Continuous Traffic	900	75	0 hours	NO	
1C - Combination Warrant		100		0 h	
- Minimum Vehicular Volume	480	120	8	3 hours	NO
- Interruption of Continuous	/20	60	4 Hours	NO	
2 - Four-hour Warrant			4	No plotted points on or above applicable curve	No
3 - Peak-hour Delay Warrant	To Minor Roa Total E 1 Plotted Point (tal Delay > 4 Veh-ho <u>AND</u> d Approach Volume <u>AND</u> Entering Volume > 6 OR One Hour Volume) <i>A</i> Curve	No plotted points on or above applicable curve	NO	
4 – Pedestrian Volume	100 or mo 190 or mor Fewer than 6 pedestrians to cros	ore pedestrians for a <u>OR</u> e pedestrians during <u>AND</u> 0 gaps/hour of adeq ss during same perio	18 during highest hour (5:30-6:30 PM)	NO	
5 – School Crossing	Intersection is used as crossing for school children. 20 Students or more during highest crossing hour Number of gaps in traffic stream when children crossing are less than number of minutes in the same period.			N/A	NO
6 – Coordinated Signal System	Coordinated Signal System In order to maintain proper grouping of vehicles within a signal system.				
7 – Crash Experience	Five or more rep correction by a tra period. 80 peds, either V	orted crashes, of typ ffic signal, have occi /hr for 4hr, or 152 fo Varrants 1-A or 1-B	5 crashes 2004 2 crashes 2005 4 crashes 2006 correctible by signalization 80% volume of warrant 1B is satisfied	YES	
8 – Roadway Network	Interse	ction of two major ro	N/A	N/A	

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ROADWAY AND INTERSECTION DESCRIPTION:

Franklin Street. - This roadway is one-way eastbound, closed section, and consists of three travel lanes during AM peak hours (7:00 AM to 9:00 AM on weekdays) plus a parking lane on the south side of the roadway. At all other times, there are two travel lanes with parking lanes on the north side and south side of the street. This street is classified as an arterial. The posted speed limit is 25 mph.

<u>South Columbus Street.</u> - This roadway is a two-lane (one travel lane in each direction) closed section, undivided facility, which runs in a north-south direction. Columbus Street is classified as a residential collector. The posted speed limit is 25 mph.

The intersection is currently controlled by a two-way stop with stop signs on the South Columbus Street approach. Land uses near the intersections are primarily residential. A convenience store is located in the southwest quadrant of the intersection.

The closest signalized intersection to the east of this intersection is Washington Street at Franklin Street. The closest intersection to the west of this intersection is Route 1 at Franklin Street. These two intersections are located approximately 325 ft to the east, and 650 ft to the west, respectively.

Roadway pavement and pavement markings are in fair condition at, and near the intersection. Roadway signage is in fair condition.

As an interim measure, "Cross Traffic Does Not Stop" signs have been installed on Columbus Street to remind drivers that Franklin Street vehicles have right-of-way.

The new traffic signal will include pedestrian infrastructure. Due to significant fluctuations in the pedestrian volume, pedestrian movements will be actuated. Pedestrian push buttons will be installed on both sides of the mainline to facilitate pedestrians crossing Franklin Street. In addition, the side street vehicular movements of the intersection will be actuated. In the event that no vehicles are present on the side streets, the signal will provide the extra time to the mainline movements. In addition, the signal will be coordinated with the adjacent intersections.

Attachments:

- Eight-Hour Vehicular Volume Warrant Summary
- Accident Record Summary
- Collision Diagram
- Key Intersection Photographs

Warrant 1 - Eight-Hour Volume

Location: Franklin Street and South Columbus Street

Major Street: Franklin Street

Minor Street: South Columbus Street

Date Of Count: <u>11/6/2007</u>

		100% Volume Warrants ^e			80% Volume Warrants ^b			70% Volume Warrants ^c				56% Volume Warrants ^d						
Time	Major Street Two-way Volume	Minor Street Highest Volume Approach	t Minimum Vehicular Volume ^e		Interruption of Continuous Traffic ¹		Minlmum Vehicular Volume ^e		Interruption of Continuous Traffic ¹		Minimum Vehicular Volume ^e		Interruption of Continuous Traffic [†]		Minimum Vehicular Volume ^e		Interruption of Continuous Traffic ¹	
			Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor	Major	Minor
			600	150	900	75	_480	120	720	60	420	105	630	53	336	84	504	42
7 AM - 8 AM	810	85	1			1	1		1	1	1		1	1	1	1	1	_ ✓
8 AM - 9 AM	1076	74	1	_	1		1		1	1	1		1	1	1		1	1
9 AM - 10 AM	1033	62	1		1		1		1	~	1		~	~	1		1	1
10 AM - 11 AM	986	66	1		1		1		1	~	1		1	1	1		1	1
11 AM - 12 PM	627	64	1				1			1	1			1	1		1	1
12 PM - 1 PM	518	64					1			1	1			~	1		1	1
1 PM - 2 PM	497	79				1	1			1	1			1	1			1
2 PM - 3 PM	478	68								1	1			1	1			1
3 PM - 4 PM	455	101				~				✓	1			~	1	~		✓
4 PM - 5 PM	571	242		~		1	1	✓		✓	1	1		1	1	✓	~	√
5 PM - 6 PM	644	276	1	1		1	1	~		1	1	~	1	1	1	1	1	✓
6 PM - 7 PM	633	169	1	1		1	1	1		 Image: A second s	\	~	1	1	~	\$	~	~
Number of Hours Warrant is Met		2	2 0 2			3 4		4	<u> </u>			6	5 9			9		
Wa	rrant Fulfilled			N	ю			N	0	NOT APPLICAE		LICABL	E	NOT APPLICABLE			E	

Warrant is satisfied if one (1) of the above volume warrants is fulfilled

WARRANT SATISFIED: NO

NOTES:

- a. Basic minimum hourly volume (8 hours of Conditions A or B required to fulfill warrant)
- b. Used for combination of Conditions A and B after adequate trial of other remedial measures (8 hours of Conditions A and B required to fulfill warrant)
- c. May be used when the major-street speeds exceeds 70 km/hr (40 mph), or in an isolated community with a population of less than 10,000 (8 hours of Conditions A or B required to fulfill warrant)

d. May be used for combination of Conditions A and B after adequate trial of other remedial measures when the majorstreet speeds exceeds 70 km/hr (40 mph) in an isolated community with a population of less than 10,000 (8 hours of Conditions A and B required to fulfill warrant)

e. Condition A

f. Condition B

Alexandria Police Accident Listing Report

Date Range: 1/1/2004 To 8/31/2007 Geography: Intersection - FRANKLIN ST AND S COLUMBUS ST

* Other parameters may be limiting the results

Time Range: 0000 To 2400

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Total Accidents: Accident Accident Location Date Time

Event #1 Dav Case# 104106002 03-Feb-04 1505 FRANKLIN ST & S COLUMBUS ST Tuesday ANGLE 104106180 04-Feb-04 1236 FRANKLIN ST & S COLUMBUS ST Wednesday ANGLE 104115204 24-Mar-04 0800 FRANKLIN ST & S COLUMBUS ST Wednesday ANGLE 104122246 29-Apr-04 0830 FRANKLIN ST & S COLUMBUS ST Thursday ANGLE 104131625 12-Jun-04 1047 FRANKLIN ST & S COLUMBUS ST Saturday ANGLE 104135517 29-Jun-04 1230 FRANKLIN ST & S COLUMBUS ST Tuesday ANGLE 104149311 31-Aug-04 1430 FRANKLIN ST & S COLUMBUS ST Tuesday OTHER 104152080 13-Sep-04 1730 FRANKLIN ST & S COLUMBUS ST Monday ANGLE 104153563 21-Sep-04 0801 FRANKLIN ST & S COLUMBUS ST Tuesday ANGLE 104168436 04-Dec-04 1027 FRANKLIN ST & S COLUMBUS ST Saturday ANGLE 105163527 30-Nov-05 1050 Wednesday ANGLE FRANKLIN ST & S COLUMBUS ST 105166045 15-Dec-05 0830 FRANKLIN ST & S COLUMBUS ST Thursday ANGLE 106105822 03-Feb-06 1533 FRANKLIN ST & S COLUMBUS ST Friday ANGLE 106109156 23-Feb-06 1529 FRANKLIN ST & S COLUMBUS ST Thursday ANGLE 106120687 29-Apr-06 1200 E FRANKLIN ST & S COLUMBUS ST Saturday SIDESWIPE - SAME DIRECTION 106128446 08-Jun-06 1241 FRANKLIN ST & S COLUMBUS ST Thursday **BACKED INTO**

3/12/2008 3:25:50 PM Source PRISM, Raw Data Only

Case#	Accident Date	Accident Time	Location	Day	Event #1
106144867	29-Aug-06	1035	FRANKLIN ST & S COLUMBUS ST	Tuesday	
106157414	04-Nov-06	0354	FRANKLIN ST & S COLUMBUS ST	Saturday	
106157507	04-Nov-06	1621	FRANKLIN ST & S COLUMBUS ST	Saturday	
106164353	14-Dec-06	1600	FRANKLIN ST & S COLUMBUS ST	Thursday	
107109322	28-Feb-07	0754	FRANKLIN ST & S COLUMBUS ST	Wednesday	
107116953	15-Apr-07	1210	FRANKLIN ST & S COLUMBUS ST	Sunday	
107122356	15-May-07	0830	FRANKLIN ST & S COLUMBUS ST	Tuesday	
107141870	25-Aug-07	1401	FRANKLIN ST & S COLUMBUS ST	Saturday	

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Photograph A. Looking west on Franklin Street.

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Photograph B. Looking north on S. Columbus Street



Photograph C. AM peak period - Spillover from upstream intersection. Signal at Washington Street and Franklin Street is in the background.



Photograph D. PM peak period - Typical queues on southbound Columbus Street.

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