

AERIAL UNIT STUDY

**Prepared for the Fire and Rescue Commission
Operations Committee**

October 1, 2001

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INTRODUCTION

At the October 25, 2000 FRC Operations Committee meeting, Chairman Ron Ogens and Fire Administrator Gordon Aoyagi concurred with the need for an "Aerial Unit Study of the MCFRS". The scope of the study included the following issues:

1. To update the 1995 Aerial Unit Study to meet current and projected needs as outlined, and to make recommendations to the Fire and Rescue Commission regarding short term/long term solutions for strategic deployment of MCFRS aerial units. The criteria for such equipment should be based upon response times, risk assessment in response areas, efficiency and effectiveness in the deployment of such resources, improvements to the public safety, and other appropriate factors.
2. To specifically address and provide recommendations on the following:
 - Memorandum from the Fire Administrator to the FRC Operations Committee dated October 12, 2000, regarding Bethesda Fire Department Aerial Tower 20.
 - Kensington VFD's request to the Fire Administrator dated September 14, 2000, to reconsider the staffing restrictions previously placed on the operations of Truck 5.
 - Silver Spring VFD's request to the FRC Operations Committee, dated October 31, 2000, urging the restoration of aerial ladder service, including vehicle and personnel to Fire Station 1.

On December 13, 2000, an "Aerial Study Work Group" was assigned to complete this Aerial Unit Review. The workgroup included membership encompassing various backgrounds, assignments, and experience with aerial units. They are:

DFRS Representatives:	District Chief Richard Bowers Captain Valerie Tarbox Master Firefighter Matthew Trivett
LFRD Representatives:	Chief Craig Baker Deputy Chief Paul Quigley Assistant Chief Tom Musgrove
Operations Committee Co-Chairs	FRC Commissioner Chief Paul Sterling Assistant Chief Philip Guercio
MCFRS Staff:	District Chief Elwood Ey

The workgroup included a member from each of the four previous Montgomery County truck/quint reports: Assistant Chief Tom Musgrove served on the original 1985 "Aerial Ladder Truck Study"; Chief Craig Baker served on the 1993 "Assignment of Aerial Units in Montgomery County"; and Assistant Chief Guercio worked on both the 1995 "Assignment of Aerial Units and Rescue Squads in Montgomery County" and the 1995 "Report of the Quint Workgroup". This membership composition contributed significant familiarity with the previous work and recommendations, and provided balanced perspectives from both the career and volunteer viewpoints.

The workgroup began actively meeting in January 2001, and began to develop consensus on the issues assigned to the workgroup, as well as on additional issues developed by the workgroup. From the beginning, the group believed that understanding the work of the previous studies was critical for two reasons. First, a tremendous amount of work had been applied to the subject of aerial units in Montgomery County. In order to provide an "update" regarding aerial unit deployment, one must carefully review the prior work, recommendations, and decisions regarding aerial units. Secondly, the three specific issues the workgroup was charged to review: the operation of T5, restoring T1, and determining the future of T20, have all been examined in the past. The workgroup had to determine whether circumstances had changed, or if prior decisions needed reconsideration.

**PART I:
REVIEW OF PREVIOUS MONTGOMERY COUNTY AERIAL UNIT REPORTS**

PURPOSE: To provide an update of aerial unit issues in Montgomery County and respond to the specific workgroup charges, the initial section of this report reviews the methodology, and recommendations made and adopted from prior reports.

REVIEW OF PREVIOUS MONTGOMERY COUNTY AERIAL DEPLOYMENT STUDIES

As stated in the Introduction, the workgroup believed that thorough review of the previous reports on aerial unit deployment was essential. Four elements are critical components for this review:

1. An overview of the 1985, 1993, and 1995 reports;
2. Examination of the methodology used to arrive at the reports conclusions;
3. Examination of the recommendations made; and
4. Examination of the recommendations actually adopted.

AERIAL LADDER TRUCK STUDY – MAY 1985

The 1985 “Aerial Ladder Truck Study” is a thorough and comprehensive report on aerial ladder deployment in Montgomery County. The study is composed of five specific areas, including local truck history, truck functions, types of trucks, cost analysis, and a location analysis. A final section summarizes the report's recommendations. Though this particular report was written 16 years ago, it is important to review in detail three specific areas: the location analysis (below), types of trucks (p. 30, pp.33-38), and summary recommendations (p. 8).

Location Analysis. Three related issues always seemed to be linked to our County’s “Truck Studies.” These are: “how many aerial units do we need?” “where should they be located?”, and “what configurations should be assigned where?” These were the issues in 1985, and interestingly, are the same issues today.

The 1985 workgroup used a location analysis consisting of nine steps:

1. Review of Relevant Available Fire Service Literature
2. Facility Analysis
3. Examination of Existing Population and Land Use
4. Examination of Projected Population and Land Use
5. Identification of Population Density Patterns
6. Classification of Truck Service Types
7. Development of Assessment Criteria
8. Assessment of Montgomery County Fire Protection Response Areas
9. Recommended Assignment of Existing and Projected Truck Vehicles

The text of this analysis is contained on pages 20-32 of the 1985 report. A comparison of the existing truck locations in 1985 to the proposed truck locations is found in Table1.

Table 1 – Aerial Recommendations 1985 Truck Study (as of May 1985)

Fire Station	LFRD	EXISTING	PROPOSED
1	SILVER SPRING	YES	YES
2	TAKOMA PARK	YES	NO
3	ROCKVILLE	YES	YES
5	KENSINGTON	YES	YES
6	BETHESDA	YES	YES
8	GAITHERSBURG	YES	YES
11	GLEN ECHO	YES	YES
12	HILLANDALE	NO	YES
13	DAMASCUS	NO	YES
15	BURTONSVILLE	NO	YES
18	KENSINGTON	YES	YES
19	SILVER SPRING	YES	YES
20	BETHESDA	YES	NO
23	ROCKVILLE	YES	YES
24	HILLANDALE	YES	NO
25	KENSINGTON	YES	YES
26	BETHESDA	YES	YES
29	GERMANTOWN	NO	YES
31	ROCKVILLE	NO	YES
40	SANDY SPRING	NO	YES

NOTE: Truck service from FS10 was not recommended in the 1985 report.

The 1985 aerial location analysis examined both a station's first due area characteristics and regional deployment issues. Hence, the analysis indicated aerial units should be located at FS 20, 16, and 2. However, additional regional analysis indicated that these areas could be adequately served with aerial apparatus and/or rescue squads responding from neighboring areas.

New truck service was recommended for Fire Stations 15, 40, 13, 29, and 31. These recommendations were made using population and land use projections in 1985. They also were made to coincide with the construction of new fire Stations 15 and 31. FS13 is the only station that was recommended in the 1985 study to eventually provide aerial service that currently does not. This study proposed 17 aerial units, including 7 tractor/trailer, 5 aerial platforms, and 5 quints.

Of particular interest is that T-20 and T-2 are recommended to be disbanded. At this point the Fire and Rescue Service Master Plan recommended a down county fire station consolidation involving Silver Spring FS1 and Takoma Park FS2. Two trucks are recommended for service in the Silver Spring/Takoma Park areas. The deployment of T-5 and AT-20 are also issues that were resolved in the past. However, these aerial deployments remain an issue in our fire service today.

1985 STUDY SUGGESTIONS AND CURRENT APPLICATION

The 1985 Truck Study made 25 overall recommendations. The analysis below examines each recommendation and its status in 2001.

- **Perform a truck staffing level study and establish a minimum and consistent staffing levels for all trucks.**

In 1986, Ryland Research, Inc, from Santa Barbara, California, conducted a study on "Staffing and Apparatus Standards for Montgomery County Fire/Rescue Services. " The study recommended 4 person staffing on engines in urban areas and 3 person truck staffing. The Fire and Rescue Commission (FRC) subsequently established a staffing standard in 1990 with the adoption of Executive Regulation 14-90AM "Apparatus Staffing Policy". This regulation establishes minimum staffing of aerial units with 3 qualified personnel, and a desired staffing level of 4 qualified personnel. FRC regulations also establish the training and experience levels required for staffing various positions on the apparatus. Aerial unit staffing will be discussed further in this report.

- **Establish truck standard operating procedures.**

Structural firefighting "Standard Operating Procedures" (SOPs) have been effective for Countywide application since 4/12/90. The first SOPs were based upon the type of structure and its location in the County. Hence, operations were based upon whether the incident was a single family detached house fire, or building (multi-family, commercial, high-rise) fire. Secondly, the incident's location, either in an urban (hydranted) or rural (non-hydranted) area, was used to determine the apparatus assignment and corresponding SOP.

In January 2001, the FRC adopted an updated SOP that merged all structural fire assignments into one operational SOP. This "SOP for Safe Structure Firefighting Operations" establishes a standard operational dispatch and SOP. Special provisions for High Rise and structures in non-hydranted areas are included.

- **Establish a minimum truck equipment list**

The workgroup makes equipment inventory recommendations in the body of the report.

- **Due to the specialized nature and scope of the work which requires "one of a kind" expertise and equipment, truck rehabilitation should be performed by the vehicle's original manufacturer.**

Aerial unit rehabilitation is performed by the vehicle's original manufacturer.

- **Develop guidelines to serve as the basis for truck rehabilitation and replacement decisions**
- **Consider truck rehabilitation as a cost-effective means for extending the life of existing vehicles**

Truck rehabilitation does extend the life of aerial units. Aerial unit rehabilitation is normally conducted at approximately the unit's 10th year of frontline service. Generally, aerial units serve 20 years in frontline service.

- **Adopt and follow a truck rehabilitation and replacement schedule**

MCFRS has adopted a truck rehabilitation schedule and is in general compliance with the schedule. See "Status of the Fleet" for additional discussion.

- **Consider all costs in planning for the implementation of future trucks.**
- **Delete Truck 20 or place it in the reserve fleet.**

This recommendation was never implemented. Instead, the Master Plan Apparatus Subcommittee made the following recommendations on March 28, 1992:

- a. Retain aerial unit service at FS20
- b. Discontinue ladder truck service from FS5
- c. Discontinue aerial ladder service from FS11
- d. Establish aerial ladder service from FS10
- e. Discontinue aerial ladder service from FS26

These recommendations were embodied in the 1993 report, "Assignment of Aerial Units in Montgomery County," and were implemented by the FRC on January 15, 1994.

- **Place a quint at relocated FS15.**

Truck service was established at relocated FS15. Currently, T15 is a 1999 Pierce 100' Aerial Ladder purchased by the Burtonsville Volunteer Fire Department.

- **Relocate Truck 24 to FS12 when T15 is placed in service.**

T24 was relocated to FS12, which currently houses a 1999 Seagrave 100' Tractor/Trailer aerial ladder.

- **Place Truck 2 in the reserve fleet.**

T-2 remains in service today. It is a 1984 Seagrave 100' Tractor / Trailer aerial ladder. The 1985 study states on page 27 that "truck service to any revised Silver Spring and Takoma Park response areas requires the placement of two truck vehicles." The 1993 report recommended moving

aerial service from either FS1 or FS2 to FS16, and transferring T24 to FS40. In fact, T24 was transferred to FS12, and Tower 1 was permanently placed out of service on March 15, 1998. Two aerial services remain in the Silver Spring/Takoma Park areas as recommended, deployed at FS2 and FS19.

- **Replace T18 in FY86.**

Aerial Tower 18 is a 1999 E-1 95' tower.

- **Purchase and place in service Truck 29 with FY85 funds as soon as possible.**

T29 was placed in service. The unit is currently a 1986 Seagrave 100' Rear Mount aerial ladder.

- **Place a truck at FS13 when projected growth is achieved.**

Truck service is not deployed at FS13. In 1990, the Fire, Rescue, and Emergency Medical Services Master Plan Task Force concurred with the 1985 Truck Study suggestions. However, the anticipated growth for significant buildout of commercial or multi-story residential structures in the Damascus area was not realized. A shortcoming of the 1985 report is that "threshold" parameters for establishing truck service are not identified. Therefore, we don't know if the Damascus area has reached the projected benchmark at this time. This report will update the status of the Damascus area.

- **Place a truck at new FS31.**

FS 31 currently houses a 1994 -100' Seagrave Rear Mount aerial ladder.

- **Place a Truck at FS40 when projected growth is achieved.**

A 100' Pierce Quint, purchased by the Sandy Spring Volunteer Fire Department, is currently housed at FS40.

- **Standardize the truck vehicle fleet to include only the following truck vehicle types: 100' tractor/trailer, 100' telescopic aerial platforms, and 100' rear mount aerial platform Quint units.**

The current aerial unit fleet includes: six 100' tractor trailer aerial ladders, four 100' rear mount aerial ladders, four 95' Tower Ladders, one Aerial Tower, and one rear mount Quint.

- **Through attrition, place 100' telescopic aerial platforms at FS 1, 6, 8, 18, and 23.**

Tower ladders or aerial platforms are currently located at FS 19, 20, 8, 18, and 23. A Pierce 95' "All Steer" Aerial Tower will be located at FS6, and the unit is currently under contract.

- **Through purchase or attrition, place 100' rear mount aerial Quints at FS13, 15, 29, 31, and 40.**

Quint 40 is the only unit of its type in Montgomery County. The current report will discuss Quint utilization.

- **Develop improved databases for future analysis purposes.**

EMBRs, CAD data, and GIS mapping and projection capability offer significant information for fire service operational analysis. However, sufficient staff must be available to use these systems.

- **Obtain a PTI type package for future analysis and study verification purposes.**

PTI packages were purchased, but this type of program has evolved to the GIS application that is now available.

- **The reserve truck fleet should consist of one truck for every four trucks in service.**

The current reserve truck fleet consists of 4 aerial units. Specific recommendations regarding the reserve fleet are made in the body of this report.

- **Utilize the reserve fleet to retain existing truck service and to implement new service as soon as possible.**

The reserve fleet is used to maintain the first line fleet of 14 aerials in service. Even with 4 units in the reserve fleet, MCFRS frequently operates with fewer than the recommended aerial units in service.

- **Review and update the aerial unit study every 3-5 years.**

Previous aerial unit studies were completed in 1993 and 1995, and a Quint report was submitted in 1995. The discontinuation of aerial service at Fire Station 1 on March 15, 1998, and the deployment of Quint 40 in 1995 are other significant actions affecting the aerial fleet.

1993 TRUCK REPORT: "ASSIGNMENT OF AERIAL UNITS IN MONTGOMERY COUNTY"

The 1993 report was written primarily by Commissioners Robert Kidd and Alan Siegel, with several members of the Fire and Rescue Service serving on the study group.

The primary focus of the study was to make recommendations that would reduce the truck fleet from 17 aerial units to 15 aerial units. The underlying issue was

the immediate need to replace T25 and AT8; however, adequate funds were unavailable to purchase two new aerial units at an estimated cost of \$1 million. The County's economic shortfall was such that the report states:

"This was an exercise in the management of scarce resources. While we are convinced that the County can be quite adequately covered by 15 aerial units, at no time did we receive any indication from any source that \$1 million could be found to retain the status quo. We, of course, believe the 17-unit status quo to be excessive in terms of total vehicles, as well as having a number of vehicles in the wrong place". (Page 2)

The methodology used by the workgroup to arrive at its recommendations was group discussion, examination of box cards, the review of previous papers on the subject, and consideration of field comments. The structural capability enabling fire stations to house aerial units was a further consideration.

For discussion purposes, it is interesting to note several aspects of this study. First, box cards were used to review proposed aerial unit deployment. Second, the concept of an "engine:truck ratio" is first introduced. Based upon a recommended engine:truck ratio of 2 – 2.5 engines:1 aerial, the workgroup concluded that 17 aerial units exceeded Montgomery County's needs. These two concepts are important because both points remain valid today and were used by the workgroup.

The recommendations of the 1993 workgroup were adopted and implemented by the FRC on January 15, 1994. The recommendations included the specific relocation of certain aerial units on a temporary basis, which is no longer relevant today. However, recommendations to relocate truck service in several areas of the County were adopted. This realignment was consistent with the recommendations that the Master Plan Apparatus Subcommittee presented to the FRC in March 1992.

Aerial realignment consisted of:

- The transfer of T5 to FS25. "This reassignment will provide interim relief to the T-25 problem. Existing T-25 can be permanently placed out of service and, if necessary, cannibalized for parts to be used on the remaining 1973 Seagrave left in service. Statistics do not support the continuation of a ladder truck assignment at FS5. FS5's response area can very appropriately be covered by the surrounding ladder trucks/aerial towers". These aerial units are assigned to FS18, FS19, FS 20, and FS23.
- The transfer of T11 to FS10. "The assignment of a truck to FS10 will provide for better truck service to the River Road corridor - a growing area with a multitude of large structures - and provide coverage for the FS11 and FS26 areas, coupled with other truck support from FS6, 20, and 23."
- Remove T26 from service. "T26's first due area, which has a high ratio of fully sprinklered buildings, can be more than adequately served by AT20, AT23, and T10. "

There were several other recommendations regarding the aerial unit fleet and its deployment.

- An "ELF" (Engine-Ladder-Foam) unit was programmed for FS28 in FY94, but was never purchased.
- "Develop within the Executive Branch, to include the FRC, DFRS, and OMB, a consensus to adhere to existing vehicle replacement schedules that will arrest the aging of the current fleet starting with the FY1995 budget cycle, and include the FY1995 replacement of T-25 with a tractor-drawn type unit and T-19 with a Quint-type unit that would also replace E-191." T-19 was recommended to be reassigned to FS15.

Of interest, both of these reports identified the need to develop and adhere to vehicle replacement schedules. Second, implementation of Quints into the service continues as an active recommendation.

The 1993 report closed with these recommendations:

"Conduct a further review of aerial assets in the eastern portion of the County in approximately 18 months (May 1995). At that time, consider the two following actions:

1. Transfer either AT1 or T-2 to FS16 to reinforce truck service to the eastern section of the County and the lower Hillandale area, while maintaining more than adequate truck coverage to the downtown Silver Spring sector from FS 2 and 19. Consider replacing Engine 11 with a Quint as soon as feasible.
2. Transfer T-24 to FS40. As the northeastern portion of the County becomes more developed and densely populated, the time has come to expand truck service to this area. The entire Hillandale sector can be covered by aerial devices from FS1/2, FS16, FS18, FS25, and FS15, and FS40."

In review, we now know that a down-County station merger of either FS1/19 or FS1/2 will not occur. Both FS1 and FS2 will be rebuilt, and will continue to operate as individual stations.

T-24 was transferred to FS12 and currently remains there, consistent with recommendations in the 1985 Truck Study. That study also recommended "Quints" to be assigned to both FS1 and FS19, and assignment of an ELF unit to FS28. Again, the only Quint currently operating in Montgomery County is Quint 40, which was placed in service by the Sandy Spring Volunteer Fire Department. This is the second report to recommend the use of Quints in Montgomery County, but the deployment of Quints remains an active issue for the service to resolve.

Two additional issues later arose affecting the aerial fleet. First, the FRC allowed Kensington to operate T5 with special staffing restrictions in place. Essentially,

FS5 must staff E51 and A59 before T5 can be staffed and placed in controlled status. Second, AT1 was permanently placed out of service on March 15, 1998, as a result of the economic constraints at the time. However, it brought about the previous deployment recommendations that two aerial units serve the lower Silver Spring / Takoma Park areas

ASSIGNMENT OF AERIAL UNITS AND RESCUE SQUADS IN MONTGOMERY COUNTY - OCTOBER 11, 1995

A final recommendation of the November 1993 study titled "Assignment of Aerial Units in Montgomery County" was to evaluate the assignment of aerial units in the eastern section of the County in approximately 18 months, just before the opening of relocated FS15. The actions considered as "candidates" during this study were already discussed in the previous section. These included the relocation of either T-2 or AT1 to FS16, and the movement of T-24 to FS40. From the historical perspective, we know that T-24 was relocated to FS12, and AT1, rather than being relocated, was permanently placed out of service. Also, T-5 has remained in place as a "volunteer" unit, with special staffing restrictions imposed by the FRC.

The FRC amended the focus of the 1995 study to include an evaluation of "the deployment of 'special service' units County-wide". However, the report noted that such a deployment assessment was "an academic issue because all rescue squads except one are corporation-owned, and relocation by the FRC is not practicable. In addition, corporations are acquiring their own aerial devices and reassignment will be more difficult in the future".

This study took a different direction, focusing on alternative force structures and required force strength. The relationship between the number of aerial units and rescue squads was not established. However, of interest to this aerial unit update, the 1995 study:

- Examined requisite staffing levels. It concluded that the current 3 person staffing required the use of 31 engines, 11 trucks, and 3 Rescue Squads, that 4-person per unit staffing would require the deployment of 30-combination pumper (quint or rescue pumper) and 3 trucks/squads.
- Concluded that "we have too many single function aerial devices and rescue squads and they are not necessarily located in the right places."
- Recommended "we begin purchasing equipment capable of functioning in more than one role, or performing a different role from dispatch to dispatch; i.e., quints and extrication engines. We need to move away from the traditional engine, aerial device, rescue squad concept toward multi-role equipment and personnel."

The report was received by the FRC, but none of its recommendations were implemented.

REPORT OF THE QUINT WORKGROUP - MARCH 1995

The Quint Work Group was established at the direction of the FRC on June 27, 1995. Its charge was to review and evaluate the operation of Quints, and to make recommendations to the FRC regarding staffing, dispatch, operational procedures, and general specifications for this type of apparatus. In August 1994, the FRC approved the purchase of Q40 by the Sandy Spring VFD. This shifted the focus of the report from conceptual to preparing for the introduction of Q40 into fire/rescue operations in Montgomery County. Recommendations for staffing, dispatch, operational procedures, specifications, and equipment inventory were made. A specific evaluation of Quint 40 operations was also instituted. (See Quint Report below.)

FINAL REPORT OF THE QUINT WORK GROUP

The "Final Report of the Quint Workgroup" was the result of the 18-month evaluation period of Quint 40's operations. The findings, conclusions, and recommendations are of significant interest to this aerial unit update, and are discussed in their entirety.

FINDINGS

- Quint 40's "engine" dispatches outnumbered its "truck" dispatches by a 9:1 ratio.
- Sufficient staffing (i.e., at least 6 personnel) was seldom available for Quint 40 to function as two minimally-staffed companies (i.e., engine and truck), thus limited opportunity existed to fully test the Quint concept as a dual-function operation from a single vehicle.
- On most of the incidents where Quint 40 was dispatched as an engine but performed truck functions instead, positive pressure fans, not the aerial ladder or ground ladders, were the predominant truck-related equipment used.
- No evidence surfaced that indicated that changes were needed to the general quint specifications listed on pp.11-12 of the Quint Work Group's original report.

CONCLUSIONS

- Station 40's area still may not be built out to the point of requiring truck service, as indicated by the evaluation findings.
- The Quint 40 experience neither strongly supports nor discounts the need for Quints in Montgomery County.
- The total equipment complement on the Quint could be reduced, although a few items may be worthy of adding or modifying (booster line or trash line, 3" supply hose, etc).

- If County-funded Quints are to be purchased in the future, consider:
 1. placing them at stations in urban settings;
 2. staffing them with at least six personnel to enable proper evaluation of the Quint as a dual-functioning unit; and
 3. equipping them with 100' aerial devices. If Quints are purchased for a rural/suburban setting, then consider a single rear-axle and a 65-75 foot aerial device.

RECOMMENDATIONS

- Existing Quint 40 operational procedures should continue to be used. However, a County-wide Quint SOP should be developed based upon input from the SSVFD and fire departments outside the County that have had long-term Quint experience.
- Quint 40 should continue to be dispatched as the primary suppression unit from Station 40, with a SSVFD reserve engine placed at Station 4 or 40.
- A revised standard Quint inventory should be developed, with input from the SSVFD. The additions and modifications below should be considered:
 - Add a booster or trash line
 - Add leak plugging material
 - Add a helicopter standby kit
 - Add a carbon monoxide monitor
 - Substitute 3" or 4" supply line, rather than existing 5" hose
 - Increase total ground ladder footage
- Minimum staffing of Quints should remain at three, with desired staffing of at least six personnel to allow for dual engine-truck operations.

Since the use of Quints is a recommendation found in every aerial report written in Montgomery County, they will be addressed in this aerial unit update. However, currently, Q40 remains the only Quint in service in the County.

SECTION SUMMARY. This section reviews the previous aerial unit reports completed by Montgomery County. The recommendations made in each report are discussed, and implemented recommendations are identified.

The issues identified for current review are not new, including the deployment of T5, AT20, T26 and T10, and T1, and recommendations to implement aerial service at FS40 and FS13. These issues are being reevaluated in this report, and the need to upgrade aerial service, particularly in the Olney and Damascus neighborhoods, is re-assessed.

PART II: ANALYSIS OF CURRENT DATA

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Aerial Deployment and FRC Master Plan Response Time Goals

This section uses a variety of data and analysis techniques to evaluate current and recommended aerial unit deployment. First, an evaluation of aerial unit response times is developed using GIS projections and actual data from CAD.

Second, a system is developed to “rate” each fire box area in the County for efficient aerial unit response. Finally, data regarding aerial incidents by fire station area is used to show how incidents requiring response of aerial units are distributed across the County.

Evaluate Aerial Unit Deployment using the FRC Response Time Goals established in the 1994 FRC Fire, Rescue, and Emergency Medical Services Master Plan.

On February 29, 2000 the Montgomery Council adopted amendments to the "Fire, Rescue, and Emergency Medical Services Master Plan." Response time goals were adopted that included density-related goals for urban, suburban, and rural areas of the County. The response times goals are intended to be used as planning goals for decisions on allocating apparatus and personnel, and to site or relocate fire and rescue stations. **The "response time" is defined as the elapsed time from the initiation of a call to 911 in the ECC to the arrival on the scene of the appropriate fire/rescue unit.**

Fire response time goals are:

Fire Incident	Time Goal	Percent of time	Special Service	Percent of time	Entire Assignment	Percent of time
Engine	5 min	50%	9 min	80%	10 min	90 %
Engine	6 min	90%	9 min	80%	10 min	90%

Supplementary to response time goals adopted by the FRC in July 1998 are a set of goals that correlate response times to population density. Three zones were established: urban, suburban, and rural. These goals supplement the Countywide fire response goals indicated below:

Zone	Engine Response	% of Population
Urban	6 - minutes	85%
Suburban	6- minutes	65%
Rural	6 - minute	25 %

The FRC response time goals for special service units and full box alarm assignments remain unchanged for the urban, suburban, and rural zones.

Using the current location of aerial units, the workgroup developed CAD data for aerial response into each fire station area. CAD Data for CY2000 Structural Fire Assignments was used in this analysis. In theory, this is a sound approach. However, the workgroup found that much of the data for the “enroute” and “on scene” times was either not available or appeared inaccurate. We believe this occurred when a unit fails to properly status itself in either or both the “enroute”

and “on scene” messages. Another limitation of the data is the number of aerial responses used in the analysis for each fire station area. The greater number of responses used would tend to validate the average response time. However, even with the elimination of the data the workgroup believed to be skewed, the data for truck response into fire station areas is important, and presented in Table 1. The data is particularly important in subsequent discussion and recommendations regarding T5, T1, and T20, and overall deployment discussion.

Further, the workgroup recommends that the MCFRS evaluate aerial unit response times, which could be accomplished in a number of ways. One method that we believe effective is to assign light duty personnel to appropriate units. These personnel would use stopwatches to record the duration of a unit’s response, and use odometer readings to determine the distance traveled. The MCFRS could use this data to either validate or disprove the RAND model used in planning.

Table 2: Truck Travel Time into Fire Station Areas
CY2000 Structural Fire Assignments

Fire Station	Avg. Travel	+Dispatch	Fire Station	Avg. Travel	+ Dispatch
1	4:13	6:13	17	10:26	12:26
2	4:17	6:17	18	4:19	6:19
3	5:56	7:56	19	3:53	5:53
4	9:37	11:37	20	5:59	7:59
5	4:09	6:09	21	4:57	6:57
6	4:10	6:10	23	4:13	6:13
7	6:07	8:07	24	5:58	7:58
8	5:06	7:06	25	5:04	7:04
9	8:25	10:25	26	5:27	7:27
10	5:50	7:50	28	7:20	9:20
11	5:43	7:43	29	6:38	8:38
12	4:50	6:50	30	8:49	10:49
13	12:28	14:28	31	6:25	8:25
14	13:11	15:11	33	10:12	12:12
15	5:03	7:03	40	9:26	11:26
16	4:53	6:53	R1	3:47	5:47
			R2	5:34	7:34

This analysis indicates that 24 fire/rescue station areas meet the FRC’s established goal for truck deployment. One station, FS28, is just beyond the response time goal, and eight station areas-- FS 4, 9, 13,14, 17, 30, 33, and 40-- exceed a 10 minute average truck response. However, the FRC response time goal was for special service arrival in 9 minutes. This analysis looks only at truck response. One could conclude that rescue squad response from FS 4, 9,17, 30, R1 and R2 would achieve a positive impact on special service response goals.

With respect to the FRC special service response time goals, the workgroup has some comments.

- First, the response time goals are a good starting point to evaluate the deployment of fire/rescue units. However, we believe that truck response time goals should have a relationship to the type of area served. This workgroup also endorses the concept that the truck response time should be linked to the engine response time for the given area. For example, if E-11 can be expected to arrive on scene to a structure fire in 6 minutes, then to be effective, the truck must arrive shortly thereafter. If E141 is not expected to arrive on the scene of a structure fire for 15 minutes, ideally, the truck would arrive shortly thereafter. There should clearly be a different expectation for delivery of truck service in the various urban, suburban, and rural areas of the County. We recommend that the FRC establish separate truck response time goals for the urban, suburban, and rural areas of the county.
- Although there are some mutual capabilities shared between rescue squads and aerial units, we do not believe that a response time goal that combines these special services as "one" is adequate. The areas comprising significant numbers of apartments, townhouses, commercial buildings, and high-rises require increased availability of aerial service independent of the location of rescue squads.
- In addition, when evaluating the capability to extricate victims from a variety of complex situations, the current special response goals do not adequately address these circumstances. For example, for an incident with "one pinned" in an automobile collision, a truck may meet the response goal of the FRC, but have no vehicle extrication capability. Overall, the FRC response time goals establish criteria for fire, BLS, ALS, and special service response times. However, "rescue" service requires its own response goal.

RAND PLANNING MODEL AND GIS ANALYSIS

A method to determine effective response areas for aerial units is to use the RAND Model and GIS to "map out" aerial unit coverage. This technology is now available to MCFRS and been used in a variety of related projects. Essentially, the RAND Model was validated in New York City in the 1970s. This study determined that fire apparatus has an average response speed of 38 MPH. Using the FRC Special Service response goal of 9 minutes (2-minute dispatch and turnout, and 7-minute road response), this correlates to a 3.8 mile response. GIS then "maps out" on the County road network those areas reached by these response criteria. This data will be shown on a map to be provided later.

BOX ALARM ANALYSIS

From a purely tactical perspective, truck support should arrive simultaneously with the first engine operating on a structural fire. All parties understand that this is not practical. However, the truck arrival has to be timely in order to support the firefighting operation. Montgomery County's own "SOP for Safe Structure Firefighting Operations" sets tactical priorities and responsibilities for each company on the initial structural alarm. Our most frequent fire, a "house" fire, requires that all of the following operations begin immediately as units arrive on the scene:

- Establish water supply
- Advance attack line
- Horizontal ventilation
- Vertical ventilation
- Search and victim removal

Outside ventilation must occur in conjunction with advancing the initial attack line. Search can not begin safely until the previous two operations are in progress. Outside ventilation allows the engine crew to safely advance to the seat of the fire. The advancement of hoselines and ventilation both ensure that the primary search can be conducted safely and quickly. There is a relationship and interdependence between the engine and truck operations that should be a primary consideration in the study of truck deployment. Since the efficiency of truck deployment is obviously dependent on fire station locations, we believe the key lies in an analysis of the box alarm assignments. The workgroup further believes that the optimum situation for effective structural firefighting is to have the 2 trucks assigned to the box arrive at, or before, the arrival of the 2nd and 4th engines.

The workgroup conducted an analysis of every box alarm assignment to determine the relationship between the engines and trucks on a box alarm. Each box area was "scored" with the following rating system:

- 1 –First truck with first or second engine, second truck with third or fourth engine
- 2 –First and second truck within 4 box engines
- 3 –First truck with 4 engines, second truck within 5 engines
- 4 –First truck with 4 engines, second truck over 5 engines
- 5 - zero trucks within 4 engines

*Quint 40 is calculated as a truck when it is 2nd due or greater

Each box area was rated, and the total number of points was divided by the number of box areas, thus creating "average" weighting. The results of this analysis are shown in Table #3 and summarized below:

Rating Summary of Table 3

Rating	Fire Station Areas
1.0	2,3,6,8,11,20,25
1.1 – 2.0	1,4,5,7,9,10,12,15,16,18,21,23,24,26,28,29,31
2.1 – 3.0	14,17,19,33
3.1 – 4.0	30,40
4.1 – 5.0	13

Table 3: Box Alarm Ranking

Fire Station	Ranking	Fire Station	Ranking
1	1.22	17	2.76
2	1.0	18	1.42
3	1.0	19	2.05
4	1.53	20	1.0
5	1.63	21	1.18
6	1.0	23	1.33
7	1.25	24	1.10
8	1.0	25	1.0
9	2.0	26	1.33
10	2.0	28	1.22
11	1.0	29	1.07
12	1.61	30	3.12
13	4.15	31	1.12
14	2.33	33	2.07
15	1.40	40	3.93
16	1.13		

*Quint 40 is calculated as a truck when it is 2nd due or greater

What does this analysis mean? First, recall that this analysis has no relationship to response time, but rather the relationship between truck availability to the engines on each box alarm in the County. While not conclusive in and of itself, it tends to support the previous decisions:

- The removal of aerial service from FS1 and FS11 has not created a significant detrimental impact, as the areas maintain the highest possible rating.
- The removal of aerial service from FS26 and FS 5 has not created a significant deployment issue, as the areas have two trucks on all but 3 box alarms.
- Placing T-10 in service improved truck service to the Cabin John portion of the River Road corridor without negatively impacting FS26 and FS11 areas.
- FS40, FS30, and FS13 areas have the highest ratings. Truck service from FS40 was recommended in both the 1985 and 1993 reports. Consideration should be given to FS13's area, as the area continues to develop. The last review of this need was in 1993. Many factors have to be considered in such discussion; this is only one.
- Quint 40 has a positive impact on truck service delivery in the surrounding areas when it is dispatched as a Truck, rather than as an Engine.

INCIDENT ANALYSIS

The history of actual incident demand by fire station area is also a critical component of aerial unit deployment analysis. The workgroup elected to study data on incidents that require the dispatch of a truck or rescue squad (special service) on structural incidents. The workgroup believes the primary mission of truck companies is to support structural firefighting. Certainly aerial units may be used as a platform for other service delivery. However, their primary focus is structural firefighting support. Therefore, EMS responses and incidents that can be handled by other units were not considered. The workgroup believes that including this type of data, i.e. EMS responses, can skew the data that indicates the need for aerial unit deployment in the various regions of the County.

Therefore, this incident analysis included the following call types:

Adaptive	Automatic Fire Alarm	Barn
Alarm Bells	Box Alarm	Box Alarm/HM
Fire Out/Smoke	Food	Gas Leak
House	House Trailer	Lock out/w food
Odor of Smoke	Oven fire	Shed
Electrical Short		

Calendar year data for 1998, 1999, and 2000, were used in this analysis, as this data is current, complete, and in consistent format to permit valid comparisons.

In addition, the incident analysis has identified how many full structure fire assignments are dispatched by fire/rescue station area, and the ratios among house:building:high-rise alarms. The workgroup believes that analysis of this data is a good indicator of where the need for truck deployment exists, and is also a good measure of MCFRS' frequency of response to structural incidents. The data presented is for CY1998 – 2000, shown in Appendix D1., Incidents Requiring Truck Service.

DISCUSSION OF THE INCIDENT DATA

A few points regarding data development are worth discussing. First, the data uses "fire box" areas to determine incident locations. There are no R1 or R2 "1st due" areas used in this analysis since Rescue Company 1 and 2 do not operate engine and aerial apparatus. Again, the data is a three year average of 1998–2000 statistics. Some interesting points:

- If one compares the location of the "core" fourteen aerial units to the "workload" in structural assignments, some interesting points are found. The most active fourteen 14 fire station areas house eleven of the "core" aerial fleet. Only AT19, AT20, and T10 are housed in stations "slower" than the top fourteen. However, AT19 and AT20 provide coverage to the two most urbanized areas in the County, Silver Spring and Bethesda.

- 62% of the structural alarms occurred in these 11 fire station areas that are assigned aerial units. 69% of structural alarms occur in fire station areas assigned with one of the 14 “core” aerial units.
- 75% of the structural alarms occurred in the busiest 14 fire station areas. Of these areas, only FS1, FS 26, and FS28 do not house aerial units.
- The number of full structural dispatches and incidents cleared as “11’s” (EMBR code for “structure fire”) follow similar patterns.

**PART III – RESPONSE TO THE SPECIFIC CHARGES OF THE
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Response to Specific Charges of the Workgroup

Thus far, the report has provided the decision-making framework developed to answer the specific group charges, and to provide an aerial deployment update. This framework includes:

- Analysis of past aerial unit studies, recommendations, and current status of recommendations.
- Aerial unit travel time into fire station areas using CAD data
- GIS mapping using RAND planning data and assumptions
- Analysis of MCFRS truck response on Box Alarms
- Analysis of truck service demand by Fire Station area

Specific Study Issues

The workgroup was charged with addressing these issues:

1. Should MCFRS vary from our present apparatus specifications for aerial towers and develop a unique specification for an aerial tower that can fit in FS20?

Is there a benefit to MCFRS to continue to move towards standardization of its towers?

Update the aerial unit study and provide recommendations on how many towers are needed for the County and the manner of their strategic deployment.

Confirm or provide recommendations regarding Truck 5.

How many reserve towers are needed to provide an appropriate level of protection for MCFRS to serve the current and projected needs of the County?

Do the aerial tower deployment recommendations improve efficiency and effectiveness, public safety, and response time requirements for MCFRS?

2. What is the feasibility of modifying the physical configuration of FS20 to accommodate our standard design of aerial towers?

What would be the estimated time line for making such alterations?

What are the cost estimates for such a modification?

If the costs are substantial, requiring CIP funding, what are the impacts to operations if the current apparatus is operated until the FY03-08 CIP?

Would the Bethesda Fire Department consider requesting Senator Amoss funding for all or part of the facility modifications?

How would such funding strategies affect the timing for facility modifications?

3. Was the deployment of AT20 based on strategic initiatives from the 1995 aerial unit study, or other strategic plan?

If this aerial tower deployment was a strategic decision, is the rationale for the deployment of AT20 at FS20 still valid?

If the strategic requirement for aerial tower deployment was regionally based, as has been suggested, where is a suitable alternative to FS20?

4. If NIH is successful in purchasing and sustaining a Quint at FS51 can we, and/or should we, depend on this deployment in place of an MCFRS aerial tower/truck at FS20?

If the location of a tower at FS20 were based primarily upon the need for first response to the NIH campus, and NIH purchases its own Quint, is it sensible to maintain a tower at FS20, since the stations are located so close together?

Is there a strategic relocation of AT20 that improves services to the public?

5. Should we move AT20 and staff to FS26, where we know that one of our standard aerial towers will fit?

If an aerial tower were deployed to FS26, is this deployment too close to FS10 and/or FS23?

If AT20 is moved to FS26, what changes, if any, must be made to HAZMAT response assignments?

If an aerial tower/truck were deployed to FS26, should we deploy the present Truck 10 to the reserve fleet (where it is clearly needed), leave its present staffing at FS10, and deploy RS30 to FS10 to continue special service out of FS10?

6. Is it feasible and practical to deploy a properly staffed Quint at FS20 in lieu of a tower?

7. What assumptions can be made about a Quint at FS51, and how should the options being considered be coordinated with NIH?

What are the best apparatus recommendations for FS20 and MCFRS, regardless of services operated by NIH?

8. What issues or concerns may the communities raise regarding any revised deployment of aerial units?

What are the potential benefits (efficiencies, coverage, response time, effectiveness, etc.) associated with fire and rescue protection of the communities regarding the proposed redeployment, if any, and what impact will the aerial units redeployment have on the risk assessment?

If other communities are affected by the Task Force recommendations, which of the community considerations mentioned above are addressed by the tower redeployment?

9. Should MCFRS acquire new technology to meet maneuverability requirements in lieu of tractor-drawn units to replace Truck 6 and Truck 2?
10. Are there any impacts on the existing Master Plan? Please describe these impacts

Rather than address each question of the workgroup's charge individually, we will address the broad, interrelated issues.

NIH FIRE DEPARTMENT AND QUINT 51

A Mutual Aid agreement currently exists between the Federal Fire Departments and Montgomery County. **The workgroup does not believe that one particular deployment of a Federal asset (Quint 51) should change the current agreement.** Quint 51 is planned for deployment in Spring 2001. The justification for the unit is based solely upon workload issues at the NIH campus and Bethesda Naval Hospital. Montgomery County cannot depend on this unit running all initial alarm assignments, as AT20 currently does. Although NIH Fire Chief Gary Hess has expressed that either Q51 or E511 would be available for Mutual Aid, this policy could change at any time.

The workgroup also believes it is in the best interest of MCFRS personnel that NIH Fire Department personnel remain on campus, prepared to mitigate emergencies that arise there. Certainly, when MCFRS assets respond to the NIH campus, the presence of NIH Fire Department personnel provides necessary knowledge of the special hazards present in those facilities.

The workgroup finds that the aerial ladder deployments initiated in the 1993 Report on the Assignment of Aerial Units in Montgomery County remains the optimal aerial unit deployment for a 14-unit aerial/1 quint fleet.

DISCUSSION:

The 1994 aerial unit realignment in the Bethesda/Glen Echo/Cabin John and Kensington communities implemented a strategic plan. Any adjustment of an individual component of the plan affects all other elements of the deployment.

In 1992, the FRC's "Master Plan Apparatus Sub-committee" made the recommendations initiated in the 1993 aerial deployment report. As the reader will recall, T11 was disbanded, T26 was disbanded, T5 was disbanded, and T-10

was placed in service. The data developed and evaluated by this workgroup confirms that:

- Aerial service to FS11's area is adequate. Analysis of travel time indicates an average aerial response of 7.43 minutes (includes 2 minute dispatch and turnout time). The Box Alarm analysis indicates that FS11's area is a 1, which is determined to be the optimal tactical situation regarding the timeliness of aerial unit support. FS 11's area is ranked 22nd in Incidents Requiring Truck Service, with a 1998-2000 average of 105.7 incidents/year.
- The disbanding of T11 did not negatively affect aerial unit response in FS6's area, given the current deployment of AT20. FS10's area, and the River Road corridor west of I-495, experienced a reduction in truck travel time with the establishment of aerial service at FS10.
- Aerial service to FS26's area is adequate. Analysis of travel time indicates an average aerial response of 7:27 minutes (includes 2 minute dispatch and turnout time). The Box Alarm analysis indicates that FS26's area is a 1.33. There are 14 box areas; 11 are rated #1, 2 are rated #2, and only one area, Box 26-11, is rated #3. Aerial service is provided by units assigned to FS10, 20, and 23.
- Assignment of an aerial unit at FS26 does not significantly improve aerial service into FS23's area. There are 12 box areas in FS23's area. 10 of these are rated as #1. Two box areas, 23-2 and 23-11, would improve their rating to #1 with aerial deployment at FS26. However, all 9 FS6 box areas, 8 box areas in FS7's area, 7 box areas in FS5's area, and 2 box areas in FS20's area would be negatively affected under this configuration.
- T-10 improves aerial unit service to the River Road corridor in the Cabin John community. The truck has adequate response capability into FS26 and FS11 areas. However, the deployment at Sta. 10 decreases truck response in the FS30 area. It must be noted that T10 responds to the fewest incidents of all aerial units. However, given a 14 aerial unit deployment, this truck does improve service in the region, with no apparent reduction of service in the FS11 or FS26 areas.
- Aerial service from FS5 is not needed. Aerial units from FS18, FS19, FS20, and FS23 more than adequately cover FS5's area. Again, CAD data indicated a 6:09 minute average response time into FS5's area. This is consistent with GIS projections. The Box Alarm analysis rates this area as a 1.63. Again, this indicates that most often 2 aerials are assigned with the 4 engines due on each box. There are 19 fire boxes in FS5's area.
- Aerial service at FS20 is not based solely upon the demands of its first due area. The strategic need for aerial service at FS20 is completely interrelated with the aerial deployment decisions made by the FRC in 1993. In this respect, deployment of AT20 must be characterized as a strategic, regional deployment.

- Aerial service should continue from FS20. The existing Sutphen aerial platform should be replaced with an aerial unit configuration that can be housed in the current facility. Extensive facility renovation would have to occur in order to house a standard rear mount aerial in the existing station.
- Given the location of Rescue Company 1, assignment of a Rescue Squad at FS10 will create a significant overlap of covered areas. This tends to indicate that FS10 is not the optimal location for a heavy rescue squad.

Aerial Service from Silver Spring FS1

The workgroup does not support the request of the Silver Spring Fire Department to provide an aerial unit and staffing at FS1. This unit was disbanded on March 15, 1998. The 1985 and 1993 aerial unit studies recommended two aerial units in the Silver Spring/Takoma Park areas. Currently, units are located at FS19 and FS2.

Fire Station 1 is a highly urbanized area. However, it has a very small geographic first due area. FS19 is located approximately 1 ½ miles away, and FS2 in Takoma Park is slightly closer. According to data from CAD, the average response time for ALL trucks responding to structural incidents (CY98-00) in FS1's area is 4:13. Adding a 2-minute dispatch and unit turnout time, this area achieves one of the fastest truck response times in the County. The Box Alarm analysis rates FS1's area as a 1.22. There are 9 box areas; a rating of 1 is achieved in 7 of those boxes, and the remaining two areas achieve a rating of 2. It must also be noted that those box areas have very small mileage differences between the stations.

The workgroup did examine the responses of T2 into Prince George's County. However, this averages approximately 15% of T2 responses, and the workgroup does not find this a significant issue. The other factors to consider are the response times and box rating to FS16 and FS19's areas. Both response times and the box rating indicate adequate aerial service into these areas.

“All Steer” Technology

The workgroup endorses the concept of “All-Steer” aerial units. The Fire Administrator, working with the Bethesda Fire Department, has approved purchase of an “All-Steer” 100' Aerial Tower, to be assigned as AT6. The workgroup makes the following recommendations regarding AT6 and future incorporation of all-steer technology into MCFRS:

- Begin preparation to receive “All-Steer AT6”. This should be accomplished by site visitation to Fire Departments that have All-Steer aerials in service. A team of MCFRS representatives should determine issues related to maintenance, driver training, and operations with the all-steer aerial units. These teams should consist of a senior aerial unit operator, a member of the Apparatus Specifications Committee, a member of the IAFF's Joint Health and Safety Team, and an LFRD representative and a mechanic.

- AT6 should undergo an 18-month evaluation period from the date the unit is placed in service. The evaluation period should provide data on complexity of driver training, operations, reliability, and maintenance.
- Additional All-Steer aerials should not be purchased to replace tractor/trailer aerial units until this evaluation period is complete and MCFRS analysis and experience indicates that All-Steer technology should be incorporated system-wide, and is as effective as tractor/trailer apparatus.

COMMUNITY BENEFIT OF PROPOSED RE-DEPLOYMENT

This workgroup does not endorse the proposed redeployment plan for AT20. As already discussed, MCFRS should not depend on a specific Mutual Aid agreement with NIH regarding the deployment of Quint 51. The workgroup recommends that E511 or Quint 51 should be dispatched according to the present policy.

FS 10 is not the optimal location to house a heavy rescue squad because of considerable overlap with Rescue Company 1. In addition, much of the response area potential is voided because of the Potomac River boundary.

The location of aerial units in the Bethesda/Glen Echo/Cabin John and Kensington communities has already been discussed.

The workgroup believes that given a 14-unit aerial fleet, an optimal deployment currently exists. This recommendation should cause little, if any, community concern.

AERIAL SERVICE IN THE OLNEY/SANDY SPRING REGION

The workgroup does recommend that the MCFRS develop a plan to implement full aerial ladder service to the Olney/Sandy Spring region of the County, deployed at FS40. Currently, FS40's area exceeds the FRC response time goal for truck service, and the box area analysis shows the 2nd highest rating in the County. FS40's area is ranked 19th in service demand. The ratings the neighboring areas in FS4 and FS17 obtained were due to Quint 40 being calculated as an aerial unit. However, this level of service also needs to be available to FS40's area. Deployment of aerial service in the Olney/Sandy Spring area has been a consistent recommendation since the 1985 Aerial Unit Study.

AERIAL SERVICE IN THE DAMASCUS REGION

The 1985 Aerial Unit Study identified the Damascus area as a growing community that would need aerial unit service at some future time. On March 27, 1992, the FRC Master Plan Apparatus Sub-committee presented a re-evaluation of this recommendation:

“The assignment of an aerial ladder truck unit to the Damascus Fire Station 13 should be deferred until the realization of potential residential development and commercial build-out.”

The 1985 Aerial Ladder Truck Study suggested that “...the local siting of a truck vehicle at the Damascus Fire Station would greatly improve upon the existing response time for truck units in this section of Montgomery County.” The 1985 study further states “...at this point in time, however, this is not a critical consideration to the delivery of fire protection in the Damascus response area.”

The Master Plan Task Force concurred with the 1985 Study’s suggestion. It also believes that the Study’s observation about the relative importance of assigning an aerial ladder truck to Fire Station 13 remains accurate in 1990.

“Further, given the limited public water service in the planning area and the present economic climate in the County, there is no strong potential for significant future build-out of commercial or multi-story residential structures in the Damascus sub-region.”

Since this re-evaluation of the area, the location of existing trucks (T-29 and AT8) has not changed. Four Rescue Squads neighbor the region, located at FS29 (Germantown), FS17 (Laytonsville), FS9 (Hyattstown), and Carroll County FS1 (Mt. Airy). Aerial service is planned for the Germantown East Fire Station, but this will have minimal positive impact on aerial unit response into the Damascus region.

FS13’s area experienced an average of 86 structural related fire incidents annually during CY1998-2000. This ranks the Damascus area 23rd of the 31 fire station areas in the County. The average number of reported “structural fires” (11’s) over the study period was 10. This ranks the Damascus region 22nd of the 31 fire station areas.

The “first due area” for FS13 is relatively large in landmass. The build-out, however, is concentrated along the Rt. 27 corridor leading into and out of Damascus, the town itself, and the Woodville Road Corridor leading back towards Laytonsville. Significant residential development of both single and multi-family dwellings exists between the Rt.27 and Woodville Road corridors.

The average response time for trucks responding into FS13’s area for CY2000 was 14:28 minutes. This time correlates to a 2 minute dispatch and turnout time, and a 12:28 minute travel time, data was determined from responses where the responding trucks correctly transmitted the “enroute” and “on scene” status. The Box Alarm analysis rates FS13’s area as a 4.15. The average response time for FS13’s area is the second highest in the County, exceeded only by that of FS14. The Box Alarm analysis indicated FS13 has the poorest rating in the County.

FS 13’s area, as discussed, averaged 86 structural fire related incidents during the CY1998-2000 study period. The entire County averaged 7,247 incidents during the same period. Therefore, FS13’s area accounts for approximately 1.1% of these structural incidents. The fire station areas with less structural

incident demand over the study period were FS 7 (83.0), 21 (77.7), 10 (73.7), 4 (71), 17 (57.3), 30 (51.7), 14 (35.7), and 9 (15.7).

Of the stations with less structural incident demand than FS13, only one, FS10, houses an aerial unit. This deployment, already discussed, came about as an initiative to improve aerial unit service in the River Road corridor. However, this was accomplished by a reconfiguration of aerial units that were very closely spaced in the region. Essentially, the movement of T-11 to T-10 did not adversely affect truck service in the Bethesda/Glen Echo areas. T-10 provides improved response in Cabin John, and yet can respond inward to the Glen Echo and Bethesda areas very efficiently.

Placement of an aerial unit at FS13 is a different situation. First, the workgroup found no reasonable reconfiguration of units that will place an existing unit in Damascus. Second, an aerial unit at FS13 would not generally respond south to the developing areas along the Route 270 corridor. An aerial unit at FS13 would improve service to FS9 and FS 17's areas. However, this would be minimal, as these areas have a relatively low history of structure fires. The unit would respond Mutual Aid to Carroll, Frederick, and Howard Counties. However, the workgroup recommends that MCFRS should begin the implementation process for aerial unit service in the Damascus Region based upon the following reasons:

- The 1985 Truck Report recommended this implementation when the region achieved more build-out. Significant build-out has occurred in the region in the last 16 years.
- The Damascus region continues to develop.
- Aerial unit response times into the Damascus region is exceeded only by the response times into the Upper Montgomery County area.
- Table 3, "Box Alarm Ranking" indicates the Damascus region as a 4.15.

COMPOSITION OF THE AERIAL FLEET

The workgroup has held considerable discussion regarding the composition of the aerial fleet. This is in response to the "White Paper" written by District Chief Michael Hamilton. The workgroup believes that an aerial fleet using both tower ladders and aerial ladders offers maximum tactical capability. Undoubtedly, tower ladders have tremendous tactical capabilities. However, aerial ladders still offer tactical advantages that complement those of aerial towers. Some of these advantages include:

- More effective positioning over a parapet roof structure;
- In some instances, a significantly reduced requirement for outrigger spread;
- An effective "continuous" stairs, notably more efficient and effective on structures of 3-5 floors; and

- Tractor-trailer apparatus offers the advantages of significant compartment space, the ability to effectively carry longer ground ladders, mid-ship mounted turntable, and excellent maneuverability.

The workgroup believes that the ideal deployment of aerial ladder units and aerial tower units would result in the dispatch of each unit on most box alarms.

STATUS OF THE FLEET

There are currently 21 aerial units in the MCFRS, including a “core” group of 14 front line aerial units. One Quint is in service at FS40. T5, a 1973 Seagrave tractor/trailer, is near the end of its service life and has been determined to be unnecessary in the fleet. Four reserve aerals are available, and one aerial is assigned to the Training Academy.

The “core” fleet of front line aerial units consists of 5 tractor/trailer aerals, 4 rear mount aerals, and 5 platform apparatus (4 tower ladders and 1 aerial tower). The average age of the core fleet is 10.43 years. The units that have undergone the rehabilitation process at roughly the 10-year service point are shown in Table 4, below.

TABLE 4 – STATUS OF MCFRS AERIAL FLEET

AERIAL#	YEAR	TYPE	REPLACE	REHAB- CHASIS	REHAB - AERIAL	
T2	1984	Seagrave – Tractor/Trailer	2003	1996	1995	
T3	1989	Seagrave – Rear Mount	2006	2000	2000	
T5	1973	Seagrave- Tractor/Trailer				
T6	1984	Seagrave- Tractor/Trailer	2001	1997	1997	
AT8	1995	Simon Duplex Tower Ladder				
T10	1984	Seagrave- Tractor/Trailer	2004	1995	1997	
T12	1997	Seagrave- Tractor/Trailer				
T15	1998	Pierce Rear Mount				
AT18	2000	E-1 Tower Ladder				
AT19	2000	E-1 Tower Ladder				
AT20	1989	Sutphen Aerial Tower	2002			
AT23	2000	E-1 Tower Ladder				
T25	1997	Seagrave Tractor/Trailer				
T29	1986	Seagrave Rear Mount	2003			
T31	1987	Seagrave Rear Mount	2003			
Q40	1995	Pierce Rear Mount Quint				
Reserve	1989	Sutphen Aerial Tower				
Reserve	1989	Seagrave Rear Mount				
Reserve	1989	Seagrave Rear Mount				
Reserve	1996	E-1 Rear Mount				
	1977	Seagrave Rear Mount *PSTA				

T-6, a 1984 tractor/trailer, is scheduled for replacement by a Pierce “All Steer “100’ tower ladder. This unit is expected to be delivered in January 2002.

Aerial apparatus typically is operated in frontline service for 20 years. At approximately the 10-year point of its service life, the unit undergoes full chassis and aerial rehabilitation. This effectively extends the life of aerial apparatus to the 20-year service life.

Four aerial units compose the primary reserve fleet, one aerial platform and three rear mount aerial units. The average age of the reserve fleet is 10.25 years. The workgroup makes the following recommendations regarding the aerial fleet:

- MCFRS should continue to operate an integrated fleet of aerial ladders and tower ladders. Optimal integration would be a fleet of 50% aerial ladders and 50% tower ladders. Current integration in the “core fleet” is 35% towers.
- MCFRS should evaluate future procurement of one aerial tower capable of top boom articulation. A “needs assessment” and evaluation of available apparatus would be components of this report.
- The reserve fleet should consist of seven readily-available units. Two units should be dedicated to long term replacement of frontline units, such as replacement when a unit undergoes rehabilitation or lengthy drive train or ladder repairs.
- Three reserve aerial units should be fully equipped and ready for rapid replacement of frontline units.
- Two reserve aerial units should remain unequipped, intended for planned replacement of frontline units.

STAFFING AERIAL UNITS

The workgroup recommends that aerial units in Montgomery County be staffed with 4 personnel. Currently, the FRC defines “minimum” aerial staffing requiring 3 qualified personnel, and “desired” aerial staffing as 4 qualified personnel. Fire Service studies have indicated that 3 person aerial unit staffing is inadequate, most notably shown by the Dallas, Texas, manpower studies conducted in 1969. The impact of NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*, must also be considered.

MCFRS should explore all options to bring aerial unit staffing to 4 personnel. The following aerial units currently have 24-hour career minimum staffing: T2, T6, AT8, T12, AT19, AT20, AT23, and T25. Minimum staffing of 4 personnel could be accomplished with the addition of approximately 33.6 personnel at an annual cost of about \$8 million.

T3, T10, T15, AT18, T29, and T31 do not have 24-hour career minimum staffing. Data from EMBRS should be used to determine average staffing for these units. A determination could be made of the number of personnel required to bring minimum staffing to 4 personnel following this analysis. All staffing options should be explored, including methods to attract volunteer participation to specifically provide aerial unit staffing.

SPECIAL SERVICE INTEGRATION IN MONTGOMERY COUNTY

The MCFRS should determine the number of special service units, i.e. trucks and squads that are required in the County. There are 15 aerial units (including T-5), one Quint, and nine Rescue Squads. Determining the optimal operational integration of these units could improve staffing efficiency.

The FRC charged the 1995 "Assignment of Aerial Units and Rescue Squads in Montgomery County" workgroup to examine this issue. However, this was not accomplished. The report states "the study group quickly concluded that we have too many single function aerial devices and rescue squads and they are not necessarily located in the right places. However, a redeployment scenario is not practicable, since in contrast with aerial devices, which all but two are currently owned by the County, all rescue squads, with one exception, are owned by the various fire and rescue corporations." Due to this situation, the scope of the study was shifted to examine the required strength of the fire suppression force required in Montgomery County.

The 1985 and 1993 truck reports both discuss this aerial unit and rescue squad "interface". However, no conclusive guidelines were established.

USE OF QUINTS

The concept of Quints is not new to the fire service. These units vary widely in operational capability. Essentially, a Quint combines the capabilities of an engine and aerial unit into one vehicle. "Quint" means a unit that carries a fire pump, hose, booster tank, aerial device, and ground ladders. The previous two decades have seen notable utilization of Quints, some determined successful and some not. Perhaps the most notable "transformation" of a fire department that used the traditional engine/truck concept was St. Louis, Missouri. Due to a severe economic downturn, that fire department essentially combined the fleet of engines and trucks into a smaller fleet of Quints. Richmond, Va. has recently followed a similar plan. However, other large departments such as Baltimore City, introduced Quint units but returned to the traditional engine/truck concept.

While a Quint is considered a "multi-purpose" vehicle, operational capability is compromised between the engine and aerial functions. In order to combine a large fire service pump (1250-1500 GPM), adequate supply hose, adequate attack lines (both preconnected and unconnected), booster tank, one hundred-foot aerial unit and sufficient ground ladders, the resulting vehicle is large and heavy. In order to design an "operational" Quint, compromises have to be made. This may be on the length of the aerial ladder, the amount of water in the booster tank, the number of preconnected attack lines, or ground ladders. Next, the Quint vehicle can only be located on the fireground in one position. This requirement in itself can compromise optimal engine or aerial operations.

Finally, the concept of a Quint often discussed is that of a unit that can perform engine and truck operations simultaneously. While this is conceivable, the unit must be properly staffed to accomplish this type of operation. This work group

believes that seven personnel are the **minimum** needed to accomplish these tasks. We do not believe that this will be achieved in Montgomery County.

The more popular trend for Quint operations appears to be dispatching the unit either as an engine or as a truck, because staffing to accomplish both engine and truck functions is rarely, if ever, available. In this scenario, a crew is simply operating a unit whose capability has been compromised as an engine or aerial unit to make it a "multi-purpose" unit.

The three previous reports on aerial units in Montgomery County have all recommended the incorporation of Quints into Montgomery County. As previously discussed, this concept has not been widely implemented. The only Quint in the County was purchased by the Sandy Spring Volunteer Fire Department and is in service at FS40.

The 1985 Truck Report recommended a total of five Quints, to be deployed at FS15, FS40, FS13, FS29 and FS31. The 1993 report recommends replacing E-11 and E-191 with Quints and assigning an ELF (engine-ladder-foam) unit to FS28. The 1995 report recommends a daily deployment of 135 suppression personnel. These 135 personnel could staff 31 engines, 11 trucks, and 3 rescue squads with 3 person minimum staffing, or use a fleet of Quints, rescue pumpers, and rescue squads to accomplish four person staffing. The "Quint Report" concluded that "...the Quint 40 experience neither strongly supports nor discredits the use of Quints in Montgomery County".

This workgroup does not support the Quint concept in Montgomery County. We believe the concept is an operational compromise. The workgroup believes that an integration of properly staffed engines/trucks/ and rescue squads provide the optimal strategic and tactical operation in Montgomery County.

AERIAL UNIT INVENTORY

Although this workgroup did not spend significant time discussing aerial unit inventories, two items of equipment were identified that should be carried on aerial units in the County:

- First, all aerial units should carry a thermal imaging camera; and
- Second, all aerial units should carry a WASAD (warning and strobe alarm device).

PRELIMINARY CONCLUSIONS

During 2001, the Aerial Study Workgroup reviewed pertinent aspects of MCFRS aerial unit deployment. This is a continuing process, and the workgroup is looking forward to receiving field comments on this preliminary report. A final report will be based upon a review and evaluation of those field comments.