ORANGE COUNTY FIRE AUTHORITY
AGENDA

Budget and Finance Committee Regular Meeting

Wednesday, July 13, 2022
12:00 Noon

Regional Fire Operations and Training Center
Board Room
1 Fire Authority Road
Irvine, California 92602

Committee Members
Tri Ta, Chair • John O'Neill, Vice-Chair
Troy Bourne • Shelley Hasselbrink • Gene Hernandez
Austin Lumbard • Mark Tettemer • Vince Rossini • Ed Sachs
Jennifer Cervantez, Ex Officio

NOTICE REGARDING PUBLIC PARTICIPATION
DURING COVID-19 EMERGENCY

This meeting is open to the public. In addition, there are several alternative ways to view and to make comments during the meeting including:

View Meeting On-Line:
You may access the meeting live electronically at: https://player.cloud.wowza.com/hosted/xvtnclkw/player.html. (Note: you should use one of the other alternatives below if you want to make comments during the meeting.)

Live Public Comments by Zoom: You may also view and make real-time verbal comments during the meeting via the Zoom link below during the meeting. You will be audible during your comments, but the committee members will not be able to see you. To submit a live comment using Zoom, please be prepared to use the "Raise Your Hand" feature when public comment opportunities are invited by the Chair. (You can raise your hand on your smart phone by pressing *9.) Also, members of the public must unmute themselves when prompted upon being recognized by the Chair in order to be heard. (To unmute your smartphone in Zoom, press *6.)

Public Comments via Zoom: https://zoom.us/j/83264128588#success
Meeting ID: 832 6412 8588
Passcode: 298121
Raise Your Hand (press *9) and Unmute (press *6)

E-Comments: Alternatively, you may email your written comments to coa@ocfa.org. E-comments will be provided to the committee members upon receipt and will be part of the meeting record as long as they are received during or before the committee takes action on an item. Emails related to an item that are received after the item has been acted upon by the committee will not be considered.

Further instructions on how to provide comments is available at: https://ocfa.org/PublicComments.

This Agenda contains a brief general description of each item to be considered. Except as otherwise provided by law, no action or discussion shall be taken on any item not appearing on the following Agenda. Unless legally privileged, all supporting documents, including staff reports, and any writings or documents provided to a majority of the Committee members after the posting of this agenda are available for review at the Orange County Fire Authority Regional Fire Operations & Training Center, 1 Fire Authority Road, Irvine, CA 92602 or you may contact the Clerk of the Authority at (714) 573-6040 Monday through Thursday, and every other Friday from 8 a.m. to 5 p.m. and available online at http://www.ocfa.org

In compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting, you should contact the Clerk of the Authority at (714) 573-6040 and identify the need and the requested modification or accommodation. Please notify us as soon as is feasible, however 48 hours prior to the meeting is appreciated to enable the Authority to make reasonable arrangements to assure accessibility to the meeting.

CALL TO ORDER – Chair Ta

PLEDGE OF ALLEGIANCE - Director Lumbard

ROLL CALL - Clerk of the Authority

PUBLIC COMMENTS

Please refer to instructions on how to submit a public comment during COVID-19 Emergency on Page 1 of this Agenda.

1. PRESENTATION

No items.

2. CONSENT CALENDAR

All matters on the consent calendar are considered routine and are to be approved with one motion unless a director or a member of the public requests separate action on a specific item.

A. Minutes for the Budget and Finance Committee Meetings

Submitted by: Maria Huizar, Clerk of the Authority

The record will reflect that any Director not in attendance at the meeting of the Minutes will be registered as an abstention, unless otherwise indicated.

Recommended Actions:

1. Approve the Minutes for the May 26, 2022, Concurrent Joint Special Meeting as submitted.
2. Approve the Minutes for the June 8, 2022, Regular Meeting as submitted.
3. Approve the Minutes for the June 23, 2022, Concurrent Joint Special Meeting as submitted.

3. DISCUSSION CALENDAR

A. Monthly Investment Reports

Submitted by: Robert Cortez, Assistant Chief/Business Services Department, Tricia Jakubiak, Treasurer/Treasury & Financial Planning and James Slobojan, Assistant Treasurer/Treasury & Financial Planning

Recommended Action:

Review the proposed agenda item and direct staff to place the item on the agenda for the Executive Committee meeting of July 28, 2022, with the Budget and Finance Committee's recommendation that the Executive Committee receive and file the reports.

B. OCFA Aircraft Replacement Review Process – Review of Remaining Phase 3 through 6 of the Work Plan

Submitted by: Brian Fennessy, Fire Chief, Kenny Dossey, Deputy Chief/Operations Bureau and Tim Perkins, Division Chief/Special Operations

Recommended Actions:

Review the remaining phases of the work plan provided herein for the OCFA Aircraft Replacement Review process and direct staff to place the item on the agenda for the Board of Directors meeting of July 28, 2022, with the Budget and Finance Committee's recommendation that the Board of Directors:

1. Receive and file the report documenting the full OCFA Aircraft Replacement Review Process.
2. Direct staff to return the two loaned Federal Excess Property Program (FEPP) UH-1H Super Huey helicopters to the federal government, with CALFIRE serving as the conduit for this FEPP return.
3. Direct staff to initiate administrative actions necessary to facilitate the purchase of two Sikorsky S-70i Type I helicopters, including: (a) procurement process for award of contract, (b) Request for Proposal process for selection of financing consultants, (c) Request for Proposal process for provision of lease-purchase financing, (d) and preparation of draft-proposed budget adjustments.
4. Upon completion of the administrative actions, direct staff to return to the Budget and Finance Committee and the Board of Directors (tentatively in September 2022) for approval to award a purchasing contract, approval of lease financing terms, and authorization of the necessary budget adjustments.

REPORTS

No items.

COMMITTEE MEMBER COMMENTS

ADJOURNMENT – The next regular meeting of the Budget and Finance Committee is scheduled for Wednesday, September 14, 2022, at 12:00 p.m.

AFFIDAVIT OF POSTING

I hereby certify under penalty of perjury and as required by the State of California, Government Code § 54954.2(a), that the foregoing Agenda was posted in the lobby and front gate public display case of the Orange County Fire Authority, Regional Fire Operations and Training Center, 1 Fire Authority Road, Irvine, CA, not less than 72 hours prior to the meeting.

Maria D. Huizar, CMC
Clerk of the Authority

FUTURE B&FC AGENDA ITEMS – THREE-MONTH OUTLOOK:

- Monthly Investment Report
- Quarterly Financial Newsletter
- Quarterly Purchasing Report
- Acceptance of SHSGP, HSGP and UASI Grants
- Carryover of Fiscal Year 2021/22 Uncompleted Projects
- Annual Investment Policy and Approval of Broker Dealer List
- Annual Statement of Investment Policy and Investment Authorization
- OCFA Aircraft Replacement Review Process

UPCOMING MEETINGS:

Concurrent Joint Special Meeting of the Board of Directors and all Committees	Thursday, July 14, 2022, 6:00 p.m.
Legislative and Public Affairs Committee	Wednesday, July 20, 2022, 12 noon
Executive Committee	Thursday, July 28, 2022, 5:30 p.m.
Board of Directors	Thursday, July 28, 2022, 6:00 p.m.
Concurrent Joint Special Meeting of the Board of Directors and all Committees	Thursday, July 28, 2022, 6:00 p.m.

MINUTES
ORANGE COUNTY FIRE AUTHORITY

Budget and Finance Committee
Concurrent Joint Special Meeting
Thursday, May 26, 2022
7:24 p.m.

Regional Fire Operations and Training Center
Board Room
1 Fire Authority Road
Irvine, CA 92602

CALL TO ORDER
A Concurrent Joint Special Meeting of the Orange County Fire Authority Board of Directors, Executive Committee, Budget and Finance Committee, and the Human Resources Committee was called to order on May 26, 2022, at 7:24 p.m.by Board of Directors Chair Steggell.

ROLL CALL

Present: Tri Ta, Westminster, Chair*
John O'Neill, Garden Grove, Vice Chair
Troy Bourne, San Juan Capistrano*
Shelley Hasselbrink, Los Alamitos*
Anthony Kuo, Irvine
Austin Lumbard, Tustin*
Ed Sachs, Mission Viejo*
Vince Rossini, Villa Park*

Absent: Gene Hernandez, Yorba Linda

Staff present were:

Fire Chief Brian Fennessy
Deputy Chief Kenny Dossey
Assistant Chief TJ McGovern
Assistant Chief Stephanie Holloman
Communications Director Matt Olson
General Counsel David Kendig
Deputy Chief Lori Zeller
Assistant Chief Lori Smith
Assistant Chief Randy Black
Assistant Chief Jim Ruane
Clerk of the Authority Maria Huizar
Assistant General Counsel Keith Dobyns

PUBLIC COMMENTS
Chair Steggell opened the Public Comments portion of the meeting and, without any comments from the general public, closed the Public Comments portion of the meeting.

**Committee Members participating via teleconferencing.*

1. PRESENTATION
None.

2. CONSENT CALENDAR

A. Findings Required by AB 361 for the Continued Use of Teleconferencing for Meetings (FILE 12.02B2)

General Counsel David Kendig presented the Findings Required by AB 361 for the Continued Use of Teleconferencing for Meetings.

On motion of Director O'Neill and second by Director Sachs, and following a roll call vote, approved 6-2 (Directors Kuo and Rossini opposed, Director Hernandez absent) to select Option # 1 to make the following findings:

a. A state of emergency has been proclaimed by California's Governor due to the COVID-19 pandemic and continues in effect; and
b. The Committee has reconsidered the circumstances of the emergency; and
c. State and local officials continue to recommend measures to promote social distancing to slow the spread of COVID-19.

REPORTS
No Items.

COMMITTEE MEMBER COMMENTS
None.

ADJOURNMENT – Chair Steggell adjourned the Concurrent Joint Special Meeting at 7:45 p.m. The next regular meeting of the Budget and Finance Committee is scheduled for Wednesday, June 8, 2022, at 12:00 noon.

Maria D. Huizar, CMC
Clerk of the Authority

MINUTES
ORANGE COUNTY FIRE AUTHORITY

Budget and Finance Committee Regular Meeting
Wednesday, June 8, 2022
12:00 Noon

Regional Fire Operations and Training Center
Board Room
1 Fire Authority Road
Irvine, CA 92602

CALL TO ORDER
A regular meeting of the Orange County Fire Authority Budget and Finance Committee was called to order on June 8, 2022, at 12:00 p.m. by Chair Ta.

PLEDGE OF ALLEGIANCE
Director Lumbard led the assembly in the Pledge of Allegiance to our Flag.

ROLL CALL

Present: Tri Ta, Westminster, Chair*
John O'Neill, Garden Grove, Vice Chair*
Shelley Hasselbrink, Los Alamitos*
Austin Lumbard, Tustin*
Ed Sachs, Mission Viejo*
Vince Rossini, Villa Park*

Absent: Mark Tettemer, Lake Forest
Tory Bourne, San Juan Capistrano
Gene Hernandez, Yorba Linda
Ex-Officio Member Jennifer Cervantez

Staff present were:

Fire Chief Brian Fennessy
Assistant Chief Robert Cortez
Assistant Chief Lori Smith
General Counsel David Kendig
Director of Communications Matt Olson
Clerk of the Authority Maria Huizar
Deputy Chief Lori Zeller
Assistant Chief Jim Ruane
Assistant Chief TJ McGovern
Assistant Chief Randy Black
Division Chief Tim Perkins

* *Budget and Finance Committee Members participating via Teleconferencing*

PUBLIC COMMENTS
Chair Ta opened the Public Comments portion of the meeting, and without any comment from the general public, closed the Public Comments portion of the meeting.

1. PRESENTATION
No items.

2. CONSENT CALENDAR

On motion of Director Hasselbrink and second by Director Sachs, and following a roll call vote, approved 5-0 Agenda Items No. 2A-2C, and 2E (Directors Hernandez, Bourne, Tettemer, and O'Neill absent). Agenda Item 2D was pulled for separate consideration.

A. Minutes for the Budget and Finance Committee Meetings (FILE 12.02B2)

Action:
1. Approve the Minutes for the April 28, 2022, Concurrent Joint Special Meeting as submitted.
2. Approve the Minutes for the May 11, 2022, Regular Meeting as submitted.
3. Approve the Minutes for the May 18, 2022, Special Meeting as submitted.

B. Monthly Investment Reports (FILE 11.10D2)

Action: Review the proposed agenda item and direct staff to place the item on the agenda for the Executive Committee meeting of June 23, 2022, with the Budget and Finance Committee's recommendation that the Executive Committee receive and file the reports.

C. Updated Cost Reimbursement Rates (FILE 15.12)

Action: Review the proposed agenda item and direct staff to place the item on the agenda for the Board of Directors meeting of June 23, 2022, with the Budget and Finance Committee's recommendation that the Board of Directors approve and adopt the proposed Cost Reimbursement Rate schedules to be effective July 1, 2022.

D. FY 2021/22 Year End Budget Adjustment (FILE 15.12)

This item was pulled by Director Rossini for clarification.

Director O'Neill arrived at this point (12:08 p.m.).

On motion of Director Rossini and second by Director O'Neill, and following a roll call vote, approved 6-0 (Directors Bourne, Hernandez, and Tettemer absent) to review the proposed agenda item and direct staff to place the item on the agenda for the Board of

Directors meeting of June 23, 2022, with the Budget and Finance Committee's recommendation that the Board of Directors approve and authorize FY 2021/22 budget adjustments as detailed in this report.

Note: The ABH adjustment detail on the staff report was corrected to reflect $4,542,894 instead of $4,415,524. However, the Board approved total general fund adjustment remained unchanged.

E. CAL FIRE Grant to OCFA for Vegetation Management (FILE 16.0212)

Action: Review the proposed agenda item and direct staff to place the item on the agenda for the Board of Directors meeting on June 23, 2022, with the Budget and Finance Committee's recommendation that the Board of Directors approve a budget adjustment to the FY 2022/23 General Fund (121) budget to increase revenues and expenditures by $1,225,000 for the OCFA Vegetation Management grant.

3. DISCUSSION CALENDAR

A. Fire Integrated Real-time Intelligence System (FIRIS) 3.0 Program Extension (FILE 18.09D)

Fire Chief Fennessy presented the Fire Integrated Real-time Intelligence System (FIRIS) 3.0 Program Extension.

On motion of Director O'Neill and second by Director Sachs, and following a roll call vote, approved 6-0 (Directors Bourne, Hernandez, and Tettemer absent) to review the proposed agenda item and direct staff to place the item on the agenda for the Board of Directors meeting of June 23, 2022, with the Budget and Finance Committee's recommendation that the Board of Directors:

1. Approve and authorize a budget adjustment to increase revenue and appropriations in the FY 2022-23 General Fund (121) budget by an additional $9,789,565 for the extension of the FIRIS 3.0 Program up to an additional six months from July 1 through December 31, 2022.
2. Approve and authorize the Purchasing Manager to either amend or enter into new FIRIS-related vendor contracts by the individual amounts needed in support of the FIRIS 3.0 Program extension, so long as the aggregate value of the increase does not exceed the revised program budget (see table).
3. Approve and authorize the Purchasing Manager to issue an amendment to the Professional Services Agreement with AEVEX to modify the scope of services to allow for the installation and utilization of additional sensor technology, as requested by Cal OES.

B. 2022 Quick Reaction Force (QRF) Program (FILE 18.09D)

Fire Chief Fennessy presented the 2022 Quick Reaction Force (QRF) Program.

On motion of Director Hasselbrink and second by Director Sachs, and following a roll call vote, approved 6-0 (Directors Bourne, Hernandez, and Tettemer absent) to review the proposed agenda item and direct staff to place the item on the agenda for the Board of Directors meeting of June 23, 2022, with the Budget and Finance Committee's recommendation that the Board of Directors:

1. Approve the Funding Agreement with Southern California Edison in a form substantially consistent with the attachment and approved by legal counsel to accept funding in the amount of $9,018,100 to fund the fixed-cost portion of the 165-day 2022 Quick Reaction Force Program.
2. Approve and authorize the Purchasing Manager to execute the Public Aircraft Lease and Service Agreement with Coulson Aviation (USA), Inc. in a form substantially consistent with the attachment and approved by legal counsel utilizing the sole source procurement provision in the Purchasing Ordinance for the provision of aircraft and other operational related services in an amount not to exceed $7,893,260 for the 2022 QRF Program term with the option to renew the agreement for two additional program terms, at the sole discretion of OCFA and contingent upon the identification of additional SCE funding.
3. Approve and authorize the Purchasing Manager to enter into a Professional Services Agreement with Perimeter Solutions in a form substantially consistent with the attachment and approved by legal counsel utilizing the sole source procurement provision in the Purchasing Ordinance for the provision of a mobile fire-retardant plant and related services in an amount not to exceed $1,655,000 for the 2022 QRF Program term.
4. Approve and authorize the Purchasing Manager to enter into new Professional Services Agreements with the Air Tactical Group Supervisors (ATGS') in a form substantially consistent with the attachment and approved by legal counsel at an amount not to exceed $250,000 each for the 2022 QRF Program term, with an aggregate program spending cap not to exceed $660,000.
5. Approve and authorize the Purchasing Manager to enter into a new Professional Services Agreement for Program Manager Services with Scott Jones, in a form substantially consistent with the attachment and approved by legal counsel with an aggregate program spending cap not to exceed $250,000 for the 2022 QRF Program term.
6. Approve and authorize a FY 2022/23 General Fund (121) budget adjustment to recognize funding from SCE for a revenue increase of $9,018,100 and to increase appropriations by the same amount.
7. Approve the updated Cost Reimbursement Rate schedule to include the CH-47 Very Large Helitanker, S-61 Helitanker, and S-76 Helitanker daily stand-by and hourly flight rates, and mobile fire retardant plant daily stand-by and hourly rates, and hourly rates for Program Manager and Air Tactical Group Supervisors to be effective June 24, 2022.
8. Adopt an exemption from the California Environmental Quality Act (CEQA) pursuant to Title 14, California Code of Regulations, Section 15301 (Existing Facilities) and direct staff to file a Notice of Exemption.

9. Approve and authorize the Fire Chief to enter into an agreement with the Los Alamitos Joint Forces Training base in a form substantially consistent with the attachment and approved by legal counsel for a program spending cap not to exceed $150,000 for the 2022 QRF Program term.

C. Award of RFP# SK2489b Design-Build Services for OCFA Mission Viejo Fire Station #24 and Approval of Corresponding Budget Adjustments (FILE 19.07C24)

Assistant Chief Jim Ruane presented the Award of RFP#SK2489b Design Build Services for OCFA Mission Viejo Fire Station #24 and Approval of Corresponding Budget Adjustments.

On motion of Director Sachs, and second by Director O'Neill, and following a roll call vote, approved 6-0 (Directors Bourne, Hernandez, and Tettemer absent) to review the proposed agenda item and direct staff to place this item on the agenda for the Board of Directors meeting on June 23, 2022, with the Budget and Finance Committee's recommendation that the Board of Directors:

1. Direct staff to increase the FY 2021/22 Fire Stations and Facilities CIP in the amount of $3,000,000 for one-time additional funding for Fire Station #24 to add station capacity for both an Engine and Truck company.
2. Approve and authorize the Purchasing Manager to execute the proposed Design-Build Services Agreement for OCFA Mission Viejo Station #24 with EC Constructors, Inc. in an amount not to exceed $14,996,489.

D. OCFA Aircraft Replacement Review Process of Air Ops Services Provided (FILE 18.9)

Fire Chief Fennessy presented the OCFA Aircraft Replacement Review Process of Air Ops Services Provided.

On motion of Director Rossini, and second by Director O'Neill, and following a roll call vote, approved 6-0 (Directors Bourne, Hernandez, and Tettemer absent) to:

1. Receive and file the second phase of the six-phased work plan for the OCFA Aircraft Replacement Review process.
2. Approve Option B, shorten the Board approved work plan by combining some of the review phases.

CLOSED SESSION - General Counsel David Kendig reported there was no necessity for Closed Session at this point.

CS1. CONFERENCE WITH LEGAL COUNSEL – ANTICIPATED LITIGATION
Significant exposure to litigation pursuant to Cal. Government Code 54956.9(d)(2): 1 matter (Quick Reaction Force operations and contracts).

COMMITTEE MEMBER COMMENTS
Director Sachs congratulated Director Ta on his Primary Election win.

ADJOURNMENT – Chair Ta adjourned the meeting at 12:32 pm. The next regular meeting of the Budget and Finance Committee is scheduled for Wednesday, July 13, 2022, at 12:00 noon.

Maria D. Huizar, CMC
Clerk of the Authority

MINUTES
ORANGE COUNTY FIRE AUTHORITY

Budget and Finance Committee
Concurrent Joint Special Meeting
Thursday, June 23, 2022
7:47 p.m.

Regional Fire Operations and Training Center
Board Room
1 Fire Authority Road
Irvine, CA 92602

CALL TO ORDER
A Concurrent Joint Special Meeting of the Orange County Fire Authority Board of Directors, Executive Committee, Budget and Finance Committee, and the Human Resources Committee was called to order on June 23, 2022, at 7:47 p.m. by Board of Directors Chair Steggell.

ROLL CALL

Present: Tri Ta, Westminster, Chair*
John O'Neill, Garden Grove, Vice Chair*
Shelley Hasselbrink, Los Alamitos*
Mark Tettemer, Lake Forest
Austin Lumbard, Tustin*
Ed Sachs, Mission Viejo*
Vince Rossini, Villa Park

Absent: Troy Bourne, San Juan Capistrano
Gene Hernandez, Yorba Linda

Staff present were:

Fire Chief Brian Fennessy
Deputy Chief Kenny Dossey
Assistant Chief TJ McGovern
Assistant Chief Jim Ruane
Clerk of the Authority Maria Huizar
Assistant Counsel Barbara Raileanu
Deputy Chief Lori Zeller
Assistant Chief Robert Cortez
Assistant Chief Stephanie Holloman
Assistant Chief Lori Smith
Communications Director Matt Olson
General Counsel David Kendig

PUBLIC COMMENTS
Chair Steggell opened the Public Comments portion of the meeting and, without any comments from the general public, closed the Public Comments portion of the meeting.

**Committee Members participating via teleconferencing.*

1. PRESENTATION
None.

2. CONSENT CALENDAR

A. Findings Required by AB 361 for the Continued Use of Teleconferencing for Meetings (FILE 12.02B2)

General Counsel David Kendig presented the Findings Required by AB 361 for the Continued Use of Teleconferencing for Meetings.

On motion of Director Lumbard and second by Director Ta, and following a roll call vote, approved 4-3 (Director Tettemer, Rossini, and Sachs opposed, Directors Hernandez and Bourne absent) to select Option # 1 to make the following findings:

a. A state of emergency has been proclaimed by California's Governor due to the COVID-19 pandemic and continues in effect; and
b. The Committee has reconsidered the circumstances of the emergency; and
c. State and local officials continue to recommend measures to promote social distancing to slow the spread of COVID-19.

REPORTS
No Items.

COMMITTEE MEMBER COMMENTS
None.

ADJOURNMENT – Chair Steggell adjourned the Concurrent Joint Special Meeting at 7:55 p.m. The next regular meeting of the Budget and Finance Committee is scheduled for Wednesday, July 13, 2022, at 12:00 noon.

Maria D. Huizar, CMC
Clerk of the Authority

Orange County Fire Authority

AGENDA STAFF REPORT

Budget and Finance Committee Meeting | **Agenda Item No. 3A**
July 13, 2022 | **Discussion Calendar**

Monthly Investment Reports

Contact(s) for Further Information

Robert Cortez, Assistant Chief, Business Services Department	robertcortez@ocfa.org	714.573.6012
Tricia Jakubiak, Treasurer Treasury & Financial Planning	triciajakubiak@ocfa.org	714.573.6301
James Slobojan, Assistant Treasurer Treasury & Financial Planning	jamesslobojan@ocfa.org	714.573.6305

Summary

This agenda item is a routine transmittal of the monthly investment reports submitted to the Committee in compliance with the investment policy of the Orange County Fire Authority and with Government Code Section 53646.

Prior Board/Committee Action

Not Applicable.

RECOMMENDED ACTION(S)

Review the proposed agenda item and direct staff to place the item on the agenda for the Executive Committee meeting of July 28, 2022, with the Budget and Finance Committee's recommendation that the Executive Committee receive and file the reports.

Impact to Cities/County

Not Applicable.

Fiscal Impact

Not Applicable.

Background

Attached is the final monthly investment report for the month ended May 31, 2022. A preliminary investment report as of June 17, 2022, is also provided as the most complete report that was available at the time this agenda item was prepared.

Attachment(s)

Final Investment Report – May 2022/Preliminary Report – June 2022

Orange County Fire Authority
Monthly Investment Report

Final Report - May 2022

Preliminary Report - June 2022

Monthly Investment Report
Table of Contents

Orange County Fire Authority

Final Investment Report

May 31, 2022

EXECUTIVE SUMMARY

Portfolio Activity & Earnings

During the month of May 2022, the size of the portfolio decreased by approximately $10.5 million to $208.8 million. Receipts for the month totaled approximately $23.8 million. Significant receipts included Property Tax apportionment payments totaling $14.3 million, cash contract payments totaling $5.9 million, and various grant reimbursement payments and other charges for current services totaling $3.6 million. Significant disbursements for the month included two biweekly payrolls and related benefits totaling approximately $34.4 million. The portfolio's balance is expected to decrease in June as expenditures will exceed projected receipts.

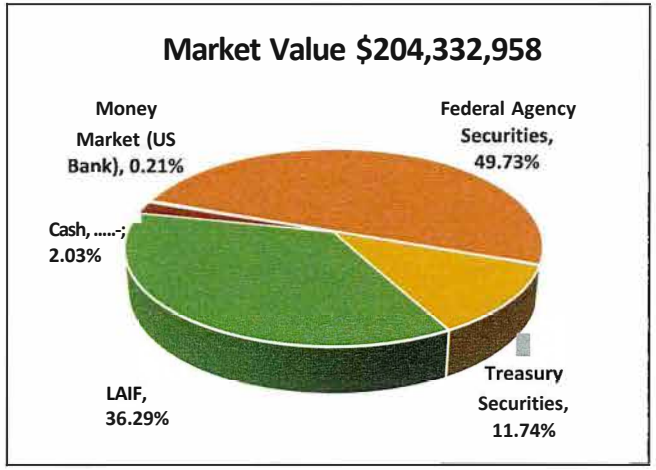
In May, the portfolio's yield to maturity (365-day equivalent) moved upward by 9 basis points to 0.62%. The effective rate ofretum increased by 6 basis points to 0.58% for the month, and the average maturity of the portfolio decreased by six days to 21 days to maturity.

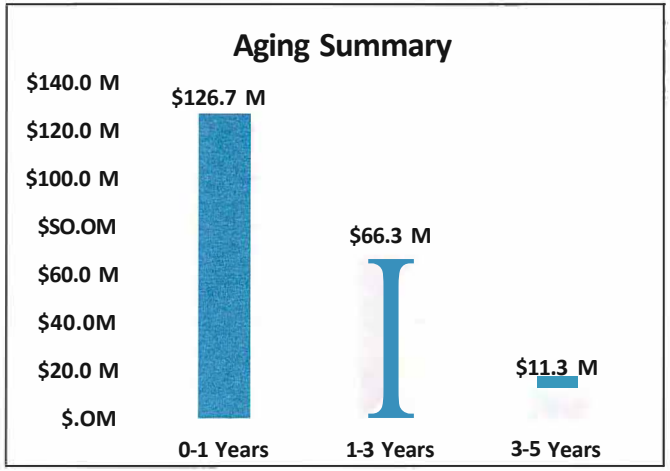
Economic News

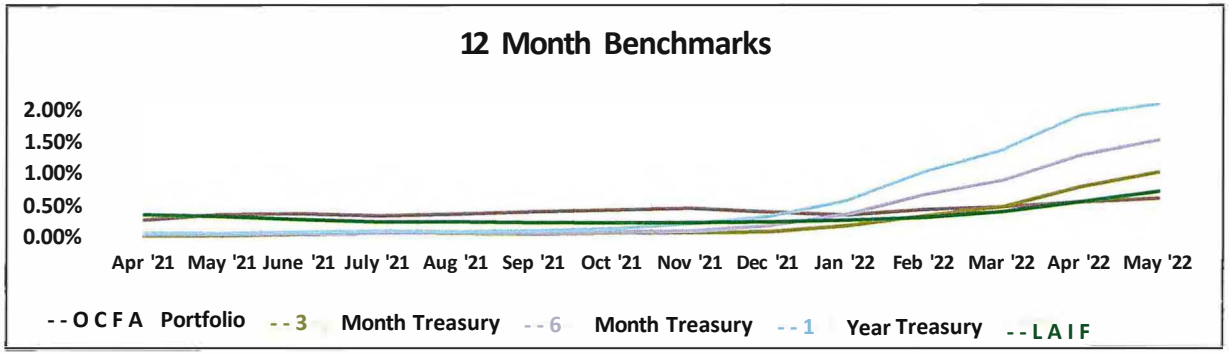
In May 2022, total nonfarm payroll employment rose by 390,000, and the unemployment rate held at 3.6%. Job gains were led by leisure and hospitality, followed by professional and business services, and transportation and warehousing. The number of unemployed persons was essentially unchanged at 6 million. Over the past 12 months, average hourly earnings have increased by 5.2%. Retail sales declined 0.3% in May, marking the first decline in five months as inflation appears to be affecting demand. Consumers pulled back on car purchases, online shopping, and spent more on gasoline. A sharp drop in vehicle sales, due to high prices, low inventory, and rising interest rates on car loans, played a large role in the decline in month over month retail spending.

U.S. Consumer confidence fell further in May, dropping eight points to a record low of 50.2. Consumers continued to have negative views on current buying conditions for houses and durables, as well as the outlook for the economy, primarily due to concerns over inflation. The Producer Price Index (PPI), which measures the prices paid by wholesalers, increased 10.8% from a year ago and rose .8% on the month. PPI is considered a forward-looking inflation measure as it tracks prices in the pipeline for goods and services that eventually reach consumers. The Consumer Price Index (CPI) increased 1% in May, while the annual CPI increased 8.6%, with inflation running at the highest rate since December 1981. Meanwhile, core CPI, which excludes food and energy, rose 6%. Inflation remains elevated, supply chain disruptions in China continue, and the Russian invasion of Ukraine is placing additional pressure on inflation and global economic activity. In its effort to combat inflation and slow the economy, the Federal Reserve has made moves to reach its 2% inflation rate objective. At its May 4, 2022 meeting, the Federal Reserve approved a .50% interest rate increase. On June 15, 2022, the Fed raised its benchmark interest rate by .75%, the highest rate increase since 1994, and taking the level of its benchmark funds rate to a range of 1.5% to 1.75%.

OCFA'S PORTFOLIO RETURN CONTINUES TO INCREASE AS THE FED RAISES SHORT TERM RATES







BENCHMARK COMPARISON AS OF MAY 31, 2022

3 Month T-Bill:	*0.99%*	*1 Year T-Bill:*	*2.06%*
6 Month T-Bill:	*1.49%*	*LAIF:*	*0.68%*
	OCFA Portfolio:	*0.58%*	

PORTFOLIO SIZE, YIELD, & DURATION

	Current Month	***Prior Month***	***Prior Year***
Book Value	*$208,807,295*	*$219,365,328*	*$200,688,284*
Yield to Maturity (365 day)	*0.62%*	*0.53%*	*0.38%*
Effective Rate of Return	*0.58%*	*0.52%*	*0.35%*
Days to Maturity	*21*	*27*	*48*

Orange County Fire Authority
1 Fire Authority Road
Irvine, CA 92602
(714)573-6301

ORANGE COUNTY FIRE AUTHORITY
Portfolio Management
Portfolio Summary
May 31, 2022

Investments	Par Value	Market Value (See Note 1 on page 10)	Book Value (See Note 2 on page 10)	% of Portfolio	Term	Days to Mat./Call	YTM/Call 360 Equiv.	YTM/Call 365 Equiv.
Money Mkt Mutual Funds/Cash	428,425.62	428,425.62	428,425.62	0.21	1	1	0.750	0.760
Federal Agency Coupon Securities	81,450,000.00	77,624,314.70	81,452,032.66	39.76	1,318	40	0.551	0.558
Federal Agency Disc. -Amortizing	24,000,000.00	23,991,600.00	23,993,103.34	11.71	44	15	0.624	0.633
Treasury Discounts -Amortizing	24,000,000.00	23,987,040.00	23,987,696.67	11.71	70	29	0.632	0.641
Local Agency Investment Funds	75,000,000.00	74,156,515.35	75,000,000.00	36.61	1	1	0.675	0.684
Investments	**204,878,425.62**	**200,187,895.67**	**204,861,258.29**	**100.00%**	**538**	**21**	**0.615**	**0.623**
Cash								
Passbook/Checking (not included in yield calculations)	4,145,062.58	4,145,062.58	4,145,062.58		1	1	0.000	0.000
Total Cash and Investments	**209,023,488.20**	**204,332,958.25**	**209,006,320.87**		**538**	**21**	**0.613**	**0.622**

Total Earnings	May 31 Month Ending	Fiscal Year To Date
Current Year	104,565.37	621,946.80
Average Daily Balance	**211,394,822.96**	**160,434,653.13**
Effective Rate of Return	**0.58%**	**0.42%**

"I certify that this investment report accurately reflects all pooled investments and is in compliance with the investment policy adopted by the Board of Directors to be effective on January 1, 2022. A copy of this policy is available from the Clerk of the Authority. Sufficient investment liquidity and anticipated revenues are available to meet budgeted expenditure requirements for the next thirty days and the next six months."

P Jakubiak 6/3/22

Patricia Jakubiak, Treasurer

Cash and Investments with GASB 31 Adjustment:		
Book Value of Cash & Investments before GASB 31 (Above)	*$*	*209,006,320.87*
GASB 31 Adjustment to Books (See Note 3 on page 10)	*$*	*(199,026.23)*
Total	*$*	*208,807,294.64*

ORANGE COUNTY FIRE AUTHORITY
Portfolio Management
Portfolio Details - Investments
May 31, 2022

CUSIP	Investment #	Issuer	Average Balance	Purchase Date	Par Value	Market Value (See Note 1 on page 10)	Book Value (See Note 2 on page 10)	Stated Rate	YTM/Call 365	Days to Mat./Call	Maturity Date
Money Mkt Mutual Funds/Cash											
SYS1042	1042	First American Treasury Oblig		09/22/2021	428,425.62	428,425.62	428,425.62	0.760	0.760	1	
SYS528	528	Federated Treasury Obligations		07/01/2021	0.00	0.00	0.00	0.010	0.010	1	
		Subtotal and Average	**9,291,724.97**		**428,425.62**	**428,425.62**	**428,425.62**		**0.760**	**1**	
Federal Agency Coupon Securities											
3133EMLE0	1020	Federal Farm Credit Bank (Continuous Call)		12/23/2020	14,000,000.00	13,619,760.00	14,000,000.00	0.190	0.190	0	09/22/2023
3133EMWH1	1030	Federal Farm Credit Bank (Callable 7/29/2022)		04/22/2021	3,000,000.00	2,816,970.00	3,002,032.66	0.710	0.636	58	04/21/2025
3133EMXS6	1032	Federal Farm Credit Bank (Continuous Call)		04/28/2021	12,000,000.00	11,329,560.00	12,000,000.00	0.720	0.720	30	04/28/2025
3130ALNY6	1025	Fed Home Loan Bank (Callable 06/30/2022)		03/30/2021	8,000,000.00	7,636,400.00	8,000,000.00	0.550	0.550	29	09/30/2024
3130ALTJ3	1029	Fed Home Loan Bank (Callable 7/8/2022)		04/22/2021	9,435,000.00	9,106,095.90	9,435,000.00	0.375	0.375	37	04/08/2024
3130ALVR2	1031	Fed Home Loan Bank (Callable 7/23/2022)		04/23/2021	11,015,000.00	10,463,368.80	11,015,000.00	0.520	0.520	52	10/23/2024
3130AM6P2	1034	Fed Home Loan Bank (Callable 7/29/2022)		04/29/2021	12,000,000.00	11,257,200.00	12,000,000.00	1.000	1.000	58	04/29/2026
3130AM6H0	1035	Fed Home Loan Bank (Callable 8/11/2022)		05/11/2021	12,000,000.00	11,394,960.00	12,000,000.00	0.550	0.550	71	10/11/2024
		Subtotal and Average	**81,452,060.09**		**81,450,000.00**	**77,624,314.70**	**81,452,032.66**		**0.558**	**40**	
Federal Agency Disc. -Amortizing											
313385XX9	1049	Fed Home Loan Bank		04/21/2022	12,000,000.00	11,997,600.00	11,998,530.00	0.490	0.504	9	06/10/2022
313385YL4	1051	Fed Home Loan Bank		05/16/2022	12,000,000.00	11,994,000.00	11,994,573.34	0.740	0.761	22	06/23/2022
		Subtotal and Average	**22,830,856.56**		**24,000,000.00**	**23,991,600.00**	**23,993,103.34**		**0.633**	**15**	
Treasury Discounts -Amortizing											
912796R68	1046	US Treasury Bill		04/21/2022	12,000,000.00	11,991,240.00	11,991,840.00	0.680	0.700	36	07/07/2022
912796R43	1047	US Treasury Bill		04/21/2022	12,000,000.00	11,995,800.00	11,995,856.67	0.565	0.581	22	06/23/2022
		Subtotal and Average	**23,981,471.67**		**24,000,000.00**	**23,987,040.00**	**23,987,696.67**		**0.641**	**29**	
Local Agency Investment Funds											
SYS336	336	Local Agency Invstmt Fund			75,000,000.00	74,156,515.35	75,000,000.00	0.684	0.684	1	
		Subtotal and Average	**73,838,709.68**		**75,000,000.00**	**74,156,515.35**	**75,000,000.00**		**0.684**	**1**	
		Total and Average	**211,394,822.96**		**204,878,425.62**	**200,187,895.67**	**204,861,258.29**		**0.622**	**21**	

ORANGE COUNTY FIRE AUTHORITY
Portfolio Management
Portfolio Details - Cash
May 31, 2022

CUSIP	Investment #	Issuer	Average Balance	Purchase Date	Par Value	Market Value	Book Value	Stated Rate	YTM/Call 365	Days to Mat./Call
Money Mkt Mutual Funds/Cash										
SYS10033	10033	Revolving Fund		07/01/2021	20,000.00	20,000.00	20,000.00		0.000	1
SYS4	4	Union Bank		07/01/2021	4,125,062.58	4,125,062.58	4,125,062.58		0.000	1
		Average Balance	**0.00**							1
		Total Cash and Investments	**211,394,822.96**		**209,023,488.20**	**204,332,958.25**	**209,006,320.87**		**0.623**	**21**

Orange County Fire Authority

In Service of Others!

ORANGE COUNTY FIRE AUTHORITY
Aging Report
By Maturity Date
As of June 1, 2022

Orange County Fire Authority
1 Fire Authority Road
Irvine, CA 92602
(714)573-6301

					Maturity Par Value	Percent of Portfolio	Current Book Value	Current Market Value
Aging Interval: 0 days	(06/01/2022 - 06/01/2022)	5 Maturities	0 Payments		79,573,488.20	38.53%	79,573,488.20	78,730,003.55
Aging Interval: 1 - 30 days	(06/02/2022 - 07/01/2022)	3 Maturities	0 Payments		36,000,000.00	17.61%	35,988,960.01	35,987,400.00
Aging Interval: 31 - 60 days	(07/02/2022 - 07/31/2022)	1 Maturities	0 Payments		12,000,000.00	5.87%	11,991,840.00	11,991,240.00
Aging Interval: 61 - 90 days	(08/01/2022 - 08/30/2022)	0 Maturities	0 Payments		0.00	0.00%	0.00	0.00
Aging Interval: 91 - 120 days	(08/31/2022 - 09/29/2022)	0 Maturities	0 Payments		0.00	0.00%	0.00	0.00
Aging Interval: 121 - 365 days	(09/30/2022 - 06/01/2023)	0 Maturities	0 Payments		0.00	0.00%	0.00	0.00
Aging Interval: 366 - 1095 days	(06/02/2023 - 05/31/2025)	7 Maturities	0 Payments		69,450,000.00	32.48%	69,452,032.66	66,367,114.70
Aging Interval: 1096 days and after	(06/01/2025 -)	1 Maturities	0 Payments		12,000,000.00	5.51%	12,000,000.00	11,257,200.00
	Total for	17 Investments	0 Payments			100.00	209,006,320.87	204,332,958.25

NOTES TO PORTFOLIO MANAGEMENT REPORT

Note 1: Market value of the LAIF investment is calculated using a fair value factor provided by LAIF. The U.S. Bank Corporate Trust and Custody Department provides market values of the remaining investments.

Note 2: Book value reflects the cost or amortized cost before the GASB 31 accounting adjustment.

Note 3: GASB 31 requires governmental entities to report investments at fair value in the financial statements and to reflect the corresponding unrealized gains/ (losses) as a component of investment income. The GASB 31 adjustment is recorded only at fiscal year-end. The adjustment for June 30, 2021 includes an increase of $6,222.75 to the LAIF investment and a decrease of ($205,248.98) to the remaining investments.

Note 4: The Federated Treasury Obligations money market mutual fund functions as the Authority's sweep account. Funds are transferred to and from the sweep account to/from OCFA's checking account in order to maintain a target balance of $1,000,000 in checking. Since this transfer occurs at the beginning of each banking day, the checking account sometimes reflects a negative balance at the close of the banking day. The negative closing balance is not considered an overdraft since funds are available in the money market mutual fund. The purpose of the sweep arrangement is to provide sufficient liquidity to cover outstanding checks yet allow that liquidity to be invested while payment of the outstanding checks is pending.

Local Agency Investment Fund (LAIF)

As of May 31, 2022, OCFA has $75,000,000 invested in LAIF. The fair value of OCFA's LAIF investment is calculated using a participant fair value factor provided by LAIF on a quarterly basis. The fair value factor as of March 31, 2022 is .988753538. When applied to OCFA's LAIF investment, the fair value is $74,156,515.35 or $843,484.65 below cost. Although the fair value of the LAIF investment is lower than cost, OCFA can withdraw the actual amount invested at any time.

LAIF is included in the State Treasurer's Pooled Money Investment Account (PMIA) for investment purposes. The PMIA market valuation at May 31, 2022 is included on the following page.

State of California
Pooled Money Investment Account
Market Valuation
5/31/2022

Description	Carrying Cost Plus Accrued Interest Purch.	Fair Value	Accrued Interest
United States Treasury:			
Bills	$ 49,529,238,397.29	$ 49,488,826,500.00	NA
Notes	$ 102,013,123,817.00	$ 100,021,677,500.00	$ 192,901,284.00
Federal Agency:			
SBA	$ 315,292,168.08	$ 315,360,436.72	$ 133,146.58
MBS-REMICs	$ 5,097,672.07	$ 5,208,914.66	$ 23,114.60
Debentures	$ 9,339,541,608.83	$ 9,207,339,900.00	$ 10,573,977.25
Debentures FR	$ -	$ -	$ -
Debentures CL	$ 1,100,000,000.00	$ 1,085,400,000.00	$ 2,601,417.00
Discount Notes	$ 29,979,361,770.70	$ 29,960,407,000.00	NA
Supranational Debentures	$ 2,215,238,528.33	$ 2,151,711,500.00	$ 4,681,224.00
Supranational Debentures FR	$ -	$ -	$ -
CDs and YCDs FR	$ -	$ -	$ -
Bank Notes	$ -	$ -	$ -
CDs and YCDs	$ 13,835,000,000.00	$ 13,818,806,856.78	$ 21,271,062.51
Commercial Paper	$ 12,043,520,242.90	$ 12,049,514,547.31	NA
Corporate:			
Bonds FR	$ -	$ -	$ -
Bonds	$ 448,806,188.80	$ 431,129,370.00	$ 2,562,883.48
Repurchase Agreements	$ -	$ -	$ -
Reverse Repurchase	$ -	$ -	$ -
Time Deposits	$ 4,224,000,000.00	$ 4,224,000,000.00	NA
PMIA & GF Loans	$ 825,022,000.00	$ 825,022,000.00	NA
TOTAL	$ 225,873,242,394.00	$ 223,584,404,525.47	$ 234,748,109.42

Fair Value Including Accrued Interest $ 223,819,152,634.89

Repurchase Agreements, Time Deposits, PMIA & General Fund loans, and
Reverse Repurchase agreements are carried at portfolio book value (carrying cost).

Orange County Fire Authority

Preliminary Investment Report

June 17, 2022

Orange County Fire Authority
1 Fire Authority Road
Irvine, CA 92602
(714)573-6301

ORANGE COUNTY FIRE AUTHORITY
Portfolio Management
Portfolio Summary
June 17, 2022

Investments	Par Value	Market Value (See Note 1 on page 19)	Book Value (See Note 2 on page 19)	% of Portfolio	Term	Days to Mat./Call	YTM/Call 360 Equiv.	YTM/Call 365 Equiv.
Money Mkt Mutual Funds/Cash	429,199.45	429,199.45	429,199.45	0.22	1	1	0.750	0.760
Federal Agency Coupon Securities	81,450,000.00	76,585,582.25	81,451,999.44	42.23	1,318	28	0.551	0.558
Federal Agency Disc. -Amortizing	12,000,000.00	11,999,040.00	11,998,766.67	6.22	38	5	0.751	0.761
Treasury Discounts -Amortizing	24,000,000.00	23,994,120.00	23,994,751.66	12.44	70	12	0.632	0.641
Local Agency Investment Funds	75,000,000.00	74,156,515.35	75,000,000.00	38.89	1	1	0.675	0.684
Investments	**192,879,199.45**	**187,164,457.05**	**192,874,717.22**	**100.00%**	**568**	**14**	**0.622**	**0.631**
Cash								
Passbook/Checking (not included in yield calculations)	11,278,485.39	11,278,485.39	11,278,485.39		1	1	0.000	0.000
Total Cash and Investments	**204,157,684.84**	**198,442,942.44**	**204,153,202.61**		**568**	**14**	**0.622**	**0.631**

Total Earnings	June 17 Month Ending	Fiscal Year To Date
Current Year	58,308.77	680,255.57
Average Daily Balance	**209,084,968.20**	**162,784,242.21**
Effective Rate of Return	**0.60%**	**0.43%**

"I certify that this investment report accurately reflects all pooled investments and is in compliance with the investment policy adopted by the Board of Directors to be effective on January 1, 2022. A copy of this policy is available from the Clerk of the Authority. Sufficient investment liquidity and anticipated revenues are available to meet budgeted expenditure requirements for the next thirty days and the next six months."

Patricia Jakubiak, Treasurer — 6/24/22

Cash and Investments with GASB 31 Adjustment:

Book Value of Cash & Investments before GASB 31 (Above)	$	*204,153,202.61*
GASB 31 Adjustment to Books (See Note 3 on page 19)	$	*(199,026.23)*
Total	$	*203,954,176.38*

ORANGE COUNTY FIRE AUTHORITY
Portfolio Management
Portfolio Details - Investments
June 17, 2022

CUSIP	Investment #	Issuer	Average Balance	Purchase Date	Par Value	Market Value (See Note 1 on page 19)	Book Value (See Note 2 on page 19)	Stated Rate	YTM/Call 365	Days to Mat./Call	Maturity Date
Money Mkt Mutual Funds/Cash											
SYS1042	1042	First American Treasury Oblig		09/22/2021	429,199.45	429,199.45	429,199.45	0.760	0.760	1	
SYS528	528	Federated Treasury Obligations		07/01/2021	0.00	0.00	0.00	0.010	0.010	1	
		Subtotal and Average	**10,292,132.83**		**429,199.45**	**429,199.45**	**429,199.45**		**0.760**	1	
Federal Agency Coupon Securities											
3133EMLE0	1020	Federal Farm Credit Bank	(Continuous Call)	12/23/2020	14,000,000.00	13,510,560.00	14,000,000.00	0.190	0.190	13	09/22/2023
3133EMWH1	1030	Federal Farm Credit Bank	(Callable 7/29/2022)	04/22/2021	3,000,000.00	2,776,140.00	3,001,999.44	0.710	0.636	41	04/21/2025
3133EMXS6	1032	Federal Farm Credit Bank	(Continuous Call)	04/28/2021	12,000,000.00	11,148,960.00	12,000,000.00	0.720	0.720	13	04/28/2025
3130ALNY6	1025	Fed Home Loan Bank	(Callable 06/30/2022)	03/30/2021	8,000,000.00	7,538,480.00	8,000,000.00	0.550	0.550	12	09/30/2024
3130ALTJ3	1029	Fed Home Loan Bank	(Callable 7/8/2022)	04/22/2021	9,435,000.00	9,010,991.10	9,435,000.00	0.375	0.375	20	04/08/2024
3130ALVR2	1031	Fed Home Loan Bank	(Callable 7/23/2022)	04/23/2021	11,015,000.00	10,325,571.15	11,015,000.00	0.520	0.520	35	10/23/2024
3130AM6P2	1034	Fed Home Loan Bank	(Callable 7/29/2022)	04/29/2021	12,000,000.00	11,026,920.00	12,000,000.00	1.000	1.000	41	04/29/2026
3130AM6H0	1035	Fed Home Loan Bank	(Callable 8/11/2022)	05/11/2021	12,000,000.00	11,247,960.00	12,000,000.00	0.550	0.550	54	10/11/2024
		Subtotal and Average	**81,452,015.07**		**81,450,000.00**	**76,585,582.25**	**81,451,999.44**		**0.558**	28	
Federal Agency Disc. -Amortizing											
313385YL4	1051	Fed Home Loan Bank		05/16/2022	12,000,000.00	11,999,040.00	11,998,766.67	0.740	0.761	5	06/23/2022
		Subtotal and Average	**18,349,388.63**		**12,000,000.00**	**11,999,040.00**	**11,998,766.67**		**0.761**	5	
Treasury Discounts -Amortizing											
912796R68	1046	US Treasury Bill		04/21/2022	12,000,000.00	11,994,720.00	11,995,693.33	0.680	0.700	19	07/07/2022
912796R43	1047	US Treasury Bill		04/21/2022	12,000,000.00	11,999,400.00	11,999,058.33	0.565	0.581	5	06/23/2022
		Subtotal and Average	**23,991,431.67**		**24,000,000.00**	**23,994,120.00**	**23,994,751.66**		**0.641**	12	
Local Agency Investment Funds											
SYS336	336	Local Agency Invstmt Fund			75,000,000.00	74,156,515.35	75,000,000.00	0.684	0.684	1	
		Subtotal and Average	**75,000,000.00**		**75,000,000.00**	**74,156,515.35**	**75,000,000.00**		**0.684**	1	
		Total and Average	**209,084,968.20**		**192,879,199.45**	**187,164,457.05**	**192,874,717.22**		**0.631**	14	

ORANGE COUNTY FIRE AUTHORITY
Portfolio Management
Portfolio Details - Cash
June 17, 2022

CUSIP	Investment #	Issuer	Average Balance	Purchase Date	Par Value	Market Value	Book Value	Stated Rate	YTM/C 365	Days to Mat./Call
Money Mkt Mutual Funds/Cash										
SYS10033	10033	Revolving Fund		07/01/2021	20,000.00	20,000.00	20,000.00		0.000	1
SYS4	4	Union Bank		07/01/2021	11,258,485.39	11,258,485.39	11,258,485.39		0.000	1
		Average Balance	0.00							1
		Total Cash and Investments	**209,084,968.20**		**204,157,684.84**	**198,442,942.44**	**204,153,202.61**		**0.631**	**14**

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ORANGE COUNTY FIRE AUTHORITY
Aging Report
By Maturity Date
As of June 18, 2022

Orange County Fire Authority
1 Fire Authority Road
Irvine, CA 92602
(714)573-6301

					Maturity Par Value	Percent of Portfolio	Current Book Value	Current Market Value
Aging Interval: 0 days	(06/18/2022 - 06/18/2022)	5 Maturities	0 Payments		86,707,684.84	43.27%	86,707,684.84	85,864,200.19
Aging Interval: 1 - 30 days	(06/19/2022 - 07/18/2022)	3 Maturities	0 Payments		36,000,000.00	18.14%	35,993,518.33	35,993,160.00
Aging Interval: 31 - 60 days	(07/19/2022 - 08/17/2022)	0 Maturities	0 Payments		0.00	0.00%	0.00	0.00
Aging Interval: 61 - 90 days	(08/18/2022 - 09/16/2022)	0 Maturities	0 Payments		0.00	0.00%	0.00	0.00
Aging Interval: 91 - 120 days	(09/17/2022 - 10/16/2022)	0 Maturities	0 Payments		0.00	0.00%	0.00	0.00
Aging Interval: 121 - 365 days	(10/17/2022 - 06/18/2023)	0 Maturities	0 Payments		0.00	0.00%	0.00	0.00
Aging Interval: 366 - 1095 days	(06/19/2023 - 06/17/2025)	7 Maturities	0 Payments		69,450,000.00	33.04%	69,451,999.44	65,558,662.25
Aging Interval: 1096 days and after	(06/18/2025 -)	1 Maturities	0 Payments		12,000,000.00	5.56%	12,000,000.00	11,026,920.00
		Total for	16 Investments	0 Payments		100.00	204,153,202.61	198,442,942.44

NOTES TO PORTFOLIO MANAGEMENT REPORT

Note 1: Market value of the LAIF investment is calculated using a fair value factor provided by LAIF. The U.S. Bank Corporate Trust and Custody Department provides market values of the remaining investments.

Note 2: Book value reflects the cost or amortized cost before the GASB 31 accounting adjustment.

Note 3: GASB 31 requires governmental entities to report investments at fair value in the financial statements and to reflect the corresponding unrealized gains/ (losses) as a component of investment income. The GASB 31 adjustment is recorded only at fiscal year-end. The adjustment for June 30, 2021 includes an increase of $6,222.75 to the LAIF investment and a decrease of ($205,248.98) to the remaining investments.

Note 4: The Federated Treasury Obligations money market mutual fund functions as the Authority's sweep account. Funds are transferred to and from the sweep account to/from OCFA's checking account in order to maintain a target balance of $1,000,000 in checking. Since this transfer occurs at the beginning of each banking day, the checking account sometimes reflects a negative balance at the close of the banking day. The negative closing balance is not considered an overdraft since funds are available in the money market mutual fund. The purpose of the sweep arrangement is to provide sufficient liquidity to cover outstanding checks yet allow that liquidity to be invested while payment of the outstanding checks is pending.

GLOSSARY

INVESTMENT TERMS

Basis Point. Measure used in quoting yields on bonds and notes. One basis point is .01% of yield.

Book Value. This value may be the original cost of acquisition of the security, or original cost adjusted by the amortization of a premium or accretion of a discount. The book value may differ significantly from the security's current value in the market.

Commercial Paper. Unsecured short-term promissory notes issued by corporations, with maturities ranging from 2 to 270 days; may be sold on a discount basis or may bear interest.

Coupon Rate. Interest rate, expressed as a percentage of par or face value, that issuer promises to pay over lifetime of debt security.

Discount. The amount by which a bond sells under its par (face) value.

Discount Securities. Securities that do not pay periodic interest. Investors earn the difference between the discount issue price and the full face value paid at maturity. Treasury bills, bankers' acceptances and most commercial paper are issued at a discount.

Effective Rate of Return. Rate of return on a security, based on its purchase price, coupon rate, maturity date, and the period between interest payments.

Federal Agency Securities. Securities issued by agencies such as the Federal National Mortgage Association and the Federal Farm Credit Bank. Though not general obligations of the US Treasury, such securities are sponsored by the government and therefore have high credit ratings. Some are issued on a discount basis and some are issued with coupons.

Federal Funds. Funds placed in Federal Reserve banks by depository intuitions in excess of current reserve requirements. These depository institutions may lend fed funds to each other overnight or on a longer basis. They may also transfer funds among each other on a same-day basis through the Federal Reserve banking system. Fed Funds are considered to be immediately available funds.

Fed Funds Rate. The interest rate charged by one institution lending federal funds to another.

Federal Open Market Committee. The branch of the Federal Reserve Board that determines the direction of monetary policy.

Local Agency Investment Fund (LAIF). A California State Treasury fund which local agencies may use to deposit funds for investment and for reinvestment with a maximum of $75 million for any agency ***(excluding bond funds, which have no maximum)***. It offers high liquidity because

deposits can be converted to cash in 24 hours and no interest is lost. Interest is paid quarterly and the State's administrative fee cannot to exceed 1/4 of a percent of the earnings.

Market value. The price at which the security is trading and could presumably be purchased or sold.

Maturity Date. The specified day on which the issuer of a debt security is obligated to repay the principal amount or face value of security.

Money Market Mutual Fund. Mutual funds that invest solely in money market instruments (short-term debt instruments, such as Treasury bills, commercial paper, bankers' acceptances, repurchase agreements and federal funds).

Par. Face value or principal value of a bond typically $1,000 per bond.

Rate of Return. The amount of income received from an investment, expressed as a percentage. A *market rate of return* is the yield that an investor can expect to receive in the current interest-rate environment utilizing a buy-and-hold to maturity investment strategy.

Treasury Bills. Short-term U.S. government non-interest bearing debt securities with maturities of no longer than one year. The yields on these bills are monitored closely in the money markets for signs of interest rate trends.

Treasury Notes. Intermediate U.S. government debt securities with maturities of one to 10 years.

Treasury bonds. Long-term U.S. government debt securities with maturities of 10 years or longer.

Yield. Rate of return on a bond.

Yield-to-maturity. Rate of return on a bond taking into account the total annual interest payments, the purchase price, the redemption value and the amount of time remaining until maturity.

ECONOMIC TERMS

Conference Board Consumer Confidence Index. A survey that measures how optimistic or pessimistic consumers are with respect to the economy in the near future.

Consumer Price Index (CPI). A measure that examines the weighted average of prices of a basket of consumer goods and services, such as transportation, food and medical care. Changes in CPI are used to assess price changes associated with the cost of living.

Durable Goods Orders. An economic indicator released monthly that reflects new orders placed with domestic manufacturers for delivery of factory durable goods such as autos and appliances in the near term or future.

Gross Domestic Product. The monetary value of all the finished goods and services produced within a country's borders in a specific time period. It includes all of private and public consumption, government outlays, investments and exports less imports that occur within a defined territory.

Industrial Production. An economic indicator that is released monthly by the Federal Reserve Board. The indicator measures the amount of output from the manufacturing, mining, electric and gas industries.

ISM Institute for Supply Management (ISM) Manufacturing Index. A monthly index that monitors employment, production inventories, new orders and supplier deliveries.

ISM Non-manufacturing Index. An index based on surveys of non-manufacturing firms' purchasing and supply executives. It tracks economic data for the service sector.

Leading Economic Index. A monthly index used to predict the direction of the economy's movements in the months to come. The index is made up of 10 economic components, whose changes tend to precede changes in the overall economy.

National Federation of Independent Business Small Business Optimism Index. An index based on surveys of small business owners' plans and expectations regarding employment, capital, inventories, economic improvement, credit conditions, expansion, and earnings trends in the near term or future.

Producer Price Index. An index that measures the average change over time in the selling prices received by domestic producers for their output.

University of Michigan Consumer Sentiment Index. An index that measures the overall health of the economy as determined by consumer opinion. It takes into account an individual's feelings toward his or her own current financial health, the health of the economy in the short term and the prospects for longer term economic growth.

Orange County Fire Authority

AGENDA STAFF REPORT

Budget and Finance Committee Meeting | **Agenda Item No. 3B**
July 13, 2022 | **Discussion Calendar**

OCFA Aircraft Replacement Review Process – Review of Remaining Phase 3 through 6 of the Work Plan

Contact(s) for Further Information

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Summary

This agenda item is provided to address the remaining phases of the OCFA Aircraft Replacement Review Process. At this meeting, staff will provide the aircraft needs and disposition of obsolete aircraft, options and associated costs in the provision of Air Operations Services, the affordability analysis with potential financing solutions and aircraft replacement recommendations.

Prior Board/Committee Action(s)

At the July 22, 2021 meeting of the Board of Directors, a presentation was provided by Division Chief/Special Operations, Vince Carpino, as an update on OCFA Air Operations. The Board was informed that staff would return at a later date to initiate more dialogue and to begin to explore next steps related to the replacement of OCFA's Air Assets.

At the November 10, 2021 meeting of the Budget and Finance Committee, discussion was initiated regarding the OCFA Aviation Unit Fleet Plan Analysis and proposed review process. However, quorum was lost prior to completing any action.

At the January 12, 2022 meeting of the Budget and Finance Committee, dialogue continued, and direction was provided to staff to finalize the proposed review structure, and to return to the Committee for an additional and final review prior to submittal to the Board of Directors for input and approval.

On March 9, 2022, the Budget and Finance Committee reviewed the proposed OCFA Aircraft Replacement Review Process item and directed staff to place on the Board of Directors agenda for approval.

At the May 18, 2022 special meeting of the Budget and Finance Committee, staff reviewed phase one of the six phase review process. The topic of the first phase review was Asset Orientation. A meeting quorum was not possible, and the meeting continued as informational only to the members in attendance. Staff provided an Asset Orientation presentation and conducted a tour of the Air Ops Fire Station 41 facilities, equipment and aircraft.

On June 8, 2022, the Budget and Finance Committee reviewed phase 2 of the OCFA Aircraft Replacement Review Process. The topic covered a review of Air Operations services provided which included call volume statistics, types of calls, etc. The information needs that the B&FC previously requested staff to include in the formal vetting process was provided during this meeting, including:

- Breakdown of helicopter call types by month within OCFA service area
- Assessment of necessity and improved outcomes from having a helicopter
- Assess OCFA & OCSD helicopter programs overlap and operational relationship
- How many aircraft we require and to do what function?
- How does the growth of county population factor into the needs of the agency?

In addition, at this meeting, the Budget & Finance Committee directed staff to combine and expedite the review phases.

RECOMMENDED ACTION(S)

Review the remaining phases of the work plan provided herein for the OCFA Aircraft Replacement Review process and direct staff to place the item on the agenda for the Board of Directors meeting of July 28, 2022, with the Budget and Finance Committee's recommendation that the Board of Directors:

1. Receive and file the report documenting the full OCFA Aircraft Replacement Review Process.
2. Direct staff to return the two loaned Federal Excess Property Program (FEPP) UH-1H Super Huey helicopters to the federal government, with CALFIRE serving as the conduit for this FEPP return.
3. Direct staff to initiate administrative actions necessary to facilitate the purchase of two Sikorsky S-70i Type I helicopters, including: (a) procurement process for award of contract, (b) Request for Proposal process for selection of financing consultants, (c) Request for Proposal process for provision of lease-purchase financing, (d) and preparation of draft-proposed budget adjustments.
4. Upon completion of the administrative actions, direct staff to return to the Budget and Finance Committee and the Board of Directors (tentatively in September 2022) for approval to award a purchasing contract, approval of lease financing terms, and authorization of the necessary budget adjustments.

Impact to Cities/County

Not Applicable.

Fiscal Impact

The fiscal impact includes $52 million in capital costs, financed with $52 million in lease-purchase financing proceeds, with a total cost of borrowing at $18.6 million spread over 15 years. Additional details regarding financing terms and ongoing operating costs are provided in the staff report and attachments.

Increased Cost Funded by Structural Fire Fund (Capital): $4.7 million/year for 15 years
Increased Cost Funded by Structural Fire Fund (Addt'l Annual Operating cost): $1.8M
Increased Cost Funded by Cash Contract Cities: $0

Background

At their respective March 2022 Budget & Finance Committee (B&FC) and Board of Directors Meetings, the B&FC and the Board reviewed and approved the OCFA's Aircraft Replacement Review Process and work plan. The review process and work plan incorporate prior input provided

by the B&FC, and developed to educate and inform our policy-makers on needs, options, costs, financing solutions, and ultimately to prepare recommendations for consideration by the Board of Directors pertaining to disposition of obsolete aircraft and acquisition of replacement aircraft.

The B&FC will conduct the Aircraft Replacement Review Process, with delivery of its findings and recommendations to the Board of Directors upon completion. In delegating this responsibility to the B&FC, the Board will rely upon the B&FC to conduct a thorough review of the services provided by OCFA's Air Operations in order to gain an understanding of needs for aircraft replacement, disposition of obsolete aircraft, as well as the costs for replacement, affordability, and options for financing these important assets.

The review process and work plan organized the review into feasible phases and sequenced in a manner to facilitate a thorough education. The review process and work plan included:

1. Asset Orientation - OCFA Air Operations Station 41
2. Review of Air Operations Services Provided
3. Aircraft Replacement Needs & Disposition of Obsolete Aircraft
4. Aircraft Options & Associated Costs
5. Affordability Analysis with Potential Financing Solutions
6. Development of Recommendations

Staff anticipated a B&FC work plan process that would extend approximately six-months to complete. However, upon conclusion of the first two phases, the B&FC directed staff that the remaining phases of the Work Plan be expedited. Based on the limited availability of the replacement aircraft best suited for the OCFA multi-mission profile, the need to expedite the Work Plan review has become more time sensitive.

The OCFA provides a variety of services to the unincorporated area of the county as well as 23 cities in the county. The primary missions for the OCFA aviation unit include firefighting and rescue. The aviation unit averages 1,250 operations per year and has flown an average of 530 hours annually beginning in 2016. The aviation unit flew just over 600 hours in 2020.

In addition to firefighting, the aviation unit uses its aircraft to do fire mapping, transport wildland crews, transport patients, and insert and extract equipment. When performing rescue missions with a 250-foot hoist cable, the unit can do various procedures including short-haul air rescue on land or water, swift-water rescue, patient transfer on litter, and large animal rescues. Other capabilities involve night vision goggle operations, infrared detection, and disaster assessment.

Of the four aircraft, the aviation unit staffs two of them 365 days each year. One of the two aircraft is staffed for 24 hours and is prepared for the firefighting and rescue missions. The crew consists of a pilot, fire captain or crew chief, and one or two paramedics. The second helicopter is a fire response helicopter and is available for 10 hours each day. The helicopter is staffed with a pilot and fire captain or crew chief. A third and fourth helicopter are necessary so that reserve aircraft are available due to FAA scheduled maintenance requirements and initial pilot training.

Current Month's Topic - Review of Remaining Phase 3 through 6 of the Work Plan:
The OCFA sought the assistance of Conklin & de Decker to provide a thorough assessment of the OCFA's current helicopter fleet to make more informed decisions on the purchase, operation, maintenance, and disposition of aircraft by providing objective and impartial information.

Staff determined that certain performance and specifications were important to evaluate the candidate helicopters. The parameters included:

- Useful Load
- Mission Endurance
- Aircraft Speed
- Hovering Capability
- Water Drop Capacity
- Cabin Volume and Seating
- Purchase Price
- Maintenance and Fuel Costs (Section 2 of the report)

Staff used the current helicopters to explain the importance of these parameters and to serve as a baseline when comparing to the candidate helicopters. The final step was to create a table that compares the current capabilities of the existing helicopters to the candidate helicopters.

More specifically, the OCFA requested that Conklin & de Decker focus on the following areas to accomplish the intent of the overview:

- Based on the OCFA's historical usage, identify the preliminary specifications of the helicopter required. Preliminary specifications could include item such as aircraft weight range, size, number of engines, and useful load.
- Estimate the cost of the acquisition and operation of helicopter alternatives. The operating cost estimates will include maintenance options and fuel costs, and other operating or overhead costs.
- Establish a defined framework for an OCFA helicopter replacement plan including the anticipated useful life of the equipment, as well as a comparison of phasing of aircraft purchases versus purchasing all replacement aircraft all at once.
- Thoroughly research the resale value of the current fleet and explore the primary and secondary markets for helicopters to determine the feasibility of replacement within specified timeframes, such as lead times in acquiring helicopters and expected duration in selling the current fleet.
- Provide a comprehensive summary of:
  - Maintenance requirements based on usage parameters such as flight hours, calendar times, or flight cycles. Compare/contrast to current maintenance schedules deployed by the OCFA.
  - Present preliminary analysis and findings to OCFA staff and receive feedback.
  - Prepare a Fleet Plan Analysis report for all involved parties with input from OCFA staff.

The following sections summarizes the results to Conklin & de Decker's analysis and research. In addition, the full report issued by Conklin & de Decker is provided as Attachment 1.

Phase 3: Aircraft Needs & Disposition of Obsolete Aircraft

Section 1: Fleet Review

OCFA does not see its primary missions changing; however, the organization does believe it needs to increase its water delivery capabilities during the firefighting mission. The current fleet of OCFA helicopters have the capacity to deliver up to 350 to 375 gallons per drop. A more acceptable volume would be Type 1 helicopters, which drop up to 1,000 gallons.

Helicopter specifications and performance requirements are identified based on OCFA current and future missions.

OCFA is seeing an annual increase in wildland fires, which occur and spread more rapidly than experienced in the past, the Fire Chief and Emergency Operations Bureau leadership believe it needs to increase its water delivery capabilities during the firefighting mission. The current fleet of helicopters have the capacity to deliver up to 350 to 375 gallons per drop. A more acceptable volume would be Type 1 helicopters, which drop up to 1,000 gallons. Comparing the Bell 412EPX to the Sikorsky S-70i illustrates the increase in water delivered during the typical mission scenario. The S-70i will carry 256 percent more water per tank load. It may be more important to note that in comparison, the S-70i performance is far superior to that of the Bell 412EPX and will provide a significantly enhanced level of safety for our aircrews. The S-70i has true fly away capability in the case of a one-engine inoperable (OEI) event while hovering at maximum gross weight.

OCFA selected two helicopter types that have the capacity to deliver more water per drop, while also providing more cabin volume and seating than the current fleet. Those aircraft were the Sikorsky S-70i and Coulson-Unical CH-47D. Important to note that although the CH-47D has the capability to drop a larger volume of water, it does not meet the needs of OCFA's primary missions, and therefore not included as a candidate helicopter in Table 1 below. OCFA also requested information on the newest version of the Bell 412 series, the Bell/Subaru 412EPX, due to its improved performance.

The table below provides information about the selected performance and specifications for the current fleet and the candidate helicopters.

Table 1				
Firefighting Mission				
	Current Helicopters		**Candidate Helicopters**	
Airframe Manufacturer /Type	Bell / Super Huey	Bell / 412EP	Subaru/Bell 412EPX	Sikorsky S-70i
Engine Manufacturer /Type	Honeywell / T53-L-703	Pratt & Whitney / PT6T-3D	Pratt & Whitney / PT6T-9	General Electric / T700 GE 701D
Useful Load (lbs.)				
Maximum Take-Off Gross Weight (Internal)	10,500	11,900	12,200	22,000
Maximum Take-Off Gross Weight (External)	11,200	11,900	13,000	23,500
Mission Configured – Fire	6,700	8,300	8,300	14,200
Flight Crew (Firefighting)	450	450	450	650
Useful Load Available for Mission	4,050	3,150	4,250	8,650
Fuel (lbs.) 1.5-Hour Mission w/ 20 Min. Reserve	1,275	1,385	1,385	1,986
Remaining Useful Load	2,775	1,765	2,865	6,664
Mission Endurance (Hours)	**2.0**	**2.9**	**2.9**	**2.9**
Hover Capabilities (Altitude)				
In-Ground Effect (ISA, Sea Level)	6,800	6,200	11,100	10,270
Out-of-Ground-Effect (ISA, Sea Level)	10,800 lbs.	11,890 lbs.	8,000	6,200

In-Ground Effect (ISA +20 C, Sea Level)	6,800	6,200	8,200	7,400
Out-of-Ground-Effect (ISA +20 C, Sea Level)	10,800 lbs.	11,890 lbs.	4,000	4,400
Helicopter Speed (kts)				
Cruise Speed - Max (knots)	106	125	130	145
Cruise Speed - Long Range (knots)	106	122	124	128
Calculated Speed (knots)	90	106	110	122-140
Water Drop Capabilities (gallons)				
Water Tank Size (gallons)	350	375	375	1,000
1.5-Hour Mission+ 20-Min Fuel Reserve	332	211	343	797
End of Mission (20-minute reserve)	457	347	478	992
Cabin				
Volume (cubic feet)	208	208	208	396
Crew/Passengers	2/14	2/14	2/14	2/12
Pricing/Value				
Basic Price (x1M)	**N/A**	**N/A**	$11.5	$17.0
Firefighting Completion (x 1M)	**N/A**	**N/A**	$14-$15	$20-$23 (1)
Resale Value	**$1.6-$2.0**	**$3.5-$4.3**	N/A	N/A

(1) Recent pricing estimate as of June 30, 2022 is $26,070,934 per aircraft

Section 2: ***Life Cycle Cost Projection***

OCFA requested that Conklin & de Decker estimate the cost of the acquisition and operation of helicopter alternatives. The operating cost estimates include maintenance options and fuel costs, and other operating or overhead costs.

Conklin & de Decker estimated the maintenance and fuel costs over a ten-year period for each of the current helicopter fleet and for the selected replacement candidate helicopters. While the chart highlights the increase in costs for the candidate helicopters, it does not represent the significant increase in water dropping capacity.

It is important to mention the effect that a helicopter's age can have on the maintenance costs in a life cycle. Three of the helicopter types, UH-1H Super Huey, Bell 412EP, and CH-47D, have been in operation for many years. The 412EPX and S-70i are considered newer helicopters. Due to their age and the number of flight hours, older aircraft will have higher maintenance costs as they encounter significant maintenance events. Based on the assumption of 200 flight hours per year per helicopter, the 412EP helicopters will encounter several of these maintenance events, which drives up the total costs during the next ten-year period. The new helicopters will not encounter the significant events in their first ten years based upon the 200 hours per year and therefore their cost may be similar to or less than the older helicopters.

New vs Used Aircraft –Two of the candidate helicopters are new, the 412EPX and S-70i. Why is this important to understand? The 412EPX and S-70i are just starting their life cycle as it relates to maintenance. The current helicopters are in a different older segment of their life cycles and have encountered certain scheduled maintenance events that a new helicopter has not. Due to the difference in the life cycles, the current Bell 412EP helicopters will more than likely cost more to maintain and not only due to scheduled maintenance, but also unscheduled maintenance associated with an aging helicopter.

Section 3: Resale Value and Lead Time

Using two industry resources, Conklin & de Decker and HeliValue$, the range of costs for a used Bell 412EP is $3.50 to $4.30 million. The UH-1H Super Huey's do not have a resale value. They were acquired through the Federal Excess Property Program (FEPP) program, the opportunity for receiving resale value is eliminated. Technically, the helicopters are still owned by the federal government with CAL FIRE serving as the conduit to OCFA.

An industry source reemphasized that estimated helicopter values are only applicable if there are available buyers. As of the end of 2020, the lack of buyers at the current estimated values indicates the actual value is somewhere lower than the estimated values. Another resource, AMSTAT, estimated that 412 helicopters are staying on the market for a year or more.

OCFA is currently not exploring resale of the Bell 412's. It is the intent of the OCFA to utilize these aircraft as reserves when the front-line aircraft are down for maintenance.

Section 4: Fleet Replacement Plan

The recommendation is to return the loaned Federal Excess Property Program (FEPP) UH-1H helicopters to CAL FIRE. There are three primary reasons for retiring these helicopters, age (over 50 years), increased costs due to limited military spares, and reduced availability. An additional factor to consider is the level of risk comparison between single-engine and multi-engine helicopters while hovering. Both Super Hueys were grounded due to safety concerns raised by the Chief Pilot and the Chief of Maintenance.

The recommendation is to acquire two (2) Type 1 helicopters. The candidate helicopters will meet the OCFA objective to increase the amount of water delivered during the firefighting mission and will directly and positively affect the life safety of our aircrews.

Significant scheduled maintenance events affect a helicopter's availability. Delivering larger amounts of water is a priority and there will be times when OCFA will not have a Type 1 helicopter available to perform the mission, therefore a second Type 1 helicopter is required for adequate coverage.

Section 5: Other Information

Guaranteed maintenance programs (GMP) or Total Assurance Programs (TAP) provide certainty for the erratic and often hard-to-predict behavior of maintenance costs. The program serves as a maintenance support program covering the cost of parts and replacement. These programs minimize maintenance cost variability and optimizes predictable financial planning by level loading the scheduled and unscheduled maintenance costs at a fixed rate per flight hour. The following are items that are included:

1. Preventive and Corrective Maintenance
2. Airframe line replaceable Units
3. Avionics
4. Navigation
5. Communications Systems
6. Fuselage and Structural Parts & Assemblies

As it relates to cost predictability, there are three other important benefits to consider.

- For governmental agencies, a GMP makes even more sense since few of them have budgeting mechanisms that efficiently handle the wide variation in maintenance costs from

year-to-year. As a result, in low-cost years, there is a budget surplus that, more than likely, will be consumed on inventory. In high-cost years, the finance department may have to scramble to find the necessary funds. Regardless of the costs that are actually incurred each year, the effects of the typical maintenance costs are magnified if funding for future maintenance needs is not prioritized.

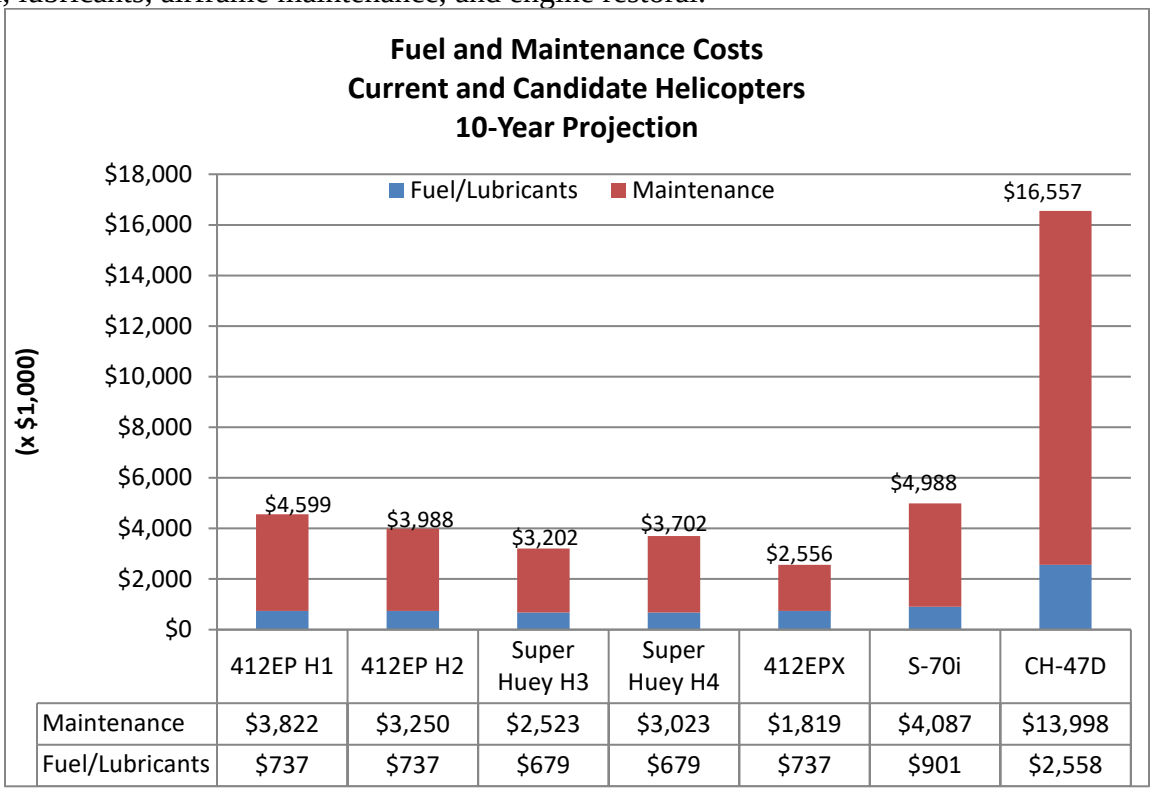
- A GMP will serve as an insurance policy when premature maintenance events occur. If the main transmission requires an overhaul prior to the scheduled 3,000 hours, the GMP will cover the event. In essence, the risk has shifted from the operator to the entity that provides the GMP.

- A GMP offers even more certainty in a changing maintenance environment. Historically most of the drive train system, flight controls, hydraulics, and engines had scheduled maintenance intervals (i.e., main transmission example). However, continued product improvements have created trends to move these schedule maintenance intervals to maintenance based on the item's condition, also referred to as on-condition maintenance. By its nature, the predictability of this type of maintenance becomes more difficult, not only its timing but also the cost.

Phase 4: Aircraft Options & Associated Costs

Conklin & de Decker's Life Cycle Cost 20.1 software was used to project maintenance and fuel costs over a ten-year period for each of the current fire and rescue helicopters and for selected candidate helicopters. The beginning point for the ten-year life cycle estimate was January 2021.

The chart below summarizes the estimated fuel and maintenance costs over the next ten-year period. Each of the OCFA helicopters are summarized individually, while the candidate helicopters are based on helicopters that are new in the life cycle. These numbers are made up of fuel, lubricants, airframe maintenance, and engine restoral.



	412EP H1	412EP H2	Super Huey H3	Super Huey H4	412EPX	S-70i	CH-47D
Maintenance	$3,822	$3,250	$2,523	$3,023	$1,819	$4,087	$13,998
Fuel/Lubricants	$737	$737	$679	$679	$737	$901	$2,558

The analysis used for the fuel and maintenance cost used the following life cycle assumptions:

1. Life cycle start Month – January 2021
2. Program Length – 10 Years
3. Hours flown per year – 200 each aircraft
4. Fuel Costs - $2.90 per gallon
5. Fuel Consumption
6. Labor - labor costs associated with maintenance are based upon an estimate referred to as "hands-on-time"
7. Inflation Rates – The life cycle cost model uses two inflation factors. The first affects the increasing cost of parts in aviation and the second is more general and is applied to such categories as fuel and labor. The assumed annual inflation factors affecting parts is 2.7 percent and the general inflation rate is 1.95 percent.

To acquire helicopters with Type 1 capability, the costs to operate them will also increase. The above chart highlights the increase. The Conklin de Decker report also itemized the estimated ongoing operating costs associated with these helicopters in Attachment 1. While the increase in maintenance and fuel costs are higher, the increase in performance that directly and positively affects the life safety of our aircrews must also be considered.

Phase 5: Affordability Analysis with Potential Financing Solutions

Staff has completed an affordability analysis associated with purchasing two Type 1 helicopters by reviewing the acquisition costs, financing/borrowing costs, and ongoing operating costs. In completing this analysis, staff also considered existing operating costs that were already funded in the base budget for operation of the former Super Huey helicopters that are recommended for disposition. These costs and cost offsets are outlined in Attachment 2.

Financing Options

Since the formation of OCFA, we have successfully used debt financing at various intervals, and in a manner that smoothed out the use of financial resources over periods of time aligned with the useful lives of the capital assets. Examples of prior financings have included:

Bond Financing: Bond financing of 50% of the cost to construct the Regional Fire Operations & Training Center (RFOTC), with the remaining 50% of the cost funded by cash reserves. For OCFA, a bond financing requires approval by two-thirds of the governing bodies of OCFA member agencies per the JPA Agreement.

Lease-Purchase Financing: Lease-purchase financing of helicopters, emergency apparatus/vehicles, and high-cost information technology equipment. OCFA is able to enter into lease-purchase financing agreements by approval of the OCFA Board of Directors, without requiring approval by the individual member agencies of the OCFA.

Lease-purchase financing is the method that was used by OCFA to finance the past purchase of the two Bell helicopters in 2008. A lease-purchase program is a tool used by government entities to finance small to mid-sized capital projects, equipment, replacements, and acquisitions. Unlike a traditional lease, with a lease-purchase the lessee selects, purchases, and owns the assets. The lessor is listed on the title document as the lien-holder. As such, a lease-purchase agreement is not

considered an indebtedness for Amended JPA purposes, but rather a lease subject to annual appropriation of lease payments as part of the annual budget process. By spreading out lease payments over time, rather than paying for a large amount of equipment all at once, a lease-purchase agreement is an effective cashflow tool.

To implement a lease-purchase financing transaction, staff would first complete a Request for Proposal (RFP) to hire the financing team, which would include a financial consultant, known as a municipal advisor, that specializes in the government sector and bond counsel.

The municipal advisor provides independent financial advice and serves solely the interests of the OCFA. Services provided by the municipal advisor include developing the Lease-Purchase structure, documents and bid package, conducting the competitive bidding process among banks and financial institutions to obtain the best financing terms at the lowest cost of borrowing and assisting with the formation and completion of all documents.

Bond Counsel services include reviewing all of the financing documents and providing a legal opinion that OCFA is authorized to execute a lease-purchase transaction and has met all legal and procedural requirements necessary.

Upon completion of these steps, staff would return to the B&FC and the Board of Directors for approval of the financing documents.

In order to complete an Affordability Analysis, staff obtained preliminary estimates from US Bank for multiple financing scenarios to include financing over 7-years, 10-years, and 15-years. Estimates are as follows:

Financing Term	Estimated Interest Rate*	Estimated Annual Installment Payment	Estimated Total Interest Cost of Borrowing
7-Years	3.95%	$8,647,698.44	$8,533,889.06
10-Years	3.95%	$6,395,181.32	$11,951,813.24
15-Years	4.10%	$4,709,699.08	$18,645,486.22

*As of 7/6/22

Affordability Analysis

Using the cost analysis provided in Attachment 2, and the financing options described above, staff prepared multiple scenarios of the OCFA's Five-Year Financial Forecast, including:

- Baseline assumption with no new Type 1 helicopter costs
- 7-year & 10-year financing terms for 2 new Type 1 helicopters assuming 2% cost of living salary increases for all labor associations upon expiration of labor agreements;
- 15-year financing term for 2 new Type 1 helicopters assuming 0%, 1% and 2% cost of living salary increases for all labor associations upon expiration of labor agreements

All of the forecast scenarios were built on the forecast scenario that was presented when the FY 2022/23 Budget was adopted. The affordability analysis demonstrates that the 15-year lease-financing term with the assumption of 0% or 1% cost of living adjustment upon expiration of agreements may be accommodated within OCFA's financial outlook. For the scenarios in which the assumption includes a 2% cost of living adjustment, the timing for other CIP projects would need to be re-prioritized and adjusted accordingly in order to accommodate the lease-financing and additional operational costs of the 2 new Type 1 helicopters.

The financial forecast scenarios for the 15-year lease-financing terms are provided in Attachment 3.

Phase 6: Development of Recommendations

OCFA fire/aviation subject matter experts are recommending the acquisition of two (2) Sikorsky S-70i Type 1 helicopters. There is a demonstrated need to drop larger quantities of water and due to the significant increase in aircraft performance that directly and positively affects the life safety of our aircrews, this is the only candidate aircraft capable of both.

Other agencies that have recently acquired Sikorsky S-70i helicopters are the Los Angeles County Fire Department, the City of San Diego Fire-Rescue Department and CAL FIRE. These agencies are in the process of procuring additional Sikorsky S-70i helicopters.

United Rotorcraft (UR) is the only company authorized to build new Sikorsky S-70i helicopters to the standard fire/rescue/EMS Firehawk configuration that OCFA requires. UR is uniquely qualified and licensed by Sikorsky to provide these services after successfully developing and supporting multi-mission helicopter modifications and operators for over 25 years. The evidence of this includes the S-70i Firehawk helicopter and equipment in operation at Los Angeles County Fire Department, CAL FIRE, and San Diego Fire-Rescue, along with their own fleet and several third-party EMS operators.

Per Attachment 4, United Rotorcraft has indicated that there remains three 2022 Sikorsky S-70i helicopters available for purchase. If OCFA is unable to secure approval by the end of August 2022, the three helicopters will be sold to other buyers that have indicated their interest in the aircraft. Further, due to heavy demand by international customers and CAL FIRE approved for four (4) more Sikorsky S-70i's, it is likely that the soonest OCFA could secure a position would be 2024, with delivery in 2025 or 2026. Hence the need to expedite the Work Plan review process.

Sikorsky S-70i

Known as Sikorsky Manufacturing Corporation in 1925, the company expanded quickly, relocated to Stratford, Connecticut, and reorganized as the Sikorsky Aviation Company in 1929. It became part of the United Aircraft and Transport Corporation, which would be reorganized as the United Technologies Corporation (UTC) in 1975. Lockheed Martin, its current parent company, purchased Sikorsky in 2015.

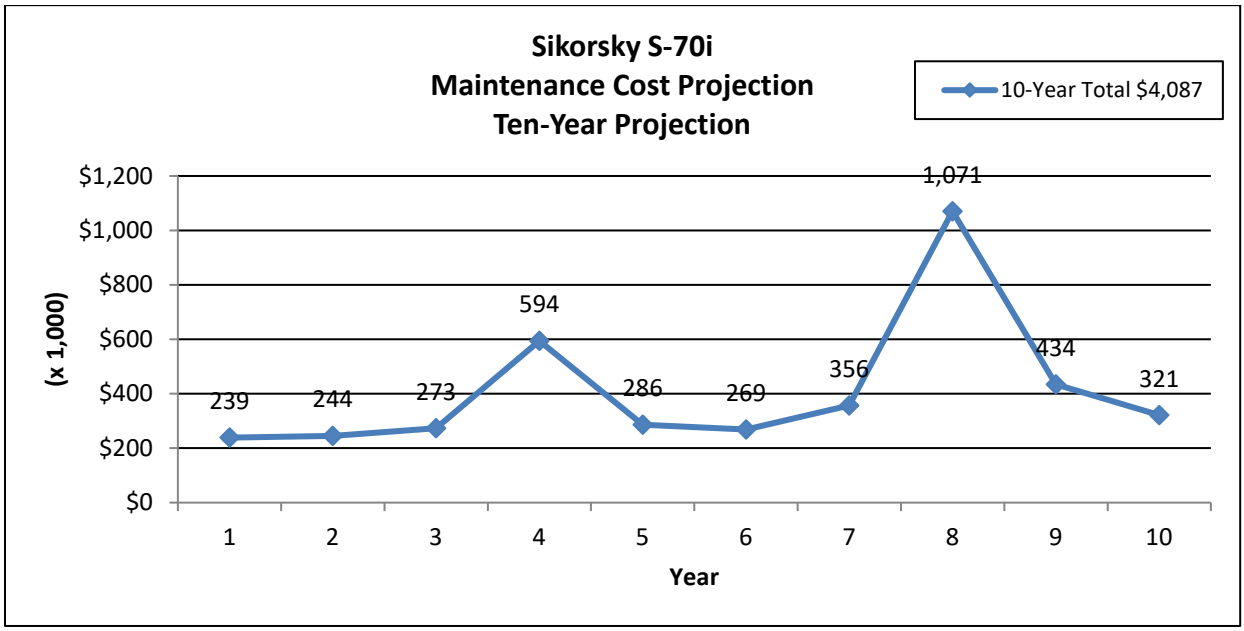
Certificated as the S-70, the helicopter was first built for the US military. The UH-60 was designed in response to a US Army competition in the early 1970's for a replacement of the UH-1 "Huey". Sikorsky has built versions of this helicopter for every branch of the US Armed Forces, the US Coast Guard, and numerous foreign armed forces. To date well over 3,300 have been delivered.

The current non-US military designation is the Sikorsky S-70i. Los Angeles County Fire Department has historically operated the S-70A version, which is the equivalent to the UH-60L military designation but has also received the S-70i version recently.

The primary improvements for the Sikorsky S-70i are more powerful engines, T700 GE 701D, and a modern avionics glass cockpit. The fuselage provides one large compartment with two seats for the flight crew and additional flexible seating for 11 to 20 individuals depending on

configuration. For the firefighting mission, the Sikorsky S-70i can carry a water tank with 1,000-gallon capacity. This places the Sikorsky S-70i, and UH-60 models, in the Type I category; a capability which has become the helicopter of choice for aerial firefighting.

The below chart is Conklin & de Decker's Sikorsky S-70i ten-year maintenance cost projection. It is important to note that this projection does not factor Sikorsky's Total Assurance Plan (TAP) Guaranteed Maintenance Plan (GMP). A GMP offers even more certainty in a changing maintenance environment which would reduce the spikes in cost represented in the chart below.



Additional Board Member Follow Up Questions

1. **What should OCFA anticipate for operational cost increases that will need to be built into the General Fund budget:**

   - See Attachment 2 for Net Operating Cost Needs

   - Initial Training (one-time cost):

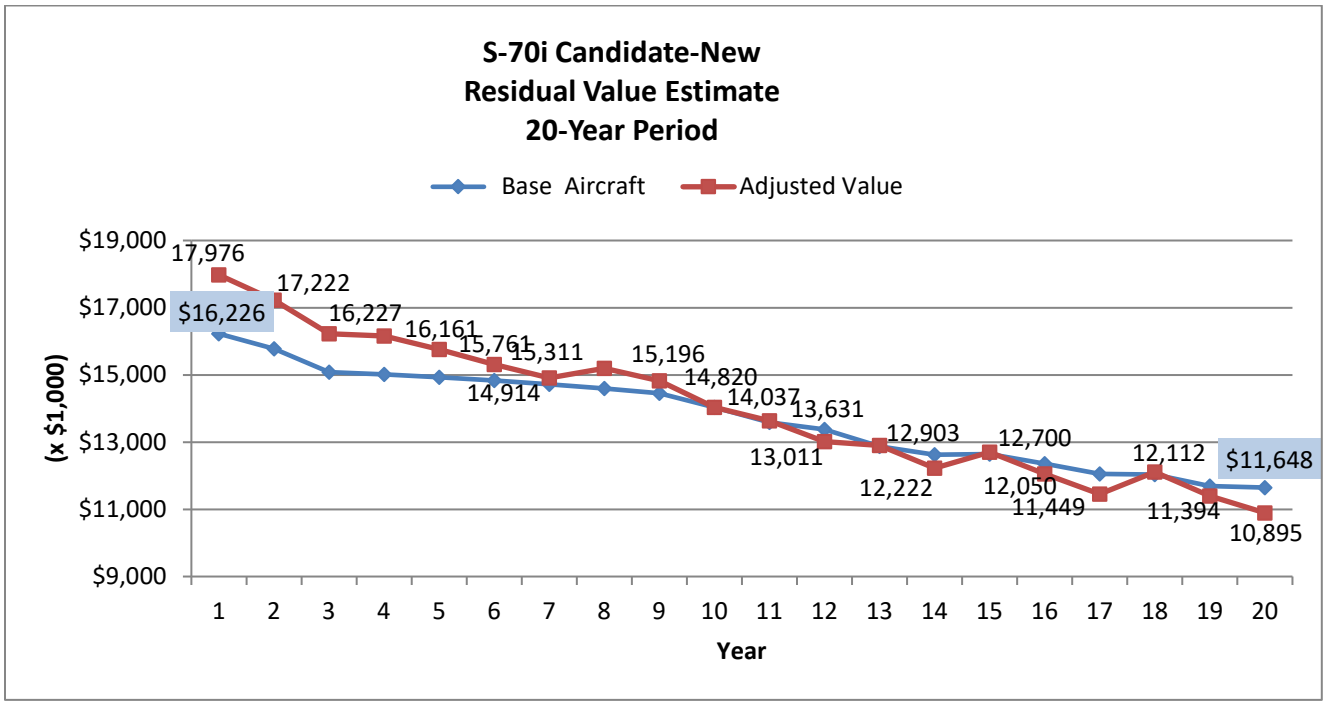
S-70i FIREHAWK TRAINING	QTY	Price	Extended Price
S-70i Pilot Initial	6	$77,525.77	$465,154.64
S70M Maintenance Initial Theory	4	$13,415.81	$53,663.23
S70M Maintenance Initial Practical	4	$13,415.81	$53,663.23
S70M Maintenance Familiarization	4	$7,422.68	$29,690.72
S70M Avionics Initial Theory	4	$13,415.81	$53,663.23
S70M Avionics Initial Practical	4	$13,415.81	$53,663.23
Total Training Cost			**$709,498.28**

2. **What is the cost differential between purchasing two new S-70i Firehawks vs. purchasing two new Bell 412EPX?**

   - Bell 412EPX quote (Jan. 2021) = $14,232,300
   - The Sikorsky S-70i quote (June 2022) = $26,070,934

3. **What can we expect in terms of useful life for the new helicopters?**

   - Twenty (20) years



The Adjusted Value estimate for the Sikorsky S-70i follows the Basic Aircraft estimate throughout the 20-year period. The years when the Adjusted Value are more than the Base Aircraft value are not much higher than the Base Aircraft value. The exception to that are the early years, one through six, when the difference between the values is more significant. Also, when the Adjusted Value drops below the Base Aircraft, the difference is not significant, except for year 20 when there is an almost a $1.0 million difference.

4. **Do we have adequate space in our hangar to accommodate two S-70i Firehawks?**

   - Yes

5. **Can the landing pads at trauma centers accommodate S-70i Firehawks?**

   - **UCI-** The S-70i Firehawk Helicopter can land at the Landing Zone (LZ) without any problem.
   - **OC Global**- The S-70i Firehawk Helicopter can land no problem with weight, but a small improvement for space is needed at the LZ in the parking lot.
   - **Mission**- As reported, the hospital would need to add width and seismic strength to the LZ. (It was reported to staff that the hospital is interested in the upgrades, so they don't lose the ability to receive trauma patients)

Attachment(s)

1. Conklin & de Decker Report
2. Operating Cost Summary – Additional funding Needs
3. Five-Year Financial Forecasts
4. United Rotorcraft Letter Dated June 30, 2022

Orange County Fire Authority Aviation Unit
Fleet Plan Analysis

Prepared for

Orange County Fire Authority

May 19, 2021

Prepared by

Conklin & de Decker Associates, Inc.
A JSSI Company

Introduction

The Orange County Fire Authority (OCFA) seeks the assistance of Conklin & de Decker with a thorough assessment of the Authority's current helicopter fleet to make more informed decisions on the purchase, operation, maintenance, and disposition of aircraft by providing objective and impartial information. More specifically, the Exhibit requested that Conklin & de Decker focus on the following areas to accomplish the intent of the Overview.

- Based on the OCFA's historical usage, identify the preliminary specifications of the helicopter(s) required. Preliminary specifications could include such items as aircraft weight range, size, number of engines, and useful load.
- Estimate the cost of the acquisition and operation of helicopter alternatives. The operating cost estimates will include maintenance options and fuel costs, and other operating or overhead costs.
- Establish a defined framework for an OCFA helicopter replacement plan including the anticipated useful life of the equipment, as well as a comparison of phasing of aircraft purchases versus purchasing all replacement aircraft all at once.
- Thoroughly research the resale value of the current fleet and explore the primary and secondary markets for helicopters to determine the feasibility of replacement within specified timeframes, such as lead times in acquiring helicopters and expected duration in selling the current fleet.
- Provide a comprehensive summary of
    - Maintenance requirements based on usage parameters such as flight hours, calendar times, or flight cycles. Compare/contrast to current maintenance schedules deployed by the OCFA.
    - Present preliminary analysis and findings to OCFA staff and receive feedback.
    - Prepare a Fleet Plan Analysis report for all involved parties with input from OCFA staff.

To address the specific areas, Conklin & de Decker created five sections, with each section containing the following categories.

- A restatement of the OCFA's original issue, concern, or question.
- Conklin & de Decker's proposed approach.
- A summary of the analysis and research.
- Conklin & de Decker's analysis explaining the process and research to support the summary.

Listed below are the sections with the respective page numbering.

Executive Summary

The Orange County Fire Authority contacted Conklin & de Decker seeking assistance with a thorough assessment of the current helicopter fleet to make more informed decisions on the purchase, operation, maintenance, and disposition of aircraft by providing objective and impartial information.

Orange County Fire Authority has four helicopters that perform primarily fire and rescue operations and a variety of services to the unincorporated area of the county as well as 23 cities in the county. The following summarizes the results to Conklin & de Decker's analysis and research.

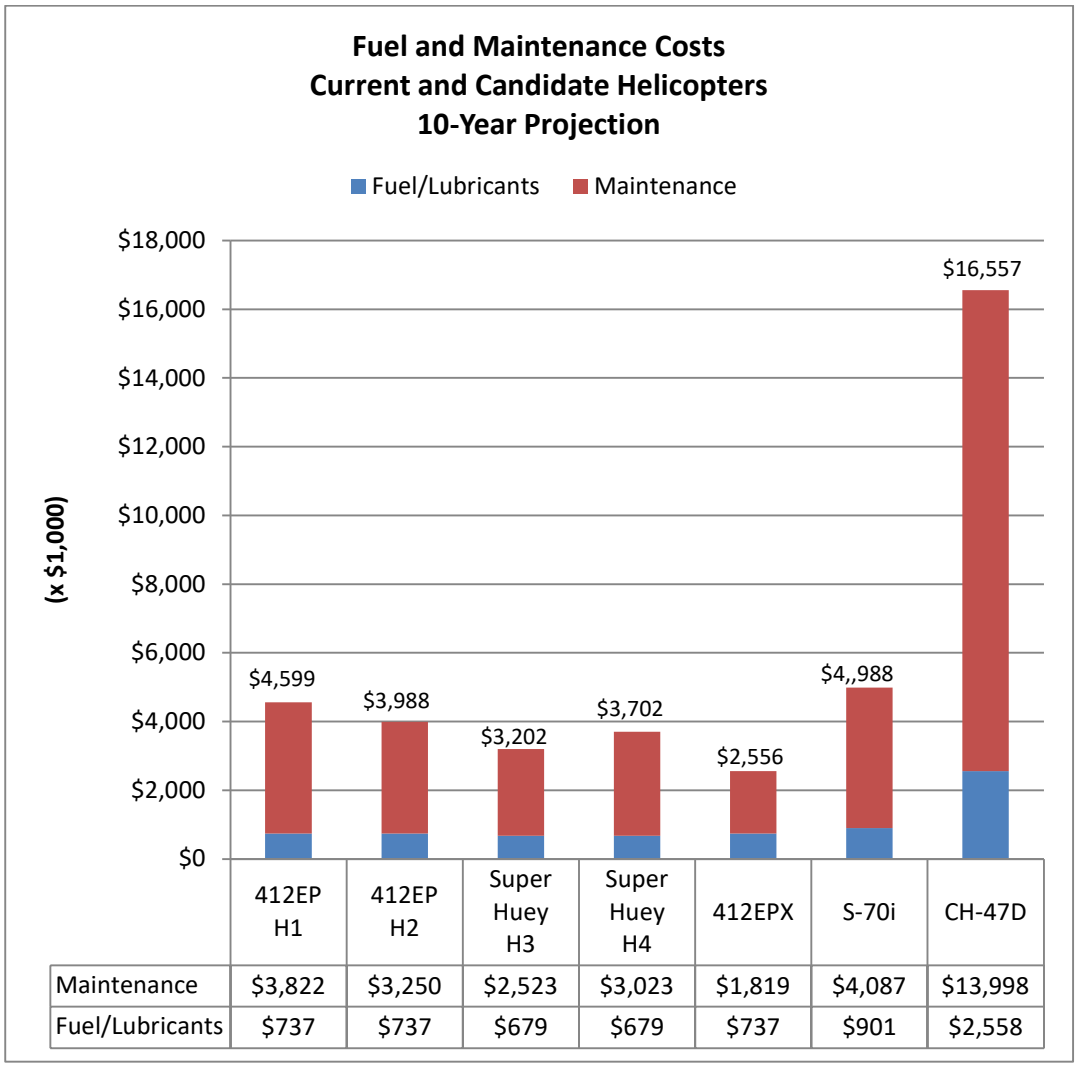
Orange County Fire Authority (OCFA)

- Section 1, Fleet Review:
  - OCFA initial request. Identify the helicopter specifications and performance requirements based on OCFA current and future missions.
  - OCFA does not see its primary missions changing; however, based on the risk to the communities the OCFA serves and the current and expected annual increase in wildland fires, which occur and spread more rapidly than experienced in the past, the Fire Chief and Emergency Operations Bureau leadership believe it needs to increase its water delivery capabilities during the firefighting mission. The current fleet of helicopters have the capacity to deliver up to 350 to 375 gallons per drop. A more acceptable volume would be in the range of Type I helicopters, which would begin around 700 or more gallons.
  - OCFA selected two helicopter types that have the capacity to deliver more water per drop, while also providing more cabin volume and seating than the current fleet. Those aircraft were the Sikorsky S-70i and Coulson-Unical CU-47D.
  - OCFA also requested information on the newest version of the Bell 412 series, the Bell/Subaru 412EPX, due to its improved performance.
  - Table 1 provides information about the selected performance and specifications for the current fleet and the candidate helicopters.

Table 1					
Current and Candidate Helicopters					
Firefighting Mission					
Airframe Manufacturer /Type	Bell / Super Huey	Bell / 412EP	Subaru/Bell 412EPX	Sikorsky S-70i	Coulson CH-47D
Engine Manufacturer /Type	Honeywell / T53-L-703	Pratt & Whitney / PT6T-3D	Pratt & Whitney / PT6T-9	General Electric / T700 GE 701D	Honeywell / T5-GA-L714A
Useful Load (lbs.)					
Maximum Take-Off Gross Weight (Internal)	10,500	11,900	12,200	22,000	50,000
Maximum Take-Off Gross Weight (External)	11,200	11,900	13,000	23,500	50,000
Mission Configured - Fire	6,700	8,300	8,300	14,200	26,500
Flight Crew (Firefighting)	450	450	450	650	650
Useful Load Available for Mission	4,050	3,150	4,250	8,650	22,850
Fuel (lbs.) 1.5-Hour Mission w/ 20 Min. Reserve	1,275	1,385	1,385	1,986	4,966
Remaining Useful Load	2,775	1,765	2,865	6,664	17,884
Mission Endurance (Hours)	**2.0**	**2.9**	**2.9**	**2.9**	**2.6**
Hover Capabilities (Altitude)					
In-Ground Effect (ISA, Sea Level)	6,800	6,200	11,100	10,270	7,750
Out-of-Ground-Effect (ISA, Sea Level)	10,800 lbs.	11,890 lbs.	8,000	6,200	6,100
In-Ground Effect (ISA +20 C, Sea Level)	6,800	6,200	8,200	7,400	5,250
Out-of-Ground-Effect (ISA +20 C, Sea Level)	10,800 lbs.	11,890 lbs.	4,000	4,400	3,900
Helicopter Speed (kts)					
Cruise Speed - Max (knots)	106	125	130	145	157
Cruise Speed - Long Range (knots)	106	122	124	128	130
Calculated Speed (knots)	90	106	110	122-140	131-157
Water Drop Capabilities (gallons)					
Water Tank Size (gallons)	350	375	375	1,000	3,000
1.5-Hour Mission+ 20-Min Fuel Reserve	332	211	343	797	2,498
End of Mission (20-minute reserve)	457	347	478	992	2,985
Cabin					
Volume (cubic feet)	208	208	208	396	1,629
Crew/Passengers	2/14	2/14	2/14	2/12	2/>30
Pricing/Value					
Basic Price (x1M)	**N/A**	**N/A**	$11.5	$17.0	$16.5
Firefighting Completion (x 1M)	**N/A**	**N/A**	$14-$15	$20-$23	$5.8*
Resale Value	**$1.6-$2.0**	**$3.5-$4.3**	N/A	N/A	N/A

- Section 2, Life Cycle Cost Projection:
  - OCFA initial request. Estimate the cost of the acquisition and operation of helicopter alternatives. The operating cost estimates will include maintenance options and fuel costs, and other operating or overhead costs.
  - We estimated the maintenance and fuel costs over a ten-year period for each of the current helicopter fleet and for the selected replacement candidate helicopters. While the chart highlights the increase in costs for the candidate helicopters, it does not represent the significant increase in water dropping capacity.
  - It is important to mention the effect that a helicopter's age can have on the maintenance costs in a life cycle. Three of the helicopter types, UH-1H Super Huey, Bell 412EP, and CH-47D, have been in operation for many years. The 412EPX and S-70i are considered newer helicopters. Due to their age and the number of flight hours, older aircraft will have higher maintenance costs as they encounter significant maintenance events. Based on the assumption of 200 flight hours per year per helicopter, the 412EP helicopters will encounter several of these maintenance events, which drives up the total costs during the next ten-year period. The new helicopters will not encounter the significant events in their first ten years based upon the 200 hours per year and therefore their cost may be similar to or less than the older helicopters.
  - Chart 1 summarizes the estimated fuel and maintenance costs over the next ten-year period. Each of the OCFA helicopters are summarized individually, while the candidate helicopters are based on helicopters that are new in the life cycle.

Chart 1



	412EP H1	412EP H2	Super Huey H3	Super Huey H4	412EPX	S-70i	CH-47D
Maintenance	$3,822	$3,250	$2,523	$3,023	$1,819	$4,087	$13,998
Fuel/Lubricants	$737	$737	$679	$679	$737	$901	$2,558

- To acquire helicopters with Type 1 capability, the costs to operate them will also increase. Chart 1 highlights the increase. While the increase in maintenance and fuel cost may seem excessive, the increase in performance must also be considered. Comparing the Bell 412EP to the Sikorsky S-70i illustrates the increase in water delivered during the typical mission scenario. The S-70i will carry 256 percent more water per tank load. The CU-47D water drop capability is ten times the 412EP. The 412EPX also increases the water dropped by 58 percent when compared to the 412EP.
- The time remaining for significant scheduled maintenance items and events influence an aircraft's value during its life cycle. Table 2 reflects that effect for the current (10 years) and candidate helicopters (20 years) and highlights the years that OCFA may want to consider when selling a particular helicopter. The years marked with yellow represent periods in the life cycle when the remaining lives of significant scheduled maintenance have a positive effect on value when compared to an assumption of 50 percent

remaining life. The single red block for each helicopter represents the lowest value. The letters in the yellow blocks identify the years with the highest estimated values. "A" identifies the highest value. Yellow blocks without letters represent estimated aircraft values that are less than the third/fifth highest years ("C" or "E"). The white blocks are the years when the helicopter's value is below the average baseline.

Table 2

OCFA Helicopters - Annual Summary of Adjusted Values

Registration Number	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
N141FA H1		A		C				B			X	X	X	X	X	X	X	X	X	X
N241FA H2	A	B					C				X	X	X	X	X	X	X	X	X	X
N441FA H3	C								A	B	X	X	X	X	X	X	X	X	X	X
N541FA H4	C					B				A	X	X	X	X	X	X	X	X	X	X
Candidate Helicopters - Annual Summary of Adjusted Values																				
412EPX	A	B											C	D	E					
S-70i	A	B	C	D	E															
CU-47D	Not Available																			

- Section 3, Resale Value and Lead Time:
  - OCFA initial request. Research the resale value of the current fleet and lead time for the new helicopters.
  - Table 3 summarizes the resale values for the current fleet and the lead time for the candidate helicopters.

Table 3

Resale, Acquisition Cost, and Lead Time

Helicopter Type	Resale Value (x 1 million)	Disposition Time	Acquisition Cost (x 1 million)	Basic Aircraft Delivery	Completion Estimate
UH-1H Super Huey	N/A	Immediate	N/A	N/A	N/A
412EP	$3.5 - $4.3	Year or more	N/A	N/A	N/A
412EPX	N/A	N/A	$14 - $15	1-6 months	6 months
S-70i	N/A	N/A	$20 - $23	24 months	6-8 months
CH-47D	N/A	N/A	$16.5	Jun-2021	Jun-2021

  - Using two industry resources, Conklin & de Decker and HeliValue$, the range of costs for a used Bell 412EP is $3.50 to $4.30 million. The UH-1H Super Hueys do not have a resale value. They were acquired through the Federal Excess Personal Property (FEPP) program, the opportunity for receiving resale value is eliminated. Technically, the

helicopters are still owned by the federal government with CAL FIRE serving as the conduit to OCFA.

- An industry source reemphasized that estimated helicopter values are only applicable if there are available buyers. As of the end of 2020, the lack of buyers at the current estimated values indicates the actual value is somewhere lower than the estimated values. Another resource, AMSTAT, estimated that 412 helicopters are staying on the market for a year or more.
- The CU-47D has the shortest lead time 3 months. The Bell 412EPX has a range of 7 to 12 months. The S-70i based on the standard lead time would be 24 months plus completion of 6-8 months. However, Sikorsky also has spec helicopters that could reduce the standard 24-month lead time significantly.

- Section 4, Fleet Replacement Plan:
  - OCFA initial request. Suggest replacement plan for existing fleet. The suggested plan is one approach to consider, however the plan can vary based upon OCFA discussions and changes to our current assumptions.
  - Retain the Current Fleet - Although retaining the current fleet is not likely, it serves as a benchmark when compared to the changes that may occur as suggested by the four steps. Based upon the life cycle cost assumptions stated in Section 2 Life Cycle Cost Projections, we projected the estimated fuel and maintenance costs for the next ten years for an unchanged fleet.
  - Step 1: Retire the UH-1H helicopters. There are three primary reasons for retiring these helicopters, age (over 50 years), increased costs due to limited military spares and aging, and reduced availability. An additional factor to consider is the level of risk comparison between single-engine and dual-engine helicopters while hovering.
  - Step 2: Acquire Bell 412EPX. If the OCFA desires to continue having two helicopters available for each day of the year, a third helicopter is required. Acquiring a 412EPX, also improves the amount of water dropped for firefighting when compared to the 412EP helicopters.
  - Step 3: Acquire a Type I helicopter. The candidate helicopters will meet the OCFA objective to increase the amount of water delivered during the firefighting mission.
  - Step 4: Consider acquiring a second Type I helicopter and if so, retire a 412EP. Significant scheduled maintenance events will affect a helicopter's availability. If delivering larger amounts of water is a priority, there will be times when OCFA will not have a Type I helicopter available to perform the mission. OCFA needs to determine the significance of this risk and if a second Type I helicopter is required for adequate coverage.
  - If OCFA does acquire a second Type I helicopter, the opportunity exists to retire one of the 412EP helicopters.

Table 4 summarizes the various options to change the current fleet.

Table 4					
OCFA - Summary of Fleet Options					
Dollar amounts x 1 Million					
Option	**Operating Cost**	**Disposition Amount**	**Purchase**	**Total**	**Management Service**
Retain Current Fleet	$15.5	Not Applicable	Not Applicable	$15.5	Not Applicable
Steps 1 and 2: Retire UH-1Hs/Acquire 412EPX					
Two 412EP/One 412EPX	$11.1	$0.0	$14.0-$15.0	$25.1-$27.1	Not Applicable
Step 3: Acquire Type I Helicopter					
S-70i	$7.0	Not Applicable	$20.0-$23.0	$27.0-$30.0	Not Applicable
CU-47D	$16.6	Not Applicable	$16.5	$33.1	$65.6
Step 4: Acquire second Type I Helicopter/ Retire one 412EP					
One 412EP/One 412EPX	$5.8	($3.7-$4.3)	Not Applicable	$9.5-$10.1	Not Applicable
S-70i	$7.0	Not Applicable	$20.0-$23.0	$27.0-$30.0	Not Applicable
CU-47D	$16.6	Not Applicable	$16.5	$33.1	$65.6

- Section 5, Other Information:
  - Guaranteed maintenance programs (GMP) provide certainty for the erratic and often hard-to-predict behavior of maintenance costs. Often overlooked but just as important, GMP will improve helicopter availability. A strong understanding of the many variables and factors that influence what a program potentially covers is important. Negotiate with the vendors for better value.
  - The dimensions at OCFA maintenance hangar bay at Fullerton Municipal Airport and the S-70i dimensions could create some problems. OCFA needs to check the dimensions for the other hangar bays.

Table 5		
OCFA Hangar and S-70i Dimensions		
Measurement - Feet		
Description	**S-70i**	**OCFA Hangar**
Door Width	53.67	55.00
Length/Depth	64.80	63.83
Height	17.20	16.50
Door Height	---	17.42

Section 1 – Fleet Review

Orange County Fire Authority Original Request

Identify the helicopter specifications and performance requirements based on Orange County Fire Authority (OCFA) current and future missions.

Conklin & de Decker Approach

In interviews with the fire aviation unit personnel, there was no indication that its primary missions, firefighting and rescue, would be changing in future years. However, it was apparent OCFA was interested in increasing the amount of water that could be dropped during firefighting missions. Based on the request, the primary objective was to identify and then compare alternative helicopter types with the current fleet to determine if there might be better-suited helicopters to perform the firefighting mission. OCFA also requested information on the newest version of the Bell 412 series, the Bell/Subaru 412EPX, due to its improved performance. We determined that certain performance and specifications were important to evaluate the candidate helicopters. The parameters included:

- Useful Load
- Mission Endurance,
- Aircraft Speed,
- Hovering Capability,
- Water Drop Capacity,
- Cabin Volume and Seating
- Purchase Price
- Maintenance and Fuel Costs (Section 2 of the report)

We used the current helicopters to explain the importance of these parameters and to serve as a baseline when comparing to the candidate helicopters. The final step was to create a table that compares the current capabilities of the existing helicopters to the candidate helicopters.

Section 1 also provides a brief background about the OCFA aviation unit history and the current and candidate helicopters.

Summary

Table 1-1 provides a comparison of the current and candidate helicopters and the parameters we selected for performance, specifications, and costs.

Table 1-1					
Current and Candidate Helicopters					
Firefighting Mission					
Airframe Manufacturer /Type	Bell / Super Huey	Bell / 412EP	Subaru/Bell / 412EPX	Sikorsky / S-70i	Coulson CH-47D
Engine Manufacturer /Type	Honeywell / T53-L-703	Pratt & Whitney / PT6T-3D	Pratt & Whitney / PT6T-9	General Electric / T700 GE 701D	Honeywell / T5-GA-L714A
Useful Load (lbs.)					
Maximum Take-Off Gross Weight (Internal)	10,500	11,900	12,200	22,000	50,000
Maximum Take-Off Gross Weight (External)	11,200	11,900	13,000	23,500	50,000
Mission Configured - Fire	6,700	8,300	8,300	14,200	26,500
Flight Crew (Firefighting)	450	450	450	650	650
Useful Load Available for Mission	4,050	3,150	4,250	8,650	22,850
Fuel (lbs.) 1.5-Hour Mission w/ 20 Min. Reserve	1,275	1,385	1,385	1,986	4,966
Remaining Useful Load	2,775	1,765	2,865	6,664	17,884
Mission Endurance (Hours)	**2.0**	**2.9**	**2.9**	**2.9**	**2.6**
Hover Capabilities (Altitude)					
In-Ground Effect (ISA, Sea Level)	10,630	10,200	9,000	10,270	7,750
Out-of-Ground-Effect (ISA, Sea Level)	11,000 lbs.	5,200	6,000	6,200	6,100
In-Ground Effect (ISA +20 C, Sea Level)	6,800	6,200	5,600	7,400	5,250
Out-of-Ground-Effect (ISA +20 C, Sea Level)	10,800 lbs.	11,890 lbs.	1,500	4,400	3,900
Helicopter Speed (kts)					
Cruise Speed - Max (knots)	106	125	130	145	157
Cruise Speed - Long Range (knots)	106	122	124	128	130
Calculated Speed (knots)	90	106	110	122-140	131-157
Water Drop Capabilities (gallons)					
Water Tank Size (gallons)	350	375	375	1,000	3,000
1.5-Hour Mission+ 20-Min Fuel Reserve	332	211	343	797	2,498
End of Mission (20-minute reserve)	457	347	478	992	2,985
Cabin					
Volume (cubic feet)	208	208	208	396	1,629
Crew/Passengers	2/14	2/14	2/14	2/12	2/>30
Pricing/Value					
Basic Price (x1M)	**N/A**	**N/A**	$11.5	$17.0	$16.5
Firefighting Completion (x 1M)	**N/A**	**N/A**	$14-$15	$20-$23	$5.8*
Resale Value	**$1.6-$2.0**	**$3.5-$4.3**	N/A	N/A	N/A

Conklin & de Decker Analysis

Current Fleet

Background:

The OCFA aviation unit started flying in 1994 by contracting with Evergreen Helicopters for one year. Since then, the OCFA fleet has grown to four helicopters. The fleet consists of two types of medium Bell helicopters, two modified military UH-1H, referred to as Super Huey, and two 412EP helicopters.

Both of the OCFA type helicopters come from the same development lineage, a military helicopter designed for the US Army, the Bell UH-1 Iroquois. The stretched version of this model became the most popular version of the UH-1 series and had various designations based on performance improvements. The UH-1D was the first stretched version with its production beginning in 1961. The UH-1H, also known as the Huey, was produced for 20 years beginning in 1967. Over 3,500 were built.

The OCFA UH-1H helicopters are referred to as Super Hueys, which is due to a performance enhancement program. The program, conducted by San Joaquin Helicopters, replaced the original engine (T53-L-13) with a more robust Lycoming engine, the T53-L-703. Additional performance improvements included the conversion of the UH-1H tail boom, tail rotor, and main rotors to Bell 212 components. The tail rotor and intermediate gearboxes were also 212 components. The improvements were also available to the commercial Bell 205 helicopter, which was designated as the 205A-1++.

The single-engine turbine military helicopter served as the basis for Bell's commercial 204 and 205 series helicopters, which were also single-engine turbines. The lineage continued with the addition of two twin-engine commercial series, the Bell 212 and 412. The Bell 212 was the first to be produced in 1971. During its 27 years of production approximately 900 were built. Production ended in 1998.

The Bell 412 model is almost identical to the Bell 212. The primary difference between the models is the main rotor blades. The 412 has four main rotor blades versus the 212's two and the blades are made with composite material rather than aluminum, which extends the life-limit of the blades.

The Bell 412 cabin features two pilot seats up front. The passenger/cargo cabin has a flat floor, and two large sliding doors provide ready access to the cabin. When used for passenger transport, the 412 can seat up to 13 passengers. It is also certified for single-pilot Instrument Flight Rules (IFR) and Category A operations (i.e. operate with one engine inoperative).

Introduced in 1981, the Bell 412 has experienced several updates involving its fuel capacity, take-off weight, transmission capabilities, and fuel control system. The 412EP was introduced in 1994 and remained in production until 2013 when Bell introduced the 412EPI. The 412EPI has just been replaced

by the 412EPX, a joint effort between Bell and Subaru. Approximately 500 Bell 412 helicopters have been built since 1981.

Basic Fleet Information:

Table 1-2 offers more basic information about the current fleet of the OCFA.

The UH-1H helicopters were manufactured in 1967. Once retired, the Department of Defense released former Army helicopters through the Federal Excess Personal Property (FEPP) program to the U.S. Forest Service. The Forest Service distributed the helicopters to states with the intention of being used for wildland firefighting. OCFA procured three UH-1H helicopters from CAL FIRE. The helicopters operate as restricted category, due to their military background, which means they can only perform special purpose operations. Firefighting is one of those operations. Should OCFA want more information on restricted category, the following link will take you to a relevant resource.

14 CFR § 91.313 - Restricted category civil aircraft: Operating limitations. | CFR | US Law | LII / Legal Information Institute (cornell.edu)

The Bell 412EP helicopters were purchased in 2008 and began operations shortly thereafter. The helicopters have commercial certificates from the FAA and do not have the same operation restrictions as the UH-1H Super Hueys.

Table 1-2

Basic Information - OCFA Helicopters

Aircraft Type	OCFA Designation	Serial Number	Registration Number	Total Time (Flight Hours)	Average Flight Hours per Year 2016-2020
412EP	H1	36484	N141FA	2,329	244
412EP	H2	36487	N241FA	2,188	176
UH-1H	H3	5610	N441FA	6,811	42
UH-1H	H4	8529	N451FA	9,196	70

Notes:

- **Aircraft Type: Manufacturer's designation for the model type.**
- **Serial Number: Unique identification for each aircraft as assigned by the manufacturer.**
- **Registration Number: Civil aircraft must be registered with the Federal Aviation Administration. The registration number is frequently referred to as the aircraft's N Number because all registered aircraft have a number starting with the letter N.**
- **Total Time (Flight Hours): The total airframe hours as reflected on January 29, 2021.**
- **Average Flight Hours per Year (2016-2020): The average annual flight hours during the most recent 5-year period. Data provided by the aviation unit.**

Mission:

The OCFA provides a variety of services to the unincorporated area of the county as well as 23 cities in the county. The primary missions for the OCFA aviation unit include firefighting and rescue. The aviation unit averages 1,250 operations per year and has flown an average of 530 hours annually beginning in 2016. The aviation unit flew just over 600 hours in 2020.

In addition to firefighting, the aviation unit uses its aircraft to do fire mapping, transport wildland crews, transport patients, and insert and extract equipment. When performing rescue missions with a 250-foot hoist cable, the unit can do various procedures including short-haul air rescue on land or water, swift-water rescue, patient transfer on litter, and large animal rescues. Other capabilities involve night vision goggle operations, infrared detection, and disaster assessment.

Of the four aircraft, the aviation unit staffs two of them 365 days each year. One of the two aircraft is staffed for 24 hours and is prepared for the firefighting and rescue missions. The crew consists of a pilot, fire captain or crew chief, and one or two paramedics. The second helicopter is a fire response helicopter and is available for 10 hours each day. The helicopter is staffed with a pilot and fire captain or crew chief. The third and fourth helicopters are used for back-up and initial pilot training.

To perform its various missions, both of the OCFA helicopters are equipped with the following mission equipment (Table 1-3). Each type of helicopter has the same equipment. For example, each of the Bell 412EPs are identical. The same is true of the UH-1H Super Hueys. When comparing the two types of helicopters to each other, the mission equipment is very similar.

Table 1-3		
Mission Equipment		
412S OUTFITTED IDENTICAL	**412EP**	**UH-1H Super Huey**
CARGO HOOK ASSEMBLY	X	X
600LB GOODRICH RESCUE HOIST	X	X
SIMPLEX MODEL 304 FIRE ATTACK SYSTEM	X	
ISOLAIR ELIMINATOR II FIRE ATTACK SYSTEM		X
KAWAK AUX HYDRAULIC SYSTEM	X	
SPECTRO-LAB SX-5 SEARCHLIGHT W/ PILOT CYCLIC CONTROLS	X	X
NVG STEERABLE SEARCHLIGHT	X	
AERODYNAMIX NVG COCKPIT	X	X
KAWAK TECHNOLOGIES HYDRAULIC HOVER PUMP W/9FT SNORKEL	X	X
SKID TUBE CABLE GUARD	X	X
DART CABIN FLOOR PROTECTIVE KIT	X	X
NAT P.A. SPEAKERS	X	X
(2) TDFM-136NV FM	X	X
(2) TDFM-680NV 800MHZ	X	X
GPS 500W/GPS 530	X	X
SKYCONNECT FLIGHT TRACKER W/ SATCOM PHONE	X	X
FORWARD RECOGNITION LIGHTS		X
DART LED PULSE LIGHTS AND CARGO MIRRORS	X	
AVIDYNE TAS TRAFFIC AVOIDANCE SYSTEM	X	
AVALEX DVR AND DATA RECORDER	X	

Notes:

- **An "x" indicates the item is present on the aircraft type.**

The following images show the OCFA Bell UH-1H (Super Huey) and 412EP helicopters.

Bell UH-1H Super Huey

Bell 412EP

Flight Activity:

Chart 1-1 summarizes the flight activity for each helicopter during a five-year period beginning in 2016.

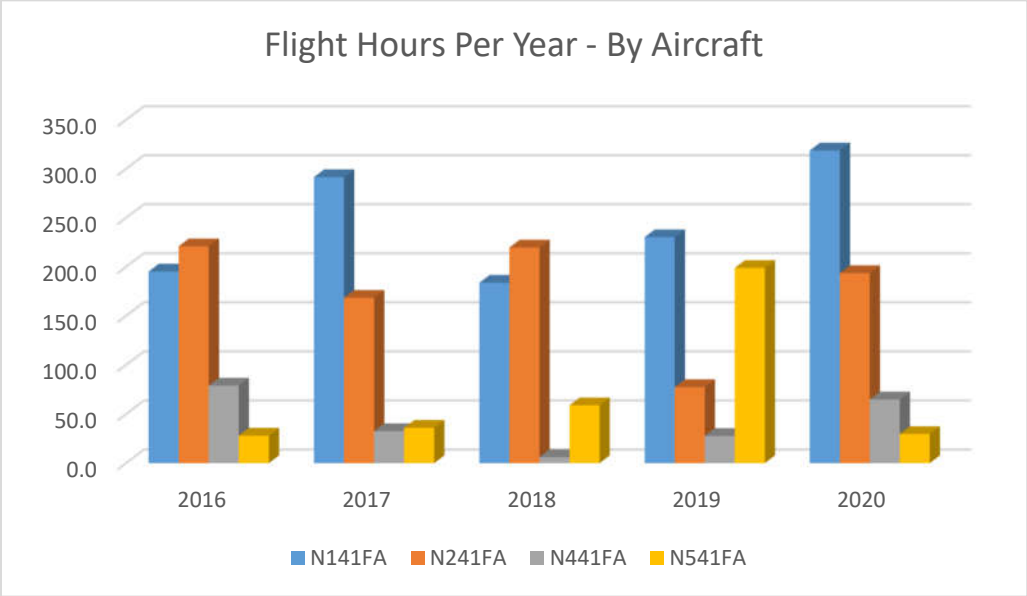
The OCFA aviation unit's fleet averaged 532 flight hours, or totaled 2,661 flight hours, during the five-year period beginning in 2016 through 2020. The hours for each year when compared to the overall average do not vary significantly. In three of the years, 2016, 2017, and 2019, the total flight hours are within nine hours of the average. Two of the years, 2018 and 2020, are approximately 12 percent from the overall average. In 2018, the aviation unit's fleet flew only 468 hours, while in 2020 the fleet flew 610 hours.

The Bell 412EP helicopters have flown the most hours during the five-year period. N141FA H1 flew a total of 1,219 hours during that period, which is the most hours when compared to the rest of the fleet. The average flight hours per year was 244. The flight hours for this helicopter varied more each year than the fleet totals. N141FA flew the fewest hours in 2018 at 184, while in 2020, it flew the most hours at 319 hours, which is a difference of 135 hours.

Bell 412EP N241FA, flew the second most hours in the fleet. During the five-year period, the helicopter flew 880 hours, which is 72 percent of N141FA. The range of flight hours during this period varied from 77 hours in 2019 to 221 hours in 2016, which is a difference of 144 hours.

The two UH-1H Super Hueys, N441FA and N541FA, combined to fly only 21 percent of the total hours flown by the fleet. Of the 561 hours flown during the five-year period by these helicopters, N441FA H3 flew 210 hours and N541FA H4 flew 351. The reason for having the fewer hours is the aviation unit uses these helicopters as back up to the Bell 412EPs when they are not available and for initial pilot training. Maintenance on the Bell 412EP is a common event that would remove a helicopter from an availability status.

Chart 1-1



Notes:

- **N141FA and N241FA are Bell 412EP helicopters.**
- **N441FA and N541Fa are the UH-1H Super Huey helicopters.**

Chart 1-2 summarizes the flight hour activity by the type of missions that are performed by the aviation unit's fleet.

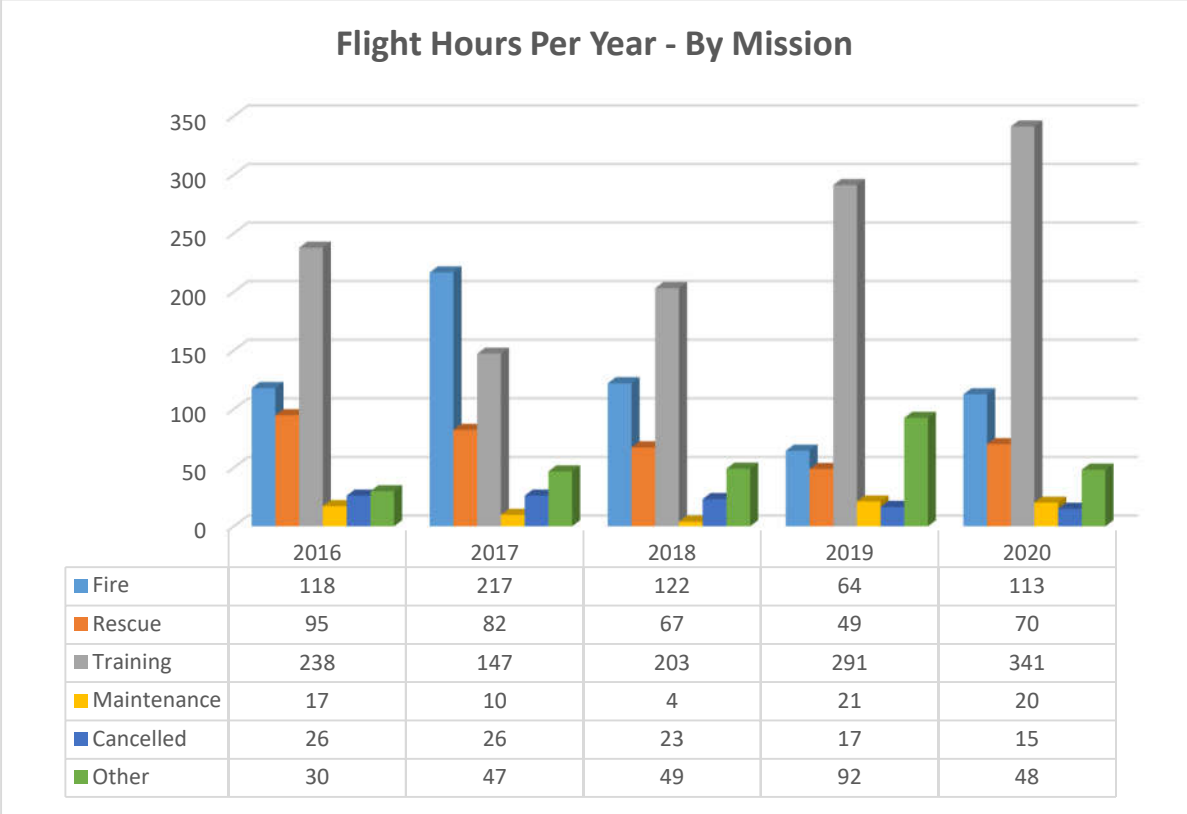
Training consumed 1,220 hours or 46 percent of the total flight hours during the five-year period. In 2019 and 2020, the flight hours increased to 291 and 341 hours respectively, which is almost 50 to 100 hours more than the five-year average of 244 flight hours.

Two factors contribute to the training mission being the highest number of flight hours. First, the primary missions, firefighting and rescue, are call-when-needed activities. These missions are not scheduled or necessarily predictable. Therefore, the number of flight hours in any given year are dependent on the frequency of the fires and rescue operations. Second, training supports, not only regulatory requirements, but also safety programs and the quality of performing firefighting and rescue missions.

The firefighting mission illustrates how much variation exists from year to year when the occurrence of fires is difficult to predict. Comparing 2016 to 2017, the flight hours increased by 84 percent, 2017 to 2018, flight hours decreased 44 percent, 2018 to 2019 decreased again by 48 percent, and 2019 to 2020 flight hours increased by 77 percent. For the five-year period, the total flight hours were 633 and an annual average of 127.

The flight hours associated with the Rescue missions are the third highest of the aviation unit's missions. Rescue flight hours totaled 363 during the five-year period. The annual average was 73 flight hours. The difference between the least annual flight hours of 49 in 2019 and the highest of 95 in 2016 was 46 hours.

Chart 1-2



	2016	2017	2018	2019	2020
Fire	118	217	122	64	113
Rescue	95	82	67	49	70
Training	238	147	203	291	341
Maintenance	17	10	4	21	20
Cancelled	26	26	23	17	15
Other	30	47	49	92	48

Candidate Helicopters

OCFA does not foresee that its types of missions will change in the foreseeable future. However, OCFA does see the need to improve its effectiveness when fighting fires. For example, a commonly accepted premise when fighting fires is that more water delivered per drop improves the odds of extinguishing or controlling a fire more quickly. Los Angeles County Fire Department has supported this concept with its introduction of Type 1 helicopters almost 20 years ago. OCFA believes a helicopter that delivers at least an average of 600 to 800 gallons would be a significant improvement over the current fleet's capabilities.

The industry has categories for helicopter types and their relative water dropping capabilities. The National Wildfire Coordinating Group (NWCG) establishes the standards by which helicopters are to

operate when working with various agencies for fire suppression. One of NWCG's publications, Standards for Helicopter Operations, defines the categories as shown in Table 1-4.

Table 1-4

Type Specifications for Helicopters

Attributes	Type 1	Type 2	Type 3
Useful load at 59°F at sea level	5,000 pounds	2,500 pounds	1,200 pounds
Passenger seats	15 or more	9-14	4-8
Retardant or water carrying capability	700 gallons	300 gallons	100 gallons
Maximum gross takeoff/landing weight	12,501+ pounds	6,000-12,500 pounds	Up to 6,000 pounds

Based upon the four attributes mentioned in Table 1-4, the OCFA's UH-1H Super Huey and Bell 412EP are considered Type 2 helicopters. Subsequent information in this section will further illustrate the capabilities of the current helicopters.

Table 1-4 also outlines the requirements for helicopters to be classified as Type 1, which are significantly larger and capable of delivering greater amounts of water for the firefighting mission. A Type 1 helicopter would also increase the cabin volume, which would have a positive effect on OCFA's other primary mission, the rescue mission. A larger cabin would also allow OCFA to carry certain mission equipment and personnel.

We were asked to consider two helicopter types that can deliver more water per drop than currently happens with the current fleet and are considered Type I helicopters.

- Sikorsky S-70i
- Coulson-Unical CU-47D

In addition to the desire to improve the firefighting efficiency, OCFA also requested a review of its current Type 2 helicopters, which are used primarily for firefighting missions but also can perform the rescue mission. The request was primarily based on identifying an appropriate time to replace the current fleet based upon their age. OCFA requested that we review Bell's most recent version of the 412, which is the 412EPX.

Following is a general review of the candidate helicopters.

Sikorsky S-70i – Known as Sikorsky Manufacturing Corporation in 1925, the company expanded quickly, relocated to Stratford, Connecticut, and reorganized as the Sikorsky Aviation Company in 1929. It became part of the United Aircraft and Transport Corporation, which would be reorganized as the United Technologies Corporation (UTC) in 1975. Lockheed Martin, its current parent company, purchased Sikorsky in 2015.

Certificated as the S-70, the helicopter was first built for the US military. The UH-60 was designed in response to a US Army competition in the early 1970's for a replacement of the UH-1 "Huey". Sikorsky has built versions of this helicopter for every branch of the US Armed Forces, the US Coast Guard, and numerous foreign armed forces. To date well over 3,300 have been delivered.

The current non-US military designation is the S-70i. Los Angeles County Fire Department has historically operated the S-70A version, which is the equivalent to the UH-60L military designation but has also received the S-70i version recently. Other agencies that have recently acquired S-70i helicopters are the City of San Diego Fire, which purchased one in 2018, CAL FIRE received the first of twelve in 2019, Ventura County purchased three UH-60L helicopters, and Santa Barbara received a UH-60A in 2021. Additionally, the California Army National Guard also operate the UH-60 for water drop operations.

The primary improvements for the S-70i are more powerful engines, T700 GE 701D, and a modern avionics glass cockpit. The fuselage provides one large compartment with two seats for the flight crew and flexible seating for between 11 to 20 individuals. For the firefighting mission, the S-70i can carry a water tank with 1,000-gallon capacity. This places the S-70i, and UH-60 models, in the Type I category; a capability which has become the helicopter of choice for aerial firefighting.

Sikorsky S-70

Coulson-Unical CU-47D – The CH-47 has a long lineage that began in the 1957/58 timeframe when Vertol, a rotorcraft company, decided it would develop a twin-engine, tandem-rotor helicopter. At the same time, the US Army announced its intention to replace its piston twin-engine heavy-lift helicopter. The initial production aircraft, known as the HC-1B, was produced by Boeing Vertol in 1961. The CH-47 designation appeared in 1962 and is also referred to as the Chinook. The CH-47 was designed to, not only carry passengers, but also heavy cargo and equipment.

The US Army placed the CH-47D into service in 1982. Improvements to its predecessor, the CH-47C, included upgraded engines (Lycoming T55-L-712) for improved performance, composite rotor blades, a redesigned cockpit to reduce workload, improved and redundant electrical systems and avionics, and the adoption of an advanced flight control system. Production of the CH-47D ended in 2002. The CH-47 is one of the few aircraft designed and built in the 1960s that is still in production and serves as an essential tool for the US Army and other military organizations.

The Coulson-Unical CU-47D has an internal water tank capacity of 3,000 gallons and a maximum passenger load of 33 plus three crew members.

Boeing Vertol also produced a commercial version of the CH-47 series. Its designation is the Model 234 and was also produced by Boeing Vertol. However, in 1996, Columbia Helicopters acquired the type certificate and is recognized now as the Columbia Model 234.

Coulson-Unical CU-47D

Bell-Subaru 412EPX – This helicopter is the latest version of the 412 series. Japan's government, looking to replace its UH-1Js operated by the Japan Air Self-Defence Force, selected a joint Bell-Subaru bid to upgrade the model 412EPI. Japan received the first prototype of the EPX in February 2019 and Subaru assembled the first customer aircraft, which is destined for Japan's national police service.

Production of the 412EPI ceased in 2020 and building of the 412EPX helicopters is at the Bell facility in Mirabel, Canada. The partners continue to promote the 412EPX to the civilian market, following its certification of the prototype in July 2018. The Japan Civil Aviation Bureau approved certification in January 2020.

Improvements to the 412EPX focused on the transmission and rotor mast. Subaru's laser-peening processes enhanced main rotor gearbox performance, allowing it to withstand higher torque loads. The commercial version of the 412EPX have higher internal and external maximum gross weights, an increase in external payload, and an update to the BasiX Pro avionics suite. The twin engines are Pratt & Whitney Canada PT6-9, which have improved ship-horsepower compared to the 412EP.

Bell-Subaru 412EPX

Parameters/Specifications

The primary missions for the OCFA helicopters are firefighting and rescue. Secondary missions include various types of pre-fire planning, rescue operations, fire department assistance, and emergency assistance. To perform those missions, helicopters must have certain capabilities. For example, how much payload is available, what is the potential mission endurance, how fast can the helicopter fly, what is the passenger capacity, and how well does it perform in certain environmental conditions? In addition to performance and specifications, costs to acquire and operate the helicopter are important?

Based on prior discussions with OCFA personnel and the nature of the OCFA missions, with an emphasis on firefighting, we selected the following parameters to compare the current Bell UH-1H Super Huey and 412EP helicopters to the candidate helicopters.

- Useful Load
- Mission Endurance
- Speed
- Hover Capabilities
- Water Drop Capabilities

- Cabin Volume and Seating
- Purchase Price
- Maintenance and Fuel Costs (Discussed in Section 2, Life Cycle Costs)

The following information explains the importance of each of the parameters, while using the existing Bell UH-1H Super Huey and 412EP helicopters as a benchmark to further illustrate each parameter. Following the explanation of the parameters, Table 1-12 compares the existing fleet to the candidate helicopters.

Current Fleet

Useful Load –The amount of available weight an aircraft can carry for fuel, supplies/cargo, and personnel is a premium. Therefore, it is one of the more important factors in the selection process. A limited amount of useful load is one of the more common reasons for an operator to change aircraft as its mission and related equipment changes.

The useful load or payload of an aircraft is calculated using the maximum take-off weight minus the basic or empty weight.

The aircraft's maximum take-off gross weight (MTOGW) is just what the name implies, the maximum weight at which the aircraft can take-off. This weight is part of the regulatory certification process. Occasionally, maximum gross weight can exceed MTOGW while in flight performing its operations. For our purposes we will use MTOGW as our parameter.

With some helicopter types, there are two limits regarding MTOGW, internal and external. Internal weight refers to the weight within the helicopter structure. External MTOW refers to the weight of the helicopter with an external load. If there is a difference, the external weight is frequently a higher amount than the internal weight. Firefighting tanks are considered external weight because the tank is attached to substantial structural elements capable of handling higher loads than an aircraft's cabin floor.

Generally, there are two points of empty weight. The first point is the weight of the aircraft as delivered by the manufacturer (also known as a green or basic aircraft). The second point is what the aircraft weighs when ready to perform its mission.

A manufacturer's empty weight can vary based upon the items each manufacturer considers as part of the basic aircraft. An example will illustrate how the empty weight can vary. When a manufacturer completes an aircraft, the weight of the aircraft will include the obvious, airframe and engines and their related mounting structures. However, where manufacturers may differ involves items such as the basic interior, seating, other furnishings, and other basic systems (e.g. avionics). Referred to as the

manufacturer's empty weight, it does not include equipment installed by the operator to perform its missions.

The mission-ready weight is the most relevant to the operator. Subtracting this weight from the MTOGW lets the operator know what the payload is. Primarily, this would include the mission equipment, basic fluids for operation (e.g., oil), and equipment required for flight (e.g. enhanced avionics package). It would not include such weights as fuel, passengers, and crew equipment.

Table 1-5 illustrates the useful load for the OCFA helicopters. The internal and external MTOGWs for the Super Huey are 10,500 and 11,200 pounds, respectively. The 412EP MTOW for internal and external is 11,900 pounds. We used the external weights for each helicopter type because the relevant weight for the firefighting mission is external MTOGW.

Table 1-5

Useful Load Calculation

	Bell Helicopter	
	Super Huey	**412EP**
Maximum Take-Off Gross Weight (external)	11,200	11,900
Less: Mfr's Basic Weight + Mission Equipment	6,700	8,300
Mission-Ready Useful Load	4,500	3,600
Less: Flight Crew/Equipment	450	450
Available Useful Load	4,050	3,150

Notes:

- **Maximum Take-Off Gross Weight (external): Source of weight was Conklin & de Decker's *Conklin & de Decker Report 21.1*.**
- **Manufacturer's Basic Weight plus Mission Equipment: The mission-ready weight of each helicopter was obtained from the OCFA aviation unit.**
- **Mission-Ready Useful Load: The payload that is available for fuel, crew, passengers, and cargo.**
- **Flight Crew: Used the average weight as provided by the OCFA aviation unit. The average assumed weight for each crew member was 200 pounds. For the firefighting mission, OCFA requires a pilot and crew chief and 50 pounds of additional equipment. For the rescue mission, OCFA requires a pilot, crew chief, and paramedic and the 50 pounds of equipment. We used the firefighting crew and equipment.**
- **Available Useful Load: The useful load available prior to considering the weight of fuel, passengers, and equipment/cargo.**

Mission Endurance – An aircraft's mission endurance or the time the aircraft can fly without refueling is determined by two primary factors, the fuel capacity and the rate at which the aircraft burns fuel. The fuel capacity, like the maximum take-off gross weight, is a fixed amount and is measured in volume (e.g. gallons, liters) or weight (e.g. pounds, kilograms). Fuel consumption will vary based upon several factors including the aircraft's speed, weight, and environmental conditions (e.g. temperature, altitude, wind).

The amount of fuel carried for a mission, which is not always the capacity, will reduce the amount of Available Useful Load displayed in Table 1-5.

Table 1-6 displays the relevant information for the OCFA helicopters regarding fuel capacity, consumption, and mission length based on certain assumptions.

Table 1-6		
Mission Endurance		
	Bell Helicopter	
	Super Huey	**412EP**
Fuel Capacity (gal.)	211	330
Fuel Capacity (lbs.)	1,414	2,211
Average Fuel Burn (gal.)/ Hour	104	113
Average Fuel Burn (lbs.)/ Hour	697	757
Endurance (hrs.) (Full Fuel)	2.0	2.9
Remaining Useful Load with Full Fuel (lbs.)	2,636	939

Notes:

- **Fuel Capacity (gallons): Obtained from Bell Helicopter's Technical Data brochure and the FAA's Type Certificate Data Sheet (TCDS).**
- **Fuel Capacity (pounds): Assumed weight per gallon 6.7 pounds. Multiplied gallons times 6.7 pounds.**
- **Average Fuel Burn (gal.)/ Hour: Super Huey based upon the average consumption by the OCFA helicopters. 412EP based upon *The Conklin & de Decker Report v21.1*.**
- **Average Fuel Burn (lbs.)/ Hour: Used the same assumption of 6.7 pounds per gallon.**
- **Endurance (hrs.) (Full Fuel): If the OCFA UH-1H Super Huey departed on a mission with a full load of fuel (211 gallons/1,414 pounds), it would be able to fly for an estimated 2.0 hours based upon the average fuel burn rate of 104 gallons per hour. Based on the same assumptions, the 412EP would be able to fly for 2.9 hours.**

Based upon the available useful load in Table 1-5 and the full-fuel weight in Table 1-6, the UH-1H Super Huey helicopters would have 2,636 pounds of remaining payload (4,050 – 1,414) and the 412EP would have 939 pounds (3,150 – 2,211).

Speed – During the typical firefighting mission, speed of the helicopter is one of the important variables in determining the amount of water that can be delivered during a given period. Simply stated, a faster speed means more trips in a given amount of time, which leads to more water dropped on the fire.

Table 1-7 summarizes the relevant information for the OCFA helicopters regarding speed.

Table 1-7		
Speed		
	Bell Helicopter	
	Super Huey	**412EP**
Cruise Speed - Max (knots)	106	125
Cruise Speed - Long Range (knots)	106	122
Calculated Speed (knots)	90	106

Notes:

- **Cruise Speed - Max (knots): Source was *The Conklin & de Decker Report* 21.*1*.**
- **Cruise Speed - Long Range (knots): Source was *The Conklin & de Decker Report* 21.*1*.**
- **Calculated Speed (knots): Represents a more likely speed utilized during the firefighting mission and is based on discussions with other firefighting organizations. This speed does not imply that the cruise speeds provided in the table would not be obtained as well in certain circumstances.**

Hover Capabilities – Unlike fixed-wing aircraft, helicopters have a unique capability, hovering, which makes them invaluable in a variety of missions. Helicopters can hover because their rotating blades provide lift, which allows them to remain airborne without any forward flight. Fixed-wing aircraft must have a certain amount of forward movement for its wings to provide enough lift to keep the aircraft airborne.

When hovering, the helicopter requires a great deal of power since forward motion is not contributing to the lift effect. If the helicopter is hovering just several feet above the ground, it is said to be hovering in-ground-effect (HIGE). Due to the downwash of the blades reflecting off the ground, the helicopter is receiving a lifting effect. Helicopters that are hovering without the benefits of the ground effect are said to be hovering out-of-ground effect (HOGE). At a given set of factors, an aircraft can HIGE at a higher weight than HOGE.

Three primary factors will affect a helicopter's ability to hover – aircraft weight, altitude, and temperature. If any of the three factors increase, the blades' lift becomes less effective, which means the ability to hover is reduced. For example, as the altitude or temperature increase, the helicopter's ability to hover with a certain weight decline. Orange County's highest point is Santiago Peak at just less than 5,700 feet. Most of Orange County's population reside in two lower altitudes coastal valleys that lie in the basin, the Santa Ana Valley and the Saddleback Valley.

For the OCFA missions, the helicopters are required to hover frequently (e.g. filling water tanks, hoist rescues). For example, when a helicopter fills its water tank, the helicopter will HIGE above the water resource. Also, while performing hoist rescues, a helicopter is required to HOGE above the rescue area.

Table 1-8 illustrates the altitude limitations when the OCFA helicopters are required to hover at maximum gross weight at a standard temperature used in aviation. It is important to remember that as the helicopters reduce their weight due to fuel consumption, the ability to hover at higher altitudes is possible.

Table 1-8		
Hover Capabilities		
	Bell Helicopter	
	Super Huey	**412EP**
Maximum Take-Off Gross Weight (external)	11,200	11,900
Scenario 1: Assumptions	ISA, Sea Level, MGW	
Hover-in-ground-effect (HIGE) (feet)	10,630	10,200
Hover-out-of-ground-effect (HOGE) (feet)	11,000 lbs.	5,200
Scenario 2: Assumptions	ISA +20 C, Sea Level	
Hover-in-ground-effect (HIGE) (feet)	6,800	6,200
Hover-out-of-ground-effect (HOGE) (feet)	10,800 lbs.	11,890 lbs.

Notes:

- **Maximum Take-Off Gross Weight: Source of weight was *The Conklin & de Decker Report* 21.*1*.**
- **Scenario 1 Assumptions: ISA stands for International Standard Atmosphere and serves as a common reference for temperature and pressure. At sea level the standard temperature is 15° Centigrade or 59° Fahrenheit. MGW is the Maximum Gross Weight.**
    - **Hover-in-ground-effect (HIGE) (feet): Obtained from the respective Technical Data brochures from Bell. Provides the altitude at which the helicopters can hover, while in ground effect, based upon the assumptions.**
    - **Hover-out-of-ground-effect (HOGE) (feet): Obtained from the respective Technical Data brochures from Bell. Provides the altitude at which the helicopters can hover, while out of ground effect, based upon the assumptions.**
        - **UH-1H Super Huey: The helicopter cannot hover OGE at the MGW of 11,200 pounds. It can hover OGE at sea level if the helicopter is 200 pounds less than the MGW.**
        - **412EP: The maximum altitude at which the helicopter can hover OGE based on the assumptions is 5,200 feet.**
- **Scenario 2 Assumption: Altitude remains at sea level, the temperature increases by 20° C to 35° C or 95° F, and the helicopter weight remains at MGW.**
    - **Hover-in-ground-effect (HIGE) (feet): Obtained from the respective Technical Data brochures from Bell. Based on Scenario2 assumptions, both helicopters can hover IGE, the Super Huey at 6,800 feet and the 412EP at 6,200 feet.**
    - **Hover-out-of-ground-effect (HOGE) (feet): Obtained from the respective Technical Data brochures from Bell.**
        - **UH-1H Super Huey: The helicopter cannot hover OGE at the MGW of 11,200 pounds. It can hover OGE if the helicopter is 400 pounds less than the MGW.**

- **412EP: The helicopter cannot hover OGE at the MGW of 11,900 pounds. It can hover OGE if the helicopter is 110 pounds less than the MGW.**

Water Drop Capabilities – In addition to a helicopter's speed, the quantity of water delivered per drop is another important variable in determining the amount of water that can be delivered during a given period. A helicopter's tank or bucket size represents the maximum amount that a particular helicopter can deliver with each drop.

However, the tank capacity does not necessarily represent what the helicopter delivers. Available useful load or payload for all helicopter types is often a parameter that limits the actual amount of water delivered to something less than the tank's capacity.

Table 1-9 illustrates this point. The UH-1H Super Huey has a 350-gallon water tank, while the 412EP's tank is 375 gallons. However, when the available useful loads for both types are considered, the amount of water that can be carried is reduced. If the Super Huey carries a full load of fuel, the amount of water it can carry is 315 gallons. If the amount of fuel carried is for a 1.5-hour mission, a common OCFA firefighting mission duration before refueling, the amount of water carried is 332 gallons. The 412EP is affected similarly but with even less water capacity. Several factors will affect water drop amounts.

- Water drop amounts increase as a helicopter consumes fuel during the mission.
- The amount of water dropped declines as a helicopter performs in higher altitudes than sea level and temperatures higher than 15°C.
- The amount of water would decrease when 20-minute reserves are allocated to the amount of fuel required.

Table 1-9

Water Drop Capabilities (gallons)

	Bell Helicopter	
	Super Huey	**412EP**
Water Tank Size (gallons)	350	375
Water Drop Amounts		
With Full Fuel (gal.)	315	112
1.5 -Hour Mission+ 20-Min Fuel Reserve	332	211

Notes:

- **Water Tank Size:**
  - **UH-1H Super Huey: The water tank for the Super Huey is manufactured by Isolair Helicopter Systems. The water tank capacity is 350 gallons and a capacity of 27.2 gallons for chemicals. The empty tank weighs 416 pounds and the gross weight of the tank and 350 gallons of water is 3,342 pounds.**

  - **412EP: Water tank is manufactured by Simplex Aerospace, a provider of fire attack systems. The tank capacity is 375 gallons and capacity of 30 gallons for foam. The empty tank weighs 395 pounds. A tank with full water weighs 3,530 pounds.**
- **Water Drop Amounts with Full Fuel: Calculated using the useful load in Table 1-5 and added the weight of full fuel in Table 1-6. Also included is the weight of 450 lbs. for two crew members and equipment. The payload available for water is 315 gallons for the Super Huey and 112 gallons for the 412EP.**
- **Water Drop Amounts, 1.5-Hour Mission + 20-Min Fuel Reserve: Calculated using the useful load in Table 1-5 and added the weight of 1.5 hours of fuel in Table 1-6 plus 20-minutes of fuel reserve. Also included is the weight of 450 lbs. for two crew members and equipment. The available Super Huey payload for water is 332 gallons. The 412EP can carry 211 gallons.**

Cabin Volume and Seating – Despite their difference as to when they were manufactured, the airframes are almost identical, which means the cabin dimensions and volume are the same. During the firefighting mission, OCFA uses two crew members, a pilot and crew chief. When transporting fire ground crews or equipment and personnel for other OCFA missions, the passenger cabin can seat up to 14, carry stretchers for rescued individuals, or be configured for the transport of equipment rather than passengers.

Table 1-10 displays the cabin volume and seating capacity for the OCFA helicopters.

Table 1-10
Cabin Information

	Bell Helicopter	
	Super Huey	**412EP**
Volume (cubic feet)	208	208
Crew/Passengers	2/14	2/14

Notes:

- **Volume: Obtained from *The Conklin & de Decker Report* 21.*1*. The calculated volume considers the curvature of the airframe and any unusable space due to obstructions. Conklin's cabin volume will not equal the product of the dimensions provided by the manufacturer (length x width x height).**
- **Seating (Crew/Passengers): The crew number was obtained from discussions with OCFA personnel. The passenger seating was obtained from *The Conklin & de Decker Report* 21.*1*.**

Purchase/Disposition Price – If the prior specifications and parameters are the only parameters analyzed in the acquisition process, then an important variable is missing, the acquisition or disposition amount. Analyzing purchase price introduces the concept of value, not only what an aircraft provides but also what it costs to obtain the asset. If an aircraft is at the end of their journey, then the remaining value becomes important. The disposition value can be affected by several factors including the age of the aircraft, status of the significant maintenance events and items, and conditions in the economy.

In the case of the current OCFA helicopters, the resale value is more important than the acquisition price. Table 1-11 provides the estimated range for the resale of the Super Huey and 412EP. Due to how the Super Huey helicopters were obtained, the Federal Excess Property Program, OCFA does not own the helicopters, therefore it will not receive any value when the helicopters are returned to CAL FIRE. Section 2 of this report covers the resale value in greater detail.

Table 1-11

Purchase Price

	Bell Helicopter	
	Super Huey	**412EP**
Basic Price (x1M)	N/A	N/A
Firefighting Completion (x 1M)	N/A	N/A
Resale Value	$1.6-$2.0	$3.5-$4.3

Notes:

- **Basic Price: N/A represents Not Applicable.**
- **Firefighting Completion Price: N/A represents Not Applicable.**
- **Resale Value: Represents a range of potential value for the respective helicopter types.**

Candidate Helicopters

Table 1-12 offers a comparison between the current OCFA helicopters (highlighted in grey) and the candidate helicopters. The comparisons are based on the parameters provided in this section for the current OCFA helicopters.

Useful Load/Payload - The MTOGWs highlight the significant difference between Type II and Type I helicopters. The current helicopters, UH-1H Super Huey and 412EP, are referred to as medium twin- or single-engine helicopters and in US firefighting terms are classified as Type II helicopters. Type II helicopters have a MTOGW of 6,000 to 12,500 pounds as summarized in Table 1-4. Helicopters classified as Type I weigh over 12,500 pounds, which is the classification for the S-70i and CU-47D helicopters. Generally, Increased MTOGW translates to an increase in payload.

Mission Endurance – Each of the candidate helicopters has enough fuel to, at the least, perform a two-hour mission with 20 minutes of fuel reserve.

Hover Capabilities – Note: Each of the candidate helicopters can hover in and out of ground effect based on the given parameters. The Bell 412EPX has also improved its hovering performance when compared to the current 412EP. The altitudes for the CU-47D reflect the performance limitations for hovering, however, the helicopter has an additional structural limitation. The altitudes limits based on the structural limitations are 5,250 feet for ISA at sea level and 3,500 feet for ISA plus 20^{O}C at sea level.

Helicopter Speed – The speed of the helicopter is an important factor in the formula as to how much a helicopter can drop during a certain period. Speed becomes more of a factor as the distance to the water source increases. Normally, there are different speeds when a helicopter is flying to the water source and back to the fire drop area. When flying to the water source, the helicopter is lighter, therefore can fly faster than when flying with a full water tank. The S-70i and CH-47D are cable of flying faster speeds than the current helicopters and the 412EPX.

Water Drop Capabilities - While the maximum take-off weight is important, it does not directly reflect a more important parameter as it relates to the firefighting mission, water drop capabilities. As Table 1-9 shows the current helicopters have a tank capacity of 350 to 375 gallons but deliver less than those amounts due to payload limitations when prepared for the typical firefighting mission (1.5 hours plus 20-minute fuel reserve).

The Type I candidate helicopters have significantly more capabilities. The tank capacity ranges from 1,000 gallons for the S-70i to 3,000 gallons for the CU-47D. The 412EPX, while still a Type II helicopter, also exceeds the current fleet's capacity due to its increased external gross weight of 1,100 pounds. Based on the assumptions, the 412EPX would have a potential water drop, 478 gallons, that is greater than the 375-gallon tank capacity.

Table 1-12 provides two data points for the amount of water that can be dropped, the start and end of a 90-minute mission with the 20-minute fuel reserve. Using the S-70i as an example, the helicopter is dropping about 25 percent more water than at the start of the mission. The range for the other candidate helicopters is 19 to 39 percent increases.

Cabin Volume - In addition to increased payload, the S-70i and CU-47D offer larger cabins, which translate into the potential to carry more passengers and equipment. The CU-47D's cabin volume is almost eight times larger than the current helicopters. The 412EPX remains the same as the current helicopters.

Pricing/Value - Obtaining the benefits that come with the candidate helicopters means an increase in costs, both to purchase and operate the helicopters. Table 1-12 offers an estimated purchase price of a basic-configured aircraft for the candidate helicopters. Also provided is an estimate for the cost to complete the respective candidate helicopters for the various missions, including firefighting. Both the basic and completion prices can vary based upon the specific requirements, the completion vendor, and contract negotiations.

The Resale Value information is relevant to the current helicopters operated by OCFA. These are the helicopters that have the possibility of being removed from the current fleet at some point. The factors that can affect a resale value include an aircraft's condition, age (e.g. years, flight hours), accuracy of tracking information, configuration, availability, and level of support (e.g. spares,

engineering). In the case of the Super Huey helicopters, asset ownership is an additional factor that will affect the resale value. OCFA will not receive compensation for returning the asset to CAL FIRE.

Table 1-12					
Current and Candidate Helicopters					
Firefighting Mission					
Airframe Manufacturer /Type	Bell / Super Huey	Bell / 412EP	Subaru/Bell / 412EPX	Sikorsky / S-70i	Coulson CH-47D
Engine Manufacturer /Type	Honeywell / T53-L-703	Pratt & Whitney / PT6T-3D	Pratt & Whitney / PT6T-9	General Electric / T700 GE 701D	Honeywell / T5-GA-L714A
Useful Load					
Maximum Take-Off Gross Weight (Internal)	10,500	11,900	12,200	22,000	50,000
Maximum Take-Off Gross Weight (External)	11,200	11,900	13,000	23,500	50,000
Mission Configured - Fire	6,700	8,300	8,300	14,200	26,500
Flight Crew (Firefighting)	450	450	450	650	650
Useful Load Available for Mission	4,050	3,150	4,250	8,650	22,850
Fuel (lbs.) 1.5-Hour Mission w/ 20 Min. Reserve	1,275	1,385	1,385	1,986	4,966
Remaining Useful Load	2,775	1,765	2,865	6,664	17,884
Mission Endurance	**2.0**	**2.9**	**2.9**	**2.9**	**2.6**
Hover Capabilities					
In-Ground Effect (ISA, Sea Level)	10,630	10,200	9,000	10,270	7,750
Out-of-Ground-Effect (ISA, Sea Level)	11,000 lbs.	5,200	6,000	6,200	6,100
In-Ground Effect (ISA +20 C, Sea Level)	6,800	6,200	5,600	7,400	5,250
Out-of-Ground-Effect (ISA +20 C, Sea Level)	10,800 lbs.	11,890 lbs.	1,500	4,400	3,900
Helicopter Speed					
Cruise Speed - Max (knots)	106	125	130	145	157
Cruise Speed - Long Range (knots)	106	122	124	128	130
Calculated Speed (knots)	90	106	110	122-140	131-157
Water Drop Capabilities (gallons)					
Water Tank Size (gallons)	350	375	375	1,000	3,000
1.5-Hour Mission+ 20-Min Fuel Reserve	332	211	343	797	2,498
End of Mission (20-minute reserve)	457	347	478	992	2,985
Cabin					
Volume (cubic feet)	208	208	208	396	1,629
Crew/Passengers	2/14	2/14	2/14	2/12	2/>30
Pricing/Value					
Basic Price (x1M)	**N/A**	**N/A**	$11.5	$17.0	$16.5
Firefighting Completion (x 1M)	**N/A**	**N/A**	$14-$15	$20-$23	$5.8*
Resale Value	**$1.6-$2.0**	**$3.5-$4.3**	N/A	N/A	N/A

Notes:

- **Useful Load:**
  - **Fuel Consumed (lbs.): Based upon the typical firefighting mission duration of ninety minutes plus a 20-minute reserve.**
- **Mission Endurance: Based upon the assumptions the helicopter started with a full load of fuel.**
- **Hover Capabilities: There are two conditions for the hovering capability, ISA (15^{O}C) at sea level and ISA +20^{o} C at sea level. Both conditions are maximum gross weight.**
- **Helicopter Speed:**
  - **Calculated Speed: During the firefighting mission, the speed will vary when carrying a full load of water versus flying to pick-up water. The range of speed reflects the speed differences and was obtained from operators and the manufacturers. For example, the Sikorsky S-70i will have a speed of 140 to the water pick up and 120-130 with a full load.**
- **Water Drop Capabilities:**
  - **Tank Size: Based upon discussions with OCFA personnel for the tank capacity on the current fleet.**
  - **1.5-Hour Mission: The amount of water that could be carried at the start of a ninety-minute mission plus a twenty-minute fuel reserve. The water amount would increase with each drop as fuel was consumed.**
  - **End of Mission (20-minute reserve):**
    - **Bell Super Huey: If the water tank had the capacity, the helicopter, based on the conditions, would be able to drop 457 gallons. Obviously, the limit would be 350 gallons.**
- **Cabin:**
  - **Crew/Passengers: Seating in the passenger cabin is flexible in each helicopter type. The number for passengers represents the maximum seating capacity.**
- **Pricing/Value:**
  - **Basic Price: Applies only to the candidate helicopters. The current helicopters are not being purchased. The amounts represent an estimated price for the basic, non-mission-configured helicopter.**
    - **CU-47D - The $16.5 million is the proposed purchase price for a mission-ready helicopter. We placed the completed value in this category due to the additional fees for management services (See Firefighting Completion).**
  - **Firefighting Completion: Represents the estimated basic price and completion costs for the candidate helicopters. The range of costs is dependent on the specific mission equipment that is requested by OCFA.**
    - **CU-47D - The $5.8 million for the CU-47D does not represent the completion costs as provided for the 412EPX and S-70i. Those costs are part of the Basic Price. The $5.8 million represents an annual cost provided by Coulson-Unical for a turnkey service to operate, maintain, and support the CU-47D.**
  - **Resale Value: This applies to the current OCFA helicopters. The range of resale values was obtained from Conklin & de Decker's, *The Conklin & de Decker Report v21.1*. The values shown for the Super Huey helicopters are representative of assets not in the Federal Excess Property Program.**

Section 2 – Life Cycle Cost Projections

Orange County Fire Authority Original Request

Estimate the cost of the acquisition and operation of helicopter alternatives. The operating cost estimates will include maintenance options and fuel costs, and other operating or overhead costs.

Conklin & de Decker Approach

Conklin & de Decker used the concept of life cycle cost analysis to examine the current and candidate helicopters. In general, and as it relates to aircraft operators, a life cycle cost analysis has three main elements – acquisition, operating costs, and disposition of the aircraft. This section deals with the costs of operating aircraft with a primary focus on maintenance and fuel costs. Subsequent sections of this report deal with the acquisition and disposition of an aircraft.

More specifically, this section contains ten-year estimates, with a beginning point of January 2021, for the current and candidate helicopters. The estimates provide totals for maintenance and fuel costs, while also highlighting the annual and sometimes significant cost variations ("peaks" and "valleys") associated with maintenance costs. The ultimate objective for summarizing the costs is to identify key potential times in the life cycle to dispose of a helicopter. Conklin & de Decker used its *Life Cycle Cost, 20.1* software version to calculate the respective projections.

This section of the report, like Section 1, consists of a summary of Conklin & de Decker's analysis and the analysis. Life cycle cost projections are provided for the current fleet and candidate aircraft. The projections for each of the current aircraft include an overall summary table, an annual maintenance cost chart for ten years, a table highlighting the significant maintenance events in the respective years, and a residual value chart for the ten-year period. The projections for the S-70i candidate aircraft include the overall summary table, an annual maintenance cost chart, and the ten-year residual value chart. The CU-47D is presented differently due to the Colson-Unical proposal. There is the overall summary for ten years of operation and then explanations about maintenance cost behavior and the resale value of the helicopter.

Summary

Using Conklin & de Decker's *Life Cycle Cost 20.1* software, we projected maintenance and fuel costs over a ten-year period for each of the current fire and rescue helicopters and for selected candidate helicopters should the OCFA decide to change to a different type of helicopter. The beginning point for the ten-year life cycle estimate was January 2021. Chart 2-1 summarizes the results to the analysis.

It is important to mention the effect that a helicopter's age can have on the maintenance costs in a life cycle. Three of the helicopter types, UH-1H Super Huey, Bell 412EP, and CU-47D, have been in operation for many years. The 412EPX and S-70i are new helicopters. Due to their age and the number of flight hours, older aircraft will have higher maintenance costs as they encounter significant maintenance events. Based on the assumption of 200 flight hours per year per helicopter, the 412EP helicopters will encounter several of these maintenance events, which drives up the total costs during the ten-year period. The new helicopters will not encounter the significant events in their first ten years based upon the 200 hours per year and therefore their cost may be similar to or less than the older helicopters. Good examples of that relationship are the 412EPX, which is less than the existing 412EP helicopters, and the S-70i, which is 8 to 25 percent depending upon the 412EP to which it is compared.

The current 412EP helicopters are similar in age and flight hours. Based on age, these helicopters are in their 13th year of operation for OCFA. Due to their similarity, the 412EP helicopters have estimated maintenance and fuel costs that is only a $600,000 difference. In essence, each helicopter will encounter the same scheduled maintenance events during the next ten years.

The UH-1H Super Huey helicopters are 54-years old. Despite their lower estimated maintenance and fuel costs over the next ten years, when compared to the 412EP helicopters, their costs could exceed the estimates significantly due to their age. Generally, as helicopters age, unscheduled maintenance costs will increase in the airframe structure, electronic system, and avionics. An example of the aging factor is the most recent ten-year inspection on N441FA H3. The almost-$500,000-inspection had several issues with the airframe structure. Also, the source of spares has changed in the last several years as military auctions of UH-1H parts have declined. Generally, parts acquired from the government as surplus are less expensive than purchasing from other sources.

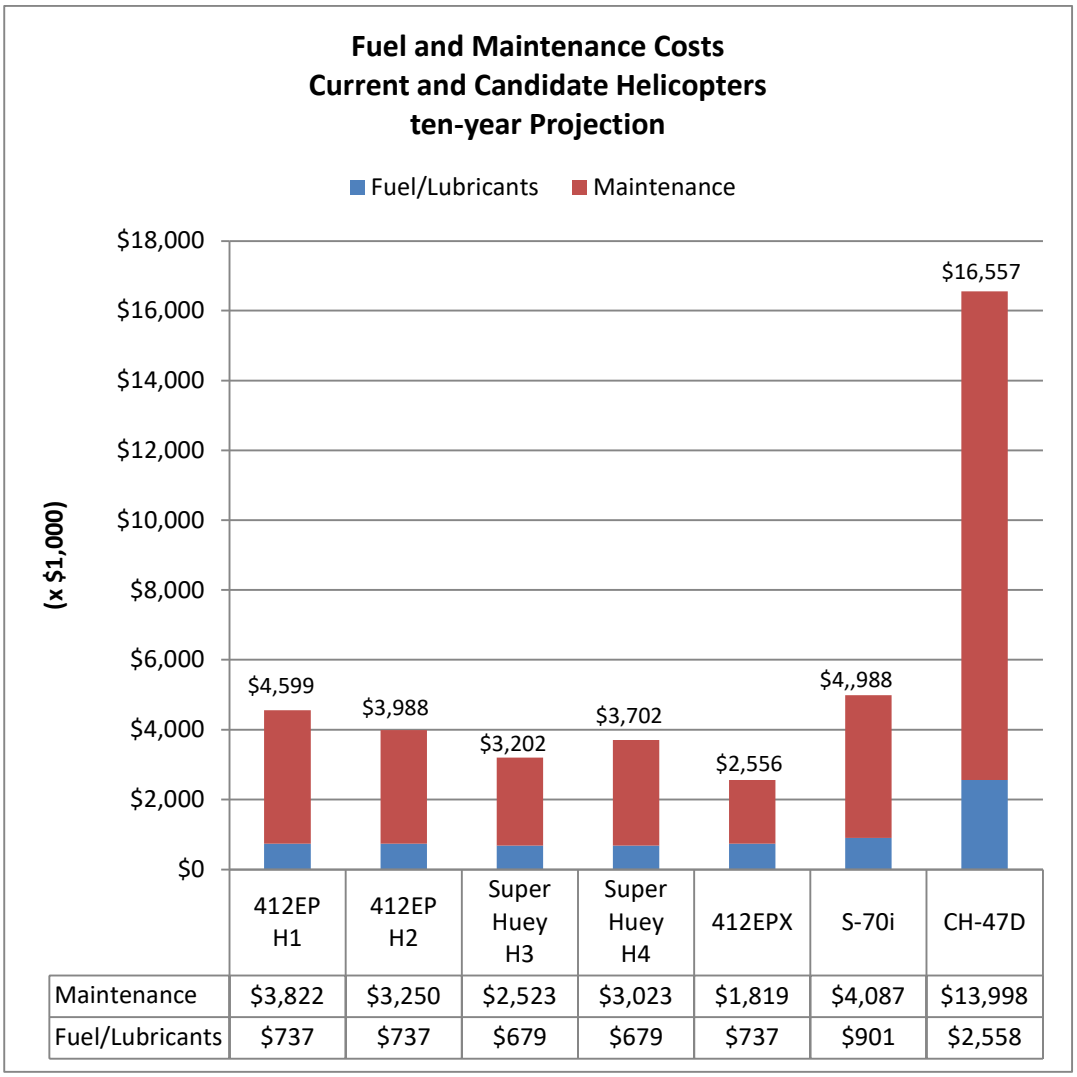
Due to OCFA's desire to improve its capabilities in primarily the firefighting mission, each of the candidate helicopters represent an increase in performance when compared to the current helicopters. The S-70i and CU-47D are Type I helicopters that can easily double the water drop capabilities of the current helicopters. The 412EPX has improved water drop performance even though it is in the same category as the current helicopters.

To acquire helicopters with that capability, the costs to operate them will also increase. Chart 2-1 highlights the increase. During a ten-year period, the candidate helicopters will increase fuel and maintenance costs anywhere from 25 percent, comparing the Bell 412EP to the Sikorsky S-70i, and 260 percent when the CU-47D is compared to the 412EP.

While the increase in maintenance and fuel cost may seem excessive, the increase in performance must also be considered. Using the Bell 412EP to the Sikorsky S-70i comparison, the increase in water delivered during the typical mission scenario, the S-70i will carry 256 percent more water per tank load (224 gallons for the 412EP versus 797 gallons for the Sikorsky S-70i). The CU-47D water drop capability

is ten times 412EP (2,498 gallons for the CU-47D). The 412EPX also increases the water dropped by 58 percent (355 gallons for the 412EPX).

Chart 2-1



While performance capabilities of the helicopters are important, so too is the value of the aircraft. Table 2-1 identifies the years when the helicopters have positive Adjusted Values, which represents when OCFA could expect to receive a higher amount when selling the asset than a helicopter around the Base Value. It is important to mention that the actual amount received in the sale of a used helicopter can differ from the adjusted values in this model due to current market activity. The model is highlighting the relationship between the Base and Adjusted Values.

For Table 2-1, we used a ten-year summary since the UH-1H Super Huey helicopters are quite old and the 412EP helicopters will be approximately 23 years old in another ten years. We extended the number of years for the candidate helicopters to 20 since they are new helicopters, and their resale

value would be more informative with a longer period. We did not have the appropriate information to generate a residual value for the CU-47D.

Table 2-1

OCFA Helicopters - Annual Summary of Adjusted Values

Registration Number	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
N141FA H1		A		C				B			X	X	X	X	X	X	X	X	X	X
N241FA H2	A	B					C				X	X	X	X	X	X	X	X	X	X
N441FA H3	C								A	B	X	X	X	X	X	X	X	X	X	X
N541FA H4	C					B				A	X	X	X	X	X	X	X	X	X	X
Candidate Helicopters - Annual Summary of Adjusted Values																				
412EPX	A	B											C	D	E					
S-70i	A	B	C	D	E															
CU-47D	Not Available																			

In Table 2-1, the years that are marked with yellow represent when the Adjusted Value is the same as or greater than the Base Value of the helicopter. The single red block for each helicopter represents the lowest value during the 10 and 20-year period. The letters in the yellow blocks identify the years with the highest Adjusted Values. "A" identifies the highest value and "C" is the third highest. The white blocks are the years when the Adjusted Value is below the Base Value.

Registration number N141FA H1 can serve as an example to explain the table. In years 1 through 5 and 8 and 9, the helicopter's adjusted value is higher than its base value, when all the significant scheduled maintenance events are assumed to have remaining lives of 50 percent. In years 6 and 7, the adjusted value is less than the base value because enough of the significant scheduled maintenance events have less than 50 percent remaining lives. Year 7 has the lowest adjusted value. Year 2 has the highest adjusted value.

Conklin & de Decker Analysis

Current Fleet

Life Cycle Assumptions: Life cycle cost estimates are based on several assumptions. Listed below are the assumptions that support the ten-year estimates for the current helicopters in the OCFA fleets as well as the candidate helicopters. Despite the grounding of the Super Huey helicopters in September 2020, we built an estimate for these helicopters should they become active again.

- Life Cycle Start Month – January 2021. The OCFA aviation unit provided the maintenance tracking information. The reports contain the remaining times for significant scheduled events such as major inspections, overhaul components, life-limited items, and engine restorations. Based on the start date, Year 1 covers from January through December 2021.

The total flight hours as of January 2021 were:

- 412EP N141FA H1: 2,329
- 412EP N241FA H2: 2,188
- Super Huey N441FA H3: 6,811
- Super Huey N541FA H4: 9,196

- Program Length – 10 years.
- Hours per Year – OCFA requested that we use 200 flight hours per helicopter per year. In most recent years, the UH-1H Super Huey helicopters have been used primarily as back-up to the 412EP helicopters when they are not available. As a result, the Super Huey helicopters have not flown 200 hours annually.

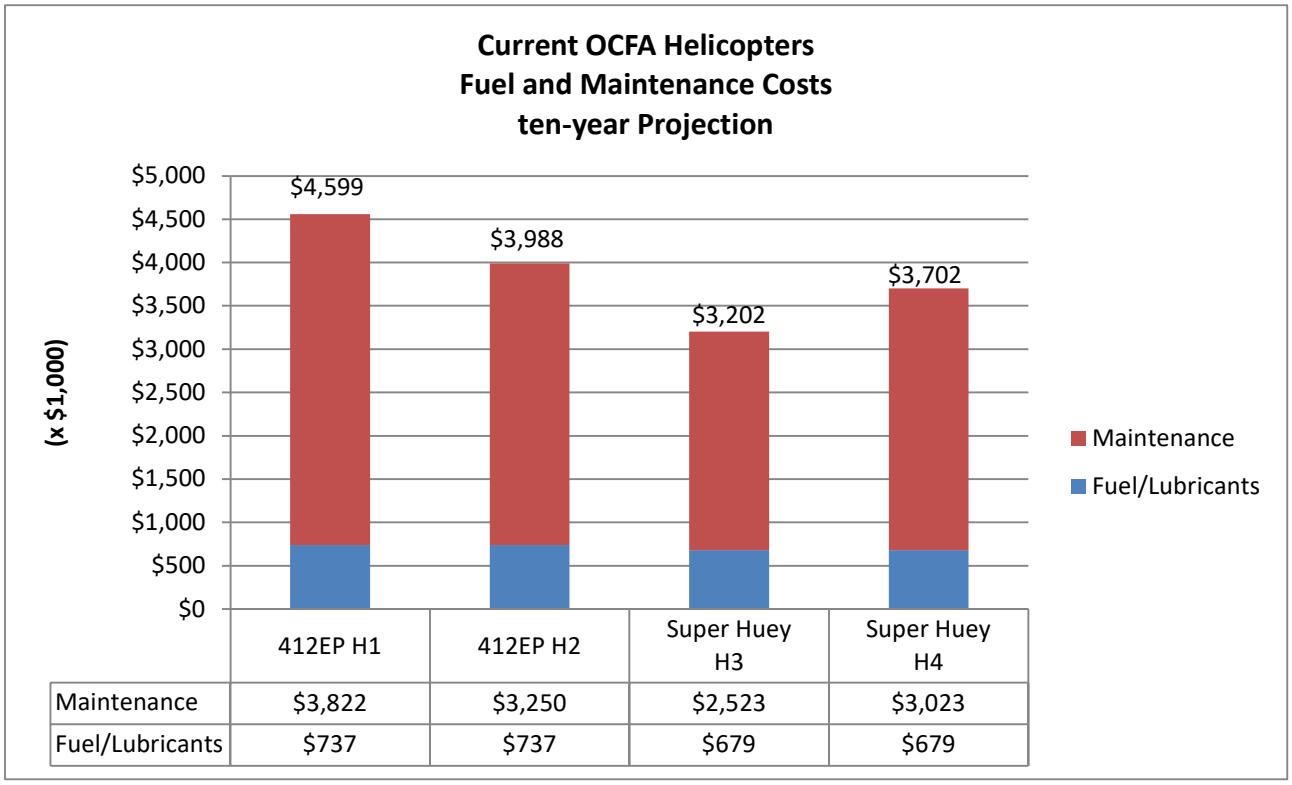
  Estimating the annual hours accurately is important as they have an important effect on the timing of certain significant maintenance events (e.g. 2,500-hour major inspection, engine overhauls, life-limited items).

  Despite the September 2020 grounding, we have included the UH-1H Super Huey helicopters. If the helicopter should resume flying, the timing of the scheduled events in the next ten years may occur at later dates than the estimates in the report, especially hourly items. Calendar scheduled maintenance (e.g. ten-year inspection) will occur as estimated.
- Fuel Cost – Assumed $2.90 cost per gallon.
- Fuel Consumption – The average amount of fuel consumed in an hour is based upon the Conklin & de Decker *Life Cycle Cost 20.1* software. The assumed hourly fuel consumption for each of the helicopter types is:
  - 412EP: 113 gallons.
  - Super Huey: 104 gallons.
- Labor – The labor costs associated with maintenance are based upon the estimated hours to work on the aircraft, also referred to as "hands-on-time". Not included as "hands-on-time" would be activities such as time-off, meetings, hangar cleaning, and other activities that are not involved with maintaining the helicopter. We used a labor rate of $106 per hour.
- Inflation Rates – The life cycle cost model uses two inflation factors. The first affects the increasing cost of parts in aviation and the second is more general and is applied to such categories as fuel and labor. The assumed annual inflation factors affecting parts is 2.7 percent and the general inflation rate is 1.95 percent.

Chart 2-2 summarizes the projected fuel and maintenance costs for each of the OCFA helicopters over a ten-year period. During the next ten years, the 412EP helicopters will have the most expenditures. N141FA H1 will consume almost $4.6 million and N241FA H2 is $600,000 less at $4.0 million. If the Super Huey helicopters become active again, their estimated costs range from $3.2 (N441FA H3) to $3.7 million (N541FA H4). The primary cause for the $500,000 difference is that N541FA H4 was just starting

its ten-year inspection when it was grounded. The ten-year inspection is a significant cost at almost $500,000.

Chart 2-2



	412EP H1	412EP H2	Super Huey H3	Super Huey H4
Maintenance	$3,822	$3,250	$2,523	$3,023
Fuel/Lubricants	$737	$737	$679	$679

The following part of the report contains a combination of tables and charts summarizing the information generated by the life cycle cost software. The information provided for each helicopter consists of

- A summary table showing the maintenance and fuel costs for a ten-year estimate.
- A line chart showing the estimated annual maintenance costs for a ten-year period.
- A table highlighting the significant maintenance events occurring in specific years.
- A line chart displaying the estimated annual residual value based on the aircraft's age and status of significant maintenance events for a ten-year period.

We have provided an explanation for each chart and its significance for the OCFA helicopter serial number 36484, registration number N141FA H1. To avoid redundancy with the explanations, we did not repeat them for each helicopter. We provided only the tables and charts for the remaining Bell 412EP and both UH-1H Super Hueys. However, and for all helicopters, we have identified when OCFA might consider disposing of each helicopter based upon their respective estimated residual values. Our suggestion for disposition in this section of the report considers each helicopter individually and does not represent the fleet plan as there will be other factors that may affect the fleet plan.

Helicopter: Bell 412EP
Serial Number: 36484
Registration Number: N141FA H1

Table 2-2 summarizes the estimated fuel and airframe and engine maintenance costs over a ten-year period. The estimate was based upon Conklin & de Decker's *Life Cycle Cost v20.1* software while using relevant OCFA department information (e.g. remaining lives on scheduled components and items). The ten-year estimated costs for this helicopter are almost $4.6 million with 16 percent of the costs associated with fuel and lubricants, 60 percent with airframe maintenance, and 23 percent with engine restoral.

Table 2-2		
ten-year Projection - N141FA H1		
Fuel	$716,006	16%
Lubricants	$21,480	0%
Subtotal	$737,487	16%
Airframe Maintenance		
Labor	$495,990	11%
Parts	$771,821	17%
Inspections	$785,285	17%
Component Overhaul	$686,454	15%
Life Limited Items	$16,555	0%
Subtotal	$2,756,106	60%
Engine Maintenance		
Engine Restoral	$1,065,614	23%
Total	$4,559,206	100%

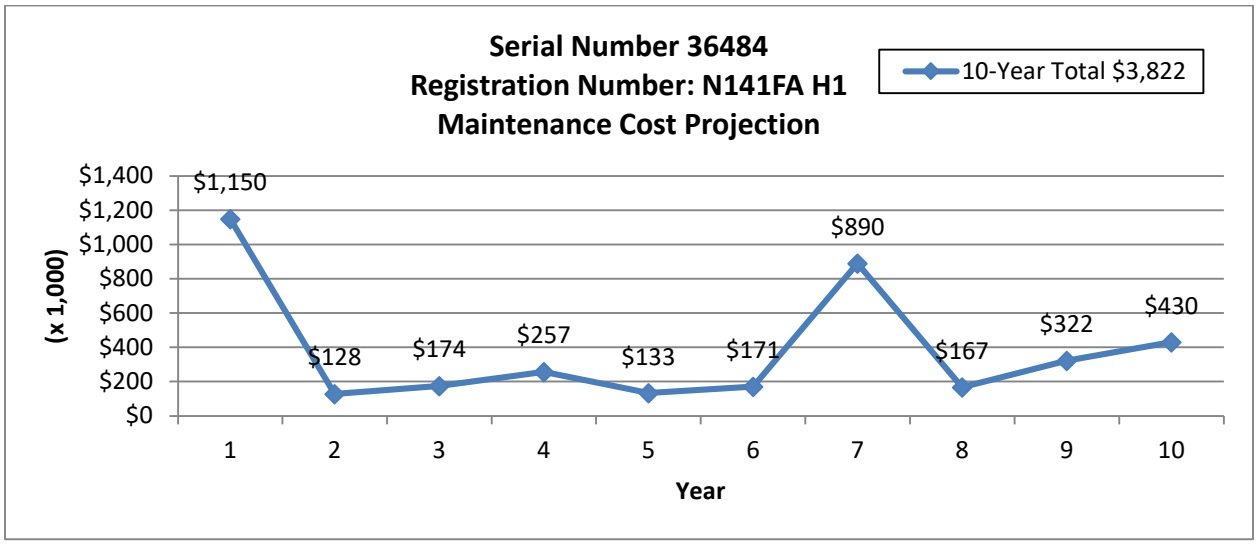
Chart 2-3 displays the estimated annual maintenance costs (fuel not included) during the ten-year period. The average annual cost is $382,000.

Due to the nature of helicopter maintenance requirements certain significant costs will occur at scheduled intervals. For example, in the next 12 months, helicopter N141FA H1 will encounter its highest maintenance costs. Thirty percent of the ten-year $3.822 million maintenance expense is related to scheduled maintenance for an engine hot section, main rotor hub and combining gearbox clutch inspections, and various component overhauls that occur at 2,500 hours. This helicopter in January 2021 had accumulated a total of 2,329 flight hours. (This detail is provided in Table 2-3.)

To use this helicopter as an example, selling the helicopter in Year 6 would not be the ideal time to dispose of the aircraft. Generally, upcoming significant maintenance due in Year 7 will subtract substantially from the resale value of the helicopter. Ideally, disposing of an aircraft should occur two or three years from significant maintenance events. Chart 2-4 illustrates this statement.

Also, it is important to remember one of the assumptions underlying the ten-year estimate; it is based on 200 flight hours per year. If the actual accumulation of flight hours differs from the projection, then the year in which the significant maintenance costs occur could change.

Chart 2-3



The information in Table 2-3 supplements Chart 2-3. The table highlights the more significant maintenance categories that are driving the costs in the peak years. For example, in Year 7 the N141FA H1 helicopter will need both of its engines overhauled. The overhauls are estimated to cost almost $728,000, which is 82 percent of the maintenance costs for the year. Other years with significant scheduled maintenance are 1, 4, 7, 9, and 10.

Table 2-3
Summary of Annual Significant Scheduled Events – N141FA H1

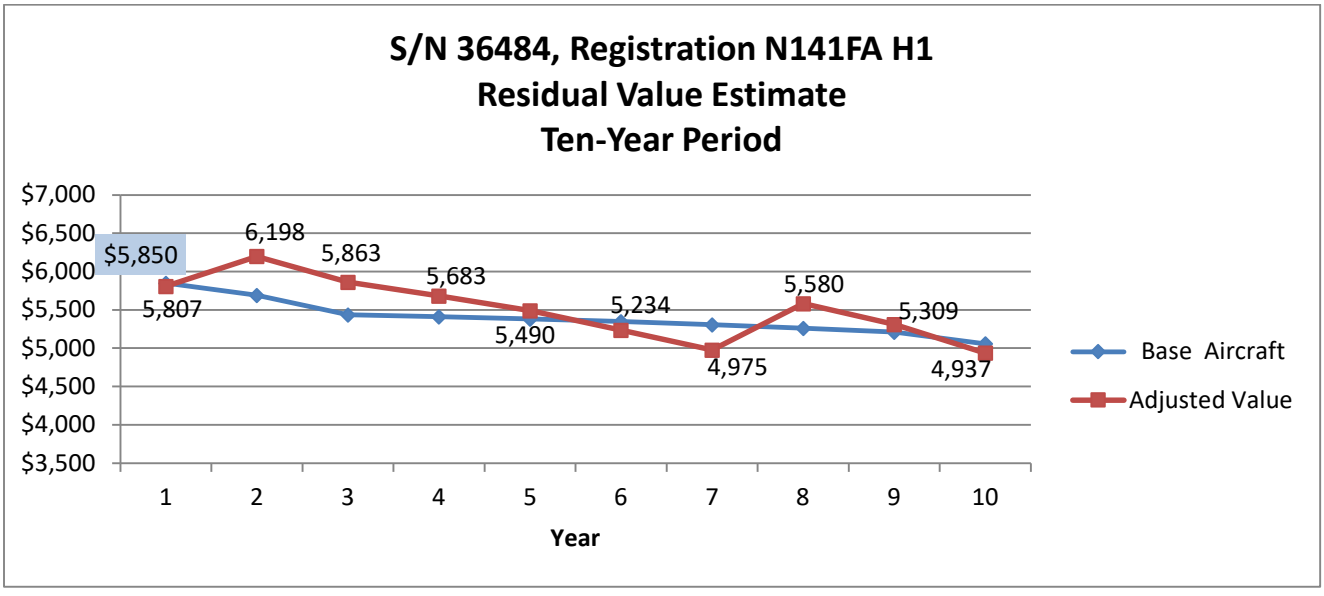
Year	Category	Significant Maintenance	Estimated Cost (x1,000)	Significant Maint. Subtotal (x1,000)	Annual Maint. Total (x1,000)	Significant Maint. / Annual Total (%)
1	Inspections	Main Rotor Hub, Combining G'box	$417			
	Engine Inspection	Hot Section	$206			
	Component Overhaul	Several Items	$410	$1,033	$1,150	90%
4	Inspections	5000-Hr/ 5-Year	$113	$113	$257	44%

7	Engine Restoration	Engines Overhauled	$728	$728	$890	82%
9	Inspections	5000-Hr/5-Year	$138	$138	$322	43%
10	Component Overhaul	Several Items	$238	$238	$430	55%

Chart 2-4 offers another perspective for N141FA H1, the estimated residual value during the ten-year period. The chart shows two perspectives for the residual value. The first perspective (Base Aircraft, blue line) involves the steady declining value of the helicopter as it ages in years. In this life cycle cost estimate, N141FA H1 31147, manufactured in 2008, begins as a 12- to 13-year-old helicopter. At the end of the ten-year period, the 22- to 23-year-old helicopter will have an estimated market value of $5.1 million. The average annual 1.5 percent rate of depreciation during the ten-year period is a general rate in the life cycle cost tool that applies to all 412EP helicopters with the same year of manufacture.

The second line (Adjusted Value, red line) in Chart 2-4 reflects the estimated residual value based upon the status of the helicopter's significant scheduled maintenance events (e.g. component overhauls, life-limited items, engine restoration, major inspections). Due to the high costs associated with these maintenance events such as a transmission overhaul, main rotor blade retirement, engine overhaul, and/or significant inspections, a helicopter's market value will be increased or decreased depending upon how much time remains before the occurrence of the event. And because the various maintenance events occur during different times in the helicopter's life cycle, the market value is affected differently by each significant maintenance event. For example, an engine overhaul that just occurred will add (betterment) to the helicopter's base market value, while a set of blades to be retired in the coming year will decrease the base market value (detriment).

Chart 2-4



If we combine the information in Chart 2-4, which reflects the estimated maintenance costs, with the maintenance details provided in Table 2-3, we will better understand why Years 2 and 8 in Chart 2-4 show a peak in values of $6,198K and $5,580 respectively. In Year 2, the helicopter will have had significant maintenance in a variety of areas and Year 7 is when engine overhauls occur.

Based on the relationship between the Base and Adjusted Value lines, the recommended period to dispose of N141FA H1 is between years 3 and 5. This is the period when the Adjusted Value is higher than the Base Aircraft line. During this period, the helicopter will be around 15 years old. Year 9 represents another opportunity.

A more complete explanation about the current market is provided in Section 3, Aircraft Acquisition and Timing. The Base Aircraft values displayed in Chart 2-4 are based upon long-term depreciation values and do not necessarily reflect current market values.

Helicopter: Bell 412EP
Serial Number: 36487
Registration Number: N241FA H2

Table 2-4		
ten-year Projection - N241FA H2		
Fuel	$716,006	18%
Lubricants	$21,480	1%
Subtotal	$737,487	18%
Airframe Maintenance		
Labor	$495,990	12%
Parts	$771,821	19%
Inspections	$758,712	19%
Component Overhaul	$139,415	3%
Life Limited Items	$17,387	0%
Subtotal	$2,183,325	55%
Engine Maintenance		
Engine Restoral	$1,066,931	27%
Total	$3,987,743	100%

Chart 2-5

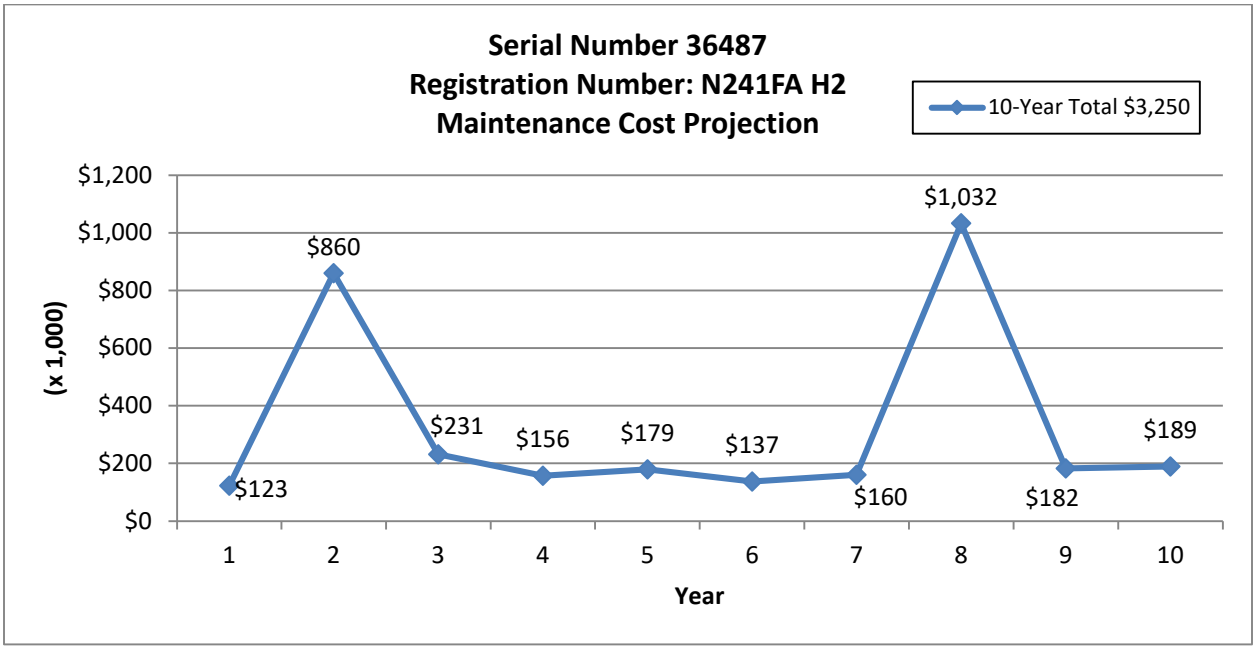
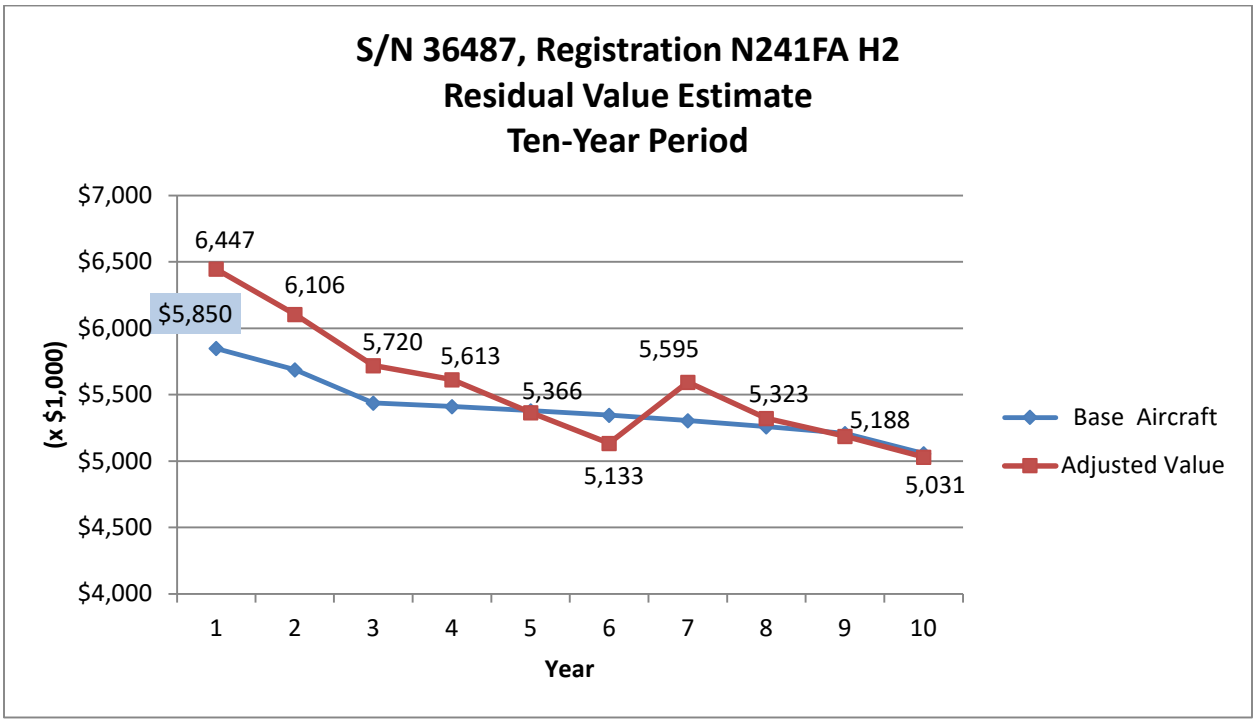


Table 2-5						
Summary of Annual Significant Scheduled Events – N807JS						
Year	**Category**	**Significant Maintenance**	**Estimated Cost (x1,000)**	**Significant Maint. Subtotal (x1,000)**	**Annual Maint. Total (x1,000)**	**Significant Maint. / Annual Total (%)**
2	Inspections	Main Rotor Hub, Combining G'box	$443			
	Engine Restoration	Hot Section	$264			
	Component Overhaul	Several Items	$85	$792	$860	92%
3	Inspections	5000-Hr/5-Year	$107	$107	$231	46%
8	Engine Restoration	C'Box Overhaul	$757			
	Inspections	5000-Hr/5-Year	$134	$891	$1,032	86%

The 412EP has a 5-year/5000-hour inspection. The flat rate is $85,000, which covers the cost to perform the inspection tasks only. During the major inspection process, discrepancies are found. The costs associated with discrepancies can increase the cost of the inspection by significant

amounts. For example, a prior 412EP 5-year/5000-hour inspection of this nature cost OCFA more than $400,000. In our life cycle cost program, we use the flat rate as the cost for this inspection. If we used the total costs to complete the inspection, the current level in year-three would be much higher.

Chart 2-6



The maintenance work performed in year 2 keeps the Adjusted Value in a positive position through Year 5. However, this changes with significant engine maintenance due in Year 8. Year 6 dips below the line because the engines do not have many flight hours prior to hitting the maintenance event.

Helicopter: Bell UH-1H Super Huey
Serial Number: 5610
Registration Number: N441FA H3

Table 2-6		
ten-year Projection - N441FA H3		
Fuel	$658,979	21%
Lubricants	$19,769	1%
Subtotal	$678,749	21%
Airframe Maintenance		
Labor	$221,147	7%
Parts	$212,567	7%

Inspections	$687,840	21%
Component Overhaul	$276,668	9%
Life Limited Items	$406,555	13%
Subtotal	$1,804,777	56%
Engine Maintenance		
Engine Restoral	$718,662	22%
Total	$3,202,188	100%

Chart 2-7

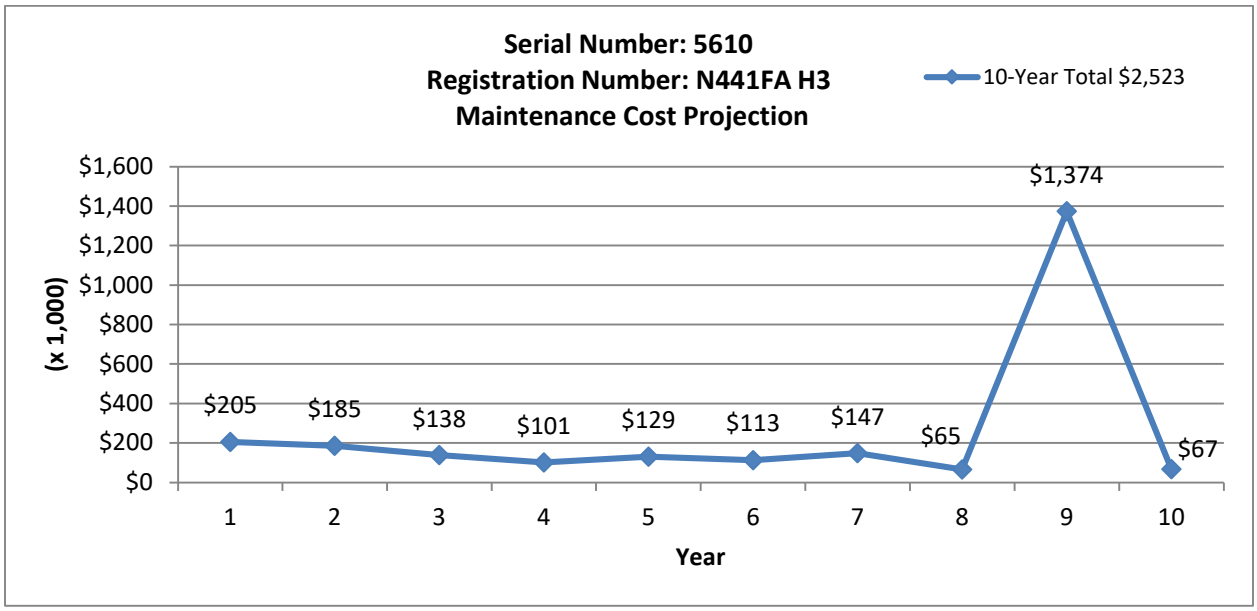
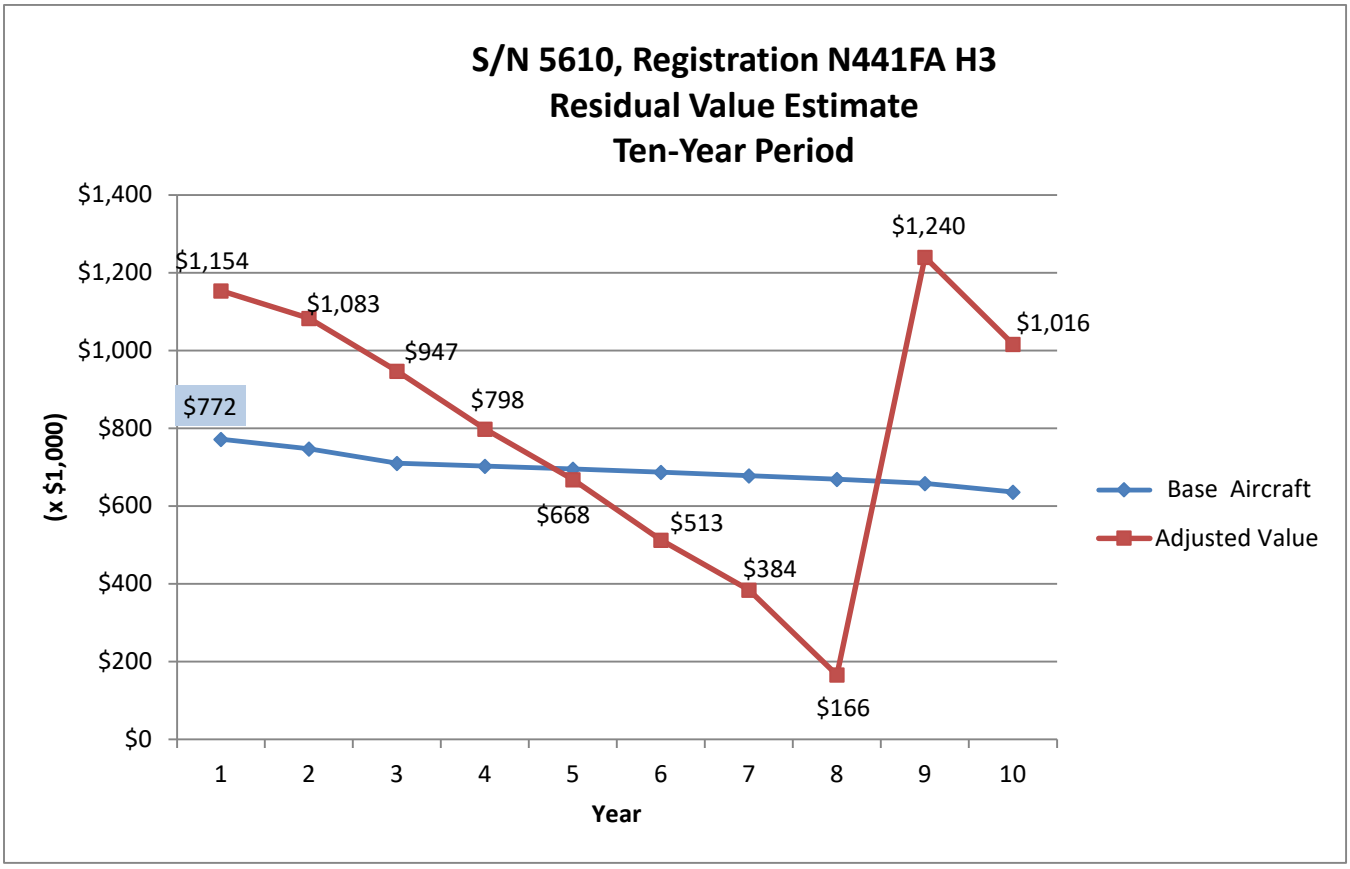


Table 2-7						
Summary of Annual Significant Scheduled Events – N800DM						
Year	**Category**	**Significant Maintenance**	**Estimated Cost (x1,000)**	**Significant Maint. Subtotal (x1,000)**	**Annual Maint. Total (x1,000)**	**Significant Maint. / Annual Total (%)**
9	Inspections	3000-Hr/ten-year	$595			
	Engine Restoration	Engine Overhaul	$621			
	Airframe Life Limited	Several Items	$108	$1,324	$1,374	96%

Chart 2-8



Due to the recent completion of the ten-year inspection, the Adjusted Value remains above the Base Aircraft value through Year 4. The low value in Year 8 is due to the next ten-year inspection and engine overhaul that are due in Year 9. Both maintenance events are significant.

If this Super Huey was brought back into service, then years 1 through 4 would be the best time from a betterment/detriment perspective to dispose of the aircraft. However, there is an additional factor associated with the Super Huey helicopters. These aircraft were acquired through the Federal Excess Property Program by way of CalFire. Ownership remains with these entities. Therefore, a sale value is irrelevant.

Helicopter: Bell UH-1H Super Huey
Serial Number: 8529
Registration Number: N541FA H4

Table 2-8		
ten-year Projection - N541FA H4		
Fuel	$658,979	18%
Lubricants	$19,769	1%
Subtotal	$678,749	18%
Airframe Maintenance		
Labor	$221,147	6%
Parts	$212,567	6%
Inspections	$1,144,473	31%
Component Overhaul	$287,863	8%
Life Limited Items	$465,054	13%
Subtotal	$2,331,103	63%
Engine Maintenance		
Engine Restoral	$691,807	19%
Total	$3,701,659	100%

Chart 2-9

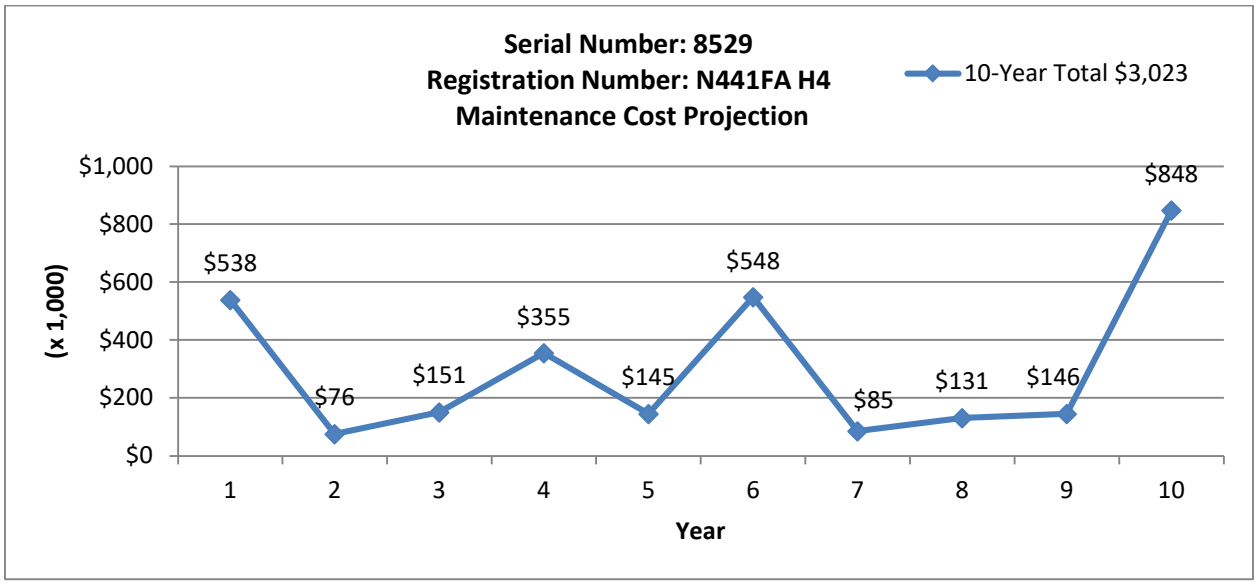
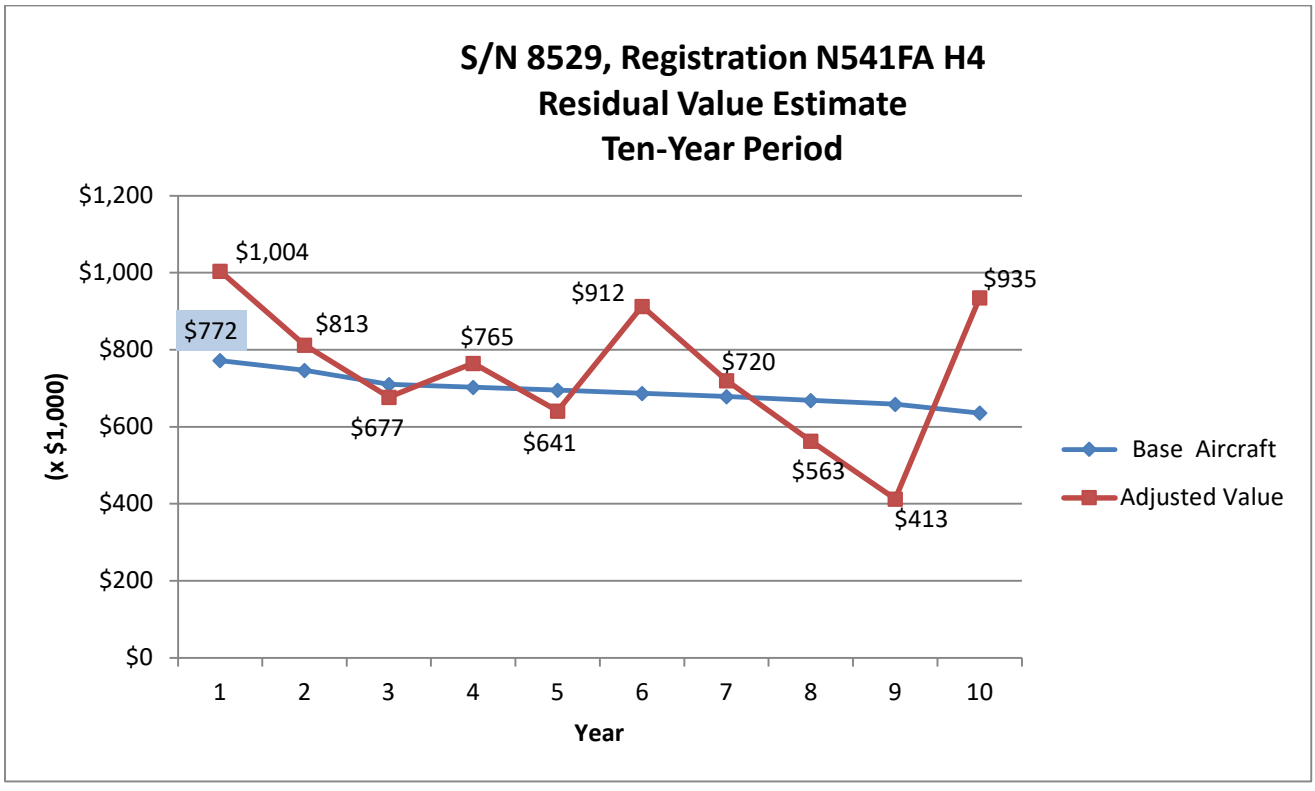


Table 2-9						
Summary of Annual Significant Scheduled Events – N800DM						
Year	**Category**	**Significant Maintenance**	**Estimated Cost (x1,000)**	**Significant Maint. Subtotal (x1,000)**	**Annual Maint. Total (x1,000)**	**Significant Maint. / Annual Total (%)**
1	Inspections	2500-Hr/ten-year	$485	$485	$538	90%
4	Component Overhaul	Mast, Main Rotor Hub, Xmsn, T/R Hub	$150			
	Airframe Life Limited	Several Items	$142	$292	$355	82%
6	Engine Restoration	Overhaul	$468	$468	$548	85%
10	Inspections	2,500-Hr/5-Year	$573			
	Airframe Life Limited	Several Items	$142	$715	$848	84%

Chart 2-10



This helicopter's ten-year inspection is currently due and had been sent to the vendor to perform the maintenance. The September 2020 grounding of the Super Huey helicopters stopped the inspection maintenance. As mentioned with N441FA H3, the program with which OCFA purchased the helicopters, Federal Excess Property Program, makes the proceeds from the disposition of this helicopter irrelevant.

Candidate Helicopters

The purpose of this section is to apply the same life cycle cost analysis that was applied to the OCFA current helicopters, which allows an apples-to-apples comparison between the varying types of helicopters. The candidate helicopters, Bell 412EPX, Sikorsky S-70i, and Coulson-Unical CU-47D, were introduced in Section 1, Fleet Review. For the candidate helicopters, we used the life cycle cost software and based it on the same assumptions as described on Pages 4-5. However, there are some assumptions that will differ and are identified with the respective helicopters.

- Hours per Year – As mentioned, OCFA requested an average of 200 annual flight hours per helicopter. We used the same assumption of 200 flight hours per year per helicopter.
- Fuel Cost – Assumed $2.90 cost per gallon.
- Fuel Consumption – The rate of consumption for each candidate helicopter were the default values in the Life Cycle Cost software. The amount consumed per hour for the:
  - 412EPX: 113 gallons.
  - S-70i: 138 gallons.
  - CU-47D: 392 gallons: The consumption rate represents an average of the different missions the helicopter can perform.
- Labor – The labor costs associated with maintenance are based upon the estimated hours to work on the aircraft, also referred to as "hands-on-time". Not included as "hands-on-time" would be activities such as time-off, meetings, hangar cleaning, and other activities that are not involved with maintaining the helicopter. We used a labor rate of $106 per hour.

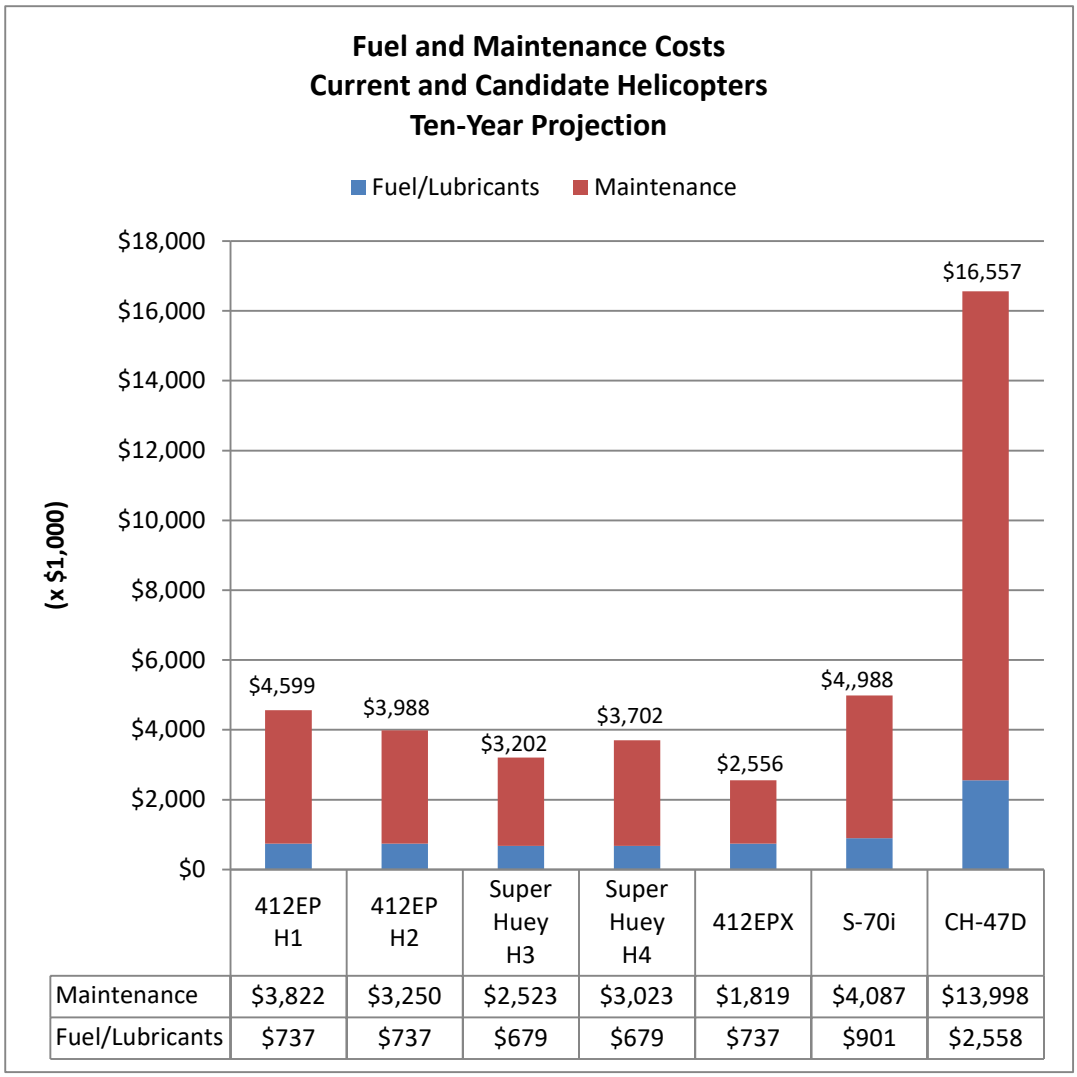
The information provided for each candidate helicopter is the same as the current OCFA helicopters except for one table, which identified the significant scheduled maintenance categories by year. The table and charts provided are:

- A summary table showing the maintenance and fuel costs for the ten-year estimate.
- A line chart showing the estimated annual maintenance costs for the ten-year period.
- A line chart displaying the estimated annual residual value based on the aircraft's age and status of significant maintenance events for the twenty-year period.

Because the table and charts convey the same type of information that was shown for the current helicopters, we did not restate the explanation and meaning as was provided with the 412EP N141FA H1.

Chart 2-11 summarizes the projected fuel and maintenance costs for the current and candidate helicopters over a ten-year period. The chart requires some comments that will provide a more complete picture of the comparisons.

Chart 2-11



	412EP H1	412EP H2	Super Huey H3	Super Huey H4	412EPX	S-70i	CH-47D
Maintenance	$3,822	$3,250	$2,523	$3,023	$1,819	$4,087	$13,998
Fuel/Lubricants	$737	$737	$679	$679	$737	$901	$2,558

New vs Used Aircraft – Each of the current helicopters have been operating for several years and in the case of the UH-1H Super Huey helicopters, more than several. Two of the candidate helicopters are new, the 412EPX and S-70i. Why is this important to understand? The 412EPX and S-70i are just starting their life cycle as it relates to maintenance. The current helicopters are in a different older segment of their life cycles and have encountered certain scheduled maintenance events that a new helicopter has not. Due to the difference in the life cycles, the current helicopters will more than likely cost more to maintain and not only due to scheduled maintenance, but also unscheduled maintenance associated with an aging helicopter.

Using the 412 helicopters as an example in Chart 2-11. The 412EP helicopters cost more to operate than the proposed 412EPX. After ten years, the 412EPX will have only flown 2,000 hours, based upon the 200-flight-hour-per-year assumption. The 412EPX will not have encountered most of the scheduled events that are measured by flight-hour activity. The difference is more than $2 million.

Helicopter Types – Historically, OCFA has used Type II helicopters for firefighting. OCFA is now analyzing Type I helicopters, the S-70i and CU-47D. It is important to realize that with the ability to drop more water, maintenance cost will also increase due to the use of a larger helicopter. While costs, acquisition and operation, are certainly important, other measurements are important to bridge the difference between Type I and II helicopters.

Bell Flight

412EPX

The EPX is very similar to the EPI, the predecessor to the EPX. The significant changes between the helicopters involved performance. The technology Subaru brought to the project improved the main gearboxes, which allowed an increase in mast torque, which led to an increase for internal and external maximum weights. However, what is not known as clear is the effects the performance changes will have on maintenance costs. While there will be a change, it will more than likely not be significant. Therefore, we chose to use a new EPI for the cost information in Table 2-10.

Table 2-10		
Ten-Year Projection - 412EPX		
Fuel	$716,006	28%
Lubricants	$21,480	1%
Subtotal	$737,487	29%
Airframe Maintenance		
Labor	$641,544	25%
Parts	$690,813	27%
Inspections	$463,398	18%
Component Overhaul	$23,155	1%
Life Limited Items	$0	0%
Subtotal	$1,818,910	71%
Engine Maintenance		
Engine Restoral	$0	0%
Total	$2,556,396	100%

Chart 2-12

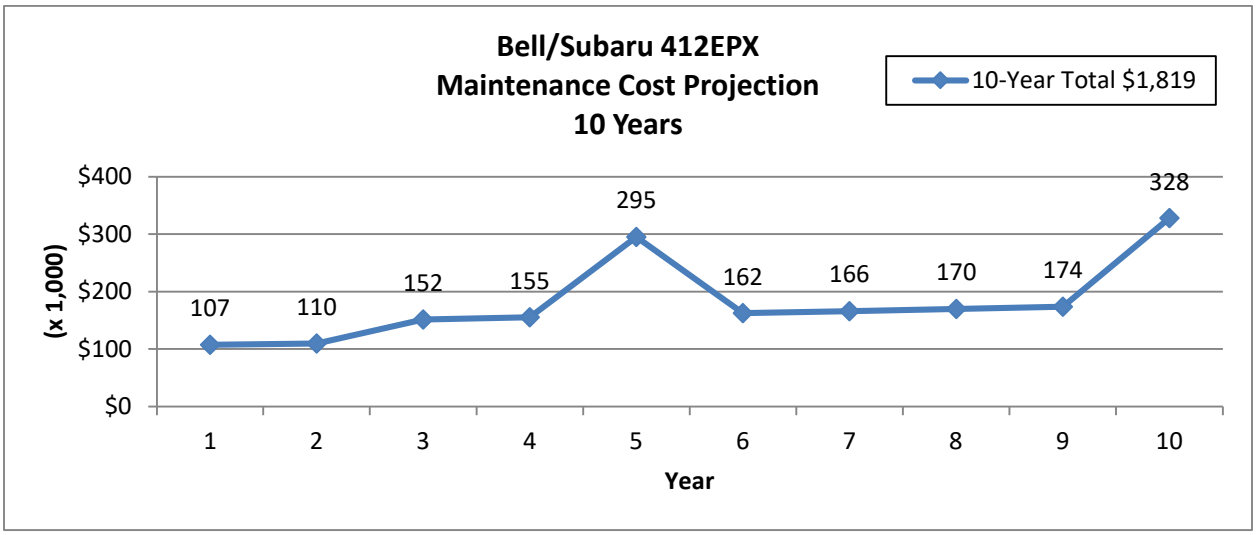
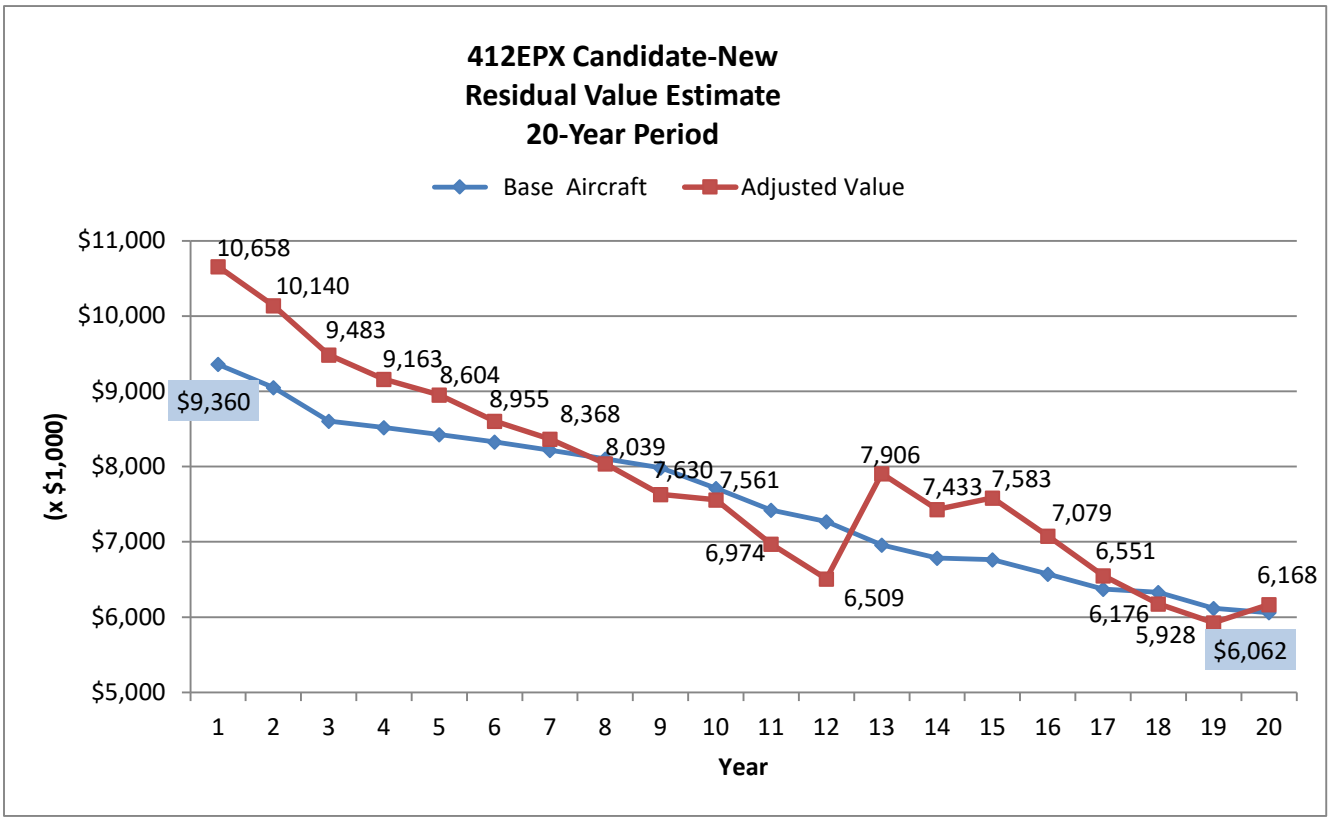


Chart 2-13



For the candidate helicopters, 412EPX and S-70i, we showed a 20-year projection for the residual value estimate. We did so because these helicopters are at the beginning of their life cycle and OCFA is likely to operate these helicopters longer than a ten-year period, which was for the current OCFA helicopters. The CU-47D residual value estimate is discussed with that helicopter's table and other information (see pages 23 and 24).

The residual value for the 412EPX is based upon an estimate for a helicopter without mission equipment, a basic configured helicopter. If we had used a mission-ready version of the 412EPX, the Base Aircraft Value would be higher as well as the Adjusted Value. During the 20 years of operation and based upon the annual flight hours of 200, years 8 through 12 and 18 through 20 are the periods when the Adjusted Value drops below the Base Aircraft values.

Sikorsky Helicopters

S-70i

Table 2-11		
Ten-Year Projection - S-70i		
Fuel	$874,415	18%
Lubricants	$26,232	1%
Subtotal	$900,647	18%
Airframe Maintenance		
Labor	$1,076,959	22%
Parts	$1,585,206	32%
Inspections	$700,999	14%
Component Overhaul	$76,266	2%
Life Limited Items	$1,500	0%
Subtotal	$3,440,931	69%
Engine Maintenance		
Engine Restoral	$646,548	13%
Total	$4,988,126	100%

Chart 2-14

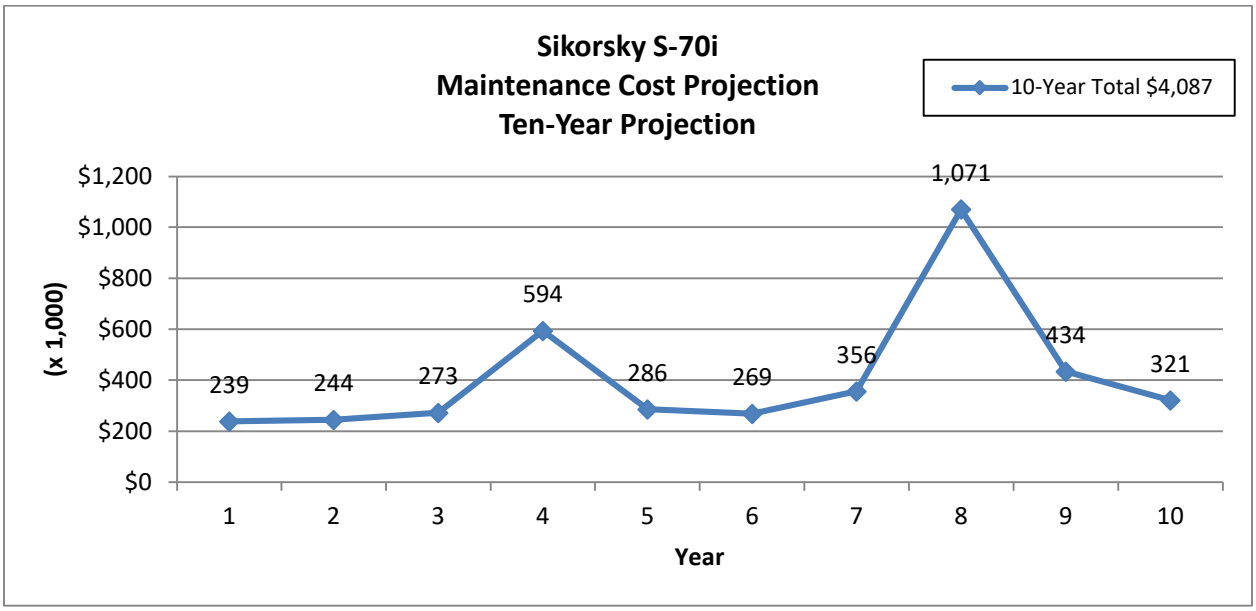
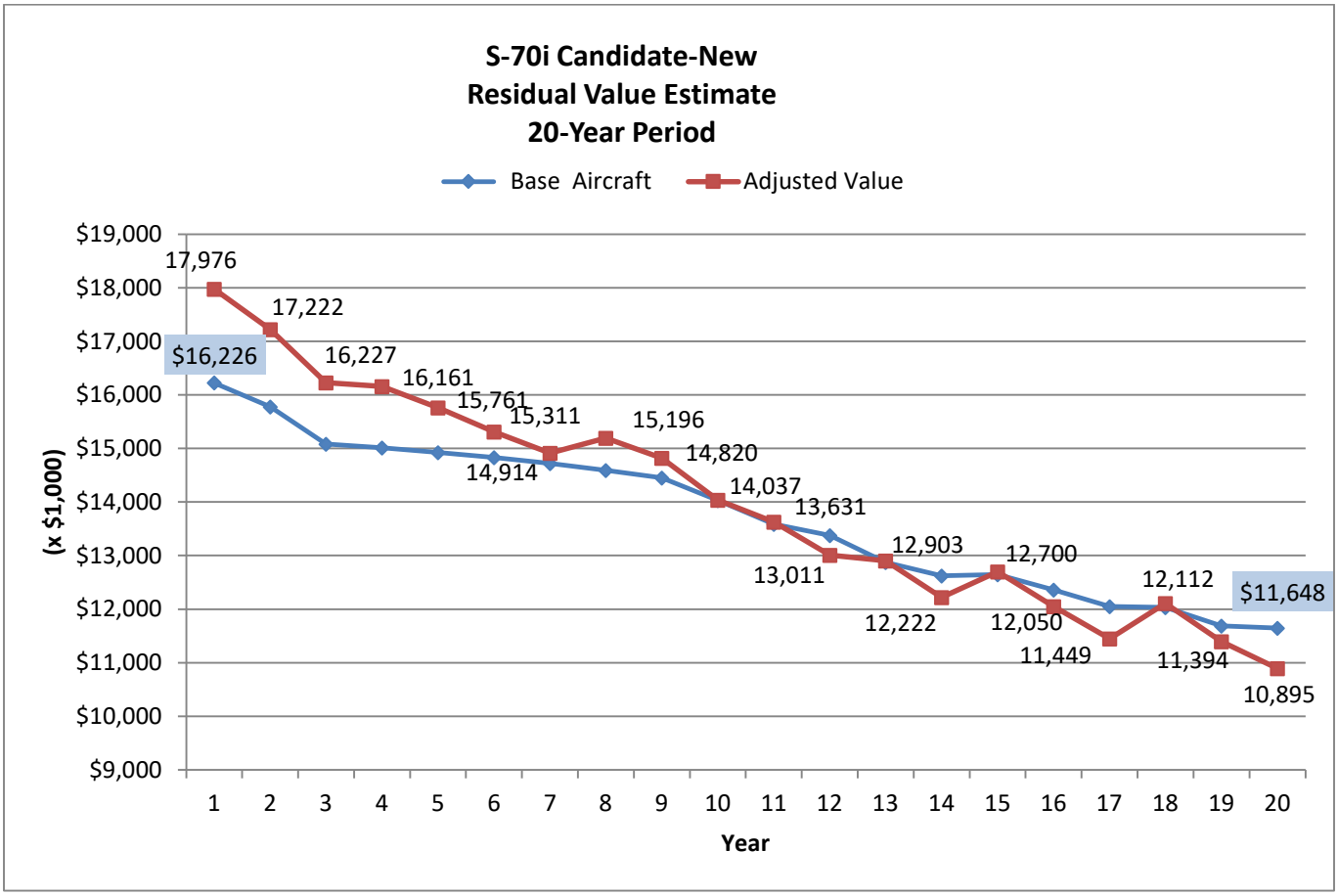


Chart 2-15



The Adjusted Value estimate for the S-70i follows the Basic Aircraft estimate throughout the 20-year period. The years when the Adjusted Value are more than the Base Aircraft value are not much higher than the Base Aircraft value. The exception to that are the early years, one through six, when the difference between the values is more significant. Also, when the Adjusted Value drops below the Base Aircraft, the difference is not significant, except for year 20 when there is an almost a $1.0 million difference.

Coulson/Unical
CH-47D

The Coulson-Unical proposal to OCFA is different in scope than what Bell and Sikorsky are proposing, which causes the cost information to be presented differently. In short, Coulson-Unical is not only offering to sell the CU-47D helicopter, but the organization is also offering a "turnkey" solution for operating and maintaining the helicopter. Based on the different approach, we are not able to show the Maintenance Cost Projection and Residual Value Estimate charts. However, the following information should provide OCFA with information that will allow comparisons to the current and other candidate helicopters.

Table 2-12		
Ten-Year Projection - CU-47D		
Fuel	$2,483,845	3%
Lubricants	$74,515	0%
Subtotal	$2,558,361	3%
Airframe Maintenance		
Hourly Maintenance Program	$13,206,718	16%
Parts not Covered by Program	$791,473	1%
Management Services	$65,579,152	80%
Component Overhaul	N/A	---
Life Limited Items	N/A	---
Subtotal	$79,577,343	97%
Engine Maintenance		
Engine Restoral	$0	0%
Total	$82,135,703	100%

Table 2-12 is similar to the prior tables for the current and candidate helicopters. The following information will explain the categories with an emphasis on the ones that are different.

- Fuel and Lubricants – The process to calculate the fuel and lubricants is the same as what was used for the other current and candidate helicopters. Fuel is calculated based on an

average fuel consumption rate per hour times a fuel cost of $2.90 per gallon. Lubricants (e.g. oil, hydraulic fluids) are calculated based upon the hourly fuel cost times three percent.

- Hourly Maintenance Program – For the current and candidate helicopters, we used Conklin & de Decker's *Life Cycle Cost v20.1* program to estimate the maintenance costs. Using the program, shows the behavior of the maintenance costs on an annual basis. An alternative to incurring maintenance expenses as they occur is an hourly maintenance program. Referred to with several terms (e.g. guaranteed maintenance program, power-by-the-hour), Coulson-Unical offered an hourly maintenance program.

  The cost-per-hour offered was $5,500. The systems that would be covered by the program would be major dynamic components, which includes main rotor blades, engines, transmissions, and drive shafts. The hourly cost would increase by four percent annually during the ten-year period.
- Parts not covered by Maintenance Program – The hourly maintenance program covers just the type of systems mentioned. The program will not cover parts and components such as small parts, rotable components, oils, and instruments. These items will be paid for as incurred.

  The cost per hour for these parts is estimated to be $350 in the first year. We applied an annual inflation rate of 2.7 for subsequent years. This is the same inflation rate used in the *Life Cycle Cost v.20.1* program.
- Management Services – Coulson-Unical also proposed providing all services to operate the CU-47D helicopter. The management program would include:
  - Personnel such as pilots, maintenance technicians, and mission crews.
  - Services to cover 24 hours a day, seven days a week.
  - Support employees for operational equipment such as fuel tank and support truck.

  The annual cost for the operating services would be $5.8 million. We applied an annual inflation rate of 2.7 percent for the management fees during the ten-year period.

  The $65.6 million for the ten-year period is included since part of the costs included relate to maintenance labor. However, other categories such as salaries for personnel other than maintenance, insurance, management charge, and ground support are also included in this amount.
- Component Overhaul, Life Limited Items and Engine Restoral – These categories of cost are not applicable based upon the hourly maintenance program and the estimates for the parts that are not covered by the program.

Section 3 – Resale Value and Lead Time

Orange County Fire Authority Original Request

Research the resale value of the current fleet and lead time for the new helicopters.

Conklin & de Decker Approach

Conklin & de Decker gathered information in the following areas to better understand the current market.

- New helicopter availability.
- Estimated completion time for mission-ready helicopters.
- Acquisition costs.
- Resale value for current OCFA helicopters.
- Market activity for used helicopters.

Due to the nature of the information of interest, the summary section will also serve as the Conklin & de Decker Analysis section.

Summary

Table 3-1 summarizes the requested information for the current and candidate helicopters. Additional explanations support the table information.

Table 3-1

Resale, Acquisition Cost, and Lead Time

Helicopter Type	Resale Value (x 1 million)	Disposition Time	Acquisition Cost (x 1 million)	Basic Aircraft Delivery	Completion Estimate
UH-1H Super Huey	N/A	Immediate	N/A	N/A	N/A
412EP	$3.5 - $4.3	Year or more	N/A	N/A	N/A
412EPX	N/A	N/A	$14 - $15	1-6 months	6 months
S-70i	N/A	N/A	$20 - $23	24 months	6-8 months
CH-47D	N/A	N/A	$16.5	Jun-2021	Jun-2021

UH-1H Super Huey:

- Resale Value: There are two important elements that are relevant for both Super Hueys. The first is related to the resale value of the helicopters. Based on how the helicopters were obtained, through the Federal Excess Personal Property (FEPP) program, the opportunity for

receiving resale value is eliminated. Technically, the helicopters are still owned by the federal government with CAL FIRE serving as the conduit to OCFA.

- Disposition Time: The second important element, should OCFA decide to retire the Super Huey helicopters, is OCFA can remove them from its fleet quickly. CAL FIRE has reached out to OCFA indicating that other government agencies have expressed an interest in operating them.
- Acquisition Cost, Purchase Availability, Time to Complete: These items are not applicable to the Super Huey helicopters as these aircraft will be departing from the aviation unit.

Bell 412EP:

- Resale Value: Unlike the Super Hueys, the Bell 412EP helicopters do have resale values. There are several factors that can influence a helicopter's resale value. The most influential factors include the age of the helicopter, both in years and flight hours, status of the economy, time-remaining status on significant scheduled components and parts, available inventory in the market, and the presence of buyers. Several sources in the industry agree that the current resale market is a difficult market due to the factors already mentioned and a few more. The effect of these factors means that aircraft values will likely be lower than estimated and will take longer to sell.

  Based on HeliValue$'s, *The Official Helicopter Blue Book*, the estimated resale value for OCFA's 412EP helicopters range from $3.5 to $4.3 million. HeliValue$'s estimates are based primarily on the time remaining for significant airframe and engine overhauled components, life-limited items, and major inspections. Simply stated, resale values decrease as remaining times on the assets decrease. As mentioned previously, other current factors will likely reduce the range of the resale values.
- Disposition Time: The length of time to sell a 412EP in the market as reported by AMSTAT, an industry research company, is a year or more. Manufacturers are another source for selling the helicopter when the used helicopter is part of the purchase of a new helicopter. Currently, and based on Section 2 of this report, OCFA has a current five-year period where the adjusted value of the helicopters is higher than the basic value.

Bell 412EPX:

- Acquisition Cost: The estimated purchase price to obtain a mission-ready helicopter can vary based upon the requirements of OCFA such as actual mission equipment, avionics, and the interior arrangement. The acquisition price can also be affected if there is competition as to which helicopters OCFA is considering. The purchase price for A 412EPX that meets OCFA's requirements will range from $14.0 to $15.0 million.
- Basic Aircraft Delivery: When is the next basic helicopter available for acquisition from the provider of the helicopter (e.g. manufacturer)? This timeline does not include the completion process. As of January 2021, Bell can deliver a 412EPX in one to six months.

- Completion Estimate: Once the acquisition of the basic aircraft has occurred, how long will it take to complete the helicopter for its intended missions? As of January 2021, Bell estimated the time to complete the helicopter was six months.

Sikorsky S-70i:

- Acquisition Cost: The estimated purchase price for a mission-ready S-70i is $20.0 to $23.0 million due to different installations of mission equipment and systems not on the basic-configured aircraft.
- Basic Aircraft Delivery: Sikorsky's standard lead time is 24 months. However, the manufacturer has flexibility as it also produces spec aircraft. As of January 2021, Sikorsky had two spec aircraft that would be ready for delivery before the end of 2021. Additional spec aircraft will be available in 2022. All of these aircraft would be delivered as a basic configured aircraft.
- Completion Estimate: Sikorsky uses United Rotorcraft to complete its S-70i helicopters. As of January 2021, the estimated completion period was six to eight months.

Coulson-Unical CU-47D:

- Acquisition Cost: The acquisition price for the CU-47D as a mission-ready helicopter is $16.5 million.
- Basic Aircraft Delivery: OCFA is currently leasing a CU-47D from Coulson-Unical. The lease will end in June 2021. The same CU-47D will be available for acquisition on June 15, 2021.
- Completion Estimate: The completion date is the same as the basic aircraft delivery date.

Section 4 – Fleet Replacement Plan

Orange County Fire Authority Original Request

Suggest replacement plan for existing fleet.

Conklin & de Decker Approach

Conklin & de Decker created a fleet replacement plan for OCFA and its aviation department. First, we produced a ten-year benchmark estimate based upon retention of the current fleet. Next, we considered changes to the fleet by incorporating new aircraft. The emphasis of the aviation unit and OCFA was the firefighting mission and the desire to increase its water drop capacity. Therefore, its analysis incorporated the possibility of helicopter type changes.

The structure of this section is the same as prior sections and contains a summary of the analysis and the analysis by Conklin & de Decker.

Summary

Conklin & de Decker has outlined an approach that OCFA may want to consider as it updates its fleet of helicopters. Table 4-1 offers a summary of the steps that would update the OCFA fleet and address the primary objective of improving the volume of water dropped while fighting fires. In addition to providing the future costs of the existing fleet, should OCFA not make any changes, we have suggested four steps to consider.

- Retain the Current Fleet - Although retaining the current fleet is not likely, it serves as a benchmark when compared to the changes that may occur as suggested by the four steps. Based upon the life cycle cost assumptions stated in Section 2 Life Cycle Cost Projections, we projected the estimated fuel and maintenance costs for the next ten years for an unchanged fleet.
- Change the Current Fleet –
    - Step 1: Retire the UH-1H helicopters. There are three primary reasons for retiring these helicopters.
        - Age (over 50 years),
        - Increased costs due to limited military spares, and
        - Reduced availability.

      An additional factor to consider is the level of risk between single-engine and dual-engine helicopters while hovering.

- Step 2: Acquire Bell 412EPX. If the OCFA desires to continue having two helicopters available for each day of the year, a third helicopter is required. Acquiring a 412EPX, also improves the amount of water dropped for firefighting when compared to the 412EP helicopters.
- Step 3: Acquire a Type I helicopter. The candidate helicopters will meet the OCFA objective to increase the amount of water delivered during the firefighting mission. Based on our research and comparing the two Type I helicopters,
  - An S-70i will cost less to operate, which is expected since the CU-47D can deliver more water to the fire.
  - The acquisition price for the CU-47D is less than the S-70i.
  - Delivery of a mission-ready helicopter ranges from 14 to 32 months for the S70i and June 2021 for the CU-47D. Section 3 of the report provides more information on the S-70i and the options that reduce the delivery range.
  - Coulson-Unical is offering a turnkey service to operate and support the CU-47D. The estimated price for over a ten-year period is $65.6 million.
- Step 4: Consider acquiring a second Type I helicopter and if so, retire a 412EP.
  - Significant scheduled maintenance events will affect a helicopter's availability. If delivering larger amounts of water is a priority, there will be times when OCFA will not have a Type I helicopter available to perform the mission. OCFA needs to determine the significance of this risk and if a second Type I helicopter is required for adequate coverage.
  - If OCFA does acquire a second Type I helicopter, the opportunity exists to retire one of the 412EP helicopters.

Table 4-1 summarizes the steps slightly differently.

- If the current fleet is retained, then the only relevant costs are the operating costs. The amount shown represents the estimated maintenance and fuel costs during a ten-year period for the four helicopters.
- Steps 1 and 2 involve transactions rather than retaining the current fleet. The total for these steps is what the operating costs would be for two 412EP helicopters and one 412EPX during the same period. The estimated purchase price of the 412EPX is provided.
- Step 3 is the acquisition of a Type I helicopter. In addition to the ten-year period for operating costs, each candidate helicopter has the acquisition cost. Management services is unique to the CU-47D and represents the costs associated with operational and support services. The operational costs of the remaining 412EP and EPX helicopters are not included.
- Step 4 is the same as Step 3 except for the suggested retirement of one of the 412EP helicopters. In Step, 4 we included the operational costs of the two remaining 412 helicopters. The disposition amount relates to the 412EP that would be retired and is the range of resale amount.

Table 4-1					
OCFA - Summary of Fleet Options					
Dollar amounts x 1 Million					
Option	**Operating Cost**	**Disposition Amount**	**Purchase**	**Total**	**Management Service**
Retain Current Fleet	$15.5	Not Applicable	Not Applicable	$15.5	Not Applicable
Steps 1 and 2: Retire UH-1Hs/Acquire 412EPX					
Two 412EP/One 412EPX	$11.1	$0.0	$14.0-$15.0	$25.1-$27.1	Not Applicable
Step 3: Acquire Type I Helicopter					
S-70i	$7.0	Not Applicable	$20.0-$23.0	$27.0-$30.0	Not Applicable
CU-47D	$16.6	Not Applicable	$16.5	$33.1	$65.6
Step 4: Acquire second Type I Helicopter/ Retire one 412EP					
One 412EP/One 412EPX	$5.8	($3.5-$4.3)	Not Applicable	$9.5-$10.1	Not Applicable
S-70i	$7.0	Not Applicable	$20.0-$23.0	$27.0-$30.0	Not Applicable
CU-47D	$16.6	Not Applicable	$16.5	$33.1	$65.6

Conklin & de Decker Analysis

OCFA currently has four aircraft in its fleet, two UH-1H Super Huey and two 412EP helicopters. The variety of missions the department is equipped and trained to perform include wild land firefighting, which includes ground crew and supply transportation and water dropping capabilities; assistance during structure and wild land fires with command and control, and exposure protection; rescues that include vehicles, animals, and humans in a wide variety of settings such as water, rough terrain, and limited light.

The wide variety of missions requires that the current helicopters carry a variety of specialized equipment, including rescue hoist, fixed tank for dispensing fire retardant, Spectro-Lab searchlight, rescue harness, cargo hook, and paramedic equipment. In addition to the equipment, the helicopters carry personnel on certain missions, which also require additional cabin space and useful load.

The current OCFA fleet can perform its various missions. However, when it performs its primary mission of firefighting, the overall objective is to deliver more water over a given period of time. OCFA would like to move into a category of helicopter that will allow it to deliver more water per drop than it can

currently. While performing its rescue mission, it is important to use a helicopter that can perform the mission efficiently from a cost perspective.

The scope of the analysis limits our effort to summarizing the costs associated with adding a larger category helicopter to the OCFA, rather than justifying its need.

Retain Current Fleet

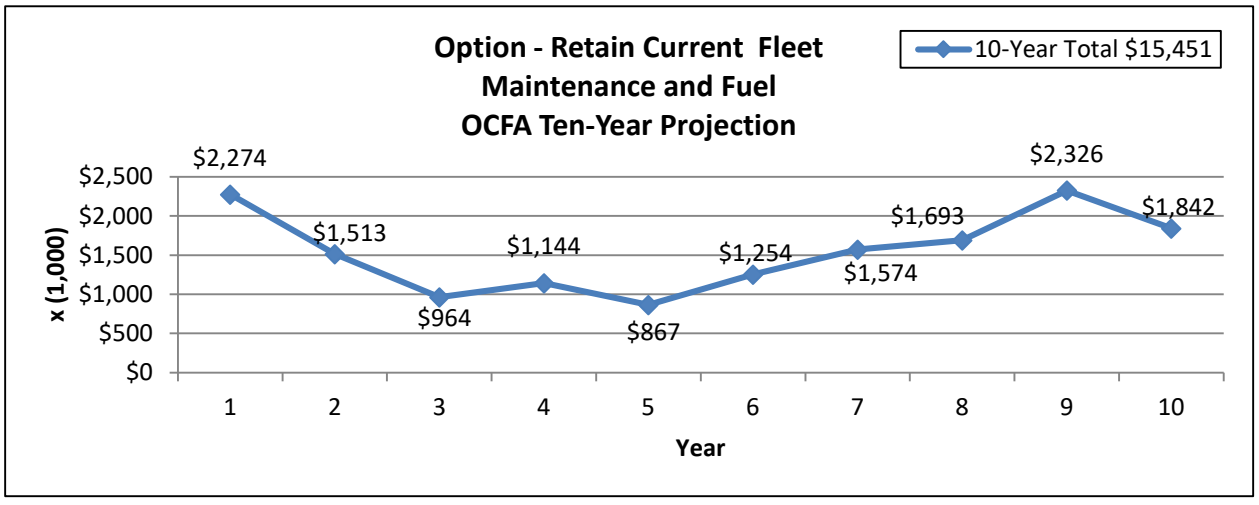
Although retaining the current fleet is not likely, due to the September 2020 grounding, it serves as a benchmark when compared to the other possible alternatives. Based upon the life cycle cost assumptions stated in Section 2 Life Cycle Cost Estimates (pages 4 and 5), we projected the estimated fuel and maintenance costs for the next ten years for the Super Huey and 412EP helicopters.

Key assumptions included the annual flight hours at 200 per helicopter, which is based on the projected hours for the current year, fuel rate per gallon of $2.90, annual inflation between 1.95 and 2.7 percent, labor that includes technicians' hands-on time, and the remaining lives for the significant scheduled maintenance events and items for the respective helicopters.

Chart 4-1 combines the annual estimated fuel and maintenance costs for the four helicopters. For example, the fleet's cost in Year 1 is an estimated $2.274 million. The helicopters contributing to high costs are H1 and H4, both are encountering significant inspections and other scheduled maintenance. Refer to Section 2 for the individual helicopter's maintenance events. The most expensive year for the current fleet is Year 9.

During the ten-year period, the total costs expended on fuel and maintenance would be $15.5 million. Under this scenario, there would not be any acquisition costs for new helicopters or receipts for the retirement of the exiting helicopters.

Chart 4-1



Change the Current Fleet?

This section of the report is our recommendations as to how and when OCFA can update its fleet to accomplish two primary objectives.

- Improve its firefighting effectiveness by increasing the volume of water dropped and
- Continue its rescue missions.

Our recommendation is based upon our analysis in this report. However, we emphasize this is just a recommendation that OCFA can adjust.

- **Step 1:** Retire the UH-1H Super Hueys.
  - These helicopters are over 50 years old. While it is true that with the proper maintenance, helicopters have an infinite life, they do so with increasing costs, both labor and parts. Less obvious is the aging effect on a helicopter's availability for operations. The recent experience with N451FA H3 and its 10-year inspection illustrates these effects of an aging helicopter. The inspection cost over $400,000, the length of time to complete the inspection was over a year (16 months), and when placed back into service, the helicopter was still not available for operations due to its questionable performance.
  - The availability of UH-1H spare parts directly from the military is no longer available. The federal logistic program that released military spares for this type of helicopter no longer has that inventory. While spares can be obtained from other sources in the industry, the pricing is higher. When the federal logistics program was active with these spares, OCFA paid a lower price because the transactions were directly with the military. What used to be full shelves in the aviation unit's inventory are now empty.
  - The UH-1H helicopters are single-engine, which raises a concern about safety. The issue of safety is not that single-engine helicopters experience engine failures more frequently than twin-engine helicopters. The issue is when and if an engine failure occurs in a single-engine helicopter, the situation involves more risk. For example, a helicopter will hover over water when it is filling up the water tank. If engine failure occurs during this phase of flight with a single-engine helicopter, then landing in the water is imminent. A helicopter with a second engine reduces this risk. Single-engine helicopters are still used broadly in the firefighting missions. The impediment from making the transition to a dual-engine helicopter is frequently the more expensive acquisition and operating costs.
  - Before disposing of the UH-1Hs, it is important to acknowledge that the UH-1H helicopters are used for pilot training. Referring to Chart 1-2 in Section 1 of the report, the highest amount of flight hours between the years of 2016 and 2020 were training

hours for pilots. Training consumed 46 percent of the total flight hours. Initial pilot training will now be performed by the 412 helicopters.

- **Step 2**: Acquire a Bell 412EPX.
  - OCFA provides services 365 days in the year. Each day, there are two helicopters available for call. One is staffed to be available 24 hours a day for fire and rescue calls. The second helicopter is staffed for 10-hours a day, primarily for fire calls. Based on these requirements, both 412EP helicopters will be required to be available. Due to scheduled inspections (e.g. 5-year inspection) and unpredictable unscheduled maintenance, it is necessary to have a third helicopter to ensure the required availability.
  - The 412EPX can also contribute to a firefighting mission. Despite its Type II category, the 412EPX, due to Subaru and Bell efforts, can drop more water than the 412EP helicopters. At the start of a 1.5-hour mission with 20-minute reserves, the 412EPX can carry 62 percent, or 130 gallons, more than the 412EP.
  - Placing a 412EPX in service will take 7 to 12 months. Receiving the basic helicopter is an estimated 1 to 6 months, while the completion process is another 6 months.
  - Retain the existing 412EP helicopters. These helicopters are 12 years old. They are relatively young, in age and flight hours, but both will encounter 2,500-hour inspections as well as 2,500-hour components for overhaul and life limited items in the next two to three years. According to the residual value analysis in Section 2, years three through five and seven through nine are better periods of time to retire the helicopters if that is OCFA's desire.
  - Based on the historical annual flight hours for the aviation unit (500 to 600), three helicopters should provide adequate availability for OCFA to perform its missions. The addition of a Type I helicopter to the fleet would reduce the annual flight hours of the 412 helicopters, which could accelerate the retirement of one of the 412EP helicopters sooner than planned.

Steps 1 and 2 address the retirement of the two Super Huey helicopters and place the aviation unit in position to perform the missions that it has performed in the last several years by acquiring a 412EPX. Table 4-2 summarizes the costs associated with these steps.

Table 4-2				
Summary of Program costs (Ten-Year Period)				
Retire UH-1H Super Hueys, Purchase 412EPX				
Aircraft	**Operating Cost**	**Disposition Amount**	**Purchase**	**Total**
	(x 1 Million)			
UH-1H	$0	$0	N/A	$0
412EP	$8.5	N/A	N/A	$8.5
412EPX	$2.6	N/A	$14.0-$15.0	$16.6-$17.6
Total	$11.1	$0	$14.0-$15.0	$25.1-$27.1

Notes:

- **Operating Cost: Consists of fuel and maintenance. Based on Conklin & de Decker's Life Cycle Cost program and 200 flight hours per year per helicopter.**
- **Disposition Amount: Retirement of UH-1H does not have resale value due to the FEPP program.**
- **Purchase: Estimated range of completed helicopter.**

- **Step 3**: Acquire Type I helicopter to meet increased water drop objective.
  - OCFA has expressed its desire to increase the amount of water that its helicopters can drop to fight fires more effectively. To meet the intended increase, OCFA will have to move from a Type II to Type I helicopter. The two candidate helicopters that we analyzed, S-70i and CU-47D, have water tank capacities of 1,000 and 3,000 gallons, respectively.
  - The S-70i and its earlier version, the UH-60A have become the helicopter of choice for aerial firefighting. The acquisition price for a mission-ready S-70i helicopter can range from $20 to $23 million. The maintenance and fuel costs are provided in Table 4-3 and summarize two options. The standard availability to acquire is 24 months, but there are spec helicopters available that can reduce the period to 9 to 15 months. Completion is an additional 6 to 8 months. Its average water drop is estimated to be 890 gallons at sea level and ISA. This average amount will decline based on hotter temperatures and higher altitude.
  - Coulson-Unical offers a different approach to OCFA. While the purchase price is straightforward at $16.5 million, the operational proposal is a turnkey operation. At an annual rate of $5.8 million, Coulson-Unical will provide the pilots, technicians, and ground support. With inflation, the ten-year total cost is $65.6 million. The ten-year fuel and maintenance costs are estimated to be $16.6 million. The availability for purchase and operation is June 2021. The average water drop is estimated to be 2,740 gallons at sea level and ISA. This average amount will decline based on hotter temperatures and higher altitude.

Table 4-3 summarizes the additional cost that would be involved with acquiring one of the Type I helicopters.

Table 4-3					
Summary of Program Costs (Ten-Year Period)					
Purchase Type I Helicopter - S-70i or CU-47D					
	(x 1 Million)				
Aircraft	**Operating Cost**	**Disposition Amount**	**Purchase**	**Total**	**Management Service**
S-70i (w/o hrly. programs)	$5.0	N/A	$20.0-$23.0	$25.0-$28.0	N/A
S-70i (with hrly. programs)	$7.0	N/A	$20.0-$23.0	$27.0-$30.0	N/A
CU-47D	$16.6	N/A	$16.5	$33.1	$65.6

Notes:

- **Operating Costs:**
  - **S-70i: $5.0 million is based upon Conklin & de Decker *Life Cycle Cost* program over a 10-year period with 200 flight-hours per year. The costs include fuel and maintenance. The maintenance costs are based upon the estimated scheduled and unscheduled costs that would occur during the 10-year period. If OCFA chose to enroll in Sikorsky's Total Assurance Plan (TAP) and the GE program, the estimated cost during the ten-year period and assuming four percent increase each year is $7.0 million. The first-year cost would be an estimated $2,900 per flight hour.**
  - **CU-47D: Coulson-Unical provided a hybrid for its maintenance costs. The major dynamic components are covered by a flight hour program, whose first rate is $5,500 with four percent annual increase. Items not covered by the program are the responsibility of OCFA. Both types of costs are represented in the Operating Cost category.**
- **Total:**
  - **We placed the Total column in its position, so we could have an apples-to-apples comparison regarding the maintenance and fuel costs, during the ten-year period, and the acquisition costs.**
- **Management Services:**
  - **CU-47D: Coulson-Unical offered turnkey operation, which is described in Section 2 of the report. Basically, they are offering to take care of the operation of the helicopter and the support material that is needed during firefighting missions. We placed this category of cost in the last column since it is a relevant but unique cost associated with the CU-47D.**

- **Step 4**: Acquire second Type 1 helicopter for availability.
  - The primary desire of OCFA is to increase its water dropping capabilities while fighting fires. The Type I candidates certainly provide that increase. But as is the case with all helicopters, they require maintenance frequently due to scheduled and unscheduled events. Maintenance affects a helicopter and its availability for flight operations. By combining the primary objective regarding firefighting and the reality of frequent maintenance affecting availability, OCFA may want to consider having two Type I

helicopters. Two helicopters will reduce the risk of having a fire and not having a Type I helicopter available.

- If OCFA chose to have two Type I helicopters, the possibility exists that the 412 series of helicopters could be reduced to two helicopters. The Type I helicopters could assist when or if a 412 is not available to perform the daily on-call missions.
- We do not suggest making this move until the effects of Step 1 and 2 have been in place for a period. OCFA can make a more informed decision at that time.

Section 5 - Other Information

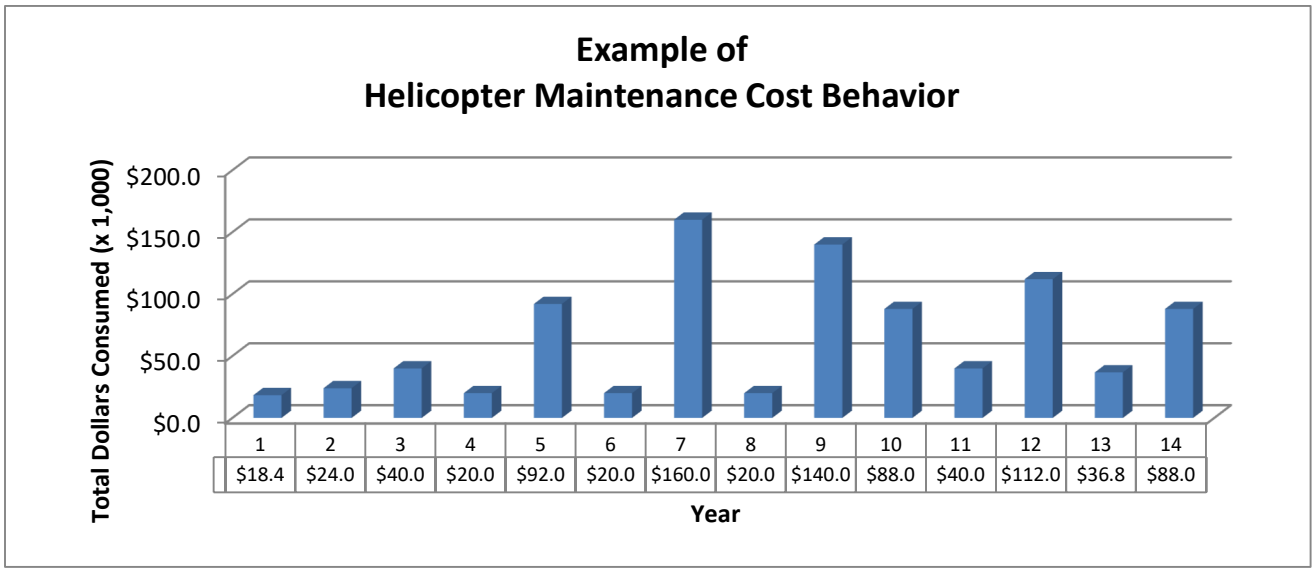
Section 5 contains information that fell outside of the scope of the Request for Proposal but caught our attention during our research and analysis.

Guaranteed Maintenance Programs

The term Guaranteed Maintenance Program (GMP) is a generic term to represent a concept that has become very popular in aviation in the last several years. Each entity that offers a program of this nature has their unique name. The most used trademarked name representing this concept was Rolls Royce's Power-by-the-Hour program (PBH). Another common reference is Pay-by-the-Hour. For clarity, we use GMP in this report to reference the concept.

What was the primary reason that pushed vendors to offer GMPs? The most obvious answer is their effect on the behavior of maintenance costs over a period of time. Chart 5-1 represents the maintenance costs of an actual helicopter whose costs we tracked over an extended period of time. The chart illustrates the erratic behavior of, mostly caused by scheduled events, maintenance costs. Using Year 7 as an example, how does an organization prepare for expenditures of this magnitude ($160 K) when they have been experiencing significantly less costs in the prior years?

Chart 5-1



The more astute operators would estimate the costs of the future significant maintenance events and then set aside or reserve funds until the events occurred. The amount reserved would accumulate based on a calculated cost per hour for the future events. In essence, the operator would be reserving cash for future maintenance at a steady rate of hours flown.

For example, if the estimated cost to overhaul a main transmission gearbox was $45,000 and its overhaul interval was 3,000 hours, the amount reserved for each hour flown would be $15. If the assumptions, $45,000 and 3,000 hours, turned out to be accurate, then the operator would have enough funds available to pay for the overhaul. Working through the exercise to build estimates for all of the scheduled maintenance as well as maintenance not scheduled (e.g. on-condition) would produce a total cost-per-hour to maintain the aircraft.

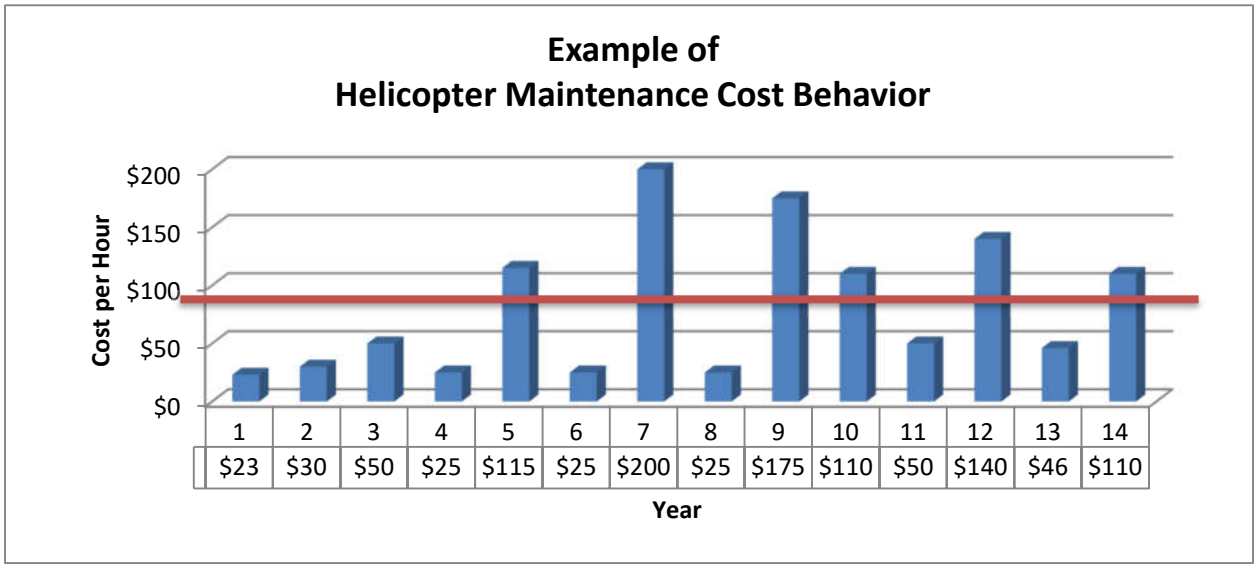
However, accurately estimating costs and avoiding premature component removals can be difficult and therefore risky from a cash flow perspective. If the transmission overhaul actually cost $100,000 and occurred at 2,000 hours, the operator would not have enough funds to pay for the event. Multiplying the effects of missing estimates related to many of the overhaul components, life-limited items, and engine(s) could have a devastating effect on the organization's long-term viability. Compounding the issue of developing accurate estimates is the lack of reliable industry information regarding costs. An organization's experience is the best source but one that is not always available.

It is also tempting to spend a growing fund of cash for purposes other than future maintenance, especially when cash is tight for the organization. Additionally, reserving funds in a for-profit organization cannot be recognized as an expense until the maintenance event occurs; therefore, the hourly reserve is not tax deductible.

To answer the initial question more directly. What was the primary reason that pushed vendors to offer GMPs? GMPs offer predictability for maintenance costs, while shifting risk from the operator.

The variability of maintenance costs over time is eliminated. Chart 5-2 illustrates the smoothing effect (red line) a GMP would have for the helicopter in Chart 5-1. The operator, minus the effects of inflation, would pay a guaranteed rate for the duration of the contract, in this example $80 per every hour flown.

Chart 5-2



As it relates to cost predictability, there are three other important benefits to consider.

- For governmental agencies, a GMP makes even more sense since few of them have budgeting mechanisms that efficiently handle the wide variation in maintenance costs from year-to-year. As a result, in low-cost years, there is a budget surplus that, more than likely, will be consumed on inventory. In high-cost years, the finance department may have to scramble to find the necessary funds. Regardless of the costs that are actually incurred each year, the effects of the typical maintenance costs are magnified if communication between operations and finance are poor.
- A GMP will serve as an insurance policy when premature maintenance events occur. If the main transmission requires an overhaul prior to the scheduled 3,000 hours, the GMP will cover the event. In essence, the risk has shifted from the operator to the entity that provides the GMP.
- A GMP offers even more certainty in a changing maintenance environment. Historically most of the drive train system, flight controls, hydraulics, and engines had scheduled maintenance intervals (i.e. main transmission example). However, continued product improvements have created trends to move these schedule maintenance intervals to maintenance based on the item's condition, also referred to as on-condition maintenance. By its nature, the predictability of this type of maintenance becomes more difficult, not only its timing but also the cost.

In addition to cost predictability, there is another significant attribute of GMPs that has become more prominent over the last several years. In fact, an aircraft's availability is viewed by for-profit operators as more important. An aircraft that is not available cannot generate revenue and revenue is what keeps the business running. However, the importance of availability is important for all types of operations if viewed from another perspective. If an aircraft is unavailable for extended periods of time, the organization is incurring additional costs that are more difficult to measure, costs that are not as obvious as maintenance costs.

For example, if an organization has one aircraft to perform its regular missions, there will be times due to maintenance that the aircraft will not be available. When it is not available for an extended period, the operation has several choices. It can

- Choose not to perform the mission, but if the mission is important, this is not a practical choice.
- Obtain temporarily (i.e. rent/lease) the use of another similar aircraft, which is not practiced much in our industry.
- Ask another organization to perform the mission, which is doable but not for a long period of time.
- Acquire another aircraft. This is not necessarily a bad solution, but it is expensive because of the acquisition costs for the second aircraft. Helicopters especially are an expensive asset.

Given the nature of aircraft and their maintenance, how does a GMP improve an aircraft's availability?

- **Consigned Inventory:** Often times the GMP provider will place inventory at the location of the operator. This is not normally part of the general contract, but if requested by the operator, certain key parts or components can be "stored" at the operator's location. A replacement part that resides at the operator's location will reduce the downtime due to maintenance, which in turns improves the availability rate.
- **Rotable Exchange or Rental Inventory:** The GMP provider will maintain a pool of rotable items. When requested, the provider will send the item to the operator to replace the existing item on the aircraft. In this scenario, the aircraft is unavailable only as long as it takes to remove and replace the item. In an exchange, the operator will operate the item until its replacement is required again. A rental will stay on the aircraft until the operator's repaired item is ready for install. Using a rental doubles the unavailability rate since the remove/replace cycle is performed twice, once to install the rental and once to install the repaired part. Regardless, if it is an exchange or rental, the aircraft's availability will improve significantly when compared to removing and waiting for the return of the same item. In many cases, the turnaround time for overhaul or repair can be several months.
- **Technical Service:** Initially, providers offered GMPs that covered basically the same thing, parts and repair costs for significant maintenance events and on-condition parts. As the programs have become more popular, operators have requested that GMPs be designed to meet their specific needs. As a result, providers now offer more variations in their GMPs and have expanded the scope of the coverage to include technical services. What technical services entails can vary by the program but could include technical engineering assistance, spare part priority, and even labor coverage. Each of these services has the potential to improve an aircraft's availability by shortening the downtime due to maintenance.

What is important to evaluate when considering a GMP? Due to the recent ongoing expansion of offerings by the GMP providers and the fact that a GMP is very helpful in the marketing aspect of selling an aircraft, an operator should understand the many variables and factors that influence what a GMP potentially covers and what an operator will eventually pay to participate in a GMP. The following information highlights some of the more important factors to consider when deciding whether a GMP is appropriate for the organization.

- **Scope of Coverage**: As already mentioned, the range of offerings is broad. For example, within its HCare customer service programs, Airbus Helicopters offers several GMPs through its HSmart Material Management -- Repair by-the-Hour, Exchange by-the-Hour, Parts by-the-Hour, and Full by-the-Hour. In a more general view, operators should know if the GMP covers such things as unscheduled maintenance, labor, bulletins (mandatory or optional), troubleshooting, mission equipment, and shipping. Scope of coverage is also affected by whether the operator wants airframe only, engine only, or both airframe and engine coverage. Unless there is a special arrangement, the airframe and engine manufacturers offer separate programs.

- **Pricing**: Obviously, the scope of coverage will influence pricing, but there are three other important factors to consider. Due to the potential effect of the factors, it is very important for the operator to 1) understand what the pricing represents, and 2) negotiate with the provider for a rate that best represents the operator's situation.

    - First, what is the perspective of the provider when it offers a GMP contract? Is the hourly cost, which is the most common method for expressing the GMP pricing, based on a long-term or short-term perspective? Chart 5-2 illustrates this point. For the aircraft in the chart, we know after 14 years, the average cost per hour for maintenance was $80 per hour. For simplicity, let us assume this represents a long-term perspective. From the same chart, we can also calculate that the actual cost experienced after five years was $39 per hour. When the operator signs the contract will the GMP's hourly rate represent the short or long-term perspective? This becomes important when the perspective is short-term, and the operator plans to own the aircraft longer than the initial contract. How much will the hourly rate have to increase to "make-up" for the short-term rate that does not reserve for maintenance items and events that occur after five years?
    - The second factor to consider is how many annual flight hours will the operator accumulate during the period of aircraft ownership? For example, if the total flight hours were 200 annual hours over a ten-year period, the expected flight-hour rate should be lower than an operator accumulating 1,000 hours per year. The low-time operator would encounter fewer scheduled maintenance events in its 2,000 hours of ownership than 10,000 hours for the high-time operator. (A maintenance event that is based on calendar time has the potential to occur prior to the flight-hour limit.) If the provider's rate was the same regardless of flight activity, then the operator will want to pay special attention to the contract clauses at the time of sale.
    - A third factor to consider is the basis for pricing of parts when a GMP is not involved. Does the operator receive some level of discount pricing when purchasing spares or receiving services from the provider (e.g. government entity)? If so, does that basis also apply to the hourly rate of a GMP? Most GMP rates are based on list or "full" price.

- **Minimum Hour Requirement**: Is the GMP contract based upon a minimum number of annual flight hours? Because some maintenance events are based on calendar time (e.g. 12-year inspection), the GMP rate is based upon an assumption of minimum flight hours over a certain period of time. For example, if an aircraft has a ten-year inspection that is estimated to cost $400,000, the measurement rate is time rather than activity. The GMP rate must reserve enough for the maintenance event causing the need for a certain level of flight hours in the ten-year period. For OCFA, this factor probably would become relevant.

- **Exiting the GMP:** What happens when an operator exits the program? Several factors may be relevant.
  - Is the contract transferable to the buyer? The GMP provider may not allow this to occur, which could affect the buyer's decision. If the contract does transfer, what portion of the accumulated reserve transfers back to the operator? Does the buyer have to pay a "buy-in" fee?
  - If the operator exits the contract, what happens to the accumulated reserve? Is there a penalty taken from the reserve for exiting or not renewing the contract? Most providers have a penalty.

- Who offers GMP programs? Historically, the manufacturers of their respective products offered these programs. Also, airframe manufacturers offer programs separately from engine manufacturers. As mentioned previously, GMPs' growing popularity are an important part of the marketing effort by the manufacturers, which means there can be flexibility in how the program is structured and what the program rate will be. Negotiations in both areas are important. Each of the manufacturers with candidate helicopters mentioned in Section 1 offer GMPs. The airframe manufacturers refer to their GMPs as:
  - Leonardo – Service Plans
  - Airbus Helicopters – Hcare, Smart and Easy
  - Bell Helicopter - Customer Advantage Plan (CAP)
  - Sikorsky – Total Assurance Plan (TAP) and Power Assurance Plan (PAP)

  Jet Support Services, Inc., an independent provider of GMPs, has recently entered the helicopter market. Like the manufacturers, it offers many different types of coverage. Unlike the manufacturers, they will cover both the airframe and engines. JSSI will also set up independent trust accounts to retain the reserve funds.

Hangar Capacity

During our research, we wanted to check the dimensions of the OCFA's hangars at Fullerton Municipal Airport, since they are considering the Type I aircraft, which our significantly larger than the UH-1H Super Huey and 412EP helicopters. The aviation unit provided dimensions for the hangar bay where maintenance occurs, which is the facility's most restrictive space. The OCFA facility has two other hangar bays, for which we do not have the dimensions. We then checked the dimensions for the Type I helicopters.

In talking with Coulson-Unical, the CU-47D has been operating out of Los Alamitos airport and unless the base location changes, the hangar capacity is not relevant.

We obtained the S-70i helicopter dimensions from its information brochure for the helicopter. Table 5-1 Shows the dimensions for the OCFA hangar and the S-70i. This could be an issue, but the other two hangar bays' dimensions need to be checked.

Table 5-1		
OCFA Hangar and S-70i Dimensions		
Measurement - Feet		
Description	**S-70i**	**OCFA Hangar**
Door Width	53.67	55.00
Length/Depth	64.80	63.83
Height	17.20	16.50
Door Height	---	17.42

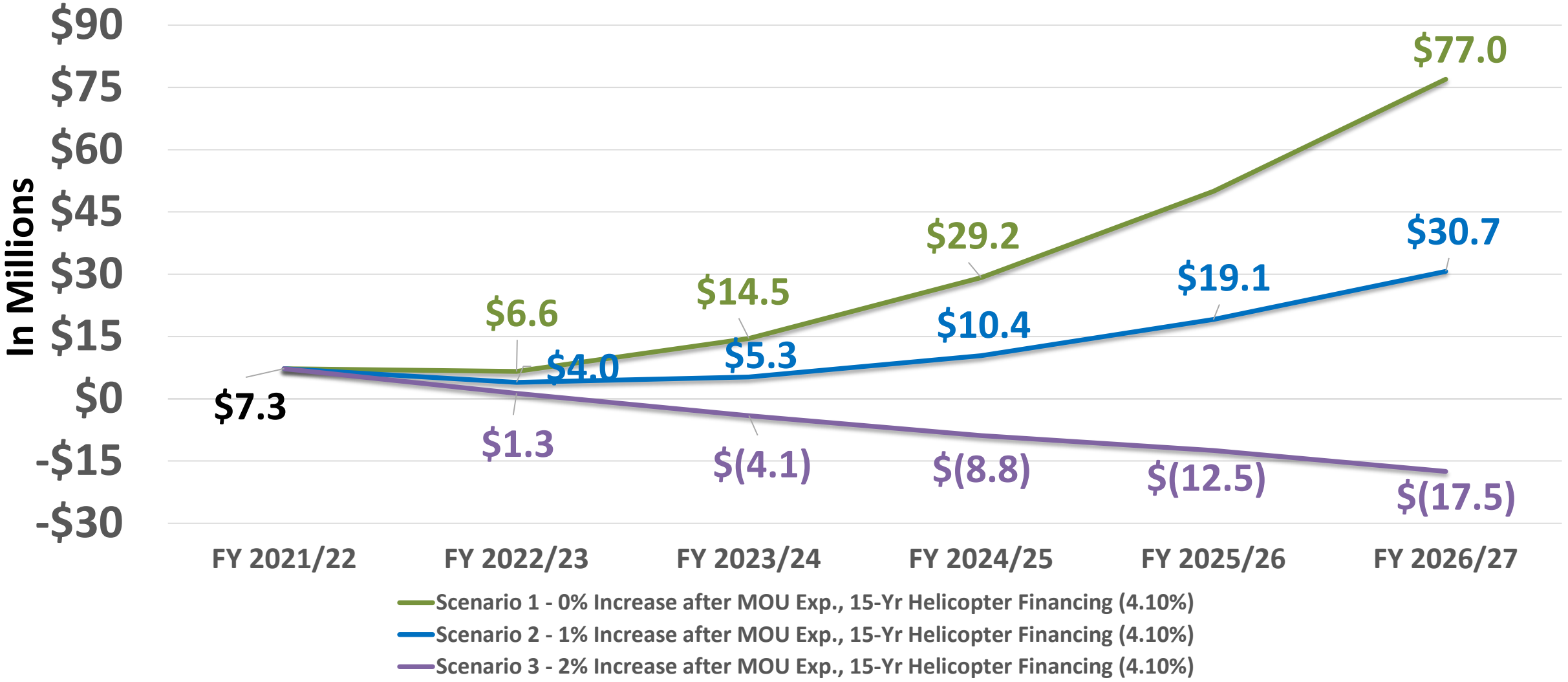
Attachment 2

ORANGE COUNTY FIRE AUTHORITY
Projected Helicopter Program Annual Operating Cost Summary
FY 2022/23

Bell 412 Projected Annual Operating Cost	
Maintenance	1,200
Fuel ($2.90 per Gallon)	35,844
Insurance	TBD
Warranty	N/A
Firehawk Projected Annual Operating Cost	
Maintenance	817,400
Fuel ($2.90 per Gallon)	180,200
Insurance	TBD
Total Assurance Plan ($2,700/hr @ 250 hrs each)	1,350,000
General Electric Warranty ($600/hr @ 250 hrs each)	300,000
Total Annual Helicopter Projected Operating Cost	**$ 2,684,644**
Less: Existing Air Ops Repair/Maintenance Base Budget	(830,236)
Less: Existing Air Ops Insurance Cost	TBD
Net Additional Funding Needed	**$ 1,854,408**

CIP Surplus/(Deficit) – Orange Line

(Helicopter lease financing would be paid out of the CIP)



United Rotorcraft®
An Air Methods Division

30 JUNE 2022

ORANGE COUNTY FIRE AUTHORITY

Attn: Brian Fennessey
Fire Chief
1 Fire Authority Road
Irvine, CA 92603

Dear Chief Fennessey,

The United Rotorcraft team continues to strive to provide the best aerial firefighting solutions for the state and people of California and hopes to soon support Orange County Fire Authority operating the Sikorsky S70 FIREHAWK.

We currently have three S-70M helicopters scheduled to be delivered to us in 2022 that can be modified and delivered as S70M FIREHAWKs in time for the start of the 2023 fire season. All three helicopters are built at the Lockheed PZL facility in Poland and converted by United Rotorcraft in Colorado for public use in the USA.

The demand for the S70M FIREHAWK remains strong, and we expect orders to be placed by CalFire and foreign agencies in 2022. Since we operate on a first come first serve basis, we feel it is important to point out that once the three aircraft mentioned above are placed on contract, Lockheed PZL's next available production slots will not be until 2024 at the earliest, but most likely 2025.

Furthermore, global inflation trends and supply chain constraints, along with the specific Black Hawk supplier base seeing volumes decreasing year over year, all lead to significant price increases for the S70M in the coming years. While we are still waiting for firm pricing from Lockheed PZL, we expect an aircraft price that could easily increase by $2.5-3M between now and 2025.

We understand and respect the process put in place by Orange County and recognize that some of the steps cannot be compressed, but we felt it was important to be transparent about the risk of delay and inflation you might face should our first three aircraft be purchased soon.

We are at your disposal to work towards a contract that will bring the FIREHAWK to Orange County as quickly as possible and look forward to supporting your mission.

Thank you,

Larry Alexandre
President

OCFA Aircraft Replacement Review Process

Review of Remaining Phase 3 through 6 of the Work Plan

Budget & Finance Committee Meeting
Agenda Item 3B
July 13, 2022

Aircraft Replacement Summary

- On July 22, 2021 a presentation was provided as an update on OCFA Air Operations. The Board was informed that staff would return at a later date to initiate more dialogue and to begin to explore next steps related to the replacement of OCFA's Air Assets.

- Since then, on five separate dates, the B&FC has received updates and presentations for the Aircraft Replacement Process. The review process and work plan organized the review into six phases.

    1) Asset Orientation
    2) Review of Services
    3) Aircraft Replacement Needs
    4) Aircraft Options
    5) Affordability Analysis
    6) Development of Recommendations

Current Month's Topic
Review of Remaining Phases 3 - 6

The following performance and specifications were used to help evaluate candidate helicopters. The parameters for a firefighting/ rescue mission profile included:

- Useful Load
- Mission Endurance
- Aircraft Speed
- Hovering Capability
- Water Drop Capacity
- Cabin Volume and Seating
- Purchase Price
- Maintenance and Fuel Costs (Section 2 of the report)

Phase 3:

Aircraft Needs & Disposition of Obsolete Aircraft

The Conklin & de Decker Aircraft Fleet Analysis report was utilized to help with the Authority's current helicopter fleet to make more informed decisions on the purchase, operation, maintenance and disposition of aircraft. To address the specific areas, the report includes the following five sections:

- ***Section 1:*** ***Fleet Review***
- ***Section 2:*** ***Life Cycle Cost Projection***
- ***Section 3:*** ***Resale Value and Lead Time***
- ***Section 4:*** ***Fleet Replacement Plan***
- ***Section 5:*** ***Other Information***

Section 1 - Fleet Review

- OCFA selected two (2) candidate helicopters from the Conklin de Decker report:
    - Sikorsky S-70i
    - Bell 412 EPX
- The Bell 412 EPX, like OCFA helicopters, have capacity to deliver up to 350 to 375 gallons per drop
- A more acceptable volume would be Type 1 helicopters, which drop up to 1,000 gallons
    - The S-70i will carry 256% more water per tank load
    - The S-70i averages 15 knots faster than the 412EPX
    - In comparison, the S-70i will provide a significantly enhanced level of safety for our aircrews
    - The S-70i has true fly away capability in the case of a one-engine inoperable (OEI) event while hovering at maximum gross weight

Section 2 - Life Cycle Cost Projection

- OCFA requested that Conklin & de Decker estimate the cost of the acquisition and operations of the helicopter alternatives
- The operating cost estimates include maintenance options and fuel costs, and other operating or overhead costs
- Estimated maintenance and fuel costs are over a ten-year period and use a 200-flight hour average
- Due to the difference in the life cycles, **the current Bell 412EP helicopters will more than likely cost more to maintain** and not only due to scheduled maintenance, but also unscheduled maintenance associated with an aging helicopter

Section 3 - Resale Value & Lead Time

- The grounded UH-1H Super Huey's do not have a resale value, they were acquired through the Federal Excess Property Program (FEPP)
  - Technically, the helicopters are still owned by the federal government with CAL FIRE serving as the conduit to OCFA
- OCFA is currently not exploring resale of the Bell 412's
  - It is the intent of the OCFA to utilize these aircraft as reserves when the front-line aircraft are down for maintenance

Section 4 - Fleet Replacement Plan

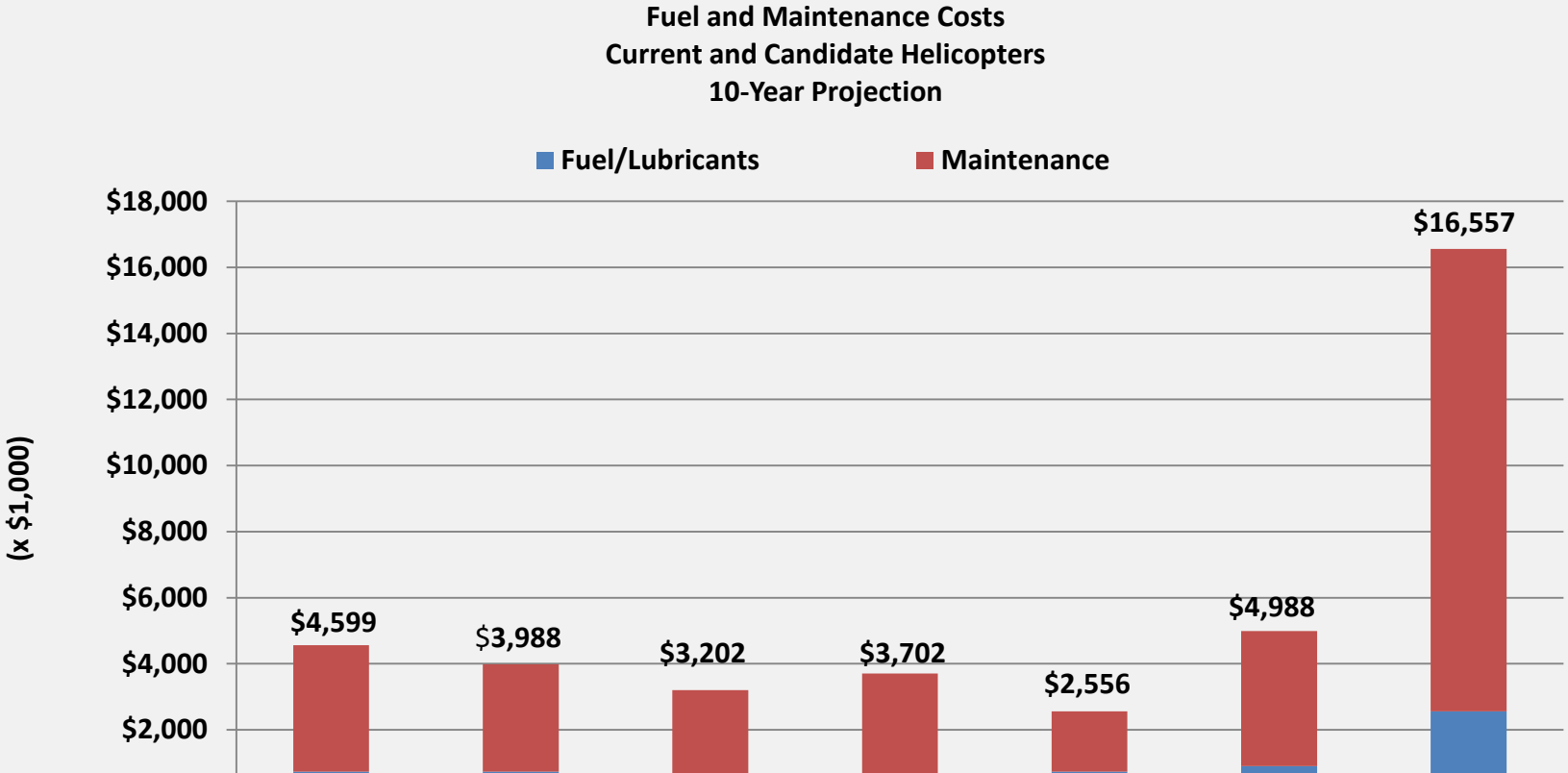
- Recommendation is to return the FEPP UH-1H helicopters to CAL FIRE; both UH-1H helicopters were grounded due to safety concerns raised by the Chief Pilot and the Chief of Maintenance
- Recommendation is to acquire two (2) Type 1 helicopters
  - The S-70i candidate helicopter will meet the OCFA objective to increase the amount of water delivered during the firefighting mission and will directly and positively affect the life safety of our aircrews
- Significant scheduled maintenance events affect a helicopter's availability; therefore, there will be times when OCFA will not have a Type 1 helicopter available to perform the mission
  - A second S-70i Type 1 helicopter is required for adequate coverage
- Bell 412's become secondary aircraft

Section 5 - Other Information

- **Guaranteed Maintenance Programs (GMP) or Total Assurance Programs (TAP)** provide certainty for the erratic and often hard-to-predict behavior of maintenance costs
- TAP minimizes aircraft maintenance cost variability, and optimize predictable financial planning by level loading the scheduled and unscheduled maintenance cost at fixed rate per flight hour
- The following are included in the TAP program:
    - o Preventive and Corrective Maintenance
    - o Airframe line replaceable Units
    - o Avionics
    - o Navigation
    - o Communications Systems
    - o Fuselage and Structural Parts & Assemblies

Phase 4:

Aircraft Options & Associated Costs

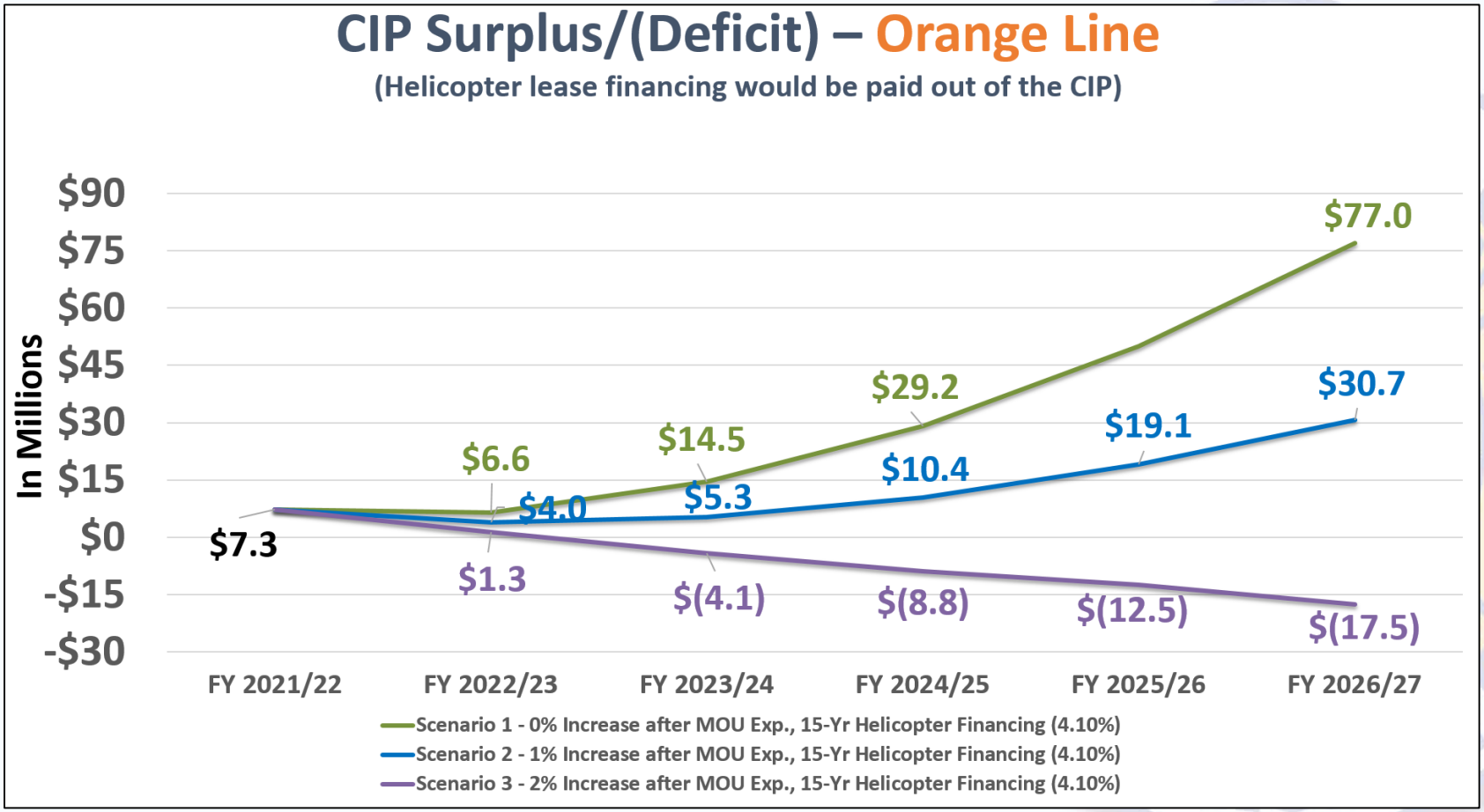


	412EP H1	412EP H2	Super Huey H3	Super Huey H4	412EPX	S-70i	CH-47D
Maintenance	$3,822	$3,250	$2,523	$3,023	$1,819	$4,087	$13,998
Fuel/Lubricants	$737	$737	$679	$679	$737	$901	$2,558

Phase 5:

Affordability Analysis w/Potential Financing Solutions

Financing Term	Est'd Interest Rate	Est'd Annual Installment Payment	Est'd Total Interest Cost of Borrowing
7-Years	3.95%	$8.6M	$8.5M
10-Years	3.95%	$6.4M	$11.9M
15-Years	4.10%	$4.7M	$18.6M



Potential CIP Adjustments

- Scenario 3 (15-year financing, w/2% salary increases) reflects a need to adjust future CIP projects, therefore, staff has identified changes in project timing that could accommodate this need:

- There are **no** proposed project deletions, only movements to a later year(s)
- There are **no** proposed adjustments to facility improvements/General Fund CIP
- There are **no** proposed adjustments to projects in the current FY 2022/23

Capital Fund	Projects with Adjusted Timing	FY 23/24	FY 24/25	FY 25/26	FY 26/27
123 – Fire Station & Facility Construction	•Solar/Charging Facilities •RFOTC Training Grounds •Security Enhancements •Contract Award, FS12 & FS9	($1.1M)	($3.1M)	+$600K	+$3.6M
124 – Comm & Info Technology	•OCFA Intranet Upgrade (HIVE) •Finance/HR System App.	($3.0M)	+$500K	+$400K	($3.8M)
133 – Fire Apparatus	•Ladder Trucks		($2.2M)	($4.6M)	($4.8M)
Total Proposed Adjustment per Year		**($4.1M)**	**($4.8M)**	**($3.6M)**	**($5.0M)**
Cumulative Change Year-End CIP Fund Bal		**($4.1M)**	**($8.9M)**	**($12.5M)**	**($17.5M)**

Phase 6:
Development of Recommendations

- There remains three (3) 2022 Sikorsky S-70i helicopters available for purchase
- If OCFA is unable to secure approval, it is anticipated that the available helicopters may be sold to other buyers
  - Heavy demand by international customers
  - CAL FIRE FY 2022/2023 budget approved four (4) more Sikorsky S-70i's. Placing order soon.
- If approval delayed, soonest OCFA could secure a position would be 2024, with delivery in 2025 or 2026

Phase 6:
RECOMMENDED ACTIONS

1. Receive and file the report documenting the full OCFA Aircraft Replacement Review Process.
2. Direct staff to return the two loaned Federal Excess Property Program (FEPP) UH-1H Super Huey helicopters to the federal government, with CALFIRE serving as the conduit for this FEPP return.
3. Direct staff to initiate administrative actions necessary to facilitate the purchase of two Sikorsky S-70i Type 1 helicopters, including:
   - (a) procurement process for award of contract,
   - (b) Request for Proposal process for selection of financing consultants,
   - (c) Request for Proposal process for provision of lease-purchase financing,
   - (d) and preparation of draft-proposed budget adjustments.
4. Upon completion of the administrative actions, direct staff to return to the B&FC and the Board of Directors (tentatively in September 2022) for approval to award a purchasing contract, approval of lease financing terms, and authorization of the necessary budget adjustments.