

Cameron Park Airport Mowing Operations

Mower and Tow Vehicle Selection Process, Requirements, Trades and
Solutions

Presentation to the CPAD Board

CPAD Board Meeting November 23, 2020

Need to Resolve Mowing Issue Now

- Mowing opportunities are here, grass/weeds are growing with rains.
- Need to mow to reduce fire hazards and risks, and keeping the airport looking good.
- Need long term, low cost solutions that meet needs of the Airport considering use of volunteers to mow, spray and trim, and maintain equipment.
- Need to keep grass and weeds cut low to meet fire requirements and reduce risk to airport, airplanes and residences
- Need flexibility to take advantage of dry times to mow during spring and early summer.
- Existing Swisher Mower work well, but requires capable tow vehicle and many manhours due to 4-width of cut (effective at about 3-feet with overlap). We do not currently have or use of a capable tow vehicle.

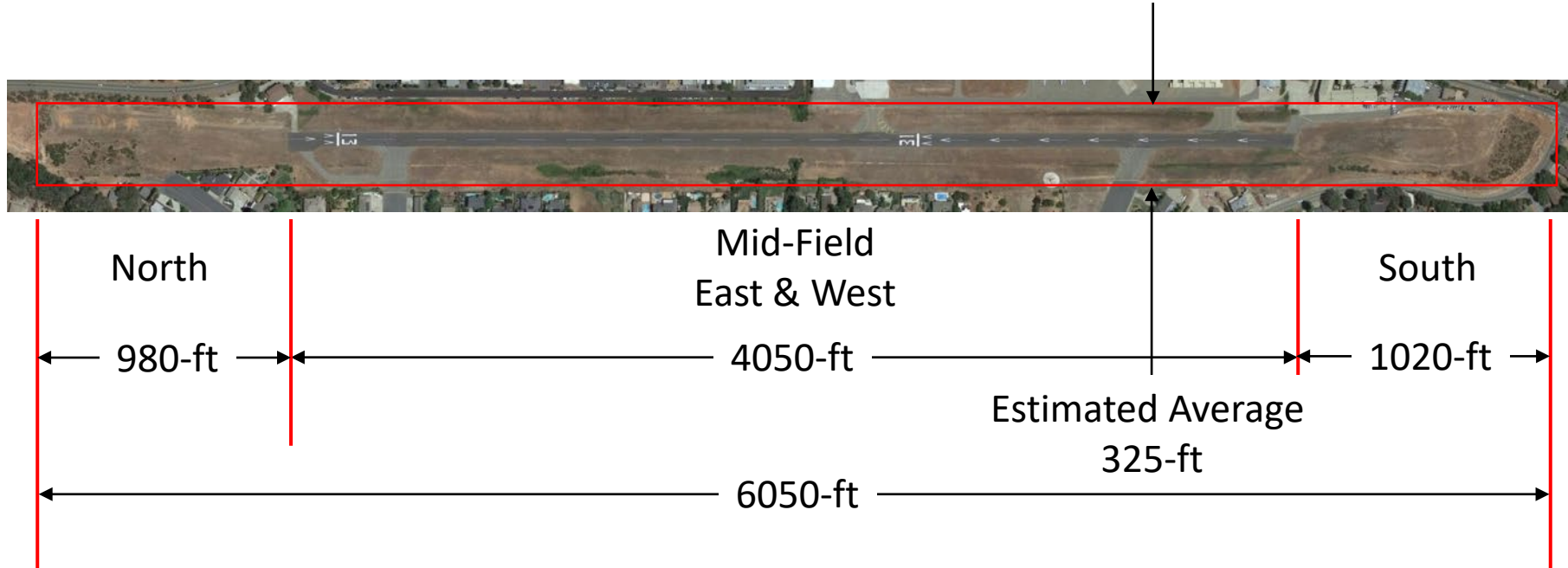
Request– Budget Allocation for Eventual Purchase

- Motion at tonight Board Meeting is to approve budget allocation of \$5000 to purchase mower and tractor.
 - Sets aside renting as not a viable long term solution due to higher cost, uncertain availability and poor schedule flexibility
- **MOTION IS NOT TO APPROVE A PURCHASE AT THIS TIME!**
 - Will request motion to approve purchase once specific equipment is identified and price agreed to
- Process:
 - Part 1 – Approve budget allocation
 - Based on \$5000, determine what is available to meet mission requirements
 - Define requirements, derive solution. Evaluate Buy vs Renting
 - Part 2 – Approve purchase of specific equipment

Mission

- Keep the Airport grounds cut and trimmed to:
 - Mitigate fire risk to airplanes, airport building and residences houses
 - Airplane safety if run off the runway,
 - Keep our Airport looking kept up and good
- How?
 - Combination mowing with pull behind mower, walk-behind and hand trimmers and weed spraying
- Who?
 - Team of resident airpark volunteers and Airport Manager

Airport Mowing Area



Approximate Areas						
Airport Area		Runway		Mowing Area		
				Area	Sq-Ft	Acres
Length (Ft)	6,050	Length (Ft)	4,051	Airport Area	1,966,250	45.1
Width (Ft)	325	Width (Ft)	50	Runway Area	202,550	4.6
Area (Sq Ft)	1,966,250	Area (Sq Ft)	202,550	Mow Area	1,763,700	40.5

Airport Mowing Area - North



Airport Mowing Area – Mid Field

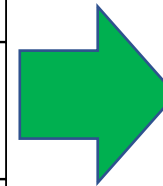


Airport Mowing Area – South



Mowing Times

Mowing Time vs Mower Width				
Assumptions	Value	Unit	Rationale	Variable
Mow Area	1,763,700	Sq Ft	See Mow Area Calculations	
Mow Length	6,050	Ft	See Mow Area Calculations	L
Effective Mow Width	292	Ft	Mow area divided by length. Approximate. Assuming one large rectangle to mow.	W
Ditches area included in mow area				
Overlap	1	ft	1 foot, this may be closer to 6 inches but its difficult to drive a tractor to 6 inch accuracy all day long	O
Mow Speed	3.5	mph	4 mph derated to 3.5 for stop start, U turns, and avoiding obstacles	S
Mower Widths		ft	Cut width of candidate mower	M
Formula			Mow Time = $\frac{((W/(M-O))*L)}{S}$	



Mowing Time vs Mower Width				
Mower Widths (ft)	Mow Time (Hours)	# of Trips	Total Distance (miles)	Percent Change in Time from 4-ft
4	31.8	97.2	111.3	0%
5	23.9	72.9	83.5	25%
6	19.1	58.3	66.8	40%
7	15.9	48.6	55.7	50%
8	13.6	41.6	47.7	57%

Mowing Time calculation is just mowing time; and does not include getting the tractor out, attaching the mower, fueling, lunch break, mower driver switch time, cleanup, repairs, etc.

Mower Selection Process

- An Airport Mower Selection Working Group was formed composed of the Airport Manager and Airpark residence volunteers currently mowing the airport and conducting weed abatement. These volunteers have been serving many years and have direct experience in different types of mowers at the airport as well as experience in renting equipment and mowing services for the airport.
- Airport Mower Selection Working Group members: Jeff Thornhill, Victor Garcia, David Becker and Kevin Cooksy. Terry Bohlen chaired the working group meeting on November 17, 2020.
- The Requirements list was initially prepared by Terry Bohlen, then sent to the Airport Mower Selection Working Group for review prior to meeting.
- During the Working Group Meeting:
 - Requirements list reviewed, line by line, new requirements added specific requirements noted.
 - Mission and Cost Requirements drove Mower Requirements that then drove Tow Vehicle Requirements.
 - Mission and Cost Requirements must be met by any proposed solutions
 - Key Mower and Tow Vehicle Requirements assigned weighting factor

Mission Requirements

1 Mission Requirements

1.1 Area to Mow

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1.1.1 Flat area

Mower and any tow vehicle shall be capable of cutting grass and weeds in the flat and relatively smooth areas, both level and slopes within the airport area.

1.1.2 Ditches

While desired, the mower is not required cut weeds in ditches to the same height requirement as mowing in flat areas.

1.2 Sprayer Towing

Any tow vehicle, should be capable of towing the spray rig

1.3 Skill Level(s) to operate

Mower and any tow vehicle shall be capable of being safety operated by designated airpark volunteers with reasonable skills.

1.4 Time to Mow

Mowing time should be no more than two days to complete

1.5 Number Mow Events per Year

Mower and Pull Vehicle shall be capable of at least four mowing events per year

1.6 Mowing Seasons

Mower and Pull Vehicle shall be capable of mowing in February/March after raining and the ground has dried to a minimum of damp without causing deep ruts. Mower and pull vehicle shall not be required to mow only when the ground is dry and hard.

Cost Requirements

1 Costs Requirements

1.1 Purchase

1.1.1 Capital Cost

The capital / purchase cost shall not exceed \$5,000, assuming purchase in 2020.

1.1.2 Recurring Cost

Estimated recurring cost per year, including but not limited to, oil changes, other maintenance, replacement parts and repairs should not exceed \$200. This assumes one oil and lube and replacing about 25% of the cutting blades.

1.2 Rent

The rent option should not exceed \$700 per year or \$125 per Mow Event based on the number of Mow Events per year specified in 2.5.

Rental requirements based on the requirements and calculations below.

Buy		Requirement Souce
Captial	\$ 5,000	3.1.1
Maintenance Cost per year	\$ 200	3.1.2
Service life	10	5.1.7
Cost over service live	\$ 7,000	
Rent		
Retal per year	\$ 700	
Number of Mows per Year	4	
Rent per Mow	\$ 175	

Renting

- Mowing Service

- Very expensive, used in past at several thousand dollars per mow (TBC)

Mowing Service	
Godzilla Tree	Has macerating mower and mowing servie. Expecting bid.

- Equipment

- Mower – search conducted. Mowers generally not available, difficult to find and availability in long term not certain
- Buy Mower, rent tractor – Tractor availability uncertain. Rental cost typically does not include delivery and pick up. Renters assuming tractor will be used for excavation, scraping, not mowing.

Tractor with PTOs	
Home Depot - Placerville	Now longer rents
Home Depot - Folsom	Only backhoe or box scrapper. Likley break rental agreement by removing backhoe or box scrapper.
True Value - Placerville	Does not rent tractors
Hank Rental	Does not rent tractors

Renting Analysis

NOTES

- In the calculation table, the orange cells are INPUT values.
- Pricing is only from All Star Rents because United does not have a deck system and Halk seems to have ratty equipment
- The iterative cycles of mowing continue well beyond the estimated 4-6 times we'd cut per year if we had our own equipment to demonstrate how quickly we would recover the investment in the various devices.
- Options for deferring a \$ spend are always there, such as acquiring only the flail mower deck and finding an interim UTV to pull it until the next \$10K Caltrans credit arrives (if ever)
- The table does not take into consideration that the time to mow could be reduced by someone on a second vehicle pulling the rotor-deck out on the flat areas of the airfield
- Good possibility that CSD will let us use their Polaris UTV - TBD

OPTION 1: Acquisition of Flail Deck w Deferred UTV		Acquisition Cost	Annual Operating Cost	Notes	Daily	Weekly	Notes
	Pull-Behind Flail (see Equip tab)	4500	200				
	UTV	9000	400				
OPTION 2: Rental of Brush Deck							
<i>ALLSTAR Rents</i>							
	BrushCat - Allstar				\$ 146	\$ 727	
	UTV				\$ 319	\$ 1,351	
	Delivery				\$ 185	\$ 185	Per delivery
	Kubota Tractor						
	PTO Flail						
Calculations							
<i>Estimating Time/Speed/Distance of Mowing</i>							
	Deck width	4 ft		48" deck			
	Est distance at 4ft lanes	387000 ft					
	Est Distance (5280 ft) miles	73 miles					
	Est Mower Speed (mph)	4		INPUT			
	Mowing Time at Est Speed	18 hours		Calculated			
	Est Mowing Hours per Rental Day	6		INPUT			
	Est rental days per cycle at TSD	4 days		Calculated and rounds UP to a full rental day charge			
Rent versus Buy							
Mowing Cycles per Year							
	Cut 1 time per year	1	\$ 2,045	Per Cutting cycle			
	Cut 4 times per year	4	\$ 8,180	Per Year	Fully recover cost of Flail in Year 1		
	Cut 5 times per year	5	\$ 10,225	Per Year			
	Cut 6 times per year	6	\$ 12,270	Per Year			
		7	\$ 14,315	cumulative cycles for ROI			
		8	\$ 16,360	cumulative cycles for ROI			
		9	\$ 18,405	cumulative cycles for ROI			
		10	\$ 20,450	cumulative cycles for ROI			
		11	\$ 22,495	cumulative cycles for ROI			
		12	\$ 24,540	cumulative cycles for ROI			

What Does Placerville Use?

- As of October 28, 2020
- KPVF does have a PTO brush hog that was given to them after *County Facilities* deemed it “used up.”
- Airports asked for a new rig of their own but the request went down in flames at budget review.
- They trailer the hand-me-down unit back and forth to Georgetown.

Key Requirements from WG Meeting

- Mowing time: about 20 Man Hours (MH) per mow. Drives width from 4-ft (30+ MH) to 6+ feet, 20 MHs . Drives tractor minimum HP of 30 to 65 HP. Lower end ok as we do not have steep hills.
- Ability to mow after rain with reasonable dry time, without significant ruts. Drives weight and width of tires, allows mowing in Feb/Mar. Narrow tires limits mowing to one season.
- Cut low to be compliant with fire break requirements
- Ability to cut long grass and weeds
- Mower not required to cut weeds in ditches, at least normally. Weeds in ditches need to first be cut low and sprayed, a lot.
- Need to keep up with mowing and spraying. Means mowing 3 to 4 times a year. Plan on 4 times.
- Front loader not needed or desired
- 10-year service life
- Capital Cost no more than \$5,000.
- Use existing Swisher mower to supplement mowing and decreased mowing time. Swisher would be towed with volunteer ATV or airport vehicle.

Derived Requirements

- Equipment needs to be stored inside, out of the sun.
- Flail mower 6+ ft wide, PTO driven
- Tractor with PTO, 2WD ok, (4WD not required), minimum 30 HP
- Roll over protection - can add
- Shade: Cover or Umbrella mounted to tractor, which can be added.

With a target of \$5000, the WG is pursuing equipment that meets requirements:

- 6+ foot Flail Mower, PTO. side shifting not required. Spray next to fences, etc, where the mower should not go.
 - Dave Becker has lead to find one, price target less than \$1,500
- Tractor. PTO, 2WD, minimum 30 HP, Good condition to last 10 years with maintenance
 - Victor has lead to find use one, price target less than \$4,000
- Storage shed. Suggested building one next to lighting shed. Shed should be permanent structure. Likely require County and CPSD architecturally code compliant with permits, power for lights and utility, perhaps large enough for other storage. Should consider finding temp storage until ready.

Rotary (Bush Hog) vs Flail Mowers



ROTARY MOWERS

- Horizontal blades are more versatile, but don't provide a manicured cut
- Best for clearing overgrown brush
- No sharp blades – large, thick, designed for power



FLAIL MOWERS

- Cuts with knives attached to a long shaft
- Best for clean, manicured grass-cutting
- Uses Y- or T-shaped spinning blades for precision



Rotary (Bush Hog) vs Flail Mowers

- Rotary
 - Good for large overgrown grassy areas. Can cut tall, thick grass with relative ease.
 - Can be run at relatively high speed (with enough power, i.e. PTO driving)
 - Compared to Flail Mower, lower quality of cut, potential for clumping and piling of clippings.
 - Simple to maintain; rotating flat blades
 - With rotary motion, objects can be thrown in all directions (rock, trash, etc)
- Flail
 - Excels at cutting vines and brush. Great for heavily overgrown areas
 - Mulches cuttings and spreads evenly.
 - Linear cut reduces risk of throwing debris, making better choice for area with rocks
 - Can cut lower than rotary
 - Flail blades relatively simple to replace.
- *Working Group has had good experience with Flail Mowing – did the best cut*

Dedicated tow vehicle (Tractor) vs. Multi-Use Airport Vehicle

- In order to meet the mission requirements, a separate, higher power and more capable tow vehicle is needed.
- This vehicle would be slower and not economical to operate on a day-to-day basis, for quick runs down to a tie-down, or a runway check for example.
- If a smaller width mower was used, it could be towed by a ATV type vehicle, however during mowing, the vehicle not available for quick trips, etc.
- Also, the wear and tear on such a vehicle would be much higher than not using it for mowing, likely reducing its life and adding to down time for maintenance and repairs.

Conclusion

- The Mower Selection Working Group believe they can locate a mower and tractor that meet the requirements within a \$5,000 purchase budget and within the specified annual maintenance costs.
- While not ideal as a new mower and tractor, this is believed to be the best solution given our budget situation.
- The MSWG is currently looking for a mower and tractor.