

## 4 Camp management options analysis

This section provides an overview of camp management options commonly used across NSW and Australia (detailed in Appendix 4) which have been considered in the development of the CMP. These are categorised as Level 1, 2 or 3 in accordance with the Policy (i.e. Level 1: Routine camp management; Level 2: Creation of buffers; Level 3: Camp disturbance or dispersal). Table 5 provides a site-specific analysis of the camp management options for Northern Beaches.

Table 5 provides an analysis of camp management options and suitability for Northern Beaches. An appraisal, based on this analysis, is provided for options to be either adopted, investigated further or disregarded within this CMP. Planned management actions based on this analysis is provided in Section 5 .

Table 5 Analysis of camp management options

Management options	Relevant impacts	Cost \$-\$-\$	Advantages	Disadvantages	Suitability for Northern Beaches
<b>Level 1 options</b>					
Education and awareness programs	Fear of disease Noise Smell Faecal drop Water contamination	\$	Low cost, increasing awareness will help the community understand the ecology of flying-foxes, providing options for landholders to reduce impacts. This is an effective long-term solution, can be undertaken on an ongoing basis and based on community concerns.	Education and advice itself will not mitigate all issues, and on its own would not be acceptable to the community.	Education, advice, and awareness programs are key components of any plan to manage flying-foxes and their camps. Appraisal: Adopt
Property modification / service subsidies	Noise Smell Faecal drop Health/wellbeing Lost rental return	\$-\$-\$	Property modification is one of the most effective ways to reduce amenity impacts of a camp, promotes conservation of flying-foxes, is a long-term option, can be undertaken quickly, will not impact on the site and may add value to the property.  Property modification, such as glazing windows or installing noise attenuating insulation, will greatly assist with noise impacts inside	May be cost-prohibitive for private landholders, however subsidies would assist.	Council established the Flying-fox Residents Assistance Program and have provided subsidies at Avalon and Balgowlah in the past, including for air conditioners and purifiers, secondary glazing for windows, car wash services, cleaning equipment, balcony upgrades, and covers for outdoor items. Council will investigate expanding this program for communities affected by flying-foxes at the three key camps.

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			residences and businesses. Installing shade sails, car ports or covering other affected areas will reduce the impacts of faecal drop.		Appraisal: Investigate distance-based subsidies program for residents affected by flying-fox camps.
Odour reducing / masking plants	Noise Smell Health/wellbeing	\$	Planting dense screens and fragrant plants to assist with odour and noise and trim tall trees to less than 5 metres high and/or use wildlife friendly netting to prevent occupation by flying-foxes.	May take time for plants to provide the desired effect, and unlikely to mitigate odour during large influxes.	Residents could be encouraged to modify properties by planting dense screens and fragrant plants. This information can be provided in an education program. Appraisal: Adopt
Routine camp management	Health/well-being	\$	While this action is not aimed at managing flying-foxes, it allows landholders to undertake routine maintenance at or near flying-fox camps (in line with the Policy). Examples of routine camp management actions are provided in the Policy. Weed removal has the potential to reduce roost availability and reduce numbers of roosting FFs.	Will not generally mitigate amenity impacts for nearby landholders.	Protocols should be developed for carrying out operations that may disturb flying-foxes, which can increase impacts such as noise and smell, and create a flying-fox welfare issue. Any weed removal should be staged and mindful of inadvertent dispersal (constituting a Level 3 action) or exacerbating heat stress events. Appraisal: Adopt
Alternative habitat creation	Noise Smell Faecal drop Health/wellbeing	\$\$- \$\$\$	If successful in attracting FFs away from high conflict areas, dedicated habitat in low conflict areas will mitigate all impacts and helps FF conservation. Rehabilitation of degraded habitat that is likely to be suitable for FF use could be a more practical and faster approach than habitat creation. Improving potential alternative camp habitat should be part of a medium-long term plan.	Generally costly, long-term approach so cannot be undertaken quickly, previous attempts to attract FFs to a new site have not been known to succeed.	Council will continue to manage existing camps within Council's bushland reserves and investigate potential habitat which may be improved/restored, or low conflict locations where habitat may be created. Appraisal: Investigate further
Provision of artificial roosting habitat	Noise Smell Faecal drop Health/wellbeing	\$\$-\$	Artificial roosting habitat could be considered to supplement vegetation damaged by large numbers of flying-foxes.	No guarantee that flying-foxes would use artificial habitat, but collaborating with a researcher on varying design options would increase the likelihood of success.	Not enough evidence at this stage to adopt and habitat quality not currently an issue at Northern Beaches camps. Appraisal: Disregard

Management options	Relevant impacts	Cost \$-\$-\$	Advantages	Disadvantages	Suitability for Northern Beaches
Protocols to manage incidents	Health/wellbeing Fear of disease	\$	Low cost, will reduce actual risk of negative human/pet–FF interactions, promotes conservation of FFs, can be undertaken quickly.	Will not mitigate amenity impacts, but will reduce fear of disease.	Council to develop standard internal procedures for operations, response to heat stress events and other potential incidents. Appraisal: Adopt
Research	Noise Smell Faecal drop Health/wellbeing	\$	Support research that improves understanding and more effectively mitigates impacts. Develop understanding of native flowering events in area.	Generally cannot be undertaken quickly, management trials may require cost input.	Council will stay up-to-date with contemporary research and review this CMP as required. Council also supports relevant research projects, such as drone-monitoring at camps. Appraisal: Adopt
Appropriate land-use planning	Noise Smell Faecal drop Health/wellbeing	\$	Suitable planning for future development will reduce potential for future conflict. Identification of degraded sites that may be suitable for long-term rehabilitation for FFs could reduce impacts.	Will not generally mitigate current impacts.	Council may consider applying additional environmental planning controls to flying-fox camps in future DCP/LEP reviews. Appraisal: Investigate further
Property acquisition	All for specific property owners Nil for broader community	\$\$\$	Cost prohibitive and not feasible for Northern Beaches.		Appraisal: Disregard
Do nothing	Nil	Nil	No resource expenditure.	Will not mitigate impacts and would not be considered acceptable by impacted members of the community.	Not appropriate. Appraisal: Disregard
<b>Level 2 options</b>					
Buffers through vegetation removal	Noise Smell Health/wellbeing	\$–\$	Any vegetation removal should be done using a staged approach, with the aim of removing as little native vegetation as possible and only in vegetation directly affecting residents.	Removing vegetation can also increase visibility into the camp and noise issues for neighbouring residents which may create further conflict. Vegetation removed too quickly could cause inadvertent dispersal.	Management buffers will be maintained for affected residents at Balgowlah and Avalon camps and considered if necessary at Warriewood camp. Appraisal: Adopt
Buffers without	Noise Smell	\$\$	Successful creation of a buffer will reduce impacts, promotes FF	May impact the site, buffers will not generally eliminate impacts,	Appraisal: Investigate various methods and implement where feasible.

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vegetation removal – visual deterrents, canopy mounted sprinklers	Health/wellbeing Damage to vegetation		conservation, can be undertaken quickly, options without vegetation removal may be preferred by the community.	maintenance costs may be significant, often logistically difficult, limited trials so likely effectiveness unknown.	
Noise attenuation fencing	Noise Smell Health/wellbeing	\$\$	Noise attenuation fencing is intended to alleviate amenity issues for residents. Advice from an acoustic consultant may provide site-specific alternatives.	Noise attenuation fencing is costly and can be considered unsightly for property fencing.	Flying-foxes roosting adjacent to 1 – 2 level houses at Balgowlah and Avalon camps are positioned high in canopies, and as such, noise attenuation fencing is unlikely to be effective. Residents in raised apartments at Balgowlah have benefited from subsidised balcony upgrades.  Appraisal: Investigate further where site topography makes fencing effective
<b>Level 3 options</b>					
Nudging	All	\$\$–\$\$\$	Can encourage flying-foxes to shift away from high conflict areas next to residential areas.	May lead to inadvertent dispersal and splintering of the camp if not done at the correct time, frequency or duration.	Not currently suitable but may be considered if Level 1 and 2 management options have been exhausted and risk has not been sufficiently mitigated.  Appraisal: Investigate if required
Active dispersal	All at that site but not generally appropriate for amenity impacts only	\$\$\$	If successful can mitigate all impacts at that site. It is important to note that the outcomes of dispersal are generally temporary, and repeat dispersal is likely to be required as flying-foxes attempt to re-establish the camp. This may be seasonally, annually, or more regularly.	Dispersal is rarely successful without significant vegetation removal or ongoing effort and excessive expenditure (e.g. several years and \$1M for Sydney Botanic Gardens). Flying-foxes will almost always continue to roost in the area (generally within 600 m), and often splinter into several locations nearby (including many remaining at the original site).	This option will only be considered in extreme circumstances, where impacts are severe and cannot be managed through Level 1 or 2 options.  Appraisal: Investigate if required