

**Report to inform the Appropriate Assessment (AA) for the Electricity Authority of Cyprus (EAC)
photovoltaic park at Akrotiri**

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1. Background

An Environmental Impact Assessment (EIA) (Reference A) was prepared in April 2015, which was considered to be inadequate, especially in the nature conservation parts. The proponents commissioned another study to address the gaps and provide AA information. This was finalised in July 2016 (Reference B).

2. Details of the project

The project includes the construction and operation of a 20 MW photovoltaic park at Akrotiri, as described in the studies at References A and B. The proposed park includes 80,000 photovoltaic panels, covering a footprint of around 353,400 square metres. The energy produced is to be fed into the EAC distribution network. Access to the plant will be from the north via the existing road/track network, which will need to be upgraded.

The park will be connected to a new EAC substation to be constructed within RAF Station Akrotiri. The underground connection between the park and the RAF boundary has been addressed in the study at Reference B, which concluded that there will be no significant impact on designation interest. The new substation and the part of the connection within RAF Akrotiri have been addressed in another study, which concluded that there will be no significant impact on designated features. Also, the underground cable connecting Kolossi substation with RAF substation will be upgraded. Another assessment has concluded that there will be no significant impact on designated features.

3. Likely impact on Special Protection Areas (SPAs), Special Areas of Conservation (SACS) and other important features - cumulative impact - alternative solutions - mitigation - residual impact

The project is likely to have the following significant impact on Akrotiri Wetlands SPA, Akrotiri Cliffs SPA, Episkopi Cliffs SPA, Akrotiri SAC and Akrotiri Ramsar Site.

A. Habitats and flora

The footprint of the project (Appendices 1 and 2) covers agricultural land, including cultivations for seasonal crops, citrus plantations and hedges/windbreaks at the boundaries of the different plots involved. It does not include any natural habitats and this was one of the guiding factors in the consideration of different alternatives

at the early design stages. The only natural habitat affected is the area where the power cable will cross '*Juniperus phoenicea* Arborescent Matorral' habitat (code 5212). The impact has been assessed in the study at Reference B, which suggested that there will be no significant impact. However, it is necessary to apply mitigation measures, such as collection and re-instatement of top soil and monitoring/managing invasive species, particularly *Acacia saligna* for a period of time.

Generally, no significant direct impact is expected on SAC habitat, but significant impact has been identified on *Urtica membranacea*. This plant species, prior to its identification within the project site, had been included in the Cyprus Red Book (Reference C), as vulnerable, with a total population of 2,700-3,000 at four locations. The population recorded in the Cyprus Red Book has been decreasing due to various human activities and land-use changes (Reference D). The population within the proposed development site has been estimated at 50,000 – 55,000, within the citrus plantations and the hedges/tree-lines along plot boundaries. Nearby citrus plantations, outside the project foot-print have been surveyed by EAC's environmental consultants, but the plant has not been found (Reference B).

Consultation with EAC and their environmental consultants has produced the following mitigation measures in respect of *U. membranacea*:

- a. EAC to maintain part of the citrus plantations, shown on the plan at Appendix A. The plantation will be maintained using best agricultural practices to be agreed with the authorities in order to benefit *U. membranacea* but also the significant bird interest prescribed under 'Birds' below.
- b. EAC to keep the hedges/tree-lines along the north boundary of the project, which is also expected to benefit the plant and bird interest.
- c. The seeds from the plants to be affected by the project to be collected and used to plant parts of the green areas to be maintained within the project fenced site.
- d. Seeds to be deposited in existing seed banks in Cyprus.
- e. Seeds to be planted in botanical gardens in Cyprus.
- f. The top soil from affected areas, containing *U. membranacea* seeds to be collected and used in the green areas of the project.
- g. A three year monitoring program to be sponsored by EAC to monitor the success of the mitigation measures and the *U. membranacea* population within the project site.

The mitigation measures need to be finalised in consultation with the authorities based on expert advice from the Cyprus Forestry Department. All mitigation measures for the project need to be implemented through a Construction Environmental Management Plan (CEMP), which will draw together all environmental management required for the project.

B. Birds

I. All birds in the designation of Akrotiri Wetlands SPA and Akrotiri Cliffs SPA

Two potential issues have been raised for possible impact on the designated bird species using the area. The first one refers to the reflections from the photovoltaic panels and the possible effect on bird navigation and orientation. A literature check and discussion with experts has so far found no evidence to support this risk. The second issue relates to bird mortality due to collisions with the photovoltaic panels caused by the 'lake effect'. This risk has been considered in the US following a Federal study on bird mortality at three solar energy facilities in California (Reference E). This issue appears to be quite complex, involving significant gaps in knowledge in quantitative (number of birds at risk) and qualitative (species of birds at risk) terms. Any mortality expected to be caused by the 'lake effect' should be assessed cumulatively with other sources of bird mortality in the area listed in Akrotiri Peninsula Management Plan (Reference F).

II. Eleonora's falcons

Eleonora's falcons are migratory breeding birds in Cyprus, nesting on the sea cliffs between Akrotiri and Cape Aspro. They are included in the 2010 SBAA designation of Akrotiri Cliffs SPA (32 nesting pairs average 2003-2008) and Episkopi Cliffs SPA (37 nesting pairs average 2003-2008) (Reference G). During the last three years (2014-2016) Akrotiri Cliffs hosted 29 nesting pairs and Episkopi Cliffs 27 nesting pairs, out of an average of 74 nesting pairs in the whole of Cyprus (References H, I).

The SPA designations in 2010 were based only on the nesting sites for this species, as there was no information available at the time in relation to other habitat uses.

A study is underway (Reference I), where 14 individuals from the Akrotiri colony (13 breeding and 1 non-breeding) have been fitted with transmitters which record locations of activity of the birds. The preliminary results of this study show that there are two main areas of activity of this colony in the whole of Cyprus (Appendix 3), one of which is Akrotiri Peninsula (Appendix 4). The study has also shown 72 hotspots of activity of the Akrotiri colony (excluding the nesting sites), in the whole island, 26 of which (36%) involve citrus plantations with tall tree-lines along plot boundaries. These hotspots mostly involve feeding activity. Out of the 72 hotspots in the whole of Cyprus, 38 (53%) are located at Akrotiri Peninsula (Appendix 4). Out of all the activity hotspots in Cyprus, 4 (6%) are within Bishop's Farm at Akrotiri and 2 (3%) within the footprint of the proposed development (Appendix 5). Out of the 38 hotspots within the peninsula, 34 (89%) are within private land, which is subject to land-use changes. Some of these hotspots have already been earmarked for development and/or change of land use, through different processes in both the Republic of Cyprus (RoC) and the SBAs. The biggest project in scale, which was expected to have an impact on Eleonora's Falcons was the Lanitis golf development within the plantations in the RoC, north of Akrotiri Salt Lake. Certain conditions for mitigation and monitoring were imposed under the environmental assessment of the project in relation to the bird interest. The Cyprus Environment Department has been asked for an update on the progress and results of these conditions with a

view to obtain more information for this AA. In the meantime, in an effort to apply the precautionary principle, the mitigation at 3 (a) above has been proposed, which is expected to maintain some of the feeding habitat interest for Eleonora's falcons within the project footprint. This will secure the long-term availability of such habitat, whereas the current statutory and management regime provides no control of the authorities over the change of fruit farming to other agricultural uses. In fact the agricultural land within Bishop's farm – and elsewhere in the peninsula – has changed considerably in the last few years from fruit-farming to seasonal crops (Appendices 6 and 7). It is expected that land-use change will intensify after the implementation of the new policy on non-military development within the SBAs, which is underway.

III. Red-footed falcons

The migratory Red-footed falcons qualified as a threatened bird-species for the designation in 2010 of Akrotiri Wetlands SPA. The designation was based on existing data and a joint study carried out in 2009 (Reference J) and included Akrotiri wetlands as well as extensive farmland north of Akrotiri Marsh. The designation covered only the 'Bishop's Pool' from the Bishop's estate, although Red-footed falcons (up to 31 birds) were observed within the citrus and seasonal plantations of the farm. The same applied to other farmland areas east of Trakhoni (within the SBAs) and between Asomatos and Trakhoni (within the RoC), which were not included in the designation either. The Roc Game Fund has been carrying out systematic surveys on the species and the data relating to the Bishop's farm have been requested in order to inform further the AA. Similarly with Eleonora's falcons, the farmland habitat used by the Red-footed falcons in both the RoC and the SBAs is at risk from development and/or land-use change. This includes the Lanitis golf development and the environmental assessment information, held by the RoC Environment Department, is relevant to this species as well. The current-project mitigation proposed for Eleonora's falcons is expected to benefit the Red-footed falcons as well. The change of fruit-farming to other land-uses within Bishop's farm and other areas on the peninsula outlined above in relation to Eleonora's falcons, is affecting the Red-footed falcon interest as well.

C. Other protected species

A protected species licence is required for any activity affecting fauna of European interest or local importance and/or any wild bird under the Protection and Management of Nature and Wildlife Ordinance, 2007 (Reference K) and the Game and the Game and Wild Birds Ordinance, 2008 (Reference L). A licence is required for activities affecting protected trees under the Forest Ordinance, 2014 (Reference M).

4. Uncertainty and gaps

At this stage there is uncertainty in the following areas and/or more information is required to inform decision-making and management in general:

- A. Progress and results of the mitigation, monitoring and other measures imposed under the EIA/AA process for the Lanitis Golf development in respect of bird interest.
- B. Data collected by the RoC Game Fund on Red-footed falcons.
- C. Quantification of the potential risk for bird collisions due to the 'lake effect'. If there is significant risk, need cumulative impact assessment with other bird mortality.
- D. Habitat requirements of Eleonora's falcons and Red-footed falcons and options to secure favourable conditions for the two species under the future land use in Akrotiri Peninsula.
- E. Optimal conditions for the conservation of *Urtica membranacea* within the project footprint.
- F. Uncertainty in the degree of effectiveness of the mitigation measures proposed for the project.

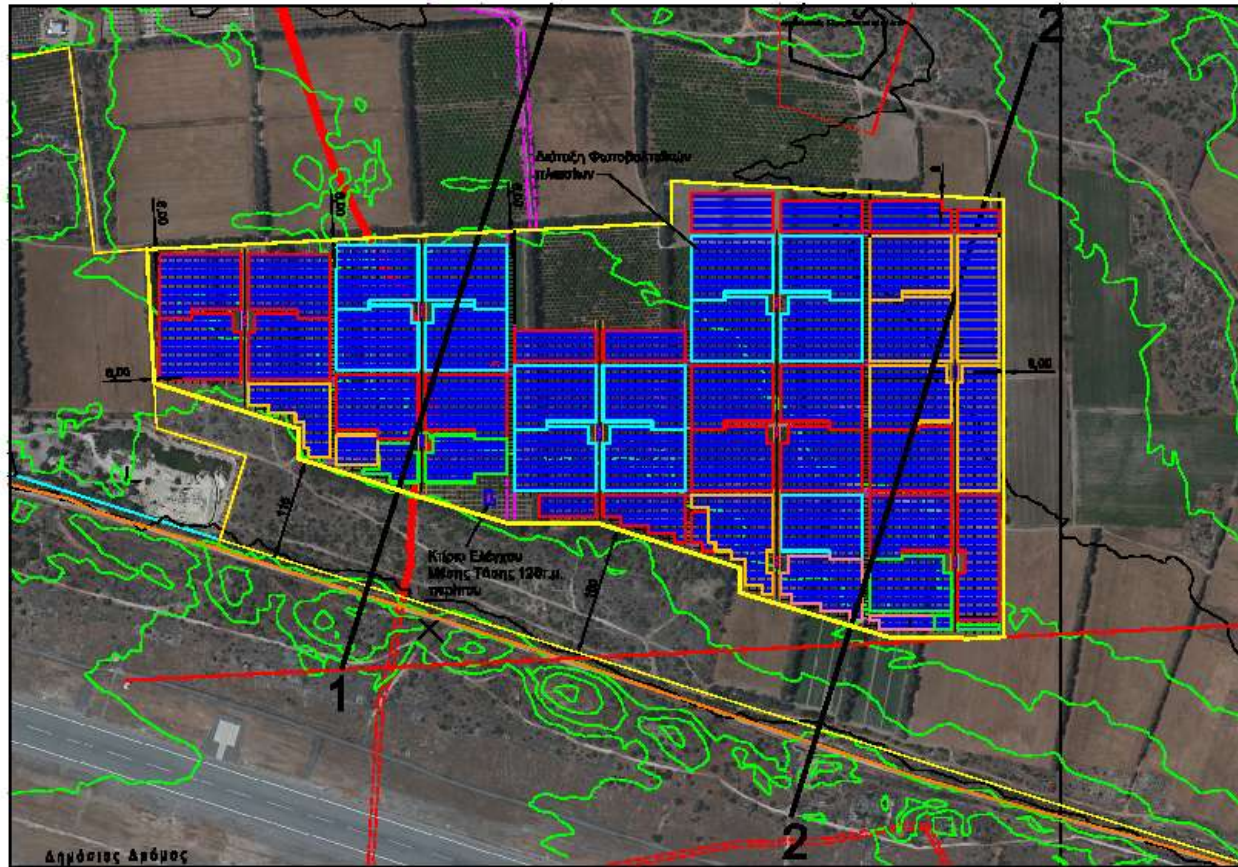
5. Appendices

Appendix 1

Project footprint (red line) and citrus plantation proposed to be maintained (orange circles)



Appendix 2
Arrangement of the solar panels within the project footprint



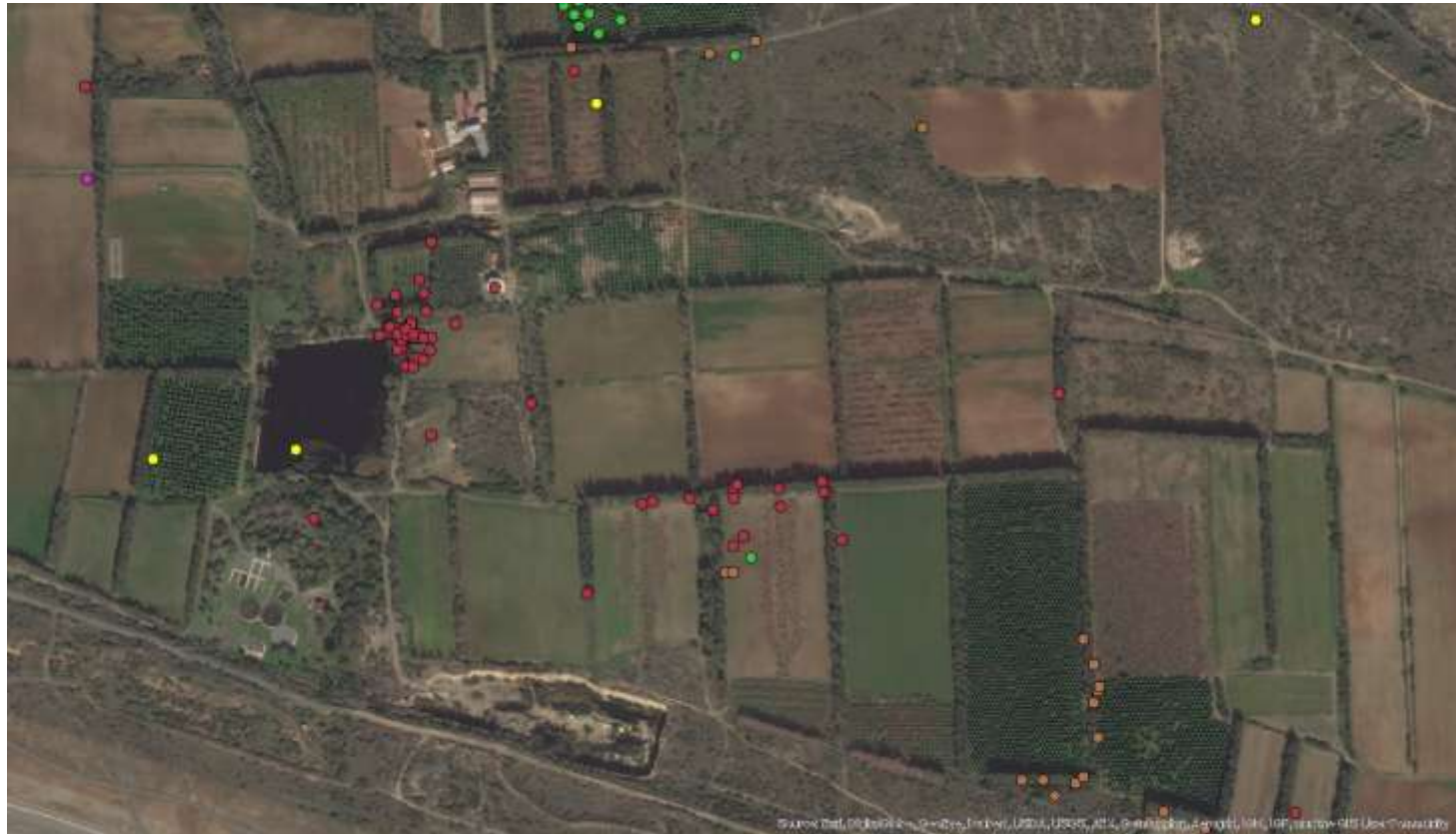
Appendix 3
Eleonora's falcon hotspots in Cyprus



Appendix 4
Eleonora's falcon hotspots in Akrotiri Peninsula



Appendix 5
Eleonora's falcon hotspots within Bishop's Farm



Appendix 6

Citrus plantations within Bishop's Farm in 2003



Appendix 7

Citrus plantations within Bishop's Farm in 2016



6. References

- A. EIA for the construction and operation of a 20 MW photovoltaic park at Akrotiri, April 2015, AEOLIKI
- B. Appropriate assessment of environmental impacts of the intended creation of a 20 MW photovoltaic park at Akrotiri, July 2016, Frederick University
- C. The Red Data Book of the Flora of Cyprus, 2007, Cyprus Forestry Association
- D. Communication P. Charilaou (SBAA) with Takis Papachristoforou (Cyprus Forestry Department) in November 2016
- E. Position Paper, Solar Energy, American Bird Conservancy, found at <https://abcbirds.org/wp-content/uploads/2015/05/PP-Solar-Energy.pdf>
- F. Akrotiri Peninsula Environmental Management Plan, SBAA Environment Department 2012, found at http://www.sbaadministration.org/home/docs/eco/20121002_AKI_PEN_MGT_PLA_N.pdf
- G. SPA Designation Order, SBAA, found at http://www.sbaadministration.org/home/legislation/01_02_09_06_PIs/01_02_09_06_51_PI_2010/20100429_PI-13_u.pdf
- H. Birdlife Cyprus, Cyprus Bird Reports 2012, 2013, 2014
- I. Unpublished PhD research data, Thomas Hadjikyriakou
- J. Distribution and population of the Red-footed falcon *Falco vespertinus* on the Akrotiri Peninsula, Davidson and Charilaou, 2009, found at http://www.sbaadministration.org/images/AEEIC/publications/20090304_RFFreport.pdf
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- L. The Game and the Game and Wild Birds Ordinance, 2008, found at http://www.sbaadministration.org/home/legislation/01_02_09_04_INCON/G/20160921_Game-and-Wild-Birds-Ordinance-2008.pdf
- M. The Forest Ordinance, 2014, found at http://www.sbaadministration.org/home/legislation/01_02_09_05_ORDINANCES/01_02_09_05_55_ORD_2014/20140808_Ord-26_G1750.pdf