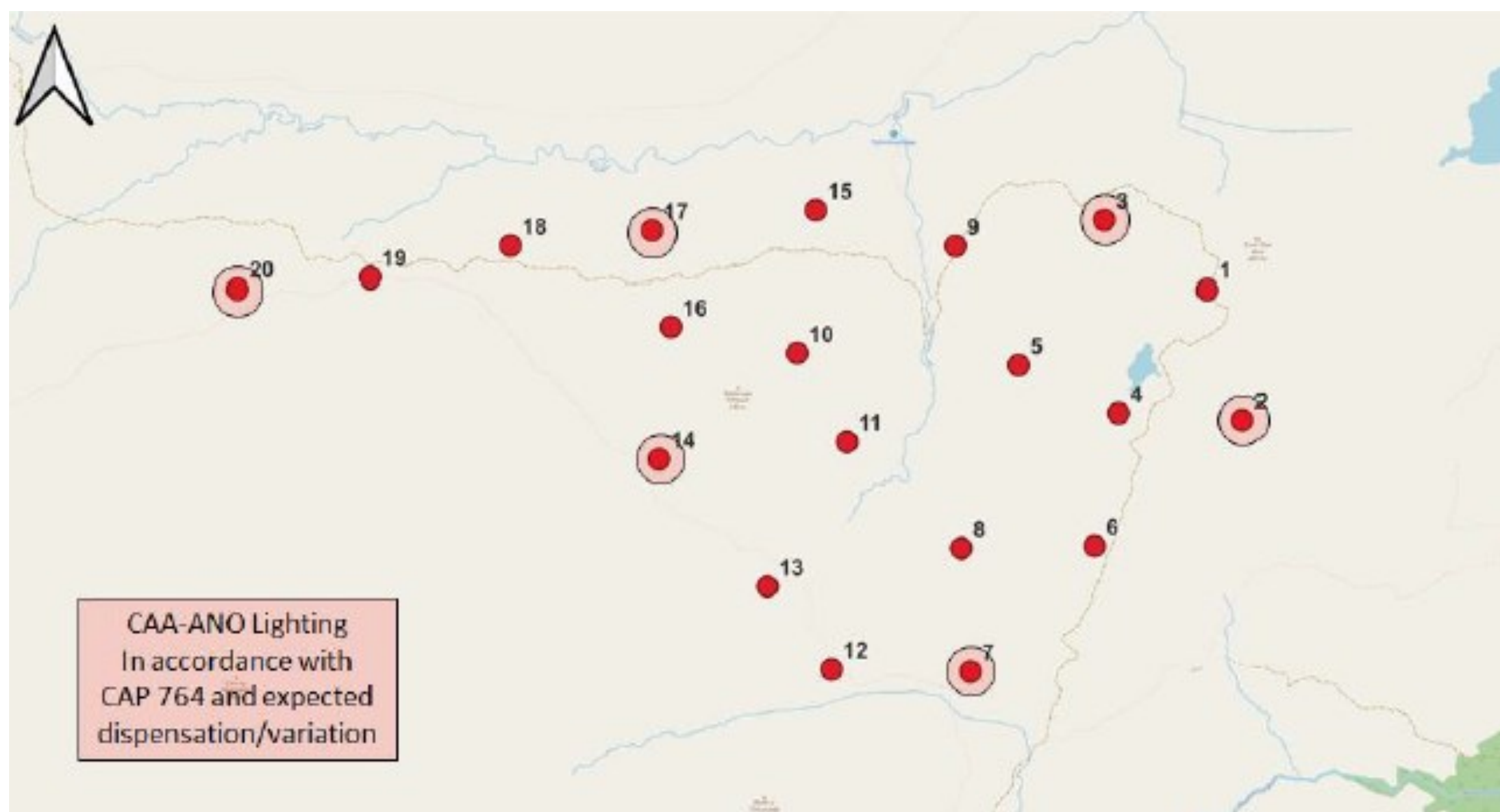


Aviation Lighting

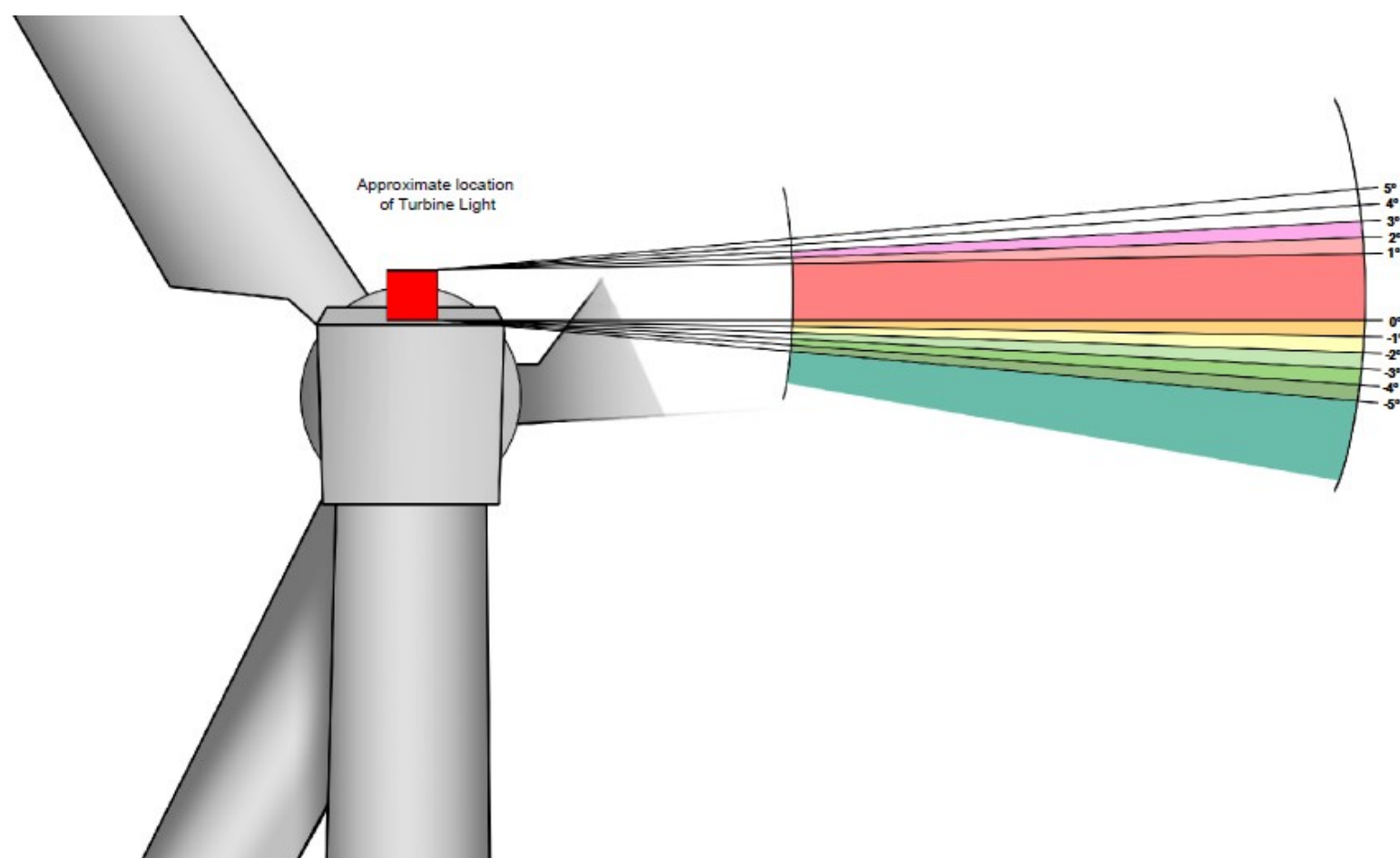
AVIATION LIGHTING PROVISION

All turbines above 150m to tip height require aviation lighting as per Aviation law. This is to warn lower flying aircraft of the presence of turbines.

- Following consultation with the Civil Aviation Authority (CAA), and Ministry of Defence (MOD) a lighting scheme for Ballach has been agreed that reduces the requirement for aviation lighting from 20 to **6 turbines**.
- Specifically turbines 2, 3, 7, 14, 17 and 20 will be lit, as per the below map:



- The standard lighting arrangement is for 2000 candela max lighting to be installed. In periods of <5km visibility, it is expected this lighting is on. When greater than 5km, then this can be dimmed to 10% (i.e. 200cd), making a big difference to the effects.
- Not all turbines lights will be seen from all locations due to topography.
- Indicative calculation suggest that instead of a maximum of 2000cd light received at source, when lights are in <5km visibility mode, the real candela brightness will often be less than 500cd.
- Indicative calculations also suggest, combining historic weather and atmospheric records, the aviation lights may be at their brightest around 4% of the year (on 14 days of 365). Conversely, they are predicted to be operating at 10% brightness around 96% of the year (on 351 days of 365).



Intensity of Turbine Light shown in Candelas (cd)

Vertical Angle of Lighting from Nacelle	Maximum and Minimum Luminous Intensity (Candela / cd.)	10% of Maximum and Minimum Luminous Intensity (Candela / cd.)
Above 5°	147 to 34	15 to 3
4° to 5°	247 to 134	25 to 13
3° to 4°	481 to 237	48 to 24
2° to 3°	1160 to 481	116 to 48
1° to 2°	2119 to 1170	212 to 117
0° to 1°	2206 to 1968	221 to 197
-1° to 0°	2036 to 987	204 to 99
-2° to -1°	996 to 383	100 to 38
-3° to -2°	394 to 197	39 to 20
-4° to -3°	199 to 131	20 to 13
-5° to -4°	131 to 92	13 to 9
Below -5°	94 to 38	9 to 4