

Appendix 8-4

Summary of Flight Line Surveys

Appendix 8.4. Summary of flight line surveys.

Appendix 8.4a Summary of non-breeding season flight line surveys conducted in October to November 2009

As noted in Section 8.6.3 of Chapter 8, flight line surveys were conducted in November and December 2009 in order to further investigate the importance of the channel for egrets during the winter months following the change in water management regime, and to determine whether egrets moving between the channel and the main Deep Bay wetlands were traversing the Project Area, and hence might, potentially, be adversely impacted by development..

As shown in Figure 1-a, five flight lines were identified, as follows:

- *Flight Line 1* - Between the Drainage Channel and the wetlands between Fairview Park and Palm Springs passing over the eastern side of Fairview Park;
- *Flight Line 2* - Following the Drainage Channel (and including birds dropping into the Channel or flying out of the Channel), with some birds continuing over the highway towards Ngau Tam Mei;
- *Flight Line 3* - Following the Drainage Channel over the highway and then following the eastern edge of the Project Area and heading to/from the wetlands between Fairview Park and Palm Springs by either skirting around, or continuing over, the southwest part of Palm Springs;
- *Flight Line 4* - Passing directly over the Project Area between the channel and the wetlands between Fairview Park and Palm Springs;
- *Flight Line 5* – Between the Drainage Channel and the farmland and grassland/shrubland to the south of the Channel.

The numbers and percentages of each ardeid species using each flight line are detailed and discussed below, whilst the percentages using each flight line are illustrated in Figures 1-b to 1-k.

Table 1. Flight-line counts: Grey Heron

Flightline number shown	Number recorded in high tide counts	Percentage of total in high tide	Number recorded in low tide counts	Percentage of total in low tide
1	4	57.1	12	57.1
2	0	0.0	4	19.1
3	1	14.3	4	19.1
4	2	28.6	1	4.8
5	0	0.0	0	0.0
Total	7	100	21	100

Grey Heron was the least frequently recorded ardeid species using the flight lines (other than single Intermediate Egrets and Black-crowned Night Herons, not mapped). Most Grey Herons (57% during both high and low tides) followed Flight Line 1, passing high over Fairview Park and few birds followed or dropped into the Channel. While 29% of Grey Herons flew over the Project Area (Flight Line 4) at high tide, this only comprised two individuals and is not considered significant.

Table 2. Flight-line counts: Great Egret

Flightline number shown	Number recorded in high tide counts	Percentage of total in high tide	Number recorded in low tide counts	Percentage of total in low tide
1	15	24.6	26	37.7
2	35	57.4	18	26.1
3	5	8.2	9	13.0
4	1	1.6	16	23.2
5	5	8.2	0	0.0
Total	61	100	69	100

Great Egret was the second most common species utilising the flight lines. Numbers were very similar at high and low tides but the pattern was very different. At high tide most birds (57%) followed the Drainage Channel (Flight Line 2), with a significant proportion (25%) flying to the west of the Project Area and over Fairview Park (Flight Line 1). At low tide this remained the most important Flight Line, with 38% of movements, while 26% followed the Channel (Flight Line 2) and 23% crossed the Project Area (Flight Line 4).

Table 3. Flight-line counts: Little Egret

Flightline number shown	Number recorded in high tide counts	Percentage of total in high tide	Number recorded in low tide counts	Percentage of total in low tide
1	22	29.0	29	13.4
2	9	10.5	98	45.2
3	40	52.6	64	29.5
4	6	7.9	26	11.9
5	0	0.0	0	0.0
Total	77	100	217	100

Little Egret was the most abundant ardeid species recorded during the surveys, comprising 58% of all ardeid movements recorded. There was a marked difference in the numbers observed between high and low tides (26% and 73% of observations respectively), reflecting the fact that this is the commonest species actually foraging in the channel (as reflected in the data collected for CEED). At high tide most Little Egrets (53%) were using Flight Line 3 (to the east of the Project Area), with a significant minority (29%) using Flight Line 1 (west of the Project Area and over Fairview Park); at low tide 45% were following the Channel (Flight Line 2), with 30% using Flight Line 3.

Table 4. Flight-line counts: Chinese Pond Heron

Flightline number shown	Number recorded in high tide counts	Percentage of total in high tide	Number recorded in low tide counts	Percentage of total in low tide
1	1	3.86	0	0.0
2	5	19.2	12	46.2
3	10	38.5	12	46.2
4	4	15.4	1	3.9
5	6	23.1	1	3.9
Total	26	100	26	100

Compared to Great and Little Egrets, relatively few Chinese Pond Herons were observed (10% of all observations), with the same numbers noted at high and low tides. As with Little Egret, Flight Line 3 was most important at high tide, with 39% of all observations, with similar numbers using each of Flight Lines 2, 4 and 5. At low tide the majority of individuals were recorded using Flight Lines 2 and 3. Chinese Pond Heron was the only species which was not regularly observed using Flight Line 1, suggesting that this species may be deterred by the presence of the buildings.

Appendix 8.4b Summary of breeding season flight line surveys conducted in April to June 2011

Additional flight line surveys were conducted during April to June 2011 to further investigate the importance of the Project Area as a foraging site for ardeids during the breeding season, especially birds breeding at Mai Po Village egretty, which is located approximately 1.6km from the Project Area.

Mai Po Lung egretty is located approximately 2.1km from the Project Area, but is separated by hills which would impede the flight-lines of egrets; this egretty has also reduced in number in recent years, with only seven nests recorded in 2010, and it is not expected that significant numbers of birds would forage in or near the site. Birds passing the Mai Po Village egretty towards the Project Area would be recorded from surveys conducted at Mai Po Village egretty.

Flight-line surveys were conducted between April and June 2011 from a location close to Mai Po Village egretty to investigate the direction taken by birds leaving the egretty, in order to evaluate the relative proportion of birds heading towards the Project Area. Surveys at the egretty only recorded individuals of the two breeding species (Little Egret and Chinese Pond Heron). Individual birds seen leaving the egretty were followed until lost from sight, and the route taken by each individual was recorded. Simultaneous surveys were conducted at a location close to the Project Area to investigate the location of flight lines in and around the Project Area, and to investigate whether birds from the egrettries at Mai Po Village or Tung Shing Lei (located approximately 3.6km from the Project Area) may be foraging in the vicinity. These surveys recorded all individual ardeids (of all species) recorded flying through the area.

Observations at Mai Po Village Egretty

A total of 101 flight line observations were made for Little Egrets and 281 for Chinese Pond Heron. It is expected that this is an underestimate of the total number of birds leaving the egretty during the survey period due to the methodology used (following birds until they are lost from sight means other individuals may leave the egretty while the observer was following each individual). The relative proportion of birds flying in each direction, however, would be representative of the population as a whole.

Most birds recorded leaving the egretty (88.2% of Little Egrets and 91.1% of Chinese Pond Herons) flew towards Mai Po, Tam Kon Chau or other nearby wetlands. Only 11.8% of Little Egrets (12 individuals) and 8.9% of Chinese Pond Herons (25 individuals) followed routes which may lead towards the Project Area. These include routes in the direction of Wo Shang Wai which may pass over Palm Springs (used by seven Little Egrets and ten Chinese Pond Herons) and routes to the east of Royal Palms following the alignment of San Tin Highway (used by five Little Egrets and 15 Chinese Pond Herons).

Observations at Project Area

Many fewer birds were recorded during surveys at the Project Area than on surveys at the egretty, indicating that the Project Area does not provide an important resource for birds from the egretty. Observations were made of flight-lines (in all directions) for only 12 Little Egrets and 54 Chinese Pond Herons (compared to 101 and 281, respectively, from the egretty).

Of the birds recorded at the Project Area only five Little Egret and three Chinese Pond Heron were recorded arriving from the direction of the egretty and landing at sites between Ngau Tam Mei Channel and Palm Springs/Royal Palms (including birds landing within the Project Area or adjacent habitats at Yau Mei San Tsuen). These represent 5% and 1% of birds seen leaving the egretty (but note earlier comment that some birds leaving the egretty may be missed).

Another two Little Egrets and 17 Chinese Pond Herons (2% and 4% of the numbers seen leaving the egretty) were recorded arriving at the Project Area from the direction of the egretty but flew past the Project Area towards foraging locations elsewhere (including birds flying along Ngau Tam Mei Channel, and potentially landing in the channel).

Three Little Egrets and 17 Chinese Pond Heron were recorded flying past the Project Area towards the egretty, none of which flew directly from the site. The other birds recorded at the Project Area (two Little Egrets and 17 Chinese Pond Herons) flew past the Project Area but did not appear to be flying to or from the egretty and may have been non-breeding birds.

Other ardeids recorded during surveys at the Project Area included Great Egret (nine individuals), Cattle Egret (ten individuals) and Black-crowned Night Heron (seven individuals), none of which currently breed in the Deep Bay area.

Table 5. Summary of results from breeding season flight-line counts at Mai Po Village egretty and at Project Area

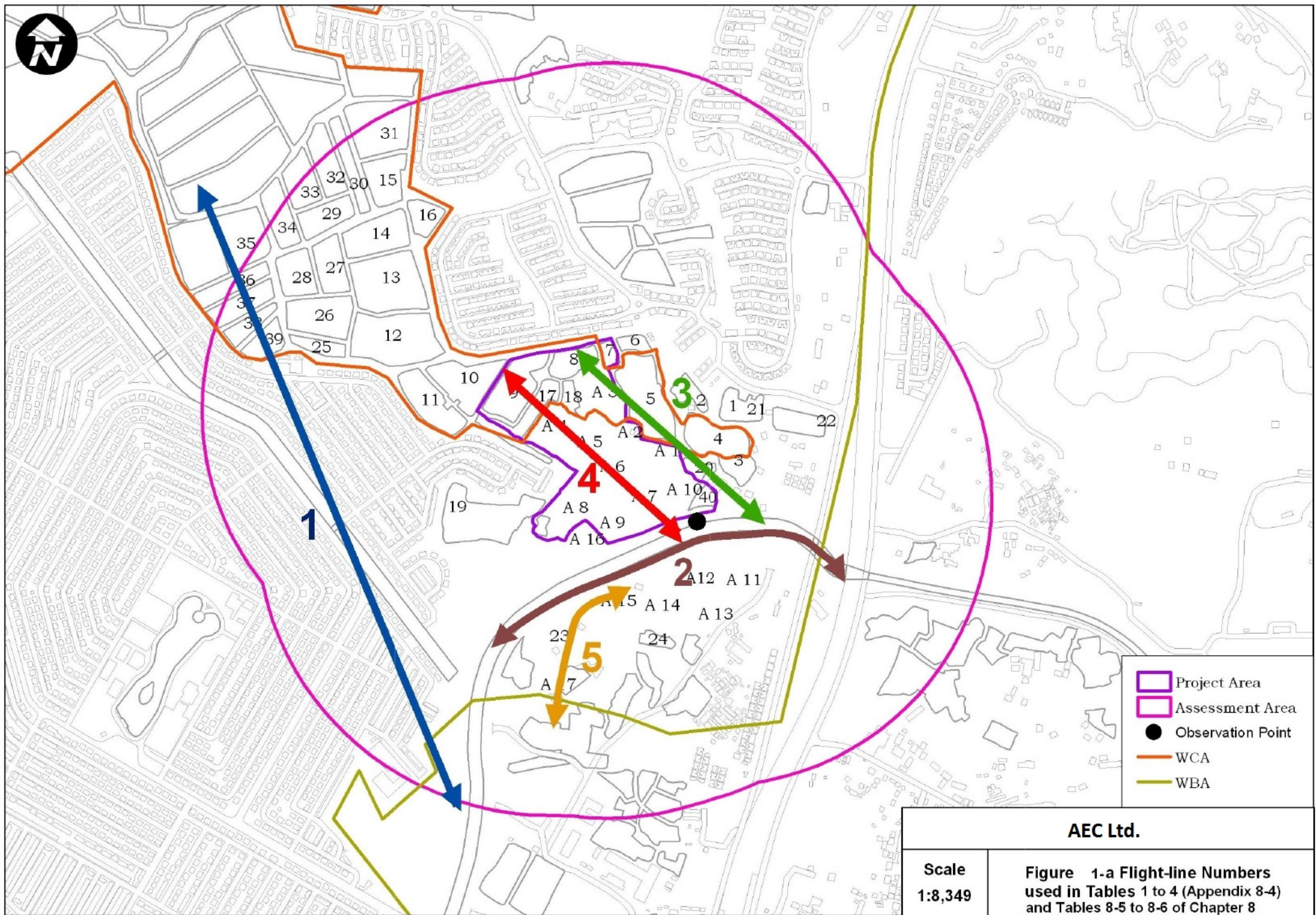
Flight Route	Little Egret	Chinese Pond Heron
Observations at Mai Po Village egretty		
From egretty in direction of Project Area	12	25
From egretty to other directions	89	256
Observations at Project Area		
From direction of egretty, landing north of Ngau Tam Mei channel	5	3
From direction of egretty, flying into or beyond Ngau Tam Mei Channel	2	17
From north of Ngau Tam Mei Channel, flying towards egretty	0	0
From Ngau Tam Mei Channel or further south, flying towards egretty	3	17
Other routes	2	17

Summary of breeding season observations

Observations indicate that most birds breeding at the Mai Po Village egretty fly towards Mai Po, Tam Kon Chau or other nearby wetlands in order to forage. According to the data this involves 88.2% of Little Egrets and 91.1% of Chinese Pond Herons. A smaller proportion of both species fly over or past Palm Springs / Royal Palms towards sites beyond these developments. The number of birds recorded arriving at the Project Area from the direction of the egretty is lower than the number recorded flying in this direction from the egretty, suggesting that some birds stop between the two sites or divert onto other routes towards foraging locations elsewhere. An even smaller number (only five Little Egrets and three Chinese Pond Herons) were recorded landing in the Project Area and adjacent wetlands at Yau Mei San Tsuen.

This indicates that only a very small proportion of the individuals breeding at the egretty forage within the site, and indicates that the proposed development would not be expected to have a significant impact on the foraging success of birds breeding at the egretty.

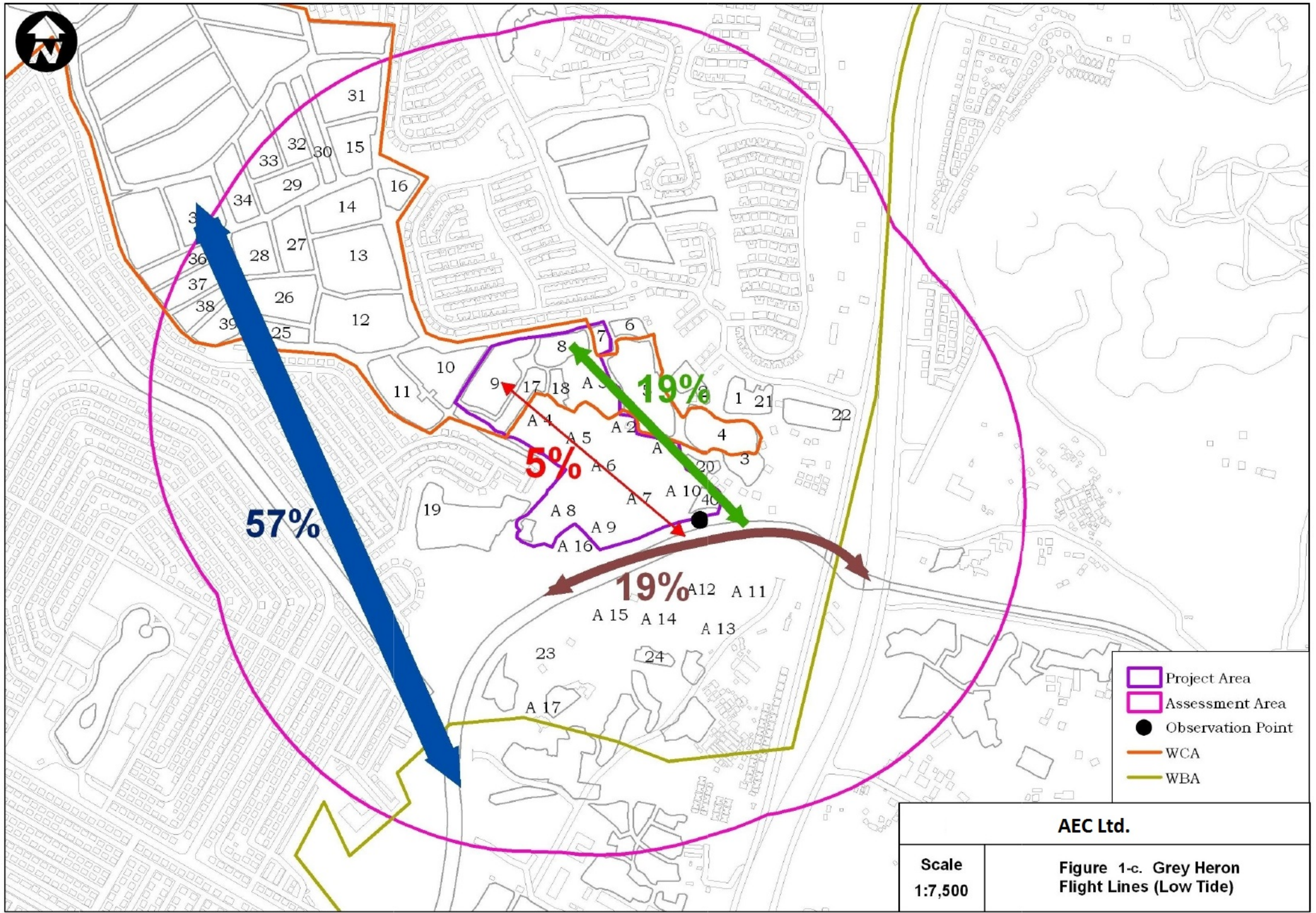
The observations are illustrated in Figures 2-a to 2-i.



- Project Area
- Assessment Area
- Observation Point
- WCA
- WBA

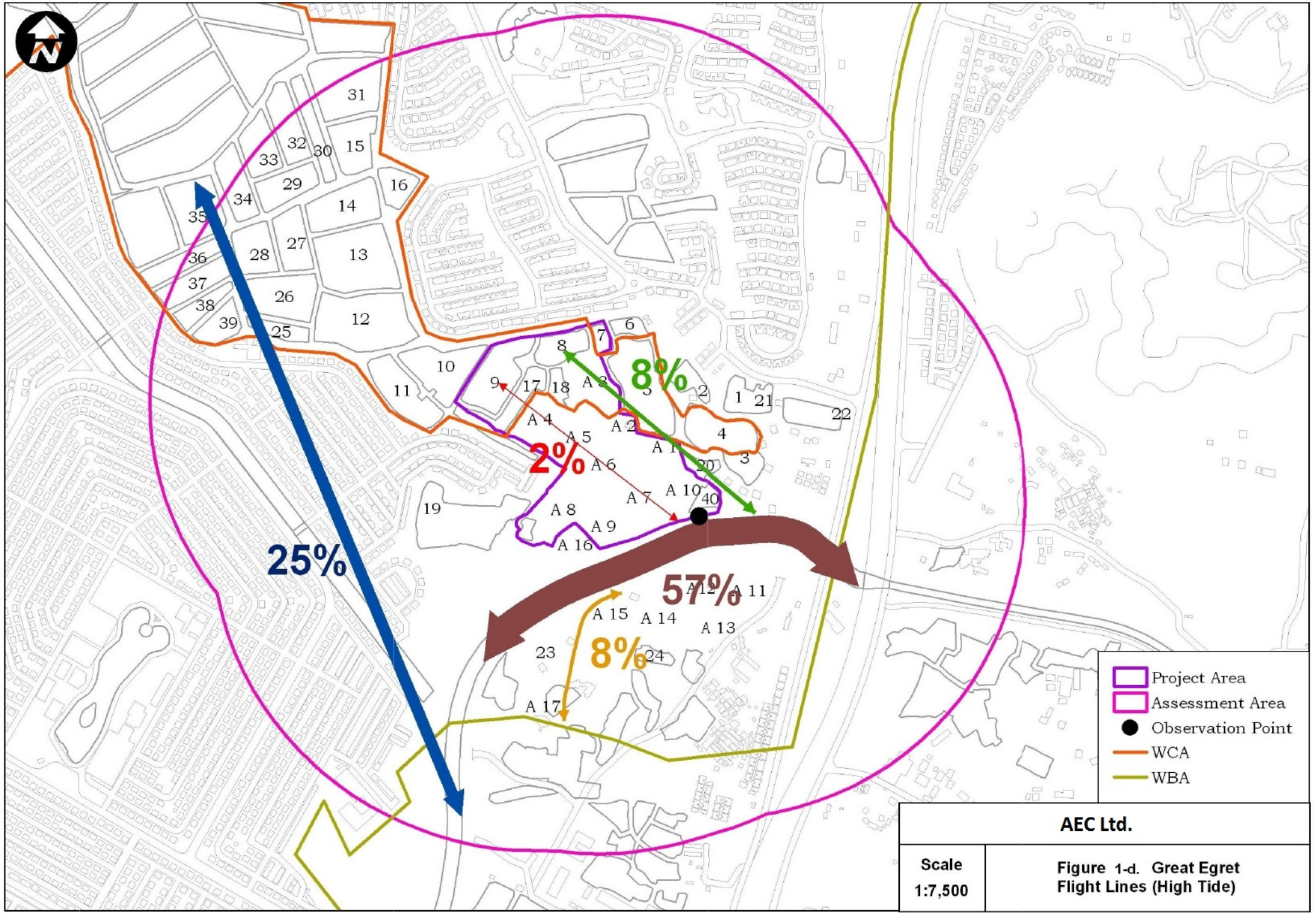
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Figure 1-a Flight-line Numbers
used in Tables 1 to 4 (Appendix 8-4)
and Tables 8-5 to 8-6 of Chapter 8



- Project Area
- Assessment Area
- Observation Point
- WCA
- WBA

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Scale 1:7,500	Figure 1-c. Grey Heron Flight Lines (Low Tide)

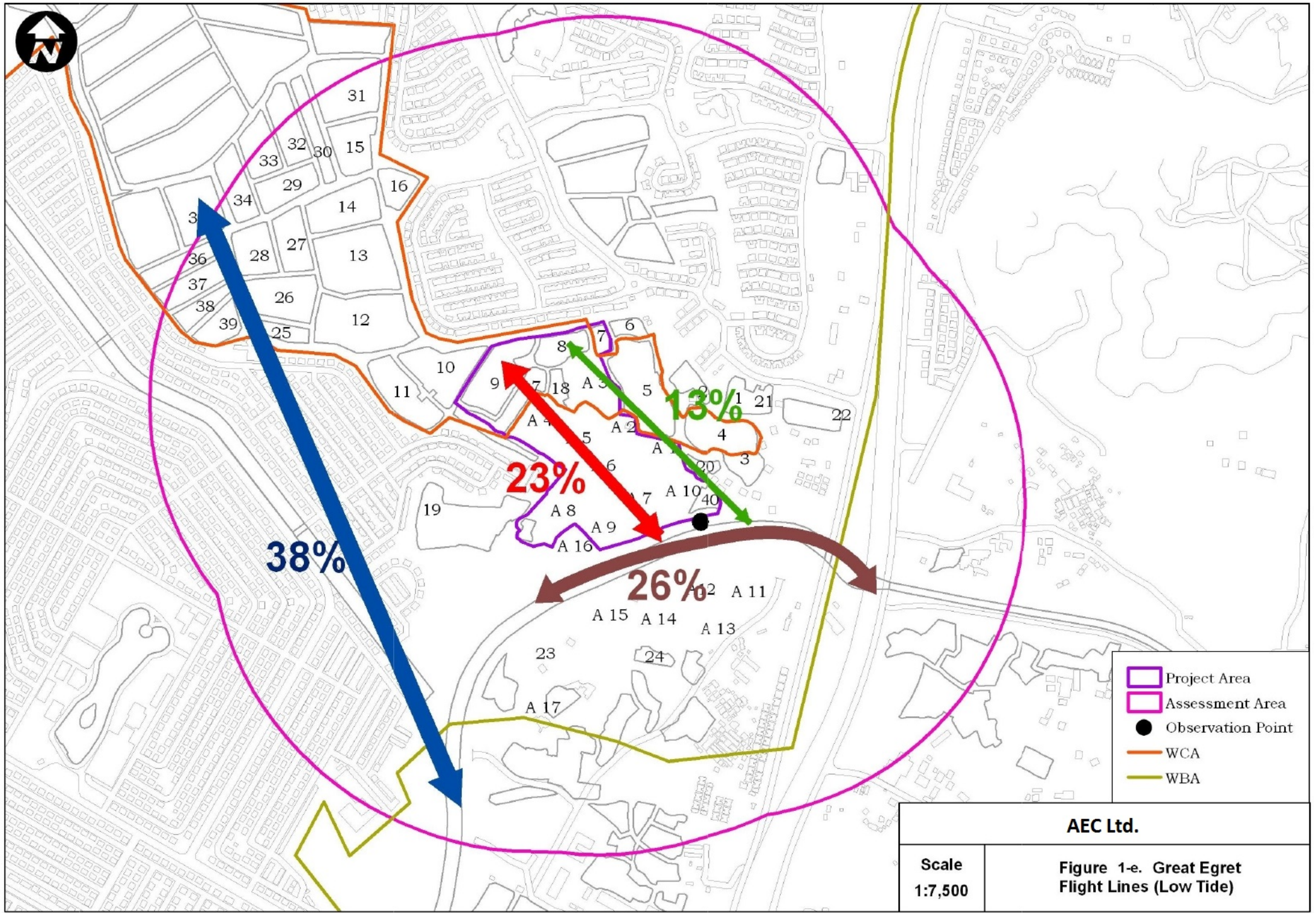


- Project Area
- Assessment Area
- Observation Point
- WCA
- WBA

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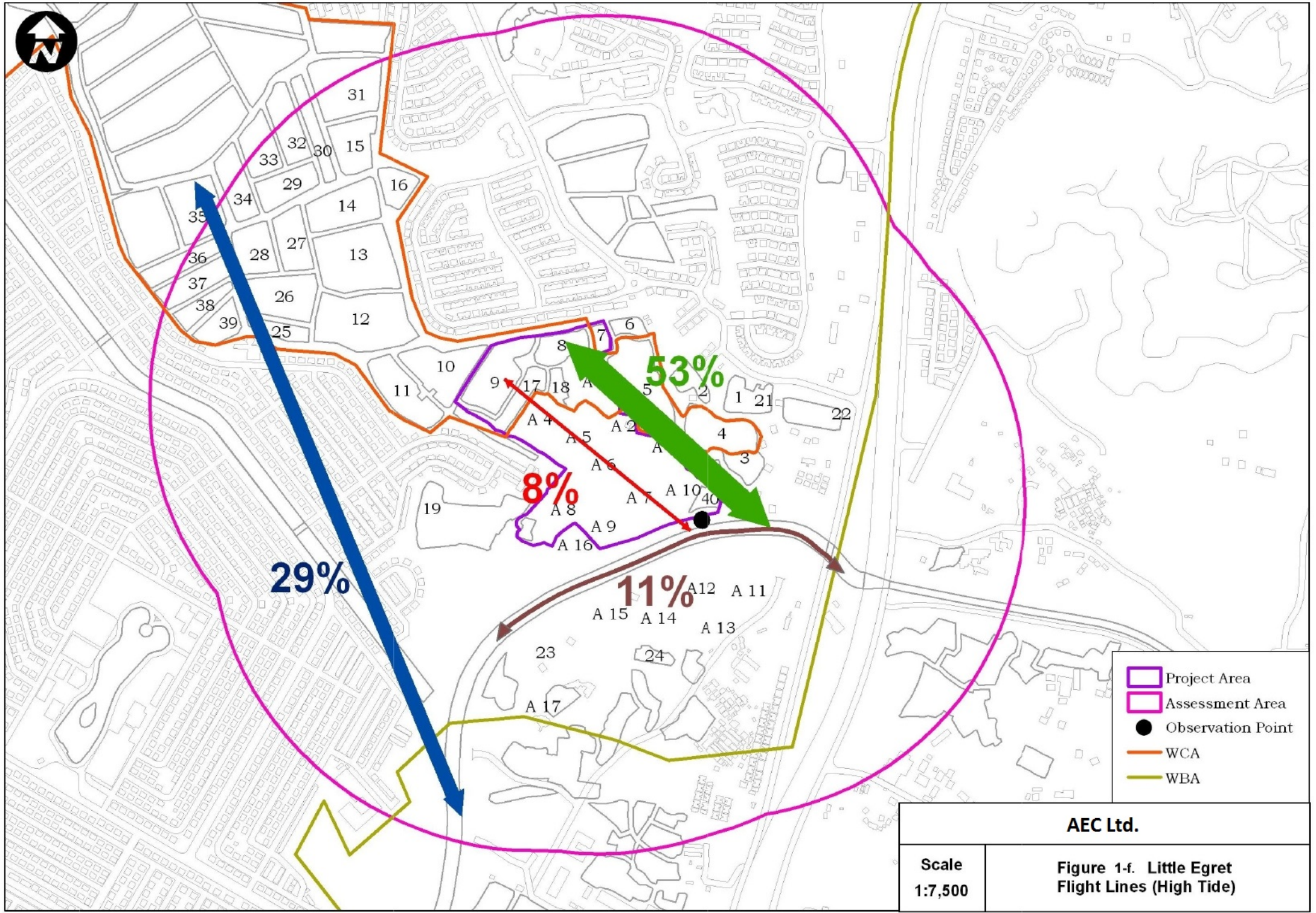
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Figure 1-d. Great Egret
Flight Lines (High Tide)



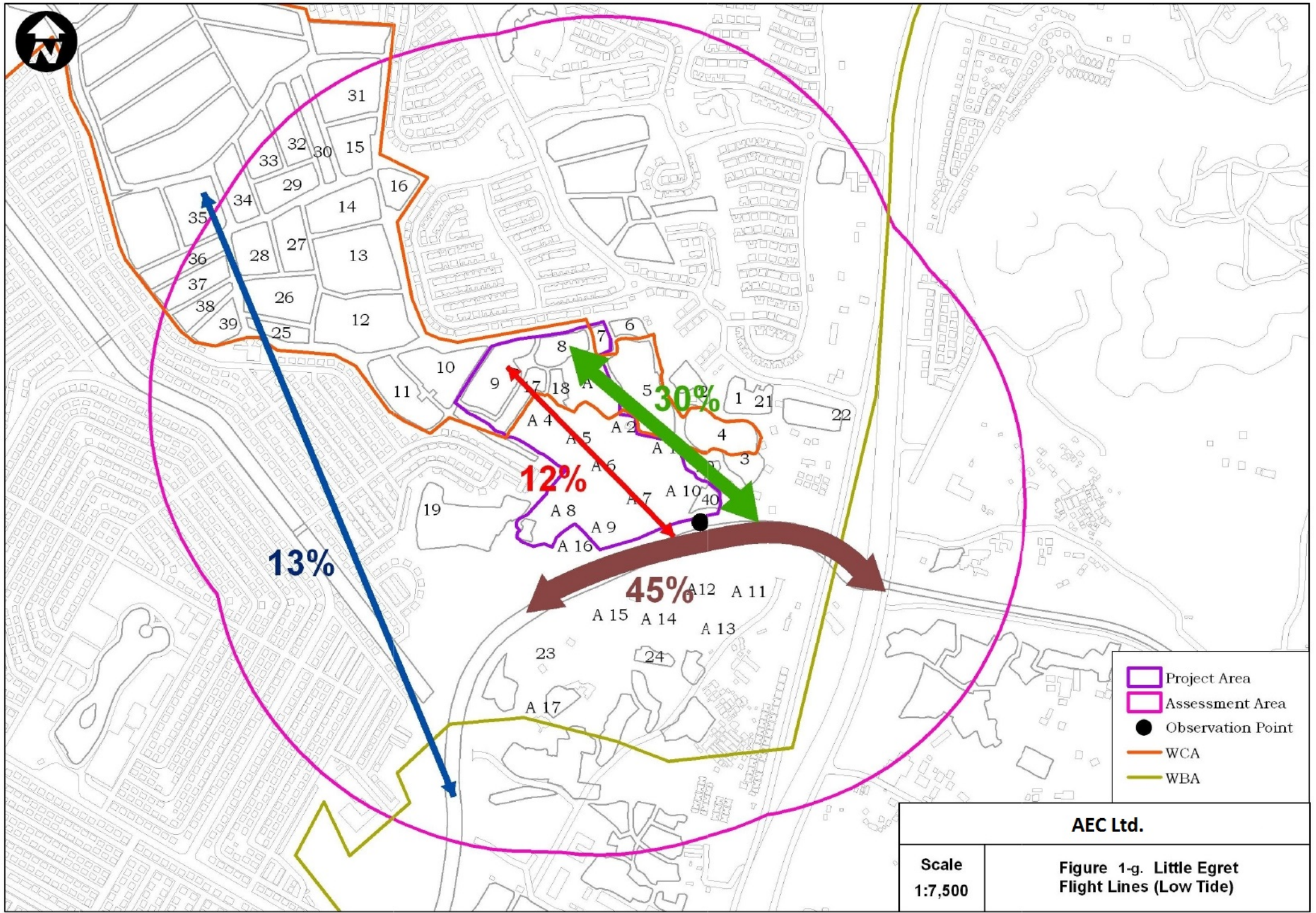
- Project Area
- Assessment Area
- Observation Point
- WCA
- WBA

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Scale 1:7,500	Figure 1-e. Great Egret Flight Lines (Low Tide)



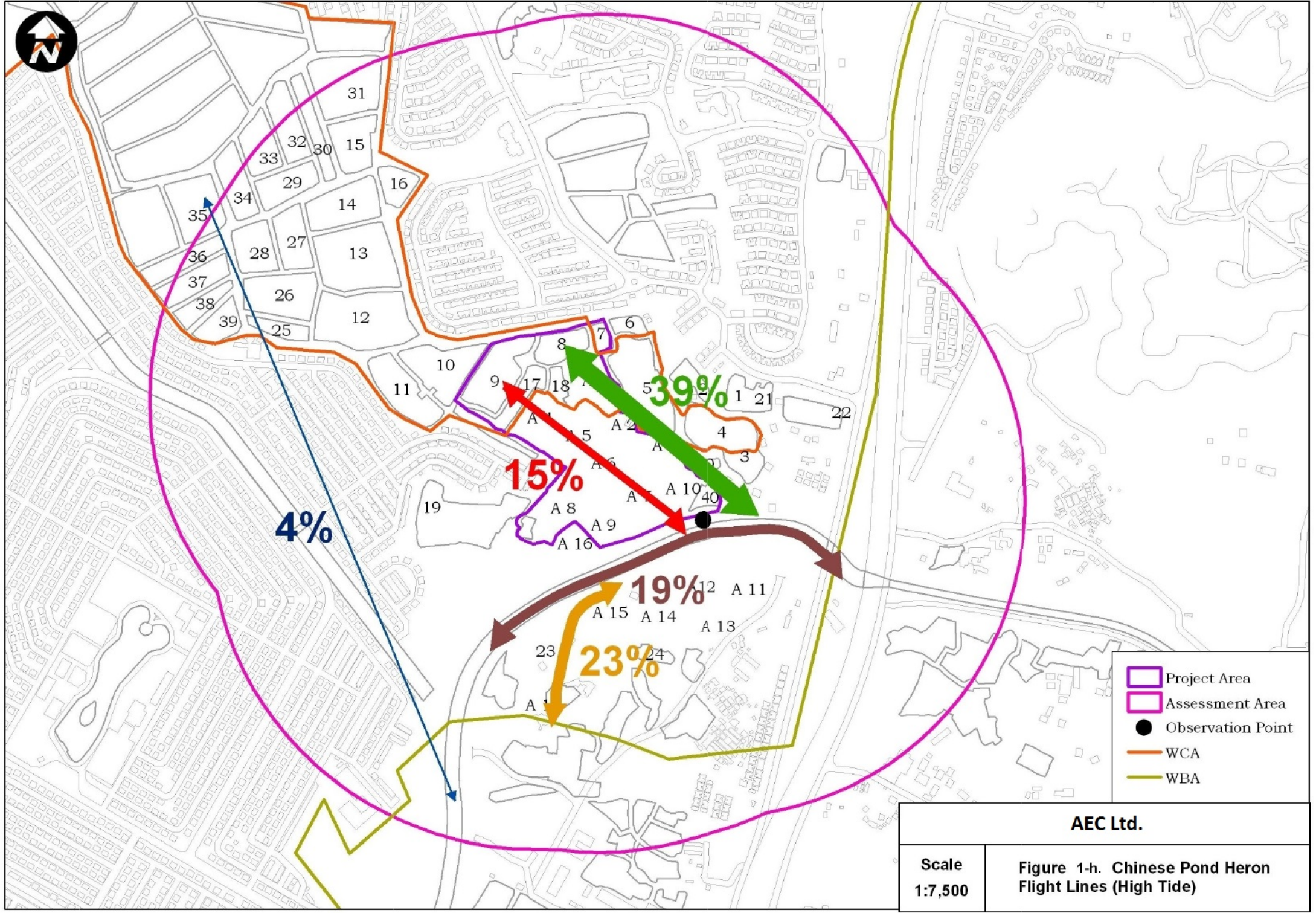
- Project Area
- Assessment Area
- Observation Point
- WCA
- WBA

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Scale 1:7,500	Figure 1-f. Little Egret Flight Lines (High Tide)



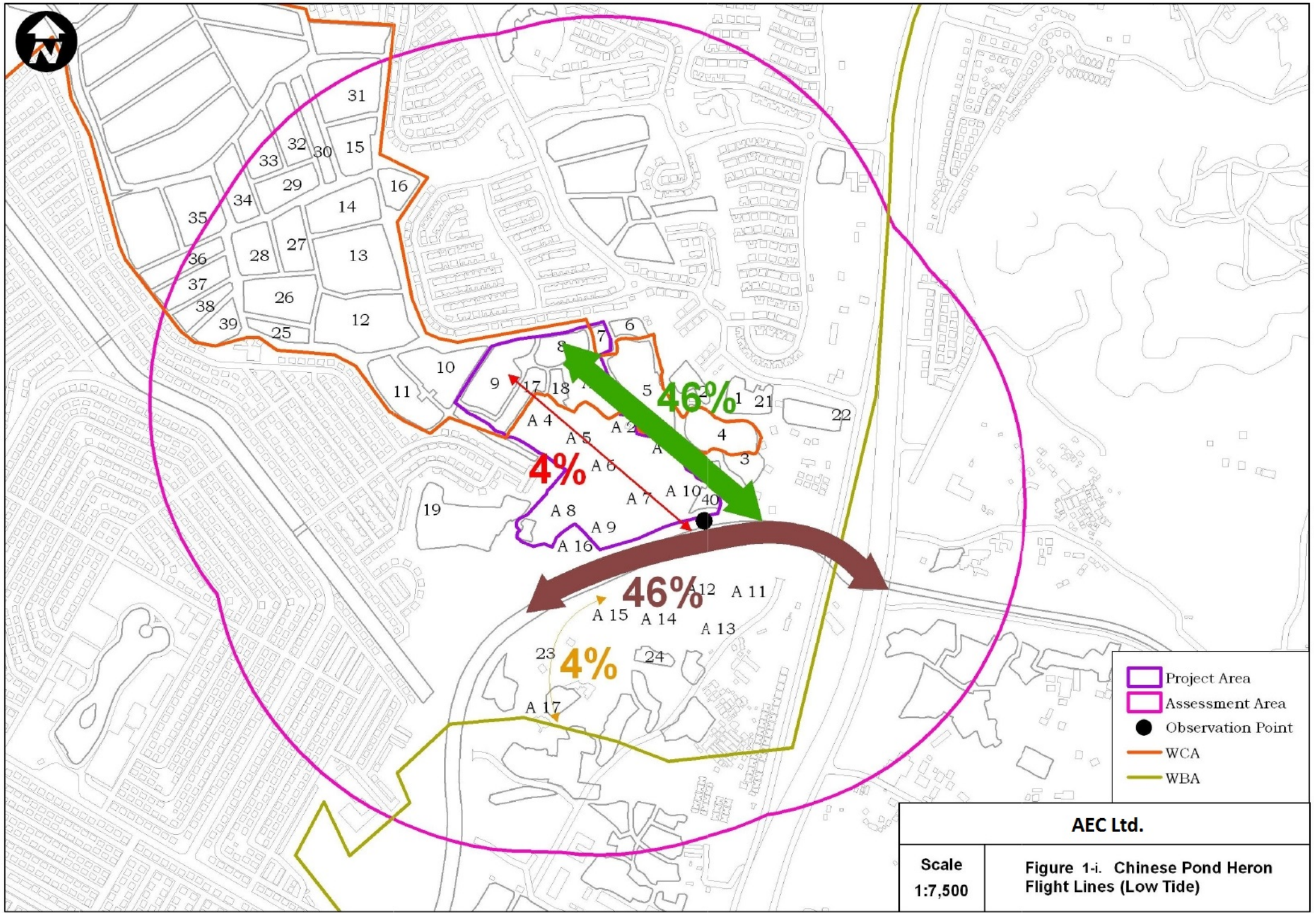
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Scale 1:7,500	Figure 1-g. Little Egret Flight Lines (Low Tide)
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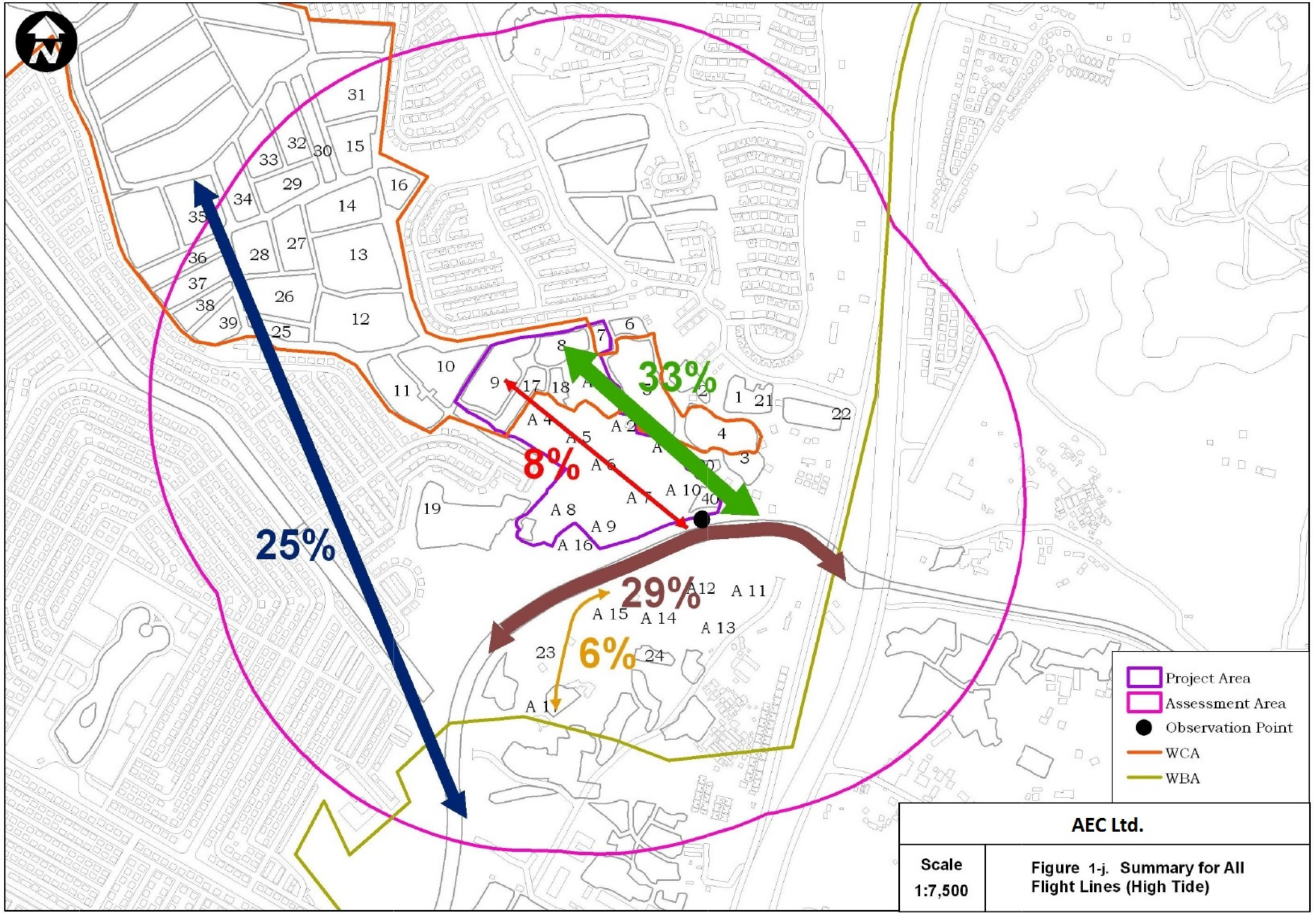
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Scale 1:7,500	Figure 1-h. Chinese Pond Heron Flight Lines (High Tide)
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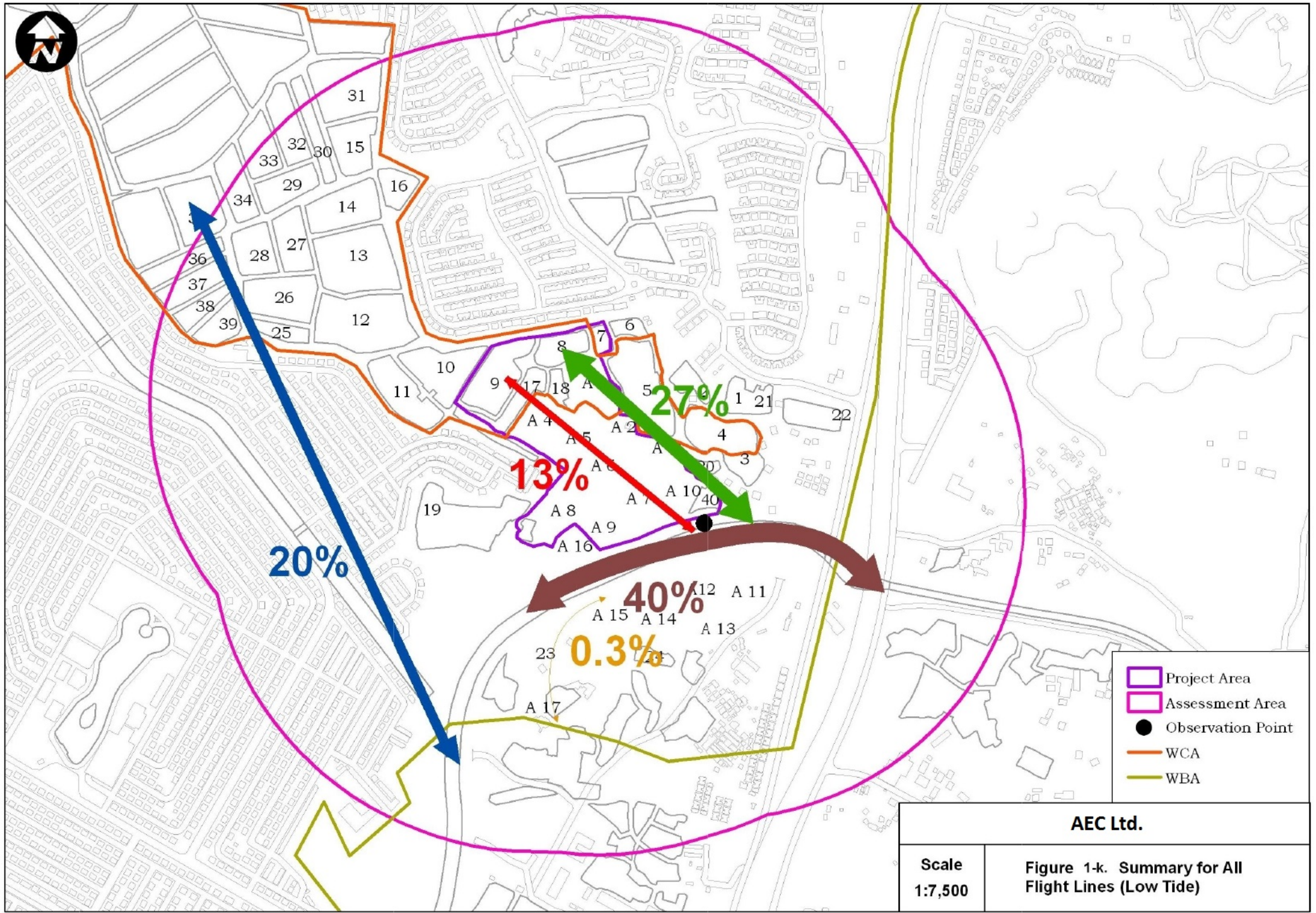
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Scale 1:7,500	Figure 1-i. Chinese Pond Heron Flight Lines (Low Tide)
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- Project Area
- Assessment Area
- Observation Point
- WCA
- WBA

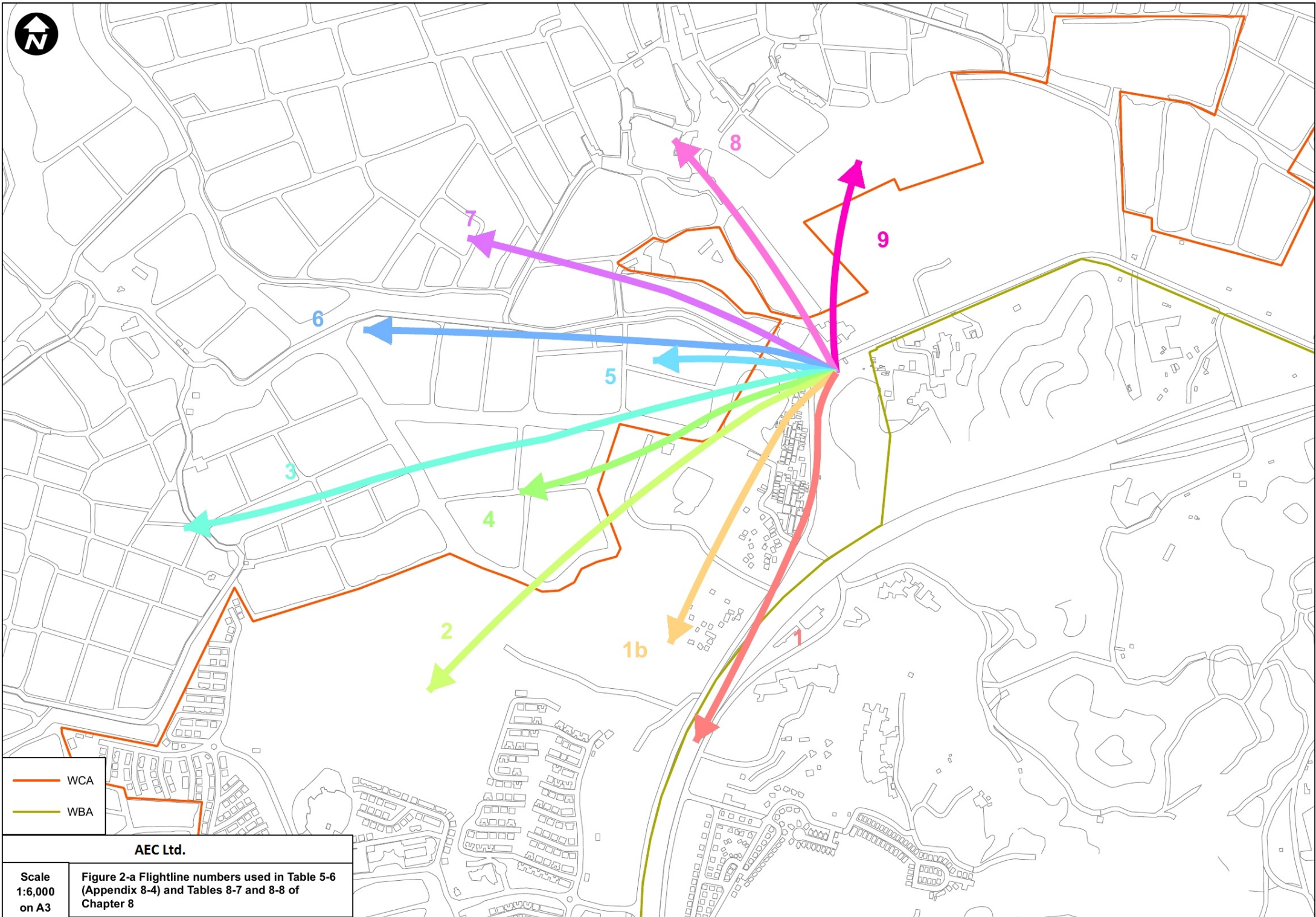
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Scale 1:7,500	Figure 1-j. Summary for All Flight Lines (High Tide)



- Project Area
- Assessment Area
- Observation Point
- WCA
- WBA

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Scale 1:7,500	Figure 1-k. Summary for All Flight Lines (Low Tide)
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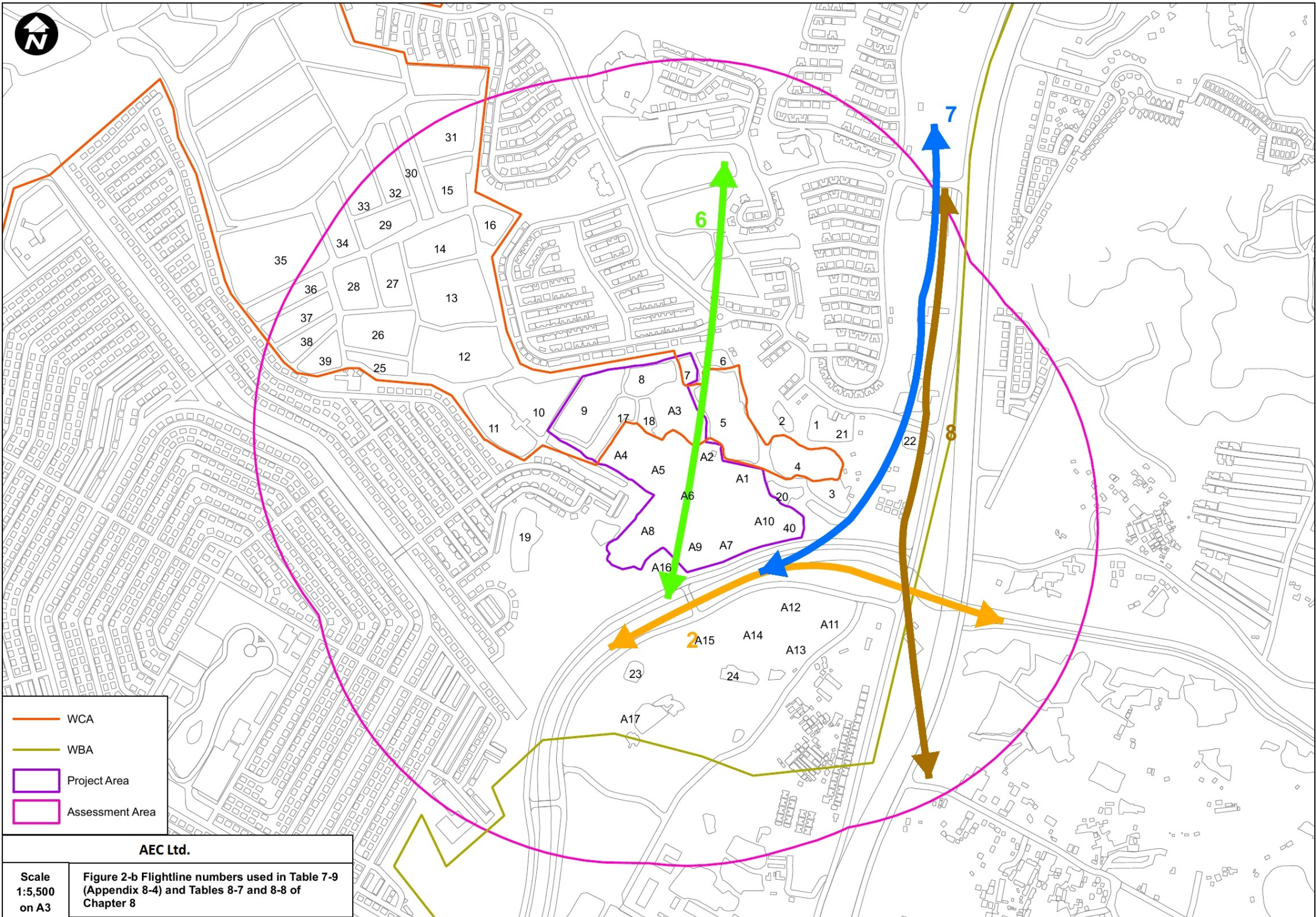


— WCA
— WBA

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Scale
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Figure 2-a Flightline numbers used in Table 5-6
(Appendix 8-4) and Tables 8-7 and 8-8 of
Chapter 8

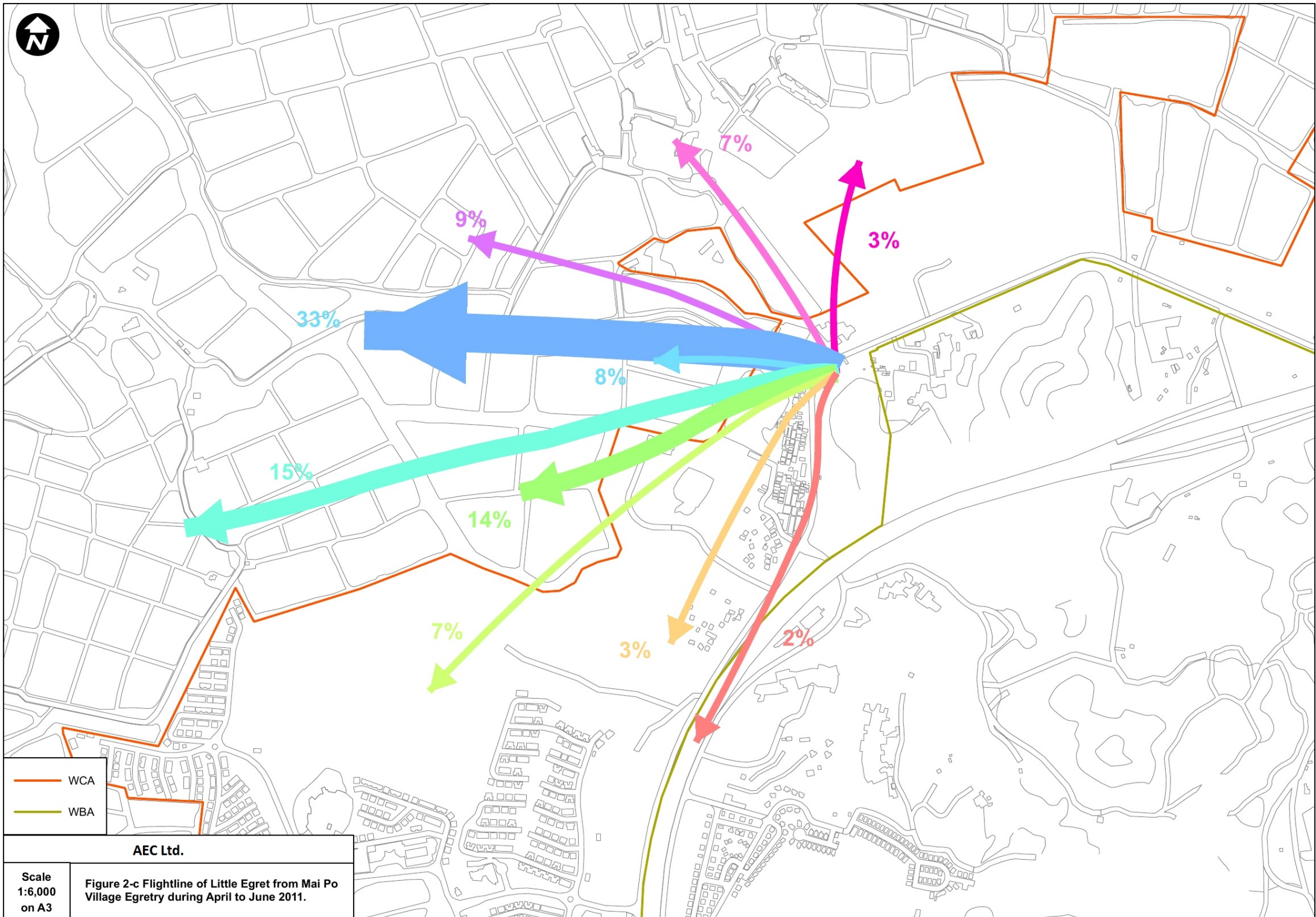


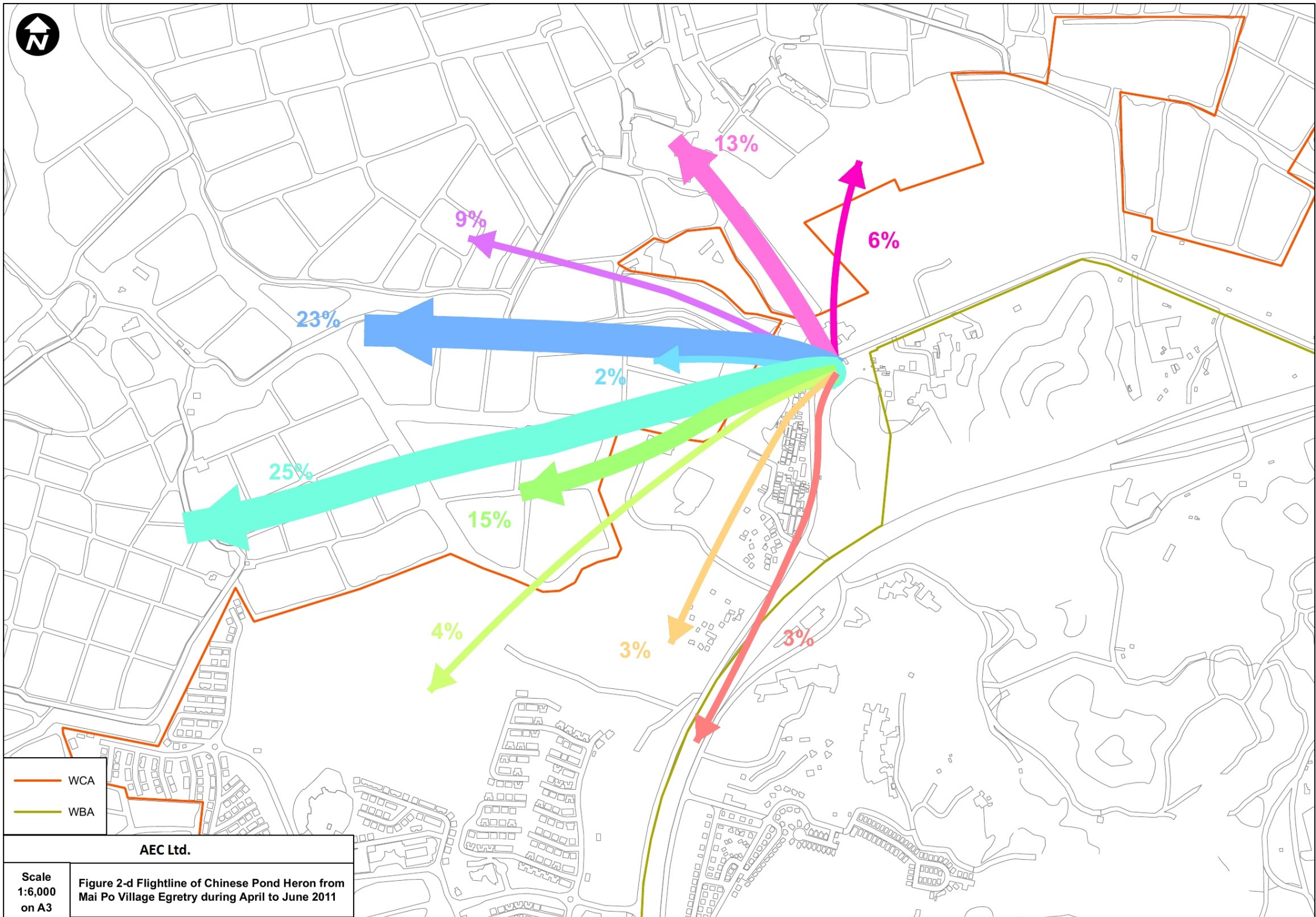
- WCA
- WBA
- Project Area
- Assessment Area

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Scale
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on A3

Figure 2-b Flightline numbers used in Table 7-9
(Appendix 8-4) and Tables 8-7 and 8-8 of
Chapter 8



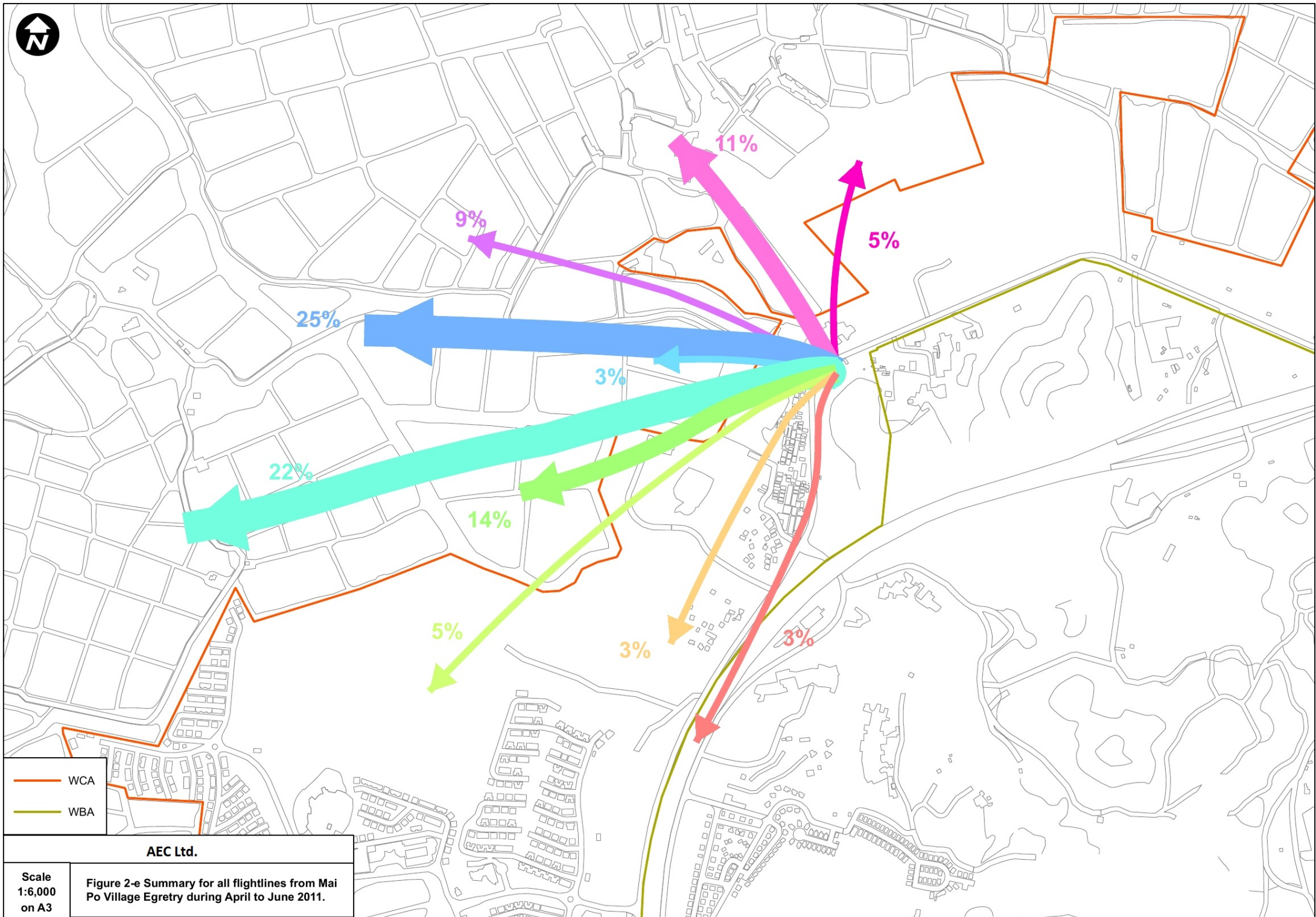


— WCA
— WBA

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Scale
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on A3

Figure 2-d Flightline of Chinese Pond Heron from Mai Po Village Egretty during April to June 2011

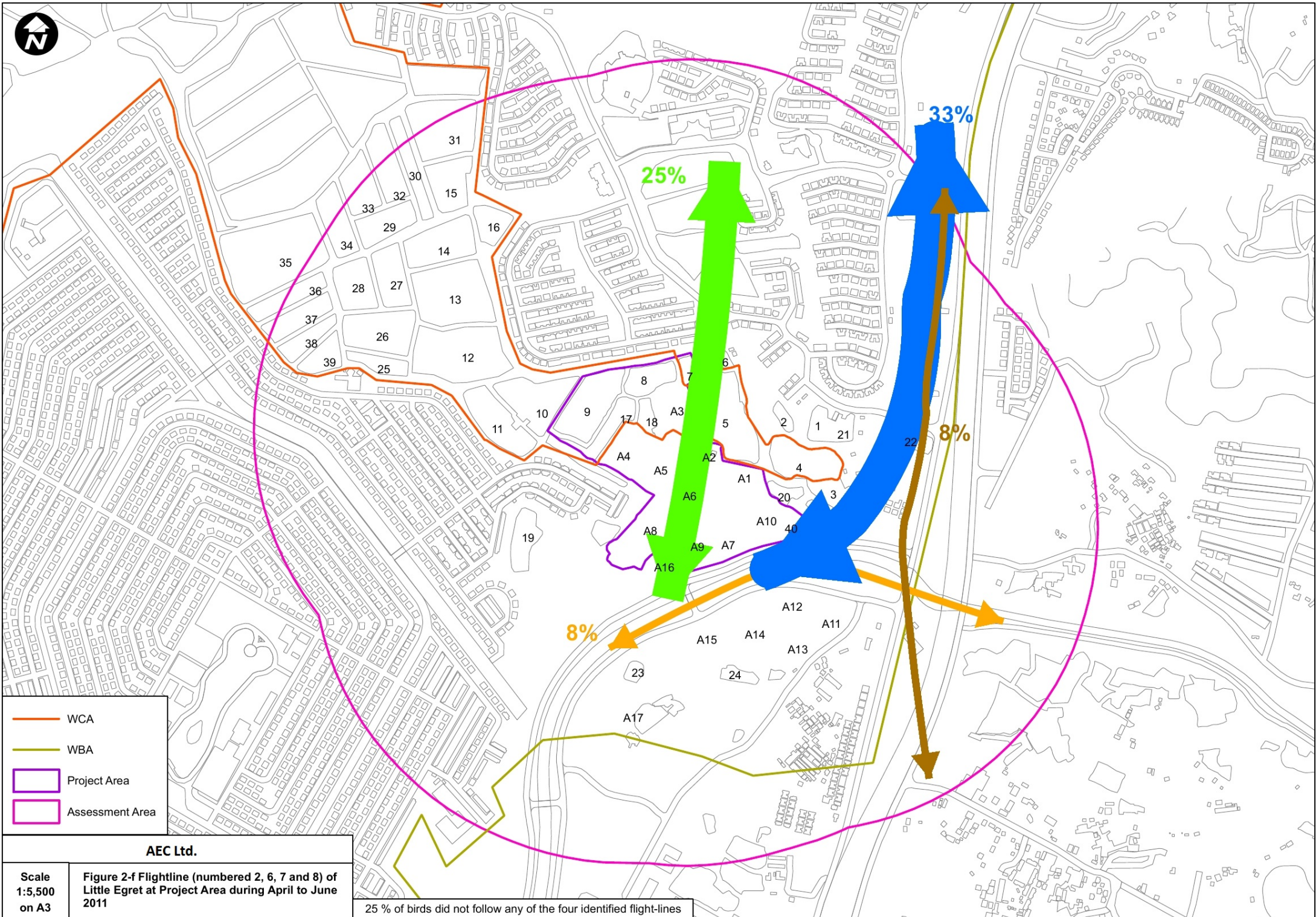


- WCA
- WBA

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Figure 2-e Summary for all flightlines from Mai Po Village Egretty during April to June 2011.



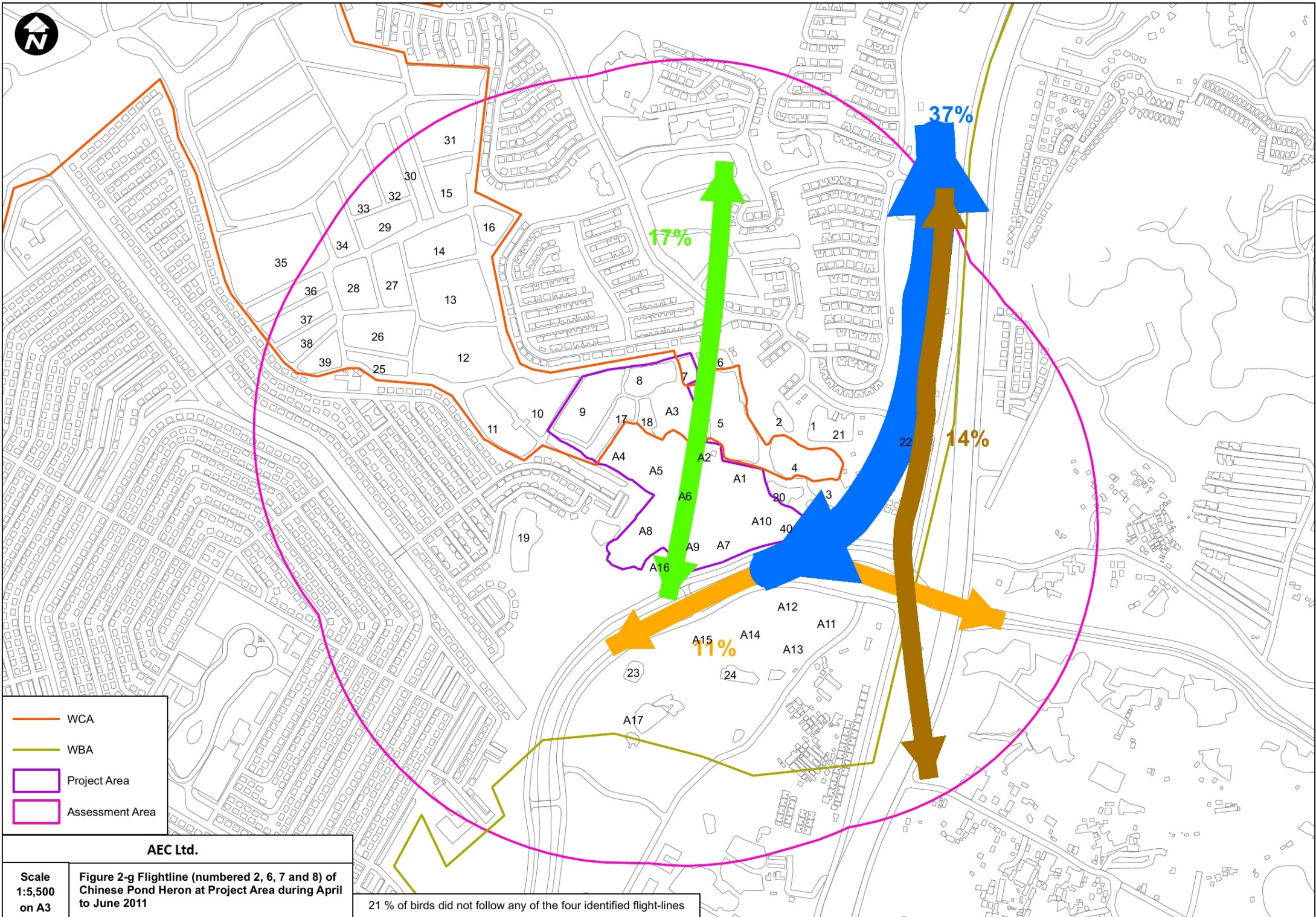
- WCA
- WBA
- Project Area
- Assessment Area

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Scale
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on A3

Figure 2-f Flightline (numbered 2, 6, 7 and 8) of Little Egret at Project Area during April to June 2011

25% of birds did not follow any of the four identified flight-lines

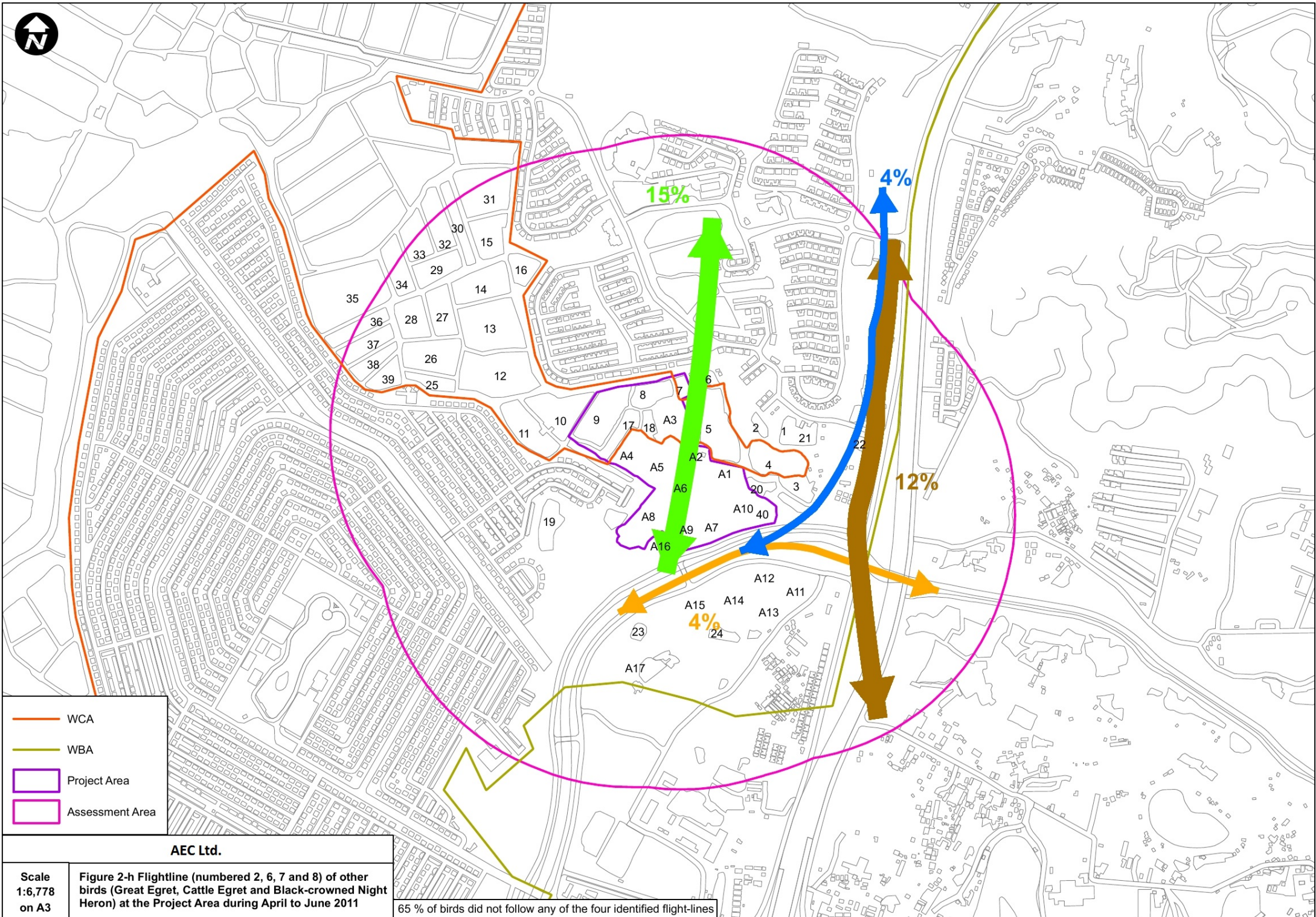


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Scale
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on A3

Figure 2-g Flightline (numbered 2, 6, 7 and 8) of Chinese Pond Heron at Project Area during April to June 2011

21 % of birds did not follow any of the four identified flight-lines

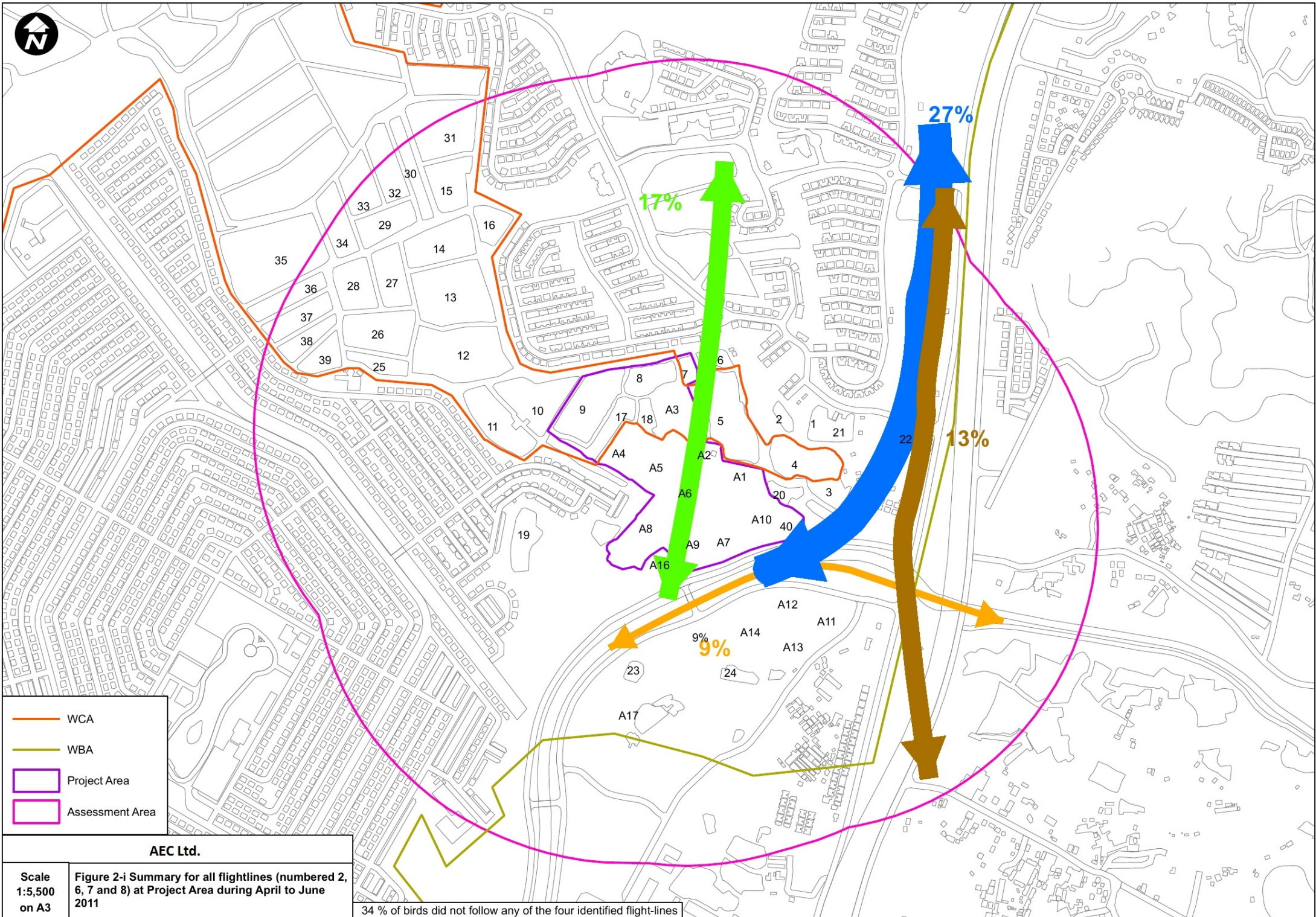


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Scale
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on A3

Figure 2-h Flightline (numbered 2, 6, 7 and 8) of other birds (Great Egret, Cattle Egret and Black-crowned Night Heron) at the Project Area during April to June 2011

65 % of birds did not follow any of the four identified flight-lines



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Scale
1:5,500
on A3

Figure 2-i Summary for all flightlines (numbered 2, 6, 7 and 8) at Project Area during April to June 2011

34 % of birds did not follow any of the four identified flight-lines