Monitoring of Chinese White Dolphins in Southwest Lantau Waters

19th Monthly Progress Report (September 2016)
submitted to Environmental Project Office for the HZMB HKLR, HZMB HKBCF and TM-CLKL – Investigation

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1. Introduction

1.1. In March 2015, Hong Kong Cetacean Research Project (HKCRP) was appointed by the Environmental Project Office for the HZMB Hong Kong Projects to undertake a monitoring study of Chinese White Dolphins in Southwest Lantau (SWL) waters.

1.2. The objectives of the monitoring study are to quantify the abundance and density of Chinese White Dolphins in SWL waters, to identify individuals during the monitoring surveys, and to analyze their range use and movement patterns in Hong Kong and the wider Pearl River Estuary waters.

1.3. The monitoring study will supplement the on-going EM&A monitoring results of the HZMB Hong Kong Projects in North and West Lantau waters, and provide a more complete picture of dolphin usage and movements between different survey areas in western Hong Kong waters.

1.4. The present report is the 19th monthly progress report under this dolphin monitoring study submitted to the Environmental Project Office, summarizing the survey findings during the month of September 2016.

2. Monitoring Methodology

2.1. Vessel-based Line-transect Survey

2.1.1. According to the requirement of the technical proposal submitted to the Environmental

Project Office, dolphin monitoring programme should cover all transect lines in SWL survey area (see Figure 1) once per month upon instruction. The co-ordinates of all transect lines conducted during the dolphin monitoring survey are shown in Table 1.

Table 1. Co-ordinates of transect lines in SWL survey area (corresponding to transect line layout as shown in Figure 1)

Line #		Northing	Easting		Line #		Northing	Easting
SWL001	1	806180	802510		SWL007	13	807380	808520
	2	804250	802510			14	805600	808520
SWL002	3	806710	803480			15	804400	808520
	4	803450	803480			16	803000	808520
SWL003	5	807270	804500			17	802100	808520
	6	802690	804500			18	800470	808520
SWL004	7	807590	805450		SWL008	19	807380	809550
	8	802295	805450			20	805050	809550
SWL005	9	808490	806500			21	804400	809550
	10	801410	806500			22	800470	809550
SWL006	11	808500	807430		SWL009	23	807380	810550
	12	801250	807430			24	800470	810550
					SWL010	25	809410	811510
						26	801470	811510

2.1.2. The HKCRP survey team used standard line-transect methods (Buckland et al. 2001) to conduct the systematic vessel surveys, and followed the same technique of data collection that has been adopted over the last 18 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2014). For each monitoring vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.

2.1.3. Two experienced observers from HKCRP (a data recorder and a primary observer) made up the on-effort survey team, and the survey vessel transited different transect lines at a

constant speed of 13-15 km per hour. The data recorder searched with unaided eyes and filled out the datasheets, while the primary observer searched for dolphins and porpoises continuously through 7 x 50 *Fujinon* marine binoculars. Both observers searched the sea ahead of the vessel, between 270° and 90° (in relation to the bow, which is defined as 0°). One to two additional experienced observer was available on the boat to work in shift (i.e. rotate every 30 minutes) in order to minimize fatigue of the survey team members. All observers were experienced in small cetacean survey techniques and identifying local cetacean species.

2.1.4. During on-effort survey periods, the survey team recorded effort data including time, position (latitude and longitude), weather conditions (Beaufort sea state and visibility), and distance traveled in each series (a continuous period of search effort) with the assistance of a handheld GPS (*Garmin eTrex Legend*).

2.1.5. Data including time, position and vessel speed were also automatically and continuously logged by handheld GPS throughout the entire survey for subsequent review.

2.1.6. When dolphins were sighted, the survey team would end the survey effort, and immediately record the initial sighting distance and angle of the dolphin group from the survey vessel, as well as the sighting time and position. Then the research vessel was diverted from its course to approach the animals for species identification, group size estimation, assessment of group composition, and behavioural observations. The perpendicular distance (PSD) of the dolphin group to the transect line was later calculated from the initial sighting distance and angle.

2.1.7. Survey effort being conducted along the parallel transect lines that were perpendicular to the coastlines (as indicated in Figure 1) was labeled as “primary” survey effort, while the survey effort conducted along the connecting lines between parallel lines as well as the section around the Soko Islands was labeled as “secondary” survey effort. Both primary and secondary survey effort were presented as on-effort survey effort in this report.

2.1.8. Encounter rates of Chinese White Dolphins (number of on-effort sightings per 100 km of survey effort and number of dolphins from all on-effort sightings per 100 km of survey effort) were calculated in SWL survey area in relation to the amount of survey effort conducted during each month of monitoring survey. Only data collected under Beaufort 3 or below condition would be used for encounter rate analysis. Dolphin encounter rates were calculated using the combined survey effort from both primary and secondary lines for comparison to the historical data collected by HKCRP in this survey area. For the historical data, the encounter rates were calculated by pooling all relevant survey effort

and dolphin sightings to calculate a single index.

2.2. Photo-identification Work

2.2.1. When a group of Chinese White Dolphins were sighted during the line-transect survey, the survey team would end effort and approach the group slowly from the side and behind to take photographs of them. Every attempt was made to photograph every dolphin in the group, and even photograph both sides of the dolphins, since the colouration and markings on both sides may not be symmetrical.

2.2.2. A professional digital camera (*Canon* EOS 7D model), equipped with long telephoto lenses (100-400 mm zoom), were available on board for researchers to take sharp, close-up photographs of dolphins as they surfaced. The images were shot at the highest available resolution and stored on Compact Flash memory cards for downloading onto a computer.

2.2.3. All digital images taken in the field were first examined, and those containing potentially identifiable individuals were sorted out. These photographs would then be examined in greater detail, and were carefully compared to the existing Chinese White Dolphin photo-identification catalogue maintained by HKCRP since 1995. For individual dolphins that are not readily identifiable from the catalogue but have distinct features on their bodies, they will be placed in a pool of "potential new individuals", with decision being made at the end of each year on whether any of them should be incorporated into the photo-ID catalogue.

2.2.4. Chinese White Dolphins can be identified by their natural markings, such as nicks, cuts, scars and deformities on their dorsal fin and body, and their unique spotting patterns were also used as secondary identifying features (Jefferson 2000).

2.2.5. All photographs of each individual were then compiled and arranged in chronological order, with data including the date and location first identified (initial sighting), re-sightings, associated dolphins, distinctive features, and age classes entered into a computer database.

3. Monitoring Results

3.1. Vessel-based Line-transect Survey

3.1.1. One set of systematic line-transect vessel survey was conducted under the present

monitoring study on September 19th to cover all transect lines in SWL survey area once. The route and track log of this survey are presented in Figure 2 and Appendix I respectively.

3.1.2. In addition, three line-transect surveys were also conducted under the AFCD long-term marine mammal monitoring programme in SWL survey area on September 6th (with lines no. SWL004, SWL006, SWL008 and SWL010 covered), September 22nd (with lines no. SWL003, SWL005, SWL007 and SWL009 covered) and September 26th (with lines no. SWL002, SWL004, SWL006, SWL008 and SWL010 covered). Such monitoring data were also incorporated into the present study for various analyses.

3.1.3. For the present study alone, a total of 67.11 km of survey effort was collected from 10:57 to 16:08 (i.e. 5 hours and 11 minutes of survey time) on September 19th, with 100% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility) (Appendix II). The total survey effort conducted on primary and secondary lines were 50.50 km and 16.61 km respectively.

3.1.4. For the combined monitoring dataset from both the present study and AFCD monitoring study, a total of 173.54 km of survey effort was collected in SWL waters in September 2016.

3.1.5. During this monitoring month, six groups of 13 Chinese White Dolphins were sighted from the present study's survey and two of the three AFCD monitoring surveys (Appendix III). All six dolphin groups were sighted during on-effort search, while none of them was associated with any operating fishing vessel.

3.1.6. Notably, three groups of 11 finless porpoise were also sighted in SWL survey area during this monitoring month.

3.1.7. Distribution of the six dolphin sightings made in September 2016 is shown in Figure 3. Most of them were clustered at the western end of the SWL survey area, adjacent to the high-speed ferry shipping route (Figure 3). A lone dolphin was also sighted to the south of Shui Hau Peninsula. On the contrary, they were mostly absent from the southern and eastern portions of the survey area during this monitoring month (Figure 3).

3.1.8. Encounter rates of Chinese White Dolphins deduced from the survey effort and on-effort sighting data made under favourable conditions (Beaufort 3 or below) in September 2016 are shown in Table 2. Comparison of encounter rates was also made to the one deduced in autumn months (September-November) in the past decade (2005-14), as well as in

September 2015 under the present study (Table 2).

Table 2. Overall dolphin encounter rates (sightings per 100 km of survey effort) from the present monitoring survey and combined database with AFCD monitoring survey conducted in September 2016 (primary lines only, as well as both primary lines and secondary lines were used) in SWL survey area in comparison to the ones deduced during summer months (September-November 2005-14) in the past decade

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		**Encounter rate (ANI)** (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	Primary Lines Only	Both Primary and Secondary Lines	Primary Lines Only	Both Primary and Secondary Lines
HYD-HZMB data (September 2016)	3.96	2.98	9.90	7.45
Combined data (September 2016)	4.06	3.51	9.75	7.60
Combined data (September 2015)	3.81	6.85	13.33	29.48
Historical Data (Autumn 2005-14)		4.29		17.05

3.1.9. From the combined data of HYD-HZMB and AFCD monitoring surveys, the overall encounter rates based on the number of dolphin sightings (ER(STG)) deduced in September 2016 in SWL waters was lower than the one deduced from the historical data during the autumn months of 2005-14, while the total number of dolphins (ER(ANI)) was much lower than the one during the autumn months of 2005-14 (Table 2). Both encounter rates (i.e. ER(STG) and ER(ANI)) deduced in September 2016 were also much lower than the ones deduced in September 2015 (Table 2).

3.1.10. The average group size of Chinese White Dolphins sighted during SWL monitoring surveys in September 2016 was 2.2 animals per group, which was considerably lower than the average group size in autumn months of 2005-14 (4.0). Five of the six dolphin groups were composed of only 1-3 animals, while the other group was moderate in size with five animals (Appendix III).

3.2. Photo-identification Work

3.2.1. Attempts were made to photograph the dolphins sighted during all SWL surveys conducted in September 2016.

3.2.2. Among the 13 dolphins sighted during this month's surveys, seven individual dolphins were identified and re-sighted seven times in total (Appendices IV and V). None of

them was accompanied by any calf.

3.2.3. The locations where most individuals were re-sighted were well within their past home ranges in Southwest and West Lantau waters. However, NL120 and NL269 was primarily sighted in North Lantau waters in the past, but have shown up in Southwest Lantau during this month's surveys. In fact, this was the first time ever that NL269 was sighted in Southwest Lantau waters.

4. References

Buckland, S. T., Anderson, D. R., Burnham, K. P., Laake, J. L., Borchers, D. L., and Thomas, L. 2001. Introduction to distance sampling: estimating abundance of biological populations. Oxford University Press, London.

Hung, S. K. 2014. Monitoring of Marine Mammals in Hong Kong waters: final report (2013-14). An unpublished report submitted to the Agriculture, Fisheries and Conservation Department, 231 pp.

Jefferson, T. A. 2000. Population biology of the Indo-Pacific hump-backed dolphin in Hong Kong waters. Wildlife Monographs 144:1-65.

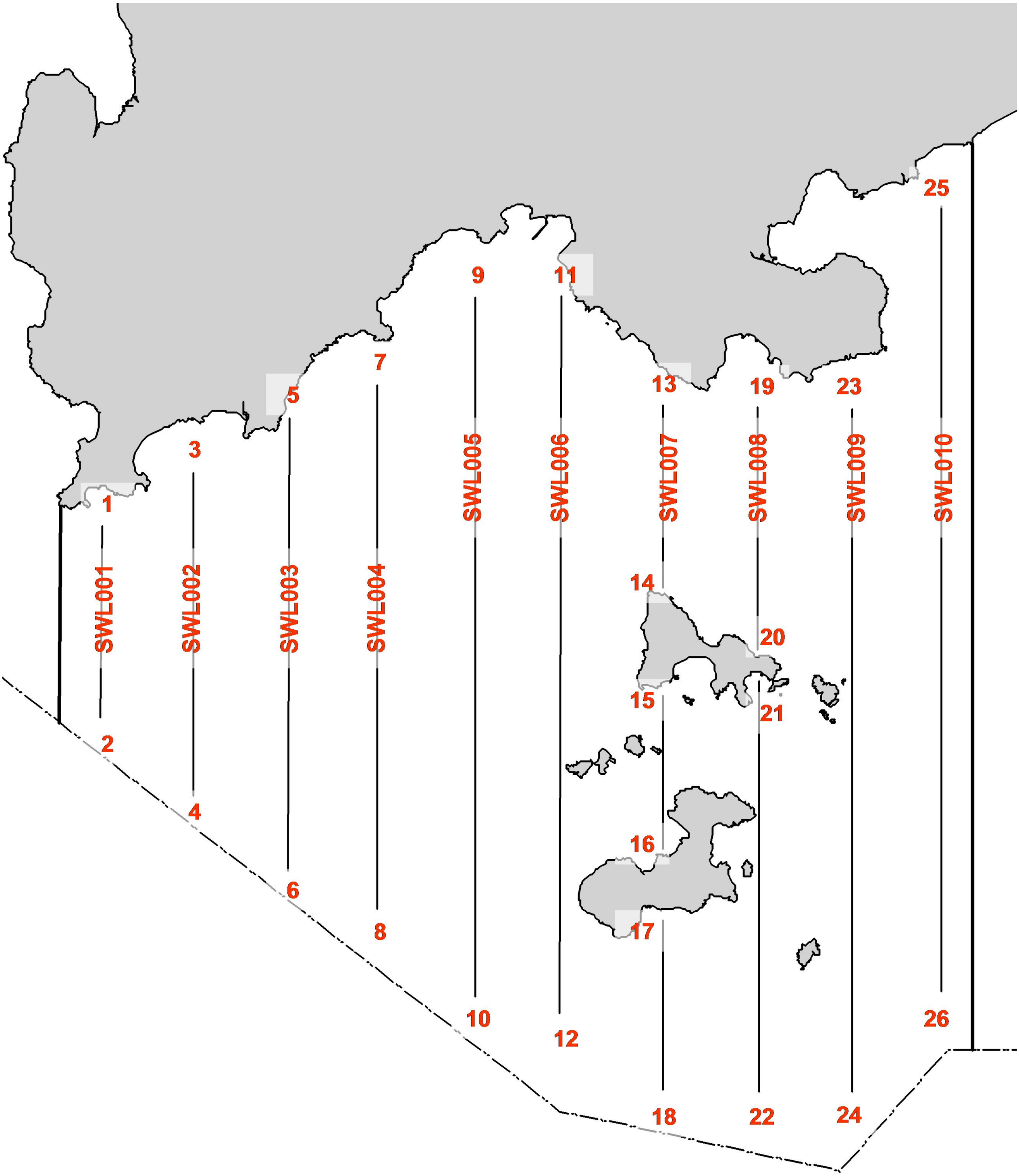

Figure 1. Survey Lines and associated coordinates in Southwest Lantau survey area

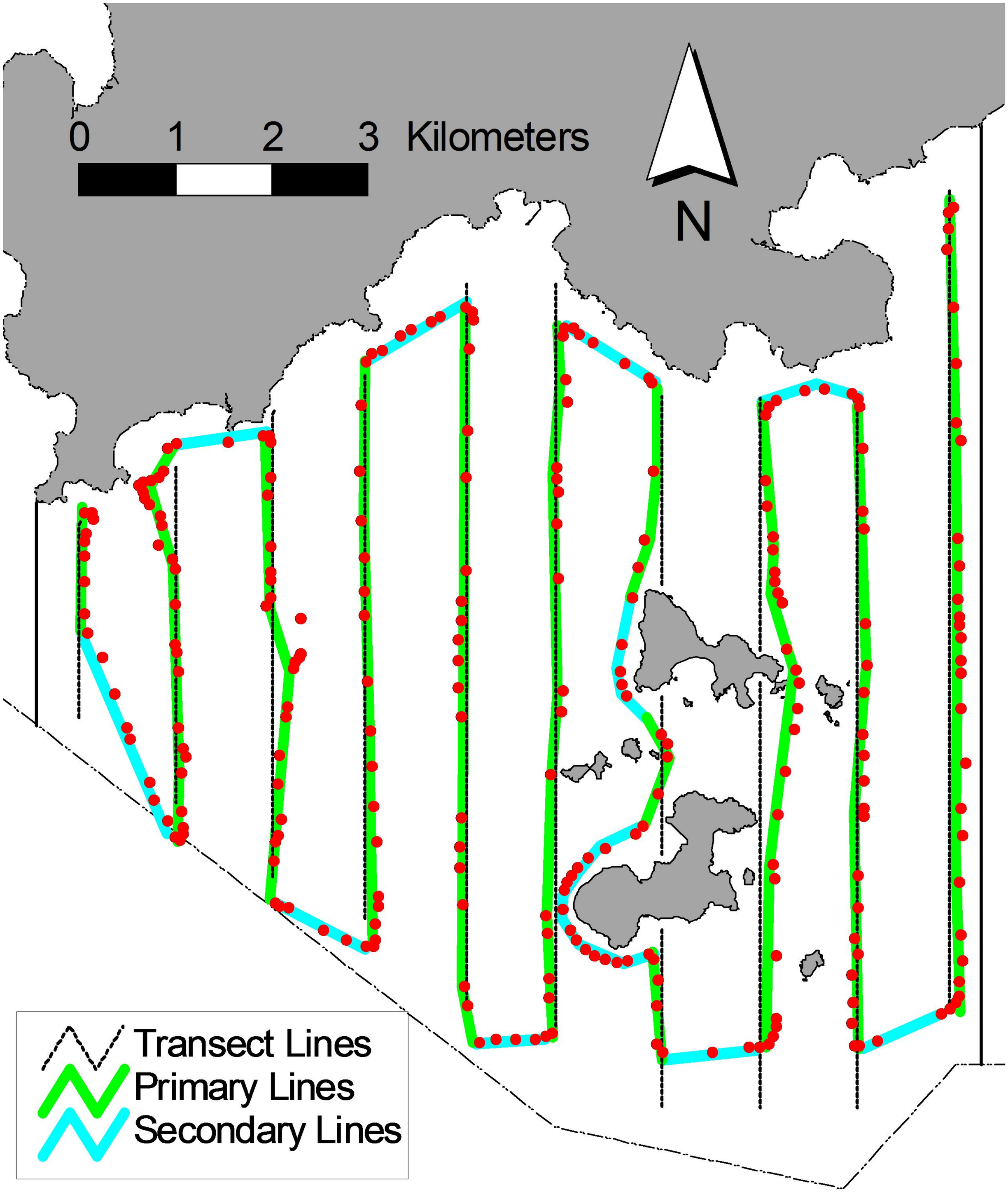

Figure 2. Survey Route on September 19th, 2016 (note: red dots represent the tracked positions of survey boat logged continuously by GPS throughout the course of the survey)

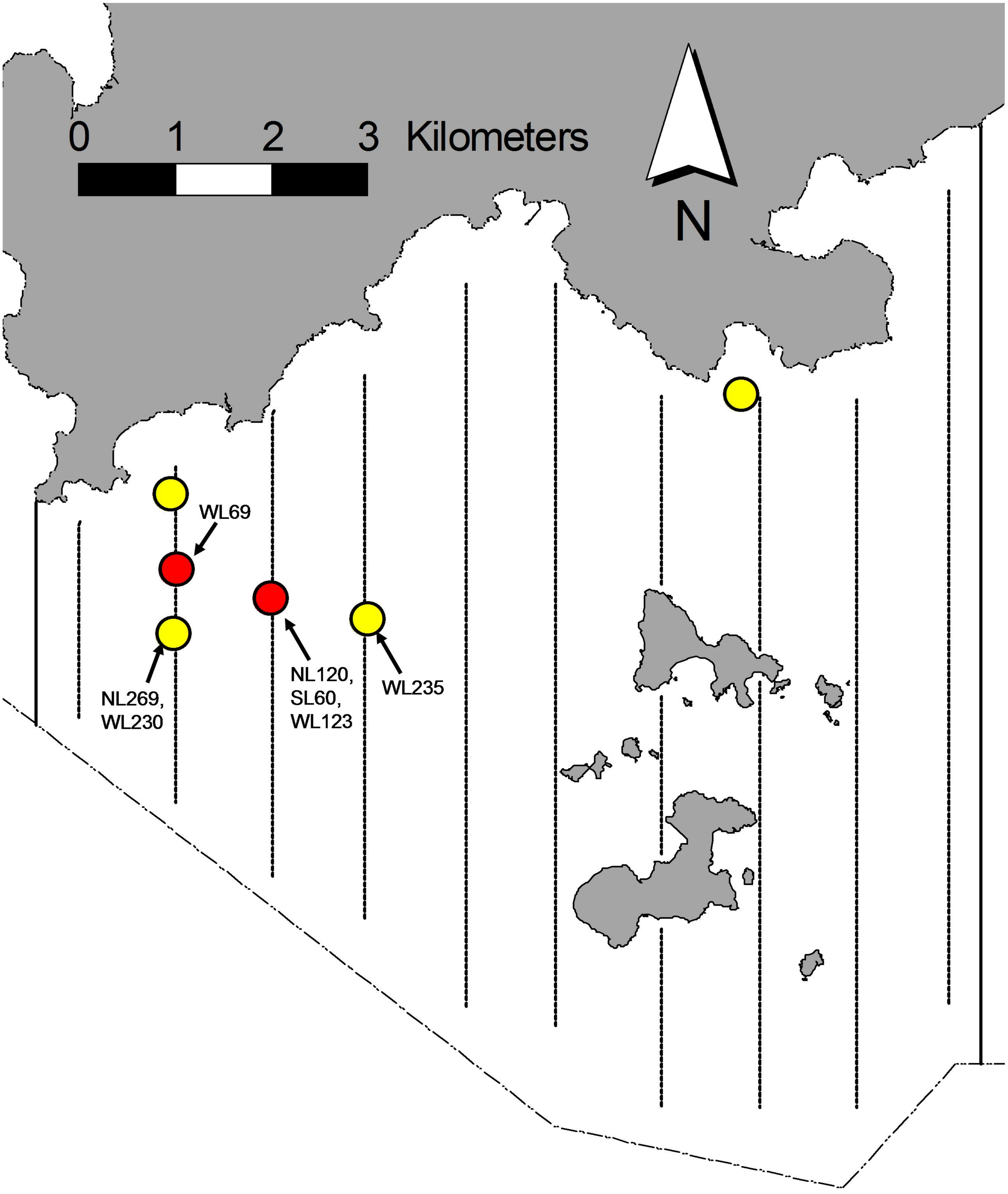

Figure 3. Distribution of Chinese White Dolphin sightings during September 2016 monitoring surveys in Southwest Lantau survey area, with identified individuals indicated for their corresponding sightings (red dot: HYD-HZMB sighting; yellow dot: AFCD sighting)

Appendix I. Track Log of SW Lantau Survey on September 19th, 2016

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
19/9/2016 10:57	ON	N22.19456 E113.85067	75 m	0:00:24	11 kph
19/9/2016 10:57	ON	N22.19397 E113.85091	70 m	0:00:21	12 kph
19/9/2016 10:58	ON	N22.19338 E113.85063	72 m	0:00:18	14 kph
19/9/2016 10:58	ON	N22.19267 E113.85014	94 m	0:00:22	15 kph
19/9/2016 10:58	ON	N22.19203 E113.84997	73 m	0:00:18	15 kph
19/9/2016 10:58	ON	N22.19147 E113.84996	62 m	0:00:16	14 kph
19/9/2016 10:59	ON	N22.19073 E113.85003	83 m	0:00:22	14 kph
19/9/2016 10:59	ON	N22.18992 E113.84995	90 m	0:00:23	14 kph
19/9/2016 11:00	ON	N22.18913 E113.84997	88 m	0:00:23	14 kph
19/9/2016 11:00	ON	N22.18850 E113.84986	71 m	0:00:18	14 kph
19/9/2016 11:00	ON	N22.18762 E113.84987	98 m	0:00:26	14 kph
19/9/2016 11:01	ON	N22.18697 E113.84993	73 m	0:00:20	13 kph
19/9/2016 11:01	ON	N22.18625 E113.85001	80 m	0:00:22	13 kph
19/9/2016 11:01	ON	N22.18558 E113.85004	75 m	0:00:20	13 kph
19/9/2016 11:02	ON	N22.18478 E113.85008	89 m	0:00:24	13 kph
19/9/2016 11:02	ON	N22.18399 E113.85029	91 m	0:00:25	13 kph
19/9/2016 11:03	ON	N22.18339 E113.85067	77 m	0:00:22	13 kph
19/9/2016 11:03	ON	N22.18267 E113.85126	101 m	0:00:28	13 kph
19/9/2016 11:03	ON	N22.18184 E113.85175	105 m	0:00:29	13 kph
19/9/2016 11:04	ON	N22.18127 E113.85196	67 m	0:00:18	13 kph
19/9/2016 11:04	ON	N22.18034 E113.85226	108 m	0:00:29	13 kph
19/9/2016 11:05	ON	N22.17939 E113.85263	112 m	0:00:29	14 kph
19/9/2016 11:05	ON	N22.17851 E113.85299	105 m	0:00:28	14 kph
19/9/2016 11:06	ON	N22.17753 E113.85348	120 m	0:00:32	14 kph
19/9/2016 11:06	ON	N22.17657 E113.85390	115 m	0:00:30	14 kph
19/9/2016 11:07	ON	N22.17560 E113.85427	115 m	0:00:30	14 kph
19/9/2016 11:07	ON	N22.17458 E113.85462	118 m	0:00:31	14 kph
19/9/2016 11:08	ON	N22.17355 E113.85517	128 m	0:00:35	13 kph
19/9/2016 11:08	ON	N22.17254 E113.85559	121 m	0:00:34	13 kph
19/9/2016 11:09	ON	N22.17152 E113.85608	124 m	0:00:35	13 kph
19/9/2016 11:09	ON	N22.17084 E113.85648	86 m	0:00:25	12 kph
19/9/2016 11:10	ON	N22.17010 E113.85670	86 m	0:00:24	13 kph
19/9/2016 11:10	ON	N22.16923 E113.85698	101 m	0:00:29	13 kph
19/9/2016 11:11	ON	N22.16856 E113.85743	87 m	0:00:26	12 kph
19/9/2016 11:11	ON	N22.16795 E113.85798	89 m	0:00:27	12 kph
19/9/2016 11:12	ON	N22.16738 E113.85842	78 m	0:00:24	12 kph
19/9/2016 11:12	ON	N22.16663 E113.85881	92 m	0:00:28	12 kph
19/9/2016 11:12	ON	N22.16591 E113.85910	85 m	0:00:25	12 kph
19/9/2016 11:13	ON	N22.16574 E113.85956	51 m	0:00:20	9 kph
19/9/2016 11:13	ON	N22.16618 E113.85988	59 m	0:00:19	11 kph
19/9/2016 11:13	ON	N22.16678 E113.85992	68 m	0:00:18	14 kph
19/9/2016 11:14	ON	N22.16757 E113.85977	89 m	0:00:22	14 kph
19/9/2016 11:14	ON	N22.16821 E113.85983	71 m	0:00:19	13 kph
19/9/2016 11:14	ON	N22.16893 E113.85984	80 m	0:00:21	14 kph
19/9/2016 11:15	ON	N22.16951 E113.85990	65 m	0:00:17	14 kph
19/9/2016 11:15	ON	N22.17010 E113.85988	66 m	0:00:17	14 kph
19/9/2016 11:15	ON	N22.17084 E113.85990	83 m	0:00:22	14 kph
19/9/2016 11:16	ON	N22.17163 E113.85984	88 m	0:00:23	14 kph
19/9/2016 11:16	ON	N22.17227 E113.85996	73 m	0:00:20	13 kph
19/9/2016 11:16	ON	N22.17297 E113.86005	79 m	0:00:22	13 kph
19/9/2016 11:17	ON	N22.17370 E113.85977	86 m	0:00:23	13 kph
19/9/2016 11:17	ON	N22.17462 E113.85963	103 m	0:00:27	14 kph
19/9/2016 11:18	ON	N22.17561 E113.85943	113 m	0:00:29	14 kph
19/9/2016 11:18	ON	N22.17625 E113.85942	71 m	0:00:19	13 kph
19/9/2016 11:19	ON	N22.17709 E113.85941	93 m	0:00:25	13 kph
19/9/2016 11:19	ON	N22.17799 E113.85932	101 m	0:00:27	13 kph
19/9/2016 11:19	ON	N22.17886 E113.85934	97 m	0:00:26	13 kph
19/9/2016 11:20	ON	N22.17949 E113.85934	70 m	0:00:19	13 kph
19/9/2016 11:20	ON	N22.18006 E113.85938	64 m	0:00:17	13 kph
19/9/2016 11:20	ON	N22.18059 E113.85937	59 m	0:00:16	13 kph
19/9/2016 11:21	ON	N22.18130 E113.85928	79 m	0:00:21	14 kph
19/9/2016 11:21	ON	N22.18215 E113.85926	95 m	0:00:25	14 kph
19/9/2016 11:21	ON	N22.18301 E113.85911	96 m	0:00:25	14 kph
19/9/2016 11:22	ON	N22.18377 E113.85910	85 m	0:00:22	14 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
19/9/2016 11:22	ON	N22.18450 E113.85909	81 m	0:00:21	14 kph
19/9/2016 11:22	ON	N22.18505 E113.85905	61 m	0:00:16	14 kph
19/9/2016 11:23	ON	N22.18584 E113.85904	88 m	0:00:23	14 kph
19/9/2016 11:23	ON	N22.18652 E113.85909	76 m	0:00:20	14 kph
19/9/2016 11:24	ON	N22.18748 E113.85909	107 m	0:00:28	14 kph
19/9/2016 11:24	ON	N22.18827 E113.85909	88 m	0:00:23	14 kph
19/9/2016 11:24	ON	N22.18905 E113.85911	87 m	0:00:23	14 kph
19/9/2016 11:25	ON	N22.18960 E113.85909	61 m	0:00:19	12 kph
19/9/2016 11:25	OFF	N22.18983 E113.85905	27 m	0:00:19	5 kph
19/9/2016 11:25	OFF	N22.18985 E113.85905	2 m	0:00:02	4 kph
19/9/2016 11:25	OFF	N22.19002 E113.85899	19 m	0:00:21	3 kph
19/9/2016 11:26	OFF	N22.19011 E113.85893	12 m	0:00:17	2 kph
19/9/2016 11:26	OFF	N22.19047 E113.85870	46 m	0:00:20	8 kph
19/9/2016 11:26	OFF	N22.19105 E113.85806	93 m	0:00:22	15 kph
19/9/2016 11:27	OFF	N22.19166 E113.85740	97 m	0:00:23	15 kph
19/9/2016 11:27	OFF	N22.19240 E113.85743	83 m	0:00:22	14 kph
19/9/2016 11:28	OFF	N22.19343 E113.85765	117 m	0:00:28	15 kph
19/9/2016 11:28	OFF	N22.19427 E113.85761	94 m	0:00:25	14 kph
19/9/2016 11:28	OFF	N22.19471 E113.85723	62 m	0:00:16	14 kph
19/9/2016 11:29	OFF	N22.19531 E113.85650	101 m	0:00:25	15 kph
19/9/2016 11:29	OFF	N22.19579 E113.85600	74 m	0:00:22	12 kph
19/9/2016 11:29	OFF	N22.19636 E113.85580	67 m	0:00:24	10 kph
19/9/2016 11:30	OFF	N22.19671 E113.85568	41 m	0:00:24	6 kph
19/9/2016 11:30	OFF	N22.19687 E113.85558	21 m	0:00:27	3 kph
19/9/2016 11:31	OFF	N22.19692 E113.85552	8 m	0:00:22	1.3 kph
19/9/2016 11:31	OFF	N22.19694 E113.85546	6 m	0:00:22	1.0 kph
19/9/2016 11:31	OFF	N22.19695 E113.85541	6 m	0:00:24	0.9 kph
19/9/2016 11:32	OFF	N22.19704 E113.85539	10 m	0:00:10	3 kph
19/9/2016 11:32	OFF	N22.19730 E113.85577	49 m	0:00:29	6 kph
19/9/2016 11:33	OFF	N22.19742 E113.85659	86 m	0:00:30	10 kph
19/9/2016 11:33	ON	N22.19768 E113.85735	83 m	0:00:27	11 kph
19/9/2016 11:33	ON	N22.19827 E113.85789	86 m	0:00:26	12 kph
19/9/2016 11:34	ON	N22.19921 E113.85806	106 m	0:00:28	14 kph
19/9/2016 11:34	ON	N22.20017 E113.85827	109 m	0:00:29	13 kph
19/9/2016 11:35	ON	N22.20065 E113.85916	106 m	0:00:29	13 kph
19/9/2016 11:35	ON	N22.20076 E113.86025	113 m	0:00:29	14 kph
19/9/2016 11:36	ON	N22.20074 E113.86130	108 m	0:00:27	14 kph
19/9/2016 11:36	ON	N22.20080 E113.86247	121 m	0:00:30	15 kph
19/9/2016 11:37	ON	N22.20088 E113.86364	121 m	0:00:30	14 kph
19/9/2016 11:37	ON	N22.20088 E113.86438	77 m	0:00:19	15 kph
19/9/2016 11:38	ON	N22.20101 E113.86539	104 m	0:00:27	14 kph
19/9/2016 11:38	ON	N22.20121 E113.86642	109 m	0:00:28	14 kph
19/9/2016 11:38	ON	N22.20127 E113.86706	66 m	0:00:17	14 kph
19/9/2016 11:39	ON	N22.20140 E113.86776	74 m	0:00:20	13 kph
19/9/2016 11:39	ON	N22.20139 E113.86846	73 m	0:00:22	12 kph
19/9/2016 11:39	ON	N22.20080 E113.86865	68 m	0:00:21	12 kph
19/9/2016 11:40	ON	N22.20016 E113.86858	71 m	0:00:19	14 kph
19/9/2016 11:40	ON	N22.19938 E113.86864	87 m	0:00:23	14 kph
19/9/2016 11:41	ON	N22.19854 E113.86862	93 m	0:00:24	14 kph
19/9/2016 11:41	ON	N22.19771 E113.86856	92 m	0:00:24	14 kph
19/9/2016 11:41	ON	N22.19692 E113.86844	89 m	0:00:23	14 kph
19/9/2016 11:42	ON	N22.19622 E113.86837	78 m	0:00:20	14 kph
19/9/2016 11:42	ON	N22.19555 E113.86841	75 m	0:00:20	13 kph
19/9/2016 11:42	ON	N22.19492 E113.86838	70 m	0:00:18	14 kph
19/9/2016 11:43	ON	N22.19416 E113.86851	86 m	0:00:23	13 kph
19/9/2016 11:43	ON	N22.19317 E113.86861	111 m	0:00:29	14 kph
19/9/2016 11:44	ON	N22.19230 E113.86862	97 m	0:00:25	14 kph
19/9/2016 11:44	ON	N22.19159 E113.86868	80 m	0:00:21	14 kph
19/9/2016 11:44	ON	N22.19096 E113.86867	70 m	0:00:18	14 kph
19/9/2016 11:45	ON	N22.19009 E113.86870	97 m	0:00:25	14 kph
19/9/2016 11:45	ON	N22.18935 E113.86864	82 m	0:00:21	14 kph
19/9/2016 11:45	ON	N22.18861 E113.86862	82 m	0:00:21	14 kph
19/9/2016 11:46	ON	N22.18770 E113.86861	101 m	0:00:26	14 kph
19/9/2016 11:46	ON	N22.18711 E113.86855	66 m	0:00:19	13 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
19/9/2016 11:46	OFF	N22.18698 E113.86852	14 m	0:00:07	7 kph
19/9/2016 11:46	OFF	N22.18688 E113.86850	11 m	0:00:09	5 kph
19/9/2016 11:47	OFF	N22.18674 E113.86844	17 m	0:00:18	3 kph
19/9/2016 11:47	OFF	N22.18660 E113.86835	18 m	0:00:25	3 kph
19/9/2016 11:47	OFF	N22.18652 E113.86830	11 m	0:00:21	2 kph
19/9/2016 11:48	OFF	N22.18647 E113.86825	8 m	0:00:17	2 kph
19/9/2016 11:48	OFF	N22.18644 E113.86824	3 m	0:00:04	3 kph
19/9/2016 11:48	OFF	N22.18635 E113.86822	10 m	0:00:08	4 kph
19/9/2016 11:48	OFF	N22.18618 E113.86854	38 m	0:00:23	6 kph
19/9/2016 11:49	OFF	N22.18608 E113.86904	52 m	0:00:17	11 kph
19/9/2016 11:49	OFF	N22.18590 E113.86965	66 m	0:00:21	11 kph
19/9/2016 11:49	OFF	N22.18573 E113.87036	76 m	0:00:24	11 kph
19/9/2016 11:50	OFF	N22.18558 E113.87092	60 m	0:00:19	11 kph
19/9/2016 11:50	OFF	N22.18545 E113.87140	51 m	0:00:18	10 kph
19/9/2016 11:50	OFF	N22.18544 E113.87142	2 m	0:00:01	6 kph
19/9/2016 11:50	OFF	N22.18543 E113.87148	7 m	0:00:05	5 kph
19/9/2016 11:50	OFF	N22.18530 E113.87169	26 m	0:00:21	4 kph
19/9/2016 11:51	OFF	N22.18478 E113.87164	58 m	0:00:25	8 kph
19/9/2016 11:51	OFF	N22.18432 E113.87166	51 m	0:00:20	9 kph
19/9/2016 11:51	OFF	N22.18407 E113.87168	28 m	0:00:22	5 kph
19/9/2016 11:52	OFF	N22.18393 E113.87169	16 m	0:00:22	3 kph
19/9/2016 11:52	OFF	N22.18385 E113.87170	8 m	0:00:17	2 kph
19/9/2016 11:52	OFF	N22.18377 E113.87171	9 m	0:00:21	2 kph
19/9/2016 11:53	OFF	N22.18347 E113.87174	34 m	0:00:24	5 kph
19/9/2016 11:53	OFF	N22.18300 E113.87173	52 m	0:00:24	8 kph
19/9/2016 11:54	OFF	N22.18254 E113.87175	52 m	0:00:21	9 kph
19/9/2016 11:54	OFF	N22.18230 E113.87175	27 m	0:00:14	7 kph
19/9/2016 11:54	OFF	N22.18211 E113.87174	22 m	0:00:19	4 kph
19/9/2016 11:54	OFF	N22.18199 E113.87170	14 m	0:00:18	3 kph
19/9/2016 11:55	OFF	N22.18191 E113.87167	9 m	0:00:14	2 kph
19/9/2016 11:55	OFF	N22.18185 E113.87163	8 m	0:00:16	2 kph
19/9/2016 11:55	OFF	N22.18179 E113.87157	9 m	0:00:29	1.2 kph
19/9/2016 11:56	OFF	N22.18178 E113.87153	4 m	0:00:16	0.9 kph
19/9/2016 11:56	OFF	N22.18177 E113.87150	3 m	0:00:13	0.8 kph
19/9/2016 11:56	OFF	N22.18176 E113.87146	5 m	0:00:07	2 kph
19/9/2016 11:56	OFF	N22.18144 E113.87112	50 m	0:00:23	8 kph
19/9/2016 11:57	OFF	N22.18089 E113.87091	65 m	0:00:23	10 kph
19/9/2016 11:57	ON	N22.18032 E113.87079	64 m	0:00:20	12 kph
19/9/2016 11:58	ON	N22.17963 E113.87064	78 m	0:00:23	12 kph
19/9/2016 11:58	ON	N22.17894 E113.87052	78 m	0:00:22	13 kph
19/9/2016 11:58	ON	N22.17824 E113.87041	79 m	0:00:22	13 kph
19/9/2016 11:59	ON	N22.17745 E113.87028	89 m	0:00:25	13 kph
19/9/2016 11:59	ON	N22.17656 E113.87019	100 m	0:00:28	13 kph
19/9/2016 12:00	ON	N22.17562 E113.86998	107 m	0:00:30	13 kph
19/9/2016 12:00	ON	N22.17475 E113.86986	98 m	0:00:28	13 kph
19/9/2016 12:01	ON	N22.17398 E113.86971	87 m	0:00:25	13 kph
19/9/2016 12:01	ON	N22.17317 E113.86958	92 m	0:00:25	13 kph
19/9/2016 12:01	ON	N22.17245 E113.86953	80 m	0:00:21	14 kph
19/9/2016 12:02	ON	N22.17167 E113.86946	87 m	0:00:23	14 kph
19/9/2016 12:02	ON	N22.17064 E113.86942	114 m	0:00:30	14 kph
19/9/2016 12:03	ON	N22.17002 E113.86945	70 m	0:00:18	14 kph
19/9/2016 12:03	ON	N22.16917 E113.86951	94 m	0:00:26	13 kph
19/9/2016 12:03	ON	N22.16837 E113.86957	89 m	0:00:25	13 kph
19/9/2016 12:04	ON	N22.16750 E113.86965	97 m	0:00:27	13 kph
19/9/2016 12:04	ON	N22.16675 E113.86957	84 m	0:00:24	13 kph
19/9/2016 12:05	ON	N22.16606 E113.86945	78 m	0:00:22	13 kph
19/9/2016 12:05	ON	N22.16548 E113.86913	73 m	0:00:20	13 kph
19/9/2016 12:05	ON	N22.16482 E113.86906	73 m	0:00:21	13 kph
19/9/2016 12:06	ON	N22.16390 E113.86904	103 m	0:00:29	13 kph
19/9/2016 12:06	ON	N22.16324 E113.86906	74 m	0:00:21	13 kph
19/9/2016 12:06	ON	N22.16250 E113.86905	81 m	0:00:23	13 kph
19/9/2016 12:07	ON	N22.16166 E113.86918	95 m	0:00:27	13 kph
19/9/2016 12:07	ON	N22.16090 E113.86919	85 m	0:00:24	13 kph
19/9/2016 12:08	ON	N22.16023 E113.86918	74 m	0:00:21	13 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
19/9/2016 12:08	ON	N22.15988 E113.86967	65 m	0:00:21	11 kph
19/9/2016 12:08	ON	N22.15967 E113.87056	94 m	0:00:26	13 kph
19/9/2016 12:09	ON	N22.15919 E113.87140	102 m	0:00:28	13 kph
19/9/2016 12:09	ON	N22.15872 E113.87227	104 m	0:00:28	13 kph
19/9/2016 12:10	ON	N22.15825 E113.87311	101 m	0:00:27	13 kph
19/9/2016 12:10	ON	N22.15778 E113.87411	116 m	0:00:31	14 kph
19/9/2016 12:11	ON	N22.15725 E113.87534	139 m	0:00:37	14 kph
19/9/2016 12:11	ON	N22.15691 E113.87631	107 m	0:00:29	13 kph
19/9/2016 12:12	ON	N22.15663 E113.87732	108 m	0:00:29	13 kph
19/9/2016 12:12	ON	N22.15635 E113.87826	102 m	0:00:27	14 kph
19/9/2016 12:13	ON	N22.15641 E113.87907	83 m	0:00:24	12 kph
19/9/2016 12:13	ON	N22.15693 E113.87930	62 m	0:00:17	13 kph
19/9/2016 12:13	ON	N22.15765 E113.87929	81 m	0:00:20	14 kph
19/9/2016 12:14	ON	N22.15841 E113.87918	85 m	0:00:21	15 kph
19/9/2016 12:14	ON	N22.15921 E113.87935	91 m	0:00:22	15 kph
19/9/2016 12:14	ON	N22.15990 E113.87945	77 m	0:00:19	15 kph
19/9/2016 12:15	ON	N22.16072 E113.87945	92 m	0:00:23	14 kph
19/9/2016 12:15	ON	N22.16162 E113.87939	100 m	0:00:25	14 kph
19/9/2016 12:16	ON	N22.16235 E113.87938	81 m	0:00:20	15 kph
19/9/2016 12:16	ON	N22.16317 E113.87937	92 m	0:00:23	14 kph
19/9/2016 12:16	ON	N22.16388 E113.87938	79 m	0:00:20	14 kph
19/9/2016 12:17	ON	N22.16484 E113.87932	107 m	0:00:28	14 kph
19/9/2016 12:17	ON	N22.16559 E113.87930	84 m	0:00:22	14 kph
19/9/2016 12:17	ON	N22.16630 E113.87926	79 m	0:00:21	13 kph
19/9/2016 12:18	ON	N22.16715 E113.87917	95 m	0:00:25	14 kph
19/9/2016 12:18	ON	N22.16800 E113.87902	95 m	0:00:25	14 kph
19/9/2016 12:19	ON	N22.16871 E113.87895	80 m	0:00:21	14 kph
19/9/2016 12:19	ON	N22.16966 E113.87892	106 m	0:00:28	14 kph
19/9/2016 12:20	ON	N22.17045 E113.87894	88 m	0:00:24	13 kph
19/9/2016 12:20	ON	N22.17126 E113.87893	90 m	0:00:25	13 kph
19/9/2016 12:20	ON	N22.17221 E113.87888	106 m	0:00:28	14 kph
19/9/2016 12:21	ON	N22.17303 E113.87886	91 m	0:00:24	14 kph
19/9/2016 12:21	ON	N22.17390 E113.87878	97 m	0:00:25	14 kph
19/9/2016 12:22	ON	N22.17462 E113.87884	80 m	0:00:21	14 kph
19/9/2016 12:22	ON	N22.17538 E113.87883	85 m	0:00:22	14 kph
19/9/2016 12:22	ON	N22.17610 E113.87875	81 m	0:00:21	14 kph
19/9/2016 12:23	ON	N22.17689 E113.87863	88 m	0:00:23	14 kph
19/9/2016 12:23	ON	N22.17750 E113.87855	69 m	0:00:18	14 kph
19/9/2016 12:23	ON	N22.17819 E113.87850	76 m	0:00:20	14 kph
19/9/2016 12:24	ON	N22.17894 E113.87842	85 m	0:00:22	14 kph
19/9/2016 12:24	ON	N22.17973 E113.87835	88 m	0:00:23	14 kph
19/9/2016 12:24	ON	N22.18048 E113.87837	83 m	0:00:22	14 kph
19/9/2016 12:25	ON	N22.18124 E113.87835	85 m	0:00:23	13 kph
19/9/2016 12:25	ON	N22.18198 E113.87830	83 m	0:00:22	14 kph
19/9/2016 12:25	ON	N22.18259 E113.87823	68 m	0:00:18	14 kph
19/9/2016 12:26	ON	N22.18337 E113.87817	87 m	0:00:23	14 kph
19/9/2016 12:26	ON	N22.18394 E113.87816	63 m	0:00:17	13 kph
19/9/2016 12:27	ON	N22.18482 E113.87813	98 m	0:00:26	14 kph
19/9/2016 12:27	ON	N22.18554 E113.87808	80 m	0:00:21	14 kph
19/9/2016 12:27	ON	N22.18619 E113.87810	72 m	0:00:19	14 kph
19/9/2016 12:28	ON	N22.18694 E113.87807	83 m	0:00:22	14 kph
19/9/2016 12:28	ON	N22.18772 E113.87806	87 m	0:00:23	14 kph
19/9/2016 12:28	ON	N22.18876 E113.87805	115 m	0:00:30	14 kph
19/9/2016 12:29	ON	N22.18959 E113.87807	92 m	0:00:24	14 kph
19/9/2016 12:29	ON	N22.19065 E113.87808	119 m	0:00:31	14 kph
19/9/2016 12:30	ON	N22.19150 E113.87793	96 m	0:00:25	14 kph
19/9/2016 12:30	ON	N22.19232 E113.87786	91 m	0:00:24	14 kph
19/9/2016 12:31	ON	N22.19319 E113.87785	97 m	0:00:25	14 kph
19/9/2016 12:31	ON	N22.19393 E113.87780	82 m	0:00:21	14 kph
19/9/2016 12:31	ON	N22.19486 E113.87773	104 m	0:00:26	14 kph
19/9/2016 12:32	ON	N22.19586 E113.87768	112 m	0:00:28	14 kph
19/9/2016 12:32	ON	N22.19712 E113.87764	140 m	0:00:35	14 kph
19/9/2016 12:33	ON	N22.19830 E113.87757	133 m	0:00:33	14 kph
19/9/2016 12:34	ON	N22.19944 E113.87754	126 m	0:00:31	15 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
19/9/2016 12:34	ON	N22.20045 E113.87766	114 m	0:00:28	15 kph
19/9/2016 12:35	ON	N22.20156 E113.87770	124 m	0:00:31	14 kph
19/9/2016 12:35	ON	N22.20291 E113.87783	151 m	0:00:37	15 kph
19/9/2016 12:36	ON	N22.20414 E113.87777	137 m	0:00:34	15 kph
19/9/2016 12:36	ON	N22.20537 E113.87795	138 m	0:00:34	15 kph
19/9/2016 12:37	ON	N22.20660 E113.87812	138 m	0:00:34	15 kph
19/9/2016 12:37	ON	N22.20786 E113.87822	140 m	0:00:35	14 kph
19/9/2016 12:38	ON	N22.20857 E113.87875	97 m	0:00:27	13 kph
19/9/2016 12:38	ON	N22.20891 E113.87978	113 m	0:00:28	14 kph
19/9/2016 12:39	ON	N22.20959 E113.88086	134 m	0:00:33	15 kph
19/9/2016 12:39	ON	N22.21022 E113.88174	115 m	0:00:28	15 kph
19/9/2016 12:40	ON	N22.21075 E113.88281	125 m	0:00:31	15 kph
19/9/2016 12:40	ON	N22.21103 E113.88374	101 m	0:00:25	15 kph
19/9/2016 12:41	ON	N22.21148 E113.88465	106 m	0:00:26	15 kph
19/9/2016 12:41	ON	N22.21190 E113.88565	113 m	0:00:28	15 kph
19/9/2016 12:42	ON	N22.21224 E113.88664	109 m	0:00:27	15 kph
19/9/2016 12:42	ON	N22.21256 E113.88744	90 m	0:00:22	15 kph
19/9/2016 12:42	ON	N22.21280 E113.88831	93 m	0:00:24	14 kph
19/9/2016 12:43	ON	N22.21232 E113.88882	74 m	0:00:22	12 kph
19/9/2016 12:43	ON	N22.21164 E113.88896	77 m	0:00:21	13 kph
19/9/2016 12:43	ON	N22.21109 E113.88882	64 m	0:00:18	13 kph
19/9/2016 12:44	ON	N22.21045 E113.88872	72 m	0:00:19	14 kph
19/9/2016 12:44	ON	N22.20983 E113.88868	69 m	0:00:18	14 kph
19/9/2016 12:44	ON	N22.20908 E113.88862	84 m	0:00:22	14 kph
19/9/2016 12:45	ON	N22.20819 E113.88866	99 m	0:00:26	14 kph
19/9/2016 12:45	ON	N22.20725 E113.88866	105 m	0:00:28	14 kph
19/9/2016 12:46	ON	N22.20617 E113.88863	120 m	0:00:32	14 kph
19/9/2016 12:46	ON	N22.20504 E113.88857	126 m	0:00:34	13 kph
19/9/2016 12:47	ON	N22.20426 E113.88858	87 m	0:00:23	14 kph
19/9/2016 12:47	ON	N22.20333 E113.88850	104 m	0:00:28	13 kph
19/9/2016 12:48	ON	N22.20261 E113.88848	80 m	0:00:21	14 kph
19/9/2016 12:48	ON	N22.20179 E113.88844	91 m	0:00:24	14 kph
19/9/2016 12:48	ON	N22.20093 E113.88842	96 m	0:00:25	14 kph
19/9/2016 12:49	ON	N22.20008 E113.88838	96 m	0:00:25	14 kph
19/9/2016 12:49	ON	N22.19950 E113.88834	64 m	0:00:17	14 kph
19/9/2016 12:50	ON	N22.19859 E113.88829	102 m	0:00:27	14 kph
19/9/2016 12:50	ON	N22.19770 E113.88827	99 m	0:00:26	14 kph
19/9/2016 12:50	ON	N22.19670 E113.88828	111 m	0:00:29	14 kph
19/9/2016 12:51	ON	N22.19584 E113.88826	96 m	0:00:25	14 kph
19/9/2016 12:51	ON	N22.19495 E113.88833	99 m	0:00:26	14 kph
19/9/2016 12:52	ON	N22.19422 E113.88829	81 m	0:00:21	14 kph
19/9/2016 12:52	ON	N22.19346 E113.88831	84 m	0:00:22	14 kph
19/9/2016 12:53	ON	N22.19245 E113.88828	113 m	0:00:29	14 kph
19/9/2016 12:53	ON	N22.19150 E113.88825	106 m	0:00:27	14 kph
19/9/2016 12:53	ON	N22.19060 E113.88821	100 m	0:00:26	14 kph
19/9/2016 12:54	ON	N22.18964 E113.88830	107 m	0:00:28	14 kph
19/9/2016 12:54	ON	N22.18872 E113.88817	103 m	0:00:28	13 kph
19/9/2016 12:55	ON	N22.18779 E113.88806	104 m	0:00:28	13 kph
19/9/2016 12:55	ON	N22.18690 E113.88789	101 m	0:00:27	14 kph
19/9/2016 12:56	ON	N22.18609 E113.88787	90 m	0:00:24	13 kph
19/9/2016 12:56	ON	N22.18517 E113.88780	102 m	0:00:27	14 kph
19/9/2016 12:57	ON	N22.18434 E113.88763	95 m	0:00:25	14 kph
19/9/2016 12:57	ON	N22.18349 E113.88747	96 m	0:00:25	14 kph
19/9/2016 12:57	ON	N22.18258 E113.88748	101 m	0:00:26	14 kph
19/9/2016 12:58	ON	N22.18159 E113.88758	111 m	0:00:28	14 kph
19/9/2016 12:58	ON	N22.18078 E113.88756	90 m	0:00:23	14 kph
19/9/2016 12:59	ON	N22.18007 E113.88749	79 m	0:00:20	14 kph
19/9/2016 12:59	ON	N22.17924 E113.88751	93 m	0:00:23	14 kph
19/9/2016 12:59	ON	N22.17838 E113.88765	97 m	0:00:24	15 kph
19/9/2016 13:00	ON	N22.17741 E113.88775	109 m	0:00:27	14 kph
19/9/2016 13:00	ON	N22.17673 E113.88777	76 m	0:00:19	14 kph
19/9/2016 13:00	ON	N22.17607 E113.88776	73 m	0:00:19	14 kph
19/9/2016 13:01	ON	N22.17531 E113.88772	85 m	0:00:22	14 kph
19/9/2016 13:01	ON	N22.17433 E113.88772	110 m	0:00:28	14 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
19/9/2016 13:02	ON	N22.17344 E113.88771	99 m	0:00:25	14 kph
19/9/2016 13:02	ON	N22.17247 E113.88772	108 m	0:00:27	14 kph
19/9/2016 13:03	ON	N22.17146 E113.88776	113 m	0:00:28	15 kph
19/9/2016 13:03	ON	N22.17052 E113.88780	105 m	0:00:26	14 kph
19/9/2016 13:04	ON	N22.16948 E113.88781	116 m	0:00:29	14 kph
19/9/2016 13:04	ON	N22.16857 E113.88779	101 m	0:00:26	14 kph
19/9/2016 13:04	ON	N22.16770 E113.88777	97 m	0:00:25	14 kph
19/9/2016 13:05	ON	N22.16693 E113.88778	87 m	0:00:22	14 kph
19/9/2016 13:05	ON	N22.16603 E113.88779	100 m	0:00:25	14 kph
19/9/2016 13:06	ON	N22.16513 E113.88780	100 m	0:00:25	14 kph
19/9/2016 13:06	ON	N22.16421 E113.88777	103 m	0:00:25	15 kph
19/9/2016 13:06	ON	N22.16327 E113.88769	105 m	0:00:26	15 kph
19/9/2016 13:07	ON	N22.16240 E113.88774	96 m	0:00:25	14 kph
19/9/2016 13:07	ON	N22.16155 E113.88794	98 m	0:00:25	14 kph
19/9/2016 13:08	ON	N22.16070 E113.88809	96 m	0:00:25	14 kph
19/9/2016 13:08	ON	N22.15998 E113.88813	80 m	0:00:21	14 kph
19/9/2016 13:08	ON	N22.15909 E113.88814	99 m	0:00:26	14 kph
19/9/2016 13:09	ON	N22.15834 E113.88819	84 m	0:00:22	14 kph
19/9/2016 13:09	ON	N22.15748 E113.88822	95 m	0:00:24	14 kph
19/9/2016 13:10	ON	N22.15669 E113.88824	89 m	0:00:21	15 kph
19/9/2016 13:10	ON	N22.15591 E113.88825	86 m	0:00:21	15 kph
19/9/2016 13:10	ON	N22.15511 E113.88825	89 m	0:00:22	15 kph
19/9/2016 13:11	ON	N22.15450 E113.88820	69 m	0:00:17	15 kph
19/9/2016 13:11	ON	N22.15366 E113.88816	94 m	0:00:23	15 kph
19/9/2016 13:11	ON	N22.15280 E113.88817	96 m	0:00:23	15 kph
19/9/2016 13:12	ON	N22.15201 E113.88828	88 m	0:00:21	15 kph
19/9/2016 13:12	ON	N22.15122 E113.88851	92 m	0:00:22	15 kph
19/9/2016 13:13	ON	N22.15024 E113.88890	117 m	0:00:28	15 kph
19/9/2016 13:13	ON	N22.14941 E113.88918	97 m	0:00:23	15 kph
19/9/2016 13:13	ON	N22.14862 E113.88934	89 m	0:00:21	15 kph
19/9/2016 13:14	ON	N22.14788 E113.88967	89 m	0:00:23	14 kph
19/9/2016 13:14	ON	N22.14791 E113.89033	68 m	0:00:19	13 kph
19/9/2016 13:14	ON	N22.14817 E113.89143	117 m	0:00:29	15 kph
19/9/2016 13:15	ON	N22.14824 E113.89239	99 m	0:00:24	15 kph
19/9/2016 13:15	ON	N22.14817 E113.89344	108 m	0:00:26	15 kph
19/9/2016 13:16	ON	N22.14814 E113.89440	99 m	0:00:24	15 kph
19/9/2016 13:16	ON	N22.14822 E113.89540	104 m	0:00:25	15 kph
19/9/2016 13:16	ON	N22.14838 E113.89637	102 m	0:00:24	15 kph
19/9/2016 13:17	ON	N22.14880 E113.89709	87 m	0:00:24	13 kph
19/9/2016 13:17	ON	N22.14945 E113.89697	74 m	0:00:20	13 kph
19/9/2016 13:18	ON	N22.15018 E113.89686	82 m	0:00:21	14 kph
19/9/2016 13:18	ON	N22.15098 E113.89687	89 m	0:00:22	15 kph
19/9/2016 13:18	ON	N22.15184 E113.89667	97 m	0:00:24	15 kph
19/9/2016 13:19	ON	N22.15274 E113.89662	101 m	0:00:25	15 kph
19/9/2016 13:19	ON	N22.15356 E113.89670	91 m	0:00:22	15 kph
19/9/2016 13:19	ON	N22.15434 E113.89675	87 m	0:00:21	15 kph
19/9/2016 13:20	ON	N22.15516 E113.89675	91 m	0:00:22	15 kph
19/9/2016 13:20	ON	N22.15590 E113.89670	82 m	0:00:20	15 kph
19/9/2016 13:21	ON	N22.15664 E113.89666	83 m	0:00:20	15 kph
19/9/2016 13:21	ON	N22.15746 E113.89664	92 m	0:00:23	14 kph
19/9/2016 13:21	ON	N22.15836 E113.89652	100 m	0:00:26	14 kph
19/9/2016 13:22	ON	N22.15913 E113.89642	86 m	0:00:23	13 kph
19/9/2016 13:22	ON	N22.15984 E113.89643	79 m	0:00:21	14 kph
19/9/2016 13:22	ON	N22.16058 E113.89646	82 m	0:00:22	13 kph
19/9/2016 13:23	ON	N22.16132 E113.89650	82 m	0:00:22	13 kph
19/9/2016 13:23	ON	N22.16227 E113.89649	105 m	0:00:28	14 kph
19/9/2016 13:24	ON	N22.16314 E113.89654	98 m	0:00:26	14 kph
19/9/2016 13:24	ON	N22.16389 E113.89660	83 m	0:00:22	14 kph
19/9/2016 13:24	ON	N22.16471 E113.89664	92 m	0:00:24	14 kph
19/9/2016 13:25	ON	N22.16561 E113.89667	100 m	0:00:26	14 kph
19/9/2016 13:25	ON	N22.16671 E113.89668	122 m	0:00:31	14 kph
19/9/2016 13:26	ON	N22.16764 E113.89666	103 m	0:00:26	14 kph
19/9/2016 13:26	ON	N22.16852 E113.89667	98 m	0:00:25	14 kph
19/9/2016 13:27	ON	N22.16970 E113.89680	132 m	0:00:33	14 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
19/9/2016 13:27	ON	N22.17070 E113.89685	111 m	0:00:28	14 kph
19/9/2016 13:28	ON	N22.17150 E113.89680	90 m	0:00:23	14 kph
19/9/2016 13:28	ON	N22.17230 E113.89686	89 m	0:00:23	14 kph
19/9/2016 13:29	ON	N22.17336 E113.89707	120 m	0:00:30	14 kph
19/9/2016 13:29	ON	N22.17430 E113.89730	107 m	0:00:26	15 kph
19/9/2016 13:29	ON	N22.17522 E113.89750	104 m	0:00:25	15 kph
19/9/2016 13:30	ON	N22.17608 E113.89769	99 m	0:00:24	15 kph
19/9/2016 13:30	ON	N22.17707 E113.89786	111 m	0:00:27	15 kph
19/9/2016 13:31	ON	N22.17807 E113.89792	112 m	0:00:28	14 kph
19/9/2016 13:31	ON	N22.17886 E113.89795	89 m	0:00:23	14 kph
19/9/2016 13:31	ON	N22.17966 E113.89796	89 m	0:00:23	14 kph
19/9/2016 13:32	ON	N22.18056 E113.89794	100 m	0:00:26	14 kph
19/9/2016 13:32	ON	N22.18163 E113.89788	119 m	0:00:31	14 kph
19/9/2016 13:33	ON	N22.18254 E113.89779	102 m	0:00:26	14 kph
19/9/2016 13:33	ON	N22.18342 E113.89773	98 m	0:00:25	14 kph
19/9/2016 13:34	ON	N22.18446 E113.89767	116 m	0:00:29	14 kph
19/9/2016 13:34	ON	N22.18548 E113.89761	113 m	0:00:28	15 kph
19/9/2016 13:35	ON	N22.18633 E113.89758	95 m	0:00:23	15 kph
19/9/2016 13:35	ON	N22.18711 E113.89756	87 m	0:00:21	15 kph
19/9/2016 13:35	ON	N22.18794 E113.89752	92 m	0:00:22	15 kph
19/9/2016 13:36	ON	N22.18880 E113.89749	96 m	0:00:23	15 kph
19/9/2016 13:36	ON	N22.18970 E113.89748	100 m	0:00:24	15 kph
19/9/2016 13:36	ON	N22.19057 E113.89747	96 m	0:00:23	15 kph
19/9/2016 13:37	ON	N22.19157 E113.89746	112 m	0:00:27	15 kph
19/9/2016 13:37	ON	N22.19253 E113.89745	107 m	0:00:26	15 kph
19/9/2016 13:38	ON	N22.19356 E113.89742	114 m	0:00:28	15 kph
19/9/2016 13:38	ON	N22.19461 E113.89745	117 m	0:00:29	15 kph
19/9/2016 13:39	ON	N22.19556 E113.89751	106 m	0:00:26	15 kph
19/9/2016 13:39	ON	N22.19650 E113.89754	105 m	0:00:26	15 kph
19/9/2016 13:40	ON	N22.19758 E113.89742	120 m	0:00:30	14 kph
19/9/2016 13:40	ON	N22.19861 E113.89744	115 m	0:00:29	14 kph
19/9/2016 13:41	ON	N22.19971 E113.89759	124 m	0:00:31	14 kph
19/9/2016 13:41	ON	N22.20082 E113.89775	124 m	0:00:31	14 kph
19/9/2016 13:42	ON	N22.20207 E113.89799	141 m	0:00:35	14 kph
19/9/2016 13:42	ON	N22.20325 E113.89819	133 m	0:00:33	15 kph
19/9/2016 13:43	ON	N22.20443 E113.89840	133 m	0:00:33	15 kph
19/9/2016 13:43	ON	N22.20547 E113.89837	116 m	0:00:29	14 kph
19/9/2016 13:44	ON	N22.20639 E113.89829	103 m	0:00:26	14 kph
19/9/2016 13:44	ON	N22.20750 E113.89830	123 m	0:00:31	14 kph
19/9/2016 13:45	ON	N22.20845 E113.89820	107 m	0:00:27	14 kph
19/9/2016 13:45	ON	N22.20937 E113.89811	103 m	0:00:26	14 kph
19/9/2016 13:46	ON	N22.21030 E113.89802	104 m	0:00:27	14 kph
19/9/2016 13:46	ON	N22.21103 E113.89823	84 m	0:00:26	12 kph
19/9/2016 13:46	ON	N22.21090 E113.89901	82 m	0:00:23	13 kph
19/9/2016 13:47	ON	N22.21043 E113.89956	77 m	0:00:19	15 kph
19/9/2016 13:47	ON	N22.21009 E113.90010	68 m	0:00:17	14 kph
19/9/2016 13:47	ON	N22.20966 E113.90096	101 m	0:00:24	15 kph
19/9/2016 13:48	ON	N22.20926 E113.90161	80 m	0:00:19	15 kph
19/9/2016 13:48	ON	N22.20891 E113.90214	67 m	0:00:16	15 kph
19/9/2016 13:48	ON	N22.20841 E113.90302	106 m	0:00:25	15 kph
19/9/2016 13:49	ON	N22.20810 E113.90363	72 m	0:00:17	15 kph
19/9/2016 13:49	ON	N22.20775 E113.90417	68 m	0:00:16	15 kph
19/9/2016 13:49	ON	N22.20729 E113.90503	103 m	0:00:24	15 kph
19/9/2016 13:50	ON	N22.20694 E113.90573	82 m	0:00:19	16 kph
19/9/2016 13:50	ON	N22.20656 E113.90660	99 m	0:00:23	15 kph
19/9/2016 13:50	ON	N22.20614 E113.90701	63 m	0:00:17	13 kph
19/9/2016 13:51	ON	N22.20551 E113.90704	70 m	0:00:19	13 kph
19/9/2016 13:51	ON	N22.20481 E113.90699	78 m	0:00:21	13 kph
19/9/2016 13:51	ON	N22.20407 E113.90700	82 m	0:00:23	13 kph
19/9/2016 13:52	ON	N22.20315 E113.90700	102 m	0:00:28	13 kph
19/9/2016 13:52	ON	N22.20217 E113.90706	109 m	0:00:30	13 kph
19/9/2016 13:53	ON	N22.20127 E113.90715	101 m	0:00:27	13 kph
19/9/2016 13:53	ON	N22.20016 E113.90719	124 m	0:00:33	13 kph
19/9/2016 13:54	ON	N22.19921 E113.90717	105 m	0:00:28	13 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
19/9/2016 13:54	ON	N22.19831 E113.90713	100 m	0:00:27	13 kph
19/9/2016 13:55	ON	N22.19741 E113.90696	102 m	0:00:28	13 kph
19/9/2016 13:55	ON	N22.19640 E113.90676	115 m	0:00:32	13 kph
19/9/2016 13:56	ON	N22.19548 E113.90662	103 m	0:00:28	13 kph
19/9/2016 13:56	ON	N22.19457 E113.90654	101 m	0:00:28	13 kph
19/9/2016 13:57	ON	N22.19391 E113.90644	74 m	0:00:21	13 kph
19/9/2016 13:57	ON	N22.19298 E113.90630	104 m	0:00:29	13 kph
19/9/2016 13:58	ON	N22.19222 E113.90618	86 m	0:00:24	13 kph
19/9/2016 13:58	ON	N22.19139 E113.90600	94 m	0:00:26	13 kph
19/9/2016 13:58	ON	N22.19053 E113.90583	97 m	0:00:27	13 kph
19/9/2016 13:59	ON	N22.18980 E113.90570	82 m	0:00:23	13 kph
19/9/2016 13:59	ON	N22.18907 E113.90550	84 m	0:00:24	13 kph
19/9/2016 14:00	ON	N22.18807 E113.90516	117 m	0:00:34	12 kph
19/9/2016 14:00	ON	N22.18709 E113.90496	111 m	0:00:33	12 kph
19/9/2016 14:01	ON	N22.18629 E113.90479	91 m	0:00:27	12 kph
19/9/2016 14:01	ON	N22.18532 E113.90448	113 m	0:00:33	12 kph
19/9/2016 14:02	ON	N22.18458 E113.90432	84 m	0:00:24	13 kph
19/9/2016 14:02	ON	N22.18377 E113.90416	91 m	0:00:26	13 kph
19/9/2016 14:02	ON	N22.18307 E113.90401	79 m	0:00:22	13 kph
19/9/2016 14:03	ON	N22.18229 E113.90387	88 m	0:00:24	13 kph
19/9/2016 14:03	ON	N22.18152 E113.90378	86 m	0:00:23	13 kph
19/9/2016 14:04	ON	N22.18063 E113.90375	99 m	0:00:26	14 kph
19/9/2016 14:04	ON	N22.17953 E113.90391	124 m	0:00:31	14 kph
19/9/2016 14:05	ON	N22.17847 E113.90446	131 m	0:00:32	15 kph
19/9/2016 14:05	ON	N22.17752 E113.90541	144 m	0:00:34	15 kph
19/9/2016 14:06	ON	N22.17683 E113.90614	108 m	0:00:25	16 kph
19/9/2016 14:06	ON	N22.17600 E113.90710	134 m	0:00:31	16 kph
19/9/2016 14:07	ON	N22.17514 E113.90796	131 m	0:00:30	16 kph
19/9/2016 14:07	ON	N22.17417 E113.90862	128 m	0:00:31	15 kph
19/9/2016 14:08	ON	N22.17312 E113.90854	117 m	0:00:31	14 kph
19/9/2016 14:08	ON	N22.17203 E113.90820	126 m	0:00:35	13 kph
19/9/2016 14:09	ON	N22.17093 E113.90793	126 m	0:00:35	13 kph
19/9/2016 14:10	ON	N22.16979 E113.90755	133 m	0:00:37	13 kph
19/9/2016 14:10	ON	N22.16864 E113.90695	142 m	0:00:40	13 kph
19/9/2016 14:11	ON	N22.16776 E113.90655	107 m	0:00:30	13 kph
19/9/2016 14:11	ON	N22.16696 E113.90617	97 m	0:00:27	13 kph
19/9/2016 14:12	ON	N22.16628 E113.90541	109 m	0:00:32	12 kph
19/9/2016 14:12	ON	N22.16591 E113.90434	118 m	0:00:33	13 kph
19/9/2016 14:13	ON	N22.16558 E113.90334	109 m	0:00:31	13 kph
19/9/2016 14:13	ON	N22.16512 E113.90228	121 m	0:00:34	13 kph
19/9/2016 14:14	ON	N22.16470 E113.90142	100 m	0:00:28	13 kph
19/9/2016 14:14	ON	N22.16418 E113.90060	102 m	0:00:28	13 kph
19/9/2016 14:15	ON	N22.16380 E113.90011	66 m	0:00:18	13 kph
19/9/2016 14:15	ON	N22.16333 E113.89961	74 m	0:00:20	13 kph
19/9/2016 14:15	ON	N22.16269 E113.89904	91 m	0:00:24	14 kph
19/9/2016 14:16	ON	N22.16209 E113.89858	83 m	0:00:21	14 kph
19/9/2016 14:16	ON	N22.16129 E113.89824	95 m	0:00:24	14 kph
19/9/2016 14:16	ON	N22.16058 E113.89810	81 m	0:00:20	15 kph
19/9/2016 14:17	ON	N22.15972 E113.89808	95 m	0:00:23	15 kph
19/9/2016 14:17	ON	N22.15880 E113.89834	106 m	0:00:25	15 kph
19/9/2016 14:18	ON	N22.15784 E113.89877	116 m	0:00:27	15 kph
19/9/2016 14:18	ON	N22.15690 E113.89941	124 m	0:00:29	15 kph
19/9/2016 14:19	ON	N22.15611 E113.90030	127 m	0:00:29	16 kph
19/9/2016 14:19	ON	N22.15550 E113.90129	122 m	0:00:28	16 kph
19/9/2016 14:20	ON	N22.15515 E113.90233	114 m	0:00:26	16 kph
19/9/2016 14:20	ON	N22.15498 E113.90348	120 m	0:00:27	16 kph
19/9/2016 14:20	ON	N22.15511 E113.90459	115 m	0:00:26	16 kph
19/9/2016 14:21	ON	N22.15545 E113.90562	113 m	0:00:25	16 kph
19/9/2016 14:21	ON	N22.15572 E113.90677	123 m	0:00:28	16 kph
19/9/2016 14:22	ON	N22.15526 E113.90734	78 m	0:00:22	13 kph
19/9/2016 14:22	ON	N22.15440 E113.90756	98 m	0:00:26	14 kph
19/9/2016 14:23	ON	N22.15352 E113.90765	99 m	0:00:26	14 kph
19/9/2016 14:23	ON	N22.15262 E113.90764	100 m	0:00:26	14 kph
19/9/2016 14:23	ON	N22.15191 E113.90764	79 m	0:00:21	14 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
19/9/2016 14:24	ON	N22.15118 E113.90761	81 m	0:00:22	13 kph
19/9/2016 14:24	ON	N22.15015 E113.90767	115 m	0:00:30	14 kph
19/9/2016 14:25	ON	N22.14936 E113.90767	88 m	0:00:23	14 kph
19/9/2016 14:25	ON	N22.14860 E113.90759	84 m	0:00:22	14 kph
19/9/2016 14:25	ON	N22.14772 E113.90763	98 m	0:00:25	14 kph
19/9/2016 14:26	ON	N22.14707 E113.90809	86 m	0:00:24	13 kph
19/9/2016 14:26	ON	N22.14699 E113.90894	88 m	0:00:22	14 kph
19/9/2016 14:27	ON	N22.14704 E113.91000	109 m	0:00:26	15 kph
19/9/2016 14:27	ON	N22.14708 E113.91098	101 m	0:00:24	15 kph
19/9/2016 14:27	ON	N22.14708 E113.91203	109 m	0:00:26	15 kph
19/9/2016 14:28	ON	N22.14706 E113.91309	110 m	0:00:26	15 kph
19/9/2016 14:28	ON	N22.14717 E113.91427	122 m	0:00:29	15 kph
19/9/2016 14:29	ON	N22.14732 E113.91535	112 m	0:00:27	15 kph
19/9/2016 14:29	ON	N22.14746 E113.91676	146 m	0:00:35	15 kph
19/9/2016 14:30	ON	N22.14748 E113.91785	113 m	0:00:27	15 kph
19/9/2016 14:30	ON	N22.14779 E113.91882	106 m	0:00:27	14 kph
19/9/2016 14:31	ON	N22.14853 E113.91927	95 m	0:00:24	14 kph
19/9/2016 14:31	ON	N22.14941 E113.91948	101 m	0:00:26	14 kph
19/9/2016 14:31	ON	N22.15011 E113.91955	78 m	0:00:20	14 kph
19/9/2016 14:32	ON	N22.15093 E113.91948	92 m	0:00:24	14 kph
19/9/2016 14:32	ON	N22.15179 E113.91947	96 m	0:00:25	14 kph
19/9/2016 14:33	ON	N22.15256 E113.91946	86 m	0:00:22	14 kph
19/9/2016 14:33	ON	N22.15344 E113.91949	98 m	0:00:25	14 kph
19/9/2016 14:33	ON	N22.15447 E113.91951	114 m	0:00:29	14 kph
19/9/2016 14:34	ON	N22.15559 E113.91954	125 m	0:00:31	15 kph
19/9/2016 14:35	ON	N22.15701 E113.91949	157 m	0:00:39	15 kph
19/9/2016 14:35	ON	N22.15817 E113.91945	129 m	0:00:32	15 kph
19/9/2016 14:36	ON	N22.15936 E113.91938	133 m	0:00:33	15 kph
19/9/2016 14:36	ON	N22.16040 E113.91940	115 m	0:00:28	15 kph
19/9/2016 14:37	ON	N22.16143 E113.91939	114 m	0:00:28	15 kph
19/9/2016 14:37	ON	N22.16238 E113.91927	107 m	0:00:27	14 kph
19/9/2016 14:38	ON	N22.16361 E113.91923	137 m	0:00:35	14 kph
19/9/2016 14:38	ON	N22.16461 E113.91930	112 m	0:00:28	14 kph
19/9/2016 14:39	ON	N22.16574 E113.91942	126 m	0:00:32	14 kph
19/9/2016 14:39	ON	N22.16686 E113.91950	125 m	0:00:32	14 kph
19/9/2016 14:40	ON	N22.16798 E113.91960	125 m	0:00:32	14 kph
19/9/2016 14:40	ON	N22.16903 E113.91981	119 m	0:00:30	14 kph
19/9/2016 14:41	ON	N22.17009 E113.92002	119 m	0:00:31	14 kph
19/9/2016 14:41	ON	N22.17097 E113.92024	101 m	0:00:27	14 kph
19/9/2016 14:42	ON	N22.17185 E113.92037	99 m	0:00:28	13 kph
19/9/2016 14:42	ON	N22.17270 E113.92068	100 m	0:00:27	13 kph
19/9/2016 14:43	ON	N22.17368 E113.92092	111 m	0:00:29	14 kph
19/9/2016 14:43	ON	N22.17467 E113.92116	114 m	0:00:29	14 kph
19/9/2016 14:44	ON	N22.17554 E113.92137	98 m	0:00:25	14 kph
19/9/2016 14:44	ON	N22.17637 E113.92150	94 m	0:00:24	14 kph
19/9/2016 14:44	ON	N22.17739 E113.92162	114 m	0:00:29	14 kph
19/9/2016 14:45	ON	N22.17842 E113.92168	115 m	0:00:29	14 kph
19/9/2016 14:45	ON	N22.17972 E113.92171	144 m	0:00:36	14 kph
19/9/2016 14:46	ON	N22.18075 E113.92150	117 m	0:00:30	14 kph
19/9/2016 14:47	ON	N22.18176 E113.92097	125 m	0:00:32	14 kph
19/9/2016 14:47	ON	N22.18272 E113.92061	113 m	0:00:29	14 kph
19/9/2016 14:48	ON	N22.18369 E113.92044	109 m	0:00:30	13 kph
19/9/2016 14:48	ON	N22.18446 E113.92040	86 m	0:00:24	13 kph
19/9/2016 14:48	ON	N22.18509 E113.92030	71 m	0:00:20	13 kph
19/9/2016 14:49	ON	N22.18597 E113.92017	99 m	0:00:28	13 kph
19/9/2016 14:49	ON	N22.18680 E113.92005	93 m	0:00:26	13 kph
19/9/2016 14:50	ON	N22.18760 E113.91958	101 m	0:00:31	12 kph
19/9/2016 14:50	ON	N22.18855 E113.91938	108 m	0:00:31	13 kph
19/9/2016 14:51	ON	N22.18951 E113.91942	107 m	0:00:29	13 kph
19/9/2016 14:51	ON	N22.19048 E113.91930	108 m	0:00:30	13 kph
19/9/2016 14:52	ON	N22.19136 E113.91920	98 m	0:00:27	13 kph
19/9/2016 14:52	ON	N22.19258 E113.91910	137 m	0:00:37	13 kph
19/9/2016 14:53	ON	N22.19350 E113.91896	103 m	0:00:28	13 kph
19/9/2016 14:53	ON	N22.19442 E113.91873	105 m	0:00:29	13 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
19/9/2016 14:54	ON	N22.19529 E113.91858	98 m	0:00:26	14 kph
19/9/2016 14:54	ON	N22.19635 E113.91847	118 m	0:00:31	14 kph
19/9/2016 14:55	ON	N22.19747 E113.91837	126 m	0:00:33	14 kph
19/9/2016 14:55	ON	N22.19859 E113.91831	125 m	0:00:33	14 kph
19/9/2016 14:56	ON	N22.19936 E113.91832	85 m	0:00:22	14 kph
19/9/2016 14:56	ON	N22.20022 E113.91833	96 m	0:00:25	14 kph
19/9/2016 14:57	ON	N22.20139 E113.91836	129 m	0:00:33	14 kph
19/9/2016 14:57	ON	N22.20250 E113.91842	124 m	0:00:31	14 kph
19/9/2016 14:57	ON	N22.20325 E113.91841	83 m	0:00:21	14 kph
19/9/2016 14:58	ON	N22.20406 E113.91869	94 m	0:00:24	14 kph
19/9/2016 14:58	ON	N22.20459 E113.91942	96 m	0:00:23	15 kph
19/9/2016 14:59	ON	N22.20495 E113.92045	113 m	0:00:26	16 kph
19/9/2016 14:59	ON	N22.20511 E113.92098	58 m	0:00:13	16 kph
19/9/2016 14:59	ON	N22.20537 E113.92184	93 m	0:00:21	16 kph
19/9/2016 14:59	ON	N22.20539 E113.92188	4 m	0:00:01	16 kph
19/9/2016 14:59	ON	N22.20550 E113.92233	48 m	0:00:11	16 kph
19/9/2016 15:00	ON	N22.20554 E113.92258	26 m	0:00:06	16 kph
19/9/2016 15:00	ON	N22.20560 E113.92348	93 m	0:00:21	16 kph
19/9/2016 15:00	ON	N22.20558 E113.92434	89 m	0:00:20	16 kph
19/9/2016 15:01	ON	N22.20548 E113.92520	89 m	0:00:20	16 kph
19/9/2016 15:01	ON	N22.20536 E113.92622	106 m	0:00:24	16 kph
19/9/2016 15:01	ON	N22.20522 E113.92697	79 m	0:00:18	16 kph
19/9/2016 15:02	ON	N22.20470 E113.92758	85 m	0:00:22	14 kph
19/9/2016 15:02	ON	N22.20401 E113.92783	81 m	0:00:21	14 kph
19/9/2016 15:02	ON	N22.20330 E113.92785	79 m	0:00:21	14 kph
19/9/2016 15:03	ON	N22.20258 E113.92789	80 m	0:00:22	13 kph
19/9/2016 15:03	ON	N22.20195 E113.92802	71 m	0:00:19	13 kph
19/9/2016 15:03	ON	N22.20120 E113.92810	84 m	0:00:23	13 kph
19/9/2016 15:04	ON	N22.20043 E113.92814	86 m	0:00:23	13 kph
19/9/2016 15:04	ON	N22.19982 E113.92815	67 m	0:00:18	13 kph
19/9/2016 15:05	ON	N22.19889 E113.92818	104 m	0:00:28	13 kph
19/9/2016 15:05	ON	N22.19799 E113.92813	100 m	0:00:27	13 kph
19/9/2016 15:05	ON	N22.19729 E113.92808	78 m	0:00:21	13 kph
19/9/2016 15:06	ON	N22.19665 E113.92812	71 m	0:00:19	14 kph
19/9/2016 15:06	ON	N22.19576 E113.92813	99 m	0:00:26	14 kph
19/9/2016 15:06	ON	N22.19487 E113.92814	100 m	0:00:26	14 kph
19/9/2016 15:07	ON	N22.19400 E113.92821	97 m	0:00:25	14 kph
19/9/2016 15:07	ON	N22.19333 E113.92826	74 m	0:00:19	14 kph
19/9/2016 15:08	ON	N22.19239 E113.92830	105 m	0:00:27	14 kph
19/9/2016 15:08	ON	N22.19155 E113.92833	94 m	0:00:24	14 kph
19/9/2016 15:08	ON	N22.19074 E113.92835	90 m	0:00:23	14 kph
19/9/2016 15:09	ON	N22.18992 E113.92839	91 m	0:00:23	14 kph
19/9/2016 15:09	ON	N22.18921 E113.92839	79 m	0:00:20	14 kph
19/9/2016 15:10	ON	N22.18835 E113.92839	96 m	0:00:24	14 kph
19/9/2016 15:10	ON	N22.18763 E113.92843	80 m	0:00:20	14 kph
19/9/2016 15:10	ON	N22.18668 E113.92840	107 m	0:00:26	15 kph
19/9/2016 15:11	ON	N22.18583 E113.92839	94 m	0:00:23	15 kph
19/9/2016 15:11	ON	N22.18490 E113.92838	103 m	0:00:25	15 kph
19/9/2016 15:11	ON	N22.18414 E113.92842	86 m	0:00:21	15 kph
19/9/2016 15:12	ON	N22.18351 E113.92847	70 m	0:00:17	15 kph
19/9/2016 15:12	ON	N22.18280 E113.92848	79 m	0:00:19	15 kph
19/9/2016 15:12	ON	N22.18191 E113.92855	100 m	0:00:24	15 kph
19/9/2016 15:13	ON	N22.18118 E113.92858	81 m	0:00:20	15 kph
19/9/2016 15:13	ON	N22.18038 E113.92857	89 m	0:00:22	15 kph
19/9/2016 15:14	ON	N22.17965 E113.92852	81 m	0:00:20	15 kph
19/9/2016 15:14	ON	N22.17877 E113.92840	99 m	0:00:25	14 kph
19/9/2016 15:14	ON	N22.17797 E113.92835	89 m	0:00:24	13 kph
19/9/2016 15:15	ON	N22.17689 E113.92827	120 m	0:00:31	14 kph
19/9/2016 15:15	ON	N22.17605 E113.92814	95 m	0:00:24	14 kph
19/9/2016 15:16	ON	N22.17521 E113.92810	93 m	0:00:24	14 kph
19/9/2016 15:16	ON	N22.17445 E113.92826	86 m	0:00:22	14 kph
19/9/2016 15:16	ON	N22.17388 E113.92835	64 m	0:00:16	14 kph
19/9/2016 15:17	ON	N22.17331 E113.92844	65 m	0:00:16	15 kph
19/9/2016 15:17	ON	N22.17255 E113.92845	84 m	0:00:21	14 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
19/9/2016 15:17	ON	N22.17176 E113.92840	88 m	0:00:22	14 kph
19/9/2016 15:18	ON	N22.17104 E113.92840	80 m	0:00:20	14 kph
19/9/2016 15:18	ON	N22.17014 E113.92831	101 m	0:00:26	14 kph
19/9/2016 15:18	ON	N22.16929 E113.92828	94 m	0:00:24	14 kph
19/9/2016 15:19	ON	N22.16866 E113.92829	71 m	0:00:18	14 kph
19/9/2016 15:19	ON	N22.16790 E113.92826	85 m	0:00:22	14 kph
19/9/2016 15:19	ON	N22.16724 E113.92819	74 m	0:00:19	14 kph
19/9/2016 15:20	ON	N22.16637 E113.92808	97 m	0:00:25	14 kph
19/9/2016 15:20	ON	N22.16558 E113.92800	89 m	0:00:23	14 kph
19/9/2016 15:21	ON	N22.16490 E113.92789	76 m	0:00:21	13 kph
19/9/2016 15:21	ON	N22.16411 E113.92779	88 m	0:00:24	13 kph
19/9/2016 15:21	ON	N22.16341 E113.92775	78 m	0:00:21	13 kph
19/9/2016 15:22	ON	N22.16270 E113.92768	80 m	0:00:22	13 kph
19/9/2016 15:22	ON	N22.16189 E113.92763	90 m	0:00:24	13 kph
19/9/2016 15:22	ON	N22.16136 E113.92763	59 m	0:00:16	13 kph
19/9/2016 15:23	ON	N22.16059 E113.92765	86 m	0:00:23	13 kph
19/9/2016 15:23	ON	N22.15976 E113.92765	92 m	0:00:25	13 kph
19/9/2016 15:23	ON	N22.15915 E113.92763	68 m	0:00:19	13 kph
19/9/2016 15:24	ON	N22.15850 E113.92761	72 m	0:00:20	13 kph
19/9/2016 15:24	ON	N22.15779 E113.92751	80 m	0:00:22	13 kph
19/9/2016 15:25	ON	N22.15706 E113.92743	83 m	0:00:23	13 kph
19/9/2016 15:25	ON	N22.15633 E113.92760	83 m	0:00:23	13 kph
19/9/2016 15:25	ON	N22.15566 E113.92769	75 m	0:00:21	13 kph
19/9/2016 15:26	ON	N22.15511 E113.92751	64 m	0:00:19	12 kph
19/9/2016 15:26	ON	N22.15443 E113.92727	79 m	0:00:23	12 kph
19/9/2016 15:26	ON	N22.15390 E113.92719	59 m	0:00:17	13 kph
19/9/2016 15:27	ON	N22.15326 E113.92720	72 m	0:00:20	13 kph
19/9/2016 15:27	ON	N22.15260 E113.92726	73 m	0:00:20	13 kph
19/9/2016 15:27	ON	N22.15204 E113.92726	63 m	0:00:17	13 kph
19/9/2016 15:28	ON	N22.15148 E113.92725	63 m	0:00:17	13 kph
19/9/2016 15:28	ON	N22.15105 E113.92723	48 m	0:00:13	13 kph
19/9/2016 15:28	ON	N22.15035 E113.92719	78 m	0:00:21	13 kph
19/9/2016 15:28	ON	N22.14969 E113.92711	74 m	0:00:20	13 kph
19/9/2016 15:29	ON	N22.14760 E113.92740	235 m	0:01:03	13 kph
19/9/2016 15:30	ON	N22.14755 E113.92804	67 m	0:00:19	13 kph
19/9/2016 15:30	ON	N22.14781 E113.92895	97 m	0:00:24	15 kph
19/9/2016 15:31	ON	N22.14806 E113.92977	90 m	0:00:22	15 kph
19/9/2016 15:31	ON	N22.14846 E113.93077	112 m	0:00:27	15 kph
19/9/2016 15:31	ON	N22.14877 E113.93158	91 m	0:00:22	15 kph
19/9/2016 15:32	ON	N22.14911 E113.93255	107 m	0:00:26	15 kph
19/9/2016 15:32	ON	N22.14938 E113.93329	82 m	0:00:20	15 kph
19/9/2016 15:33	ON	N22.14971 E113.93419	100 m	0:00:24	15 kph
19/9/2016 15:33	ON	N22.15008 E113.93508	101 m	0:00:24	15 kph
19/9/2016 15:33	ON	N22.15054 E113.93607	114 m	0:00:27	15 kph
19/9/2016 15:34	ON	N22.15093 E113.93695	101 m	0:00:25	15 kph
19/9/2016 15:34	ON	N22.15145 E113.93755	85 m	0:00:22	14 kph
19/9/2016 15:34	ON	N22.15205 E113.93787	74 m	0:00:19	14 kph
19/9/2016 15:35	ON	N22.15276 E113.93801	81 m	0:00:21	14 kph
19/9/2016 15:35	ON	N22.15325 E113.93801	53 m	0:00:14	14 kph
19/9/2016 15:35	ON	N22.15393 E113.93803	76 m	0:00:20	14 kph
19/9/2016 15:36	ON	N22.15467 E113.93817	83 m	0:00:22	14 kph
19/9/2016 15:36	ON	N22.15521 E113.93821	60 m	0:00:16	14 kph
19/9/2016 15:36	ON	N22.15594 E113.93820	82 m	0:00:22	13 kph
19/9/2016 15:37	ON	N22.15670 E113.93816	85 m	0:00:23	13 kph
19/9/2016 15:37	ON	N22.15749 E113.93813	88 m	0:00:24	13 kph
19/9/2016 15:37	ON	N22.15806 E113.93811	63 m	0:00:17	13 kph
19/9/2016 15:38	ON	N22.15869 E113.93813	70 m	0:00:19	13 kph
19/9/2016 15:38	ON	N22.15937 E113.93809	77 m	0:00:21	13 kph
19/9/2016 15:38	ON	N22.16006 E113.93804	77 m	0:00:21	13 kph
19/9/2016 15:39	ON	N22.16059 E113.93804	59 m	0:00:16	13 kph
19/9/2016 15:39	ON	N22.16128 E113.93800	77 m	0:00:21	13 kph
19/9/2016 15:39	ON	N22.16207 E113.93800	88 m	0:00:23	14 kph
19/9/2016 15:40	ON	N22.16303 E113.93807	107 m	0:00:28	14 kph
19/9/2016 15:40	ON	N22.16371 E113.93810	76 m	0:00:20	14 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
19/9/2016 15:41	ON	N22.16436 E113.93811	73 m	0:00:19	14 kph
19/9/2016 15:41	ON	N22.16487 E113.93816	57 m	0:00:15	14 kph
19/9/2016 15:41	ON	N22.16552 E113.93819	73 m	0:00:19	14 kph
19/9/2016 15:41	ON	N22.16617 E113.93816	73 m	0:00:19	14 kph
19/9/2016 15:42	ON	N22.16703 E113.93817	96 m	0:00:24	14 kph
19/9/2016 15:42	ON	N22.16786 E113.93812	92 m	0:00:23	14 kph
19/9/2016 15:43	ON	N22.16867 E113.93813	91 m	0:00:23	14 kph
19/9/2016 15:43	ON	N22.16939 E113.93819	80 m	0:00:21	14 kph
19/9/2016 15:43	ON	N22.17011 E113.93823	80 m	0:00:21	14 kph
19/9/2016 15:44	ON	N22.17061 E113.93830	56 m	0:00:15	13 kph
19/9/2016 15:44	ON	N22.17120 E113.93835	66 m	0:00:18	13 kph
19/9/2016 15:44	ON	N22.17179 E113.93841	66 m	0:00:18	13 kph
19/9/2016 15:44	ON	N22.17232 E113.93846	59 m	0:00:16	13 kph
19/9/2016 15:45	ON	N22.17255 E113.93850	26 m	0:00:07	13 kph
19/9/2016 15:45	ON	N22.17300 E113.93849	50 m	0:00:14	13 kph
19/9/2016 15:45	ON	N22.17358 E113.93838	65 m	0:00:18	13 kph
19/9/2016 15:46	ON	N22.17440 E113.93829	92 m	0:00:24	14 kph
19/9/2016 15:46	ON	N22.17503 E113.93826	70 m	0:00:18	14 kph
19/9/2016 15:46	ON	N22.17577 E113.93825	83 m	0:00:21	14 kph
19/9/2016 15:46	ON	N22.17639 E113.93819	68 m	0:00:18	14 kph
19/9/2016 15:47	ON	N22.17694 E113.93815	62 m	0:00:17	13 kph
19/9/2016 15:47	ON	N22.17748 E113.93812	60 m	0:00:16	13 kph
19/9/2016 15:47	ON	N22.17821 E113.93812	82 m	0:00:22	13 kph
19/9/2016 15:48	ON	N22.17884 E113.93815	70 m	0:00:19	13 kph
19/9/2016 15:48	ON	N22.17938 E113.93811	60 m	0:00:16	13 kph
19/9/2016 15:48	ON	N22.17995 E113.93810	64 m	0:00:17	14 kph
19/9/2016 15:49	ON	N22.18054 E113.93807	65 m	0:00:17	14 kph
19/9/2016 15:49	ON	N22.18102 E113.93810	54 m	0:00:14	14 kph
19/9/2016 15:49	ON	N22.18165 E113.93811	70 m	0:00:18	14 kph
19/9/2016 15:49	ON	N22.18227 E113.93809	69 m	0:00:18	14 kph
19/9/2016 15:50	ON	N22.18298 E113.93803	80 m	0:00:21	14 kph
19/9/2016 15:50	ON	N22.18365 E113.93798	74 m	0:00:19	14 kph
19/9/2016 15:50	ON	N22.18416 E113.93794	58 m	0:00:15	14 kph
19/9/2016 15:51	ON	N22.18482 E113.93790	73 m	0:00:19	14 kph
19/9/2016 15:51	ON	N22.18552 E113.93788	78 m	0:00:20	14 kph
19/9/2016 15:51	ON	N22.18643 E113.93781	102 m	0:00:26	14 kph
19/9/2016 15:52	ON	N22.18712 E113.93778	77 m	0:00:20	14 kph
19/9/2016 15:52	ON	N22.18787 E113.93780	82 m	0:00:21	14 kph
19/9/2016 15:52	ON	N22.18853 E113.93783	74 m	0:00:19	14 kph
19/9/2016 15:53	ON	N22.18922 E113.93785	76 m	0:00:19	14 kph
19/9/2016 15:53	ON	N22.19003 E113.93786	91 m	0:00:23	14 kph
19/9/2016 15:53	ON	N22.19068 E113.93784	72 m	0:00:18	14 kph
19/9/2016 15:54	ON	N22.19157 E113.93775	100 m	0:00:25	14 kph
19/9/2016 15:54	ON	N22.19240 E113.93778	93 m	0:00:23	14 kph
19/9/2016 15:54	ON	N22.19309 E113.93779	77 m	0:00:19	15 kph
19/9/2016 15:55	ON	N22.19359 E113.93779	56 m	0:00:14	14 kph
19/9/2016 15:55	ON	N22.19431 E113.93777	80 m	0:00:20	14 kph
19/9/2016 15:55	ON	N22.19497 E113.93780	73 m	0:00:18	15 kph
19/9/2016 15:56	ON	N22.19570 E113.93787	82 m	0:00:20	15 kph
19/9/2016 15:56	ON	N22.19651 E113.93784	90 m	0:00:22	15 kph
19/9/2016 15:56	ON	N22.19729 E113.93785	87 m	0:00:21	15 kph
19/9/2016 15:57	ON	N22.19818 E113.93787	100 m	0:00:24	15 kph
19/9/2016 15:57	ON	N22.19886 E113.93790	76 m	0:00:18	15 kph
19/9/2016 15:57	ON	N22.19954 E113.93796	75 m	0:00:18	15 kph
19/9/2016 15:58	ON	N22.20025 E113.93800	80 m	0:00:19	15 kph
19/9/2016 15:58	ON	N22.20108 E113.93798	92 m	0:00:22	15 kph
19/9/2016 15:59	ON	N22.20205 E113.93771	111 m	0:00:27	15 kph
19/9/2016 15:59	ON	N22.20272 E113.93752	77 m	0:00:19	15 kph
19/9/2016 15:59	ON	N22.20354 E113.93754	91 m	0:00:22	15 kph
19/9/2016 16:00	ON	N22.20448 E113.93755	105 m	0:00:25	15 kph
19/9/2016 16:00	ON	N22.20525 E113.93760	86 m	0:00:21	15 kph
19/9/2016 16:00	ON	N22.20611 E113.93757	96 m	0:00:23	15 kph
19/9/2016 16:01	ON	N22.20693 E113.93759	90 m	0:00:22	15 kph
19/9/2016 16:01	ON	N22.20787 E113.93761	105 m	0:00:25	15 kph

Appendix I. (cont'd)

Date & Time	EFFORT	Position	Leg Length	Leg Time	Leg Speed
19/9/2016 16:02	ON	N22.20892 E113.93751	117 m	0:00:28	15 kph
19/9/2016 16:02	ON	N22.20967 E113.93745	84 m	0:00:20	15 kph
19/9/2016 16:02	ON	N22.21035 E113.93745	75 m	0:00:18	15 kph
19/9/2016 16:03	ON	N22.21128 E113.93731	105 m	0:00:25	15 kph
19/9/2016 16:03	ON	N22.21198 E113.93732	78 m	0:00:19	15 kph
19/9/2016 16:03	ON	N22.21282 E113.93730	93 m	0:00:23	15 kph
19/9/2016 16:04	ON	N22.21380 E113.93715	110 m	0:00:27	15 kph
19/9/2016 16:04	ON	N22.21448 E113.93711	76 m	0:00:19	14 kph
19/9/2016 16:05	ON	N22.21537 E113.93702	99 m	0:00:24	15 kph
19/9/2016 16:05	ON	N22.21613 E113.93688	86 m	0:00:21	15 kph
19/9/2016 16:05	ON	N22.21701 E113.93682	98 m	0:00:24	15 kph
19/9/2016 16:06	ON	N22.21788 E113.93674	98 m	0:00:24	15 kph
19/9/2016 16:06	ON	N22.21887 E113.93671	110 m	0:00:27	15 kph
19/9/2016 16:07	ON	N22.21983 E113.93675	107 m	0:00:26	15 kph
19/9/2016 16:07	ON	N22.22116 E113.93675	148 m	0:00:36	15 kph
19/9/2016 16:08	ON	N22.22171 E113.93724	79 m	0:00:22	13 kph

Appendix II. Survey Effort Database in SWL (September 2016)

(Abbreviations: BEAU = Beaufort Sea State; P = Primary Line Effort; S = Secondary Line Effort)

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
6-Sep-16	SW LANTAU	1	4.40	AUTUMN	STANDARD31516	HKCRP	P
6-Sep-16	SW LANTAU	2	21.09	AUTUMN	STANDARD31516	HKCRP	P
6-Sep-16	SW LANTAU	1	3.80	AUTUMN	STANDARD31516	HKCRP	S
6-Sep-16	SW LANTAU	2	5.44	AUTUMN	STANDARD31516	HKCRP	S
19-Sep-16	SW LANTAU	2	34.08	AUTUMN	STANDARD36826	HYD-HZMB	P
19-Sep-16	SW LANTAU	3	16.42	AUTUMN	STANDARD36826	HYD-HZMB	P
19-Sep-16	SW LANTAU	2	13.47	AUTUMN	STANDARD36826	HYD-HZMB	S
19-Sep-16	SW LANTAU	3	3.14	AUTUMN	STANDARD36826	HYD-HZMB	S
22-Sep-16	SW LANTAU	2	0.31	AUTUMN	STANDARD31516	HKCRP	P
22-Sep-16	SW LANTAU	3	16.68	AUTUMN	STANDARD31516	HKCRP	P
22-Sep-16	SW LANTAU	4	2.40	AUTUMN	STANDARD31516	HKCRP	P
22-Sep-16	SW LANTAU	2	4.51	AUTUMN	STANDARD31516	HKCRP	S
22-Sep-16	SW LANTAU	3	7.90	AUTUMN	STANDARD31516	HKCRP	S
26-Sep-16	SW LANTAU	2	24.62	AUTUMN	STANDARD36826	HKCRP	P
26-Sep-16	SW LANTAU	3	5.50	AUTUMN	STANDARD36826	HKCRP	P
26-Sep-16	SW LANTAU	2	9.78	AUTUMN	STANDARD36826	HKCRP	S

Appendix III. Chinese White Dolphin Sighting Database in SWL (September 2016)

(Abberviations: STG# = Sighting Number; HRD SZ = Dolphin Herd Size; BEAU = Beaufort Sea State; PSD = Perpendicular Distance; ND = Not Determined; BOAT ASSOC. = Fishing Boat Association; P/S: Sighting Made on Primary/Secondary Lines)

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
6-Sep-16	4	1501	1	SW LANTAU	1	83	ON	HKCRP	805225	805465	AUTUMN	NONE	P
19-Sep-16	1	1125	2	SW LANTAU	2	144	ON	HYD-HZMB	805705	803486	AUTUMN	NONE	P
19-Sep-16	2	1146	3	SW LANTAU	2	166	ON	HYD-HZMB	805426	804465	AUTUMN	NONE	P
26-Sep-16	6	1201	5	SW LANTAU	2	114	ON	HKCRP	805074	803454	AUTUMN	NONE	P
26-Sep-16	7	1216	1	SW LANTAU	2	163	ON	HKCRP	806436	803436	AUTUMN	NONE	P
26-Sep-16	8	1341	1	SW LANTAU	2	76	ON	HKCRP	807410	809347	AUTUMN	NONE	S

Appendix IV. Individual dolphins identified during HYD-HZMB and AFCD monitoring surveys in SWL waters in September 2016

ID#	DATE	STG#	TYPE	AREA
NL120	19/09/16	2	HYD-HZMB	SW LANTAU
NL269	26/09/16	6	HKCRP	SW LANTAU
SL60	19/09/16	2	HYD-HZMB	SW LANTAU
WL69	19/09/16	1	HYD-HZMB	SW LANTAU
WL123	19/09/16	2	HYD-HZMB	SW LANTAU
WL230	26/09/16	6	HKCRP	SW LANTAU
WL235	06/09/16	4	HKCRP	SW LANTAU

Appendix V. Photographs of Identified Individual Dolphins in September 2016 in SWL waters