

Measurement report

Tallinna Maraton

42,195 km

Karen Aau
WA - AIMS B grade measurer
August 2024

GENERAL INFORMATION

Name of measurer: Karen Aau, B grade measurer

Address: Vanakuu 13-13, Tallinn, Estonia

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Name of event: Tallinna Maraton

Location: Tallinn, Estonia

Race date: 08.09.2024

Distance: 42,195 km

Advertised race distance: not less than 42195 m

Race contact person: Mati Lilliallik

Phone: +372 521 3331

E-mail: jooks@jooks.ee

Description of the course

Type of course: flat, point to point

Race surface: asphalt

Separation: 0,23%

Altitude:

Start – 18,5 m, Finish 23,5 m

Highest point – 38,5 m, Lowest point – 3 m

Difference in elevation highest > lowest point – 35,5 m

Measurement details

Section of road available: Mostly entire width of road, except:

P11>P12 - Paldiski road (land-side lane between Tuuleveski St > Mõisa St)

P11>P12 - Paldiski road (the lane entering the city from Astangu street to the viaduct)

P3>P18 - Rannamäe tee St (cycle path up to the right-hand bend to the bus park)

P18>Finish - Toompuiestee St (Old Town side lane)

Line to be taken at turns: shortest possible route

DETAIL OF THE CALIBRATION COURSE

Date: 01.08.2022

Location of calibration course: bathway at Kõrgepinge street near Paldiski road

Measure method: steel taped

Number of measurements: 2

Markers: nails

Start time: 11:30

Finish time: 12:00

Temperature: *Start* +19°C, *Finish* +19°C, *Average* +19°C

MEASUREMENTS AND CALCULATIONS:

1 First measurement.

$$\frac{6}{\text{\# tape lengths}} \times \frac{49,9 \text{ m}}{\text{distance per tape length}} + \frac{0,6 \text{ m}}{\text{partial tape length}} = \frac{300 \text{ m}}{\text{measured distance}}$$

2 Second measurement.

$$\frac{6}{\text{\# tape lengths}} \times \frac{49,9 \text{ m}}{\text{distance per tape length}} + \frac{0,612 \text{ m}}{\text{partial tape length}} = \frac{300,012 \text{ m}}{\text{measured distance}}$$

3 Average raw (uncorrected) measurement of course 300,006 m

4 Temperature correction.

$$\text{Correction factor} = 1 + (0.0000116 \times [19 - 20]) = 0,9999884$$

5 Multiply the temperature correction factor by the average raw measurement of the course

$$\frac{0,9999884}{\text{correction factor}} \times \frac{300,006 \text{ m}}{\text{avg. raw measurement}} = \frac{300,0025199 \text{ m}}{\text{corrected measurement}}$$

6 Final (adjusted) length of calibration course: **300 m**

$$\underline{300,0025199 \text{ m} - 0,0025199 \text{ m} = 300 \text{ m}}$$

Summary: To get 300 m length calibration course, divorced 2,5 mm with steel tape.

BICYCLE CALIBRATION DATA SHEET

PRE-CALIBRATION:

Day: 02.08.2022

Time: 11.05

Temperature: +20°C

Start count	Finish count	Difference
380382	383663	3281
383663	386945	3282
386945	390226	3281
390226	393508	3282

 Pre-measurement average count = $(3281+3282+3281+3282) / 4 = 3281,5$

 Counts per km = $3281,5 \times 1000 / 300 = 10938,3333$

 Working Constant = $10938,3333 \times 1,001 / 1000 = 10,9492716 \text{ c/m}$

POST-CALIBRATION:

Day: 02.08.2022

Time: 15.00

Temperature: +23°C

Start count	Finish count	Difference
725980	729261	3281
729261	732542	3281
732542	735824	3282
735824	739105	3281

 Post-measurement average count = $(3288+3288+3288+3289) / 4 = 3281,25$

 Counts per km = $3281,25 \times 1000 / 300 = 10937,5$

 Working Constant = $10937,5 \times 1,001 / 1000 = 10,9484375 \text{ c/m}$
CONSTANT FOR THE DAY = $(10,9492716+10,9484375) / 2 = 10,9488546 \text{ c/m}$

PRE-CALIBRATION:

Day: 02.08.2022

Time: 23.10

Temperature: +18°C

Start count	Finish count	Difference
740555	743842	3287
743842	747129	3287
747129	750416	3287
750416	753703	3287

 Pre-measurement average count = $(3287+3287+3287+3287) / 4 = 3287$

 Counts per km = $3287 \times 1000 / 300 = 10956,6667$
Working Constant = $10956,6667 \times 1,001 / 1000 = 10,9676233 \text{ c/m}$

POST-CALIBRATION:
Day: 03.08.2022

Time: 2.10

Temperature: +15°C

Start count	Finish count	Difference
964070	967358	3288
967358	970646	3288
970646	973934	3288
973934	977223	3289

 Post-measurement average count = $(3288+3288+3288+3289) / 4 = 3288,25$

 Counts per km = $3288,25 \times 1000 / 300 = 10960,8333$

 Working Constant = $10960,8333 \times 1,001 / 1000 = 10,9717942 \text{ c/m}$
CONSTANT FOR THE DAY = $(10,9676233+10,9717942) / 2 = 10,9697087 \text{ c/m}$

PRE-CALIBRATION:
Day: 09.08.2022

Time: 21.10

Temperature: +18°C

Start count	Finish count	Difference
86837	90129	3292
90129	93422	3293
93422	96714	3292
96714	100006	3292

 Pre-measurement average count = $(3292+3293+3292+3292) / 4 = 3292,25$

 Counts per km = $3292,25 \times 1000 / 300 = 10974,1667$

 Working Constant = $10974,1667 \times 1,001 / 1000 = 10,9851408 \text{ c/m}$
POST-CALIBRATION:
Day: 09.08.2022

Time: 23.45

Temperature: +14°C

Start count	Finish count	Difference
171000	174294	3294
174294	177588	3294
177588	180882	3294
180882	184175	3293

 Post-measurement average count = $(3294+3294+3294+3293) / 4 = 3293,75$

 Counts per km = $3293,75 \times 1000 / 300 = 10979,1667$

 Working Constant = $10979,1667 \times 1,001 / 1000 = 10,9901458 \text{ c/m}$
CONSTANT FOR THE DAY = $(10,9851408+10,9901458) / 2 = 10,9876433 \text{ c/m}$

PRE-CALIBRATION:
Day: 09.08.2023

Time: 12.08

Temperature: +19°C

Start count	Finish count	Difference
960270	963552	3282
963552	966835	3283
966835	970118	3283
970118	973401	3283

 Pre-measurement average count = $(3282+3283+3283+3283) / 4 = 3282,75$

 Counts per km = $3282,75 \times 1000 / 300 = 10942,5$

 Working Constant = $10942,5 \times 1,001 / 1000 = 10,9534425$ c/m

POST-CALIBRATION:
Day: 09.08.2023

Time: 15.55

Temperature: +21°C

Start count	Finish count	Difference
269457	272742	3285
272742	276028	3286
276028	279313	3285
279313	282599	3286

 Post-measurement average count = $(3285+3286+3285+3286) / 4 = 3285,5$

 Counts per km = $3285,5 \times 1000 / 300 = 10951,66666$

 Working Constant = $10951,66666 \times 1,001 / 1000 = 10,96261832$ c/m

CONSTANT FOR THE DAY = $(10,9534425+10,96261832) / 2 = 10,95803041$ c/m

PRE-CALIBRATION:
Day: 09.08.2023

Time: 22.30

Temperature: +15°C

Start count	Finish count	Difference
283790	287079	3289
287079	290368	3289
290368	293658	3290
293658	296948	3290

 Pre-measurement average count = $(3289+3289+3290+3290) / 4 = 3289,5$

 Counts per km = $3289,5 \times 1000 / 300 = 10965$
Working Constant = $10965 \times 1,001 / 1000 = 10,975965$ c/m

POST-CALIBRATION:
Day: 10.08.2023

Time: 02.05

Temperature: +13°C

Start count	Finish count	Difference
423438	426728	3290
426728	430019	3291
430019	433310	3291
433310	436600	3290

 Post-measurement average count = $(3290+3291+3291+3290) / 4 = 3290,5$

 Counts per km = $3290,5 \times 1000 / 300 = 10968,33333$
Working Constant = $10968,33333 \times 1,001 / 1000 = 10,97930166$ c/m

CONSTANT FOR THE DAY = $(10,975965+10,97930166) / 2 = 10,97763333$ c/m

PRE-CALIBRATION:
Day: 07.08.2024

Time: 21.30

Temperature: +19°C

Start count	Finish count	Difference
340285	343567	3282
343567	346849	3282
346849	350131	3282
350131	353412	3281

 Pre-measurement average count = $(3282+3282+3282+3281) / 4 = 3281,75$

 Counts per km = $3281,75 \times 1000 / 300 = 10939,16666$
Working Constant = $10939,16666 \times 1,001 / 1000 = 10,95010582$ c/m

POST-CALIBRATION:
Day: 08.08.2024

Time: 00.15

Temperature: +16°C

Start count	Finish count	Difference
461230	464514	3284
464514	467798	3284
467798	471082	3284
471082	474366	3284

 Post-measurement average count = $(3284+3284+3284+3284) / 4 = 3284$

 Counts per km = $3284 \times 1000 / 300 = 10946,66666$
Working Constant = $10946,66666 \times 1,001 / 1000 = 10,95761332$ c/m

CONSTANT FOR THE DAY = $(10,95010582+10,95761332) / 2 = 10,95385957$ c/m

COURSE MEASUREMENT DATA SHEET

reading	counts	distance	adj.dist	location
<i>Measured in reverse of running direction, 03.08.2022, c=10,9697087 c/m</i>				
--- adjustment here removes 1058 counts $c = 10,95385957c/m = 96,6 m$ ---				
899456	0	0.0m		START - at Falgi tee near pc (detailed sketch attached)
917394	17938	1635,2 m	1538,6 m	P1 – the edge of the manhole cover before the turn to Kolde pst St
<i>Measured in running direction, 03.08.2022, c=10,9697087 c/m</i>				
960100	0	1635,2 m	1538,6 m	P1 - the edge of the manhole cover before the turn to Kolde pst
967088	6988	2272,2 m	2175,6 m	P2 - pc sign post right hand after Luste St
<i>Measured in reverse of running direction, 03.08.2022, c=10,9697087 c/m</i>				
931577	0	2272,2 m	2175,6 m	P2 - pc sign post right hand after Luste St
956349	24772	4530,4 m	4433,8 m	P3 – pc sign post right hand before Kopli/Suurtüki St corner
<i>Measured in reverse of running direction, 03.08.2022, c=10,9697087 c/m</i>				
846689	0	4530,4 m	4433,8 m	P3 – pc sign post right hand before Kopli/Suurtüki St corner
852881	6192	5094,9 m	4998,3 m	P4 - edge of the manhole cover before the turn to cycling pathway
<i>Measured in running direction, 03.08.2022, c=10,9697087 c/m</i>				
866426	0	5094,9 m	4998,3 m	P4 - edge of the manhole cover before the turn to cycling pathway
898272	31846	7998,0 m	7901,4 m	P2 - pc sign post left hand before Luste St
<i>Measured in reverse of running direction, 03.08.2022, c=10,9697087 c/m</i>				
799026	0	7998,0 m	7901,4 m	P2 - pc sign post left hand before Luste St
805598	6572	8597,1 m	8500,5 m	P5 – pc post left hand after turning to Kolde pst St
<i>Measured in running direction, 03.08.2022, c=10,9697087 c/m</i>				
791085	0	8597,1 m	8500,5 m	P5 – pc post left hand after turning to Kolde pst St
794250	3165	8885,6 m	8789,0 m	P6 - kids on the road sign post right hand
<i>Measured in running direction, 07.08.2024, c = 10,95385957</i>				
457412	0	9181,3 m	8789,0 m	P6 - kids on the road sign post left hand
460651	3239	9181,3 m	9084,7 m	P7 – lp right hand before pc
<i>Measured in reverse of running direction, 07.08.2024, c = 10,95385957</i>				
378353	0	9181,3 m	9084,7 m	P7 - lp right hand before pc
390586	12233	10298,1 m	10201,5 m	P20 - lp left hand after pc
<i>Measured in reverse of running direction, 07.08.2024, c = 10,95385957</i>				
377945	0	10298,1 m	10201,5 m	P20 - lp left hand after pc
378353	408	10335,3 m	10238,7 m	P8 – first lp left hand
<i>Measured in reverse of running direction, 07.08.2024, c = 10,95385957</i>				
356652	0	10335,3 m	10238,7 m	P8 – first lp left hand
373713	17061	11892,8 m	11796,2 m	P9 - tlp before left turn to Paldiski mnt
<i>Measured in reverse of running direction, 03.08.2022, c = 10,9697087 c/m</i>				
754680	0	11892,8 m	11796,2 m	P9 - traffic light post before turning left to Paldiski mnt
758451	3771	12236,6 m	12140,0 m	P10 - tlp after pc on Paldiski mnt before turn to Kõrgepinge St
<i>Measured in running direction, 02.08.2022, c = 10,9488546 c/m</i>				
441124	0	12236,6 m	12140,0 m	P10 - tlp after pc on Paldiski mnt before turn to Kõrgepinge St
467266	26142	14624,2 m	14527,6 m	P11 - wooden lp left hand before the trash cans
<i>Measured in reverse of running direction, 09.08.2023, c=10,97763333 m</i>				
375344	0	14624,2 m	14527,6 m	P11 - wooden lp left hand before the trash cans
422916	47572	18957,7 m	18861,1 m	P12 – tlp at the beginning of pavement

Measured in running direction, 09.08.2023, c=10,95803041 c/m

163449	0	18957,7 m	18861,1 m	P12 – tlp at the beginning of pavement
185170	21721	20939,9 m	20843,3 m	P13 – pc post after first roundabout

Measured in reverse of running direction, 02.08.2022, c = 10,9488546 c/m

527313	0	20939,9 m	20843,3 m	P13 – pc post after first roundabout
577815	50502	25552,4 m	25455,8 m	P14 – Astangu St pavement/car road crossing

Measured in reverse of running direction, 09.08.2023, c=10,95803041 c/m

100887	0	25552,4 m	25455,8 m	P14 – Astangu St pavement/car road crossing
144857	43970	29565,0 m	29468,4 m	P15 – tunnel wall left hand
49379	0	29565,0 m	29468,4 m	P15 – tunnel wall left hand
100887	51508	34265,5 m	34168,9 m	P16 - signpost post right hand before intersection
4028	0	34265,5 m	34168,9 m	P16 - signpost post right hand before intersection
11601	7573	34956,6 m	34860,0 m	P17 - lp right hand before junction

Measured in running direction, 09.08.2023, c = 10,95803041 c/m

21867	0	34956,6 m	34860,0 m	P17 - lp right hand before junction
37494	15627	36382,7 m	36286,1 m	P19 - right hand cycle path sign post before car park

Measured in reverse of running direction, 02.08.2022, c = 10,9488546 c/m

374456	0	36382,7 m	36286,1 m	P19 - right hand cycle path sign post before car park
375162	706	36447,2 m	36350,6 m	P20 - lp right hand before pc

Measured in running direction, 07.08.2024, c = 10,95385957

378353	0	36447,2 m	36350,6 m	P20 - lp right hand before pc
390586	12233	37564,0 m	37467,4 m	P7 - lp left hand after pc

Measured in reverse of running direction, 07.08.2024, c = 10,95385957

457412	0	37564,0 m	37467,4 m	P7 – lp right hand before pc
460651	3239	37859,7 m	37763,1 m	P6 - kids on the road sign post left hand

Measured in reverse of running direction, 03.08.2022, c = 10,96970875 m

791085	0	37859,7 m	37763,1 m	P6 - kids on the road sign post right hand
794250	3165	38148,2 m	38051,6 m	P5 - pc post right hand before turning to Ristiku St

Measured in running direction, 03.08.2022, c = 10,9697087 c/m

799026	0	38148,2 m	38051,6 m	P5 - pc post right hand before turning to Ristiku St
805598	6572	38747,3 m	38650,7 m	P2 - pc sign post right hand after Luste St

Measured in reverse of running direction, 03.08.2022, c=10,9697087 c/m

931577	0	38747,3 m	38650,7 m	P2 - pc sign post right hand after Luste St
956349	24772	41005,5 m	40908,9 m	P3 – pc sign post right hand before Kopli/Suurtüki St corner

Measured in reverse of running direction, 09.08.2023, c=10,97763333 m

346582	0	41005,5 m	40908,9 m	P3 – pc sign post right hand before Kopli/Suurtüki St corner
353671	7089	41651,3 m	41554,7 m	P18 - manhole cover Center left hand near Toompuiestee 37/1

--- adjustment here with steel tape removes 6,3 m ---

319452	0	41651,3 m	41554,7 m	P18 - manhole cover Center left hand near Toompuiestee 37/1
326550	7098	42297,9 m	42195,0 m	FINISH - at Falgi tee near pc (detailed sketch attached)

Note any adjustments made to the course after measurement:

Adjustments made between START – P1 (new startline, removed 96,6 m with bicycle) and P9 – FINIŠ (new finish line, removed 6,3 m with steel tape)



Notes:

lp= lamp post

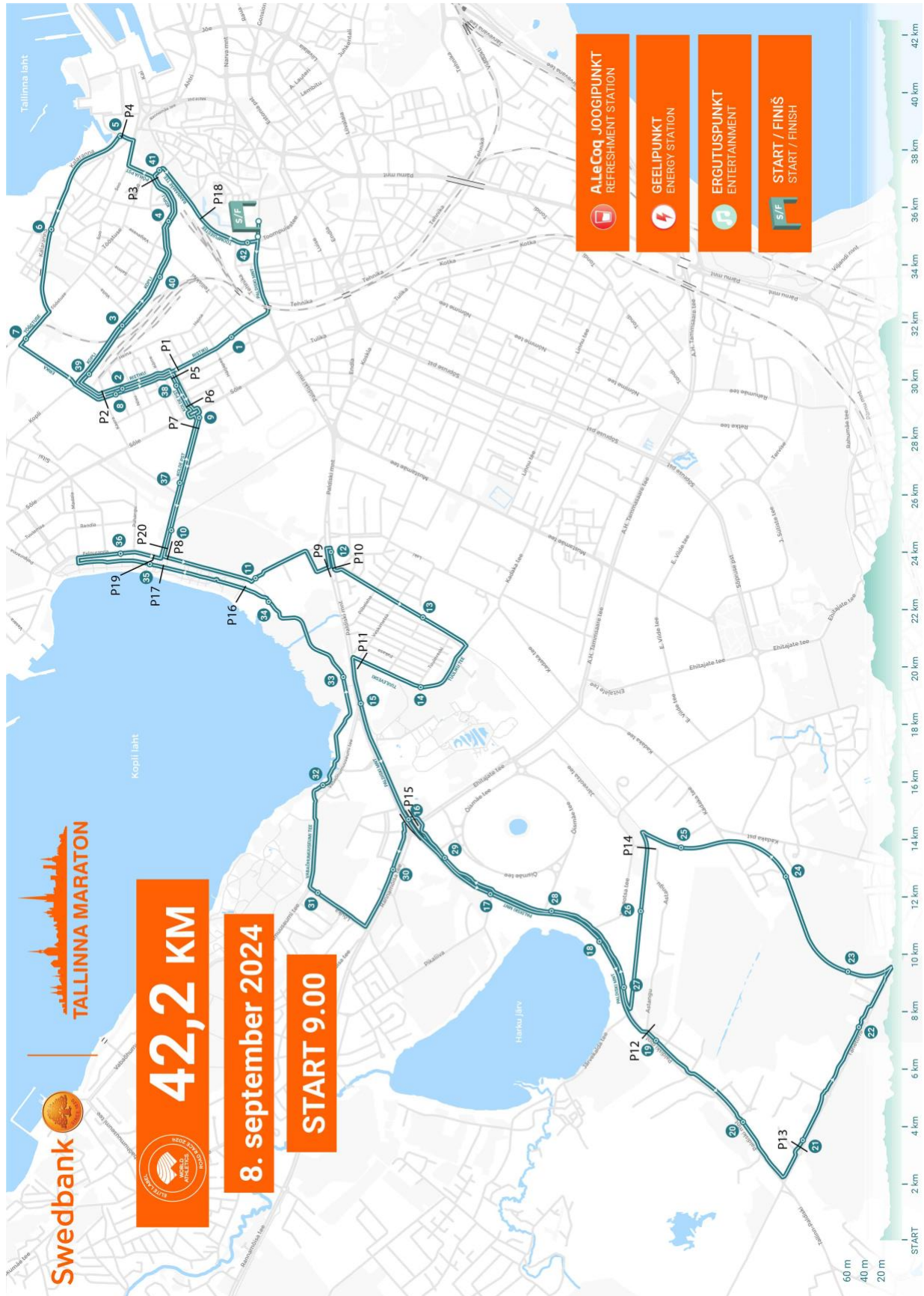
pc=pedestrian crossing

tlp=traffic light post

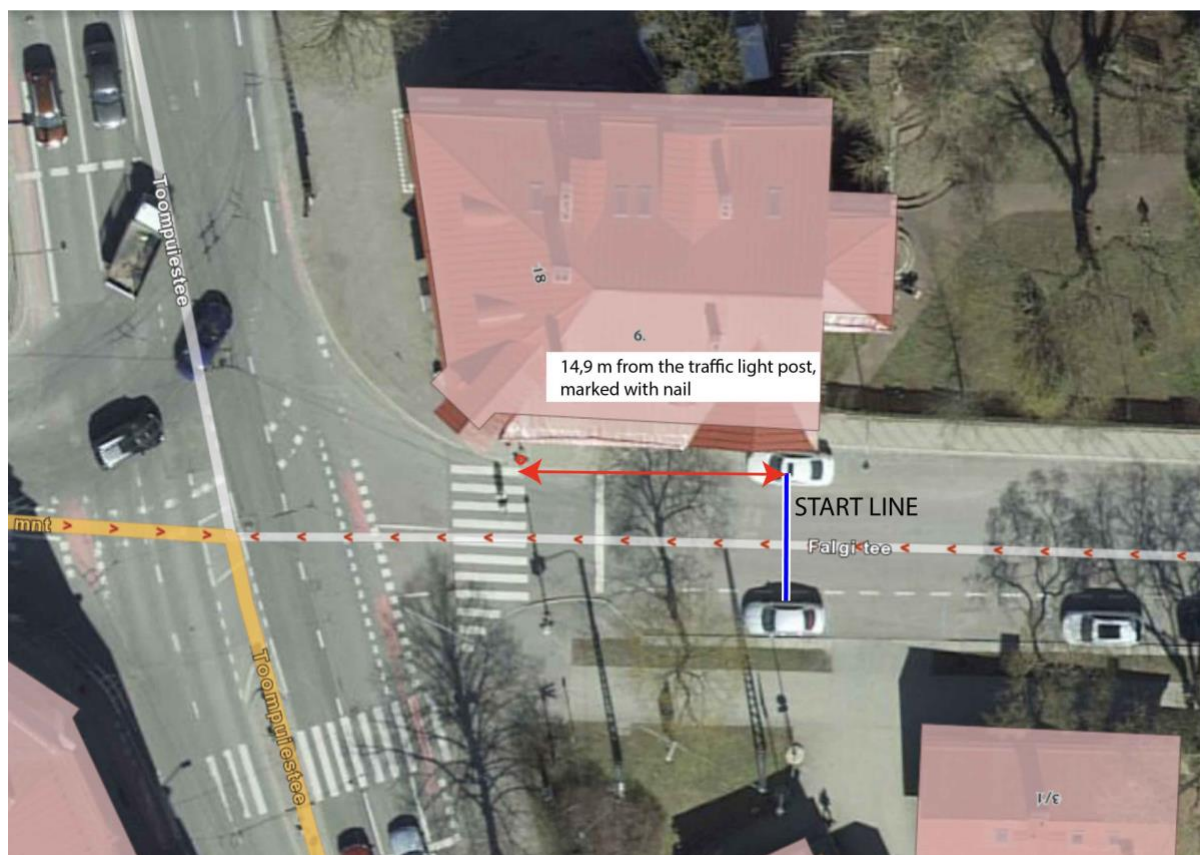
CALIBRATION COURSE - 300m



COURSE



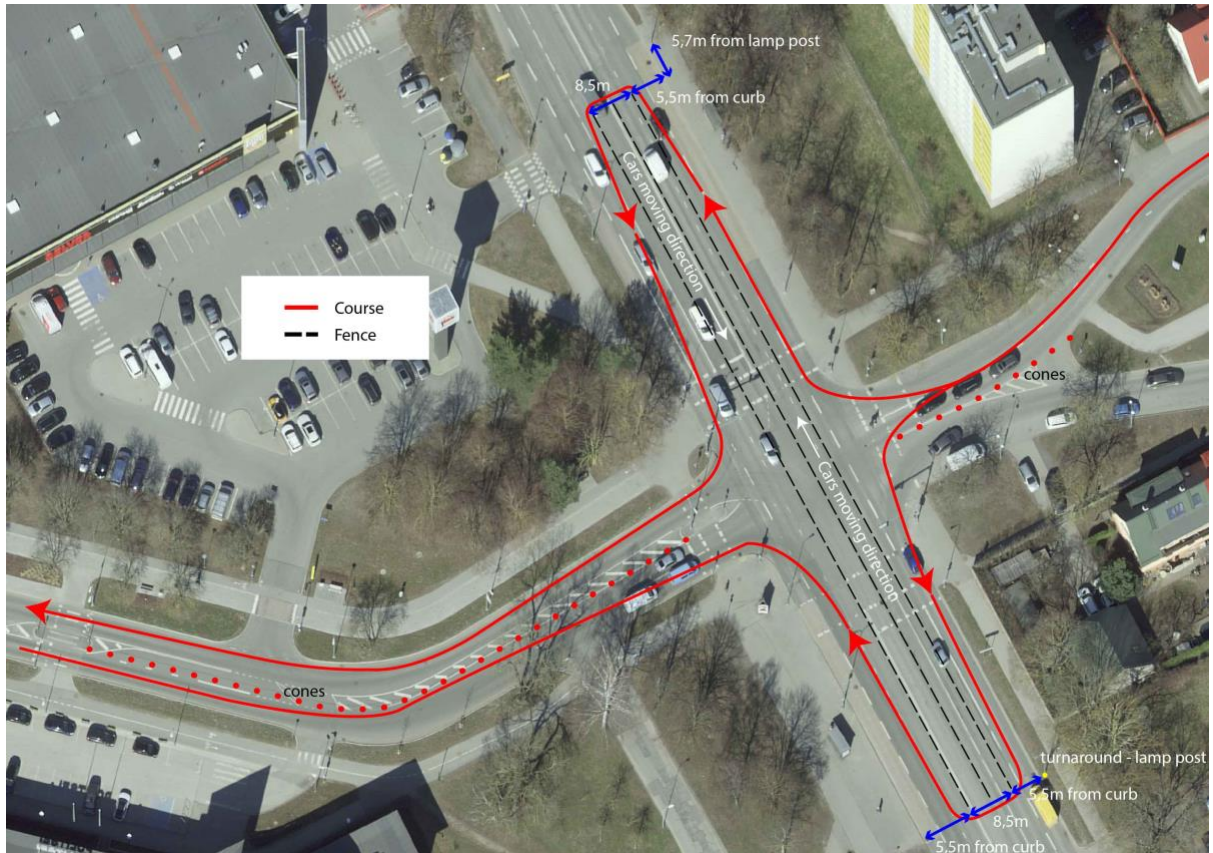
START LINE



FINISH LINE



SÕLE St P3>P4



PALDISKI ROAD P6>P7



PALDISKI ROAD P11>P12



VABAÕHUMUUSEUMI TEE St P15>P16



PELGURANNA St / KOLDE PST St P17>P8



RANNAMÄE TEE St P13>P14

