

Measurement report

Tartu Linnamaraton

21,1 km

Karen Aau
WA - AIMS B grade measurer
September 2024

GENERAL INFORMATION

Name of measurer: Karen Aau, B grade measurer

Address: Vanakuu 13-13, Tallinn, Estonia

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Name of event: Tartu Linnamaraton

Location: Tartu, Estonia

Race date: 05.10.2024

Distance: 21,1 km

Advertised race distance: not less than 21097,5 m

Race contact person: Indrek Kelk

Phone: +3727421644

E-mail: indrek@tartumaraton.ee

Description of the course

Type of course: mostly flat, few ups and downs, point to point

Race surface: asphalt, some gravel sections (similar with concrete)

Separation: 0,76%

Altitude:

Start – 35,5 m, Finish 36,5 m

Highest point – 74 m, Lowest point – 33 m

Difference in elevation highest > lowest point – 41 m

Measurement details

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

Start >P1 – Siili St (car road + right side pavement)

P1>P2 - Võru St and Tehase St (On pavement)

P1>P2 – Kesk St (car road + left side pavement)

P4>P5 – Puiestee st, Aruküla tee St (On left side pavement)

P5>Finish – K. E. Von Baeri St, Vallikraavi St (On left side pavement)

Line to be taken at turns: shortest possible route

DETAIL OF THE CALIBRATION COURSE

Location of calibration course: bathway at Ihaste tee

Date: 27.09.2020

Start time: 9:00

Finish time: 10:00

Temperature: *Start* +10°C, *Finish* +12°C, *Average* +11 °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.

$$\frac{6}{\text{\# tape lengths}} \times \frac{49,9 \text{ m}}{\text{distance per tape length}} + \frac{0,617 \text{ m}}{\text{partial tape length}} = \frac{300,004 \text{ m}}{\text{measured distance}}$$

3 Average raw (uncorrected) measurement of course 300,002 m

4 Temperature correction.

$$\text{Correction factor} = 1 + (0.0000116 \times [12 - 20]) = 0,9999072$$

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

$$\frac{0,9999072}{\text{correction factor}} \times \frac{300,002 \text{ m}}{\text{avg. raw measurement}} = \frac{299,974 \text{ m}}{\text{corrected measurement}}$$

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

$$\underline{299,974 \text{ m} + 0,026 \text{ m} = 300\text{m}}$$

Summary: To get 300 m length calibration course, added 0,026 m with steel tape.

BICYCLE CALIBRATION DATA SHEET

PRE-CALIBRATION:

Day: 27.09.2024

Time: 12.30

Temperature: +16°C

Start count	Finish count	Difference
757681	760970	3289
760970	764259	3289
764259	767548	3289
767548	770837	3289

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

Counts per km = $3289 \times 1000 / 300 = 10963,33333$

Working Constant = $10963,33333 \times 1,001 / 1000 = 10,97429666$ c/m

POST-CALIBRATION:

Day: 27.09.2024

Time: 15.30

Temperature: +16°C

Start count	Finish count	Difference
39760	43049	3289
43049	46338	3289
46338	49627	3289
49627	52916	3289

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

Counts per km = $3289 \times 1000 / 300 = 10963,33333$

Working Constant = $10963,33333 \times 1,001 / 1000 = 10,97429666$ c/m

CONSTANT FOR THE DAY = $(10,97429666+10,97429666) / 2 = 10,97429666$ c/m

COURSE MEASUREMENT DATA SHEET

reading	counts	distance	adj.dist	location
<i>Measured in running direction, 27.09.2024, c=10,97429666 c/m</i>				
771812	0	0 m		START - at Vabaduse pst (detailed sketch attached)
793907	22095	2013,3 m		P1 - pc sign post left hand in the middle of Siili St
839850	45943	6199,7 m		P2 – lp before turn to Rimi shop parking lot
849007	9157	7034,1 m		P3 – 2 nd pc sign post right hand after turn from Sõpruse St
<i>Measured in running direction, 27.09.2024, c=10,97429666 c/m</i>				
--- adjustment here adds 834 counts = 76 m ---				
851410	2403	7253,1 m	7329,1 m	P3 - 2 nd pc sign post right hand after turn from Sõpruse St
880822	29412	9933,2 m	10009,2 m	P4 – lp right hand before turn to Ujula St
924598	43776	13922,2 m	13998,2 m	P5 – parking sign post right hand
2508	77910	21021,5 m	21097,5 m	FINISH - at Raekoja plats St (detailed sketch attached)

Note any adjustments made to the course after measurement:

Adjustments made between P3 (moved turnaround 934 counts = 76 m with bicycle)

Notes:

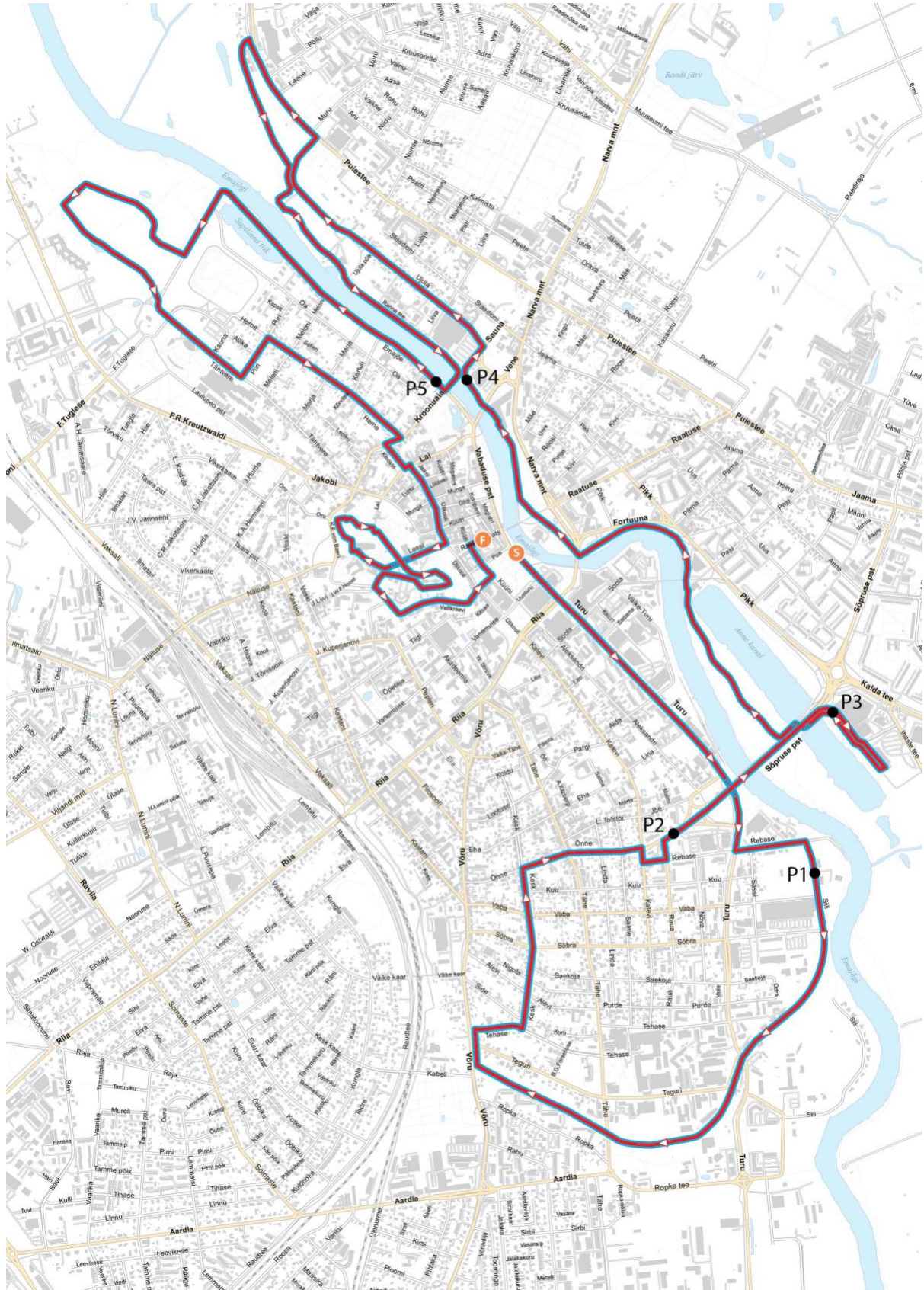
lp= lamp post

pc=pedestrian crossing

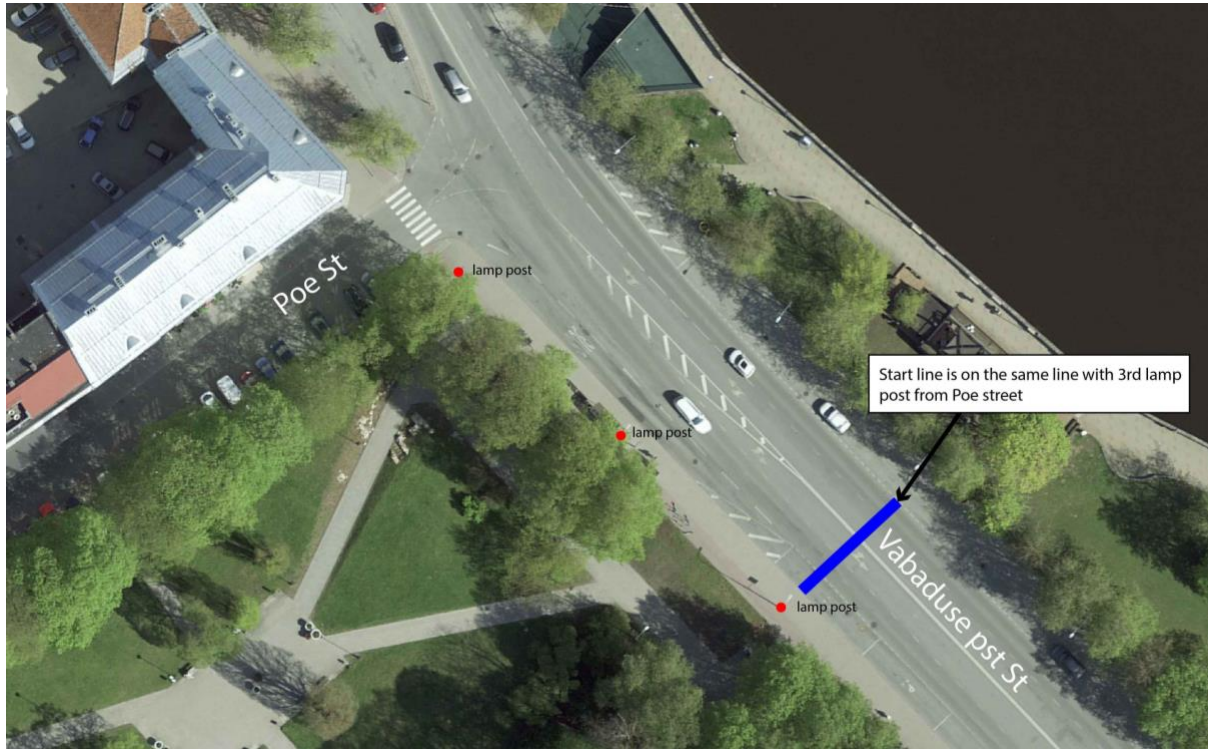
CALIBRATION COURSE – 300 m



COURSE



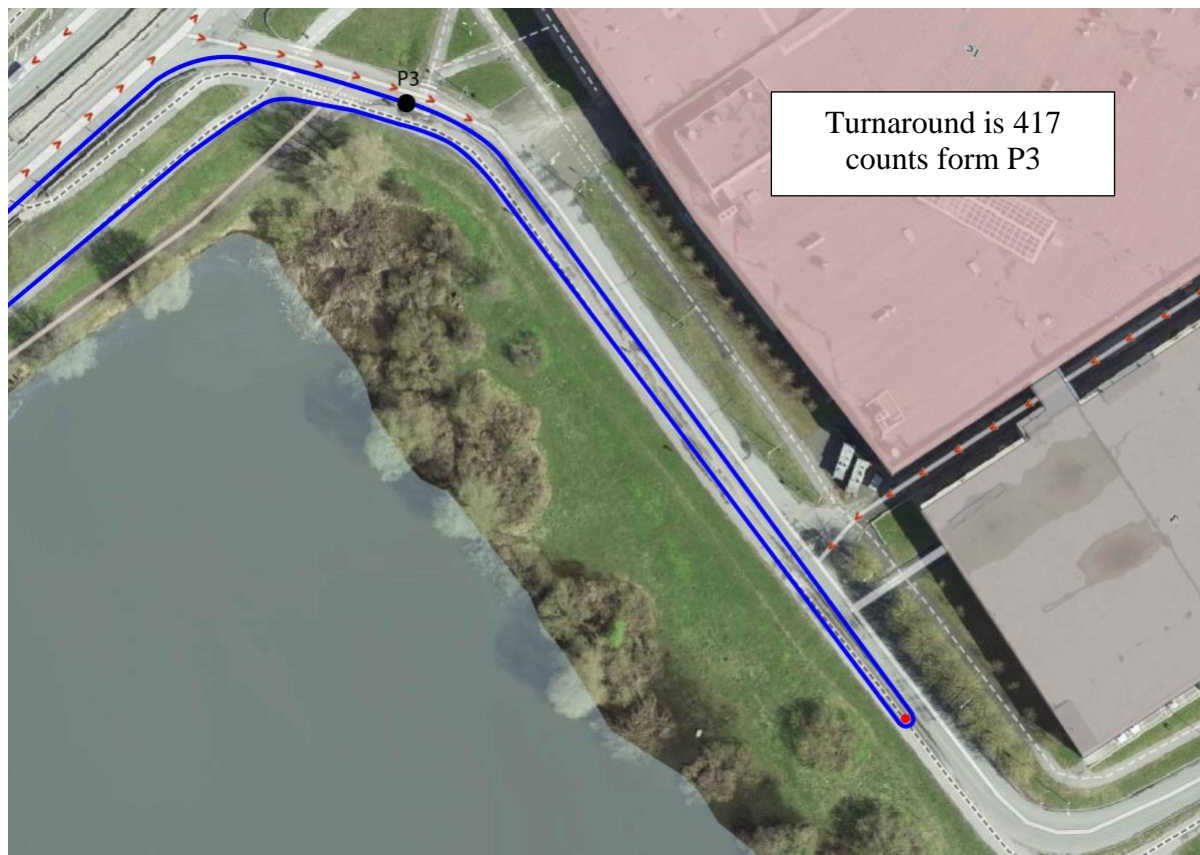
START LINE



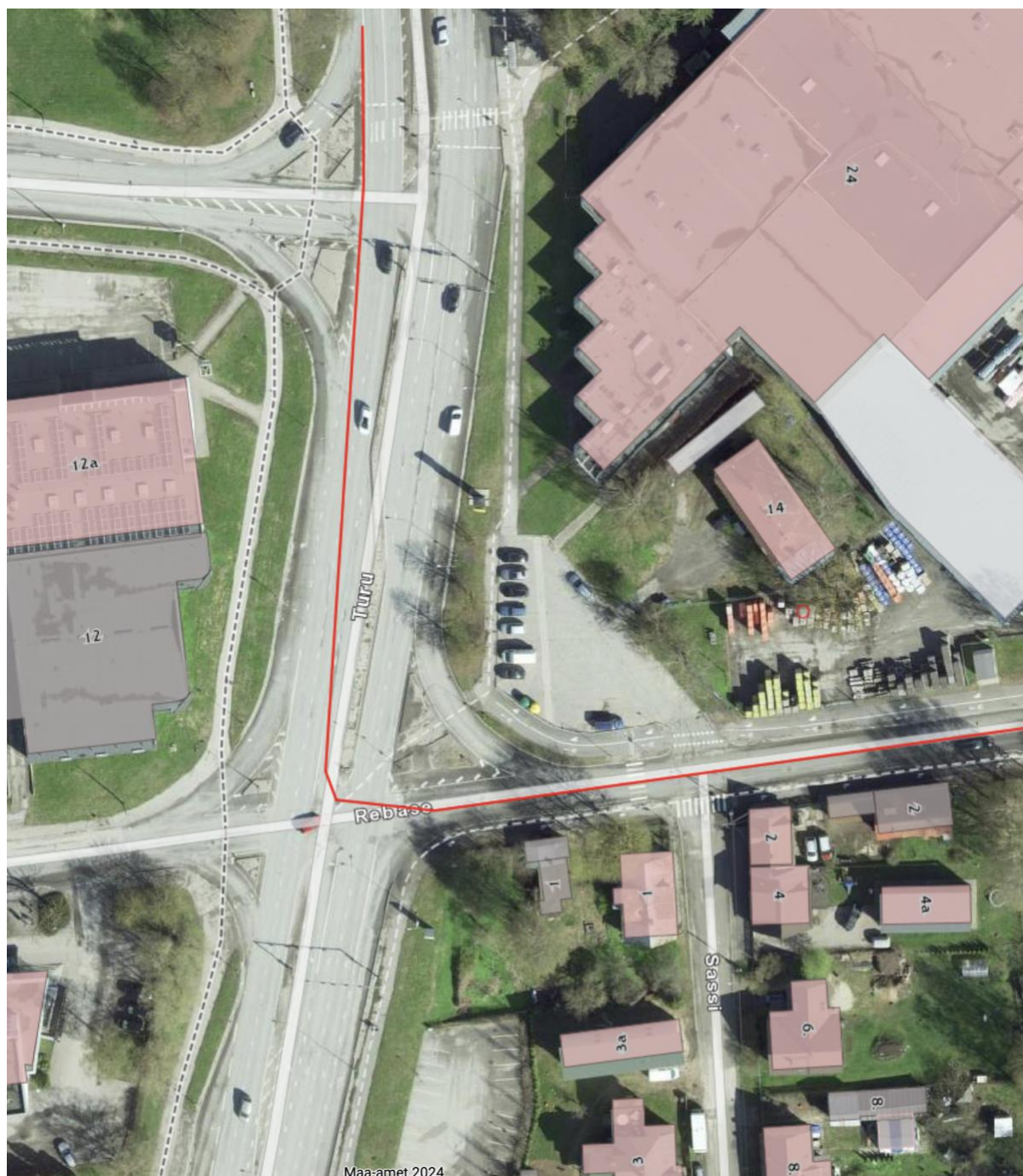
FINISH LINE



Turnaround P3



Turu St START>P1



Ujula St P4>P5



Aruküla tee St P4>P5



Maa-amet 2024

Sauna St P4>P5

