

Pre-Survey Report for Transports

## MYRSKY: HATTULA – NIINIMÄKI

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<b>1</b>	<b>Background of This Report .....</b>	<b>3</b>
<b>2</b>	<b>The Project .....</b>	<b>4</b>
<b>3</b>	<b>Suggested Port.....</b>	<b>5</b>
<b>4</b>	<b>Transport for Transformer.....</b>	<b>6</b>
4.1	Route .....	6
4.2	Special Notes About the Route .....	7
4.3	Suggested Handover Point.....	20
4.4	Preliminary Transport Permit.....	21
4.5	Other Notes.....	21
<b>5</b>	<b>Transport for Turbine Components .....</b>	<b>22</b>
5.1	Route for blades .....	22
5.2	Special Notes About the Route for blades .....	23
5.3	Route for main components and tower sections .....	26
5.4	Special Notes About the Route .....	27
5.5	Suggested Handover Point.....	40
5.6	Preliminary Transport Permit.....	41
5.7	Other Notes.....	41
<b>6</b>	<b>Conclusions.....</b>	<b>42</b>
6.1	Next steps.....	42

## **1 BACKGROUND OF THIS REPORT**

This report has been made as an assignment for Myrsky Energia Oy. Its purpose is to preliminary describe the transportation options and plans of a project that is under planning.

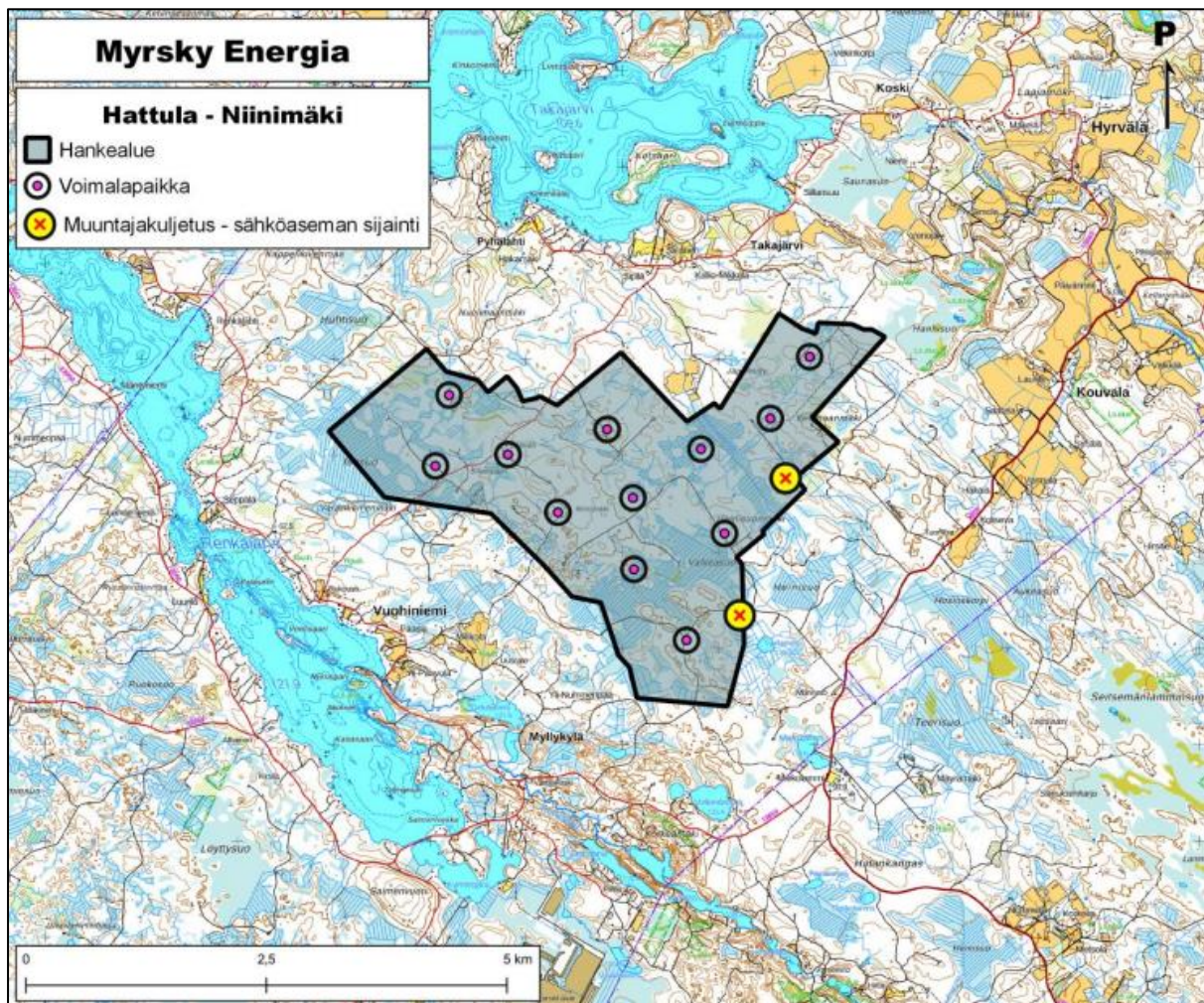
The report describes options and plans concerning the transport of heavy transformers as well as wind turbine components.

This report is made as a “desktop” survey. The report has been written using information available at the time of making the report. Vuorsola Oy is not responsible for possible incomplete or incorrect information, nor for changes to circumstances or other reported matters after the time of making the report.

## 2 THE PROJECT

Myrsky Energia Oy is planning to build Vestas V172 or similar wind turbines and 50MVA 110kV powerstation to HATTULA – NIINIMÄKI windpark and Vestas V172 or similar wind turbines.

HATTULA – NIINIMÄKI is located south from Takajärvi lake and west from Hämeenlinna.



Planned transformer: 2 X Max power 50MVA, 110kV, transport weight 59t

Planned turbine type: Vestas V172 or similar,  
blade length 85m,  
heaviest component 105t

### **3 SUGGESTED PORT**

Geographically the best option would be to transport the transformer from Port of Pori to the powerplant/windpark. Turbine components will use the same port.

Port of Pori has the capacity and equipment needed for handling the windmill components and the transformer. Port of Pori is one of the Finland's main ports for the wind power projects. There is suitable access from the port to main road 2.

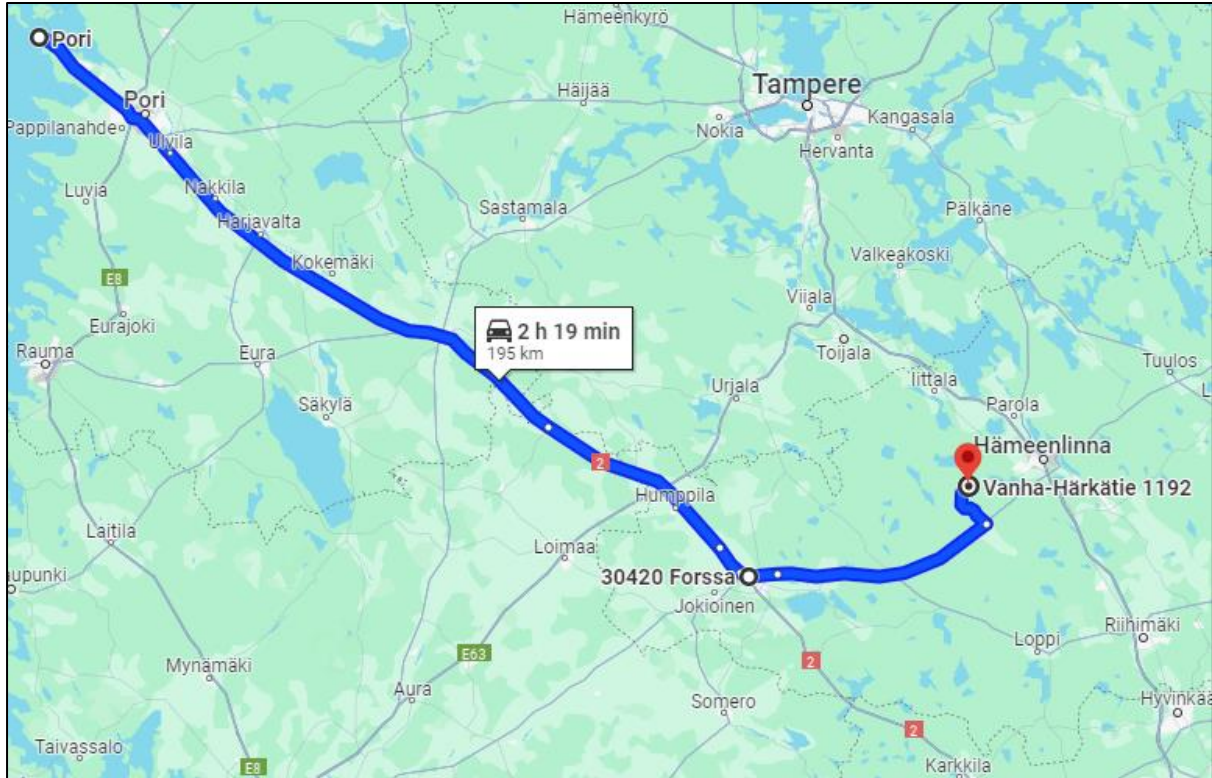
Here is link for Port of Pori's own website for more detailed information about the port:

<https://portofpori.fi/>



## 4 TRANSPORT FOR TRANSFORMER

### 4.1 Route



<https://maps.app.goo.gl/w564RdL1V3BDUNtz5>

Port of Pori/Merisatamantie 3 – 42020 (Merisatamantie) – 2 – 23502 – 10 – 2855 (Hämeen Härkätie) – Vanha-Härkätie 1192 (60.956038, 24.236152).

**4.2 Special Notes About the Route**

Number	Km	Coordinates N/W	Map	Transport road	Class	Action
1.	3km	61.583350, 21.527855	Map 1	2	1	Easy section
2.	17km	61.492531, 21.738208	Map 2	2	1	Easy section
3.	25km	61.451239, 21.829158	Map 3	2	1	Easy section
4.	28km	61.432617, 21.862480	Map 4	2	1	Easy section
5.	39km	61.363348, 21.992195	Map 5	2	1	Easy section
6.	46km	61.319722, 22.092272	Map 6	2	1	Easy section
7.	48km	61.307692, 22.125112	Map 7	2	1	Easy section
8.	60km	61.251253, 22.300771	Map 8	2	1	Easy section
9.	82km	61.170110, 22.672618	Map 9	2	2	Moderate section
10.	145km	60.826698, 23.580724	Map 10	Turn from 2 to 10	1	Easy section
11.	187km	60.901716, 24.290602	Map 11	Turn from 10 to 2855	1	Easy section

**Classification of constructional measures**

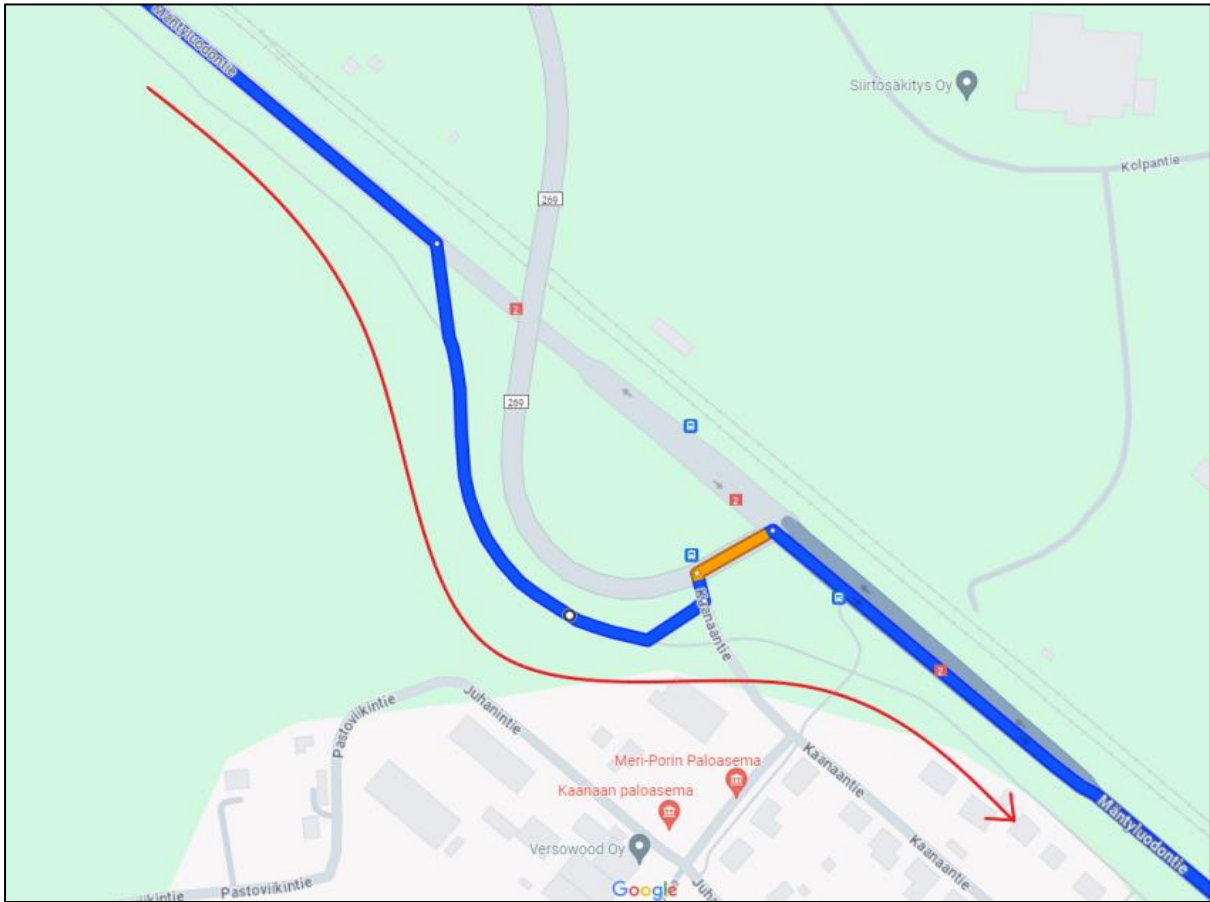
Class	Category	Description
1	Easy section	<b>Minor modifications</b> needed, like e.g. removing road signs or arranging a parking section
2	Moderate section	<b>Modifications necessary</b> , like e.g. removing signs, fixing a traffic refuge or pedestrian path, covering with steel or concrete plates and other smaller road constructions or modifications
3	Complex section	<b>Large modifications</b> necessary, like e. g. removing crash barriers, reconstruction of roundabouts, establishment of turn tunnels, road enlargements, turning maneuver in general, private and undeveloped properties are affected, traffic lights and streetlamps must be removed, considerable long-term construction site with a high licensing effort.
4	Difficult section	<b>Passage is doubtful</b> , some additional investigations are necessary (e.g. expertise, swept path analysis, simulations, bearing capacity tests or dummy runs).

**In simulations:**

- Driveable Area
- Obstacle (Not passable. Traversable if the height of the obstacle allows it)
- Tire tracks of tractor
- Tire tracks of trailer
- Area covered by vehicle combination
- Area covered by cargo

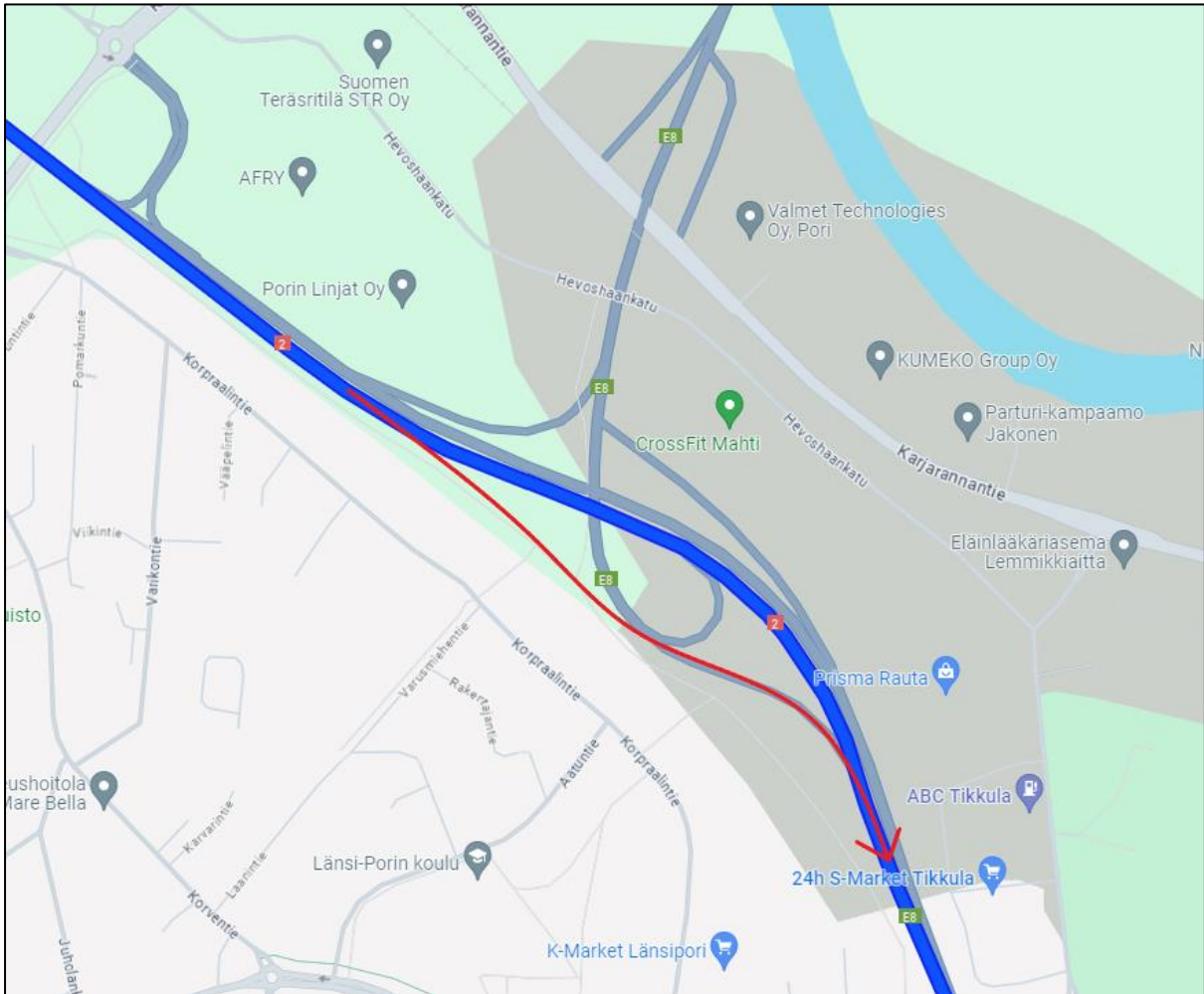


1.	3km	Map 1	Class 1
Bypassing the Levo bridge. Should be easy section with only minor modifications.			



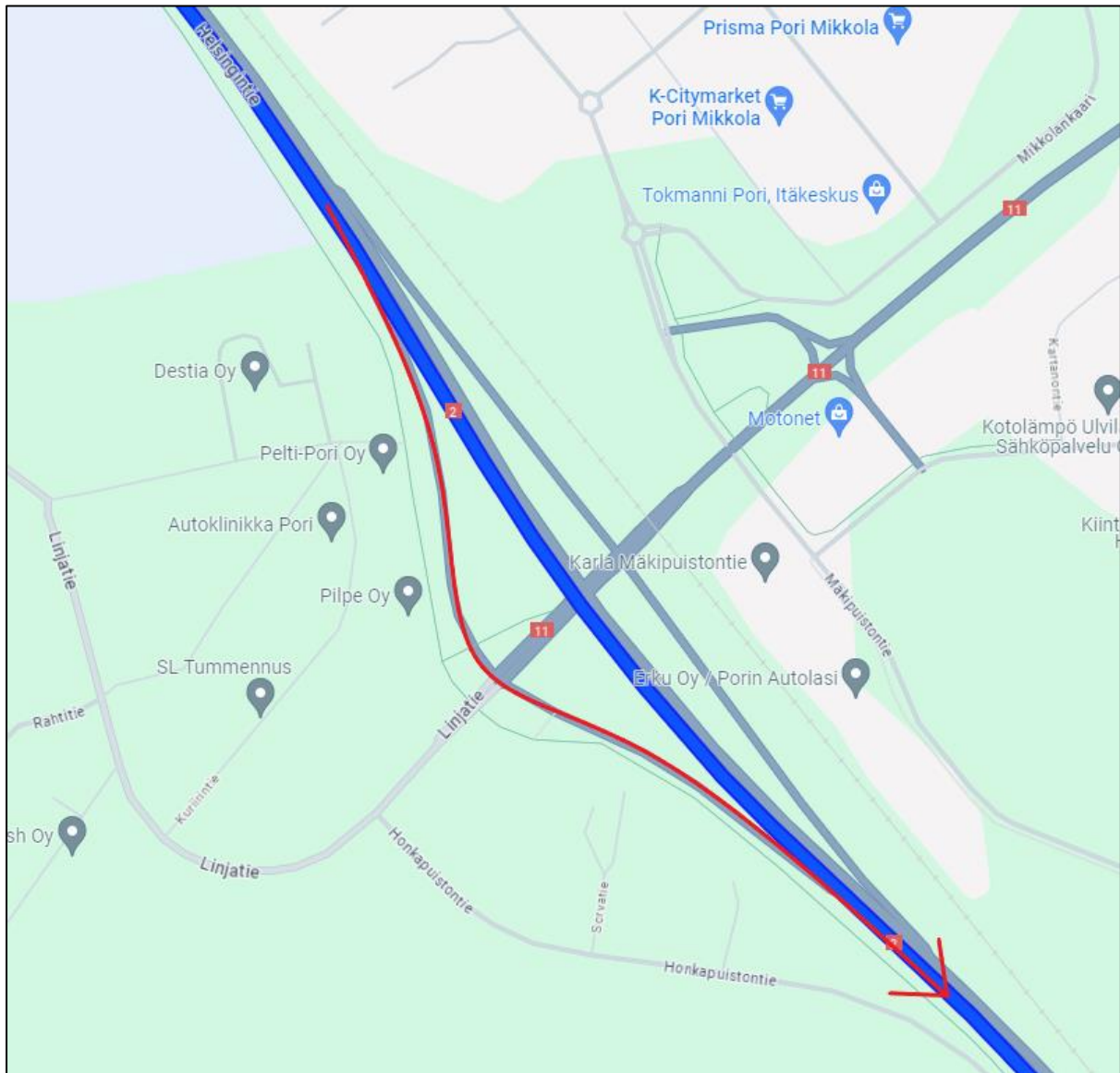
Map 1 – Turn from 2 to 2.

2.	18km	Map 2	Class 1
Bypassing the Laani interchange. Should be easy section with only minor modifications.			



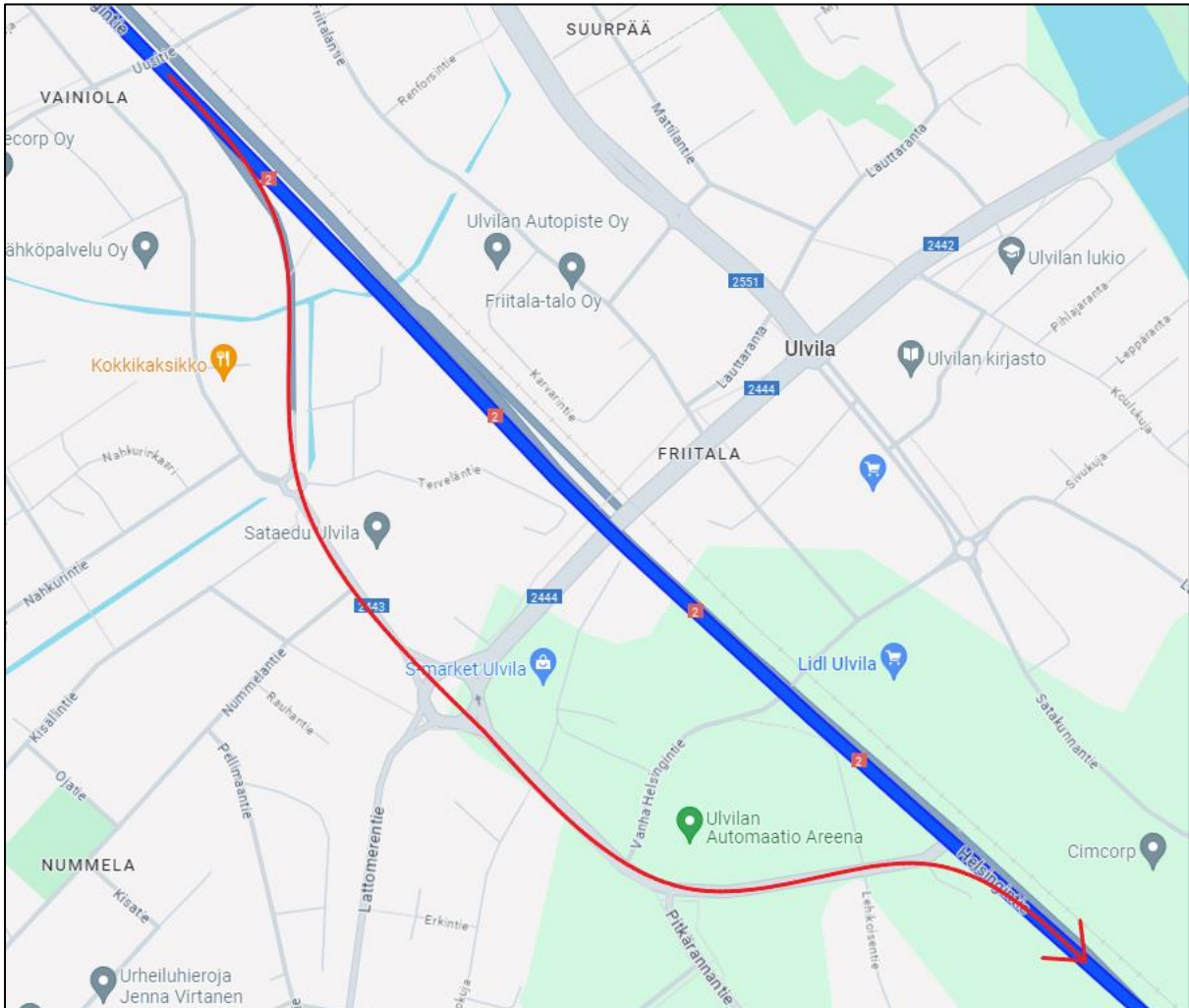
Map 2 – Turn from 2 to 2. Red arrow marks the special transport route.

3.	25km	Map 3	Class 1
Bypassing the Honkaluoto bridge. Should be easy access with only minor modifications.			



Map 3 – Turn from 2 to 2. The red arrow marks the driving line.

4.	28km	Map 4	Class 1
Bypassing the Friitala bridge. Should be easy access with only minor modifications.			



Map 4 – Turn from 2 to 2. The red arrow marks the driving line.

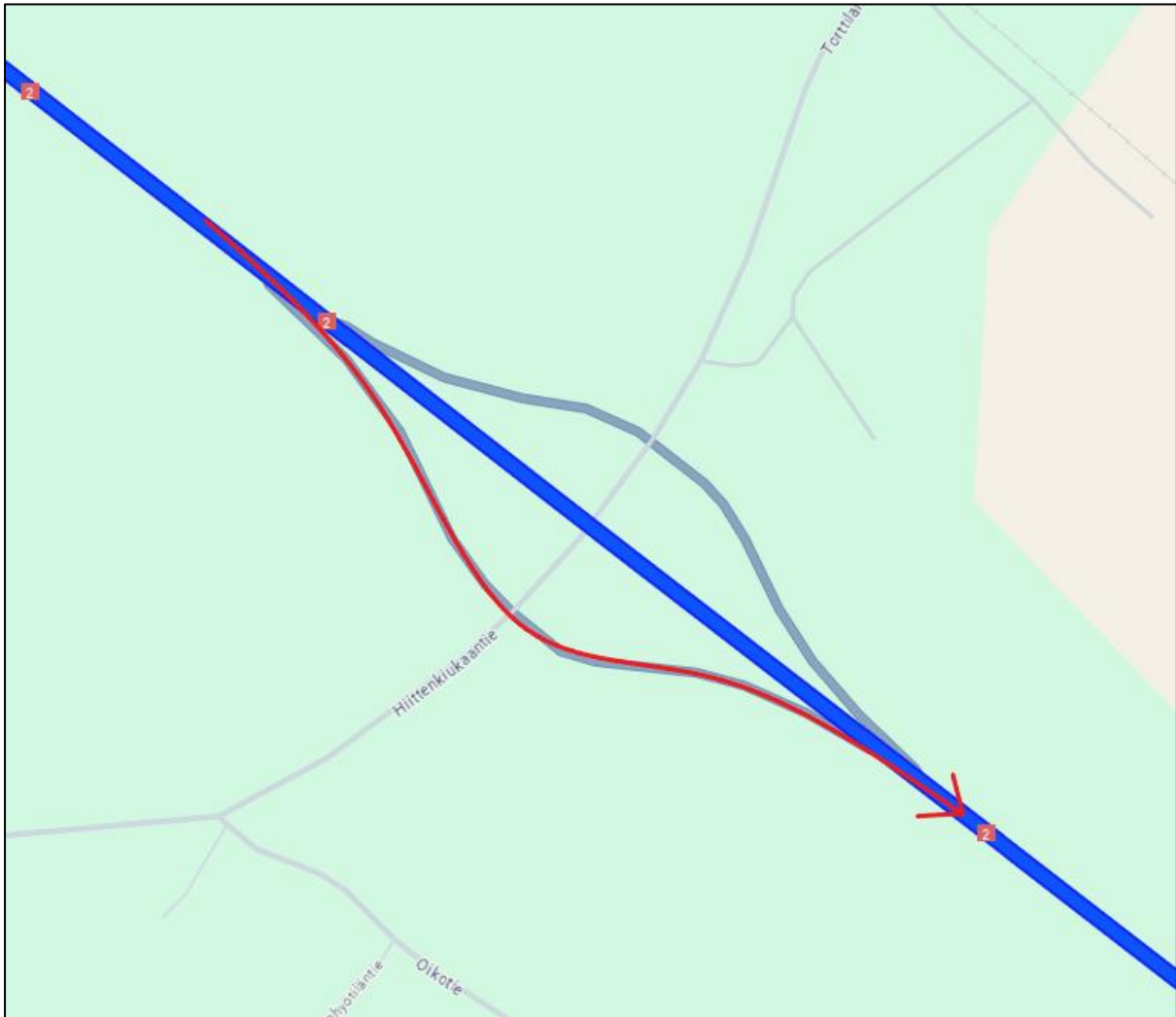
5.	39km	Map 5	Class 1
Bypassing the Nakkila bridge. Should be easy access with only minor modifications.			



Map 5 – Turn from road 2 to 2. The red arrow marks the driving line.



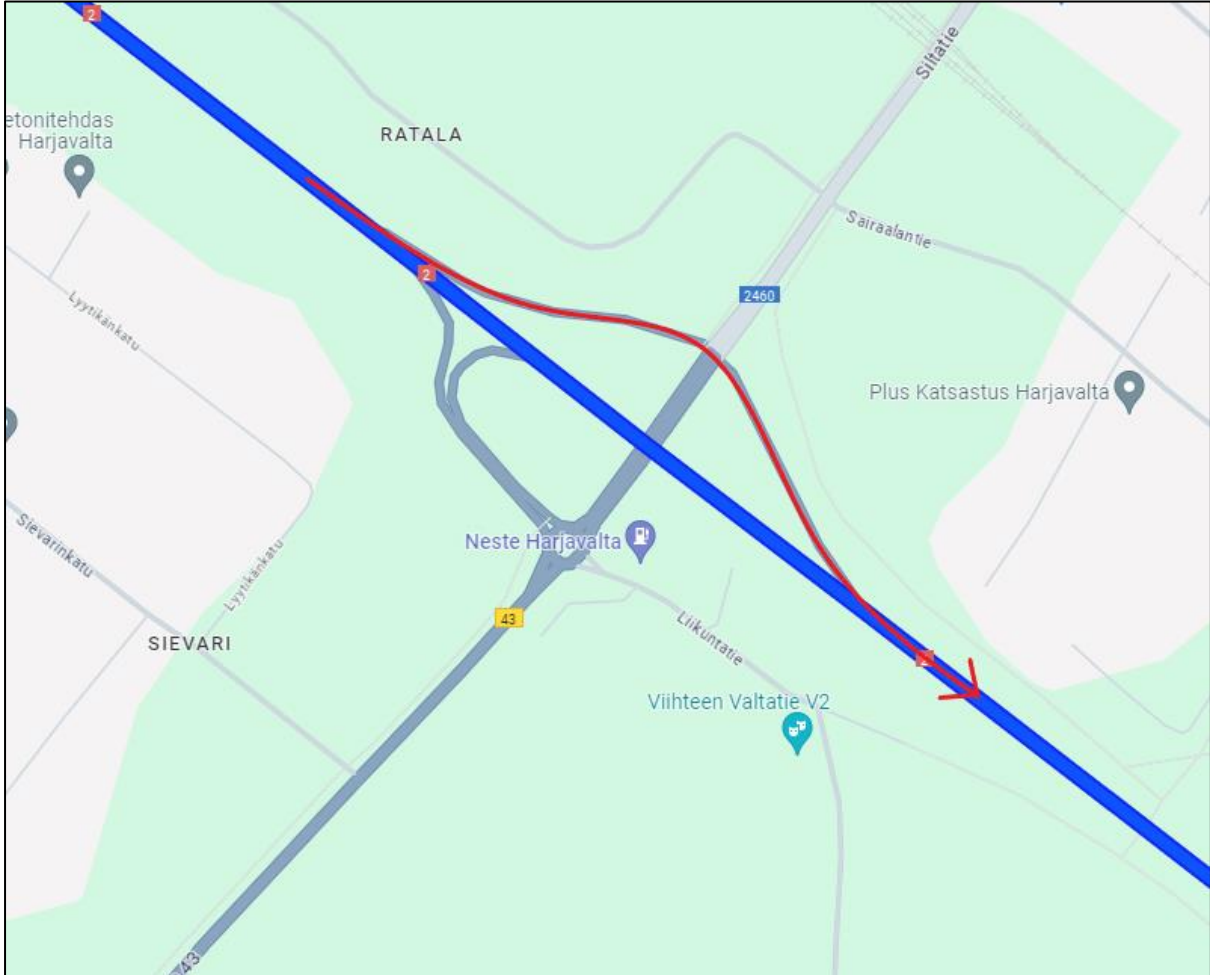
6.	46km	Map 6	Class 1
Bypassing the Torttila bridge. Should be easy access with only minor modifications.			



Map 6 – Turn from 2 to 2. The red arrow marks the driving line.



7.	48km	Map 7	Class 1
Bypassing the Harjavalta bridge. Should be easy section with only minor modifications.			



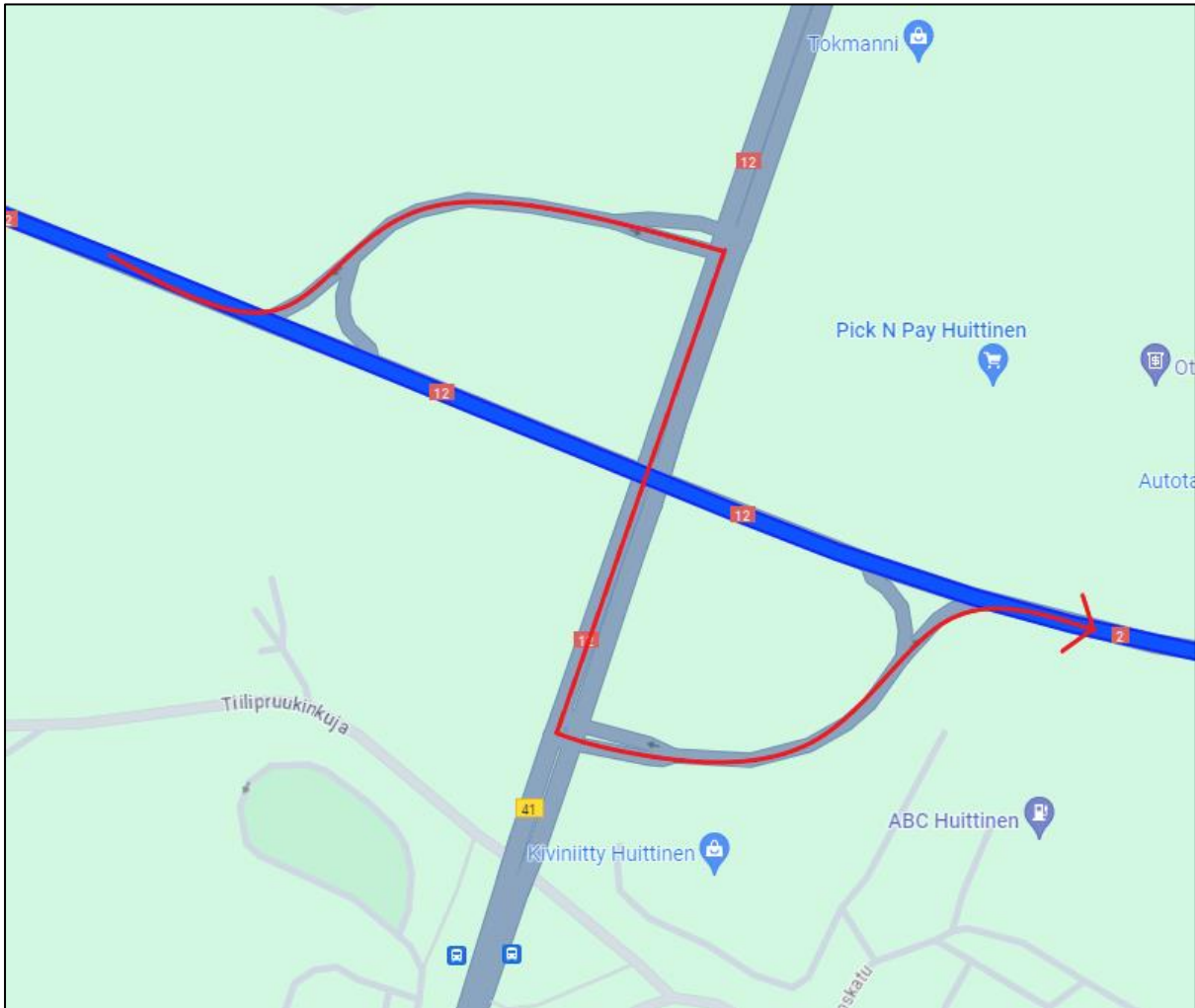
Map 7 – Turn from 2 to 2. The red arrow marks the driving line.

8.	60km	Map 8	Class 1
Bypassing the Kokemäki bridge. Should be easy access with only minor modifications.			



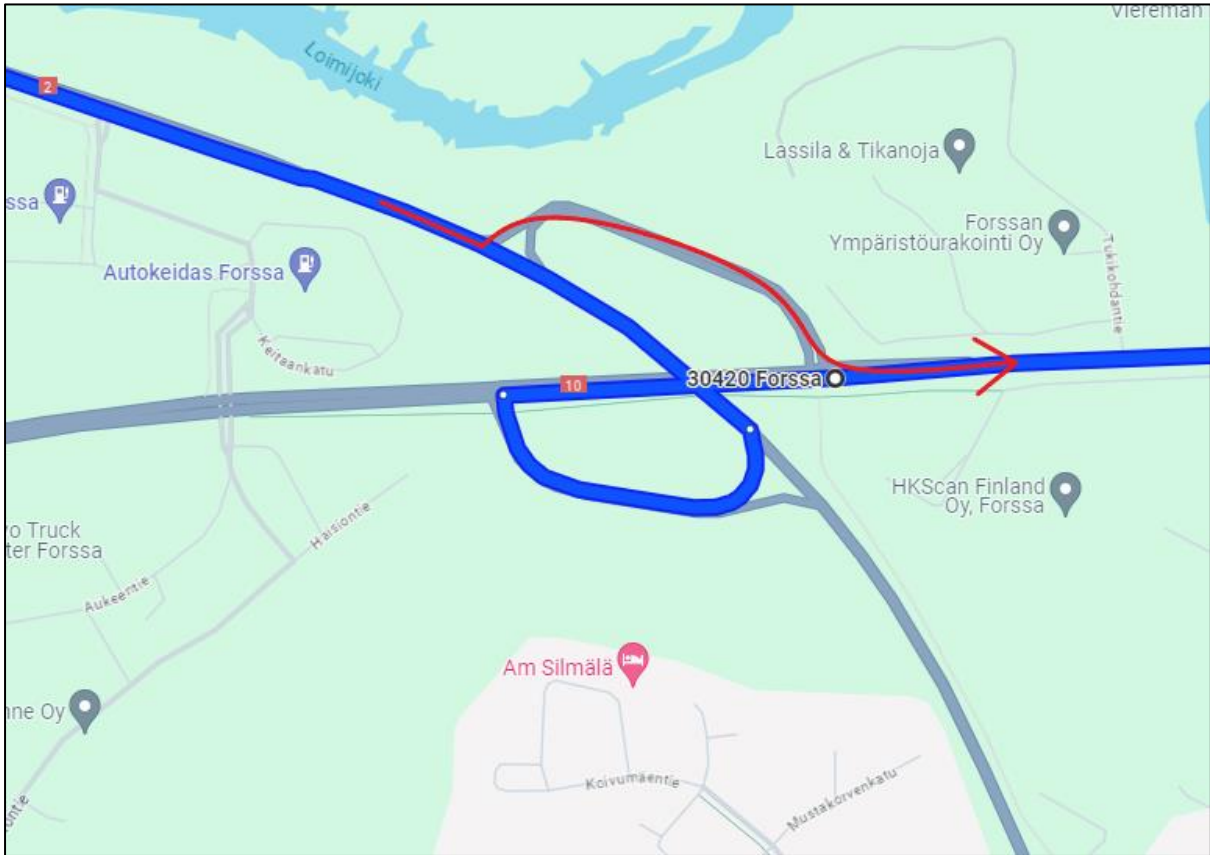
Map 8 – Turn from 2 to 2. The red arrow marks the driving line.

9.	82km	Map 9	Class 2
Bypassing the Huittinen bridge. Fillings of traffic dividers.			



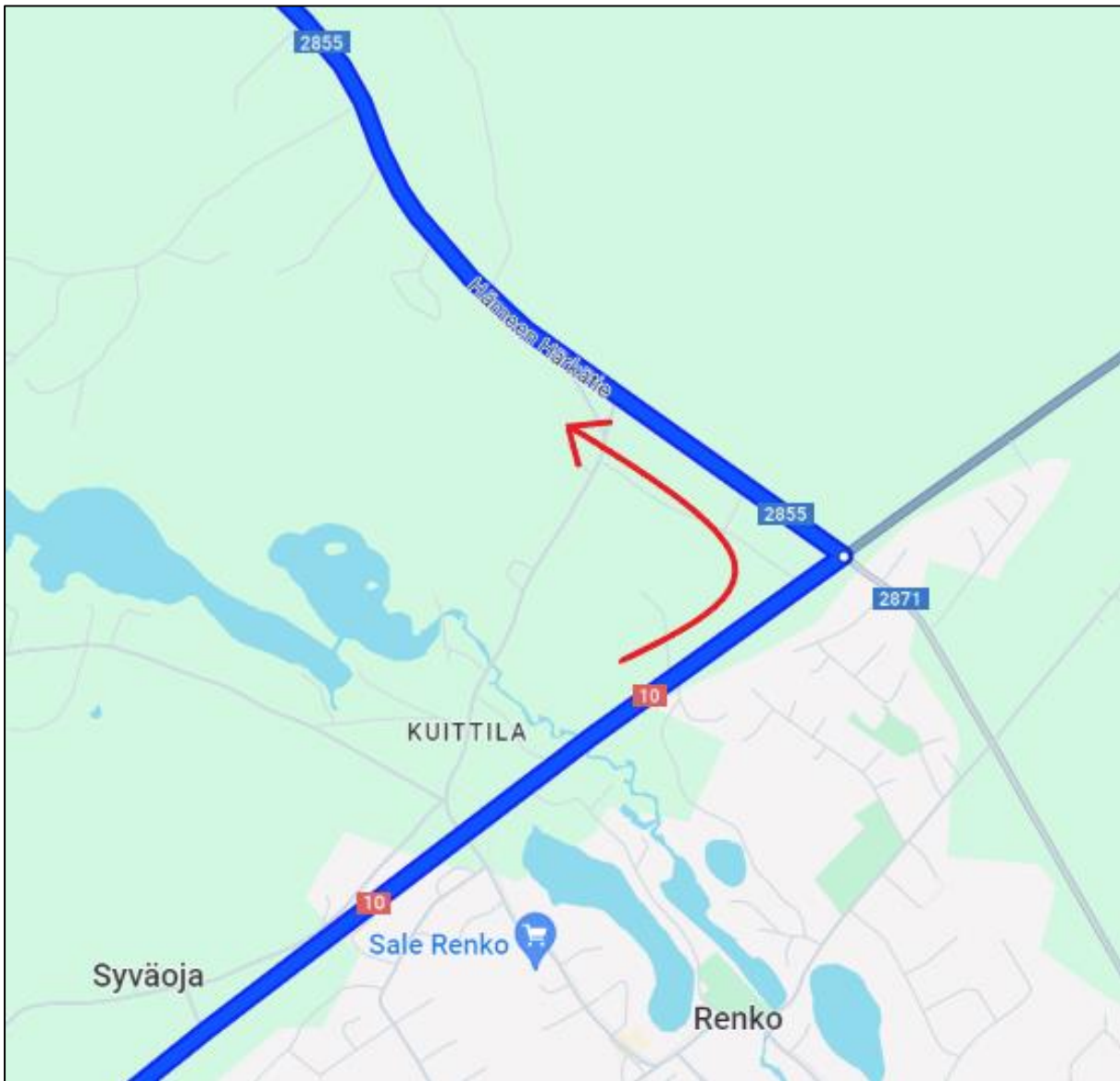
Map 9 – Turn from 2 to 2. The red arrow marks the driving line.

10.	145km	Map 10	Class 1
Should be easy access with only minor modifications.			



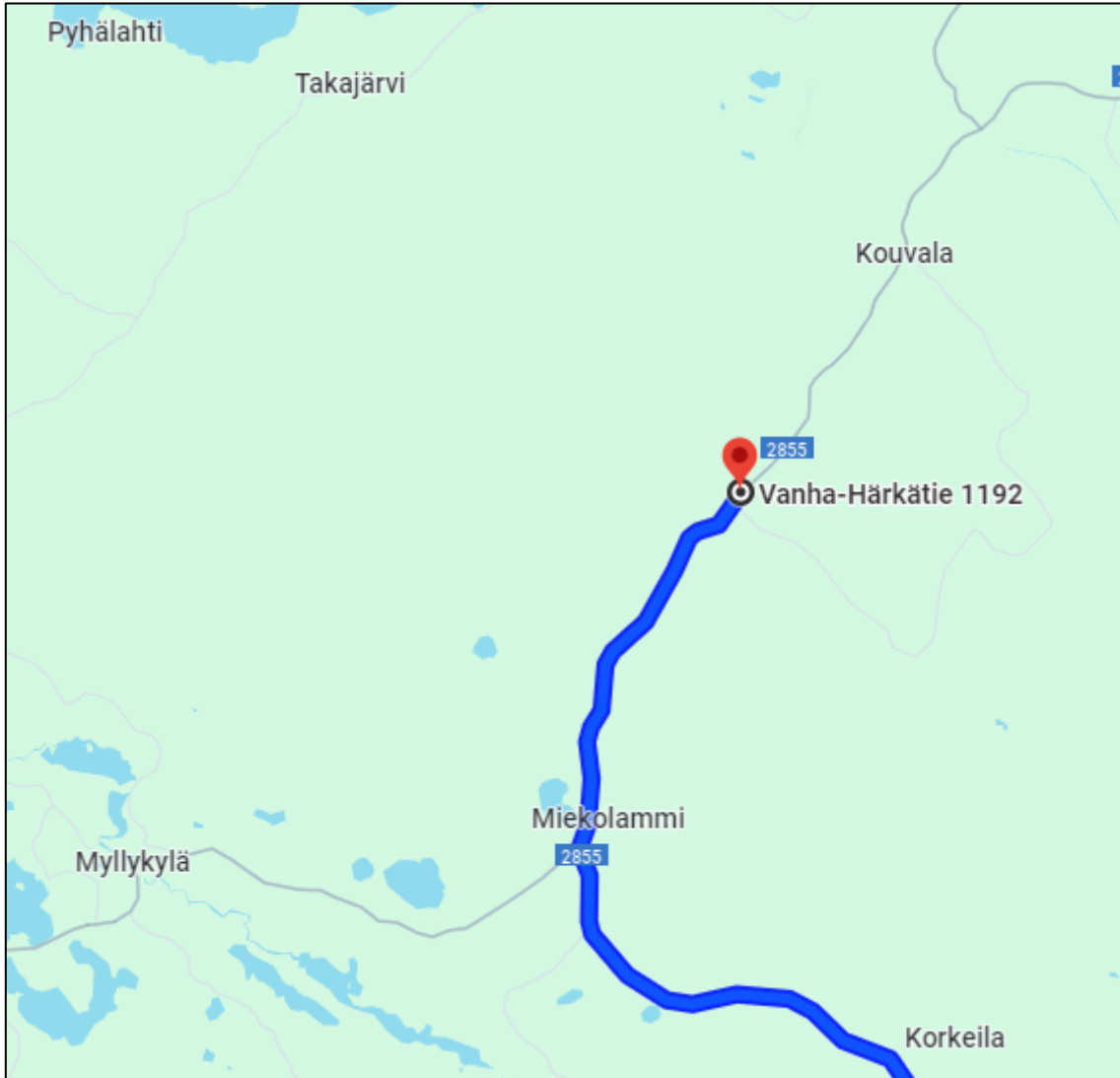
Map 10 – Turn from 2 to 10. The red arrow marks the driving line.

11.	187km	Map 11	Class 1
Should be easy access with only minor modifications.			



Map 11 – Turn from 10 to 2855.

### 4.3 Suggested Handover Point



*Suggested handover point.*

Suggested handover point is located on road 2855 on point 60.956038, 24.236152. The handover point could also be before the given point or after it if there is suitable access to the site road.



#### **4.4 Preliminary Transport Permit**

Preliminary transport permit has been applied on 7.11.2023. The Preliminary transport permit (12351/2023) was accepted 16.11.2023 with conditions.

These conditions are bridge control (sillanvalvontaehto) and possibility for weighing condition (punnitusehto).

On the suggested route there are eleven bridges that need to pass under supervision. The bridge controls and other conditions will become more exact with the transport permits. Then it's possible to know what components will have the bridge control and which are those supervised bridges.

The transport permits may also be accompanied by a weighing condition to ensure that the axle weights are kept within the permitted limits.

The preliminary transport permit was applied with the dimensions of the heaviest component, powertrain. It is the limiting component on the transport because it is so short and heavy.

#### **4.5 Other Notes**

There is suitable access from the Port of Pori to main road 2 due to the special transport gate.

On the route there are traffic portals that can be necessary to remove but that will become clear with the full route survey.

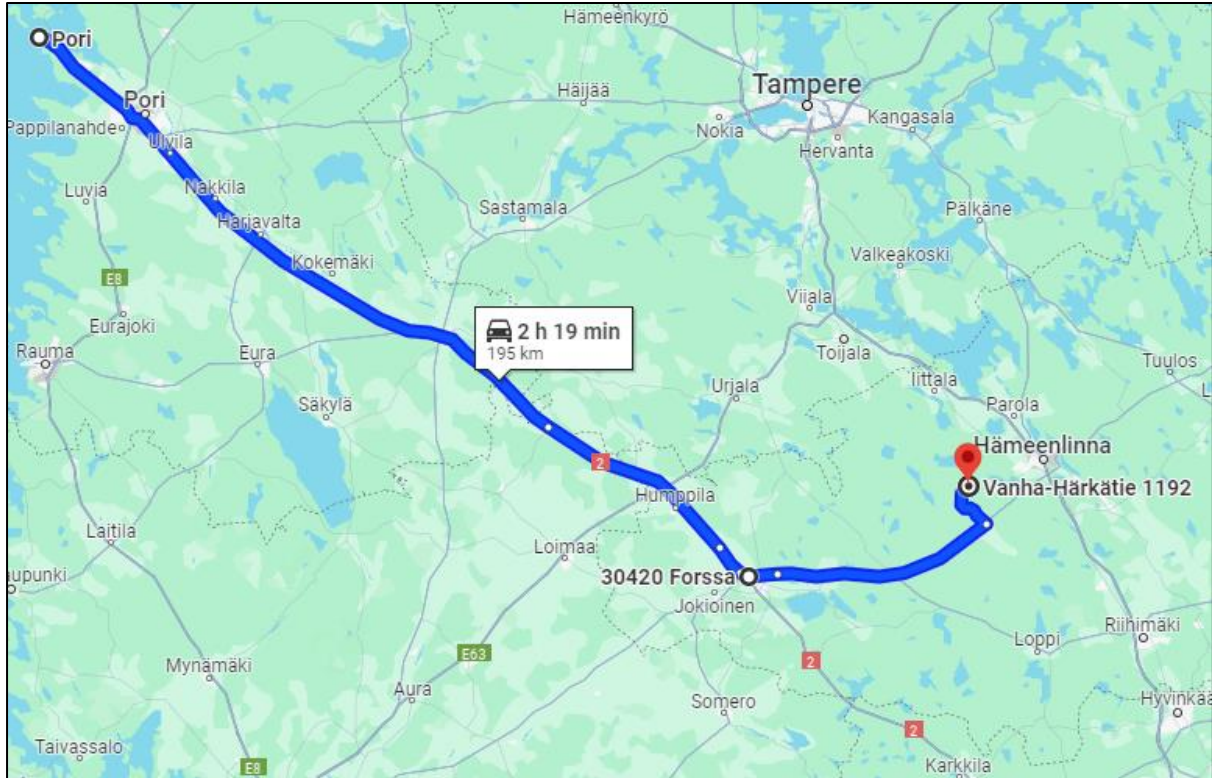
A full route survey is needed to determine all possible modifications and to confirm that the route is suitable for the transports. For example, the amount of overhead cable work will be confirmed when the route is measured.

The suitability of the route for transports depends on:

- Transport permit is granted

## 5 TRANSPORT FOR TURBINE COMPONENTS

### 5.1 Route for blades



<https://maps.app.goo.gl/w564RdL1V3BDUNtz5>

Port of Pori/Merisatamantie 3 – 42020 (Merisatamantie) – 2 – 23502 – 10 – 2855 (Hämeen Härkätie) – Vanha-Härkätie 1192 (60.956038, 24.236152).

### 5.2 Special Notes About the Route for blades

Number	Km	Coordinates N/W	Map	Transport road	Class	Action
12.	145km	60.826698, 23.580724	Map 12 & Sim 1	Turn from 2 to 10	3	Complex section
13.	186km	60.901716, 24.290602	Map 13	Turn from 10 to 2855	3	Complex section

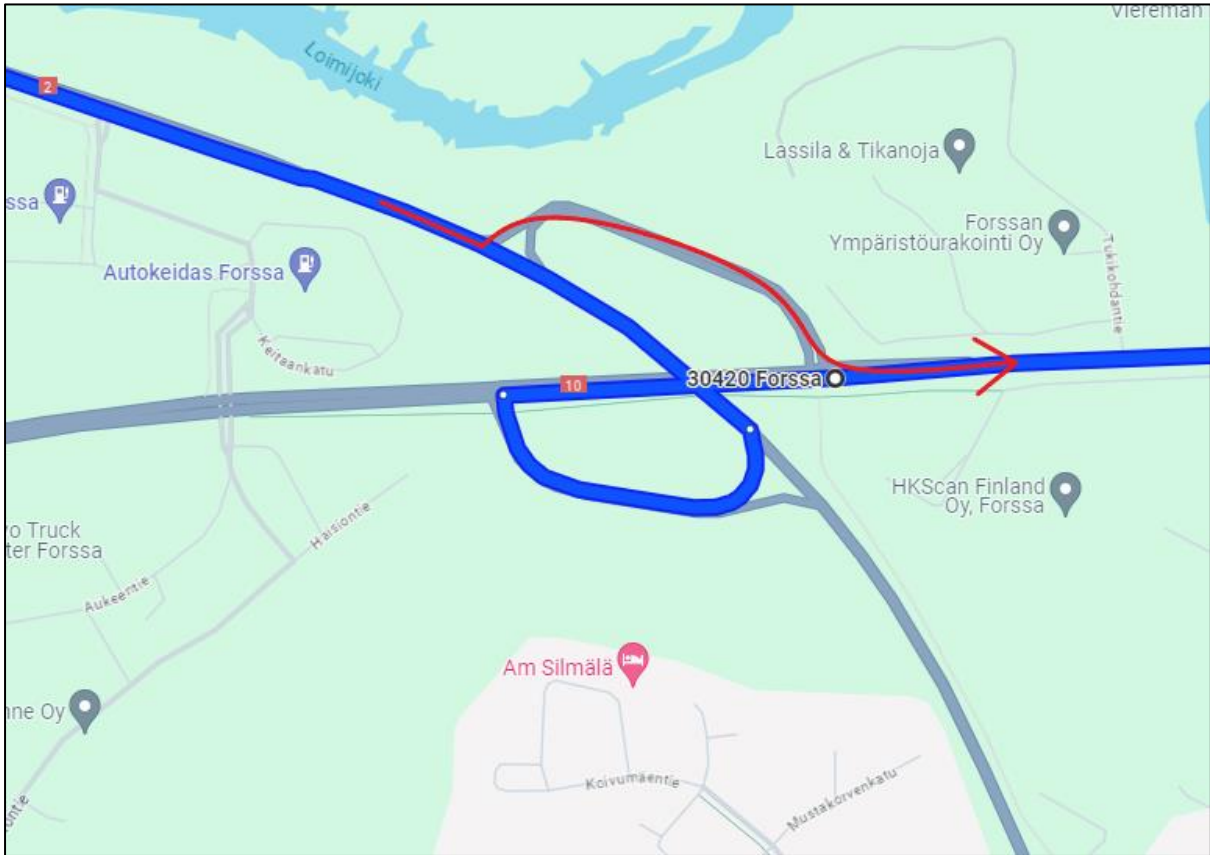
#### Classification of constructional measures

Class	Category	Description
1	Easy section	<b>Minor modifications</b> needed, like e.g. removing road signs or arranging a parking section
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3	Complex section	<b>Large modifications</b> necessary, like e. g. removing crash barriers, reconstruction of roundabouts, establishment of turn tunnels, road enlargements, turning maneuver in general, private and undeveloped properties are affected, traffic lights and streetlamps must be removed, considerable long-term construction site with a high licensing effort.
4	Difficult section	<b>Passage is doubtful</b> , some additional investigations are necessary (e.g. expertise, swept path analysis, simulations or dummy runs).

#### In simulations:

- Driveable Area
- Obstacle (Not passable. Traversable if the height of the obstacle allows it)
- Tire tracks of tractor
- Tire tracks of trailer
- Area covered by vehicle combination
- Area covered by cargo

12.	145km	Map 12 & Sim 1	Class 3
Removal of lamp poles and traffic portals. Fillings on traffic dividers. Tree removals.			



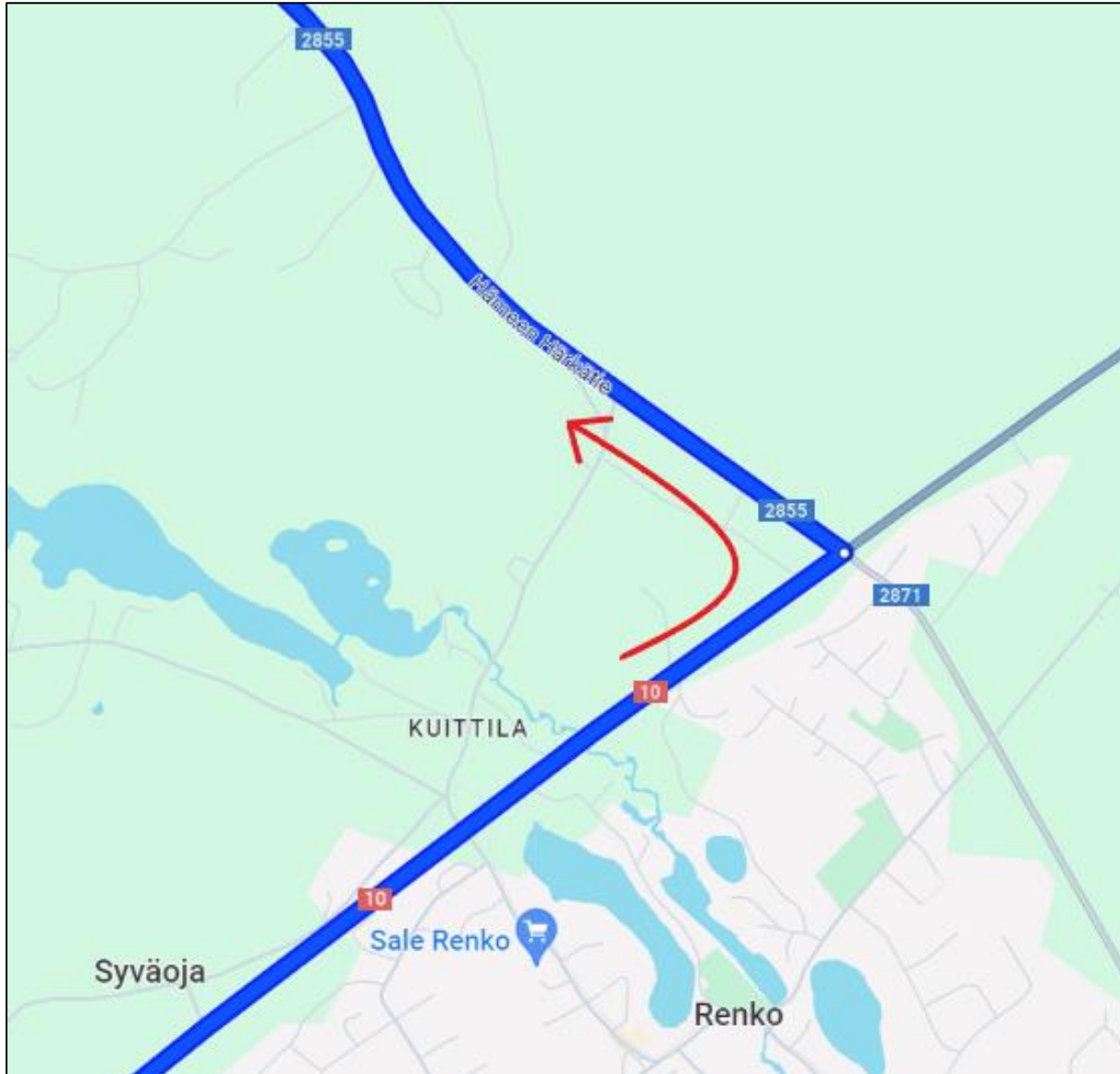
Map 12 – Turn from 2 to 10. The red arrow marks the driving line.



Sim 1 – Turn from 2 to 10.

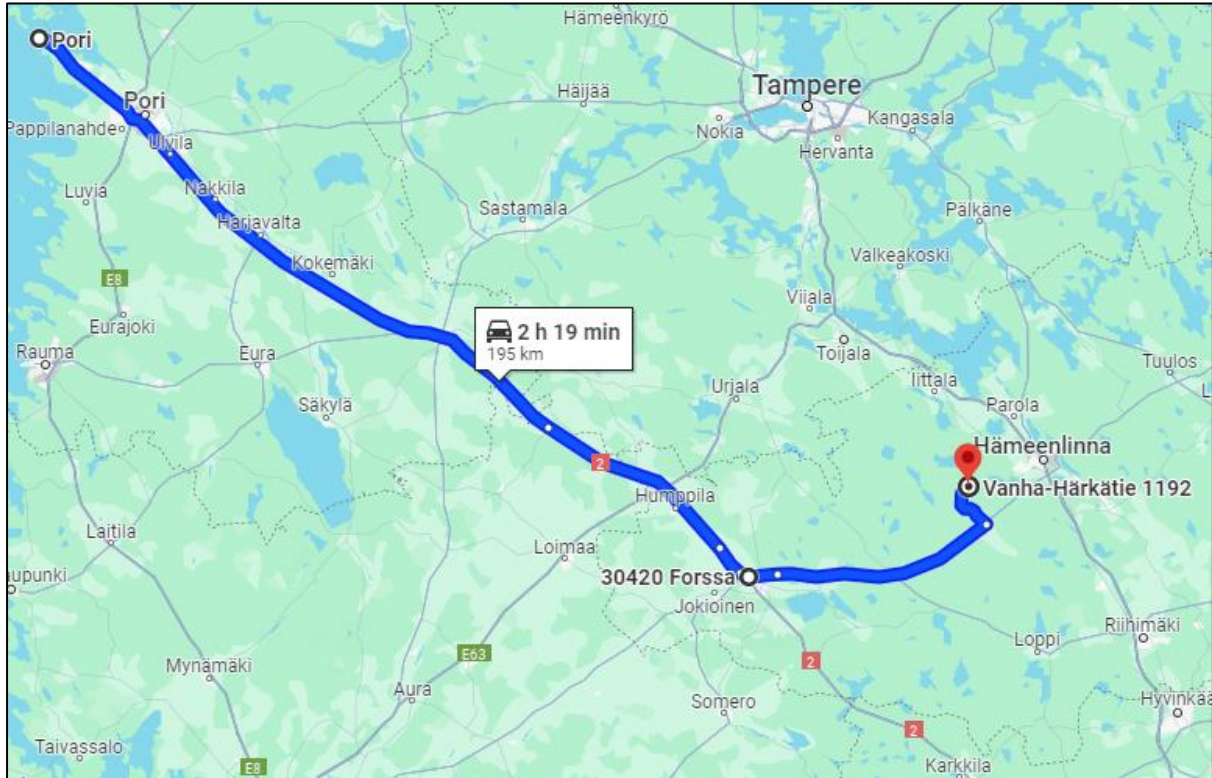


13.	187km	Map 13	Class 3
Removal of lamp poles. Possible fillings. Filling of traffic divider. Possible tree removals from blades sweep area on private land (109-573-11-68).			



Map 13 – Turn from 10 to 2855.

**5.3 Route for main components and tower sections**



<https://maps.app.goo.gl/w564RdL1V3BDUNTz5>

Port of Pori/Merisatamantie 3 – 42020 (Merisatamantie) – 2 – 23502 – 10 – 2855 (Hämeen Härkätie) – Vanha-Härkätie 1192 (60.956038, 24.236152).



**5.4 Special Notes About the Route**

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20.	48km	61.307692, 22.125112	Map 20	2	1	Easy section
21.	60km	61.251253, 22.300771	Map 21	2	1	Easy section
22.	82km	61.170110, 22.672618	Map 22	2	3	Complex section
23.	145km	60.826698, 23.580724	Map 23	Turn from 2 to 10	3	Complex section
24.	187km	60.901716, 24.290602	Map 24	Turn from 10 to 2855	3	Complex section

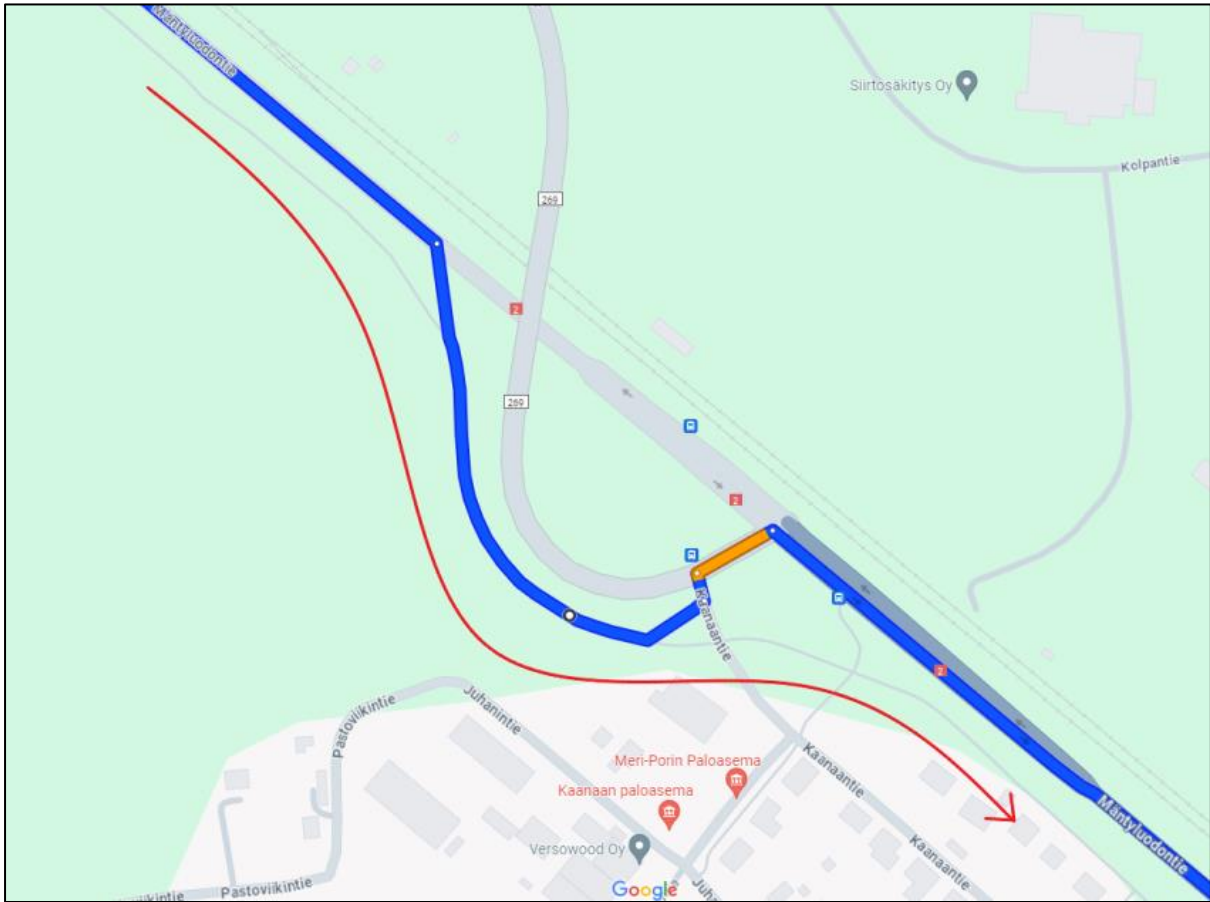
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4	Difficult section	<b>Passage is doubtful</b> , some additional investigations are necessary (e.g. expertise, swept path analysis, simulations, bearing capacity tests or dummy runs).

**In simulations:**

- Driveable Area
- Obstacle (Not passable. Traversable if the height of the obstacle allows it)
- Tire tracks of tractor
- Tire tracks of trailer
- Area covered by vehicle combination
- Area covered by cargo

14.	3km	Map 14	Class 2
Bypassing the Levo bridge. Possible fillings.			



Map 34 – Turn from 2 to 2.

15.	18km	Map 15	Class 1
Bypassing the Laani interchange. Should be easy section with only minor modifications.			



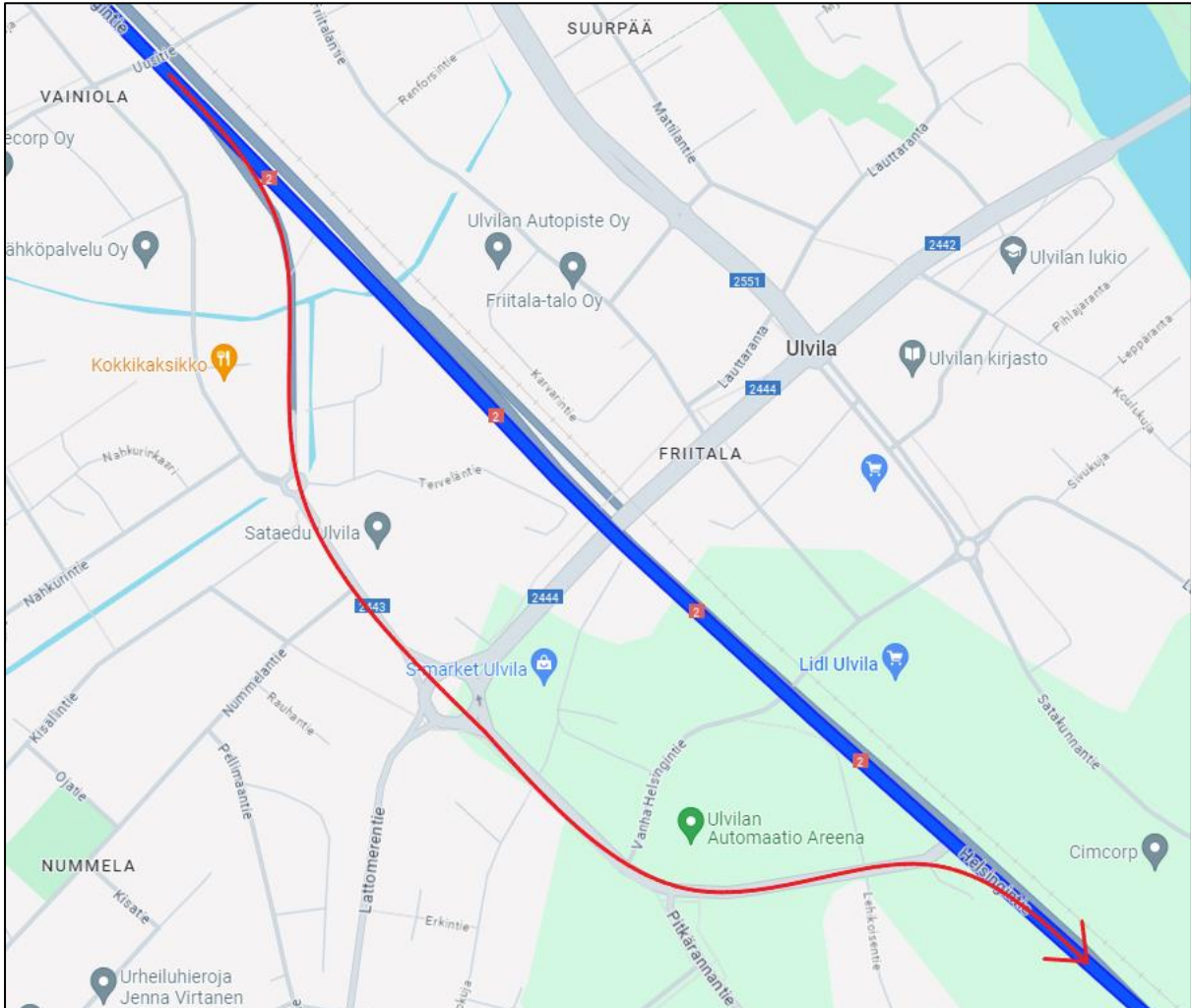
Map 15 – Turn from 2 to 2. Red arrow marks the special transport route.

16.	25km	Map 16	Class 1
Bypassing the Honkaluoto bridge. Should be easy access with only minor modifications.			



Map 16 – Turn from 2 to 2. The red arrow marks the driving line.

17.	28km	Map 17	Class 3
Bypassing the Friitala bridge. Simulations and full route survey needed to determine exact modifications. Fillings needed. Possible removal of lamp poles. Fillings of traffic dividers.			



Map 17 – Turn from 2 to 2. The red arrow marks the driving line.

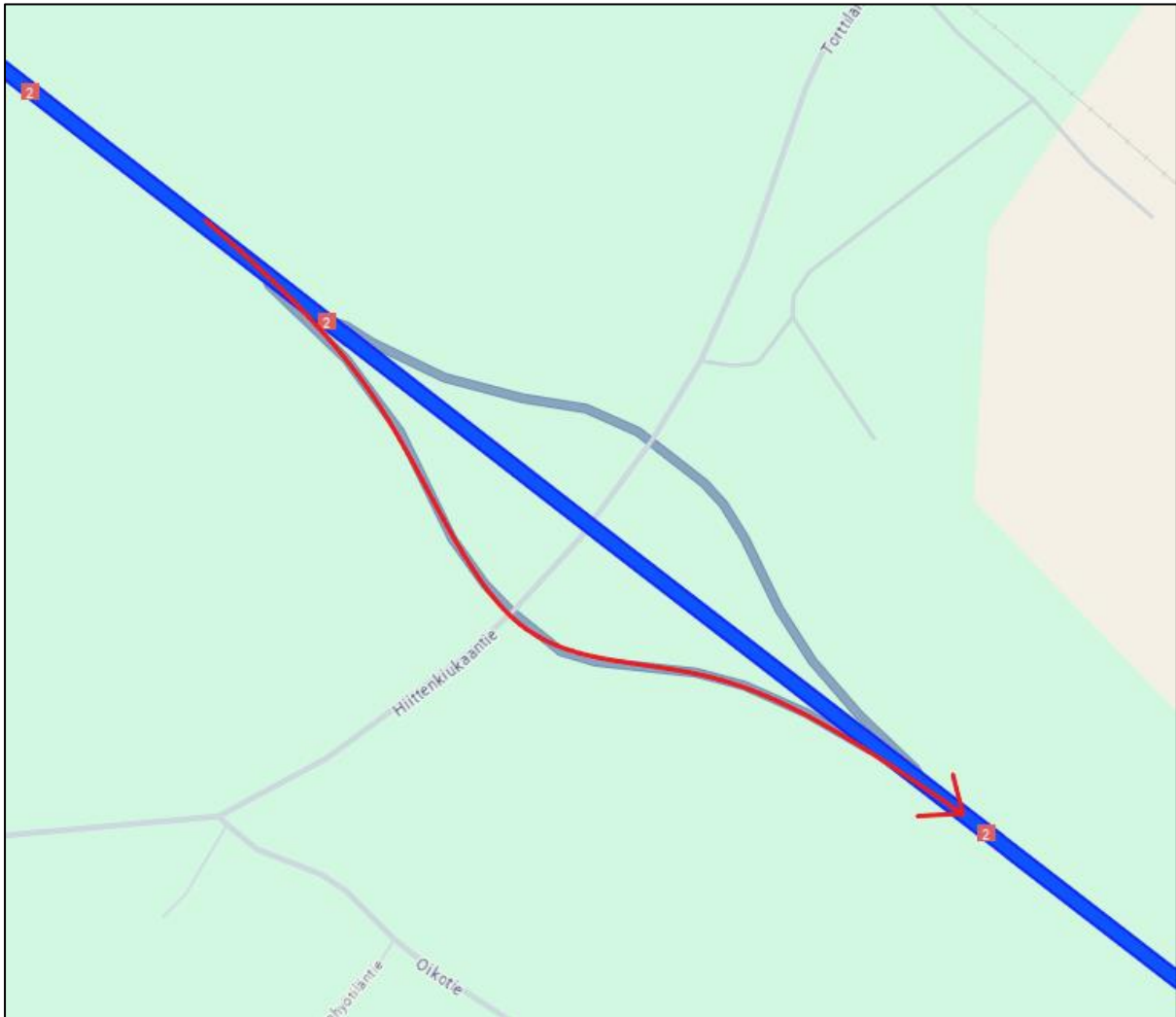


18.	39km	Map 18	Class 1
Bypassing the Nakkila bridge. Should be easy access with only minor modifications.			



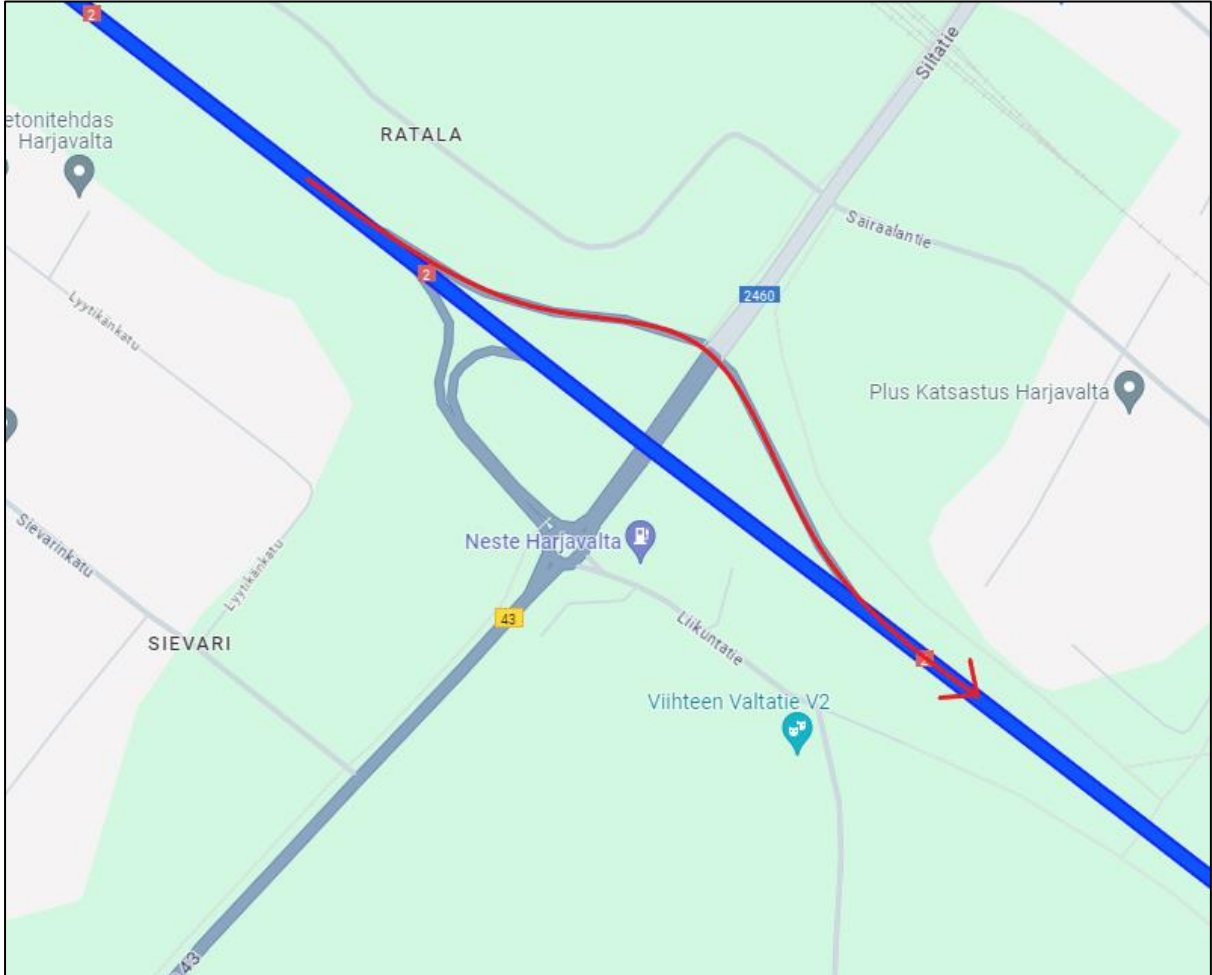
Map 18 – Turn from road 2 to 2. The red arrow marks the driving line.

19.	46km	Map 19	Class 1
Bypassing the Torttila bridge. Should be easy access with only minor modifications.			



Map 19 – Turn from 2 to 2. The red arrow marks the driving line.

20.	48km	Map 20	Class 1
Bypassing the Harjavalta bridge. Should be easy section with only minor modifications.			



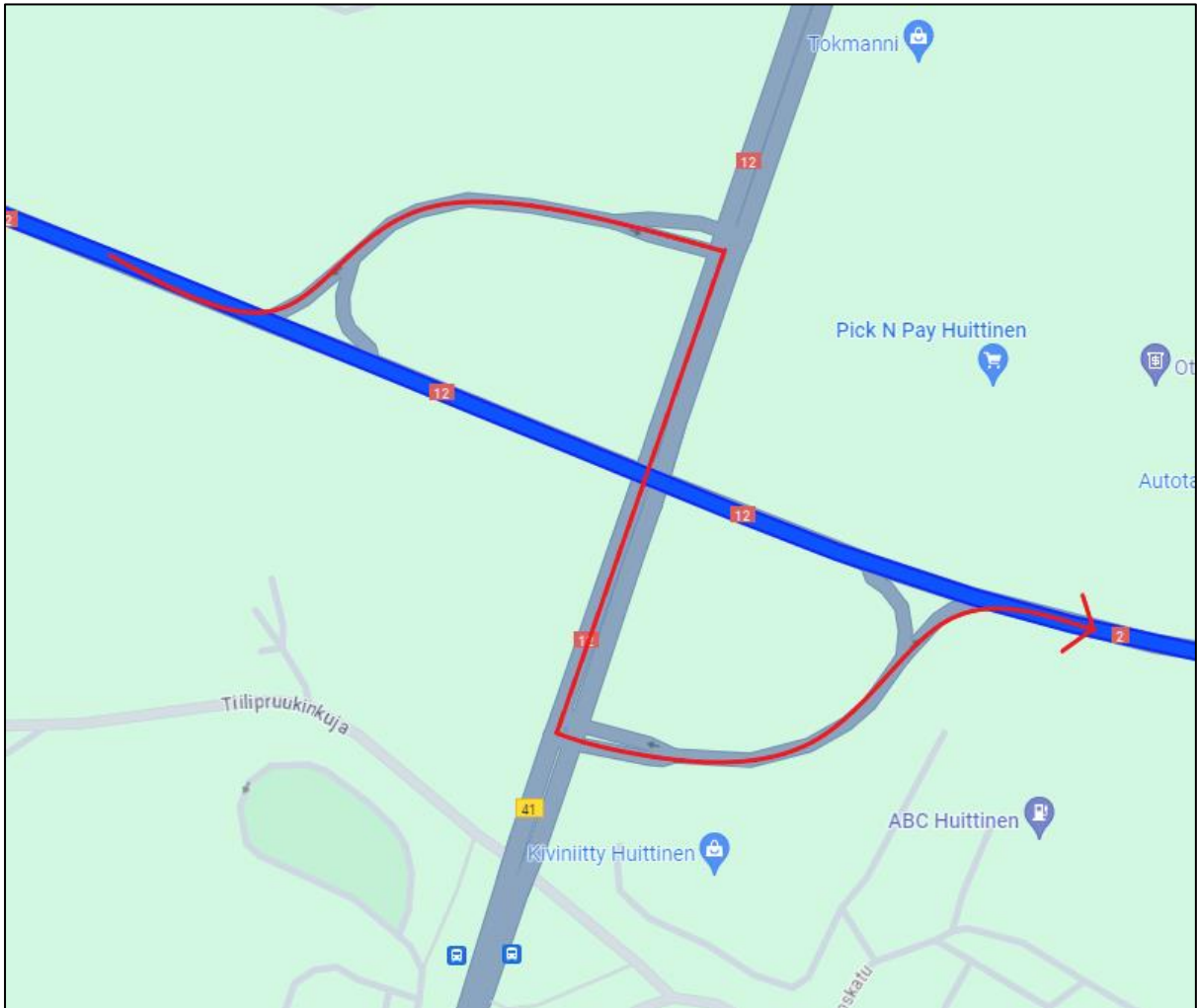
Map 20 – Turn from 2 to 2. The red arrow marks the driving line.

21.	60km	Map 21	Class 1
Bypassing the Kokemäki bridge. Should be easy access with only minor modifications.			



Map 21 – Turn from 2 to 2. The red arrow marks the driving line.

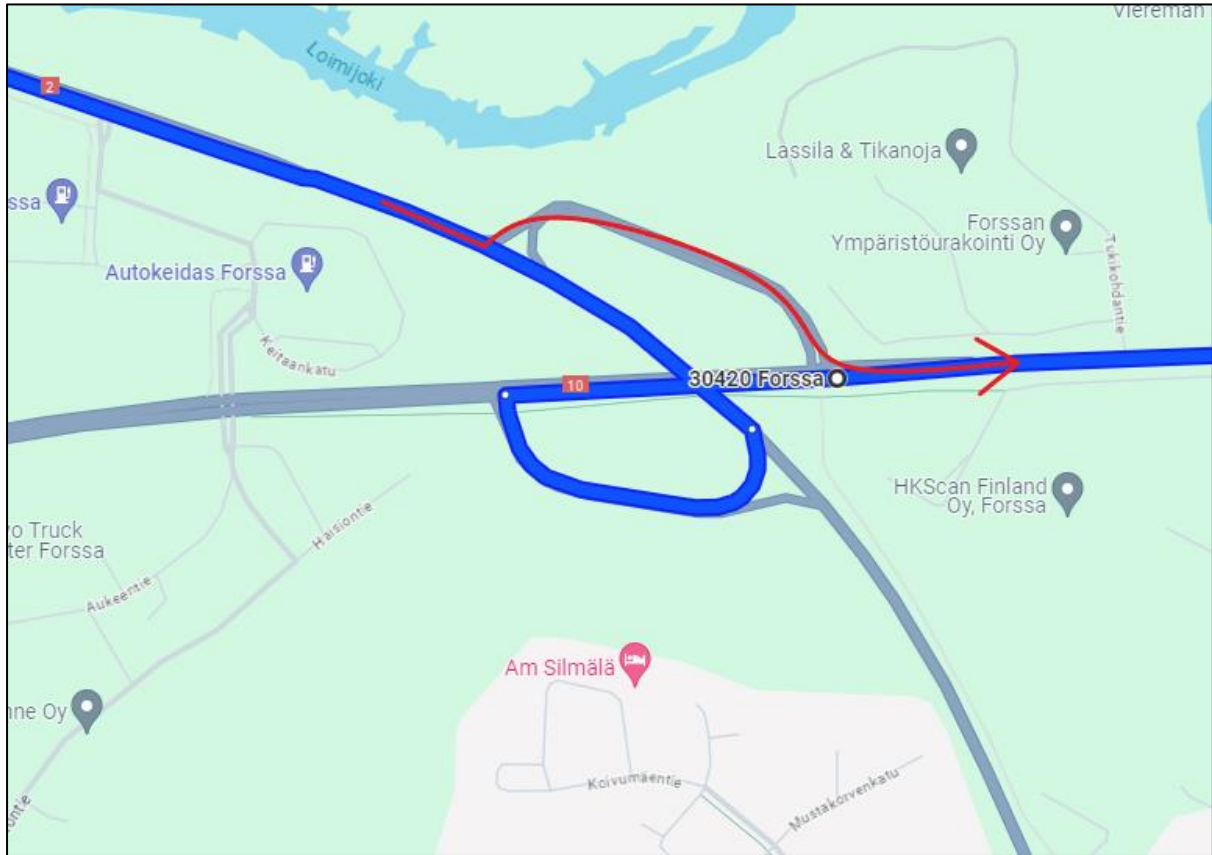
22.	82km	Map 22	Class 3
Bypassing the Huittinen bridge. Fillings needed. Removal of lamp poles. Fillings of traffic dividers.			



Map 22 – Turn from 2 to 2. The red arrow marks the driving line.

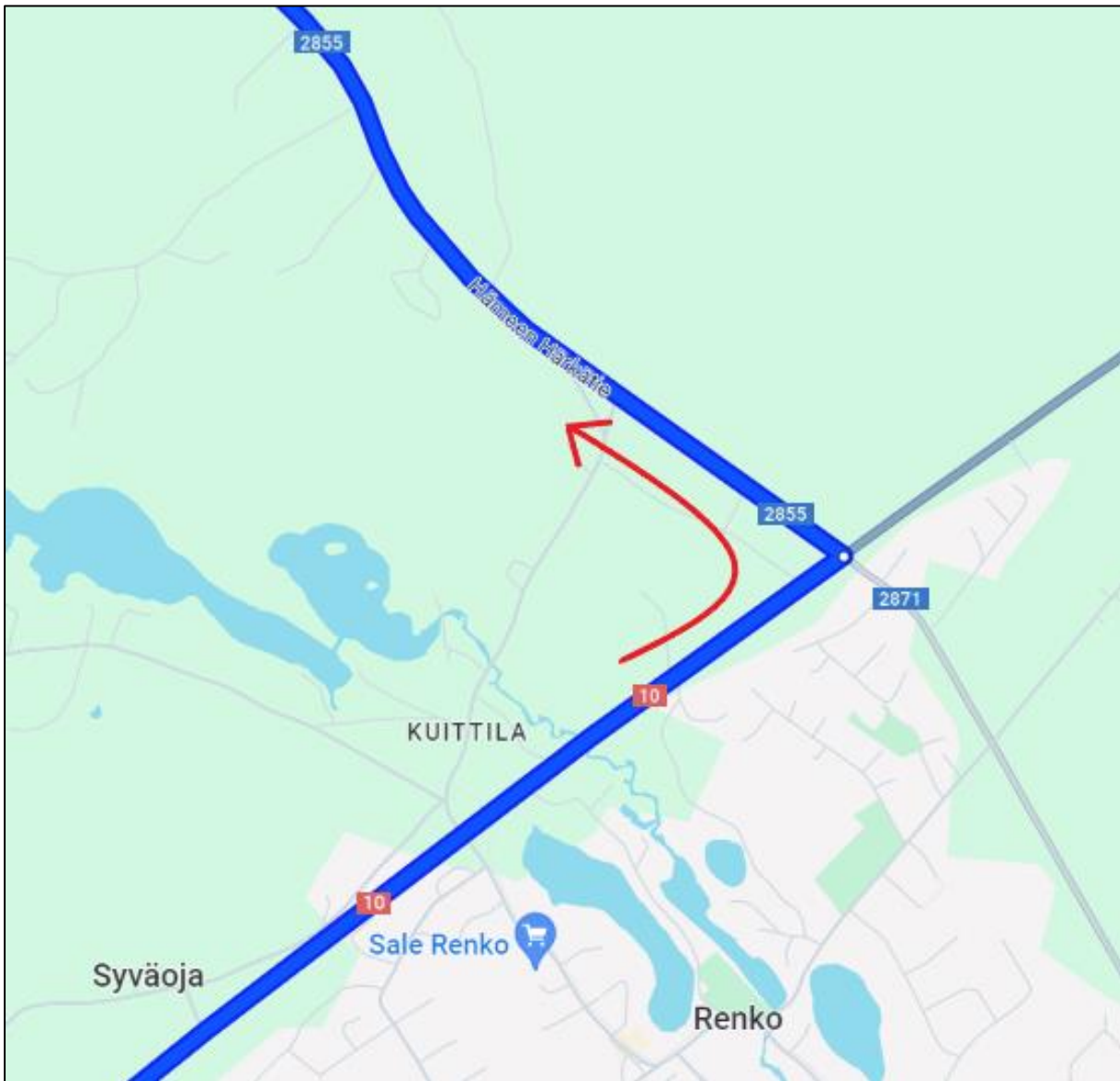


23.	145km	Map 23	Class 3
Removal of lamp poles. Fillings of traffic dividers.			



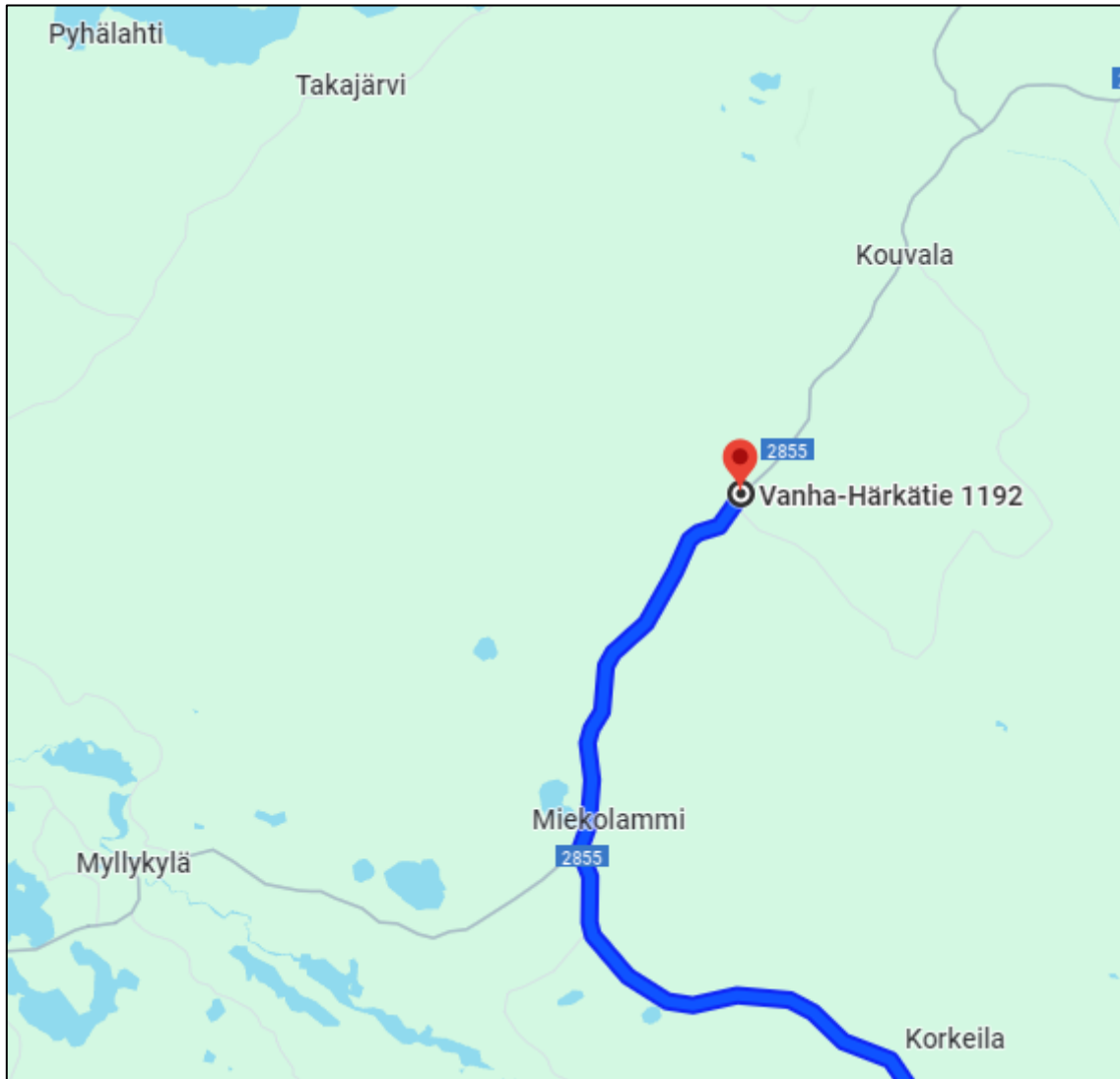
Map 23 – Turn from 2 to 10. The red arrow marks the driving line.

24.	187km	Map 24	Class 3
Removal of lamp pole. Filling or removal of traffic divider.			



Map 24 – Turn from 10 to 2855.

### 5.5 Suggested Handover Point



*Suggested handover point.*

Suggested handover point is located on road 2855 on point 60.956038, 24.236152. The handover point could also be before the given point or after it if there is suitable access to the site road.

There is no suitable route to the site from the south via Renkajärventie. The crossing of 2855 and Renkajärventie would need major road modifications to fit the blades and the tower sections through it.

## 5.6 Preliminary Transport Permit

Preliminary transport permit has been applied on 7.11.2023. The Preliminary transport permit (12351/2023) was accepted 16.11.2023 with conditions.

These conditions are bridge control (sillanvalvontaehto) and possibility for weighing condition (punnitusehto).

On the suggested route there are eleven bridges that need to pass under supervision. The bridge controls and other conditions will become more exact with the transport permits. Then it's possible to know what components will have the bridge control and which are those supervised bridges.

The transport permits may also be accompanied by a weighing condition to ensure that the axle weights are kept within the permitted limits.

The preliminary transport permit was applied with the dimensions of the heaviest component, powertrain. It is the limiting component on the transport because it is so short and heavy.

## 5.7 Other Notes

There is suitable access from the Port of Pori to main road 2 due to the special transport gate.

On the route there are traffic portals that will be necessary to remove but that will become clear with the full route survey.

A full route survey is needed to determine all possible modifications and to confirm that the route is suitable for the transports. For example, the amount of overhead cable work will be confirmed when the route is measured.

The route is quite tight for V172 size blades and other turbine components so when planning to increase the size of the components (for example blade length increase to 100m), the route must be further explored with route survey and simulations. If the diameter of 100m blade increases a lot from the V172 size blade it can be possible that those blades won't be able to pass under some bridges of the route.

The suitability of the route for transports depends on:

- Transport permit is granted

## 6 CONCLUSIONS

In summary, there are suitable routes for the transformers and for each turbine component. These routes will need road modifications.

The transport route is suitable for transport with some modifications. A full route survey including more exact simulations is needed to determine necessary modifications. Modifications might include fillings, removal of lamp poles, traffic signs and trees, and other needed modifications. Cost estimate for these road modifications can be estimated after a full route survey and final simulations.

The suitability of the route for transport depends on whether the transport permit is granted.

### 6.1 Next steps

- Full route survey for transformer/turbine transports.
- Cost estimate for road modifications.
- Permitting road modifications.
- Transport permit for each component.
- Project execution.