
Kuva: Edmonton.ca


Kuva: Kuopio.fi, Kuopio


Kuva: Nallikarin winter village, Oulu



Kuva: Pekka Tahkola, Oulu




Kuva: TheZreezeWay.com

WINTER AND SNOW STORAGE PLANNING GUIDEBOOK, FINLAND =

YEAR-ROUND ACTIVE AND ATTRACTIVE CITIES

Winter Cycling Congress 2024, Edmonton

Eeva Huuhtanen, Timo Perälä, Navico Ltd.

”CREATIVE MADNESS, GOOD & FAIR SPIRIT, BETTER ENVIRONMENT”

DESIGN OFFICE FOR THE FUTURE





GREEN SUPERINTENDANT

www.navico.fi
masterclass.city

- Development of urban operating models
- Development of habitats
- Active mobility
- 12 countires, 65 cities



ORACLE OF OULU



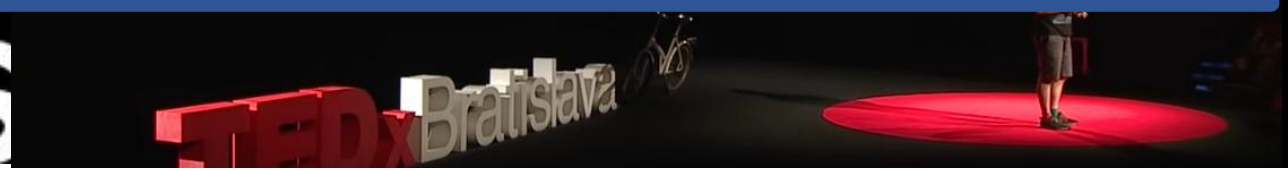
URBAN WELL-BEING KICK ASS ENGINEER



WINTER CYCLING FEDERATION

- Single accidents among pedestrians and cyclists + maintenance quality level of bicycle and pedestrian paths, 1999
- National winter cycling study, 2001
- ……
- Maintenance planning guidebook for municipalities, 2008
- Savilahti winter maintenance plan, city of Kuopio, 2019
- Development of Snow storage sizing charts, city of Oulu, 2020
- Winter and snow storage planning courses for cities, 2021 - (cities of Oulu, Lahti, Vantaa, Mikkeli, Joensuu, Tampere, Turku, Kuopio)
- Functionality evaluation of the maintenance law , Finnish Ministry of environment (2022-2023)
- Snow storage planning guidebook, 18 Finnish cities, 2024
- Fix the maintenance!, Network of Finnish Cycling Municipalities, 2024

WinterCities



I OULU
WINNIPEG 2014 WINTER CYCLING CONGRESS
LEEUWARDEN 2015 WINTER CYCLING CONGRESS
ST. PAUL – MINNEAPOLIS 2016 – WINTER CYCLING CONGRESS
CONGRÈS VÉLO D'HIVER MONTRÉAL 2017 WINTER CYCLING CONGRESS
WINTER CYCLING CONGRESS 2019 CALGARY
WINTER CYCLING CONGRESS JOENSUU 2020
e-Global Winter Cycling Congress February 2021
2024 WINTER CYCLING CONGRESS A BRIDGE TO A HEALTHY FUTURE

- Scan the QR code

Or…

- Go to: **menti.com**
- Enter code: **45 79 14 6**

- Describe with 1-4 words how you see / experience winter in your home town
- You can give 3 answers

RESULTS

HOW IS WINTER IN YOUR CITY?

Keskiviikko 16.1.2019 Helsinki -7°

ILTALEHTI

Etusivu Uutiset Urheilu Viihde Sää

Tuoreimmat | Luetuimmat

Valkoinen kurittaja iskee illalla: Suomessa sataa lunta lähes kaksi vuorokautta yhtä soittoa – suurimmat määrät pääkaupunkiseudulle

The **white punisher** strikes this evening: it will be snowing 2 days in a row in Finland – heaviest snowfall to the capital region.



UUTISET

Terrible weather in the capital region! Snow coming hard - on your face. Stay at home, says meteorologist.

UUTISET | SÄÄUUTISET

Pk-seudulla karmea keli – kohta tulee lunta päin naamaa ja lujaa: Pysy kotona, sanoo meteorologi

Ajokelin odotetaan muuttuvan paikoin erittäin huonoksi.

11 Car Features To Help Keep You Warm During Winter

When your car is your last bastion of warmth, which features are best to have?

Seven ways ... to beat the 'winter blues' without medication

26 Epic Winter Vacation Ideas to Escape the Cold

SAINT PAUL MINNESOTA I WANT TO RESIDENTS

SNOW PARKING MAP STAY INFORMED

SNOW EMERGENCY

DEPARTMENTS / PUBLIC WORKS / STREET MAINTENANCE

How To Make Staying Indoors More Fun This Winter

Lyrics

Oh, the weather outside is frightful
But the fire is so delightful
And since we've no place to go
Let it snow! Let it snow! Let it snow!... Full lyrics

Source: Musixmatch





WINTER IS CORNERED TO CERTAIN PLACES






REMOVE
WINTER
CULTURE

PLANNING CITIES ONLY FOR THE SUMMER PERIOD















navico


THERE IS SOME WINTER LEFT IN FINLAND...
70°
ROVANIEMI
1.11. – 5.5.
OULU
22.11. – 20.4.
KUOPIO
20.11. – 25.4.
60°
TURKU
5.1. – 26.3.
HELSINKI
5.1. – 5.4.
navico


OTHER REASONS FOR THE GUIDEBOOK
SCATTERED INFORMATION
PLANNING HISTORY FROM NATIONAL ROAD NETWORK
MORE NEEDS, NEW VALUES AND PRIORITIES
RENEWAL OF LEGISLATION
navico

Financed by 18 cities, Association of Finnish Municipalities, The Confederation of Finnish Construction Industries

1. Why to plan for winter and snow storages
2. Backgroud for not planning for winter and snow storages
3. Future challenges for winter and snow storage planning
4. Planning guide for different phases of build urban environment process

Key challenges
Best practices
Tools& tips
Memory lists

Sisällysluettelo

Lukijalle 4
1. Miksi talvea ja lumitiloja tulee suunnitella? 5
   1.1. Faktoja ja esimerkkejä talven suunnittelun tärkeydestä 7
2. Talven ja lumitilojen suunnittelemattomuuden taustat 14
   2.1. Talven ja lumitilojen puuttuminen lainsäädännöstä 14
3. Odotettavissa olevat lisähaasteet talven ja lumitilojen suunnitteluun 18
   3.1. Uudet liikkumismuodot ja -palvelut 18
   3.2. Tiedonhallinta, automaatio ja robotiikka 19
4. Talven ja lumitilojen suunnittelu 20
   4.1. Strateginen suunnittelu 20
   4.2. Maankäytön suunnittelu 27
   4.3. Yleisten alueiden suunnittelu 40
   4.4. Kiinteistöjen pihat .....
   4.5. Talvihoidon ja lumilogistinen suunnittelu .....
   4.6. Kunnossapidon toteutus ja valvonta .....
   4.7. Vuorovaikutus ja viestintä .....
   4.8. Tiedonhallinta .....
   LIITTEET .....

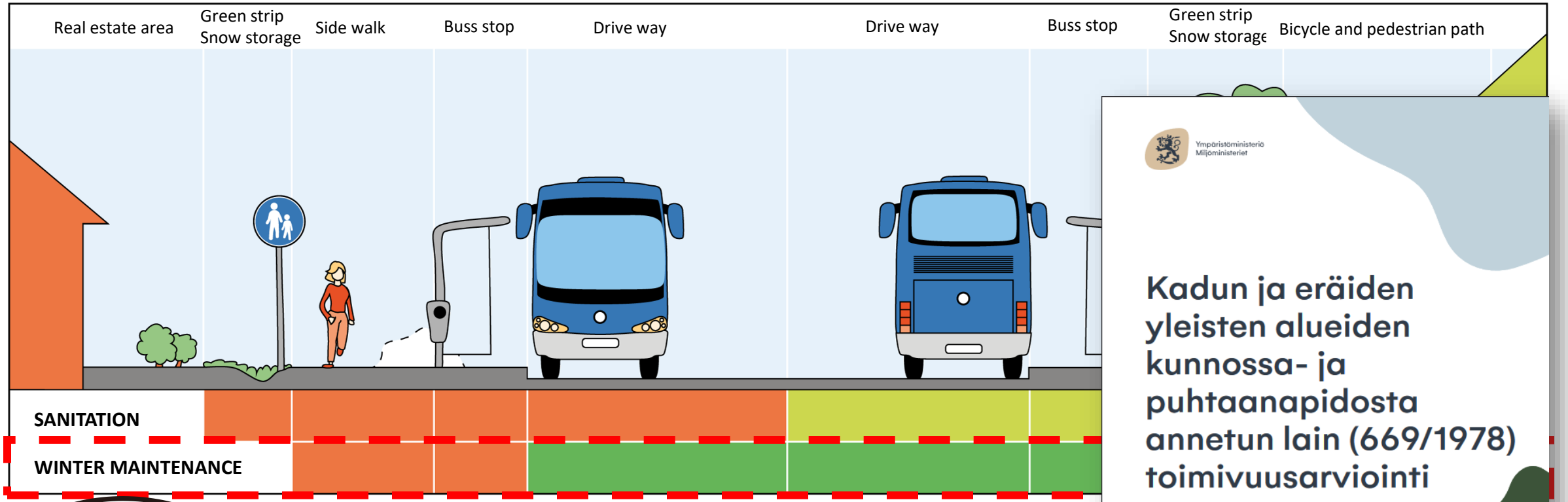
CONTENT OF THE GUIDEBOOK

www.vyl.fi/ohjeet/lumitilaopas-ohjeet-parempaan-talveen/
www.navico.fi/lumitilakaaviot/

REAL ESTATE A

REAL ESTATE B

MUNICIPALITY / CITY



FINNISH MAINTENANCE RESPONSIBILITIES IN URBAN AREAS (1980)

”..the purpose is to keep the street in a satisfactory condition required by traffic needs”.

”Street maintenance also includes those measures that are necessary in the winter to keep the street in condition according to subsection 1”

EXPECTED CHANGES IN FINNISH LEGISLATION

NEW PRIORITIES TO MEET NATIONAL TARGETS



Kuva. Ikäinstituutti

REQUIREMENTS TO PLAN MAINTENANCE AND SNOW STORAGES



Kuva. Timo Perälä

FULL WINTER MAINTENANCE RESPONSIBILITY FOR MUNICIPALITIES?



Kuva. Timo Perälä

DATA MANAGEMENT REQUIREMENTS



Kuva. Länsiväylä





LEGISLATION → CITY STRATEGY → LAND USE PLANNING → DETAILED PLANNING → CONSTRUC-TION → MAINTENANCE PLANNING → MAINTENANCE OPERATIONS → SUPERVISION

Law for land use and construction

Maintenance law

Old priorities in legislation, no mention of winter. The two laws are from ”different worlds”.

In silos

Focus on investments and on summer time. Done during summer time.

Compromizing between needs. One dimensional economical efficiency.

No winterproof solutions, many separated plans not taking maintenance into cosideration.

Changes to save money -> makes often maintenance more expensive.

Good intentions, rarely implemented into following stages.

Budget first - thinking. More infra, less resources. Based on street hierarchy.

Low valuation, Low budget. Infrastructure hard to maintain. Old fashioned culture.

Insufficient resources to control and develop contract mechanisms.

KEY BOTTLENECKS IN BUILD URBAN ENVIRONMENT PROCESS


LEGISLATION
CITY STRATEGY
LAND USE PLANNING
DETAILED PLANNING
CONSTRUC-TION
MAINTENANCE PLANNING
MAINTENANCE OPERATIONS
SUPERVISION
MAINTENANCE PLANNING & OPERATIONS
SUPERVISION
1-3 YEARS EACH
50+ YEARS
LOOKING FROM A DIFFERENT PERSPECTIVE

- Scan the QR code

Or…

- Go to: **menti.com**
- Enter code: **3413 0894**

SOUNDED FAMILIAR? BOTTLENECKS OF YOUR CITY?

- Describe shortly (1-4 words) your city's bottlenecks that are prohibiting your city to be winterproof
- You can give 3 answers

RESULTS


SOME PICKS
FROM THE
GUIDEBOOK
navico


2030
HYVÄN ELÄMÄN PÄÄKAUPUNKI
Uudistuva ja
Yhdessä
Vastuullisesti
Innostavasti
Avoimesti
Kuopio kumppaneineen mahdollistaa kestävän kasvun ja hyvän elämän
Missio
Kumppanuus - Kansainvälisyys - Digitalisaatio
KUOPIO

Neulamäki elementary school 4B (10 y.)

FOR WHOM ARE WE PLANNING OUR CITIES FOR?

We would like it if there was a downhill skiing area, a winter park, skating rinks and ski slopes nearby in the winter.

We would like a ski slope, a big sledding hill, a winter park, an ice rink on Upper Neulamäki, and a sledging shop. Detail of the winter park: a safe climbing frame, a labyrinth, a winter swing, a storage room and anything else you can think of.

Snowman and snow castle point

I hope the plan is good.

Personally, I would like to have some Christmas lights and a Christmas atmosphere there. Otherwise, a bright or illuminated place would be a good idea in my opinion.

Hi Timo! How's it going? We are doing fine.

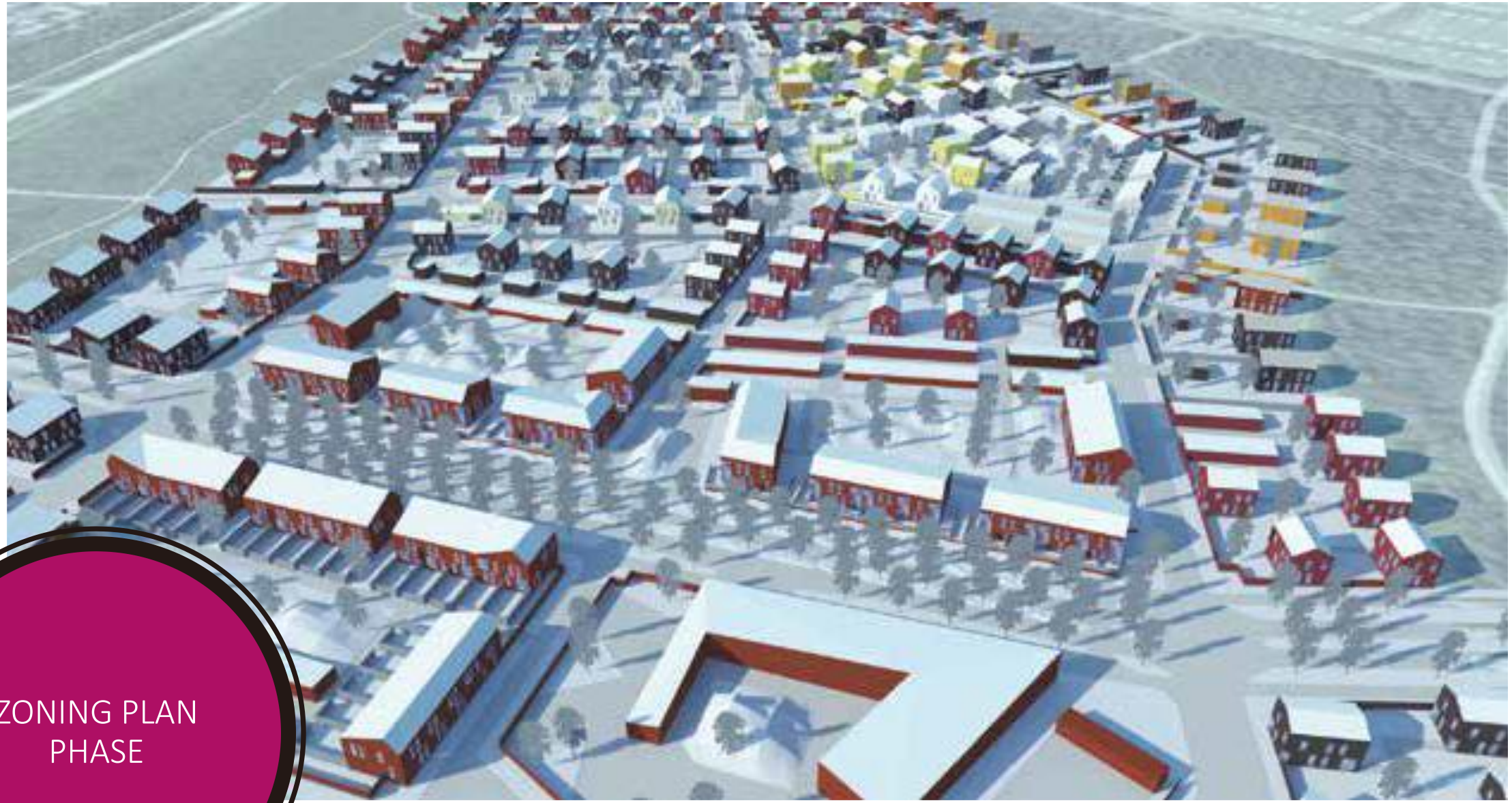
It would be nice for us in the winter if there was a place nearby where we could skate and go down the hill safely.

It would be nice if in winter there were also some events related to winter, for example making snow sculptures.

Thank you for letting us have an impact to this project and happy end of winter!

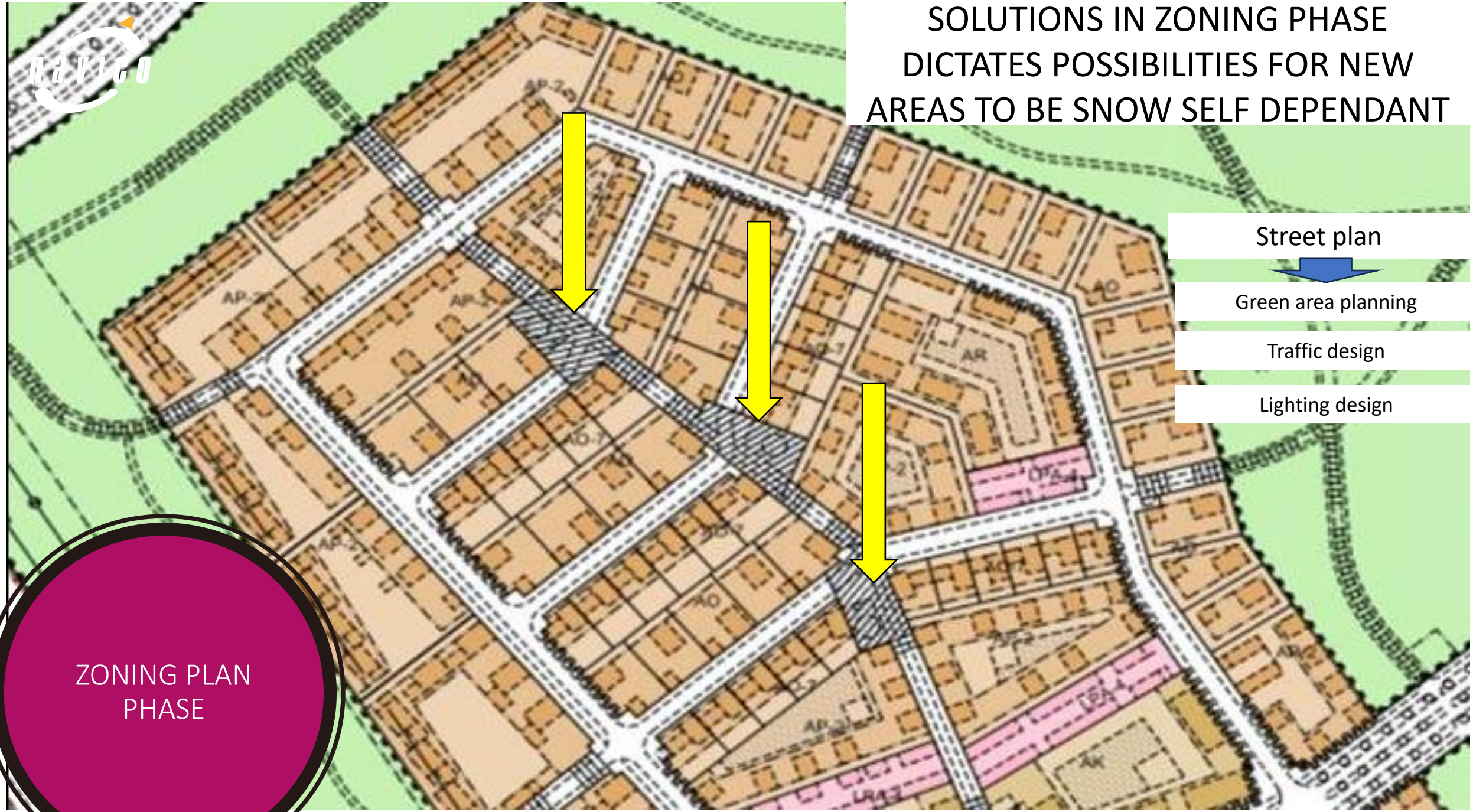
It would be nice if an ice hill was made in Savilahti and it had different heights, so that the age and height of the children would be taken into account accordingly.


SNOWLOGISTICS COMBINED WITH HYDROLOGICAL PLANNING
ENERGY NETWORKS (COLD ENERGY, HEATED AREAS)
GENERAL ZONING PLAN PHASE
WINTER AND YEAR-ROUND USABILITY PRINCIPLES!!!
navico



ZONING PLAN PHASE

SOLUTIONS IN ZONING PHASE DICTATES POSSIBILITIES FOR NEW AREAS TO BE SNOW SELF DEPENDANT



Street plan

Green area planning

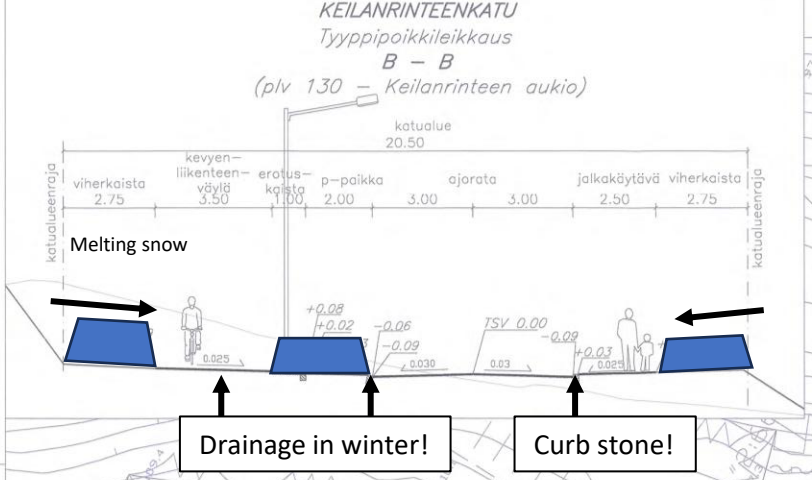
Traffic design

Lighting design

ZONING PLAN PHASE



NICE IDEA, BUT...



CROSS-SECTIONAL CALCULATION

- 4,66 m^2 needed,
- 6,22 m^2 capasity
- Enough space for the snow

STREET SECTION CALCULATION

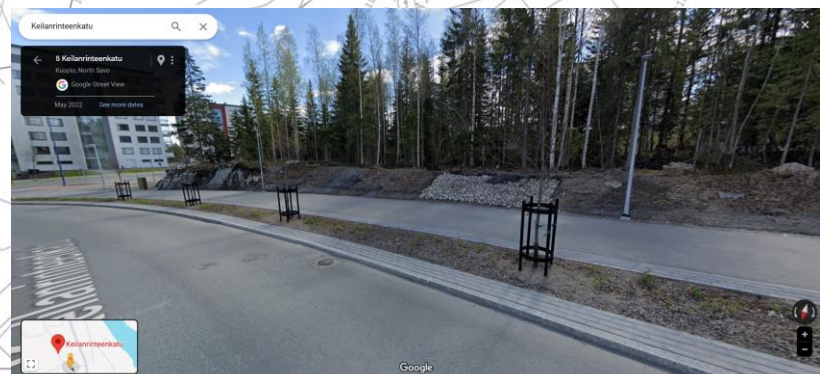
- 886 m^3needed,
- 810 m^3 capasity (as build)
- Not enough space for the snow

Edge area not been built according to the plan. The slope eats up 40% of the planned snow storage, 60 % on the other side.

16m
4m
4m
4m
4m
4m
4m
10m

= Snow storage not in use (crossing, parking, bus stop, etc.)

= Visibility display area (max. height 0,5 m)



STREET DESIGN, WINTER AUDITING OF PLANS

Table 1. Snow logistics data from Finnish cities, 2017–2023 averages

City	Transported snow (m3)	Truck loads (kpl)	Costs, average / y (€)	Emissions (CO2) kg / y	Costs / y / inhab.	Saving potential with near-by storages (€/y), 64 %	Emission cuts with near-by storages (kg/y), 40 %
Tampere	396 000	19 800	781 000	241 956	3,12	500 000	81 600
Joensuu	226 000	11 300	447 000	138 086	5,77	286 000	55 500
Mikkeli	129 000	6 450	255 000	78 819	4,90	163 000	31 600
Turku	269 000	13 464	532 000	164 530	2,66	340 000	66 000
Kuopio	400 000	20 000	700 000	246 000	5,69	300 000 *	73 800*

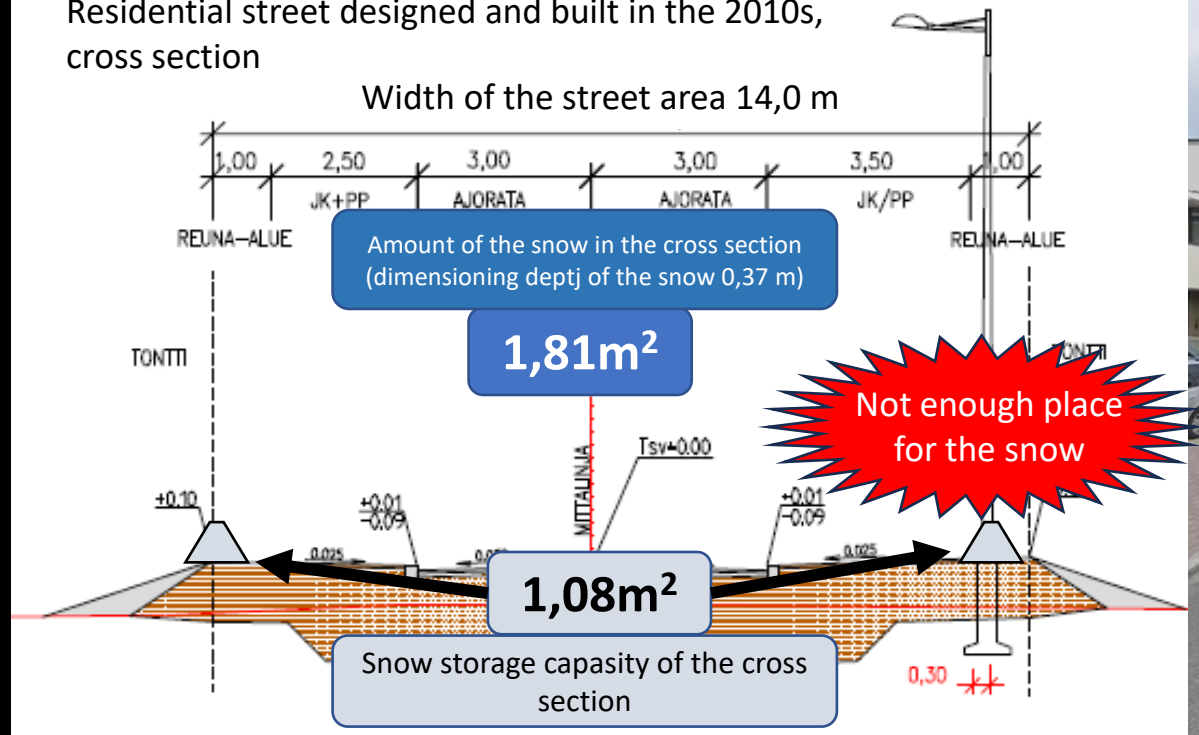
TRANSPORTING AIR WITH A LOT OF MONEY

navico

FRANS EMILIN KATU plv 220–635

Residential street designed and built in the 2010s, cross section

Width of the street area 14,0 m





SNOW LOGISTIC COSTS / 1 KM

AVERAGE WINTER

x 64

3 600 € / v

SNOWY WINTER

x 115

5 500 € / v

Kuljetusmäärä laskettu 1+1m lumitiloilla

WINTERPROOF STREET DESIGN

MODIFYINGTHE CROSS SECTION: 2,5 m SPACE FOR THE SNOW -> NO NEED TO TRANSPORT SNOW

AVERAGE WINTER, SAVINGS IN MAINTENANCE DURING 20y.

83 000 € / km

WIDENING THE STREET AREA, SNOW STORAGE SPACE FROM REAL ESTATES

SAVINGS DURING 20y.

83 000 € / km

LESS LAND RENTAL INCOME DURING 20 y.

57 000 € / km

CALCULATION EXAMPLE

Over 1 000 m^3, max. distance 200m to transport

Absorption of meltwater sanitation of the area

The need to treat meltwater?

Bearing capasity of the area

Protection of trees and vegetation. Usage during summertime.

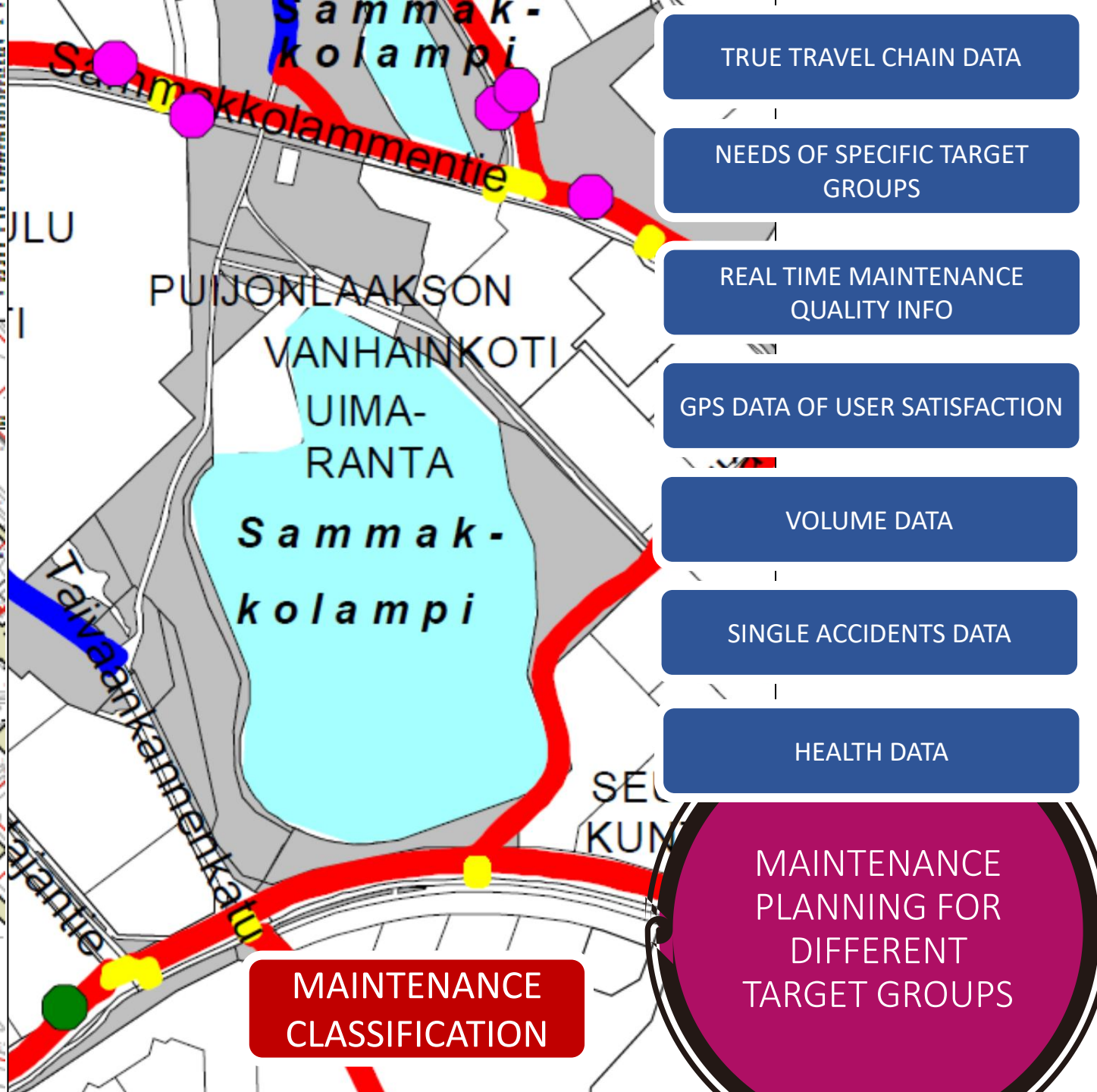
Minding the height differences

Connetion to the maintenance instructions and contracts, supervision



MAINTENANCE PLAN; PRINCIPLES FOR LOCAL NEAR-BY SNOW STORAGES





TRUE TRAVEL CHAIN DATA

NEEDS OF SPECIFIC TARGET GROUPS

REAL TIME MAINTENANCE QUALITY INFO

GPS DATA OF USER SATISFACTION

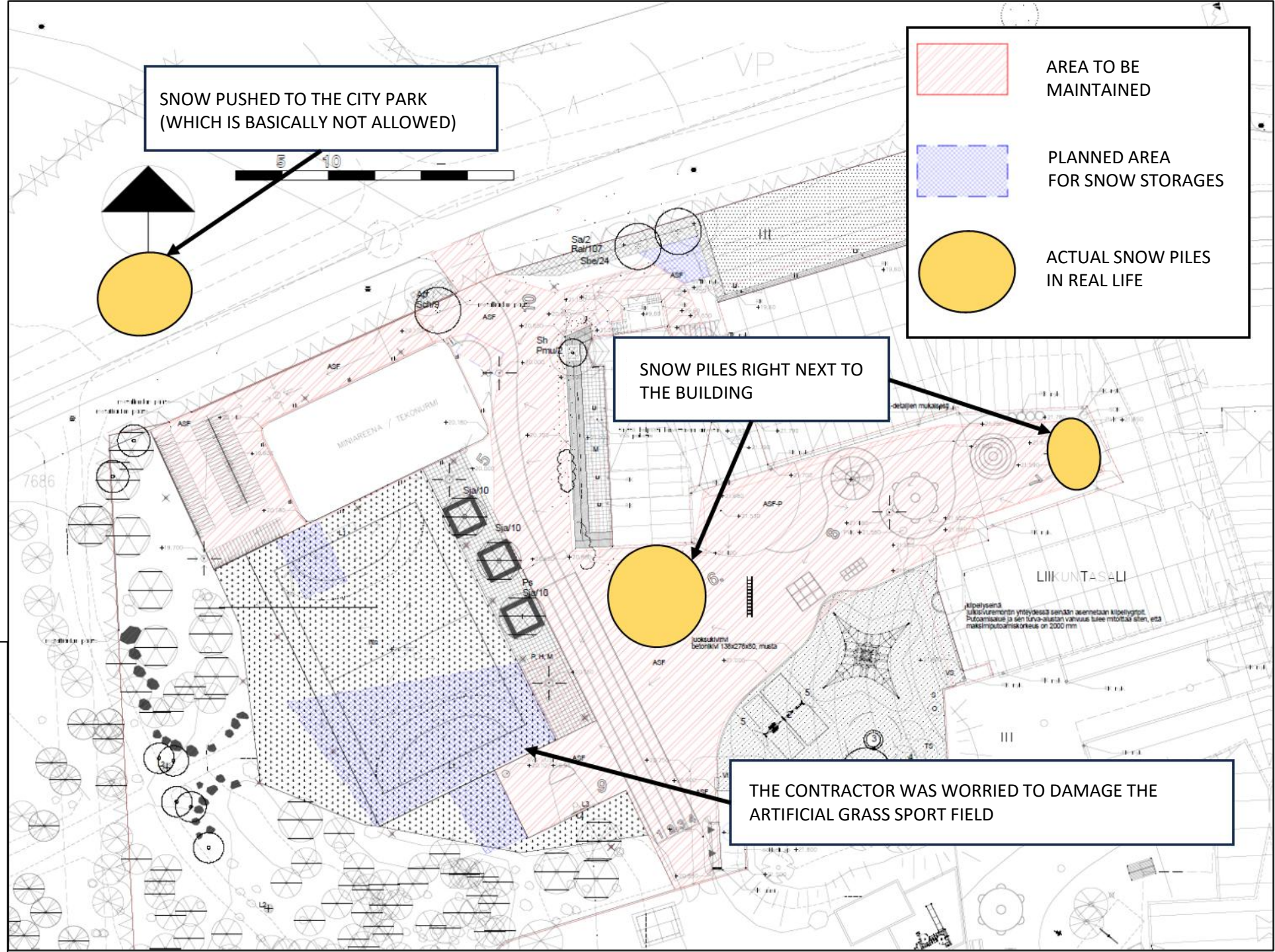
VOLUME DATA

SINGLE ACCIDENTS DATA

HEALTH DATA

MAINTENANCE PLANNING FOR DIFFERENT TARGET GROUPS

PLANNED WELL, BUT NO SEEING IT THROUGH ALL THE WAY TO THE PRACTICE



Aurattavien alueiden alat yhteensä: 1850 m2,
tarvittava lumitilavuus 222m3

Lumitilojen pinta-alat yhteensä: 297 m2
Lumitilojen tilavuudet yhteensä: 316 m3

	Leveys	Syvyys	Korkeus	Pinta-ala	Tilavuus
Lumitila 1	6.50	5.00	1.9	32.5	19.3
Lumitila 2	4.30	2.80	1.1	12.0	3.6
Lumitila 3	3.00	2.80	1.1	8.4	2.1
Lumitila 4	3.63	3.20	1.2	11.6	3.7
Lumitila 5	8.00	5.40	2.1	43.2	29.6
Lumitila 6	21.00	9.00	3.5	189.0	257.7


TALVEN JA LUMITILOJEN SUUNNITTELEMUUDEN TAUSTAT
• Kunnossapito on edelleen syrjässä päätöksenteossa sekä rahoituksessa, ja sen arvostus on alhainen myös lainsäädännön puolella
• Talven ja lumitilojen puuttuminen lainsäädännöstä
• Huomio investoinneissa ja kaavoituksessa
EDUCATION AND INTERACTION!

OUR TAILORED, CITY SPECIFIC WEBINARS:

WHY SHOULD WE INVEST IN YEAR-ROUND CYCLING?

Possible benefits for your city. Dedicated for decision makers.

HOW TO MAKE OULU HAPPEN IN YOUR CITY?

Finding the right narrative and tools for your city.

WINTER AND SNOW STORAGE PLANNING

How to plan winter and snow storages in your city? Winter audits of plans.







navico

WINTER CYCLING FEDERATION

CITY MASTERCLASS

THANK YOU!
Questions?

timo.perala@navico.fi
@TinkerImatz
@CityMasterClass
navico.fi
masterclass.city