EESTI
GEOLOOGIATEENISTUS

CONSTRUCTION MATERIAL RESOURCES IN THE HARJU COUNTY, ESTONIA

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Geological Survey of Estonia

CONSTRUCTION MATERIAL RESOURCES IN THE HARJU COUNTY, ESTONIA

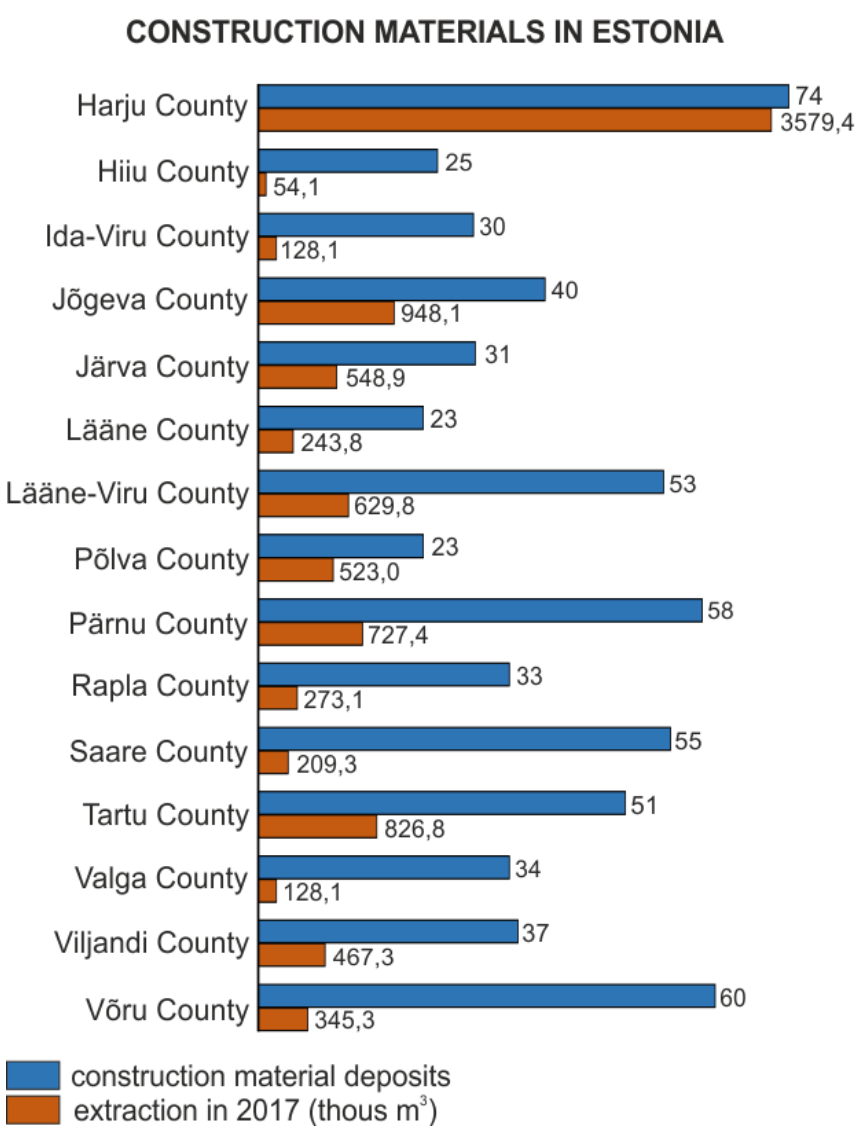
Increased consumption of construction materials and related problems need national legislation

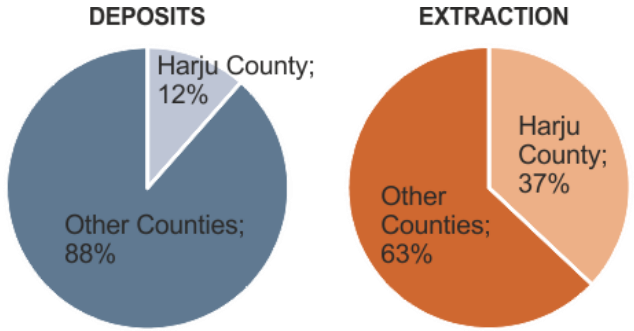
Objectives:

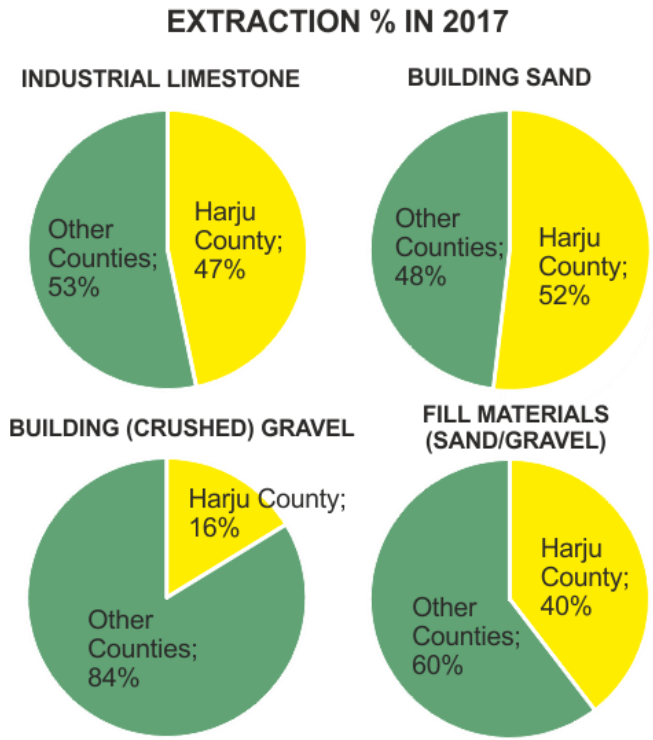
- give overview of construction material resources, distribution and use in Harju County
- evaluate security of supply in Harju County with construction materials until 2030 with perspective as far as 2050



MINING OF CONSTRUCTION MATERIALS







USE AND NEED OF CONSTRUCTION MATERIALS

Main consumers of construction materials in Estonia:

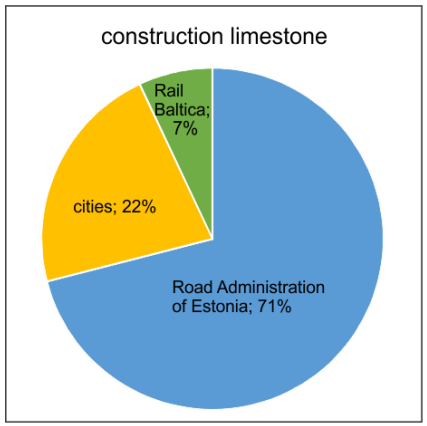
- Road Administration of Estonia
- Rail Baltica
- Estonian Railway Ltd

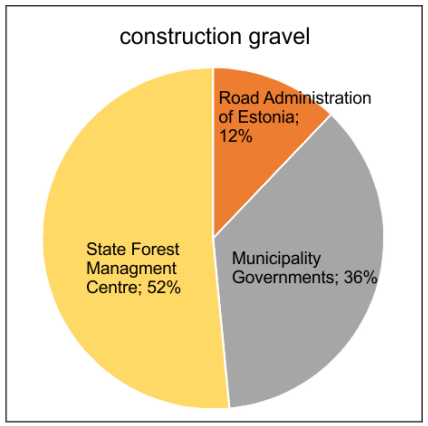
- Cities
- State Forest Management Centre (RMK)
- Municipality Governments

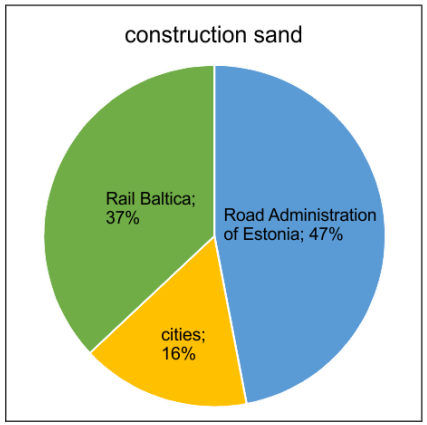


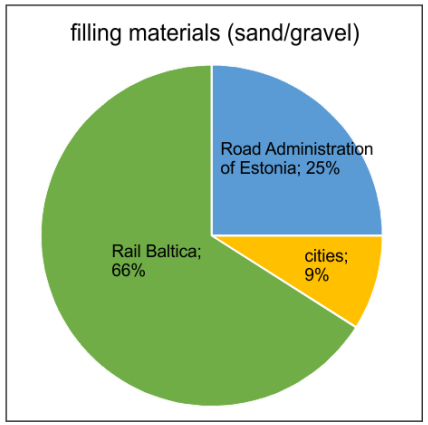
Ehitusuudised.ee

Construction materials needed by consumers in the period 2016–2025:



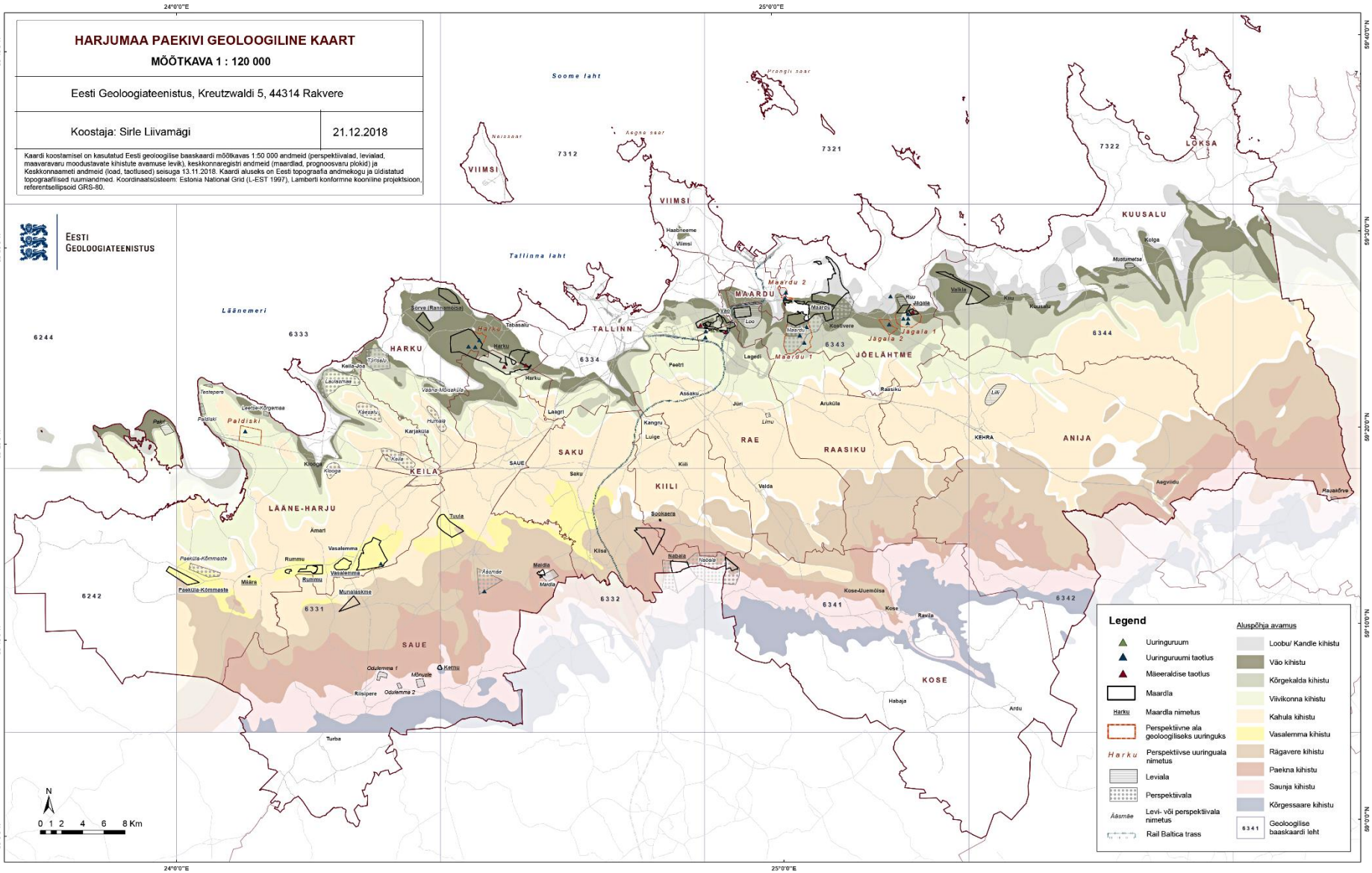






A. Moppel, MKM, 26.10.2018 *(Virumaa maapõuepäev in Rakvere)*

LIMESTONE DEPOSITS AND AREAS IN HARJU COUNTY



SECURITY OF SUPPLY: LIMESTONE

quarry	deposit	reg nr	mining permit owner	Municipality Government	area, ha	reserve, thousand, m^3	extraction in 2017, thousand, m^3	average extraction (5 years) thousand, m^3	year of depletion	period of depletion (years)
									security of supply (limestone)	
	Harku	**161**		**Harku, Saue**		**2467,8**	**417,9**	**325,9**	**2026**	**8**
Harku karjäär			AS Harku Karjäär		53,97	256,0	6,5	20,0	2031	13
Harku II karjäär			AS Harku Karjäär		14,13	258,2	177,2	39,7	2024	6
Harku IV lubjakivikarjäär			AS Harku Karjäär		19,44	950,8	136,2	210,2	2023	5
Harku V lubjakivikarjäär			Balti Kivi OÜ		9,95	516,8	98,0	53,7	2028	10
Harku VI lubjakivikarjäär			AS Harku Karjäär		3,64	486,0	0,0	0,0		
	Maardu	**178**		**Jõelähtme**		**405,0**	**86,8**	**124,3**	**2021**	**3**
Maardu lubjakivikarjäär			OÜ STARHILL		19,15	9,2	0,3	0,9	2028	10
Maardu lõunakarjäär			Esito OÜ		21,38	155,3	28,3	28,8	2023	5
Maardu II lubjakivikarjäär			OÜ STARHILL		6,68	134,8	57,4	35,0	2022	4
Pärtli paemurd			OÜ Pärtli Paas		2,26	105,7	0,8	0,7	2162	144
	Määra	**647**		**Lääne-Harju**		**6,3**		**0,1**	**2103**	**85**
Määra lubjakivikarjäär			Padise Grupp OÜ		0,65	6,3	0,0	0,1	2103	85
	Rummu	**55**		**Lääne-Harju**		**539,0**		**0,0**		
Rummu III lubjakivikarjäär			OÜ Erksaar		9,12	539,0	0,0	0,0		
	Valkla	**56**		**Kuusalu**		**78,5**	**0,8**	**0,8**	**2115**	**97**
Valkla lubjakivikarjäär			OÜ PÕHJAKIVI		3,05	78,5	0,8	0,8	2115	97
	Vasalemma	**212**		**Lääne-Harju**		**12548,8**	**73,4**	**85,2**	**2165**	**147**
Vasalemma karjäär	Padise Paemurrud nr 2		Nordkalk AS		344,09	12548,8	73,4	85,2	2165	147
	Väo	**46**		**Tallinn, Rae, Jõelähtme**		**4020,3**	**518,6**	**568,1**	**2025**	**7**
Väo lubjakivikarjäär			Paekivitoodete Tehase OÜ		123,43	2128,4	367,9	372,8	2024	6
Väo VI lubjakivikarjäär			Paekivitoodete Tehase OÜ		1,79	231,0	0,0	0,0		
Väo V lubjakivikarjäär			OÜ Väo Paas		13,68	1428,7	103,0	51,5	2046	28
Tondi-Väo lubjakivikarjäär			OÜ Väo Paas		42,14	184,2	25,9	44,3	2022	4
Tondi-Väo III lubjakivikarjäär			AS TREF Nord		1,52	11,7	0,0	43,7	2018	0
Väo-Lagedi lubjakivikarjäär			OÜ Eesti Paekivi		1,74	0,0	0,0	0,0		

LIMESTONE DEPOSITS (1)

Harku limestone deposit (reg nr 161; 1 177,5 ha)

Geological setting:

- Kõrgekalda and Väo formation outcrop
- mineable resource: 10–15 m thick Ordovician (Väo, Kandle, Loobu and Kõrgekalda formation) limestone

Quality:

- high quality limestone

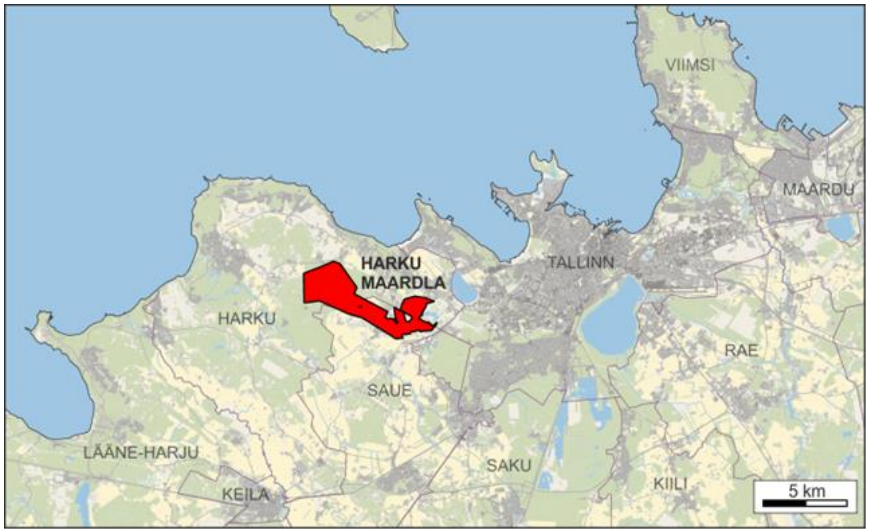
Environmental conditions:

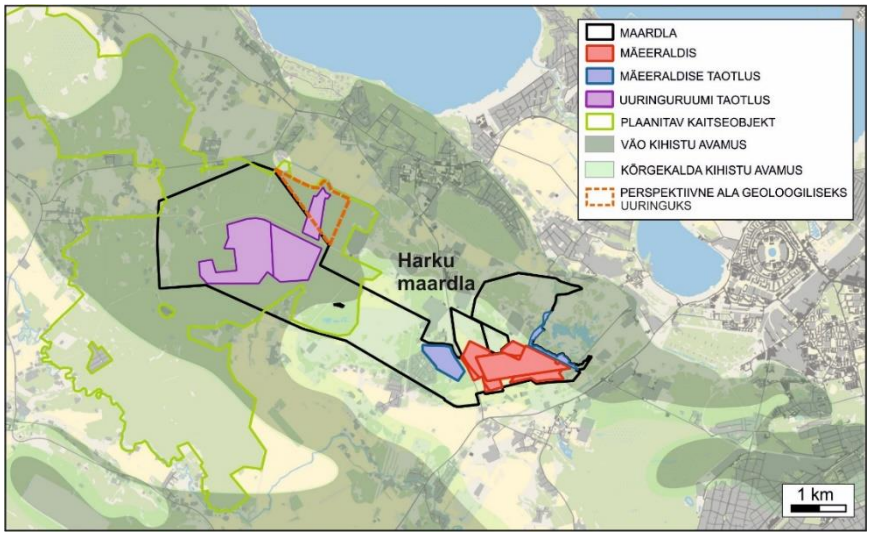
- exploration permit requests – suspended
- Sõrve Nature Reserve – in planning
- Vatsla village at close proximity

Security of supply:

- critical!
- supplies left for 8 years!

- potential for extension – compromise between protecting nature and mining mineral resources





LIMESTONE DEPOSITS (2)

Väo limestone deposit (reg nr 46; 396 ha)

Geological setting:

- Kõrgekalda and Väo formation outcrop
- mineable resource : 16 m thick Ordovician (Väo and Kandle formation) limestone

Quality:

- high quality limestone

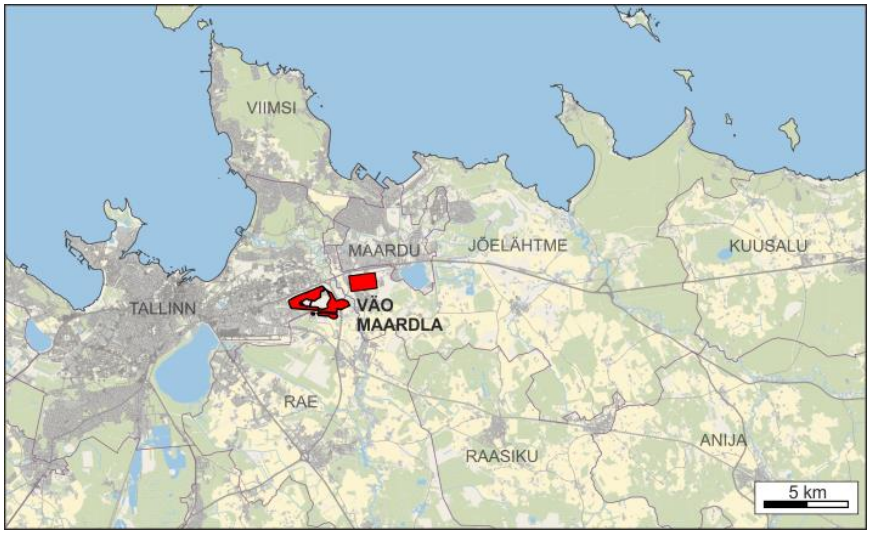
Environmental conditions:

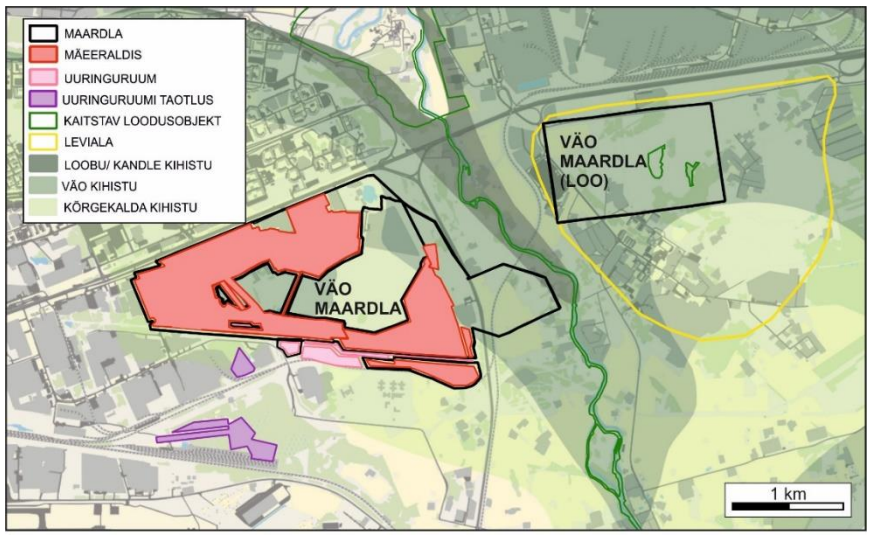
- City of Tallinn
- Loo area – II ja III category protected species

Security of supply:

- critical!
- supplies left for 7 years!

- extension limited – settlement (Tallinn)





LIMESTONE DEPOSITS (3)

Maardu limestone deposit (reg nr 178; 1 053,9 ha)

Geological setting:

- Väo, Kandle and Loobu formation outcrop
- mineable resource: ~11 m thick Ordovician (Väo, Kandle and Loobu formation) limestone

Quality:

- mainly high quality limestone

Environmental conditions:

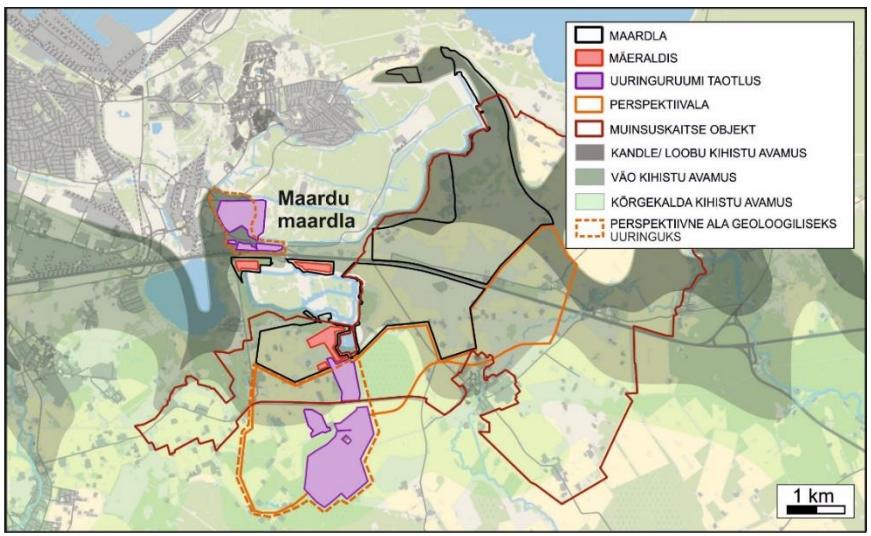
- Rebala Heritage Reserve
- Lake Maardu

Security of Supply:

- critical!
- supplies left for 3 years!

- extension limited – Rebala Heritage Reserve





LIMESTONE DEPOSITS (4)

Jägala limestone deposit (reg nr 577; 102,4 ha)

Geological setting:

- Kõrgekalda and Väo formation outcrop
- mineable resource: 10 (up to 14) m thick Ordovician (Väo, Kandle, Loobu and Kõrgekalda formation) limestone

Quality:

- mainly high quality limestone

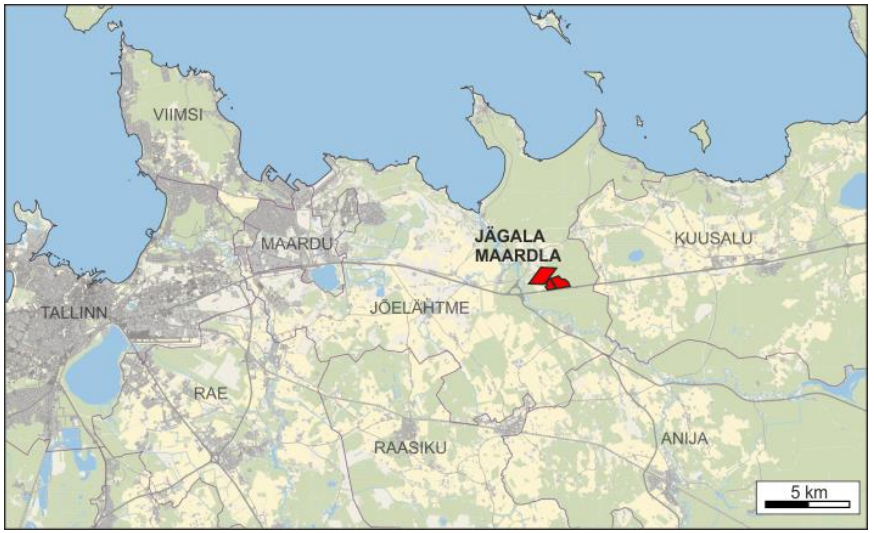
Environmental conditions:

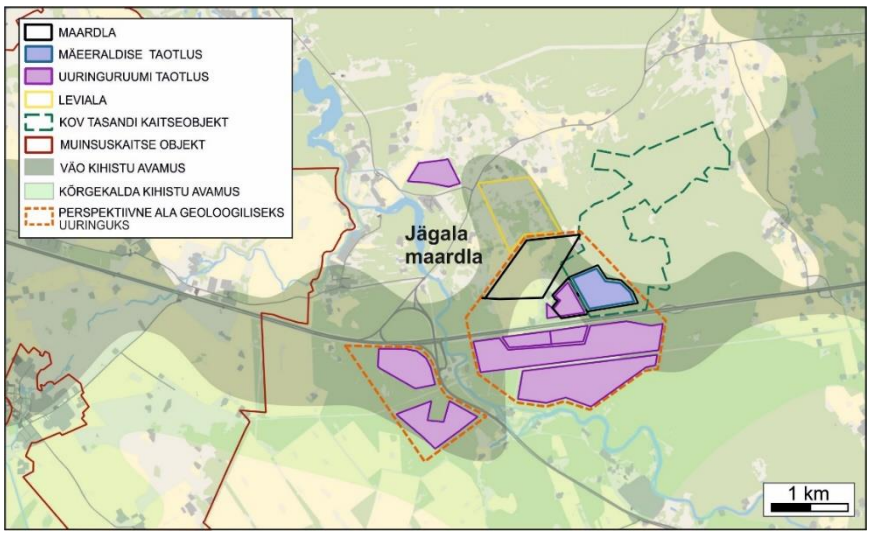
- Ruu Nature Reserve – protected by Municipality Government (pending)
- Rebala Heritage Reserve

Security of Supply:

- high quality limestone – 9,4 million m^3 (proved and probable reserve)
- detailed exploration is needed

Perspective area until year 2050!





LIMESTONE DEPOSITS (5)

Paldiski perspective area for geological studies (288 ha)

Geological setting:

- Viivikonna formation outcrop
- mineable resource: 6–7 m thick Ordovician (Väo formation) limestone?

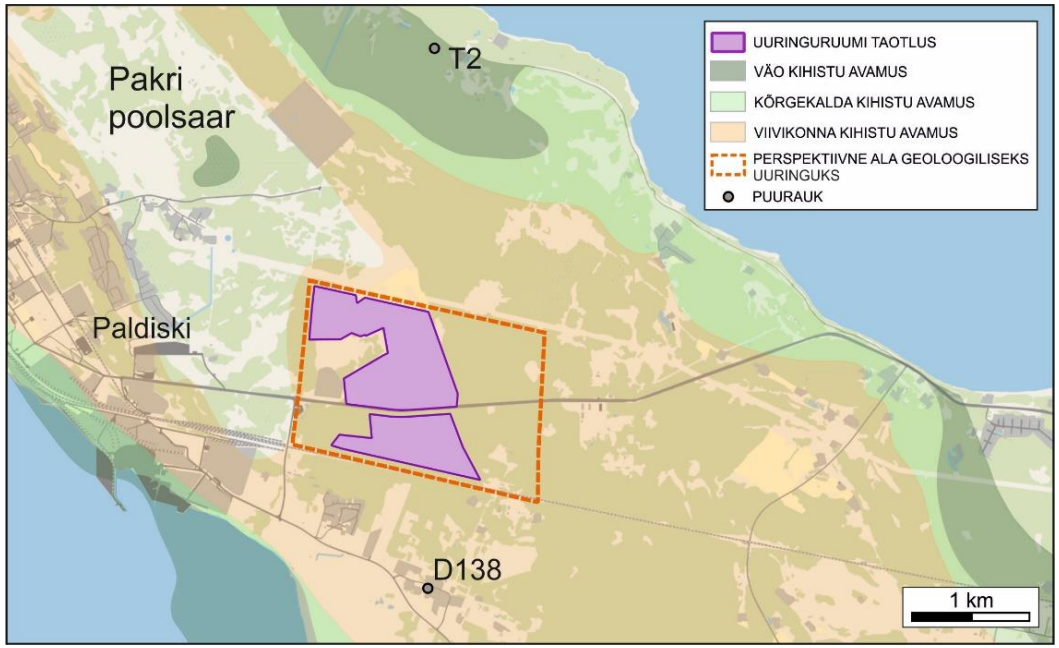
Quality:

- high quality limestone?

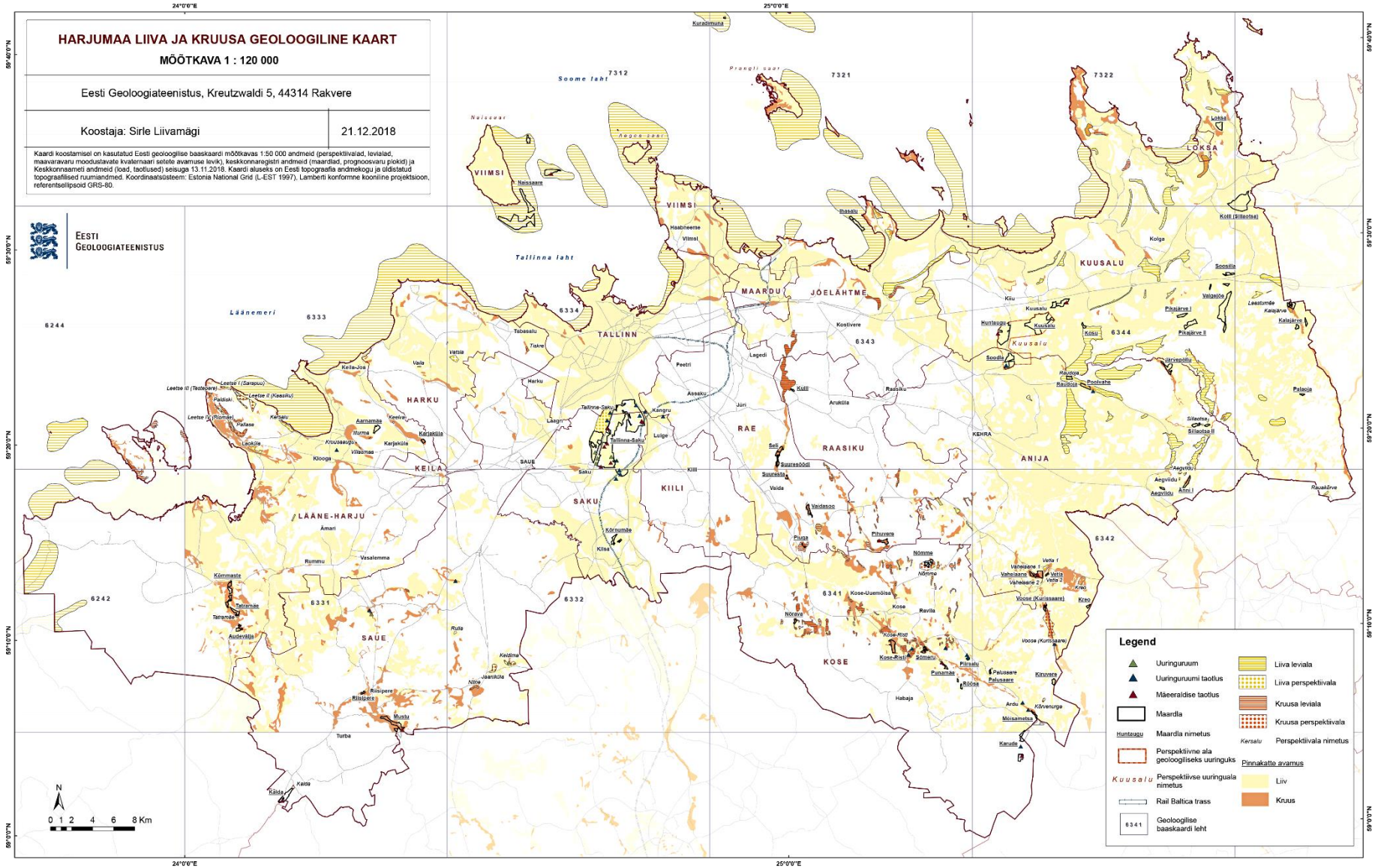
Security of Supply:

- Paldiski exploration field – 9 million m^3 ? (reserve not accounted for)
- detailed exploration is needed

Perspective area until year 2050!



SAND, GRAVEL DEPOSITS AND AREAS IN HARJU COUNTY



SECURITY OF SUPPLY: SAND AND GRAVEL (1)

quarry	deposit	reg nr	mining permit owner	Municipality Government	area, ha	reserve, thousand, m^3	extraction in 2017, thousand, m^3	average extraction (5 years) thousand, m^3	year of depletion	period of depletion (years)
									security of supply (sand and gravel)	
	Audevälja	**794**		**Lääne-Harju**		**280,53**	**49,05**	**29,94**	**2027**	**9**
Audevälja II kruusakarjäär			YIT Infra Eesti AS		13,52	77,53	15,51	8,57	2027	9
…			…		…	…	…	…	…	…
	Karjaküla	**765**		**Lääne-Harju**		**7,58**	**9,52**	**14,27**	**2018**	**0**
Karjaküla karjäär			AS KIIRKANDUR		9,74	5,00	7,80	6,62	2019	1
…			…		…	…	…	…	…	…
	Kõrnumäe	**327**		**Saku**		**147,70**	**16,47**	**24,53**	**2024**	**6**
Väike-Kõrnomaa karjäär			Tallinna Teede AS		15,12	1,70	0,00	0,66	2021	3
…			…		…	…	…	…	…	…
	Palusaare	**904**		**Kose**		**17,20**	**0,00**	**36,16**	**2018**	**0**
Palusaare kruusakarjäär			Kivimeistrid OÜ		4,38	10,90	0,00	22,42	2018	0
…			…		…	…	…	…	…	…
	Poolvahe	**815**		**Anija**		**762,30**	**141,30**	**102,88**	**2025**	**7**
Poolvahe II liivakarjäär			AS Merko Infra		23,86	762,30	141,30	102,88	2025	7
	Sõmeru	**869**		**Kose**		**276,92**	**60,77**	**46,17**	**2024**	**6**
Sõmeru II liivakarjäär			AS Tariston		6,46	59,26	60,34	18,13	2021	3
…			…		…	…	…	…	…	…
	Vaidasoo	**873**		**Rae**		**445,15**	**5,41**	**53,70**	**2026**	**8**
Vaidasoo liivakarjäär			AS Tariston		18,84	74,91	1,58	8,57	2027	9
…			…		…	…	…	…	…	…
	Voose	**205**		**Kose, Anija**		**28,21**	**0,00**	**6,36**	**2022**	**4**
Kurissaare - 3			AS KIIRKANDUR		3,61	28,21	0,00	6,36	2022	4

SECURITY OF SUPPLY: SAND AND GRAVEL (2)

quarry	deposit	reg nr	mining permit owner	Municipality Government	area, ha	reserve, thousand, m^3	extraction in 2017, thousand, m^3	average extraction (5 years) thousand, m^3	year of depletion	period of depletion (years)
									security of supply (sand and gravel)	
	Huntaugu	**293**		**Kuusalu**		**3124,6**	**248,4**	**38,4**	**2099**	**81**
Huntaugu I liivakarjäär			AS TREV-2 Grupp		35,77	1418,31	26,57	6,7	2231	213
…			…		…	…	…	…	…	…
	Kose	**450**		**Kose**		**1061,83**	**23,366**	**31,7**	**2051**	**33**
Kose-Risti II			AS K.U.Mell		21,46	472,19	5,156	16,3	2047	29
…			…		…	…	…	…	…	…
	Kuusalu	**69**		**Kuusalu**		**6922,30**	**280,28**	**189,1**	**2055**	**37**
Kuusalu II karjäär			OÜ KIIU SOON		17,94	1096,00	85,698	60,9	2036	18
…			…		…	…	…	…	…	…
	Mustu	**457**		**Saue**		**799,18**	**10,5**	**10,3**	**2096**	**78**
Mustu kruusakarjäär			OÜ Laseri Puit		2,09	84,18	10,5	10,3	2026	8
…			…		…	…	…	…	…	…
	Pihuvere	**203**		**Raasiku**		**277,82**	**18,5**	**5,4**	**2070**	**52**
Pihuvere II kruusakarjäär			METSAMAAHALDUSE AS		12,3	222,00	0	0,0		
…			…		…	…	…	…	…	…
	Soodla	**602**		**Anija**		**4276,86**	**192,2**	**148,9**	**2047**	**29**
Soodla II liivakarjäär			AS Merko Infra		24,01	34,00	0	4,7	2025	7
…			…		…	…	…	…	…	…
	Suuresta	**843**		**Rae**		**246,19**	**4,42**	**7,4**	**2051**	**33**
Suuresta liivakarjäär			Arkop OÜ		6,36	6,82	1,98	2,5	2021	3
…			…		…	…	…	…	**…**	**…**
	Tallinna-Saku	**109**		**Tallinn, Saku**		**23284,51**	**1193,3**	**925,8**	**2013**	**25**
Liivalaia 4			AS KIIRKANDUR		26,02	864,72	101,3	78,7	2029	11
…			…		…	…	…	…	**…**	**…**

SAND DEPOSITS AND GRAVEL DEPOSITS (1)

Tallinna-Saku deposit (reg nr 109; 1254,7 ha)

Geological setting and mineral resources:

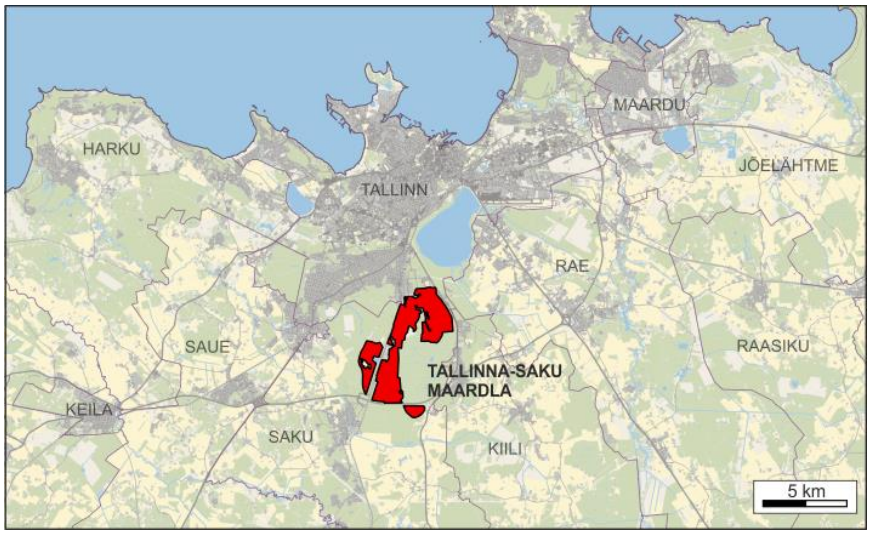
- mineable resource: 2–28 m thick fine to very fine fraction sand
- building sand and fill materials

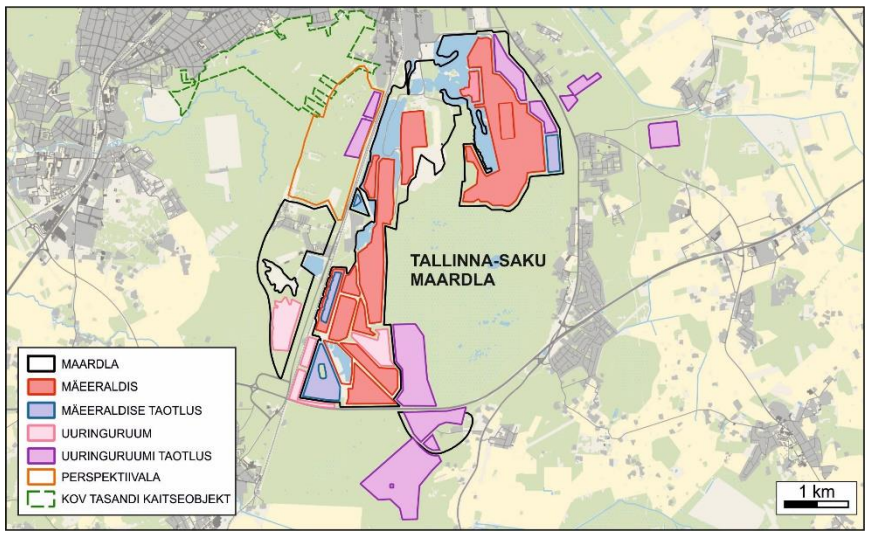
Environmental conditions:

- I-III category protected species
- buildings protected by the State

Security of Supply:

- secured for now
- enough supplies for 25 years!





SAND DEPOSITS AND GRAVEL DEPOSITS (2)

Kuusalu, Huntaugu and Soodla deposits

Geological setting and mineral resources:

- mineable resource: 1–18 m thick fine to very fine fractioned sand
- building sand and fill materials

Environmental conditions:

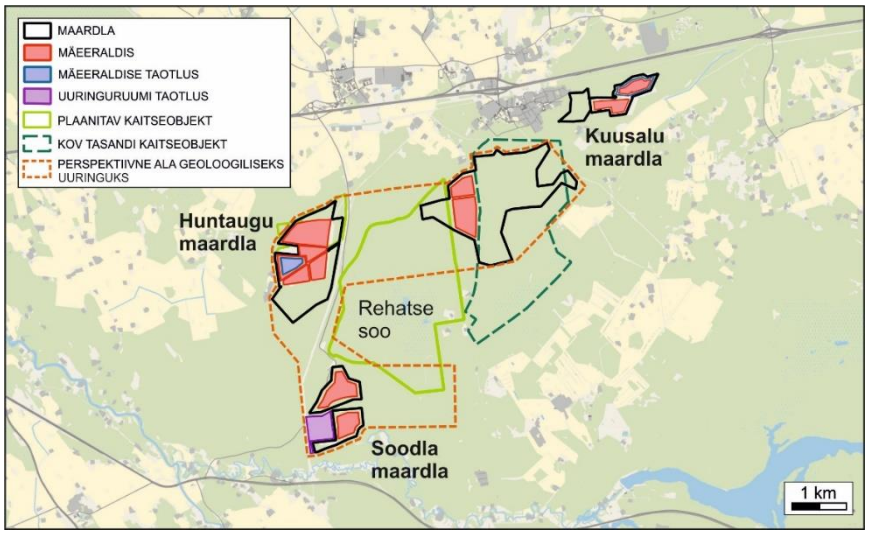
- Rehatse Nature Park – protected by Municipality Government
- a protected area in planning
- I–III category protected species
- buildings protected by the State

Security of supply:

- secured for now
- potential for extension – compromise between protecting nature and mining mineral resources

Perspective area until year 2050!





ALTERNATIVE CONSTRUCTION MATERIALS

Recycling and reusing waste materials and residues:

- extends use of non-recoverable mineral Resources and decreases environmental impact caused by mining
- some materials are used almost completely and ohter have potential to be used more efficiently
- it is not possible to completely replace mining mineral resources with alternative constructing materials

Waste materials in Estonia:

- oil shale waste rock
- oil shale ash
- limestone screenings
- construction and demolition waste
- extracted mineral matter and overburden

Increased use of alternative construction materials is a goal to be pursued!

MUNICIPALITY GOVERNMENTS – PROBLEMS AND SUGGESTIONS

Poor experiences with entrepreneurs:

- roads are in poor shape
- quarries are opened for decades and people are living under constant mining conditions

Municipality Governments are unaware of their mineral resources:

- county-wide spatial plans should obtain deposits as well as perspective areas for mining

Dissatisfaction with legal system:

- understanding the basis of security of supply is poor
- geological studies should be carried out by the State, mining permits should be available at auction
- The State should have a say in where to mine
- mining is not acceptable near settlements

ENTREPRENEURS – PROBLEMS AND SUGGESTIONS

Mining permits and security of supply:

- quarries are depleting and there is constant demand for mineral resources, however mining permits are not available
- mining permits should be controlled by market and not by artificial security of supply

Hostile attitude by Municipality Governments (and society):

- Municipality Governments do not wish to understand national importance of mining (road) construction materials
- false understanding of blasting
- The State should find out potential exploration fields and make agreements with Municipality Governments regarding mining in these areas

Requirements for road construction materials (by Road Administration of Estonia):

- requirements for road construction materials need to be evaluated and compared with other EL countries (Finland, Latvia)

SUGGESTIONS FROM GEOLOGICAL SURVEY OF ESTONIA

- The State should have a better understanding regarding need and use of construction materials
- concept of proved reserve in Records of mineral resources needs to be in agreement with concept of proved reserve in Earth's Crust Act
- land ownership should be considered for Quaternary mineral resources (sand and gravel)
- Quaternary mineral reserves (sand and gravel) need to be reassessed based on quality requirements
- security of supply has to show the actual need of construction materials
- a compromise between limitations (settlements and protecting nature) and mining mineral resources is needed for national interest

SUMMARY (1)

Security of supply in major limestone deposits in Harju County is in critical state – there are enough supplies roughly for about three to eight years.

To ensure security of supply for limestone in Harju County:

- all mining opportunities need to be considered in major (Harku, Väo and Maardu) limestone deposits
- mining in Jägala deposit needs to be considered
- Paldiski perspective area needs to be explored

Security of supply in major sand and gravel deposits in Harju County is artificially secured for a longer period of time.

To ensure security of supply for sand and gravel in Harju County:

- sand and gravel reserves need to be reassessed based on quality requirements in Records of mineral resources
- Kuusalu perspective area needs to be explored



SUMMARY (2)

Mineral resources can be mined only in areas where mineral resources are spreading!

Security of supply for construction materials in Harju County is guaranteed only when a compromise between limitations and mining mineral resources is established!

National interest along with suggestions made by Municipality Governments, entrepreneurs, experts and Geological Survey of Estonia need to be considered!



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Thank you!

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