

Household and Industrial Wastewater— Legal and Practical Issues



Sources of Information

Surveys commissioned by VARAM (Ministry of Environment Protection and Regional development):

1L/47/2017, Actualization of pollution parameters of Typical household wastewater, Stage II

1L/34/2018, Actualization of Water management data in 49 Agglomerations with 2000 – 10000 PE

20 years experience in the field of municipal and industrial wastewater



1L/47/2017, Actualization of pollution parameters of Typical household wastewater, Stage II



Typical household wastewater – why is it so important to quantify it?

LR MK No. 34

PARAMETER	CONCENTRATION (mg/l)
COD	210-740
BOD5	150-350
Suspended solids	120-450
Ntot	20-80
Ptot	6-23

- Values date back to 2002, i.e. have not been updated for 17 years
- Household water consumption has gone down significantly since 2002.
- Ergo, says the industry, pollution values should be higher
- Nay, say municipalities, these values are just fine as they are.

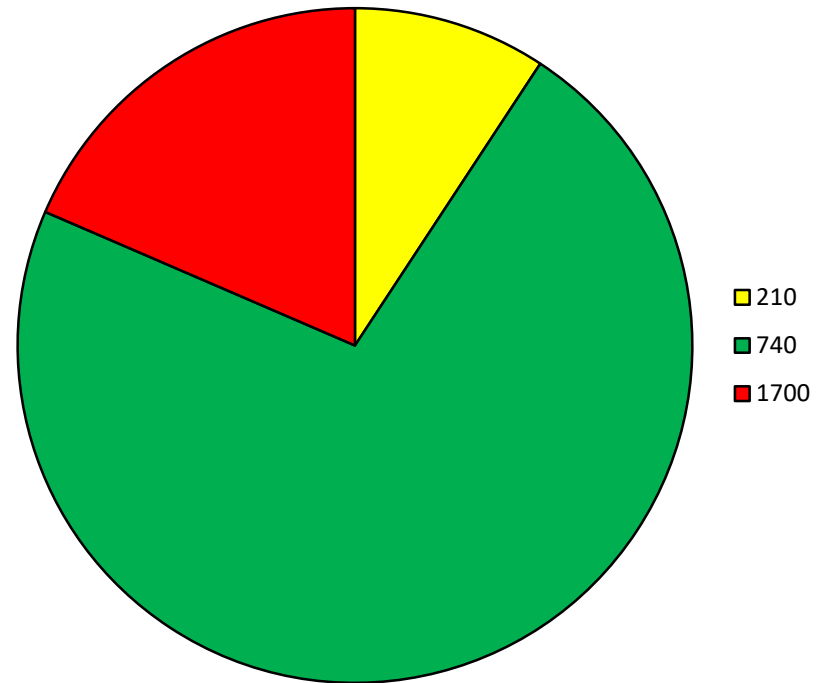
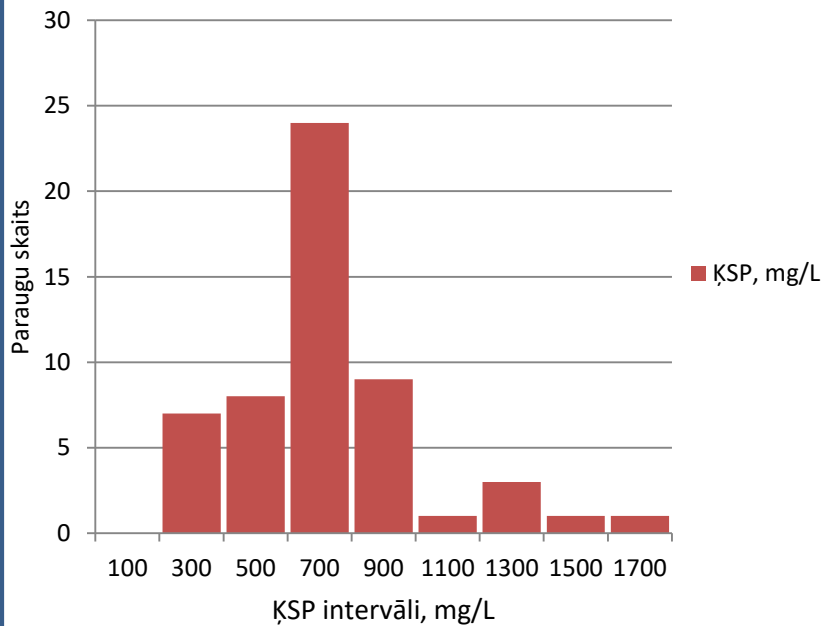
Wastewater sampling times and addresses, 2017

Novads	Pilsēta	Notekūdeņu paraugu ņemšanas vieta	Datums, kad tiks ņemti paraugi
Kurzeme	Liepāja	Zirņu iela 90/92	2017. g. 4. – 5. jūlijs
	Aizpute	Raiņa bulvāris 24	2017. g. 5. - 6. jūlijs
	Saldus	KSS Irbenieku iela	2017. g. 9. – 10. jūlijs
	Talsi	Mālu iela 15	2017. g. 10. – 11. jūlijs
	Ventspils	Pērkoņu 11a	2017. g. 11. – 12. jūlijs
Vidzeme	Smiltene	KSS Silva-Uplejas	2017. g. 16. jūlijs
	Cēsis	KSS Vilku-Saules kvartāls	2017. g. 17. – 18. jūlijs
	Valmiera	Strauta iela 2B	2017. g. 18. – 19. jūlijs
	Sigulda	KSS Riekstu iela	2017. g. 19. – 20. jūlijs
	Salaspils	KSS Saulkalnes	2017. g. 24. – 25. jūlijs
	Madona	KSS Lazdonas iela	2017. g. 10. – 11. augusts
	Jūrmala	KSS Stīrnu 503 (Vikingu iela)	2017. g. 2. – 3. augusts
Latgale	Balvi	KSS Jaunatnes 14*	2017. g. 14. augusts
	Daugavpils	KSS Vaļņu 35a	2017. g. 15. – 16. augusts
	Jēkabpils	KSS Atpūtas iela	2017. g. 10. – 11. augusts
	Krāslava	KSS-4, Klusā iela	2017. g. 15. – 16. augusts
	Rēzekne	KSS-12, Latgales iela	2017. g. 14. augusts
Zemgale	Baldone	Baldones NAI	2017. g. 26. – 27. jūlijs
	Bauska	KSS Krasta iela	2017. g. 1. augusts
	Jaunpils	Levestes NAI	2017. g. 30. jūlijs
	Jelgava	KSS Elejas iela	2017. g. 21. – 22. augusts
	Tukums	KSS Lielā iela 43a	2017. g. 25. – 26. jūlijs
Rīga	Garkalne	KSS Kaiju iela	2017. g. 21. – 22. augusts
	Mārupe	KSS Cidoniju iela	2017. g. 8. – 9. augusts
	3 punkti Rīgas pilsētas administratīvajā teritorijā	Vecāķi, Airu iela 32, Ilūkstes iela 14, Imantas 15. līnija 10	2017. g. 7. – 8. augusts 2017. g. 7. – 8. augusts 2017. g. 8. – 9. augusts

COD Results distribution

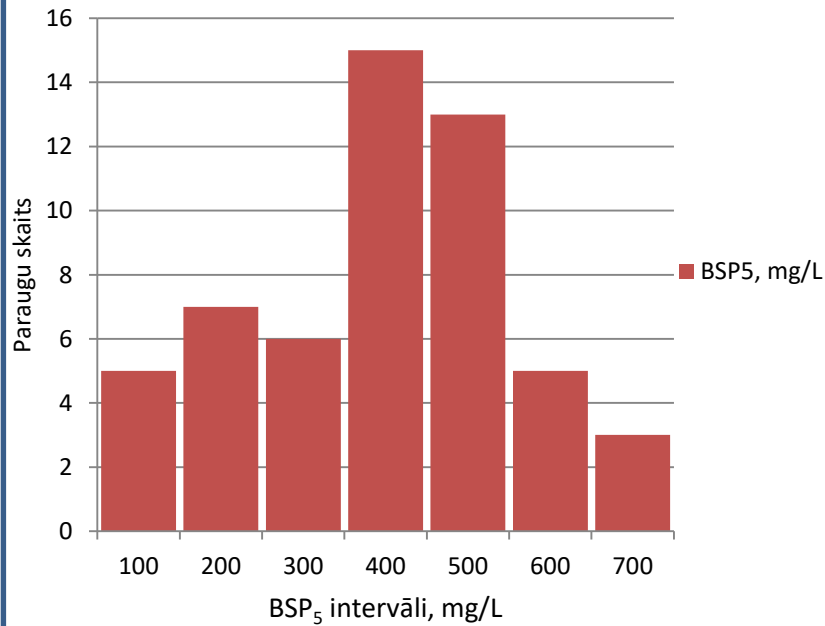
No. of samples in various COD ranges

Sample distribution as per LR MK 34:

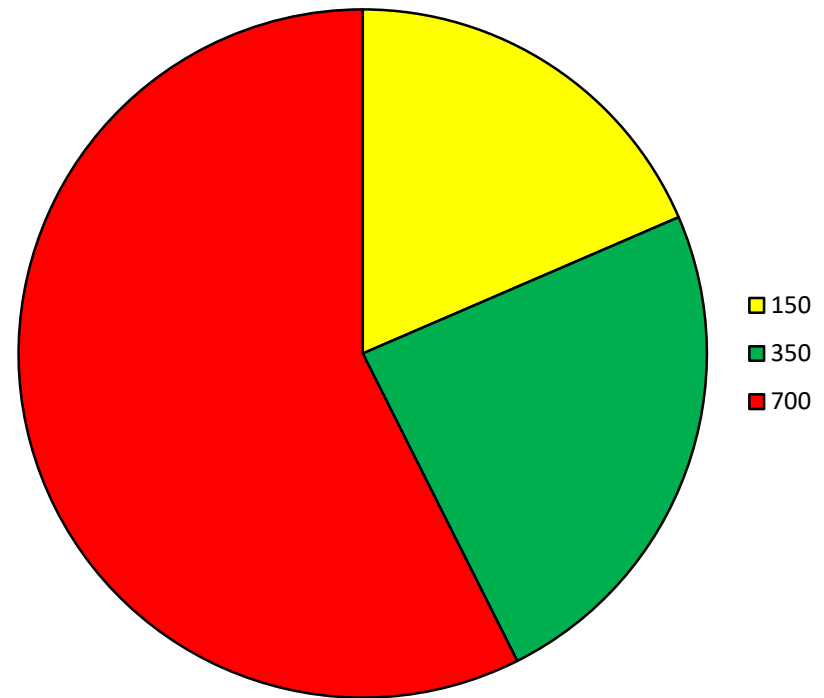


BOD5 Results distribution

No. of samples in various BOD5 ranges



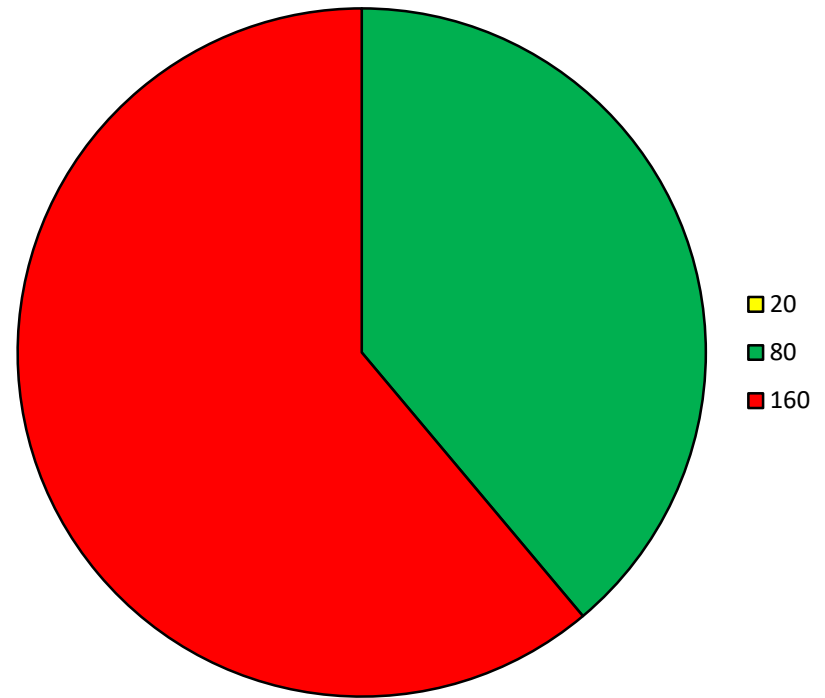
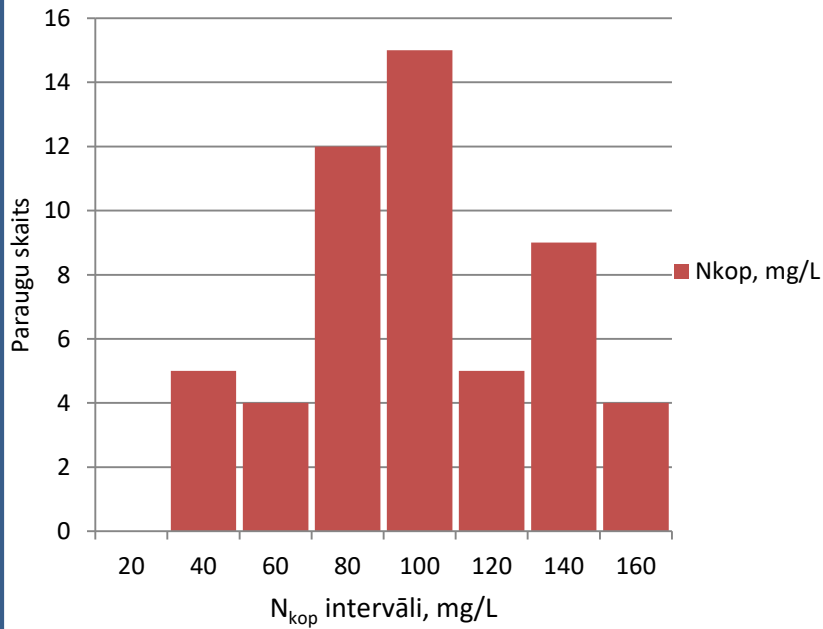
Sample distribution as per LR MK 34:



Ntot Results distribution

No. of samples in various Ntot ranges

Sample distribution as per LR MK 34:



Conclusions from the household wastewater sampling program

- While average observed BOD_5 was only 352 mg/L (MK 34. max value: 350 mg/L), average observed BOD_5 during the Summer session was 384 mg/L, median value: 410 mg/L, 85% percentile: 482 mg/L. Elevation of max BOD_5 value in typical household wastewater to 400 – 410 mg/L should be considered;
- While average observed N_{tot} value was only 89,7 mg/L (MK 34. max value: 80 mg/L), average N_{kop} during the Summer session was 104 mg/L, median value: 97,5 mg/L, but 85% percentile: 131 mg/L. Elevation of max N_{tot} value in typical household wastewater to 100 mg/L should be considered.

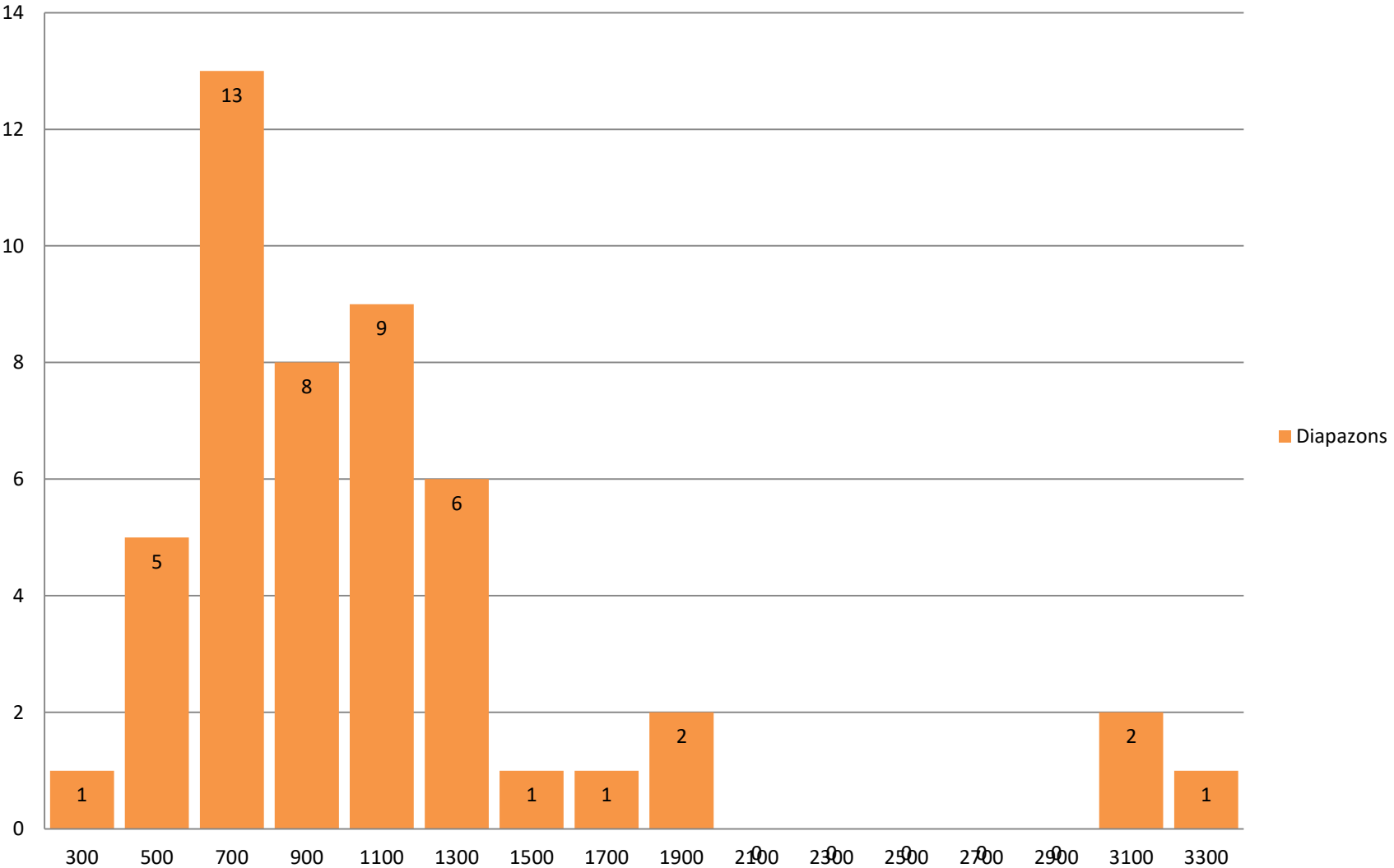
1L/34/2018, Actualization of Water management data in 49 Agglomerations with 2000 – 100000 PE



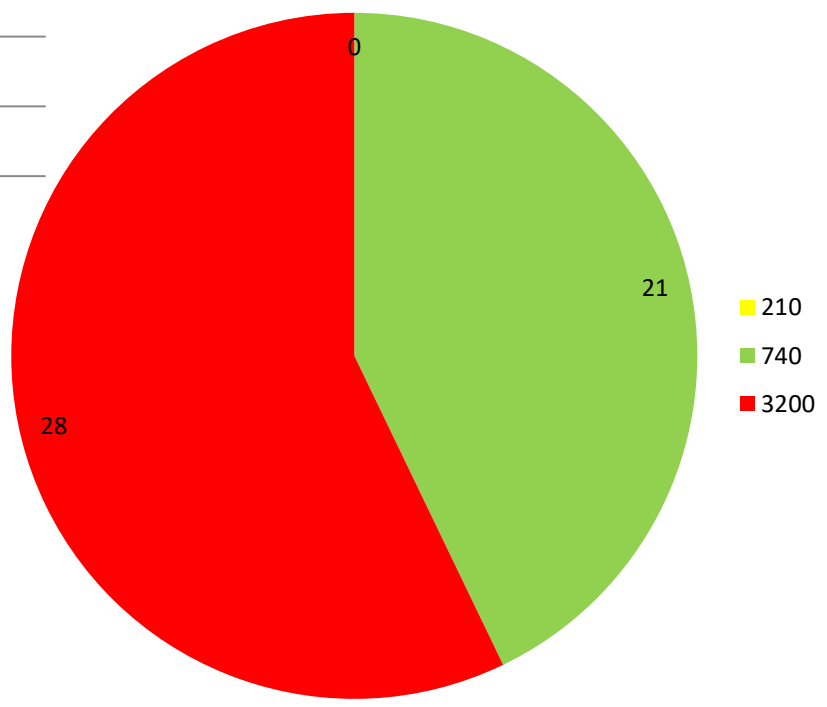
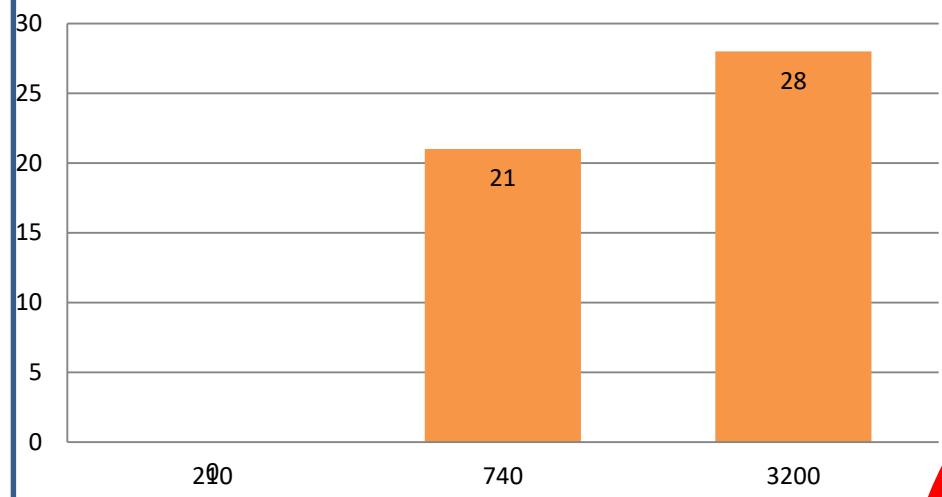
COD and BOD₅ results table

No.	Location	Test report No.	Date	COD, mg/L	BOD ₅ , mg/L
1	2	3	4	5	6
1	Babīte	18A02240	2018.07.04.-05.	710	370
2	Baldone	18A02240	2018.07.04.-05.	600	370
3	Baloži	18A02212	2018.07.03.-04.	1050	580
4	Carnikava	18A02288	2018.07.10.-11	600	380
5	Vangaži	18A02300	2018.07.11.-12.	1640	1290
6	Mālpils	18A02300	2018.07.11.-12.	3000	1900
7	Ķegums	18A02309	2018.07.15.-16.	400	260
8	Ikšķile	18A02305	2018.07.12.-13.	1480	1000
9	Ilūkste	18A02406	2018.07.19.-20.	660	400
10	Krāslava	18A02371	2018.07.17.-18	930	480
11	Dagda	18A02406	2018.07.19.-20.	520	420
12	Ludza	18A02371	2018.07.17.-18	820	490
13	Varakļāni	18A02449	2018.07.23.-24.	930	560
14	Viļāni	18A02473	2018.07.24.-25.	1130	780
15	Kārsava	18A02473	2018.07.24.-25.	570	410
16	Malta	18A02493	2018.07.25.-26.	630	390
17	Preiļi	18A02493	2018.07.25.-26.	510	320
18	Smiltene	18A02536	2018.07.31.-08.01.	1060	400
19	Alūksne	18A02536	2018.07.31.-08.01.	730	500
20	Balvi	18A02547	2018.08.01.-02.	550	330
21	Jaunpiebalga	18A02547	2018.08.01.-02.	3000	2200
22	Priekule	18A02817	2018.08.20.-21.	630	300
23	Liepa	18A02817	2018.08.20.-21.	780	760
24	Valka	18A02840	2018.08.21.-22.	350	220
25	Rūjiena	18A02840	2018.08.21.-22.	600	370
26	Salacgrīva	18A02843	2018.08.22.-23.	290	42
27	Limbaži	18A02843	2018.08.22.-23.	1270	940
28	Kandava	18A02925	2018.08.28.-29.	480	240
29	Stende	18A02925	2018.08.28.-29.	920	300
30	Dundaga	18A02940	2018.08.29.-30.	1290	1250
31	Roja	18A02940	2018.08.29.-30.	1720	1500
32	Skrunda	18A03078	2018.09.10.-11.	470	200
33	Aizpute	18A03078	2018.09.10.-11.	810	320
34	Grobiņa	18A03109	2018.09.11.-12.	580	300
35	Brocēni	18A03109	2018.09.11.-12.	850	500
36	Priekule	18A03125	2018.09.12.-13.	1110	730
37	Auce	18A03175	2018.09.13.-14.	510	240
38	Īsļice	18A03175	2018.09.17.-18.	1080	560
39	Vecumnieki	18A03175	2018.09.17.-18.	960	620
40	Lielvārde	18A03227	2018.09.18.-19.	1150	790
41	Skrīveri	18A03227	2018.09.18.-19.	1900	660
42	Pļaviņas	18A03260	2018.09.19.-20.	400	150
43	Ērgļi	18A03260	2018.09.19.-20.	900	440
44	Līvāni	18A03277	2018.09.20.-21.	530	260
45	Jaunolaine	18A03373	2018.10.01.-02.	3200	2100
46	Ozolnieki	18A03373	2018.10.01.-02.	940	560
47	Iecava	18A03390	2018.10.02.-03.	950	580
48	Ulbroka	18A03390	2018.10.02.-03.	890	520
49	Saulkrasti	18A03426	2018.10.03.-04.	1200	280

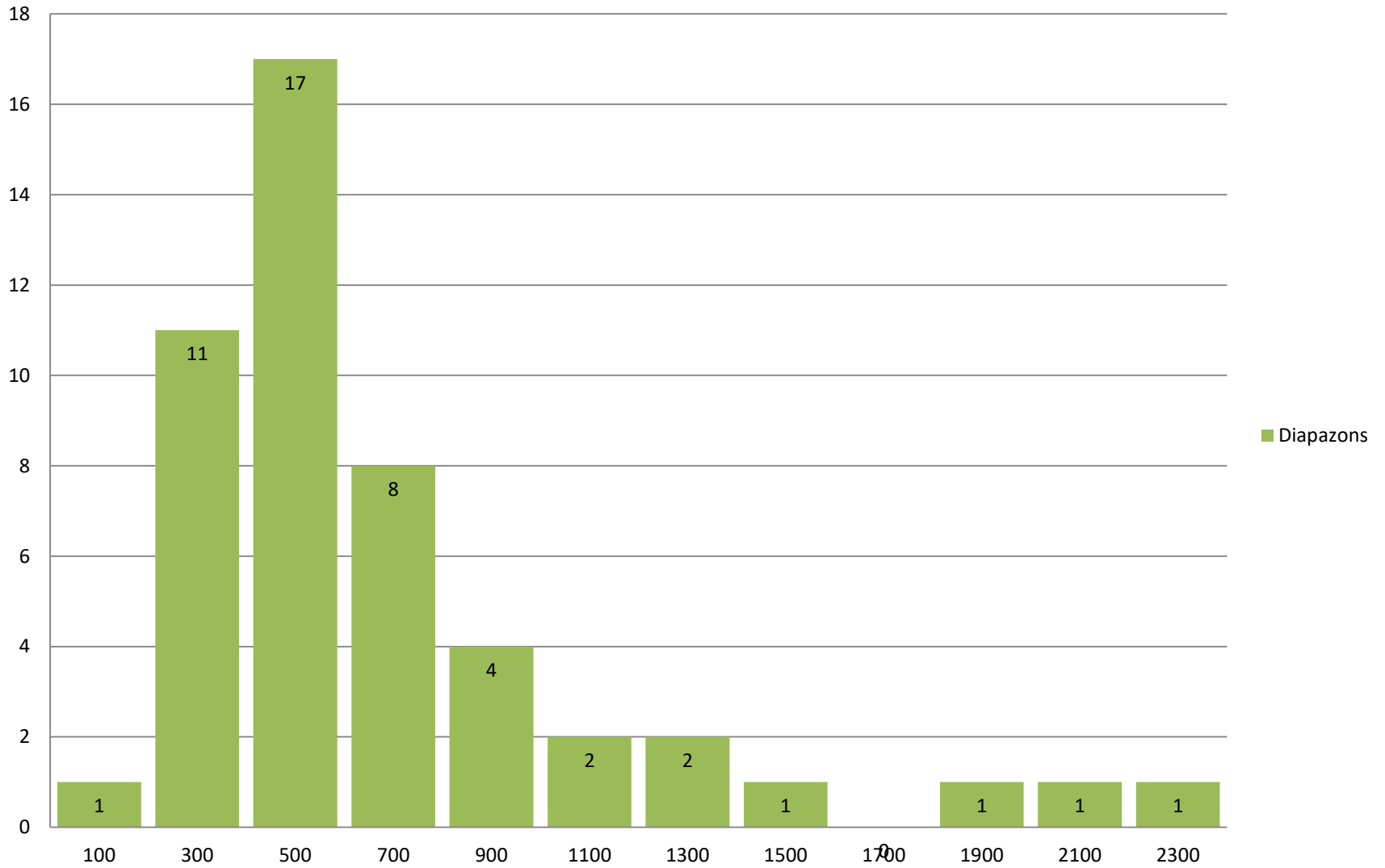
COD Results distribution



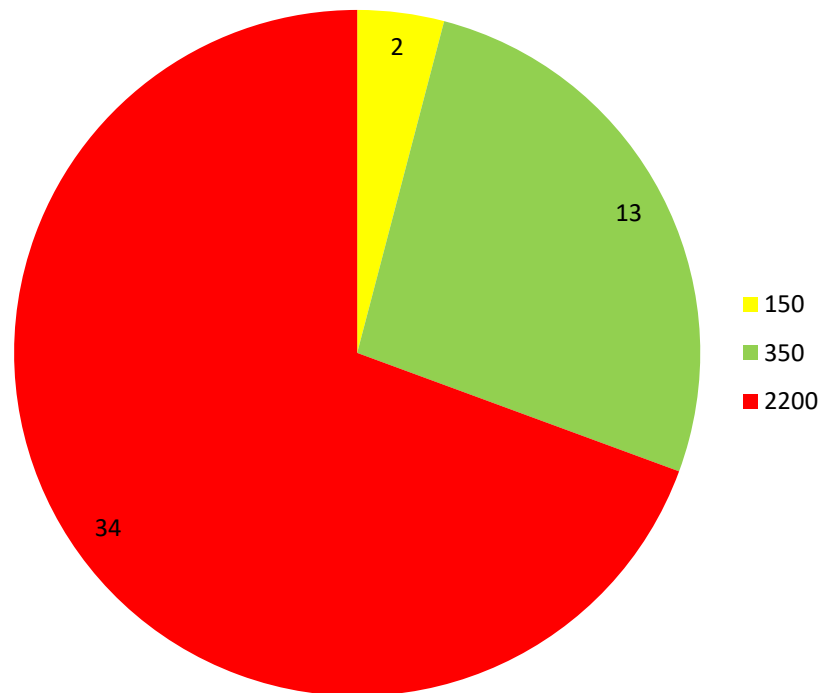
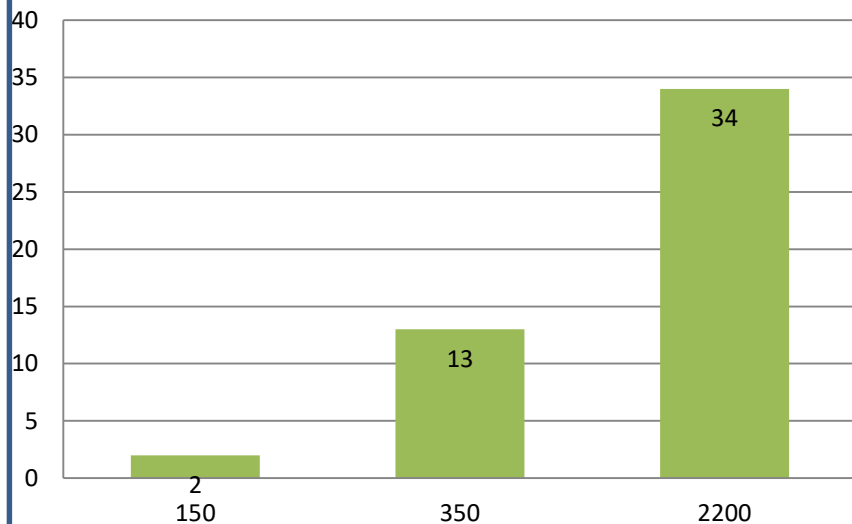
COD Results distribution compared to LR MK 34 values



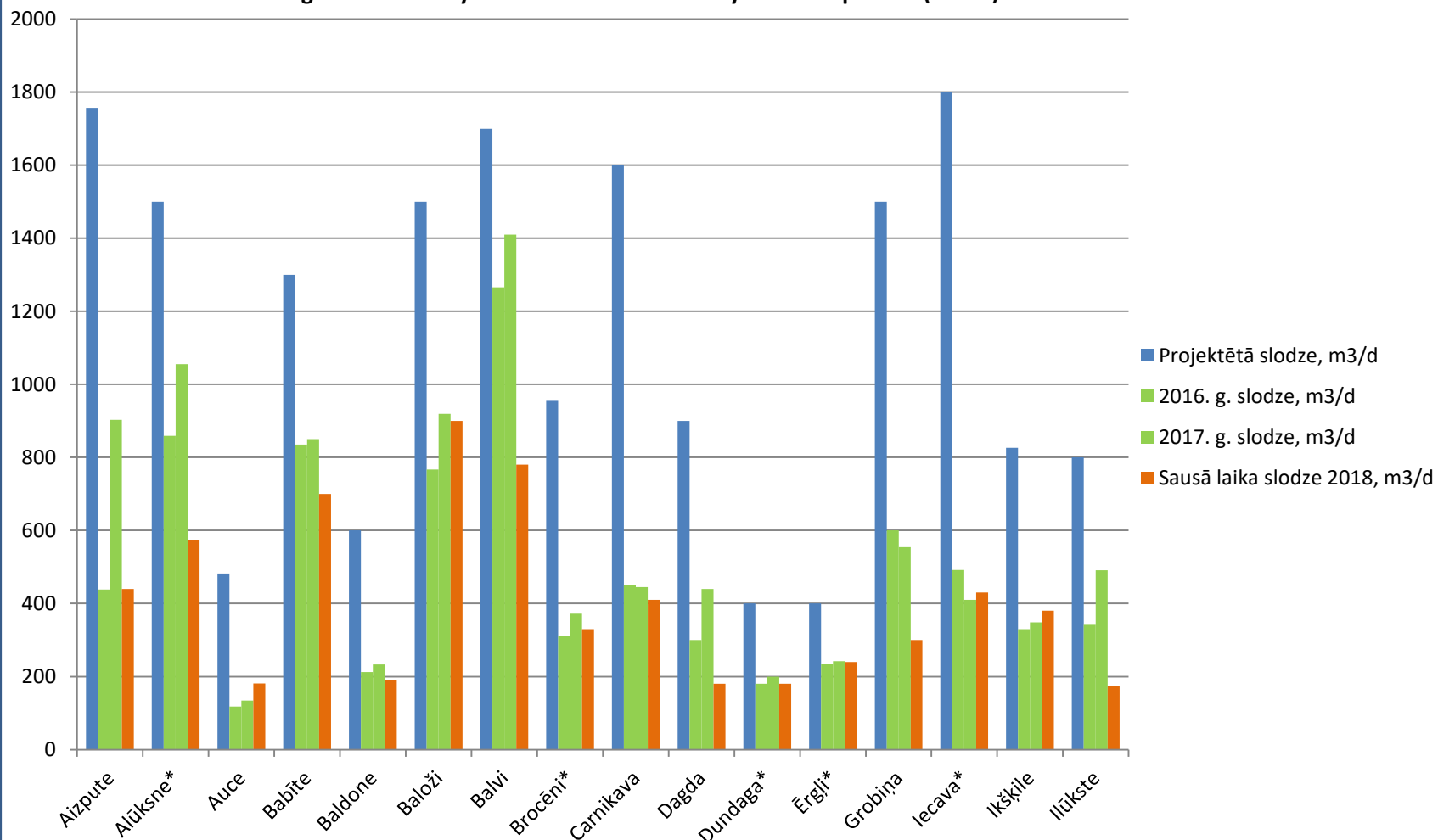
BOD5 results distribution



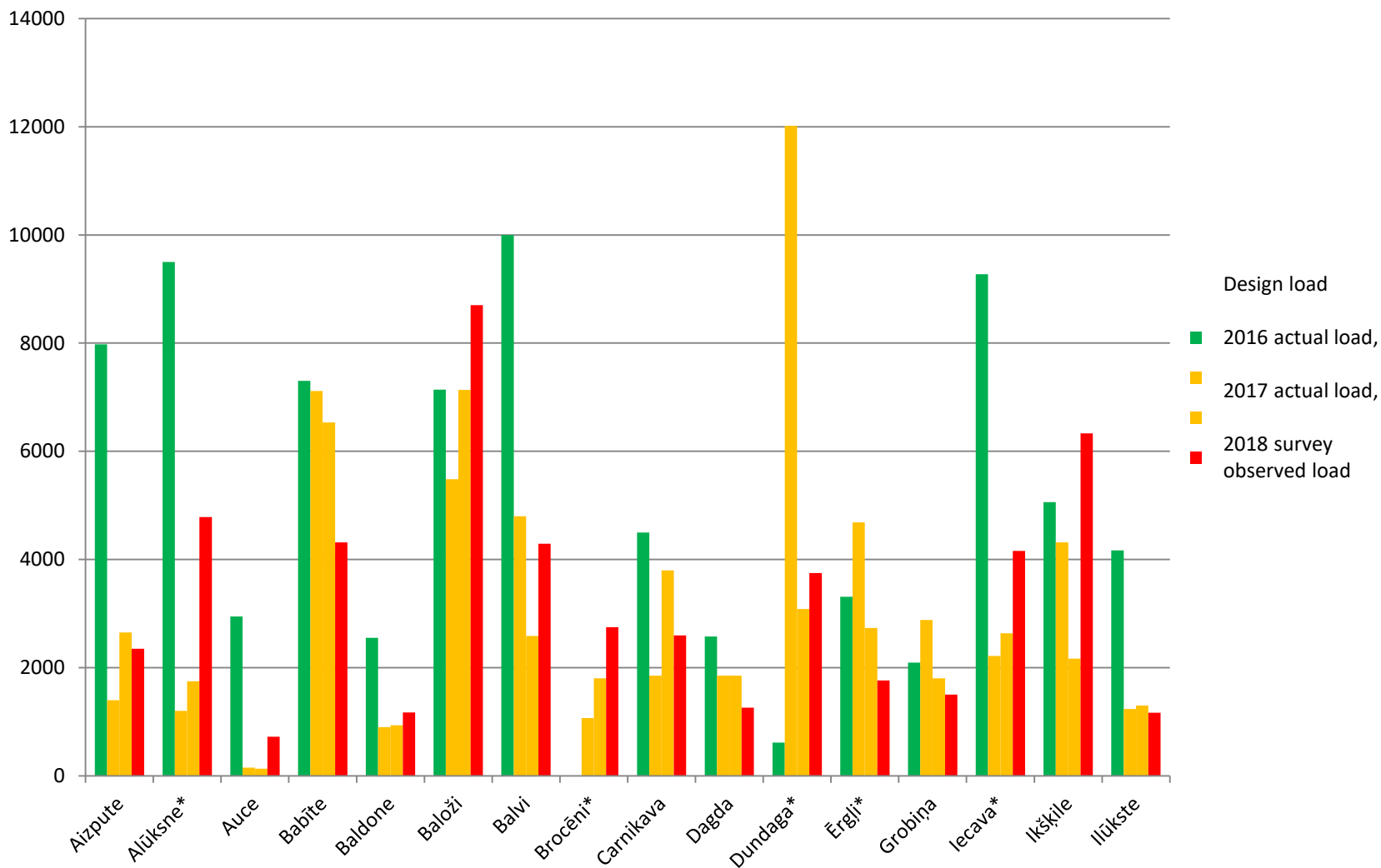
BOD5 Results distribution compared to LR MK 34 values



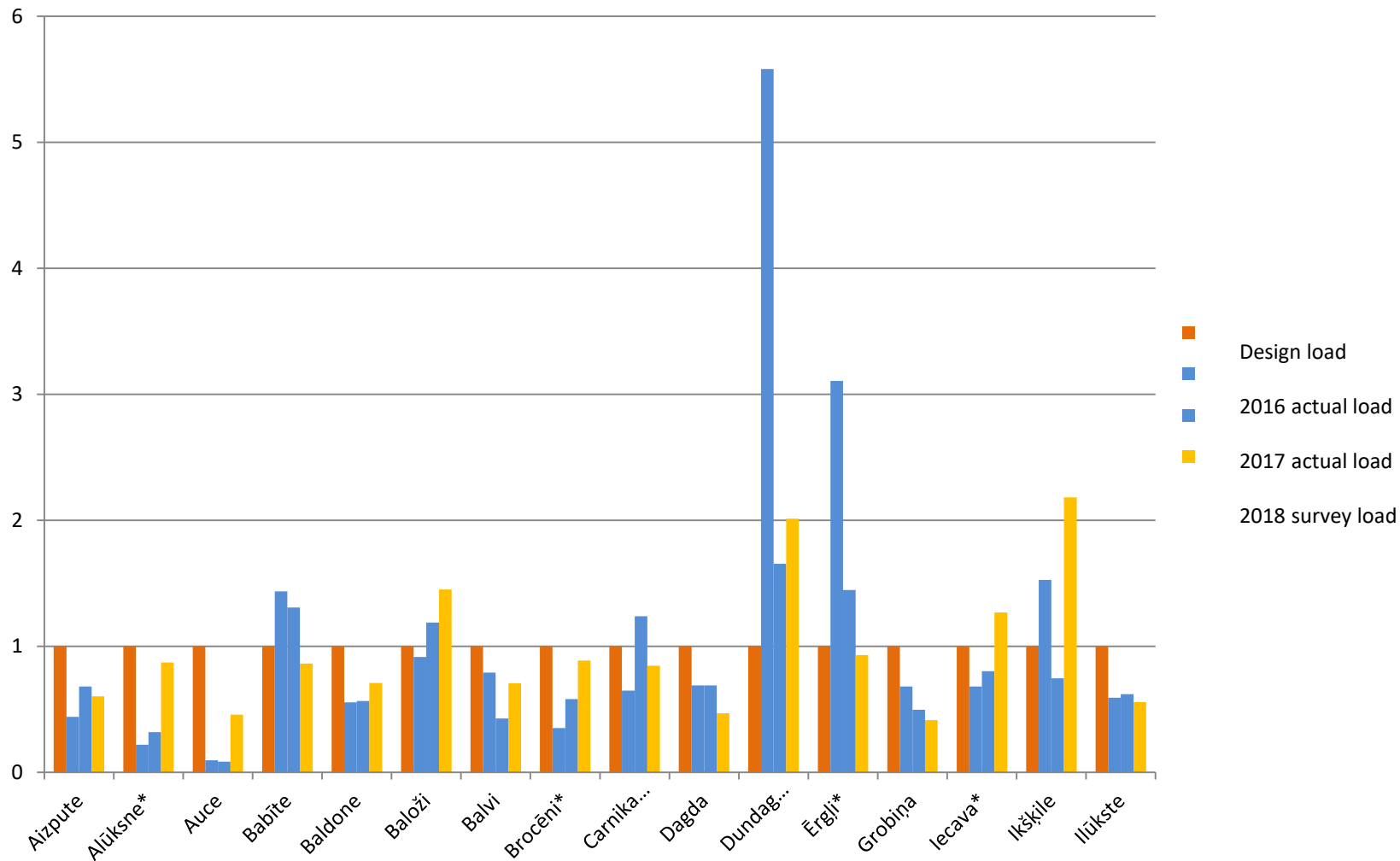
Design and actual hydraulic loads in the surveyed municipalities (Part 1)



Design and actual PE loads on WWTP's (in PE), Part 1



Design and actual BOD5 load, in PE/Number of persons actually connected to the municipal sewerage network



Conclusions from the municipal wastewater sampling program

- The observed COD and BOD5 values significantly exceed those listed in the Regulations No. 34 from Latvian Republic Cabinet of Ministers from January 22, 2002 (Table parameters characterizing typical household wastewater).
- Since the weather during the sampling period was exceptionally dry (the driest Summer in decades) the observed values can be considered representative dry weather values.

Problems the food industry is facing

Inability to meet the effluent standards required by the municipality

Inability to invest in sustainable technology



This is supposed to be a flotation unit

Flotation system price vs. capacity

- - 5 m³/h, flotation system price app. 67.000,- €
- - 10 m³/h, flotation system price app. 75.000,- €
- - 15 m³/h, flotation system price app. 86.000,- €
- - 20 m³/h, flotation system price app. 95.000,- €
- - 35 m³/h, flotation system price app. 120.000,- €
- - 50 m³/h, flotation system price app. 132.000,- €
- - 80 m³/h, flotation system price app. 160.000,- €



Dairy wastewater

Dairy-1								
Parameter	In, mg/L	Out, mg/L	Reduction, %		MK 34, mg/L	Excess, mg/L	Excess, %	
COD		3381	815	76		740	75	10
BOD5		1913	566	70		350	216	62
SS		930	6	99		450	-444	-99
Ntot		80,1	28,1	65		80	-51,9	-65
Ptot		16,5	0,95	94		23	-22,05	-96
Dairy-2								
Parameter	In, mg/L	Out, mg/L	Reduction, %		MK 34, mg/L	Excess, mg/L	Excess, %	
COD		3289	1268	61		740	528	71
BOD5		2017	933	54		350	583	167
SS		700	92	87		450	-358	-80
Ntot		168	46,5	72		80	-33,5	-42
Ptot		24,3	1,67	93		23	-21,33	-93
Dairy-3								
Parameter	In, mg/L	Out, mg/L	Reduction, %		MK 34, mg/L	Excess, mg/L	Excess, %	
COD		4990	1893	62		740	1153	156
Ntot		96,6	34,5	64		80	-45,5	-57
Ptot		34	2	94		23	-21	-91
Dairy-4								
Parameter	In, mg/L	Out, mg/L	Reduction, %		MK 34, mg/L	Excess, mg/L	Excess, %	
COD		5544	2641	52		740	1901	257
BOD5		3706	1330	64		350	980	280
SS		1235	198	84		450	-252	-56
Ntot		129	68,7	47		80	-11,3	-14
Ptot		36,1	6,4	82		23	-16,6	-72

What the legislation says

Regulations No. 174 of the Cabinet of Ministers «Regulations regarding provision and receiving of water supply services» from March 22, 2016:

In case the maximum permissible concentration of BOD5 and COD in wastewater has been exceeded, compensation is to be calculated for the excess COD concentration only. Compensation is to be calculated as follows:

$$V = T \times K \times (R - 1), \text{ where}$$

- V – compensation (€);
- T – Regular tariff (€/m³);
- K – Quantity of the discharged wastewater (m³);
- R – Coefficient which is calculated as follows::

$$R = E/M, \text{ where}$$

- E – Maximum observed concentration of the parameter in wastewater (mg/l);
- M – permissible concentration of the said parameter (mg/l).

CONCLUSIONS

- Best available practices in industrial wastewater treatment and pre-treatment should be defined, together with the expected results these practices shall produce,
- Recommended control procedures and controllable parameters should be defined for monitoring the wastewater pre-treatment plants based on the above best available practices,
- When the said best wastewater pre-treatment practice has been implemented, guidelines shall be provided for the municipalities regarding regular tariff calculations, and emergency situations.
- Financial resources shall be allocated specifically for water intensive, but small scale producers to support sustainable wastewater pre-treatment technologies,
- Control mechanism should be designed to control the utilization of the said resources. The mechanism should include wastewater pre-treatment efficiency monitoring program & penalties for violations.

THANK YOU FOR YOUR ATTENTION!

