I.A.R.

Investigation Analysis Solutions

Contracting Authority : „Balts un Melns” LTD
Design stage: *Technical project*

Geotechnical investigation work report

For Valga – Valka twin city center development

Chairperson of the Board:	B. Arāja
Geotechnical engineer:	G. Robalts
Field geologist:	G. Robalts

Rīga 2017

LTD „I.A.R.”, Grobiņa Municipality., Grobiņa rural theritory., “Robalti”, LV-3430, Mob. tel. 29466195

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LTD „I.A.R.” **Geotechnical engineer Gints Robalts**
Latvian Association of Civil Engineers (LACE) bulding trade certificate 20-6929

Grobiņa Municipality., Grobiņa rural territory., “Robalti”, tel. 29466195, e-mail robalts@inbox.lv

Geotechnical investigation report

Valga – Valka twin city center development, Rīgas, Raiņa, and Latgales Street, Valka Municipality,Valka city, Latvia Raja, Tartu, and Sõpruse Street, Valga city, Estonia
(the name and the address of the building)
„ Balts un Melns” LTD
(Contracting Authority)
Geotechnical investigation work task from October 1, 2017
(inspection task, its issue date)

1. General information regarding the investigation object

1.1.	Building kind	Territory development
1.2.	Investigation territory	Rīgas, Raiņa, and Latgales Street, Valka Municipality,Valka city, Latvia Raja, Tartu, and Sõpruse Street, Valga city, Estonia

2. General information regarding the investigation methids and amounts

2.1.	Investigation kinds	Threading 15 pieces.
		Static probing(CPT) 1 piece
		Dynamic probing (DPL) 4 pieces
2.2.	Development amount	15
2.3.	Laboratory tests	Granulometric composition 16 pieces. (LVS CEN ISO/TS 17892-4:2005) Atterberg limit 2 pieces. Organic substance composition 6 pieces Ground agressiveness on concrete 1 piece, and on iron constructions 1 piece

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3. The present situation

3.1.	City territory

The investigation territory is located at: Rīgas, Raiņa, and Latgales Street, Valka Municipality, Valka city, Latvia; Raja, Tartu, and Sõpruse Street, Valga city, Estonia

image 1

The territory is geomorphologically included in Tālava lowland, in the Northern part of Seda plain. The relief of the investigated theritorry is quite even, but with a slight rise from Estonian-Latvian side towards Valka city center. The absolute altitude marks start from 45,5 – 51,0 m above sea level.

The geological composition up to the depth of 15,0 m in the investigation points is made of quaternary sediments: 1) technogenic sediments – asphalt, heaped up grounds; 2) the Baltic ice lake limnoglacial sediments – thin, dusty sand and sandy loam; 3) river and bog sediments – the sludge is sandy and with addition of and organics.

See a more detailed geotechnical section in the drilling journals and geotechnical sections.

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4. Summary

4.1.	Geotechnical description of the field

During the geotechnical investigation (drilling, static probing, and laboatory test results) it has been concluded that the engineering geological section up to the depth of 15,50 m is composed of the following grounds:

1. (siOr) ***Soil (ĢTE-2),*** sandy, starting from very unconsolidated up to medium dense, humid, has been found at the upper part of the section 0,10 - 0,30 m thick (in drillings PA12, PA13, IP1, IP3-IP5).

2. (FSaMg) ***Technogenous ground - asphalt*** *(ĢTE-A)* found at the beginning of the section, 0,10 – 0,20 m thick (in drillings PA1 – PA3, PA6-PA9).

3. (FSaMg) ***Embanked ground– fragments with fine sand*** *(ĢTE-1^{gr})* compacted up to a very dense condition, dry, located under the asphalt layer in depth of 0,20 – 0,60 m (in drillings PA1-PA3, PA6-PA9, and IP6).

3. (FSaMg) ***Embanked ground – fine sand*** *(ĢTE-1^{s})* dense, dry, which has been found in drillings PA1-PA3, PA7-PA9, and IP5. The thickness of ground is 0,30 -2,10 m.

4. (FSaMg) ***Embanked ground – medium sand*** *(ĢTE-1^{m})* is medium dense, dry, but wet along with the ground level, found in the drilling PA1 with thickness of 0,80 m.

5. (FSaMg) ***Embanked ground – fine sand with soil and debris*** *(ĢTE-1^{sbr})* compressed, dry, found in the drilling IP1. with thickness of 1,50 m.

6. (siSa) ***Dusty sand*** *(ĢTE -6^{3})* medium dense, dry and saturated with water, found in the drillings PA8 and IP5. A dusty sand layer has been found in thickness of 0,40 m (PA8) and 1,1 m (IP5). The layer was not perforated.

7. (FSaP) **Fine sand** (ĢTE-7^{5}) very loose, water-saturated, foud in the drilling IP2 with thickness of 0,60 m.

6. (FSaP) **Fine sand** (ĢTE-7^{4}) loose, with organics, wet and water-saturated, found in the drillings PA12, PA13, IP1-IP3, IUP5 with the thickness of 0,2 – 3,8 m at different heights of the section.

6. (FSaP)**Fine sand** (ĢTE - 7^{3}) average dense, dry, and water-saturated, found in the drillings PA7-PA9, PA12, PA13, IP2-IP6 at the lower part of the section with thickness of 0,3 – 3,9 m. The layer was perforatd only in the drillings PA8, PA13 and IP5.

6. (FSaP) **Fine sand** (ĢTE – 7^{2}) dense, water-saturated, found in the drillings PA2, PA13 and IP1 at the lower part of the section with thickness of 0,1 m (PA13) 1,4 m (PA2) and 9,6 m (IP1), the layer was not perforated.

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7. (OH organic clay with sandy interlayers) **Sludge is sandy** (ĢTE – 9^{mp}, 9^{p}) softly plastic, fluent, water-saturated, sandy, found in the drilling IP2 in the middle part of the section with thickness of 1,9 m.

5. (ClL) **Loamy soil** (ĢTE – 14^{s}), tenacious, wet; found in the drilling IP4 at the upper and middle parts of the section with thickness of 4,10 m.

6. (ClI) **Sandy loam** (ĢTE – 15^{s}), tenacious, wet; found in the drilling PA13 at the upper part of the section with thickness of 0,20 m.
See a more detailed geotechnical section in the drilling journals and in the geotechnical section 1-1', as well as the ground physically mechanical property table.

7. Groundwater level on 29.10.2017. was found for PA1, PA2, PA8, PA12, PA13, IP1-IP4 in depth of 0,10 - 3,50 m of the ground surface. The groundwater level monitoring was not xecuted at the investigation territory.

8. The ground corrosion activity towrds steel is high, and the average density of the ground kcathode current A/m^2 is 0,279. See Annex 5.

The information gained within the work frame reflects the situation at the specific place an it has been assumed that it is similar in other places as well, where the tests have not been executed. However, it is possible that at some places the situation or conditions may differ from the assumed ones, and that has not been found.

4.2. Conclusions and suggestions

1. The geotechnical conditions in the investigated territory are inconsistent. They are good for a bridge building, because the piles will be based on firm grounds. The foundation must be executed following the ground physically mechanical properties (Annex 1).

2. At the upper and the middle part of the investigated theritory geotechnical section

At the upper and the middle part of the investigated territory geotechnical section grounds with weak load carrying capacity have been found ĢTE - 7^{5}, ĢTE – 7^{4}, ĢTE – 8^{4}, ĢTE – 9^{mp}, 9^{p}, loose and very loose fine sand and sandy sludge layers (E= 3.11 Mpa up to 17.15 Mpa). It is suggested not to use these grunds for the foundation of the newly erected building, otherwise an uneven building compaction and basement deformation may take place.

3. In a case of the pile foundation usage it is suggested to use dense, fine sand (ĢTE-7^{2}) (E = 31.68 MPa).

4. The groundwater level was found on 29.10.2017. in PA1, PA2, PA8, PA12, PA13, IP1-IP4 starting from the depth of 0,10 - 3,50 m from the ground

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	surface, but depending on the season and the amount of precipitation it can change within the borders of ±0,50 m. 5. Correspondingly to LBN 003 - 15 „Construction climatology” the sandy ground freezing depth in the territory is 1,38 m once in 10 years.

The geotechnical investigation was executed on October 29. 2017.

„I.A.R.” LTD geotechnical engineer/ geologist:	Gints Robalts

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Text annexes		
1.	Physically mechanical indicators of the ground	1 page
2.	Static probing data (graphic and probilng data)	1 page
3.	Ground testing report	2 pages
4	Ground chemical analyses	1 page
5.	Teotechnical investigation certificate (Gints Robalts)	1 page
Graphical annexes		
1.	Geotechnical development location plan M 1 : 500	2 pages
2.	Drilling descriptions	7 pages

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TEXT ANNEXES

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ATTACHMENT 1

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I.A.R. **Ground normative and calculation indicators**

GTE	Ground name	Porosity ratio	Natural humidity	Density,, g/cm³	Bond MPa			Internal frictions, in degrees			Def. mod MPa	p_d MPa	R_0 MPa
		e	w	P_n	P_n	P_n	P_n	Φ_n	φ_{II}	φ_I	E		
7^2	Fine sand, dense	0,563	-	2,04	0,0033	0,0033	0,0022	34,67	34,67	31,52	31,68	9,45	0,34
7^3	Fine sand, medium dense	0,665	-	1,97	0,0018	0,0018	0,0018	31,16	31,00	30,90	18,89	4,30	0,26
7^4	Fine sand, loose	0,822	-	1,95	0,0007	0,0007	0,0007	28,78	28,23	27,75	9,33	1,29	-
7^5	Fine sand, very loose	0,95	-	1,93	-	-	-	-	-	-	-	0,78	-
8^4	Medium coarse sand, loose	0,697	-	1,95	0,0004	0,0004	0,0004	33,48	32,50	31,78	17,15	3,38	0,30
9mp	Mineral sludge, softly plastic	1,64	61,5	1,59	-	-	-	-	-	-	13,20	3,14	-
9p	Mineral sludge, fluid	1,54	~80	1,50	-	-	-	-	-	-	3,11	0,89	-
15sp	Loamy soil, tenaciously plastic	0,98	25	1,86	0,0426	0,0426	0,0426	25,34	24,84	24,40	*18*	13,39	-

For the bridge investigation

GTE	Ground name	Porosity ratio	Natural humidity	Density, g/cm³	Bond, MPa			Internal frictions, in degrees			Def. mod MPa	q_s MPa	f_s KPa
		e	w	P_n	P_n	P_n	P_n	Φ_n	φ_{II}	φ_I	E		
7^2	Fine sand, dense	0,546		2,04	0,0034	0,0034	0,0034	35,48	35,30	35,18	38,58	13,29	80,7166
7^3	Fine sand, medium dense	0,628		1,97	0,0019	0,0019	0,0019	32,67	32,56	32,50	22,10	6,05	45,6926
7^4	Fine sand, loose	0,786		1,95	-	-	-	26,95	26,75	26,61	9,27	1,32	6,3375
15sp	Smilšmāls, sīksti plastisks, vājas nestspējas	0,85	35	1,86	0,0185	0,0185	0,0185	16,75	16,61	16,52	5,54	0,91	14,1202

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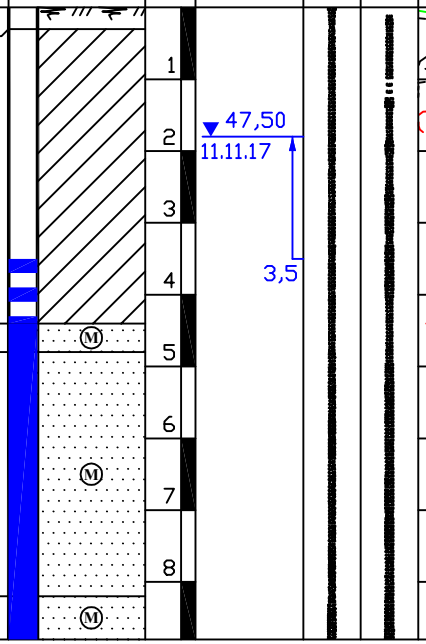
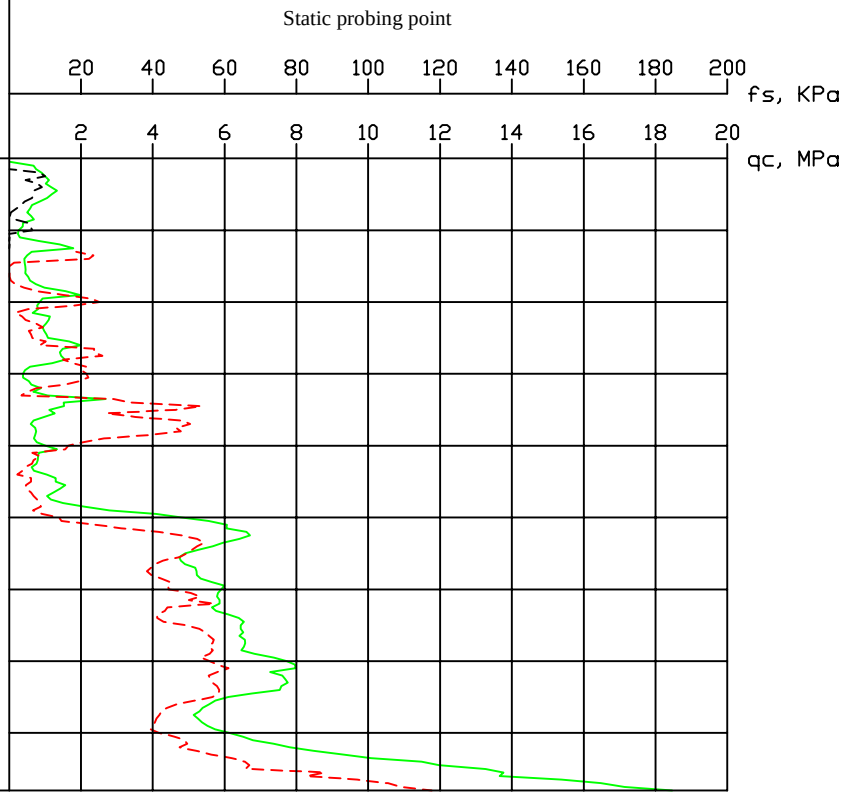
Attachment 2

Abs. altitude mark 49,30 m | Drilling № IP4 | Depth 8,8

GTE	Layer depth , m	Layer thickness, m	Absolute foot mark, m	Ground description	qc, MPa	fs, KPa
2	0,3	0,3	49,0	SOIL	0,89	5,80
15sp	4,4	4,1	44,9	SANDY LOAM tenacious, brown, weak.	0,91	14,12
7^4	4,8	0,4	44,5	Fine sand, loose	1,32	6,34
7^3	8,2	3,4	41,1	Fine sand, medium dense	6,05	45,69
7^2	8,8	0,6	40,5	Fine sand, dense	13,29	80,72





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ATTACHMENT 3

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GEOSERVISS

A/S "Geoserviss"
Ģeotehniskā laboratorija

Piedrujas iela 3-107, Rīga
Tel. 67248039
laboratorija@geoserviss.lv

Pasūtītājs : SIA „L.A.R." Grobiņas nov., Grobiņas pag., "Robalti", LV-3430
Pasūtījuma Nr. 804929
Objekts: Valka - Valga
Testējamais materiāls: grunts paraugs
Datums: 23.11.2017.

LATAK -T-281

TESTĒŠANAS PĀRSKATS № TP- 2017-255
GRANULOMETRISKĀ SASTĀVA NOTEIKŠANAS REZULTĀTI

Nr. p.k.	Parauga identifikācija			Granulometriskais sastāvs, atlikums % pēc masas uz sietiem; sieta izmēri, mm										Areometra metode					Filtrācijas koeficients (sabl. stāv.)			Dabīgās nogāzes leņķis υ^o		I_{org} %
	Urb. Nr.	Par. Nr.	Parauga ņemšanas dziļums, m	grants					smilts					putekļi				māls	ρ g/cm³	e	K_{10} m/dien.	ψ_s	$\psi_{st.}$	
				16.0-11.2	11.2-8.0	8.0-5.6	5.6-4.0	4.0-2.0	2.0-1.0	1.0-0.63	0.63-0.20	0.20-0.10	0.10-0.063	0.063-0.038	0.038-0.02	0.02-0.006	0.006-0.004	0.004-0.002	<0.002						
1.	PA1	PA1-2	1.2-1.5	-	-	-	5.6	7.2	4.9	4.5	23.4	22.7	10.8	9.8	0.6	5.0	1.6	3.4	0.5						7.51
2.	PA2	PA2-2	2.0-2.5	-	-	-	-	-	0.1	0.7	17.2	55.9	18.7	7.4											
3.	PA3	PA3-1	0.8-1.0	-	-	1.5	6.0	5.5	23.0	11.8	31.7	11.8	2.8	5.9											
4.	PA7	PA7-1	0.5-0.9	-	4.0	4.8	3.7	3.5	4.0	5.0	29.9	20.2	8.1	4.7	4.5	1.9	3.2	2.5							
5.	PA8	PA8-2	0.7-1.2	-	-	-	-	-	0.5	1.1	43.4	43.0	8.9	3.1											
6.	PA8	PA8-3	2.6-3.0	-	-	-	-	-	0.2	0.9	10.2	15.3	31.7	29.6	4.5	2.5	2.6	2.5							
7.	PA9	PA9-2	0.9-1.4	-	-	-	-	-	-	0.5	23.8	50.5	19.1	6.1											
8.	PA12	PA12-1	1.5-2.0	-	-	-	-	0.5	5.0	4.8	26.1	33.5	15.7	8.0	0.7	3.2	1.9	0.6							
9.	PA12	PA12-2	2.5-3.0	-	-	-	-	-	0.8	0.9	8.4	23.1	25.6	29.8	5.0	1.3	5.1								
10.	PA13	PA13-1	0.8-1.0	-	-	-	-	2.2	0.8	2.0	23.9	33.2	14.9	10.9	3.2	3.2	5.1	0.6							3.42
11.	IP1	IP1-2	6.5-7.0	-	-	-	-	-	0.8	1.9	26.0	46.6	17.2	7.5											
12.	IP1	IP1-4	14.0-14.5	-	-	-	-	-	-	0.3	3.5	34.8	40.7	15.6	1.9	1.9	1.3								
13.	IP3	IP3-1	1.5-2.0	-	-	-	-	0.8	0.4	2.0	2.0	29.6	26.1	13.0	14.2	5.0	3.1	3.8							3.78
14.	IP5	IP5-1	1.0-1.5	-	-	-	2.8	3.5	2.2	3.7	32.2	23.6	8.6	6.1	6.0	4.7	4.2	2.4							3.42
15.	IP6	IP6-1	0.2-0.5	-	-	3.4	11.9	11.5	17.3	9.1	11.1	2.9	2.6	14.4	2.8	6.9	1.9	4.2							

Materiāla testēšanas metodes :

1. Ģeotehniskā izpēte un testēšana. Grunts testēšana laboratorijā. 4.daļa: Daļiņu izmēra sadalījuma noteikšana - LVS CEN ISO/TS 17892-4:2017, p.5.2; 5.3*
2. Filtrācijas koeficienta noteikšana smilšainām gruntīm - GOST 25584-90 p.2 , *
3. Grunts testēšana laboratorijā. 1.daļa: Ūdens satura noteikšana LVS CEN ISO/TS 17892-1:2005 *
4. Organisko vielu un pelnu satura noteikšana - LVS EN 13039 : 2012*
5. Grunts dabīgās nogāzes leņķis – Метод определения угла естественного откоса - инженерные изискания для строительства РСН 51-84

Testēšanu veica : Inženiere I. Meijere

* - LATAK akreditētās metodes (LATAK – T- 281)

Paraugus laboratorijā piegādāja un par paraugu kvalitāti atbild pasūtītājs.
Testēšanas rezultāti attiecas tikai uz konkrētiem testēšanas paraugiem
Bez A/S "Ģeoserviss" ģeotehniskās laboratorijas rakstiskas atļaujas nav tiesību pavairot testēšanas pārskatu nepilnā apjomā

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GEOSERVISS
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Pasūtītājs: SIA „J.A.R." Grobiņas nov., Grobiņas pag., "Robalti", LV-3430
Pasūtījuma Nr. 804929
Objekts: Valka - Valga
Testējamais materiāls: grunts paraugi
Datums: 23.11.2017.

LATAK -T-281

TESTĒŠANAS PĀRSKATS Nr. TP 2017-255

MĀLAINO GRUNŠU FIZIKĀLO ĪPAŠĪBU NOTEIKŠANAS REZULTĀTI

Nr. p.k.	Parauga identifikācija			Dabīgais mitrums, W %	Plūstamības robeža W_L, %	Plastiskuma robeža W_P, %	Plastiskuma indekss I_P, %	Konsistences indekss I_c	Plūstamības indekss I_L	Grunts daļiņu blīvums g/cm³	I_{org} %
	Urb. Nr.	Par. Nr.	Paraugu ņemšanas dziļums, m								
1.	IP2	IP2-1	2.0-2.5	61.5	88.3	46.9	41.4	0.65	0.35		11.96
2.	IP3	IP3-2	3.5-4.0	202.8	179.9	105.0	74.9	-0.31	1.31		32.61
3.	IP4	IP4-2	2.6-3.1	34.9	40.7	30.4	10.3	0.56	0.44		-

Materiāla testēšana veikta:

1. Grunts testēšana laboratorijā. 12.daļa: Atterberga robežu noteikšana LVS CEN ISO/TS 17892-12:2013 , konuss 80g/30° *
2. Grunts testēšana laboratorijā. 1.daļa: Ūdens satura noteikšana LVS CEN ISO/TS 17892-1:2015*
3. Ģeotehniskā izpēte un testēšana. Augsnes testēšana laboratorijā. 3.daļa : Daļiņu blīvuma noteikšana. Piknometra metode –LVS CEN ISO/TS 17892-3:2005*.
4. Grunts testēšana : Organisko vielu un pelnu satura noteikšana - LVS EN 13039 :2012*

* - LATAK akreditēta metode (LATAK – T –281)

Testēšanu veica : inženiere I. Meijere

Par paraugu kvalitāti atbild piegādātājs
Testēšanas rezultāt: attiecas tikai uz konkrētajiem testēšanas (objektiem) paraugiem
Testēšanas pārskata reproducēšana nepilnā apjomā nav atļauta

2017-255 PV22-1 2(2)

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ATTACHMENT 4

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GRUNTSEKSPERTS

Margrietas Street 7, Rīga, LV-1046
latgeolab@gmail.com, tel. 26434310

Contracting Authority: "I.A.R." LTD
Object: Valka
Information regarding the sample: ground in a PE bag, approx. 2,5 kg
The sample collection date: no information available
The sample receipt date: 17.11.2017.

TESTING REPORT: 639ķ-2017

Ground corrosion activity towards steel

Lab. No.	Drilling No.	Sample No. N	Depth from-to, m	Ground electrical resistivity, Om·m	Cathode current density, A/m^2	Ground corrocion activity towards steel
639V690	IP1	1	0,5-1,5	43,2	0,279	high
Testing method:				"GOST 9.602-2005", Annex A2	"GOST 9.602-2005", Annex Б	"GOST 9.602-2005", p.4.2.

Equipment: "АКАГ"

Ground corrossion activity towards concrete
A water extract is tested

Lab. No.	Drilling No.	Sample No.	Depth from-to, m	Water extract pH	Chloride content Cl-, mg/kg	Sulphate content SO_4^{2-}, mg/kg
639V690	IP1	1	0,5-1,5	9,1	31,9	757
Testing method:				BS 1377-3:1990, p.9	BS 1377-3:1990, p.7.2.	BS 1377-3:1990, p. 5
Water extract preparation: ground:water proportion				1:2,5	1:2	1:2

Testing was executed from 21.11.2017. to 24.11.2017.
Testing was executed by: L.Blūzma

Laboratory manager: S.Terentjeva

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GRAPHICAL ANNEXES

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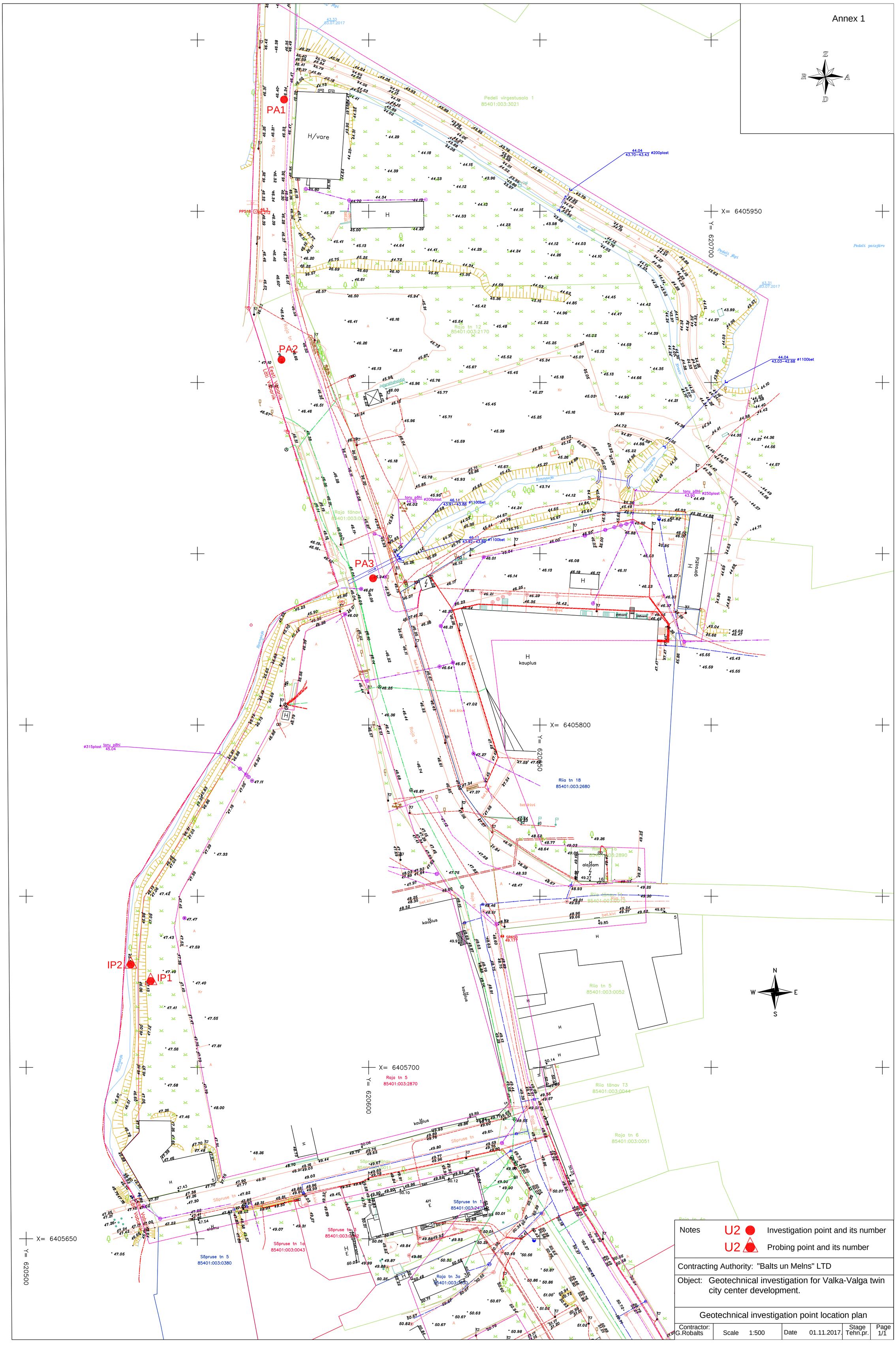
Annex 1



Notes	U2 ● Investigation point and its number U2 ▲ Probing point and its number
Contracting Authority: "Balts un Melns" LTD	
Object: Geotechnical investigation for Valka-Valga twin city center development.	
Geotechnical investigation point location plan	

Contractor: G.Robalts	Scale 1:500	Date 01.11.2017.	Stage Tehn.pr.	Page 1/1

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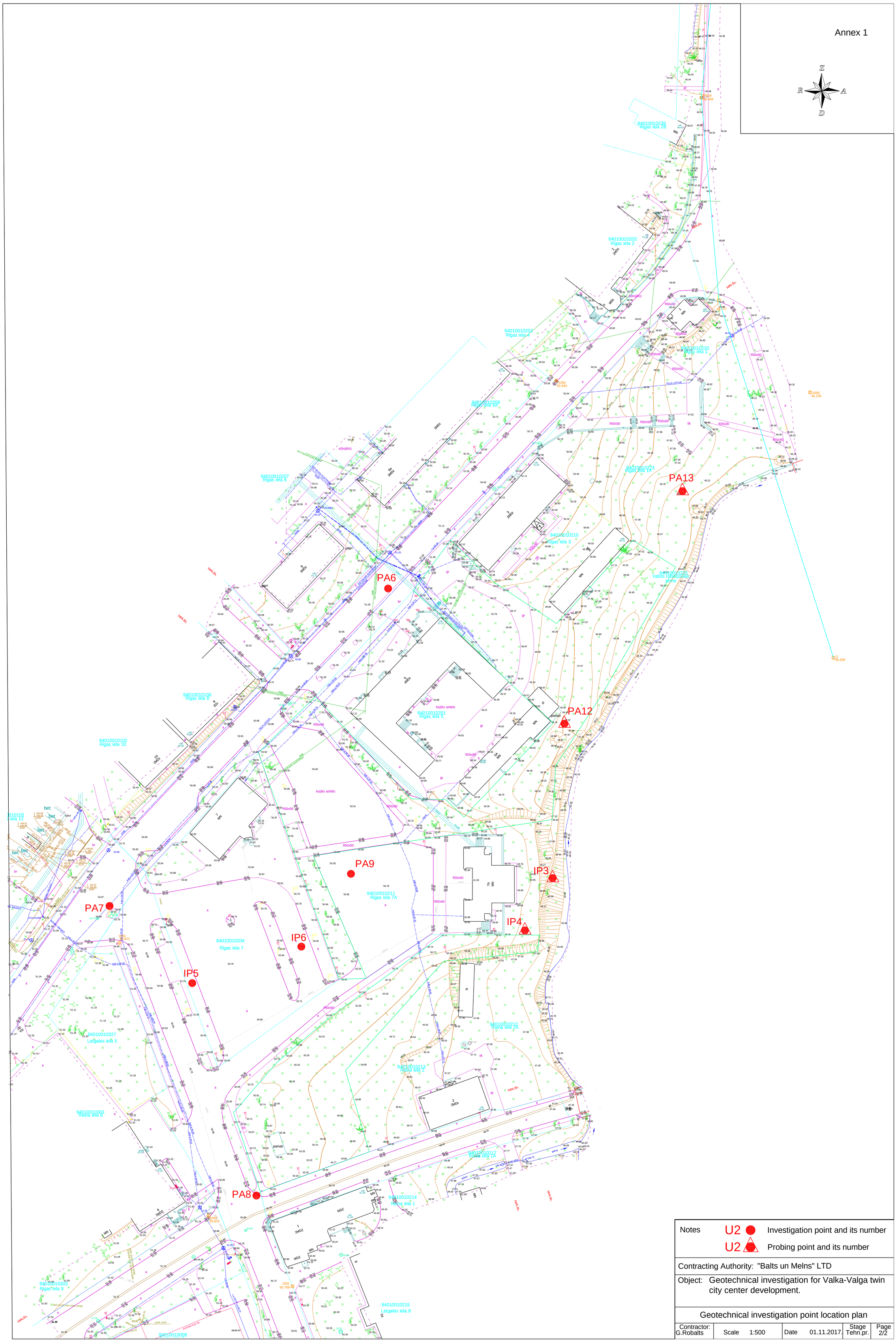
Annex 1



Notes	U2 ● Investigation point and its number				
	U2 ▲ Probing point and its number				
Contracting Authority: "Balts un Melns" LTD					
Object: Geotechnical investigation for Valka-Valga twin city center development.					
Geotechnical investigation point location plan					
Contractor: G.Robalts	Scale 1:500	Date 01.11.2017.	Stage Tehn.pr.	Page 2/2	

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The object: Valga-Valka twin city center development	Drilling No. PA1	Date: 03.11.2017.
Drilling method: drilling with an auger 135mm	Drilling absolute height 46.3 m	Groundwater level from ground surface 2.1 m
Drilling equipment: UGB 1VS		

Ground description	GTE No.		Absol. height, m	Legend	Depth and thickness, m	Sample number	Sampling interval
ASPHALT	A		46.1		0.2		
			45.7		0.6		
FRAGMENTATION with addition of fine sand	1^{gr}	1.0			(1.1)	PA1-1	0.8-1.1
EMBANKMENT, fine, tamped, brown sand	1^{s}		44.6		1.7	PA1-2	1.2-1.5
EMBANKMENT, medium, medium dense, dark brown sand.	1^{m}	2.0		▼2.1m	(0.8)		
		2.5	43.8		2.5		

The object: Valga-Valka twin city center development	Drilling No. PA2	Date: 03.11.2017.
Drilling method: Drilling with an auger:135mm	Drilling absolute height: 46.6 m	Groundwater level from ground surface:1.6 m
Drilling equipment: UGB 1VS		

Gound description	GTE No.		Absol. height, m	Legend	Depth and thicknessm	Sample number	Sampling interval
ASPHALT	A		46.5		0.1		
			46.3		0.3		
FRAGMENTATION with addition of fine sand	1^{gr}	1.0			(1.3)	PA2-1	0.5-0.8
EMBANKMENT, fine, tamped, brown sand.	1^{s}		45.0	▼1.6m	1.6		
		2.0			(1.4)	PA2-2	2.0-2.5
SAND fine, tamped, brown.	7^{2}	3.0	43.6		3.0		

The object: Valga-Valka twin city center development	Drilling No. PA3	Date: 03.11.2017.
Drilling method: Drilling with an auger:135mm	Drilling absolute height 45.9 m	Groundwater level from ground surface: -
Drilling equipment:: UGB 1VS		

Gound description	GTE No.		Absol. height, m	Legend	Depth and thickness,m	Sample number	Sampling interval
ASPHALT	A		45.7		0.2		
			45.3		0.6		
FRAGMENTATION with addition of fine sand	1^{gr}	1.0	44.9		1.0	PA3-1	0.8-1.0
EMBANKMENT, fine, tamped, brown sand.	1^{s}						

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The object: Valga-Valka twin city center development	Drilling No. PA6	Date: 29.10.2017.
Drilling method: drilling with an auger 135mm	Drilling absolute height: 51.0 m	Groundwater level from ground surface -
Drilling equipment: UGB 1VS		

Ground description	GTE No.		Absol. height, m	Legend	Depth and thickness, m	Sample number	Sampling interval
ASPHALT	A	0.5	50.8		0.2		
FRAGMENTATION with addition of fine sand	1^{gr}		50.5		0.5		

The object: Valga-Valka twin city center development	Drilling No. PA7	Date: 29.10.2017.
Drilling method: drilling with an auger 135mm	Drilling absolute height: 50.8 m	Groundwater level from ground surface -
Drilling equipment: UGB 1VS		

Ground description	GTE No.		Absol. height, m	Legend	Depth and thickness, m	Sample number	Sampling interval
ASPHALT	A		50.7		0.1		
			50.5		0.3		
FRAGMENTATION with addition of fine sand	1^{gr}	1.0				PA7-1	0.5-0.9
EMBANKMENT, fine, tamped, brown sand.	1^{s}	2.0			(2.1)		
			48.4		2.4		
EMBANKMENT, fine, tamped, brown sand	7^{3}	3.0	47.8		3.0	PA7-2	2.5-3.0

The object: Valga-Valka twin city center development	Drilling No. PA8	Date: 29.10.2017.
Drilling method: drilling with an auger 135mm	Drilling absolute height: 50.5 m	Groundwater level from ground surface 2.6 m
Drilling equipment: UGB 1VS		

Ground description	GTE No.		Absol. height, m	Legend	Depth and thickness, m	Sample number	Sampling interval
ASPHALT	A		50.4		0.1		
			50.2		0.3		
			49.9		0.6	PA8-1	0.3-0.6
FRAGMENTATION with addition of fine sand	1^{gr}	1.0				PA8-2	0.7-1.2
EMBANKMENT, fine, tamped, brown sand.	1^{s}				(2.0)		
EMBANKMENT, fine, tamped,	7^{3}	2.0					
			47.9	▼2.6m	2.6		
Sand dusty, medium dense, brown.	6^{3}	3.0	47.5		3.0	PA8-3	2.6-3.0

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The object: Valga-Valka twin city center development	Urbuma Nr. PA9	Datums: 29.10.2017.
Urbšanas metode: urbšana ar gliemežskrūvi 135mm	Urbuma absolūtā atzīme 50.8 m	Gruntsūdens līmenis no zemes virsmas -
Urbšanas iekārta: UGB 1VS		

Ground description	ĢTE Nr.	Absol. atzīme, m	Dziļums un biezums, m	Parauga numurs	Paraugošanās intervāls
ASPHALT	A	50.7	0.1		
FRAGMENTATION with addition of fine sand		50.5	0.3	PA9-1	0.3-0.6
EMBANKMENT, fine, dense, brown	1^{s}	49.9 (1.0)	0.9	PA9-2	0.9-1.4
SAND fine, medium dense, brown.	7^{3}	(2.0) 47.8 (3.0)	(2.1) 3.0		

Objekts: Valgas-Valkas dvīņu pilsētas centra attīstība.	Urbuma Nr. PA12	Datums: 29.10.2017.
Urbšanas metode: urbšana ar gliemežskrūvi 100mm	Urbuma absolūtā atzīme 47.9 m	Gruntsūdens līmenis no zemes virsmas 1.4 m
Urbšanas iekārta: STIHL BT 121		

Ground description	ĢTE Nr.	Absol. atzīme, m	Dziļums un biezums, m	Parauga numurs	Paraugošanās intervāls
SOIL	2	47.6	0.3		
SAND fine, medium dense, brown.	7^{3}	(1.0) 46.3 ▼1.4m	(1.3) 1.6		
SMILTS smalka, irdena, brūna.	7^{4}	46.1	1.8	PA12-1	1.5-2.0
SAND fine, medium dense, brown.	7^{3}	(2.0) 45.8	2.1		
SAND fine, loose, brown	7^{4}	45.6	2.3		
SAND fine, medium dense, brown.	7^{3}	(3.0) 44.9	(0.7) 3.0	PA12-2	2.5-3.0

Objekts: Valgas-Valkas dvīņu pilsētas centra attīstība.	Urbuma Nr. PA13	Datums: 29.10.2017.
Urbšanas metode: urbšana ar gliemežskrūvi 100mm	Urbuma absolūtā atzīme 46.4 m	Gruntsūdens līmenis no zemes virsmas 1.3 m
Urbšanas iekārta: STIHL BT 121		

Ground description	ĢTE Nr.	Absol. atzīme, m	Dziļums un biezums, m	Parauga numurs	Paraugošanās intervāls
SOIL	2	46.1	0.3		
LOAM, tenacious, brown.	15^{3}	45.7	0.7	PA13-1	0.6-1.0
SAND fine, medium dense, brown.	7^{3}	(1.0) ▼1.3m (2.0) 43.5	(2.2) 2.9	PA13-2	1.7-2.3
SAND fine, dense, brown.	7^{2}	(3.0) 43.4	3.0		

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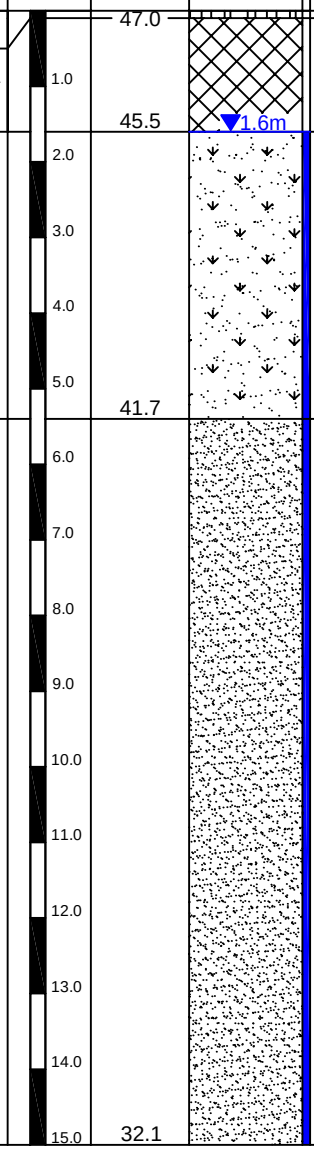
The object: Valga-Valka twin city center development	Drilling No. IP1	Date: 03.11.2017.
Drilling method: drilling with an auger 135mm Drilling equipment: UGB 1VS	Drilling absolute height: 47.1 m	Groundwater level from ground surface 1.6 m

Ground description	GTE No.	Absol. height, m	Depth and thickness, m	Sample number	Sampling interval
SOIL	2	47.0	0.1		
EMBANKMENT, fine, tamped sand with debris, dark brown.	1^{sb}	45.5	(1.5) 1.6	IP1-1	0.5-1.5
SAND fine, loose, with addition of organic, brown.	7^{4}	41.7	(3.8) 5.4		
SAND fine, dense, brown.	7^{2}	32.1	(9.6) 15.0	IP1-2 IP1-3 IP1-4	6.5-7.0 10.5-11.0 14.0-14.5



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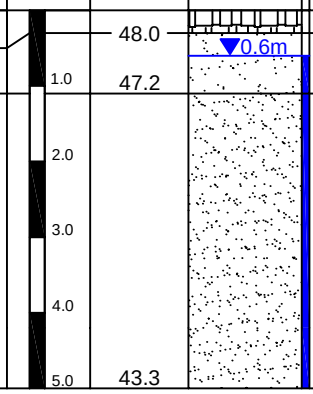
Objekts: Valgas-Valkas dvīņu pilsētas centra attīstība.	Urbuma Nr. IP2	Datums: 29.10.2017.
Urbšanas metode: urbšana ar gliemežskrūvi 100mm	Urbuma absolūtā atzīme 45.5 m	Gruntsūdens līmenis no zemes virsmas 0.1 m
Urbšanas iekārta: STIHL BT 121		

Ground description	GTE Nr.	Absol. atzīme, m	Leģenda	Dziļums un biezums, m	Parauga numurs	Paraugošanās intervāls
SAND fine, loose, brown.	7^{4}	44.2	▼0.1m	1.3		
SLUDGE sandy, fluid.	9^{p}	43.8		1.7		
SLUDGE sandy, softly plastic.	9^{mp}	42.3		(1.5) 3.2	IP2-1	2.0-2.5
SAND fine, average dense, brown.	7^{3}	41.5		(0.8) 4.0		

Objekts: Valgas-Valkas dvīņu pilsētas centra attīstība.	Urbuma Nr. IP3	Datums: 29.10.2017.
Urbšanas metode: urbšana ar gliemežskrūvi 100mm	Urbuma absolūtā atzīme 48.3 m	Gruntsūdens līmenis no zemes virsmas 0.6 m
Urbšanas iekārta: STIHL BT 121		

Ground description	GTE Nr.	Absol. atzīme, m	Leģenda	Dziļums un biezums, m	Parauga numurs	Paraugošanās intervāls
SOIL	2	48.0		0.3		
SAND medium, loose, brown.	8^{4}	47.2	▼0.6m	(0.8) 1.1		
SAND fine, medium dense, brown.	7^{3}	43.3		(3.9) 5.0	IP3-1 IP3-2	1.5-2.0 3.5-4.0



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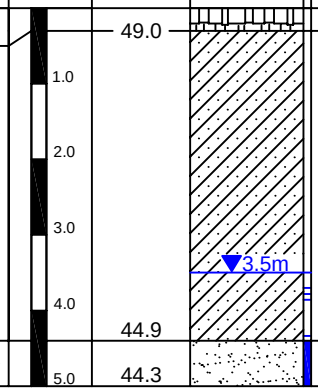
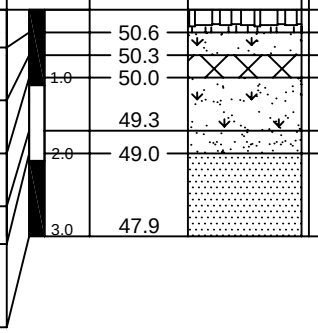
The object: Valga-Valka twin city center development	Drilling No. IP4	Date: 29.10.2017.
Drilling method: drilling with an auger 100mm	Drilling absolute height: 49.3 m	Groundwater level from ground surface 3.5 m
Drilling equipment: UGB 1VS		

Ground description	GTE No.	Absol. height, m	Depth and thickness, m	Sample number	Sampling interval
SOIL	2	49.0	0.3		
SANDY LOAM, tough, brown.	14^{3}	44.9	(4.1) 4.4	IP4-1 IP4-2	0.8-1.2 2.6-3.1
SAND fine, medium dense, brown.	7^{3}	44.3	5.0		



The object: Valga-Valka twin city center development	Drilling No. IP5	Date: 29.10.2017.
Drilling method: drilling with an auger 135mm	Drilling absolute height: 50.9 m	Groundwater level from ground surface -
Drilling equipment: UGB 1VS		

Ground description	GTE No.	Absol. height, m	Depth and thickness, m	Sample number	Sampling interval
SOIL	2	50.6	0.3		
SAND fine, loose, with addition of organic, brown.	7^{4}	50.3	0.6		
EMBANKMENT, fine, damped, brown sand	1^{s}	50.0	0.9	IP5-1	1.0-1.5
SAND fine, loose, with addition of organics, brown.	7^{4}	49.3	1.6		
SAND, fine, medium dense, brown.	7^{3}	49.0	1.9		
SAND, dusty, medium dense, brown.	6^{3}	47.9	(1.1) 3.0	IP5-2	2.2-2.8



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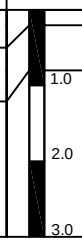
The object: Valga-Valka twin city center development	Drilling No. IP6	Date: 29.10.2017.
Drilling method: drilling with an auger 135mm	Drilling absolute height: 50.8 m	Groundwater level from ground surface -
Drilling equipment: UGB 1VS		

Ground description	GTE No.	Absol. height, m	Legend	Depth and thickness, m	Sample number	Sampling interval
ASPHALT	A	50.6		0.2	IP6-1	0.2-0.5
FRAGMENTATION with addition of fine sand.	1^{g}	50.0		0.8		
SAND fine, medium dense, brown.	7^{3}	47.8		(2.2) 3.0		



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