MINISTRY OF REGIONAL DEVELOPMENT AND PUBLIC WORKS

DRAFT

Regulation amending and supplementing

Regulation No RD-02-20-8 of 2013 on the design, construction and operation of sewage systems

(promulgated in the State Gazette (SG), No 49 of 2013; amend. and suppl. No 82 of 2014; amend. and suppl. No 99 of 2018; amend. and suppl. No 58 of 2024, corr. No 65 of 2024)

§ 1. In Article 11, paragraph 4 is created:

‘(4) Three types of hyetographs are used for hydraulic modelling of sewage networks, in accordance with the algorithm shown in Annex 6.’

§ 2. Annex 2 is amended and supplemented as follows:

1. Point 1.1 is repealed;

2. Point 2 is amended as follows:

‘**2. Method of determining the intensity of measured rainfall**

2.1. The territory of Bulgaria is divided into 12 dimensioning zones (Fig. 1), using the country’s administrative division into municipalities as the basis for zoning.

Fig. 1

Table No 1 describes the municipalities in the country and the dimensioning zone in which they are located.

Table No 1

Municipality code	Municipality name	Zone
BGS01	Aytos	7
BGS04	Burgas	11
BGS06	Sredets	11
BGS08	Kameno	11
BGS09	Karnobat	7
BGS12	Malko Tarnovo	11
BGS13	Tsarevo	11
BGS15	Nesebar	11
BGS17	Pomorie	11
BGS18	Ruen	7
BGS21	Sozopol	11
BGS23	Sungurlare	7
BGS27	Primorsko	11
BLG01	Bansko	8
BLG02	Belitsa	8
BLG03	Blagoevgrad	8
BLG11	Gotse Delchev	8
BLG13	Garmen	8
BLG28	Kresna	8

Municipality code	Municipality name	Zone
BLG33	Petrich	8
BLG37	Razlog	8
BLG40	Sandanski	8
BLG42	Satovcha	8
BLG44	Simitly	8
BLG49	Strumyani	8
BLG52	Hadzhidimovo	8
BLG53	Yakoruda	1
DOB03	Balchik	11
DOB12	General Toshevo	4
DOB15	Dobrich	4
DOB17	Kavarna	12
DOB20	Krushari	4
DOB27	Tervel	4
DOB28	Dobrich	4
DOB29	Shabla	12
GAB05	Gabrovo	2
GAB12	Dryanovo	2
GAB29	Sevlievo	2
Municipalit	**Municipality**	**Zone**

y code	name	
GAB35	Tryavna	2
HKV09	Dimitrovgrad	11
HKV11	Ivaylovgrad	10
HKV17	Lyubimets	11
HKV18	Madzharovo	11
HKV19	Mineralni bani	11
HKV28	Svilengrad	11
HKV29	Simeonovgrad	11
HKV30	Stambolovo	11
HKV32	Topolovgrad	11
HKV33	Harmanli	11
HKV34	Haskovo	11
JAM03	Bolyarovo	11
JAM07	Elhovo	11
JAM22	Straldzha	7
JAM25	Tundzha	7
JAM26	Yambol	7
KNL04	Bobov dol	1
KNL05	Boboshevo	1
KNL27	Kocherinovo	1

Municipality code	Municipality name	Zone
KNL29	Kyustendil	1
KNL31	Nevestino	1
KNL38	Rila	1
KNL41	Sapareva banya	1
KNL48	Dupnitsa	1
KNL50	Treklyano	1
KRZ02	Ardino	10
KRZ08	Dzhebel	10
KRZ14	Kirkovo	10
KRZ15	Krumovgrad	10
KRZ16	Kardzhali	10
KRZ21	Momchilgrad	10
KRZ35	Chernoochene	10
LOV02	Apriltsi	2
LOV17	Letnitsa	2
LOV18	Lovech	3
LOV19	Lukovit	2
LOV33	Teteven	2
LOV34	Troyan	2
LOV36	Ugarchin	2
LOV38	Yablanitsa	2

Municipality code	Municipality name	Zone
MON02	Berkovitsa	1

MON04	Boychinovtsi	1
MON07	Brusartsi	1
MON11	Valchedram	1
MON12	Varshets	1
MON14	Georgi Damyanovo	1
MON24	Lom	1
MON26	Medkovets	1
MON29	Montana	1
MON36	Chiprovtsi	1
MON38	Yakimovo	1
PAZ03	Batak	9
PAZ04	Belovo	1
PAZ06	Bratsigovo	6
PAZ08	Velingrad	1
PAZ14	Lesichovo	1
PAZ19	Pazardzhik	6
PAZ20	Panagyurishte	1
PAZ21	Peshtera	6
PAZ24	Rakitovo	9

Municipality code	Municipality name	Zone
PAZ29	Septemvri	1
PAZ32	Strelcha	1
PAZ39	Sarnitsa	1
PDV01	Asenovgrad	6
PDV07	Brezovo	6
PDV12	Kaloyanovo	6
PDV13	Karlovo	7
PDV15	Laki	9
PDV17	Maritsa	6
PDV22	Plovdiv	6
PDV23	Parvomai	6
PDV25	Rakovski	6
PDV26	Rodopi	6
PDV28	Sadovo	6
PDV33	Saedinenie	6
PDV37	Hisarya	6
PDV39	Krichim	6
PDV40	Perushtitsa	6
PDV41	Stamboliyski	6
PDV42	Kuklen	6
PDV43	Sopot	7

Municipality code	Municipality name	Zone
PER08	Breznik	1

PER19	Zemen	1
PER22	Kovachevtsi	1
PER32	Pernik	1
PER36	Radomir	1
PER51	Tran	1
PVN03	Belene	1
PVN08	Gulyantsi	1
PVN10	Dolna Mitropolia	1
PVN11	Dolni Dabnik	2
PVN16	Levski	4
PVN21	Nikopol	1
PVN23	Iskar	2
PVN24	Pleven	3
PVN27	Pordim	3
PVN37	Cherven Bryag	2
PVN39	Knezha	2
RAZ11	Zavet	4
RAZ14	Isperih	4
RAZ16	Kubrat	4

Municipality code	Municipality name	Zone
RAZ17	Loznitsa	4
RAZ26	Razgrad	4
RAZ29	Samuil	4
RAZ36	Tsar Kaloyan	4
RSE03	Borovo	4
RSE04	Byala	4
RSE05	Vetovo	4
RSE08	Dve mogili	4
RSE13	Ivanovo	4
RSE27	Ruse	4
RSE33	Slivo pole	4
RSE37	Tsenovo	4
SFO06	Bozhurishte	1
SFO07	Botevgrad	1
SFO09	Godech	1
SFO10	Gorna Malina	1
SFO16	Dragoman	1
SFO17	Elin Pelin	1
SFO18	Etropole	1
SFO20	Ihtiman	1
SFO24	Koprivshtitsa	1

Municipality code	Municipality name	Zone
SFO25	Kostenets	1
SFO26	Kostinbrod	1

SFO34	Pravets	1
SFO39	Samokov	1
SFO43	Svoge	1
SFO45	Slivnitsa	1
SFO47	Zlatitsa	1
SFO54	Anton	1
SFO55	Pirdop	1
SFO56	Mirkovo	1
SFO57	Chavdar	1
SFO58	Chelopech	1
SFO59	Dolna banya	1
SHU07	Venets	4
SHU10	Varbitsa	7
SHU11	Hitrino	4
SHU18	Kaolinovo	4
SHU19	Kaspichan	5
SHU21	Nikola Kozlevo	4
SHU22	Novi Pazar	5
SHU23	Veliki Preslav	5
Municipality code	**Municipality name**	**Zone**
SHU25	Smyadovo	7
SHU30	Shumen	5

SLS01	Alfatar	4
SLS07	Glavinitsa	4
SLS10	Dulovo	4
SLS15	Kaynardzha	4
SLS31	Silistra	4
SLS32	Sitovo	4
SLS34	Tutrakan	4
SLV11	Kotel	7
SLV16	Nova Zagora	7
SLV20	Sliven	7
SLV24	Tvarditsa	7
SML02	Banite	10
SML05	Borino	10
SML09	Devin	9/10
SML10	Dospat	10
SML11	Zlatograd	10
SML16	Madan	10
SML18	Nedelino	10
SML27	Rudozem	10
Municipality code	**Municipality name**	**Zone**
SML31	Smolyan	10
SML38	Chepelare	9

SZR04	Bratya Daskalovi	6
SZR07	Galabovo	11
SZR12	Kazanlak	7
SZR22	Maglizh	7
SZR23	Opan	11
SZR24	Pavel Banya	7
SZR27	Radnevo	7
SZR31	Stara Zagora	7
SZR36	Chirpan	7
SZR37	Gurkovo	7
SZR38	Nikolaevo	7
TGV02	Antonovo	5
TGV22	Omurtag	5
TGV23	Opaka	4
TGV24	Popovo	4
TGV35	Targovishte	5
VAR01	Avren	11
VAR02	Aksakovo	11

Municipality code	Municipality name	Zone
VAR04	Beloslav	11
VAR05	Byala	11
VAR06	Varna	11
VAR08	Vetrino	5
VAR09	Valchi dol	4
VAR13	Dolni chiflik	11
VAR14	Devnya	5
VAR16	Dalgopol	7
VAR24	Provadia	5
VAR26	Suvorovo	4
VID01	Belogradchik	1
VID03	Boynitsa	1
VID06	Bregovo	1
VID09	Vidin	1
VID15	Gramada	1
VID16	Dimovo	1
VID22	Kula	1
VID25	Makresh	1
VID30	Novo selo	1
VID33	Ruzhintsi	1
VID37	Chuprene	1

Municipality code	Municipality name	Zone
VRC05	Borovan	1
VRC08	Byala Slatina	2
VRC10	Vratsa	1

VRC20	Kozloduy	1
VRC21	Krivodol	1
VRC27	Mezdra	1
VRC28	Mizia	1
VRC31	Oryahovo	1
VRC32	Roman	2
VRC35	Hayredin	1
VTR04	Veliko Tarnovo	2
VTR06	Gorna Oryahovitsa	2
VTR13	Elena	2
VTR14	Zlataritsa	2
VTR20	Lyaskovets	2
VTR22	Pavlikeni	4
VTR26	Polski Trambesh	4
Municipality code	**Municipality name**	**Zone**
VTR28	Svishtov	4
VTR31	Strazhitsa	4
VTR32	Suhindol	2

2.2. The intensity of measured rainfall for each dimensioning zone for a single overflow interval (recurrence interval) of up to 10 years is determined by the following formula:

$$q(t,T) = \frac{a(T^n - b)}{\left(1 + \frac{t}{c}\right)^m}$$

where:

q - the intensity of rainfall in l/(s.ha);

T - a single overflow interval, year;

t - the duration of the rainfall, min;

a, b, c, m and n - characteristic coefficients for each zone (see Table 2)

Table No 2

Zone 1	$q(t,T)=\frac{961.(T^{0.1}-0.69)}{\left(1+\frac{t}{12.78}\right)^{0.99}}$
Zone 2	$q(t,T)=\frac{714.(T^{0.16}-0.46)}{\left(1+\frac{t}{9.7}\right)^{0.99}}$
Zone 3	$q(t,T)=\frac{998.(T^{0.15}-0.61)}{\left(1+\frac{t}{10.66}\right)^{0.99}}$
Zone 4	$q(t,T)=\frac{950.(T^{0.11}-0.65)}{\left(1+\frac{t}{11.29}\right)^{0.99}}$
Zone 5	$q(t,T)=\frac{786.(T^{0.11}-0.6)}{\left(1+\frac{t}{14.17}\right)^{0.95}}$
Zone 6	$q(t,T)=\frac{880.(T^{0.11}-0.67)}{\left(1+\frac{t}{12.40}\right)^{0.99}}$

Zone 7	$q(t,T)=\frac{651.\left(T^{0.16}-0.48\right)}{\left(1+\frac{t}{11.39}\right)^{0.99}}$
Zone 8	$q(t,T)=\frac{906.\left(T^{0.1}-0.67\right)}{\left(1+\frac{t}{9.15}\right)^{0.99}}$
Zone 9	$q(t,T)=\frac{350.\left(T^{0.3}-0.22\right)}{\left(1+\frac{t}{9.67}\right)^{0.99}}$
Zone 10	$q(t,T)=\frac{780.\left(T^{0.16}-0.51\right)}{\left(1+\frac{t}{8.73}\right)^{0.99}}$
Zone 11	$q(t,T)=\frac{877.\left(T^{0.12}-0.64\right)}{\left(1+\frac{t}{11.07}\right)^{0.99}}$
Zone 12	$q(t,T)=\frac{879.\left(T^{0.14}-0.69\right)}{\left(1+\frac{t}{9.21}\right)^{0.92}}$

Table 3 shows the values of the intensity of measured rainfall per zone calculated using the formulas in ***Table 2*** at different duration of the rainfall from 5 to 90 min.

Table No 3

Values of the intensity for the 12 zones calculated using the formulas in Table No 2

Single overflow interval (years)	Duration of the rainfall, t (min)									
	5	**10**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**90**
Zone 1										
1	215	168	138	117	102	90	73	62	53	38
2	265	207	170	144	125	111	90	76	66	47
3	295	231	190	161	140	124	101	85	73	52
4	318	249	204	173	151	133	108	91	79	56
5	336	263	216	183	159	141	114	96	83	59
10	394	309	253	215	187	165	134	113	98	69
Zone 2										
1	255	191	153	127	109	96	76	64	55	38
2	311	233	186	155	133	116	93	78	67	47
3	346	259	207	173	148	130	104	86	74	52
4	373	279	223	186	159	139	112	93	80	56
5	394	295	236	197	169	148	118	98	84	59
10	466	349	279	232	199	174	140	116	100	70

Single overflow interval (years)	Duration of the rainfall, t (min)									
	5	**10**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**90**
Zone 3										
1	266	202	163	137	118	103	83	70	60	42
2	341	259	209	175	151	132	107	89	77	54
3	388	295	238	200	172	151	121	102	87	62
4	424	322	260	218	188	165	132	111	95	67
5	452	344	277	233	200	176	141	118	102	72
10	547	416	336	281	242	213	171	143	123	87
Zone 4										
1	231	177	144	121	105	92	74	62	54	38
2	284	218	177	149	128	113	91	76	66	46
3	316	243	197	166	143	126	102	85	73	52
4	340	261	212	178	154	135	109	92	79	56
5	359	276	224	188	163	143	115	97	83	59
10	422	324	263	221	191	168	136	114	98	69
Zone 5										
1	236	189	158	136	120	107	88	75	65	47
2	283	227	190	163	143	128	105	90	78	57
3	312	250	209	180	158	141	116	99	86	62
4	333	267	224	192	169	151	124	106	92	67
5	350	281	235	202	178	158	131	111	97	70
10	406	326	272	234	206	184	151	129	112	81

Single overflow interval (years)	Duration of the rainfall, t (min)									
	5	**10**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**90**
Zone 6										
1	208	162	132	112	97	86	70	59	51	36
2	258	201	164	139	121	107	86	73	63	45
3	288	225	184	156	135	119	97	81	70	50
4	311	242	199	168	146	129	105	88	76	54
5	330	257	210	178	154	136	111	93	80	57
10	389	303	248	210	182	161	131	110	95	67
Zone 7										
1	236	181	147	124	107	94	76	64	55	39
2	289	222	181	152	131	116	93	78	67	48
3	323	248	202	170	147	129	104	87	75	53
4	349	268	218	183	158	139	113	94	81	57
5	369	284	231	194	168	148	119	100	86	61
10	438	337	274	230	199	175	141	119	102	72
Zone 8										
1	194	144	114	95	81	71	57	47	40	28
2	236	175	139	116	99	86	69	57	49	34
3	263	195	155	128	110	96	77	64	55	38
4	282	209	166	138	118	103	82	68	59	41
5	297	220	175	145	124	108	87	72	62	43
10	347	257	204	169	145	127	101	84	72	50

Single overflow interval (years)	Duration of the rainfall, t (min)									
	5	**10**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**90**
Zone 9										
1	181	135	108	90	77	67	54	45	39	27
2	234	175	140	117	100	87	70	58	50	35
3	271	203	162	135	116	101	81	68	58	41
4	300	225	179	149	128	112	90	75	64	45
5	324	243	194	162	138	121	97	81	69	49
10	411	308	246	205	176	154	123	103	88	62
Zone 10										
1	244	180	142	118	100	87	70	58	50	35
2	303	222	176	146	124	108	86	72	61	43
3	340	250	198	164	140	122	97	81	69	48
4	368	270	214	177	151	132	105	87	75	52
5	390	287	227	188	160	140	111	93	79	55
10	466	343	271	224	191	167	133	111	95	66
Zone 11										
1	218	167	135	114	98	86	69	58	50	35
2	271	207	168	141	122	107	86	72	62	44
3	304	232	188	158	136	120	97	81	70	49
4	328	251	203	171	147	130	104	87	75	53
5	347	266	215	181	156	137	111	93	80	56
10	411	315	255	214	185	162	131	110	94	67

Single overflow interval (years)	Duration of the rainfall, t (min)									
	5	**10**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**90**
Zone 12										
1	183	139	112	94	81	72	58	49	43	31
2	243	184	149	125	108	95	77	65	57	41
3	281	213	172	145	125	110	90	76	65	47
4	309	234	189	159	138	122	99	83	72	52
5	332	252	203	171	148	130	106	89	77	56
10	407	309	249	210	181	160	130	110	95	68

2.3. For a single overflow interval (recurrence interval) T > 10 years, the tabulated discrete model values of intensities are given in Table No 4 and Table No 5 by zone and depending on the duration of the rainfall – respectively for a recurrence interval T = 20 years and T = 50 years.

Table 4

Values of the intensity by zone and depending on the duration of the rainfall per single overflow interval T = 20 years

Design zones	Duration of the rainfall, t (min)									
	5	**10**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**90**
Zone 1	444	346	285	246	215	191	152	126	109	78
Zone 2	552	430	342	290	249	219	178	152	131	81
Zone 3	645	501	390	329	286	255	199	171	144	101
Zone 4	364	332	291	251	224	201	168	138	118	84
Zone 5	387	333	303	262	229	204	172	149	130	81
Zone 6	457	349	281	234	204	181	150	128	110	79
Zone 7	470	382	315	270	236	212	176	144	119	91
Zone 8	371	296	240	201	172	151	122	99	83	63
Zone 9	476	383	314	271	233	205	159	129	115	71
Zone 10	520	390	309	248	211	186	150	130	112	72
Zone 11	389	336	288	258	227	202	167	138	121	85
Zone 12	380	340	294	258	222	200	166	143	130	91

Table No 5

Values of the intensity by zone and depending on the duration of the rainfall per single overflow interval T = 50 years

Dimensioning zones	Duration of the rainfall, t (min)									
	5	**10**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**90**
Zone 1	510	400	329	284	251	220	177	148	129	93
Zone 2	696	517	405	349	301	269	217	186	163	101
Zone 3	827	629	470	393	346	313	237	202	176	121
Zone 4	372	358	329	292	267	242	204	171	150	109
Zone 5	406	355	342	298	259	229	195	170	151	99
Zone 6	559	411	323	268	233	205	171	151	126	86
Zone 7	560	442	374	326	286	257	221	188	155	123
Zone 8	415	346	273	228	197	179	146	119	100	77
Zone 9	613	509	429	373	328	288	225	186	163	95
Zone 10	616	443	354	284	245	218	180	157	135	89
Zone 11	413	376	337	314	282	254	214	178	159	111
Zone 12	401	400	356	319	278	252	216	185	165	118

§ 3. In Annex 6, a new point 3 is created:

‘**3. Algorithm for the creation of three kinds of hyetographs based on inferred analytical relationships of intensity/duration/frequency and an example of the algorithm application**

In the hydraulic modelling of sewage networks, the three kinds of hyetographs created according to the specified algorithm are used. Based on the arguments presented, one of them is accepted as relevant for each specific case, in accordance with the objectives and specific characteristics of the modelled network. The main criterion for the acceptability of the hydraulic test should be the prevention of flooding of the site.

ПОДГОТВИТЕЛЕН ЕТАП

Изберете времетраене на А (min) и период на повторяемост Т (год.)

Изчислете по формулата интензивността q за всяка нарастваща продължителност t: 5 min до А min със стъпка о 5 мин

Превърне интензивността q (l/s.hq) във валежна височина h (mm), като използвате зависимостта : h = 0,006*q*t

Подредете 5-мин интервал в нарастваща последователност : 0 до 5 мин; 6 до 10 мин, 11 до 15 мин и т.н.

Изчислете delta h за всеки 5-мин интервал като разлика между изчисление валежни височини в края и началото на интервала

Пример: Клъстер 1; Т=2 год, А=45 min

Подготвителен етап

интервал, min

забе лежка: delta h е валежната височина за даден интервал и е разлика между съседни валежни височини

Ойлер тип I

PREPARATORY PHASE

Select the duration of A (min) and the recurrence interval T (year).

Using the formula, calculate the intensity q for each increasing duration t: 5 min to A min with step 5 min

Convert the intensity q (l/s.hq) to rainfall height h (mm) using the relation: h = 0,006*q*t

Arrange the 5-minute intervals in ascending order: 0 to 5 min; 6 to 10 min, 11 to 15 min, etc.

Calculate delta h for each 5-minute interval as the difference between the calculation of rainfall heights at the end and the beginning of the interval

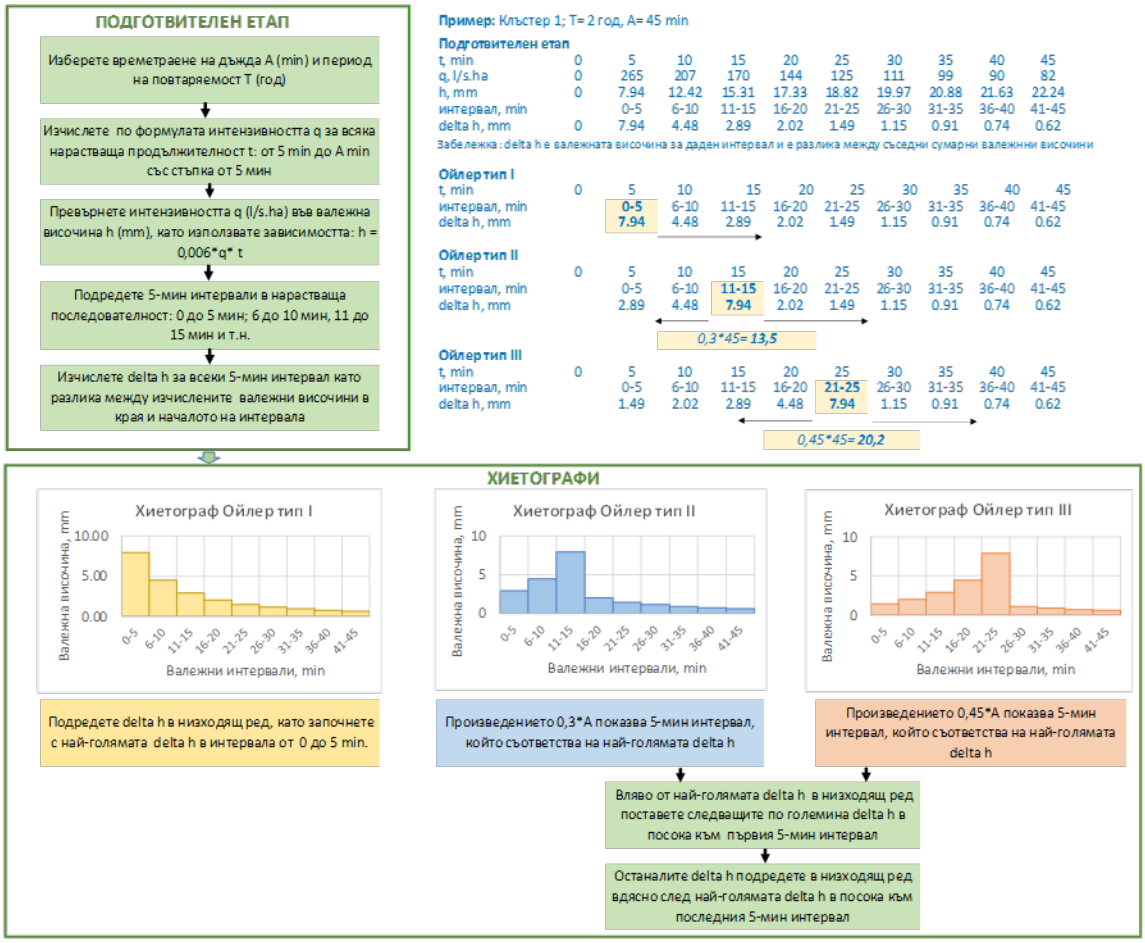
Example: Cluster 1; T = 2 years, A = 45 min

Preparatory phase

interval, min

note: delta h is the rainfall height for a given interval and is the difference between adjacent rainfall heights

Euler Type I



ХИЕТОГРАФ

Хиетограф Ойлер тил I

Валежна височина

Валежни интервали, mn

Подредете delta h в низходящ ред, като започнете с най-голямата delta h в интервала от 0 до 5 min.

Произведението 0,3* А показва 5-мин интервал, който съответства на най-голямата delta h

Произведението 0,45* А показва 5-мин интервал, който съответства на най-голямата delta h

Вляво от най-голямата delta h в низходящ ред доставете по големина delta h в посока към 5-мин интервал

Останалите delta h подредете в низходящ ред вдясно след най-

HYETOGRAPH

Hyetograph Euler Type I

Rainfall height

Rainfall intervals, mn

Arrange delta h in descending order, starting with the biggest delta h in the interval from 0 to 5 min.

The product 0,3 * A shows a 5-minute interval corresponding to the highest delta h

The product 0,45 * A shows a 5-minute interval corresponding to the highest delta h

To the left of the highest delta h, in descending order, provide the delta h according to height towards the 5-minute interval

Arrange the remaining delta h values in descending order to the right of the

голямата delta h в посока към последния 5-мин интервал highest delta h value towards the last 5-minute interval

3.2 The rainfall heights for the three types of hyetographs (Euler Type I, Euler Type II and Euler type III) for different duration of the rainfall and single overflow intervals (recurrence interval), calculated using the rainfall intensity formula in point 2.2 and following the proposed algorithm for hyetographs, are according to **Tables No 6, 7 and 8** for a duration of the rainfall of 45 min, **Tables No 9, 10 and 11** for a duration of the rainfall of 60 min and **Tables No 12, 13 and 14** for a duration of the rainfall of 90 min.

Table No 6

Calculated rainfall heights for the EULER TYPE I hyetograph with a duration of the rainfall of 45 minutes

EULER TYPE I										
Zones	**Single overflow interval (years)**	**Duration of the rainfall, t (min)**								
		0-5	**6-10**	**11-15**	**16-20**	**21-25**	**26-30**	**31-35**	**36-40**	**41-45**
Zone 1	**2**	7.937	4.48	2.888	2.018	1.492	1.149	0.913	0.744	0.618
	5	10.08	5.69	3.665	2.562	1.894	1.459	1.159	0.944	0.785
	10	11.83	6.68	4.303	3.007	2.223	1.713	1.361	1.108	0.921
Zone 2	**2**	7.092	3.42	2.021	1.337	0.953	0.714	0.556	0.446	0.366
	5	8.908	4.3	2.538	1.68	1.196	0.897	0.698	0.56	0.459
	10	10.4	5.01	2.962	1.96	1.396	1.047	0.815	0.653	0.536
Zone 3	**2**	7.725	4.31	2.752	1.914	1.41	1.083	0.859	0.699	0.58
	5	9.886	5.51	3.522	2.449	1.804	1.386	1.099	0.894	0.742
	10	11.67	6.51	4.158	2.892	2.13	1.637	1.298	1.055	0.876
Zone 4	**2**	9.077	4.27	2.493	1.638	1.161	0.867	0.674	0.539	0.441
	5	11.71	5.51	3.217	2.114	1.498	1.119	0.869	0.695	0.57
	10	13.98	6.58	3.84	2.523	1.788	1.336	1.037	0.83	0.68
Zone 5	**2**	9.329	4.63	2.78	1.857	1.331	1.002	0.783	0.629	0.517
	5	11.83	5.88	3.526	2.355	1.688	1.271	0.993	0.798	0.656
	10	13.99	6.95	4.167	2.784	1.995	1.502	1.174	0.943	0.775
Zone 6	**2**	8.681	4.66	2.913	1.997	1.457	1.111	0.877	0.71	0.587
	5	11.08	5.95	3.719	2.55	1.86	1.419	1.119	0.906	0.749
	10	13.15	7.06	4.412	3.026	2.207	1.684	1.328	1.075	0.889
Zone 7	**2**	7.028	3.49	2.089	1.395	0.999	0.752	0.588	0.472	0.388
	5	9.735	4.83	2.894	1.932	1.384	1.042	0.814	0.654	0.538
	10	12.34	6.12	3.668	2.449	1.755	1.321	1.032	0.829	0.681

Zone 8	**2**	8.509	4.55	2.837	1.943	1.416	1.079	0.851	0.689	0.569
	5	10.78	5.76	3.594	2.461	1.793	1.367	1.077	0.872	0.721
	10	12.65	6.76	4.219	2.889	2.105	1.605	1.265	1.024	0.846
Zone 9	**2**	8.48	5.13	3.465	2.514	1.918	1.518	1.236	1.029	0.872
	5	10.51	6.35	4.293	3.115	2.376	1.88	1.531	1.274	1.081
	10	12.18	7.37	4.976	3.611	2.754	2.18	1.774	1.477	1.253
Zone 10	**2**	7.289	3.76	2.347	1.632	1.215	0.949	0.768	0.639	0.543
	5	9.957	5.13	3.206	2.229	1.66	1.297	1.05	0.873	0.741
	10	12.22	6.3	3.933	2.735	2.037	1.591	1.288	1.071	0.909
Zone 11	**2**	8.127	4.3	2.671	1.823	1.326	1.009	0.794	0.642	0.531
	5	10.42	5.52	3.427	2.339	1.701	1.294	1.019	0.824	0.681
	10	12.34	6.53	4.056	2.768	2.013	1.532	1.206	0.975	0.806
Zone 12	**2**	10.22	5.32	3.268	2.217	1.605	1.218	0.957	0.772	0.637
	5	13.57	7.06	4.338	2.942	2.131	1.616	1.27	1.025	0.845
	10	16.42	8.54	5.25	3.561	2.579	1.956	1.537	1.24	1.023

Table 7

Calculated rainfall heights for the EULER TYPE II hyetograph with a duration of the rainfall of 45 minutes

EULER TYPE II										
Zones	**Single overflow interval (years)**	**Duration of the rainfall, t (min)**								
		0-5	**6-10**	**11-15**	**16-20**	**21-25**	**26-30**	**31-35**	**36-40**	**41-45**
Zone 1	**2**	2.89	4.48	7.94	2.02	1.49	1.15	0.91	0.74	0.62
	5	3.67	5.69	10.08	2.56	1.89	1.46	1.16	0.94	0.78
	10	4.30	6.68	11.83	3.01	2.22	1.71	1.36	1.11	0.92
Zone 2	**2**	2.02	3.42	7.09	1.34	0.95	0.71	0.56	0.45	0.37
	5	2.54	4.30	8.91	1.68	1.20	0.90	0.70	0.56	0.46
	10	2.96	5.01	10.40	1.96	1.40	1.05	0.82	0.65	0.54
Zone 3	**2**	2.75	4.31	7.73	1.91	1.41	1.08	0.86	0.70	0.58
	5	3.52	5.51	9.89	2.45	1.80	1.39	1.10	0.89	0.74
	10	4.16	6.51	11.67	2.89	2.13	1.64	1.30	1.06	0.88
Zone 4	**2**	2.49	4.27	9.08	1.64	1.16	0.87	0.67	0.54	0.44
	5	3.22	5.51	11.71	2.11	1.50	1.12	0.87	0.70	0.57
	10	3.84	6.58	13.98	2.52	1.79	1.34	1.04	0.83	0.68
Zone 5	**2**	2.78	4.63	9.33	1.86	1.33	1.00	0.78	0.63	0.52
	5	3.53	5.88	11.83	2.36	1.69	1.27	0.99	0.80	0.66
	10	4.17	6.95	13.99	2.78	2.00	1.50	1.17	0.94	0.78
Zone 6	**2**	2.91	4.66	8.68	2.00	1.46	1.11	0.88	0.71	0.59
	5	3.72	5.95	11.08	2.55	1.86	1.42	1.12	0.91	0.75
	10	4.41	7.06	13.15	3.03	2.21	1.68	1.33	1.08	0.89
Zone 7	**2**	2.09	3.49	7.03	1.39	1.00	0.75	0.59	0.47	0.39
	5	2.89	4.83	9.73	1.93	1.38	1.04	0.81	0.65	0.54
	10	3.67	6.12	12.34	2.45	1.75	1.32	1.03	0.83	0.68

Zone 8	**2**	2.84	4.55	8.51	1.94	1.42	1.08	0.85	0.69	0.57
	5	3.59	5.76	10.78	2.46	1.79	1.37	1.08	0.87	0.72
	10	4.22	6.76	12.65	2.89	2.11	1.60	1.26	1.02	0.85
Zone 9	**2**	3.47	5.13	8.48	2.51	1.92	1.52	1.24	1.03	0.87
	5	4.29	6.35	10.51	3.11	2.38	1.88	1.53	1.27	1.08
	10	4.98	7.37	12.18	3.61	2.75	2.18	1.77	1.48	1.25
Zone 10	**2**	2.35	3.76	7.29	1.63	1.22	0.95	0.77	0.64	0.54
	5	3.21	5.13	9.96	2.23	1.66	1.30	1.05	0.87	0.74
	10	3.93	6.30	12.22	2.73	2.04	1.59	1.29	1.07	0.91
Zone 11	**2**	2.67	4.30	8.13	1.82	1.33	1.01	0.79	0.64	0.53
	5	3.43	5.52	10.42	2.34	1.70	1.29	1.02	0.82	0.68
	10	4.06	6.53	12.34	2.77	2.01	1.53	1.21	0.98	0.81
Zone 12	**2**	3.27	5.32	10.22	2.22	1.61	1.22	0.96	0.77	0.64
	5	4.34	7.06	13.57	2.94	2.13	1.62	1.27	1.02	0.85
	10	5.25	8.54	16.42	3.56	2.58	1.96	1.54	1.24	1.02

Table 8

Calculated rainfall heights for the EULER TYPE III hyetograph with a duration of the rainfall of 45 minutes

EULER TYPE III AT PEAK OF 0.5										
Zones	**Single overflow interval (years)**	**Duration of the rainfall, t (min)**								
		0-5	**6-10**	**11-15**	**16-20**	**21-25**	**26-30**	**31-35**	**36-40**	**41-45**
Zone 1	**2**	1.49	2.02	2.89	4.48	7.94	1.15	0.91	0.74	0.62
	5	1.89	2.56	3.67	5.69	10.08	1.46	1.16	0.94	0.78
	10	2.22	3.01	4.30	6.68	11.83	1.71	1.36	1.11	0.92
Zone 2	**2**	0.95	1.34	2.02	3.42	7.09	0.71	0.56	0.45	0.37
	5	1.20	1.68	2.54	4.30	8.91	0.90	0.70	0.56	0.46
	10	1.40	1.96	2.96	5.01	10.40	1.05	0.82	0.65	0.54
Zone 3	**2**	1.41	1.91	2.75	4.31	7.73	1.08	0.86	0.70	0.58
	5	1.80	2.45	3.52	5.51	9.89	1.39	1.10	0.89	0.74
	10	2.13	2.89	4.16	6.51	11.67	1.64	1.30	1.06	0.88
Zone 4	**2**	1.16	1.64	2.49	4.27	9.08	0.87	0.67	0.54	0.44
	5	1.50	2.11	3.22	5.51	11.71	1.12	0.87	0.70	0.57
	10	1.79	2.52	3.84	6.58	13.98	1.34	1.04	0.83	0.68
Zone 5	**2**	1.33	1.86	2.78	4.63	9.33	1.00	0.78	0.63	0.52
	5	1.69	2.36	3.53	5.88	11.83	1.27	0.99	0.80	0.66
	10	2.00	2.78	4.17	6.95	13.99	1.50	1.17	0.94	0.78
Zone 6	**2**	1.46	2.00	2.91	4.66	8.68	1.11	0.88	0.71	0.59
	5	1.86	2.55	3.72	5.95	11.08	1.42	1.12	0.91	0.75
	10	2.21	3.03	4.41	7.06	13.15	1.68	1.33	1.08	0.89
Zone 7	**2**	1.00	1.39	2.09	3.49	7.03	0.75	0.59	0.47	0.39
	5	1.38	1.93	2.89	4.83	9.73	1.04	0.81	0.65	0.54
	10	1.75	2.45	3.67	6.12	12.34	1.32	1.03	0.83	0.68

Zone 8	**2**	1.42	1.94	2.84	4.55	8.51	1.08	0.85	0.69	0.57
	5	1.79	2.46	3.59	5.76	10.78	1.37	1.08	0.87	0.72
	10	2.11	2.89	4.22	6.76	12.65	1.60	1.26	1.02	0.85
Zone 9	**2**	1.92	2.51	3.47	5.13	8.48	1.52	1.24	1.03	0.87
	5	2.38	3.11	4.29	6.35	10.51	1.88	1.53	1.27	1.08
	10	2.75	3.61	4.98	7.37	12.18	2.18	1.77	1.48	1.25
Zone 10	**2**	1.22	1.63	2.35	3.76	7.29	0.95	0.77	0.64	0.54
	5	1.66	2.23	3.21	5.13	9.96	1.30	1.05	0.87	0.74
	10	2.04	2.73	3.93	6.30	12.22	1.59	1.29	1.07	0.91
Zone 11	**2**	1.33	1.82	2.67	4.30	8.13	1.01	0.79	0.64	0.53
	5	1.70	2.34	3.43	5.52	10.42	1.29	1.02	0.82	0.68
	10	2.01	2.77	4.06	6.53	12.34	1.53	1.21	0.98	0.81
Zone 12	**2**	1.61	2.22	3.27	5.32	10.22	1.22	0.96	0.77	0.64
	5	2.13	2.94	4.34	7.06	13.57	1.62	1.27	1.02	0.85
	10	2.58	3.56	5.25	8.54	16.42	1.96	1.54	1.24	1.02

Table 9

Calculated rainfall heights for the EULER TYPE I hyetograph with a duration of the rainfall of 60 minutes

EULER TYPE I													
Zones	**Single overflow interval (years)**	**Duration of the rainfall, t (min)**											
		0-5	**6-10**	**11-15**	**16-20**	**21-25**	**26-30**	**31-35**	**36-40**	**41-45**	**46-50**	**51-55**	**56-60**
Zone 1	**2**	7.94	4.48	2.89	2.02	1.49	1.15	0.91	0.74	0.62	0.52	0.45	0.39
	5	10.08	5.69	3.67	2.56	1.89	1.46	1.16	0.94	0.78	0.66	0.57	0.49
	10	11.83	6.68	4.30	3.01	2.22	1.71	1.36	1.11	0.92	0.78	0.67	0.58
Zone 2	**2**	7.09	3.42	2.02	1.34	0.95	0.71	0.56	0.45	0.37	0.31	0.26	0.22
	5	8.91	4.30	2.54	1.68	1.20	0.90	0.70	0.56	0.46	0.38	0.33	0.28
	10	10.40	5.01	2.96	1.96	1.40	1.05	0.82	0.65	0.54	0.45	0.38	0.33
Zone 3	**2**	7.73	4.31	2.75	1.91	1.41	1.08	0.86	0.70	0.58	0.49	0.42	0.36
	5	9.89	5.51	3.52	2.45	1.80	1.39	1.10	0.89	0.74	0.63	0.54	0.46
	10	11.67	6.51	4.16	2.89	2.13	1.64	1.30	1.06	0.88	0.74	0.63	0.55
Zone 4	**2**	9.08	4.27	2.49	1.64	1.16	0.87	0.67	0.54	0.44	0.37	0.31	0.27
	5	11.71	5.51	3.22	2.11	1.50	1.12	0.87	0.70	0.57	0.48	0.40	0.35
	10	13.98	6.58	3.84	2.52	1.79	1.34	1.04	0.83	0.68	0.57	0.48	0.41
Zone 5	**2**	9.33	4.63	2.78	1.86	1.33	1.00	0.78	0.63	0.52	0.43	0.37	0.32
	5	11.83	5.88	3.53	2.36	1.69	1.27	0.99	0.80	0.66	0.55	0.47	0.40
	10	13.99	6.95	4.17	2.78	2.00	1.50	1.17	0.94	0.78	0.65	0.55	0.48
	2	8.68	4.66	2.91	2.00	1.46	1.11	0.88	0.71	0.59	0.49	0.42	0.36

Zone 6													
	5	11.08	5.95	3.72	2.55	1.86	1.42	1.12	0.91	0.75	0.63	0.54	0.47
	10	13.15	7.06	4.41	3.03	2.21	1.68	1.33	1.08	0.89	0.75	0.64	0.55
Zone 7	**2**	7.03	3.49	2.09	1.39	1.00	0.75	0.59	0.47	0.39	0.32	0.28	0.24
	5	9.73	4.83	2.89	1.93	1.38	1.04	0.81	0.65	0.54	0.45	0.38	0.33
	10	12.34	6.12	3.67	2.45	1.75	1.32	1.03	0.83	0.68	0.57	0.49	0.42
Zone 8	**2**	8.51	4.55	2.84	1.94	1.42	1.08	0.85	0.69	0.57	0.48	0.41	0.35
	5	10.78	5.76	3.59	2.46	1.79	1.37	1.08	0.87	0.72	0.61	0.52	0.45
	10	12.65	6.76	4.22	2.89	2.11	1.60	1.26	1.02	0.85	0.71	0.61	0.52
Zone 9	**2**	8.48	5.13	3.47	2.51	1.92	1.52	1.24	1.03	0.87	0.75	0.65	0.58
	5	10.51	6.35	4.29	3.11	2.38	1.88	1.53	1.27	1.08	0.93	0.81	0.71
	10	12.18	7.37	4.98	3.61	2.75	2.18	1.77	1.48	1.25	1.08	0.94	0.83
Zone 10	**2**	7.29	3.76	2.35	1.63	1.22	0.95	0.77	0.64	0.54	0.47	0.41	0.36
	5	9.96	5.13	3.21	2.23	1.66	1.30	1.05	0.87	0.74	0.64	0.56	0.50
	10	12.22	6.30	3.93	2.73	2.04	1.59	1.29	1.07	0.91	0.79	0.69	0.61
Zone 11	**2**	8.13	4.30	2.67	1.82	1.33	1.01	0.79	0.64	0.53	0.45	0.38	0.33
	5	10.42	5.52	3.43	2.34	1.70	1.29	1.02	0.82	0.68	0.57	0.49	0.42
	10	12.34	6.53	4.06	2.77	2.01	1.53	1.21	0.98	0.81	0.68	0.58	0.50
Zone 12	**2**	10.22	5.32	3.27	2.22	1.61	1.22	0.96	0.77	0.64	0.53	0.46	0.39
	5	13.57	7.06	4.34	2.94	2.13	1.62	1.27	1.02	0.85	0.71	0.60	0.52
	10	16.42	8.54	5.25	3.56	2.58	1.96	1.54	1.24	1.02	0.86	0.73	0.63

Table 10

Calculated rainfall heights for the EULER TYPE II hyetograph with a duration of the rainfall of 60 minutes

EULER TYPE II													
Zones	**Single overflow interval (years)**	**Duration of the rainfall, t (min)**											
		0-5	**6-10**	**11-15**	**16-20**	**21-25**	**26-30**	**31-35**	**36-40**	**41-45**	**46-50**	**51-55**	**56-60**
Zone 1	**2**	2.02	2.89	4.48	7.94	1.49	1.15	0.91	0.74	0.62	0.52	0.45	0.39
	5	2.56	3.67	5.69	10.08	1.89	1.46	1.16	0.94	0.78	0.66	0.57	0.49
	10	3.01	4.30	6.68	11.83	2.22	1.71	1.36	1.11	0.92	0.78	0.67	0.58
Zone 2	**2**	1.34	2.02	3.42	7.09	0.95	0.71	0.56	0.45	0.37	0.31	0.26	0.22
	5	1.68	2.54	4.30	8.91	1.20	0.90	0.70	0.56	0.46	0.38	0.33	0.28
	10	1.96	2.96	5.01	10.40	1.40	1.05	0.82	0.65	0.54	0.45	0.38	0.33
Zone 3	**2**	1.91	2.75	4.31	7.73	1.41	1.08	0.86	0.70	0.58	0.49	0.42	0.36
	5	2.45	3.52	5.51	9.89	1.80	1.39	1.10	0.89	0.74	0.63	0.54	0.46
	10	2.89	4.16	6.51	11.67	2.13	1.64	1.30	1.06	0.88	0.74	0.63	0.55
Zone 4	**2**	1.64	2.49	4.27	9.08	1.16	0.87	0.67	0.54	0.44	0.37	0.31	0.27
	5	2.11	3.22	5.51	11.71	1.50	1.12	0.87	0.70	0.57	0.48	0.40	0.35
	10	2.52	3.84	6.58	13.98	1.79	1.34	1.04	0.83	0.68	0.57	0.48	0.41
Zone 5	**2**	1.86	2.78	4.63	9.33	1.33	1.00	0.78	0.63	0.52	0.43	0.37	0.32
	5	2.36	3.53	5.88	11.83	1.69	1.27	0.99	0.80	0.66	0.55	0.47	0.40
	10	2.78	4.17	6.95	13.99	2.00	1.50	1.17	0.94	0.78	0.65	0.55	0.48
	2	2.00	2.91	4.66	8.68	1.46	1.11	0.88	0.71	0.59	0.49	0.42	0.36

Zone 6													
	5	2.55	3.72	5.95	11.08	1.86	1.42	1.12	0.91	0.75	0.63	0.54	0.47
	10	3.03	4.41	7.06	13.15	2.21	1.68	1.33	1.08	0.89	0.75	0.64	0.55
Zone 7	**2**	1.39	2.09	3.49	7.03	1.00	0.75	0.59	0.47	0.39	0.32	0.28	0.24
	5	1.93	2.89	4.83	9.73	1.38	1.04	0.81	0.65	0.54	0.45	0.38	0.33
	10	2.45	3.67	6.12	12.34	1.75	1.32	1.03	0.83	0.68	0.57	0.49	0.42
Zone 8	**2**	1.94	2.84	4.55	8.51	1.42	1.08	0.85	0.69	0.57	0.48	0.41	0.35
	5	2.46	3.59	5.76	10.78	1.79	1.37	1.08	0.87	0.72	0.61	0.52	0.45
	10	2.89	4.22	6.76	12.65	2.11	1.60	1.26	1.02	0.85	0.71	0.61	0.52
Zone 9	**2**	2.51	3.47	5.13	8.48	1.92	1.52	1.24	1.03	0.87	0.75	0.65	0.58
	5	3.11	4.29	6.35	10.51	2.38	1.88	1.53	1.27	1.08	0.93	0.81	0.71
	10	3.61	4.98	7.37	12.18	2.75	2.18	1.77	1.48	1.25	1.08	0.94	0.83
Zone 10	**2**	1.63	2.35	3.76	7.29	1.22	0.95	0.77	0.64	0.54	0.47	0.41	0.36
	5	2.23	3.21	5.13	9.96	1.66	1.30	1.05	0.87	0.74	0.64	0.56	0.50
	10	2.73	3.93	6.30	12.22	2.04	1.59	1.29	1.07	0.91	0.79	0.69	0.61
Zone 11	**2**	1.82	2.67	4.30	8.13	1.33	1.01	0.79	0.64	0.53	0.45	0.38	0.33
	5	2.34	3.43	5.52	10.42	1.70	1.29	1.02	0.82	0.68	0.57	0.49	0.42
	10	2.77	4.06	6.53	12.34	2.01	1.53	1.21	0.98	0.81	0.68	0.58	0.50
Zone 12	**2**	2.22	3.27	5.32	10.22	1.61	1.22	0.96	0.77	0.64	0.53	0.46	0.39
	5	2.94	4.34	7.06	13.57	2.13	1.62	1.27	1.02	0.85	0.71	0.60	0.52
	10	3.56	5.25	8.54	16.42	2.58	1.96	1.54	1.24	1.02	0.86	0.73	0.63

Table 11

Calculated rainfall heights for the EULER TYPE III hyetograph with a duration of the rainfall of 60 minutes

EULER TYPE III AT PEAK OF 0.5													
Zones	**Single overflow interval (years)**	**Duration of the rainfall, t (min)**											
		0-5	**6-10**	**11-15**	**16-20**	**21-25**	**26-30**	**31-35**	**36-40**	**41-45**	**46-50**	**51-55**	**56-60**
Zone 1	**2**	2.02	2.89	4.48	7.94	1.49	1.15	0.91	0.74	0.62	0.52	0.45	0.39
	5	2.56	3.67	5.69	10.08	1.89	1.46	1.16	0.94	0.78	0.66	0.57	0.49
	10	3.01	4.30	6.68	11.83	2.22	1.71	1.36	1.11	0.92	0.78	0.67	0.58
Zone 2	**2**	1.34	2.02	3.42	7.09	0.95	0.71	0.56	0.45	0.37	0.31	0.26	0.22
	5	1.68	2.54	4.30	8.91	1.20	0.90	0.70	0.56	0.46	0.38	0.33	0.28
	10	1.96	2.96	5.01	10.40	1.40	1.05	0.82	0.65	0.54	0.45	0.38	0.33
Zone 3	**2**	1.91	2.75	4.31	7.73	1.41	1.08	0.86	0.70	0.58	0.49	0.42	0.36
	5	2.45	3.52	5.51	9.89	1.80	1.39	1.10	0.89	0.74	0.63	0.54	0.46
	10	2.89	4.16	6.51	11.67	2.13	1.64	1.30	1.06	0.88	0.74	0.63	0.55
Zone 4	**2**	1.64	2.49	4.27	9.08	1.16	0.87	0.67	0.54	0.44	0.37	0.31	0.27
	5	2.11	3.22	5.51	11.71	1.50	1.12	0.87	0.70	0.57	0.48	0.40	0.35
	10	2.52	3.84	6.58	13.98	1.79	1.34	1.04	0.83	0.68	0.57	0.48	0.41
Zone 5	**2**	1.86	2.78	4.63	9.33	1.33	1.00	0.78	0.63	0.52	0.43	0.37	0.32
	5	2.36	3.53	5.88	11.83	1.69	1.27	0.99	0.80	0.66	0.55	0.47	0.40
	10	2.78	4.17	6.95	13.99	2.00	1.50	1.17	0.94	0.78	0.65	0.55	0.48
Zone 6	**2**	2.00	2.91	4.66	8.68	1.46	1.11	0.88	0.71	0.59	0.49	0.42	0.36

	5	2.55	3.72	5.95	11.08	1.86	1.42	1.12	0.91	0.75	0.63	0.54	0.47
	10	3.03	4.41	7.06	13.15	2.21	1.68	1.33	1.08	0.89	0.75	0.64	0.55
Zone 7	**2**	1.39	2.09	3.49	7.03	1.00	0.75	0.59	0.47	0.39	0.32	0.28	0.24
	5	1.93	2.89	4.83	9.73	1.38	1.04	0.81	0.65	0.54	0.45	0.38	0.33
	10	2.45	3.67	6.12	12.34	1.75	1.32	1.03	0.83	0.68	0.57	0.49	0.42
Zone 8	**2**	1.94	2.84	4.55	8.51	1.42	1.08	0.85	0.69	0.57	0.48	0.41	0.35
	5	2.46	3.59	5.76	10.78	1.79	1.37	1.08	0.87	0.72	0.61	0.52	0.45
	10	2.89	4.22	6.76	12.65	2.11	1.60	1.26	1.02	0.85	0.71	0.61	0.52
Zone 9	**2**	2.51	3.47	5.13	8.48	1.92	1.52	1.24	1.03	0.87	0.75	0.65	0.58
	5	3.11	4.29	6.35	10.51	2.38	1.88	1.53	1.27	1.08	0.93	0.81	0.71
	10	3.61	4.98	7.37	12.18	2.75	2.18	1.77	1.48	1.25	1.08	0.94	0.83
Zone 10	**2**	1.63	2.35	3.76	7.29	1.22	0.95	0.77	0.64	0.54	0.47	0.41	0.36
	5	2.23	3.21	5.13	9.96	1.66	1.30	1.05	0.87	0.74	0.64	0.56	0.50
	10	2.73	3.93	6.30	12.22	2.04	1.59	1.29	1.07	0.91	0.79	0.69	0.61
Zone 11	**2**	1.82	2.67	4.30	8.13	1.33	1.01	0.79	0.64	0.53	0.45	0.38	0.33
	5	2.34	3.43	5.52	10.42	1.70	1.29	1.02	0.82	0.68	0.57	0.49	0.42
	10	2.77	4.06	6.53	12.34	2.01	1.53	1.21	0.98	0.81	0.68	0.58	0.50
Zone 12	**2**	2.22	3.27	5.32	10.22	1.61	1.22	0.96	0.77	0.64	0.53	0.46	0.39
	5	2.94	4.34	7.06	13.57	2.13	1.62	1.27	1.02	0.85	0.71	0.60	0.52
	10	3.56	5.25	8.54	16.42	2.58	1.96	1.54	1.24	1.02	0.86	0.73	0.63

Table 12

Calculated rainfall heights for the EULER TYPE I hyetograph with a duration of the rainfall of 90 minutes

EULER TYPE I																			
Zones	**Single overflow interval (years)**	**Duration of the rainfall, t (min)**																	
		0-5	**6-10**	**11-15**	**16-20**	**21-25**	**26-30**	**31-35**	**36-40**	**41-45**	**46-50**	**51-55**	**56-60**	**61-65**	**66-70**	**71-75**	**75-80**	**81-85**	**86-90**
Zone 1	**2**	7.94	4.48	2.89	2.02	1.49	1.15	0.91	0.74	0.62	0.52	0.45	0.39	0.34	0.30	0.27	0.24	0.22	0.20
	5	10.08	5.69	3.67	2.56	1.89	1.46	1.16	0.94	0.78	0.66	0.57	0.49	0.43	0.38	0.34	0.30	0.27	0.25
	10	11.83	6.68	4.30	3.01	2.22	1.71	1.36	1.11	0.92	0.78	0.67	0.58	0.51	0.45	0.40	0.36	0.32	0.29
Zone 2	**2**	7.09	3.42	2.02	1.34	0.95	0.71	0.56	0.45	0.37	0.31	0.26	0.22	0.19	0.17	0.15	0.14	0.12	0.11
	5	8.91	4.30	2.54	1.68	1.20	0.90	0.70	0.56	0.46	0.38	0.33	0.28	0.24	0.21	0.19	0.17	0.15	0.14
	10	10.40	5.01	2.96	1.96	1.40	1.05	0.82	0.65	0.54	0.45	0.38	0.33	0.29	0.25	0.22	0.20	0.18	0.16
Zone 3	**2**	7.73	4.31	2.75	1.91	1.41	1.08	0.86	0.70	0.58	0.49	0.42	0.36	0.32	0.28	0.25	0.22	0.20	0.18
	5	9.89	5.51	3.52	2.45	1.80	1.39	1.10	0.89	0.74	0.63	0.54	0.46	0.41	0.36	0.32	0.29	0.26	0.23
	10	11.67	6.51	4.16	2.89	2.13	1.64	1.30	1.06	0.88	0.74	0.63	0.55	0.48	0.42	0.38	0.34	0.30	0.28
Zone 4	**2**	9.08	4.27	2.49	1.64	1.16	0.87	0.67	0.54	0.44	0.37	0.31	0.27	0.23	0.21	0.18	0.16	0.15	0.13
	5	11.71	5.51	3.22	2.11	1.50	1.12	0.87	0.70	0.57	0.48	0.40	0.35	0.30	0.27	0.23	0.21	0.19	0.17
	10	13.98	6.58	3.84	2.52	1.79	1.34	1.04	0.83	0.68	0.57	0.48	0.41	0.36	0.32	0.28	0.25	0.22	0.20
Zone 5	**2**	9.33	4.63	2.78	1.86	1.33	1.00	0.78	0.63	0.52	0.43	0.37	0.32	0.28	0.24	0.22	0.19	0.17	0.16
	5	11.83	5.88	3.53	2.36	1.69	1.27	0.99	0.80	0.66	0.55	0.47	0.40	0.35	0.31	0.27	0.24	0.22	0.20
	10	13.99	6.95	4.17	2.78	2.00	1.50	1.17	0.94	0.78	0.65	0.55	0.48	0.41	0.36	0.32	0.29	0.26	0.23
Zone 6	**2**	8.68	4.66	2.91	2.00	1.46	1.11	0.88	0.71	0.59	0.49	0.42	0.36	0.32	0.28	0.25	0.22	0.20	0.18

	5	11.08	5.95	3.72	2.55	1.86	1.42	1.12	0.91	0.75	0.63	0.54	0.47	0.41	0.36	0.32	0.28	0.26	0.23
	10	13.15	7.06	4.41	3.03	2.21	1.68	1.33	1.08	0.89	0.75	0.64	0.55	0.48	0.42	0.38	0.34	0.30	0.28
Zone 7	**2**	7.03	3.49	2.09	1.39	1.00	0.75	0.59	0.47	0.39	0.32	0.28	0.24	0.21	0.18	0.16	0.14	0.13	0.12
	5	9.73	4.83	2.89	1.93	1.38	1.04	0.81	0.65	0.54	0.45	0.38	0.33	0.29	0.25	0.22	0.20	0.18	0.16
	10	12.34	6.12	3.67	2.45	1.75	1.32	1.03	0.83	0.68	0.57	0.49	0.42	0.36	0.32	0.28	0.25	0.23	0.21
Zone 8	**2**	8.51	4.55	2.84	1.94	1.42	1.08	0.85	0.69	0.57	0.48	0.41	0.35	0.31	0.27	0.24	0.22	0.19	0.18
	5	10.78	5.76	3.59	2.46	1.79	1.37	1.08	0.87	0.72	0.61	0.52	0.45	0.39	0.34	0.31	0.27	0.25	0.22
	10	12.65	6.76	4.22	2.89	2.11	1.60	1.26	1.02	0.85	0.71	0.61	0.52	0.46	0.40	0.36	0.32	0.29	0.26
Zone 9	**2**	8.48	5.13	3.47	2.51	1.92	1.52	1.24	1.03	0.87	0.75	0.65	0.58	0.51	0.46	0.42	0.38	0.35	0.32
	5	10.51	6.35	4.29	3.11	2.38	1.88	1.53	1.27	1.08	0.93	0.81	0.71	0.64	0.57	0.51	0.47	0.43	0.39
	10	12.18	7.37	4.98	3.61	2.75	2.18	1.77	1.48	1.25	1.08	0.94	0.83	0.74	0.66	0.60	0.54	0.50	0.46
Zone 10	**2**	7.29	3.76	2.35	1.63	1.22	0.95	0.77	0.64	0.54	0.47	0.41	0.36	0.33	0.29	0.27	0.25	0.23	0.21
	5	9.96	5.13	3.21	2.23	1.66	1.30	1.05	0.87	0.74	0.64	0.56	0.50	0.45	0.40	0.37	0.34	0.31	0.29
	10	12.22	6.30	3.93	2.73	2.04	1.59	1.29	1.07	0.91	0.79	0.69	0.61	0.55	0.49	0.45	0.41	0.38	0.35
Zone 11	**2**	8.13	4.30	2.67	1.82	1.33	1.01	0.79	0.64	0.53	0.45	0.38	0.33	0.29	0.25	0.22	0.20	0.18	0.16
	5	10.42	5.52	3.43	2.34	1.70	1.29	1.02	0.82	0.68	0.57	0.49	0.42	0.37	0.32	0.29	0.26	0.23	0.21
	10	12.34	6.53	4.06	2.77	2.01	1.53	1.21	0.98	0.81	0.68	0.58	0.50	0.44	0.38	0.34	0.30	0.27	0.25
Zone 12	**2**	10.22	5.32	3.27	2.22	1.61	1.22	0.96	0.77	0.64	0.53	0.46	0.39	0.34	0.30	0.27	0.24	0.22	0.20
	5	13.57	7.06	4.34	2.94	2.13	1.62	1.27	1.02	0.85	0.71	0.60	0.52	0.46	0.40	0.36	0.32	0.29	0.26
	10	16.42	8.54	5.25	3.56	2.58	1.96	1.54	1.24	1.02	0.86	0.73	0.63	0.55	0.49	0.43	0.39	0.35	0.31

Table 13

Calculated rainfall heights for the EULER TYPE II hyetograph with a duration of the rainfall of 90 minutes

EULER TYPE II																			
Zones	**Single overflow interval (years)**	**Duration of the rainfall, t (min)**																	
		0-5	**6-10**	**11-15**	**16-20**	**21-25**	**26-30**	**31-35**	**36-40**	**41-45**	**46-50**	**51-55**	**56-60**	**61-65**	**66-70**	**71-75**	**75-80**	**81-85**	**86-90**
Zone 1	**2**	1.15	1.49	2.02	2.89	4.48	7.94	0.91	0.74	0.62	0.52	0.45	0.39	0.34	0.30	0.27	0.24	0.22	0.20
	5	1.46	1.89	2.56	3.67	5.69	10.08	1.16	0.94	0.78	0.66	0.57	0.49	0.43	0.38	0.34	0.30	0.27	0.25
	10	1.71	2.22	3.01	4.30	6.68	11.83	1.36	1.11	0.92	0.78	0.67	0.58	0.51	0.45	0.40	0.36	0.32	0.29
Zone 2	**2**	0.71	0.95	1.34	2.02	3.42	7.09	0.56	0.45	0.37	0.31	0.26	0.22	0.19	0.17	0.15	0.14	0.12	0.11
	5	0.90	1.20	1.68	2.54	4.30	8.91	0.70	0.56	0.46	0.38	0.33	0.28	0.24	0.21	0.19	0.17	0.15	0.14
	10	1.05	1.40	1.96	2.96	5.01	10.40	0.82	0.65	0.54	0.45	0.38	0.33	0.29	0.25	0.22	0.20	0.18	0.16
Zone 3	**2**	1.08	1.41	1.91	2.75	4.31	7.73	0.86	0.70	0.58	0.49	0.42	0.36	0.32	0.28	0.25	0.22	0.20	0.18
	5	1.39	1.80	2.45	3.52	5.51	9.89	1.10	0.89	0.74	0.63	0.54	0.46	0.41	0.36	0.32	0.29	0.26	0.23
	10	1.64	2.13	2.89	4.16	6.51	11.67	1.30	1.06	0.88	0.74	0.63	0.55	0.48	0.42	0.38	0.34	0.30	0.28
Zone 4	**2**	0.87	1.16	1.64	2.49	4.27	9.08	0.67	0.54	0.44	0.37	0.31	0.27	0.23	0.21	0.18	0.16	0.15	0.13
	5	1.12	1.50	2.11	3.22	5.51	11.71	0.87	0.70	0.57	0.48	0.40	0.35	0.30	0.27	0.23	0.21	0.19	0.17
	10	1.34	1.79	2.52	3.84	6.58	13.98	1.04	0.83	0.68	0.57	0.48	0.41	0.36	0.32	0.28	0.25	0.22	0.20
Zone 5	**2**	1.00	1.33	1.86	2.78	4.63	9.33	0.78	0.63	0.52	0.43	0.37	0.32	0.28	0.24	0.22	0.19	0.17	0.16
	5	1.27	1.69	2.36	3.53	5.88	11.83	0.99	0.80	0.66	0.55	0.47	0.40	0.35	0.31	0.27	0.24	0.22	0.20
	10	1.50	2.00	2.78	4.17	6.95	13.99	1.17	0.94	0.78	0.65	0.55	0.48	0.41	0.36	0.32	0.29	0.26	0.23
Zone 6	**2**	1.11	1.46	2.00	2.91	4.66	8.68	0.88	0.71	0.59	0.49	0.42	0.36	0.32	0.28	0.25	0.22	0.20	0.18

	5	1.42	1.86	2.55	3.72	5.95	11.08	1.12	0.91	0.75	0.63	0.54	0.47	0.41	0.36	0.32	0.28	0.26	0.23
	10	1.68	2.21	3.03	4.41	7.06	13.15	1.33	1.08	0.89	0.75	0.64	0.55	0.48	0.42	0.38	0.34	0.30	0.28
Zone 7	**2**	0.75	1.00	1.39	2.09	3.49	7.03	0.59	0.47	0.39	0.32	0.28	0.24	0.21	0.18	0.16	0.14	0.13	0.12
	5	1.04	1.38	1.93	2.89	4.83	9.73	0.81	0.65	0.54	0.45	0.38	0.33	0.29	0.25	0.22	0.20	0.18	0.16
	10	1.32	1.75	2.45	3.67	6.12	12.34	1.03	0.83	0.68	0.57	0.49	0.42	0.36	0.32	0.28	0.25	0.23	0.21
Zone 8	**2**	1.08	1.42	1.94	2.84	4.55	8.51	0.85	0.69	0.57	0.48	0.41	0.35	0.31	0.27	0.24	0.22	0.19	0.18
	5	1.37	1.79	2.46	3.59	5.76	10.78	1.08	0.87	0.72	0.61	0.52	0.45	0.39	0.34	0.31	0.27	0.25	0.22
	10	1.60	2.11	2.89	4.22	6.76	12.65	1.26	1.02	0.85	0.71	0.61	0.52	0.46	0.40	0.36	0.32	0.29	0.26
Zone 9	**2**	1.52	1.92	2.51	3.47	5.13	8.48	1.24	1.03	0.87	0.75	0.65	0.58	0.51	0.46	0.42	0.38	0.35	0.32
	5	1.88	2.38	3.11	4.29	6.35	10.51	1.53	1.27	1.08	0.93	0.81	0.71	0.64	0.57	0.51	0.47	0.43	0.39
	10	2.18	2.75	3.61	4.98	7.37	12.18	1.77	1.48	1.25	1.08	0.94	0.83	0.74	0.66	0.60	0.54	0.50	0.46
Zone 10	**2**	0.95	1.22	1.63	2.35	3.76	7.29	0.77	0.64	0.54	0.47	0.41	0.36	0.33	0.29	0.27	0.25	0.23	0.21
	5	1.30	1.66	2.23	3.21	5.13	9.96	1.05	0.87	0.74	0.64	0.56	0.50	0.45	0.40	0.37	0.34	0.31	0.29
	10	1.59	2.04	2.73	3.93	6.30	12.22	1.29	1.07	0.91	0.79	0.69	0.61	0.55	0.49	0.45	0.41	0.38	0.35
Zone 11	**2**	1.01	1.33	1.82	2.67	4.30	8.13	0.79	0.64	0.53	0.45	0.38	0.33	0.29	0.25	0.22	0.20	0.18	0.16
	5	1.29	1.70	2.34	3.43	5.52	10.42	1.02	0.82	0.68	0.57	0.49	0.42	0.37	0.32	0.29	0.26	0.23	0.21
	10	1.53	2.01	2.77	4.06	6.53	12.34	1.21	0.98	0.81	0.68	0.58	0.50	0.44	0.38	0.34	0.30	0.27	0.25
Zone 12	**2**	1.22	1.61	2.22	3.27	5.32	10.22	0.96	0.77	0.64	0.53	0.46	0.39	0.34	0.30	0.27	0.24	0.22	0.20
	5	1.62	2.13	2.94	4.34	7.06	13.57	1.27	1.02	0.85	0.71	0.60	0.52	0.46	0.40	0.36	0.32	0.29	0.26
	10	1.96	2.58	3.56	5.25	8.54	16.42	1.54	1.24	1.02	0.86	0.73	0.63	0.55	0.49	0.43	0.39	0.35	0.31

Table 14

Calculated rainfall heights for the EULER TYPE III hyetograph with a duration of the rainfall of 90 minutes

EULER TYPE III AT PEAK OF 0.5																			
Zones	**Single overflow interval (years)**	**Duration of the rainfall, t (min)**																	
		0-5	**6-10**	**11-15**	**16-20**	**21-25**	**26-30**	**31-35**	**36-40**	**41-45**	**46-50**	**51-55**	**56-60**	**61-65**	**66-70**	**71-75**	**75-80**	**81-85**	**86-90**
Zone 1	**2**	0.62	0.74	0.91	1.15	1.49	2.02	2.89	4.48	7.94	0.52	0.45	0.39	0.34	0.30	0.27	0.24	0.22	0.20
	5	0.78	0.94	1.16	1.46	1.89	2.56	3.67	5.69	10.08	0.66	0.57	0.49	0.43	0.38	0.34	0.30	0.27	0.25
	10	0.92	1.11	1.36	1.71	2.22	3.01	4.30	6.68	11.83	0.78	0.67	0.58	0.51	0.45	0.40	0.36	0.32	0.29
Zone 2	**2**	0.37	0.45	0.56	0.71	0.95	1.34	2.02	3.42	7.09	0.31	0.26	0.22	0.19	0.17	0.15	0.14	0.12	0.11
	5	0.46	0.56	0.70	0.90	1.20	1.68	2.54	4.30	8.91	0.38	0.33	0.28	0.24	0.21	0.19	0.17	0.15	0.14
	10	0.54	0.65	0.82	1.05	1.40	1.96	2.96	5.01	10.40	0.45	0.38	0.33	0.29	0.25	0.22	0.20	0.18	0.16
Zone 3	**2**	0.58	0.70	0.86	1.08	1.41	1.91	2.75	4.31	7.73	0.49	0.42	0.36	0.32	0.28	0.25	0.22	0.20	0.18
	5	0.74	0.89	1.10	1.39	1.80	2.45	3.52	5.51	9.89	0.63	0.54	0.46	0.41	0.36	0.32	0.29	0.26	0.23
	10	0.88	1.06	1.30	1.64	2.13	2.89	4.16	6.51	11.67	0.74	0.63	0.55	0.48	0.42	0.38	0.34	0.30	0.28
Zone 4	**2**	0.44	0.54	0.67	0.87	1.16	1.64	2.49	4.27	9.08	0.37	0.31	0.27	0.23	0.21	0.18	0.16	0.15	0.13
	5	0.57	0.70	0.87	1.12	1.50	2.11	3.22	5.51	11.71	0.48	0.40	0.35	0.30	0.27	0.23	0.21	0.19	0.17
	10	0.68	0.83	1.04	1.34	1.79	2.52	3.84	6.58	13.98	0.57	0.48	0.41	0.36	0.32	0.28	0.25	0.22	0.20
Zone 5	**2**	0.52	0.63	0.78	1.00	1.33	1.86	2.78	4.63	9.33	0.43	0.37	0.32	0.28	0.24	0.22	0.19	0.17	0.16
	5	0.66	0.80	0.99	1.27	1.69	2.36	3.53	5.88	11.83	0.55	0.47	0.40	0.35	0.31	0.27	0.24	0.22	0.20
	10	0.78	0.94	1.17	1.50	2.00	2.78	4.17	6.95	13.99	0.65	0.55	0.48	0.41	0.36	0.32	0.29	0.26	0.23
Zone 6	**2**	0.59	0.71	0.88	1.11	1.46	2.00	2.91	4.66	8.68	0.49	0.42	0.36	0.32	0.28	0.25	0.22	0.20	0.18

	5	0.75	0.91	1.12	1.42	1.86	2.55	3.72	5.95	11.08	0.63	0.54	0.47	0.41	0.36	0.32	0.28	0.26	0.23
	10	0.89	1.08	1.33	1.68	2.21	3.03	4.41	7.06	13.15	0.75	0.64	0.55	0.48	0.42	0.38	0.34	0.30	0.28
Zone 7	**2**	0.39	0.47	0.59	0.75	1.00	1.39	2.09	3.49	7.03	0.32	0.28	0.24	0.21	0.18	0.16	0.14	0.13	0.12
	5	0.54	0.65	0.81	1.04	1.38	1.93	2.89	4.83	9.73	0.45	0.38	0.33	0.29	0.25	0.22	0.20	0.18	0.16
	10	0.68	0.83	1.03	1.32	1.75	2.45	3.67	6.12	12.34	0.57	0.49	0.42	0.36	0.32	0.28	0.25	0.23	0.21
Zone 8	**2**	0.57	0.69	0.85	1.08	1.42	1.94	2.84	4.55	8.51	0.48	0.41	0.35	0.31	0.27	0.24	0.22	0.19	0.18
	5	0.72	0.87	1.08	1.37	1.79	2.46	3.59	5.76	10.78	0.61	0.52	0.45	0.39	0.34	0.31	0.27	0.25	0.22
	10	0.85	1.02	1.26	1.60	2.11	2.89	4.22	6.76	12.65	0.71	0.61	0.52	0.46	0.40	0.36	0.32	0.29	0.26
Zone 9	**2**	0.87	1.03	1.24	1.52	1.92	2.51	3.47	5.13	8.48	0.75	0.65	0.58	0.51	0.46	0.42	0.38	0.35	0.32
	5	1.08	1.27	1.53	1.88	2.38	3.11	4.29	6.35	10.51	0.93	0.81	0.71	0.64	0.57	0.51	0.47	0.43	0.39
	10	1.25	1.48	1.77	2.18	2.75	3.61	4.98	7.37	12.18	1.08	0.94	0.83	0.74	0.66	0.60	0.54	0.50	0.46
Zone 10	**2**	0.54	0.64	0.77	0.95	1.22	1.63	2.35	3.76	7.29	0.47	0.41	0.36	0.33	0.29	0.27	0.25	0.23	0.21
	5	0.74	0.87	1.05	1.30	1.66	2.23	3.21	5.13	9.96	0.64	0.56	0.50	0.45	0.40	0.37	0.34	0.31	0.29
	10	0.91	1.07	1.29	1.59	2.04	2.73	3.93	6.30	12.22	0.79	0.69	0.61	0.55	0.49	0.45	0.41	0.38	0.35
Zone 11	**2**	0.53	0.64	0.79	1.01	1.33	1.82	2.67	4.30	8.13	0.45	0.38	0.33	0.29	0.25	0.22	0.20	0.18	0.16
	5	0.68	0.82	1.02	1.29	1.70	2.34	3.43	5.52	10.42	0.57	0.49	0.42	0.37	0.32	0.29	0.26	0.23	0.21
	10	0.81	0.98	1.21	1.53	2.01	2.77	4.06	6.53	12.34	0.68	0.58	0.50	0.44	0.38	0.34	0.30	0.27	0.25
Zone 12	**2**	0.64	0.77	0.96	1.22	1.61	2.22	3.27	5.32	10.22	0.53	0.46	0.39	0.34	0.30	0.27	0.24	0.22	0.20
	5	0.85	1.02	1.27	1.62	2.13	2.94	4.34	7.06	13.57	0.71	0.60	0.52	0.46	0.40	0.36	0.32	0.29	0.26
	10	1.02	1.24	1.54	1.96	2.58	3.56	5.25	8.54	16.42	0.86	0.73	0.63	0.55	0.49	0.43	0.39	0.35	0.31

Transitional and final provisions

§ 4. (1) The Regulation shall apply to investment projects whose investment project approval procedure and building permit issuance procedure will begin after its entry into force.

(2) The date the investment project is submitted to the competent authority for approval shall be considered as the start date of the investment project approval procedure and the building permit issuance procedure.

§ 5. The Regulation shall enter into force one year after its publication in the State Gazette.

IVAN IVANOV

MINISTER FOR REGIONAL

DEVELOPMENT AND PUBLIC WORKS