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# LAMPIRAN



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## LAMPIRAN

### A. PENGOLAHAN DATA

#### PENGUJIAN KADAR AIR

Hasil Pengamatan :

Cawan Timbang		1	2
Berat Cawan Kosong	$M_1$ Gram	11.50	11.16
Berat Cawan + Tanah Basah	$M_2$ Gram	49.19	49.21
Berat Cawan + Tanah Kering	$M_3$ Gram	44.09	44.10
Berat Air	$(M_2 - M_3)$ Gram	5.1	5.73
Berat Tanah Kering	$(M_3 - M_1)$ Gram	32.59	32.94
Kadar Air (%)	$\frac{[(M_2 - M_3)/(M_3 - M_1)] \times 100}{\%}$	15.65%	15.51%
Kadar Air Rata-Rata (%)		15.58%	

#### PENGUJIAN BERAT JENIS

No. Picnometer		A	B
Berat Picnometer	$M_1$ gram	40.35	40.37
Berat tanah kering + Picnometer	$M_2$ gram	96.50	96.50
Berat tanah kering + air + picnometer	$M_3$ gram	176.60	176.67
Berat air + picnometer	$M_4$ gram	141.44	141.45
Temperatur $t^{\circ}\text{C}$		25	
$A = M_2 - M_1$		56.15	56.13
$B = M_3 - M_4$		35.16	35.22
$C = A - B$		20.99	20.91
Berat Jenis, $G_1 = A/C$		2.675	2.684
Berat Jenis rata-rata, $G_1$		2.68	
		0.9973	



## ANALISIS UKURAN BUTIR

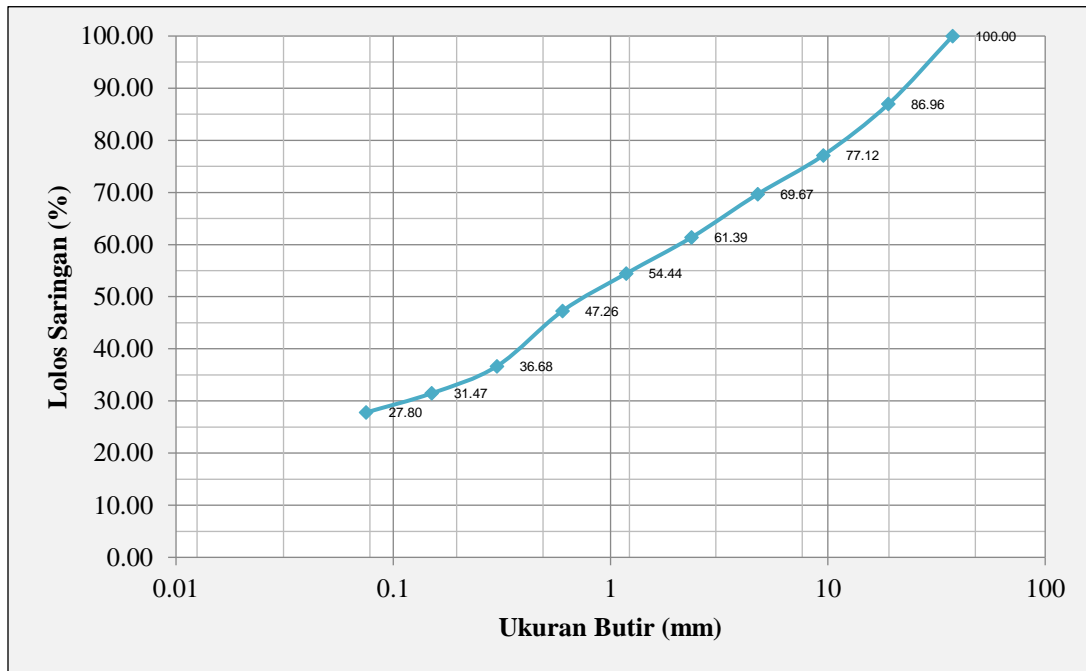
No. Saringan	Ukuran Butir (mm)	Berat Tertahan Saringan (gr)		Jumlah Berat Tertahan Saringan (gr)		Presentase (%)		Klasifikasi
		1	2	1	2	Tertahan	Lolos	
1 1/2 '	37,5	0	0	0	0	0.00	100.00	
3/4 '	19.00	108.38	152.45	108.38	152.45	13.04	86.96	30.33
3/8 '	9.52	91.11	105.75	199.49	258.2	22.88	77.12	
#4	4.75	75.37	73.51	274.86	331.71	30.33	69.67	
#8	2.36	92.64	73.03	367.50	404.74	38.61	61.39	
#16	1.18	72.39	66.48	439.89	471.22	45.56	54.44	33.00
#30	0.60	59.93	83.71	499.82	554.93	52.74	47.26	
#50	0.30	117.83	93.90	617.65	648.83	63.32	36.68	
#100	0.15	53.14	51.02	670.79	699.85	68.53	31.47	8.87
#200	0.075	37.51	35.81	708.30	735.66	72.20	27.80	
PAN	<0.075	291.70	264.34	1000.00	1000.00	100.00	0.00	27.80

USCS STANDART	Kerikil (>2)	Pasir (0,075 – 2,0)	Lanau (0,005 – 0,075)	Lempung (< 0,002)
	30.33	33.00	8.87	27.80








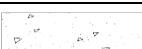
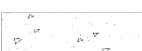
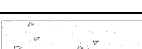
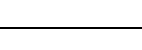
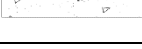
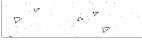


## ANALISIS UKURAN BUTIR



Grafik Analisa Ukuran butir










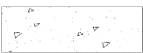



### HASIL UJI PENGEBORAN TITIK 1

KEDALAMAN (Cm)	SIMBOL		DESKRIPSI TANAH	
	HURUF	PROFIL	JENIS	WARNA
0	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
20	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
40	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
60	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
80	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
100	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
120	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
140	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
160	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
180	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
200	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan



## HASIL UJI PENGEBORAN TITIK 2

KEDALAMAN (Cm)	SIMBOL		DESKRIPSI TANAH	
	HURUF	PROFIL	JENIS	WARNA
0	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
20	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
40	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
60	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
80	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
100	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
120	CL		Pasir berlempung, berbatu (Batu gamping -Berkapur)	Kuning kecoklatan
140	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
160	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
180	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan
200	CL		Pasir berlempung, berbatu (Batu gamping - Berkapur)	Kuning kecoklatan



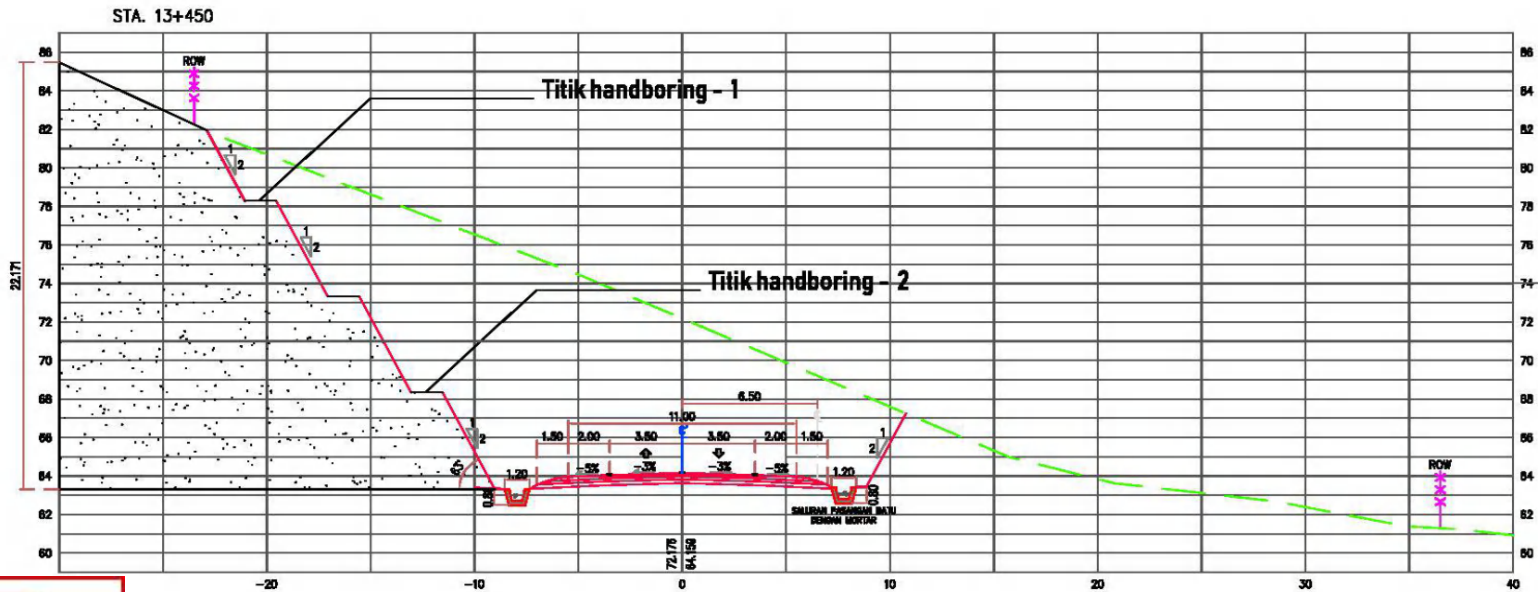
# Lokasi Handboring GORR STASIUN 13+450

TITIK - 1 : 0°38'44.60"N | 122°56'45.91"E

TITIK- 2 : 0°38'74.20"N | 122°56'76.20"E

SKALA

1:200



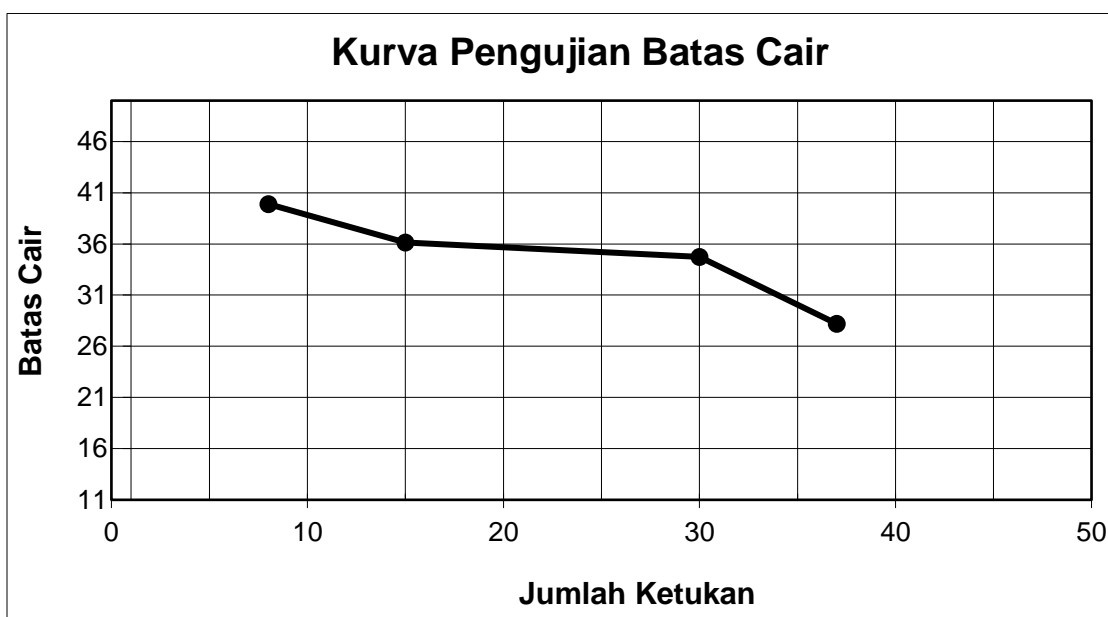
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## PEMERIKSAAN ATTERBERG LIQUIT LIMIT

Agregat  
Lokasi

Tanah  
GORR STA 13+600

Macam Percobaan	BATAS PLASTIS (LL)			
	I	II	III	IV
Nomor Cawan				
Jumlah Pukulan	8	15	30	37
Brk Tnh Bsh + Cawan	27.76	31.80	27.62	31.72
Brk Tnh Krg + Cawan	22.43	25.77	22.84	26.74
Berat Air	5.3	6.0	4.8	5.0
Berat Cawan	9.07	9.09	9.08	9.08
Brk Tnh kering	13.4	16.7	13.8	17.7
Kadar Air (%)	39.9	36.2	34.7	28.2



BATAS CAIR (LL)	BATAS PLASTIS (PL)	PLASTIS INDEX (PI)
33.90	23.13	10.77



## GESER LANGSUNG TITIK 1

Pekerjaan

Lokasi : GORR 13+600

Kordinat : 0°38'44.60"N | 122°56'45.91"E

Diameter 6.3 cm

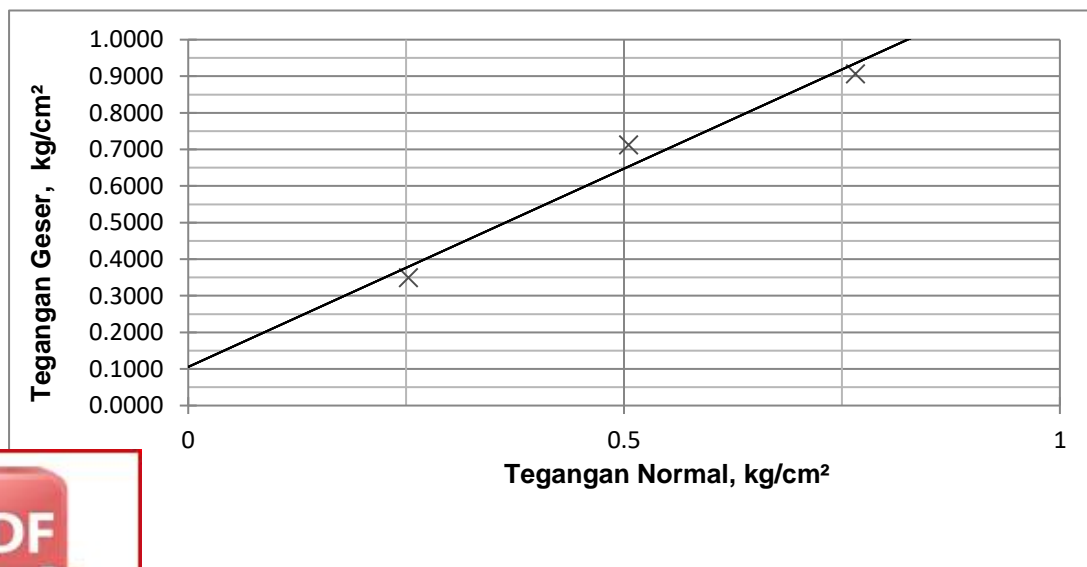
Area 31.67 cm<sup>2</sup>

Tinggi 2.00 cm

Volume 63.34 cm<sup>3</sup>

Waktu Pembebanan = 0.06 m/menit

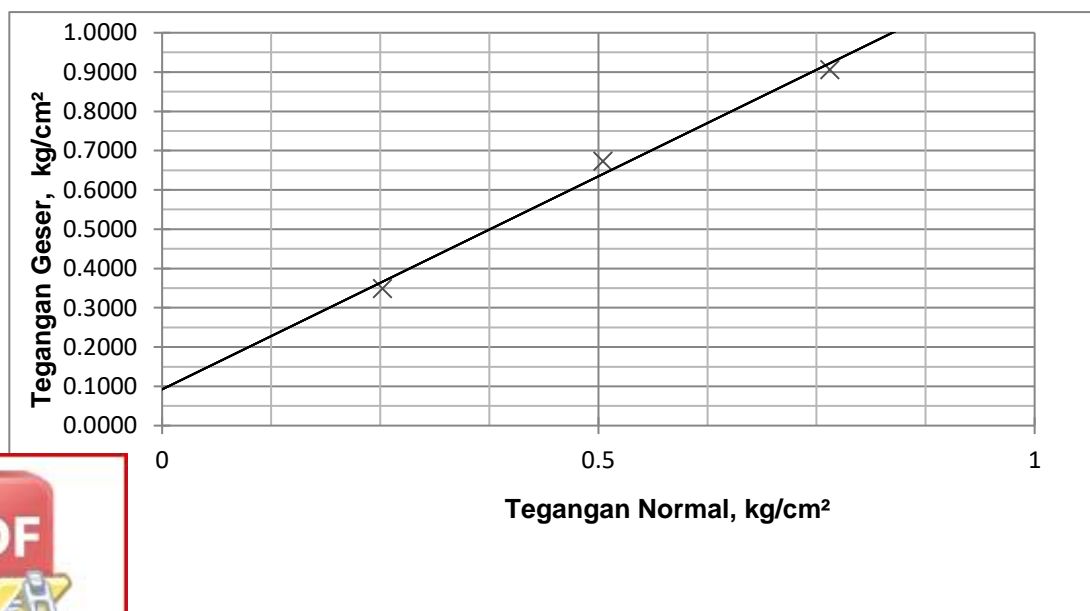
Beban	kg	8	16	24
Berat tanah + Cincin	gr	178.06	178.06	178.06
Berat cincin	gr		57.20	
Berat tanah	gr	120.86	120.86	120.86
Kadar air awal	w <sub>N</sub> (%)	11.82	11.82	11.82
Berat volume basah	g <sub>b</sub> (g/cm <sup>3</sup> )	1.91	1.91	1.91
Berat volume Kering	g <sub>d</sub> (g/cm <sup>3</sup> )	1.71	1.71	1.71
Kadar air akhir	w <sub>N</sub> (%)	18.65	20.77	18.28
Tegangan Normal	s <sub>n</sub> (kg/cm <sup>2</sup> )	0.25	0.51	0.77
Tegangan Geser saat runtuh	t (kg/cm <sup>2</sup> )	0.350	0.712	0.906
Perubahan Geser saat runtuh	d <sub>h</sub> (%)	0.39	0.71	1.04
Sudut gesek dalam, φ =		25 °		
Kohesi, c =		0.106 kg/cm <sup>2</sup> = 10.36 kN/m <sup>2</sup>		



## GESER LANGSUNG TITIK 2

Pekerjaan :  
 Lokasi : GORR 13+600  
 Koordinat : 0°38'44.60"N | 122°56'45.91"E  
 Diameter 6.3 cm  
 Area 31.67 cm<sup>2</sup>  
 Tinggi 2.00 cm  
 Volume 63.34 cm<sup>3</sup>  
 Waktu Pembebanan = 0.06 m/menit

Beban	kg	8	16	24
Berat tanah + Cincin	gr	178.06	178.06	178.06
Berat cincin	gr		57.25	
Berat tanah	gr	120.81	120.81	120.81
Kadar air awal	w <sub>N</sub> (%)	11.82	11.82	11.82
Berat volume basah	g <sub>b</sub> (g/cm <sup>3</sup> )	1.91	1.91	1.91
Berat volume Kering	g <sub>d</sub> (g/cm <sup>3</sup> )	1.71	1.71	1.71
Kadar air akhir	w <sub>N</sub> (%)	18.65	20.77	18.28
Tegangan Normal	s <sub>n</sub> (kg/cm <sup>2</sup> )	0.25	0.51	0.77
Tegangan Geser saat runtuh	t (kg/cm <sup>2</sup> )	0.350	0.673	0.906
Perubahan Geser saat runtuh	d <sub>h</sub> (%)	0.46	0.63	0.79
Sudut gesek dalam, φ				
=		25°		
Kohesi, c	=	0.092	kg/cm <sup>2</sup>	= 9,05 kN/m <sup>2</sup>



## Parameter Erodibilitas Tanah

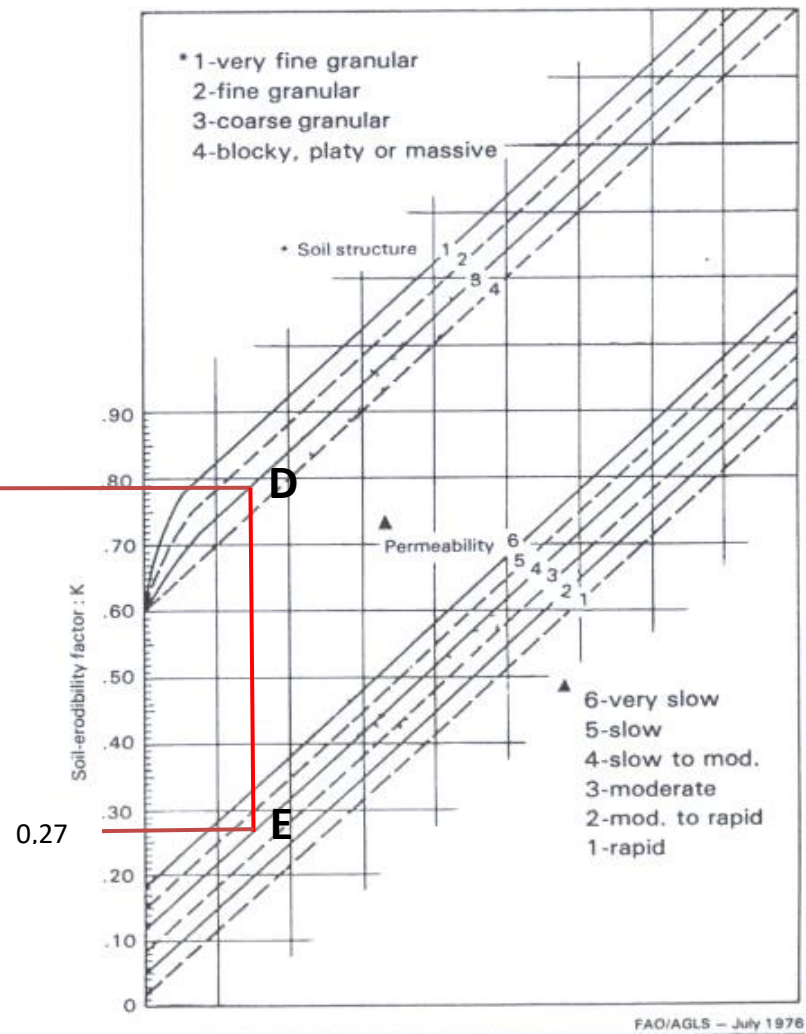
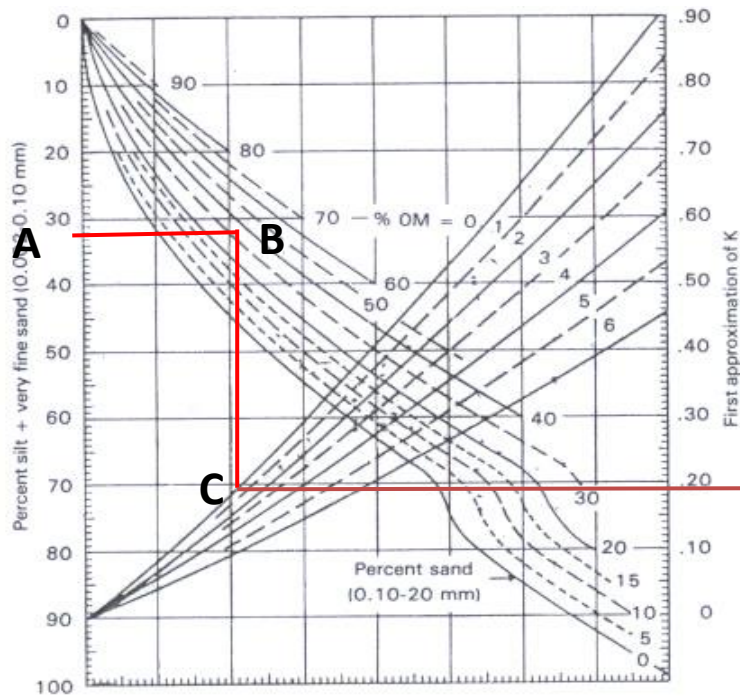
Karakteristik tanah yang sudah diketahui kemudian dimasukkan dalam nomograf beberapa parameter yang harus diketahui adalah sebagai berikut analisis:

- a. Debu + pasir sangat halus (0.002 – 0.10 mm) = 31.47 %
- b. Pasir (0.10 mm sampai dengan 2.00 mm) = 33.59 %
- c. Kandungan bahan organik = 0%
- e Struktur tanah : Granular sedang dan besar (katagori 3)
- f. Permeabilitas tanah : Sedang sampai lambat (moderate to slow)  
termasuk katagori 4





## MENENTUKAN NILAI K (NOMOGRAF)



## PEMODELAN USLE

Lereng tanpa vegetasi

$$A = R.K.L.S.C.P$$

TAHUN 2017					
	R	K	L.S	C	P
A	45.010	0.27	5.241	0.5	0.2
A	6.37	Ton /Ha thn			
TAHUN 2018					
A	50.803	0.27	5.241	0.5	0.2
A	7.19	Ton / Ha /thn			
Rata-Rata Pertahun 6.78 Ton / Ha atau 2.53m <sup>3</sup>					

Lereng dengan sistem vegetasi

$$A = R.K.L.S.C.P$$

TAHUN 2017					
	R	K	L.S	C	P
A	45.010	0.27	5.241	0.3	0.2
A	2.87	Ton /Ha thn			
TAHUN 2018					
A	50.803	0.27	5.241	0.3	0.2
A	2.23	Ton / Ha /thn			
Rata-Rata Pertahun 3.05 Ton / Ha atau 1.44 m <sup>3</sup>					

### Keterangan

A = Jumlah tanah yang hilang rata-rata setiap tahun (ton/ha/tahun)

R = Indeks daya erosi curah hujan (erosivitas Hujan)

K = Indeks kepekaan tanah terhadap erosi (erosibilitas tanah )

LS = Faktor Panjang (L) dan curamnya (S) Lereng

C = Faktor tanaman (Vegetasi)

P = Faktor Usaha-usaha Pencegahan Erosi

Rata Pertahun = (Nila A tahun 2017 + Tahun 2018 / 2)



## PERSAMAAN FAKTOR PANJANG DAN KEMIRINGAN LERENG (LS)

Diketahui ;

Panjangnya Lereng (L) 225 m

Curamnya Lereng (S) 63°

**Lereng 63°**

$$\begin{aligned}
 LS &= (l / 22)m c'(\cos\alpha)^{1,50} [0,5(\sin\alpha)^{1,25} + (\sin\alpha)^{2,25}] \\
 &= 55/22 * 0,5 * 34 * (0,85)^{1,50} [0,5(0,85)^{1,25} + (0,85)^{2,25}] \\
 &= 5.241
 \end{aligned}$$



## ANALISIS INFILTRASI

Radius ring pengukur, (a)	30 cm		
Kedalaman Pembenaan	8 cm		
Kedalaman Pengeangan	12 cm		
marcosopic capitaly length parameter,			
Simbol	Parameter	Titik 1	Titik 2
F	laju infiltrasinya	1.07	1.01
fc	Laju infiltrasi tetap	6.2	13.6
f0	Laju infiltrasi awal	12.5	14
k	Konstanta geofisik	0.01	0.002
e		2.718	

Hasil yang diperoleh adalah

No	Lokasi	T	Fo-fc	Penurunan/menit	Cm/Jam
1	Titik 1	2	12.5	0	
2	Titik 1	2	11.3	1.2	36
3	Titik 1	2	10.9	1.6	48
4	Titik 1	2	10.9	1.6	48
5	Titik 1	2	10.8	1.7	51
6	Titik 1	2	10.8	1.7	51
7	Titik 1	2	10.7	1.8	54
8	Titik 1	2	10.7	1.8	54
9	Titik 1	2	10.6	1.9	57
10	Titik 1	2	8.8	3.7	111
11	Titik 1	2	8.6	3.9	117
12	Titik 1	2	7.4	5.1	153
13	Titik 1	2	6.6	5.9	177
14	Titik 1	2	6.2	6.3	189
15	Titik 1	2	6.2	6.3	189

Lokasi	T	Fo-fc
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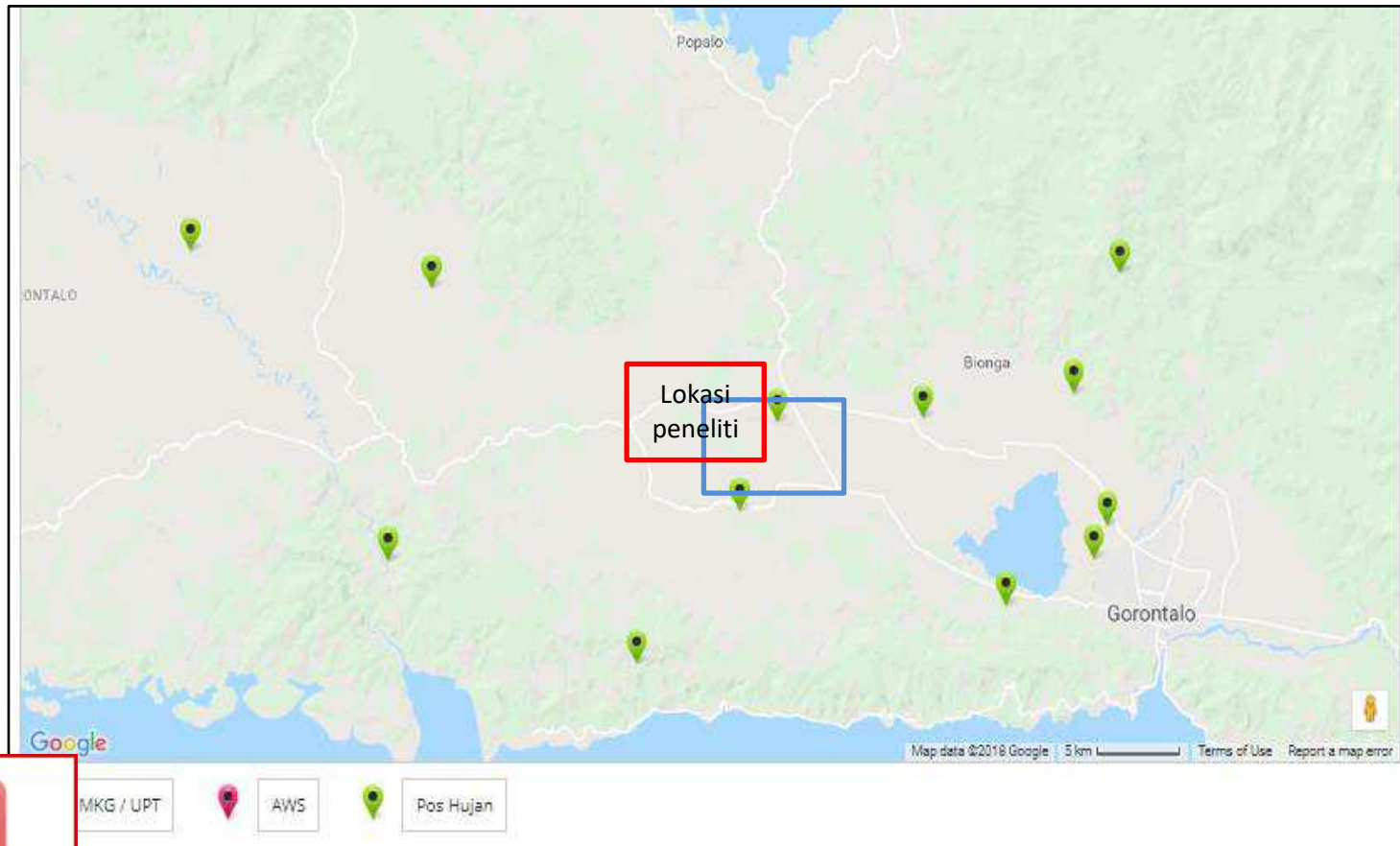
### ANALISIS INFILTRASI

No	Lokasi	T	Fo-fc	Penurunan/menit	Cm/Jam
1	Titik 2	2	14	0	
2	Titik 2	2	13.5	0.5	15
3	Titik 2	2	13.7	0.3	9
4	Titik 2	2	13.6	0.4	12
5	Titik 2	2	13.6	0.4	12
6	Titik 2	2	13.6	0.4	12
7	Titik 2	2	13.6	0.4	12
8	Titik 3	2	13.6	0.4	12
9	Titik 4	2	13.6	0.4	12
9	Titik 5	2	13.6	0.4	12
9	Titik 6	2	13.6	0.4	12
9	Titik 7	2	13.6	0.4	12
9	Titik 8	2	13.6	0.4	12
9	Titik 9	2	13.6	0.4	12
9	Titik 10	2	13.6	0.4	12
No	Lokasi	T	Fo-fc		



## B. DOKUMENTASI

### PETA TITIK POS HUJAN



Sumber : Website BMKG

## Luas Cakupan Penelitian



Keliling ⓘ

2,45 km

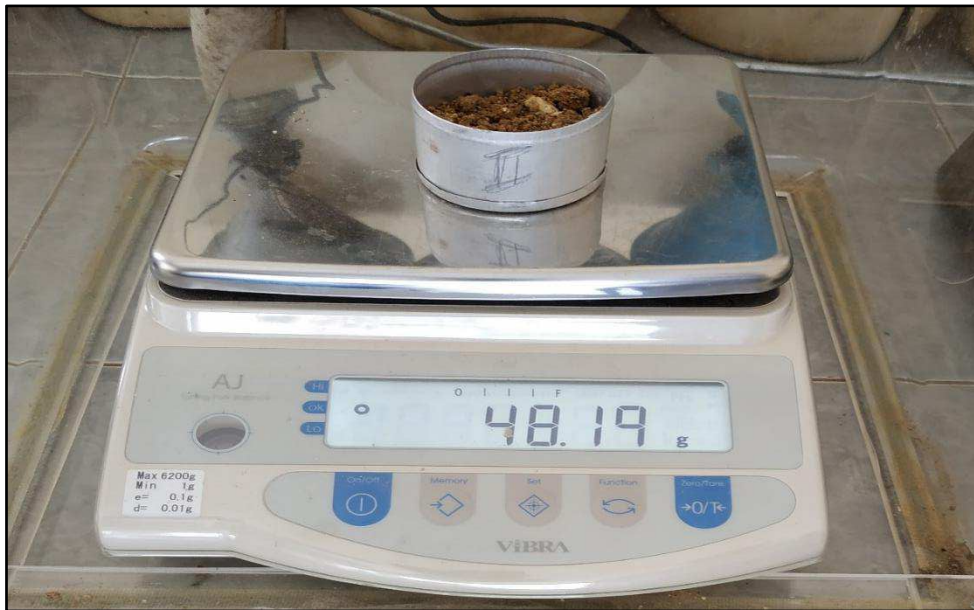
Luas

2.914 m<sup>2</sup>



Optimization Software:  
[www.balesio.com](http://www.balesio.com)

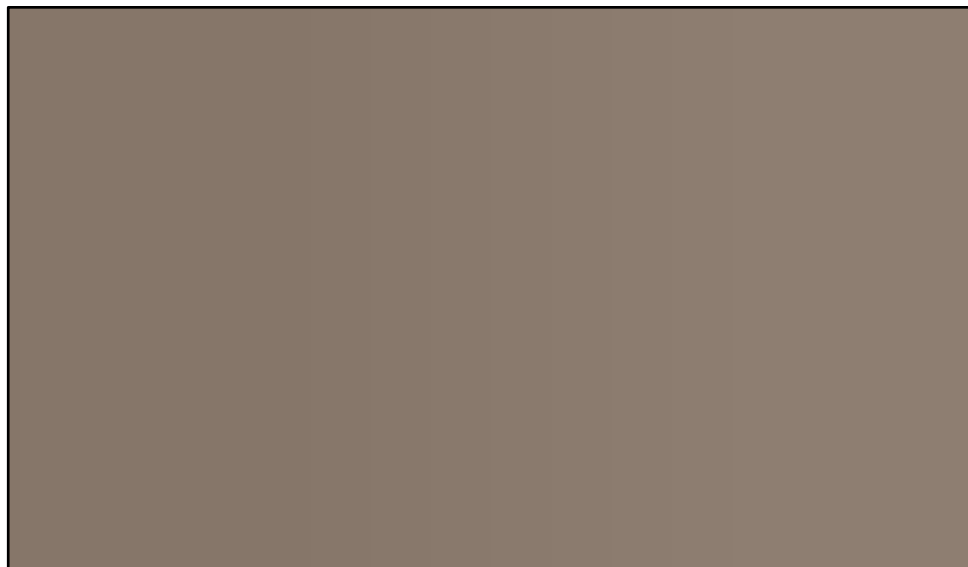
## PENGUJIAN KADAR AIR





**PENGUJIAN BERAT JENIS**

### PENGUJIAN BERAT JENIS



## PENGUJIAN KUAT GESER



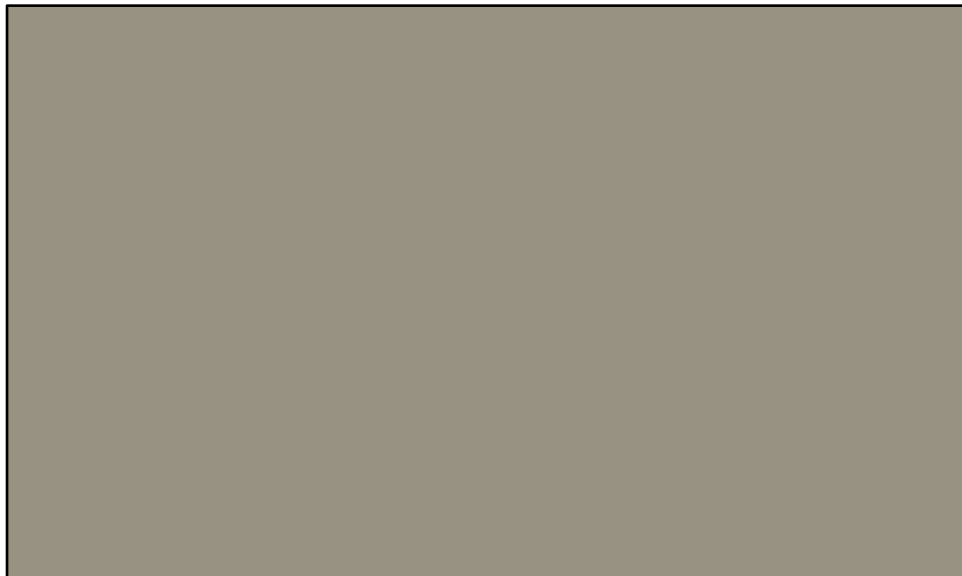
### PENGUJIAN ANALISIS UKURAN BUTIR



### PENGUJIAN BATAS ATTERBERG



### PENGUJIAN BATAS ATTERBERG



## PENGEBORAN LAPANGAN



## PENGEBORAN LAPANGAN





### PENGUJIAN INFILTRASI



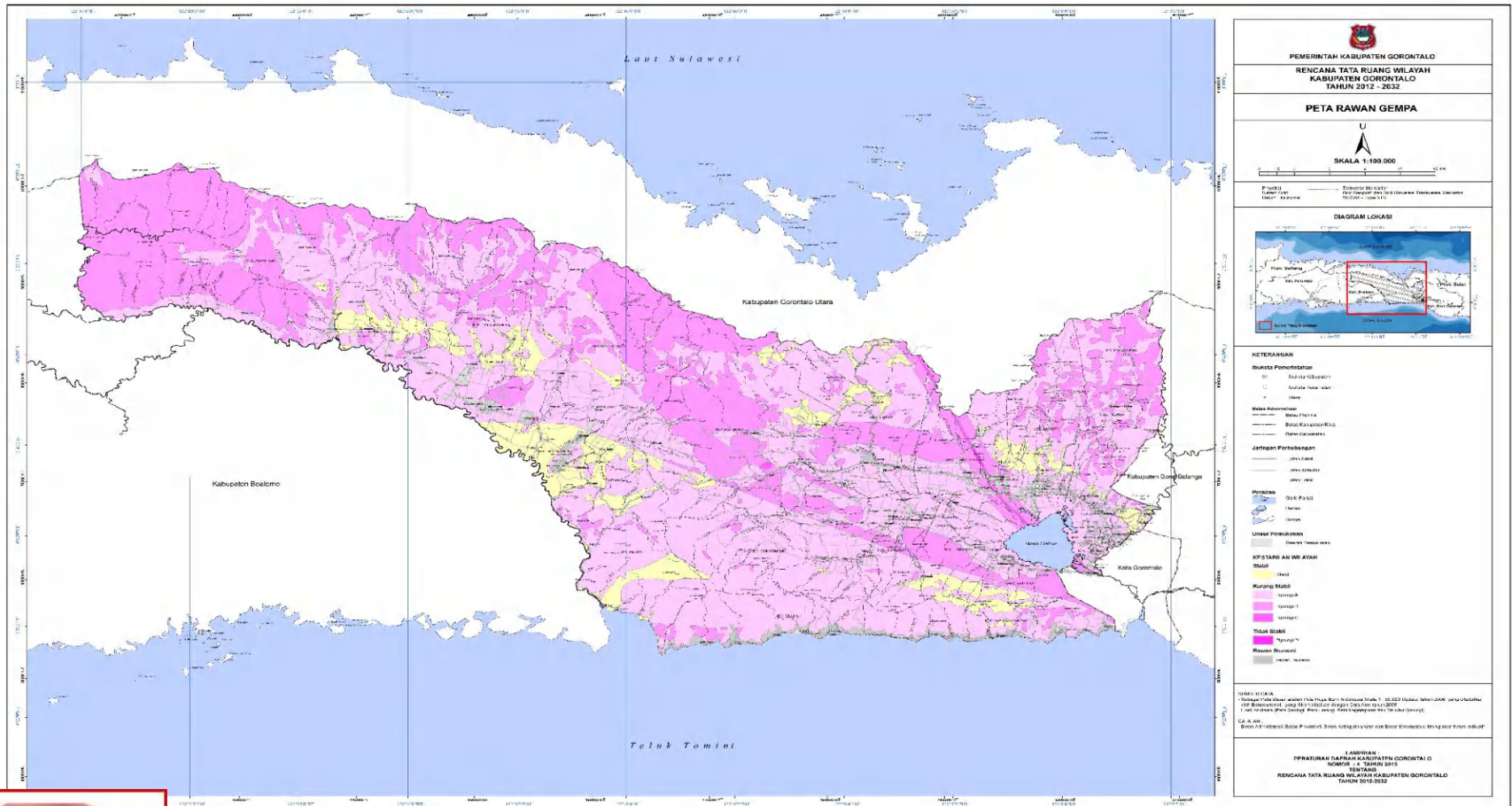
### PENGUJIAN UNSUR PH tanah



**PENGUJIAN UNSUR KIMIWI TANAH**

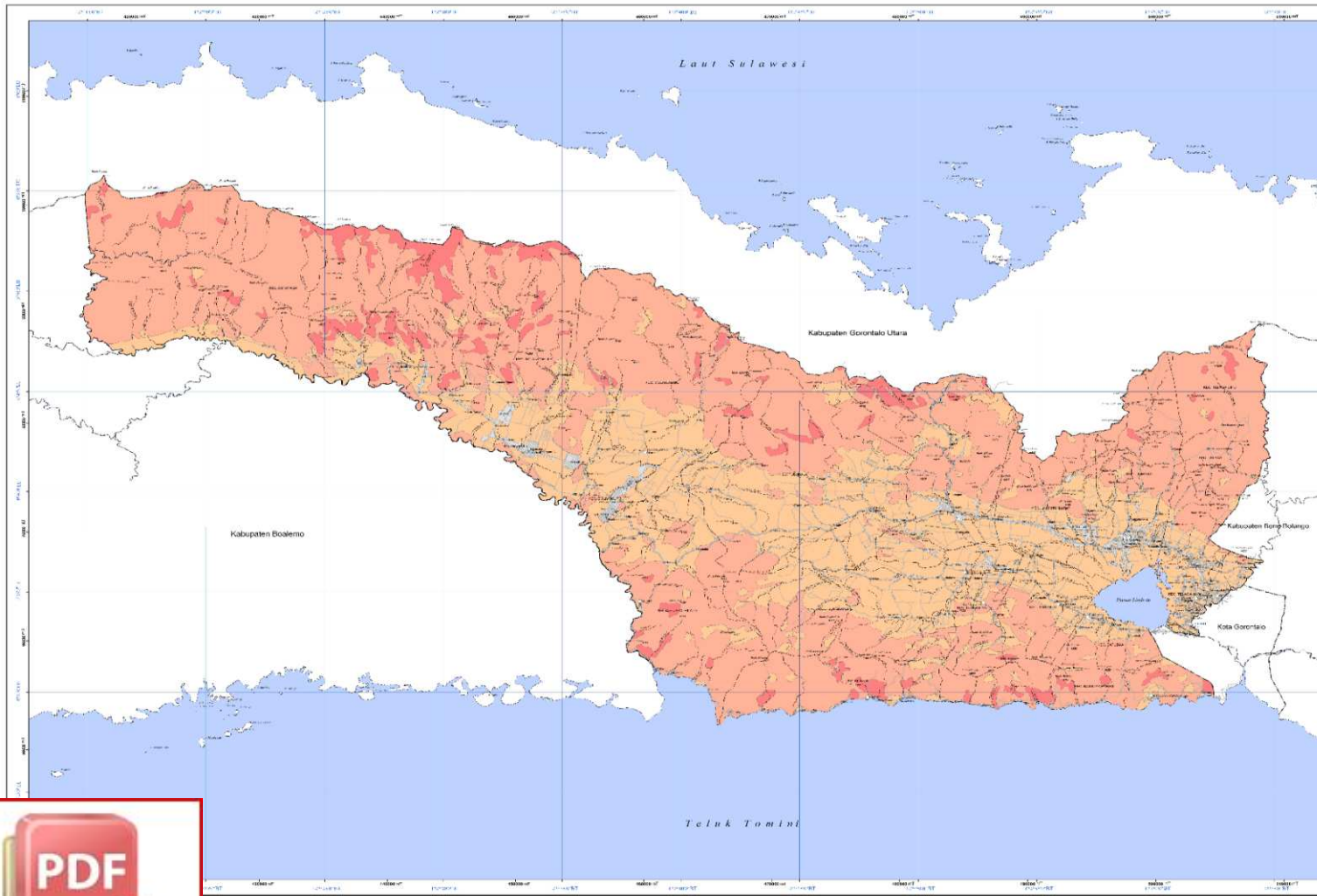
### PENGUJIAN UNSUR KIMIWI TANAH





Lampiran: Peta Rawan Gempa Kawasan Gorontalo Outer Ring Road (GORR)  
 Sumber: Pemda Kabupaten Gorontalo





**PEMERINTAH KABUPATEN GORONTALO**  
**RENCANA TATA RUANG WILAYAH**  
**KABUPATEN GORONTALO**  
**TAHUN 2019 - 2032**

**PETA RAWAN LONGSOR**

U  
**SKALA** 1:100.000

**DIAGRAM LOKASI**

**KETERANGAN**

- Suduta Perencanaan**
  - Bujur
  - Bujur Kanan
  - Utara
- Batas Administrasi**
  - Kota
  - Kabupaten
  - Kecamatan
- Jaringan Perhubungan**
  - Jalan Aspal
  - Jalan Keras
  - Jalan Lantai
- Perairan**
  - Laut
  - Sungai
  - Danau
- Linear Perumahan**
  - Ekspor Perumahan
- Rawan Longsor**
  - Rendah
  - Sedang
  - Tinggi

**REVISI**  
 (1) 2019: Peta Dasar 2018 dan Peta Rupa Bumi 1:50.000 Tahun 2000 yang direvisi  
 (2) 2020: Peta Dasar 2019 dan Peta Rupa Bumi 1:50.000 Tahun 2019 yang direvisi  
 (3) 2021: Peta Dasar 2020 dan Peta Rupa Bumi 1:50.000 Tahun 2020 yang direvisi  
 (4) 2022: Peta Dasar 2021 dan Peta Rupa Bumi 1:50.000 Tahun 2021 yang direvisi

**LAMPIRAN**  
**PERATURAN DAERAH KABUPATEN GORONTALO**  
**NO. 4 TAHUN 2019**  
**TENTANG**  
**RENCANA TATA RUANG WILAYAH KABUPATEN GORONTALO**  
**TAHUN 2019 - 2032**

**Optimization Software:**  
[www.balesio.com](http://www.balesio.com)

Lampiran: Peta Rawan Longsor Kawasan Gorontalo Outer Ring Road (GORR)  
 Sumber: Pemda Kabupaten Gorontalo

