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THE REPUBLIC OF KOREA

THE STUDY ON RIVER ENVIRONMENT IMPROVEMENT FOR THE TRIBUTARIES OF HAN RIVER SYSTEM IN SEOUL MUNICIPALITY AND ITS VICINITY

VOLUME 3
SUPPORTING REPORT

JANUARY 1992

JAPAN INTERNATIONAL COOPERATION AGENCY

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Chapter 1 Introduction

1.1 Purpose of this study

Rainfall and discharge were observed in order to analyse hydrological and pollution loading balance within the basins and to understand the present flow-regime.

1.2 Study Method

(1) Rainfall Observation

In order to understand the precipitation trend of each basin in terms of time and location, rainfall was measured from June 20, 1990 until July 18, 1991 at the five places where the self recording raingauges, SK1-10, were installed. The rainfall data were arranged as ten minute precipitation data through the whole observation period.

In order to understand the hydrological balance and pollution loading balance of each basin throughout the year, the water level of 15 stations were measured. Afterwards these data were utilized to determine the design conditions of water quality and the flow regime improvement plan.

(2) Discharge Observation

Observation started at fifteen places on April 9, 1990. In the beginning time, water level was recorded once a day through visual observations. Water level was recorded through the self-registering water level gauges, SUIKEN W-021-Z, installed from September to November 1991, until July 8, 1991.
The discharge survey, which measures velocity and depth in river cross sections, was carried out at every water level gauging station.

The water level data of a day was average figure of water levels of 6am and 6pm. Excepting the aforesaid stational observation, the discharge observation was conducted once droughty water period at the water resources in order to determine base run-off base flow.

Chapter 2 Rainfall Analysis

2.1 Location of Observation Stations

The locations of the observation stations for rainfall are shown in Table 2.1-1 and Fig. 2.1-1.

Table 2.1-1 Rainfall Observation Station

River name	Station name	Type	Available data	Remarks
Anyang	Yangchon-gu	Self	Jan. 1'90 to Jun. 12'91	Existing
ditto	Kuro-gu	ditto	Jan. 1'90 to Jun. 12'91	ditto
ditto	Yongdungpo-gu	ditto	Jan. 1'90 to Jun. 12'91	ditto
ditto	Kwangmyong-gu	ditto	Jan. 1'90 to Jun. 12'91	ditto
ditto	Anyang-shi	Manual	Jan. 1'90 to Jun. 12'91	ditto
ditto	Kunpo-shi	Self	Jan. 1'90 to Jun. 12'91	ditto
ditto	Uiwang-shi	Manual	Jan. 1'90 to Jun. 16'91	ditto
ditto	Seoul National Univ.	Self	Jun. 20'90 to Jul. 16'91	New
ditto	Tokjang Primary School	Self	Jun. 20'91 to Jul. 16'91	New
ditto	Anyang Middle School	Self	Jan. 20'91 to Jul. 16'91	New
Yangjae	Socho-gu	Self	Jan. 1'91 to Jun. 12'91	Existing
ditto	Kangnam-gu	Self	Jan. 1'91 to Jun. 12'91	ditto
ditto	Kwachon-gu	Self	Jan. 1'91 to Jun. 12'91	ditto
ditto	Songnam-shi	Self	Jan. 1'91 to Jun. 12'91	ditto
Ui	Dobong-gu	Self	Jan. 1'91 to Jun. 12'91	ditto
ditto	Songbulsa	Self	Jun. 20'91 to Jul. 16'91	New
Chungroung	Songbuk-gu	Self	Jan. 1'91 to Jun. 12'91	Existing
ditto	Tongdaemun-gu	Self	Jan. 1'91 to Jun. 12'91	ditto
ditto	National Univ.	Self	Jun. 20'91 to Jul. 16'91	New

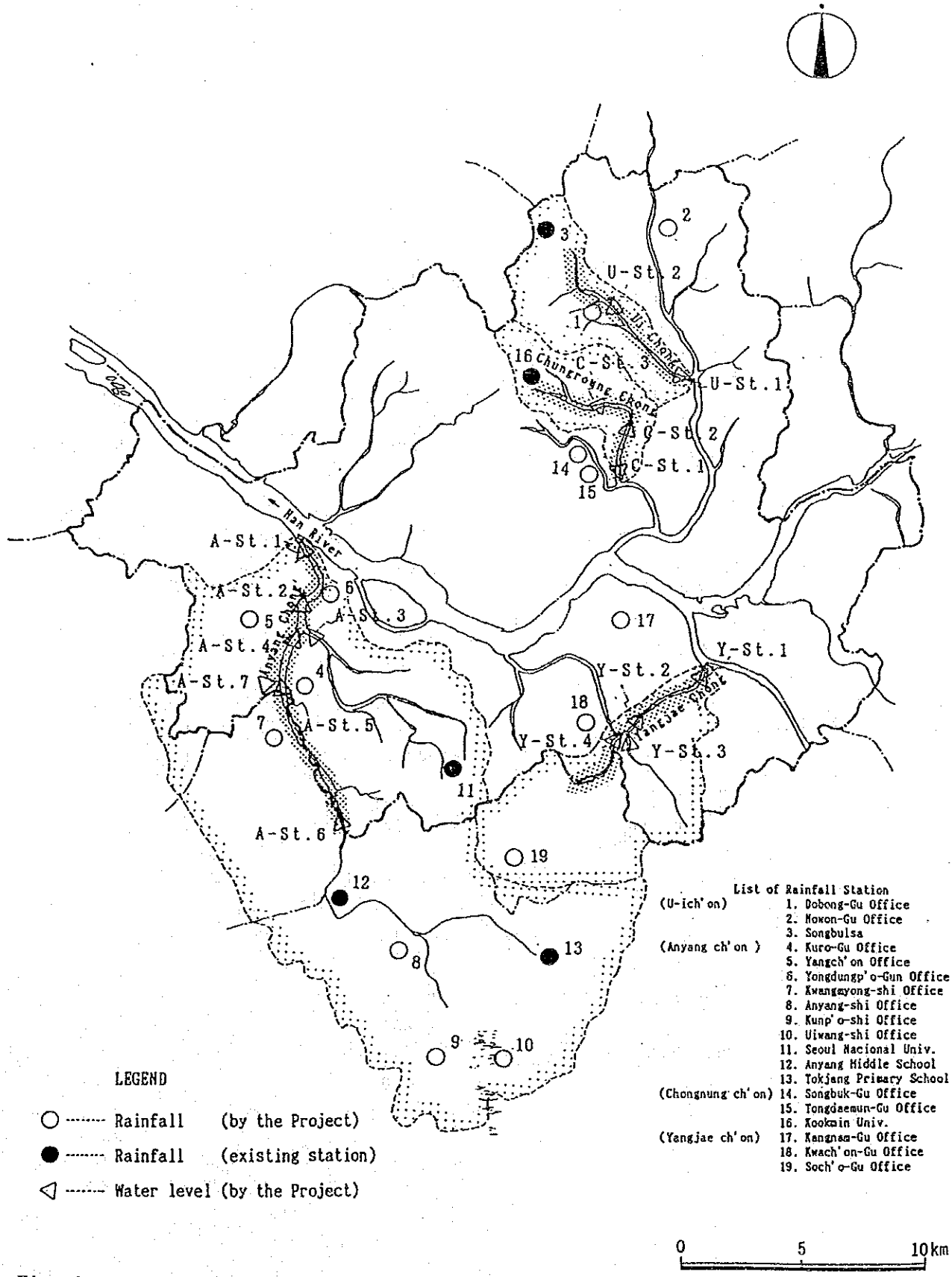


Fig. 2.1-1 Location Map of Rainfall Observation Stations

2.2 Areal Rainfall

Areal rainfall was obtained with the following calculation methods.

a. Average method between January 1 in 1990 and June 30 in 1991.

b. Thiessen method

The Thiessen polygon and ratio are shown below.

Anyang Chong

Station name	Thiessen rate
Yangchon-gu	0.085
Kuro-gu	0.068
Yongdungpo-gu	0.054
Kwangmyong-shi	0.156
Anyang-shi	0.095
Kunpo-shi	0.060
Uiwang-shi	0.058
Seoul National Univ.	0.120
Tokjang Primary School	0.104
Anyang Middle School	0.170
Kwachon-shi	0.030
total	1.000

Yangjae Chong

Station name	Thiessen rate
Socho-gu	0.439
Kangnam-gu	0.062
Kwachon-shi	0.460
Tokjang Primary School	0.104
Songnam-shi	0.010
total	1.000

Ui Chong

Station name	Thiessen rate
Dobong-gu	0.340
Songbulsa	0.602
Songbuk-gu	0.009
National Univ.	0.049
total	1.000

Chungroung Chong

Station name	Thiessen rate
Dobong-gu	0.144
Songbuk-gu	0.337
Tongdaemun-gu	0.093
National Univ.	0.426
total	1.000

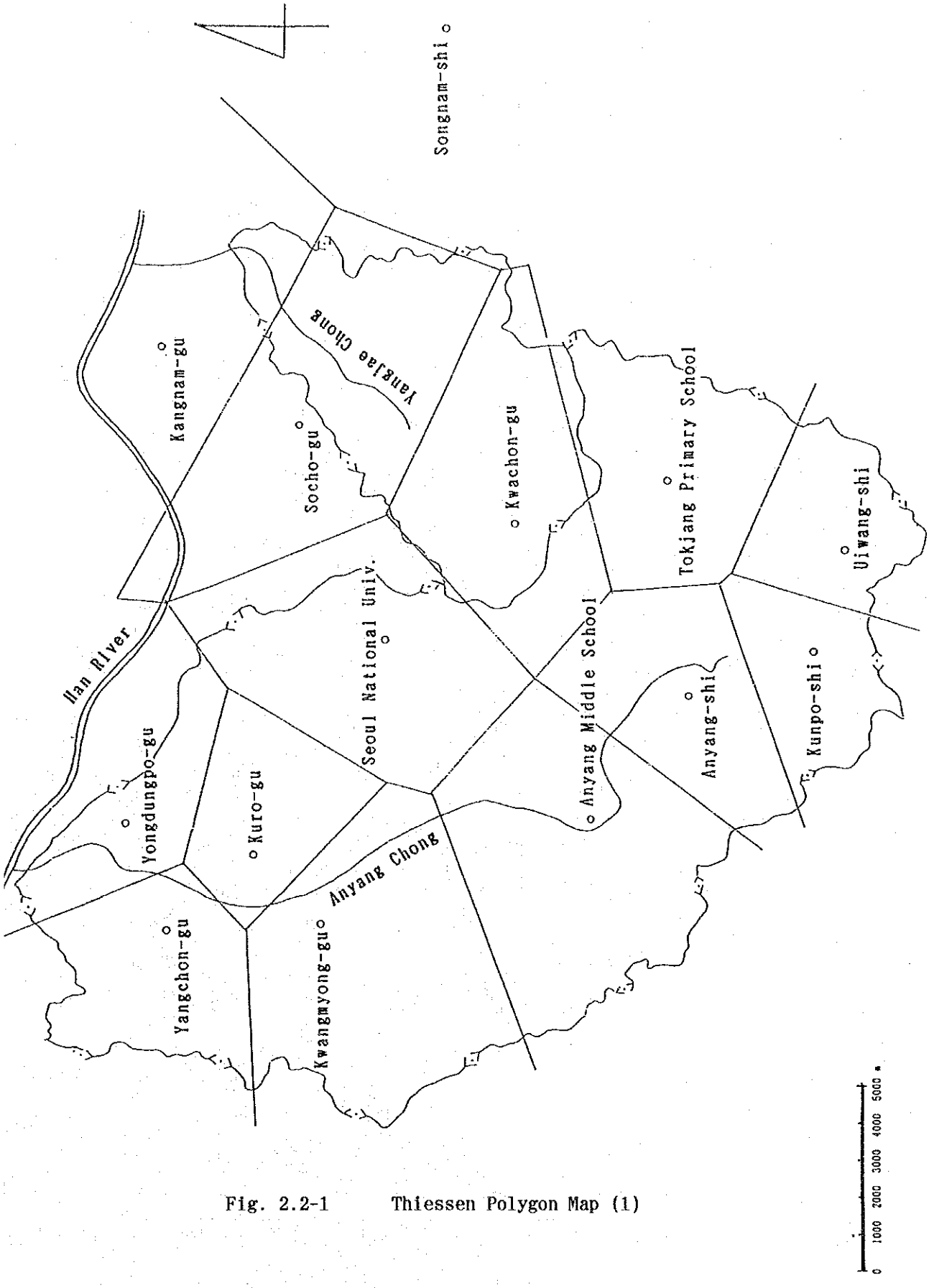


Fig. 2.2-1 Thiessen Polygon Map (1)

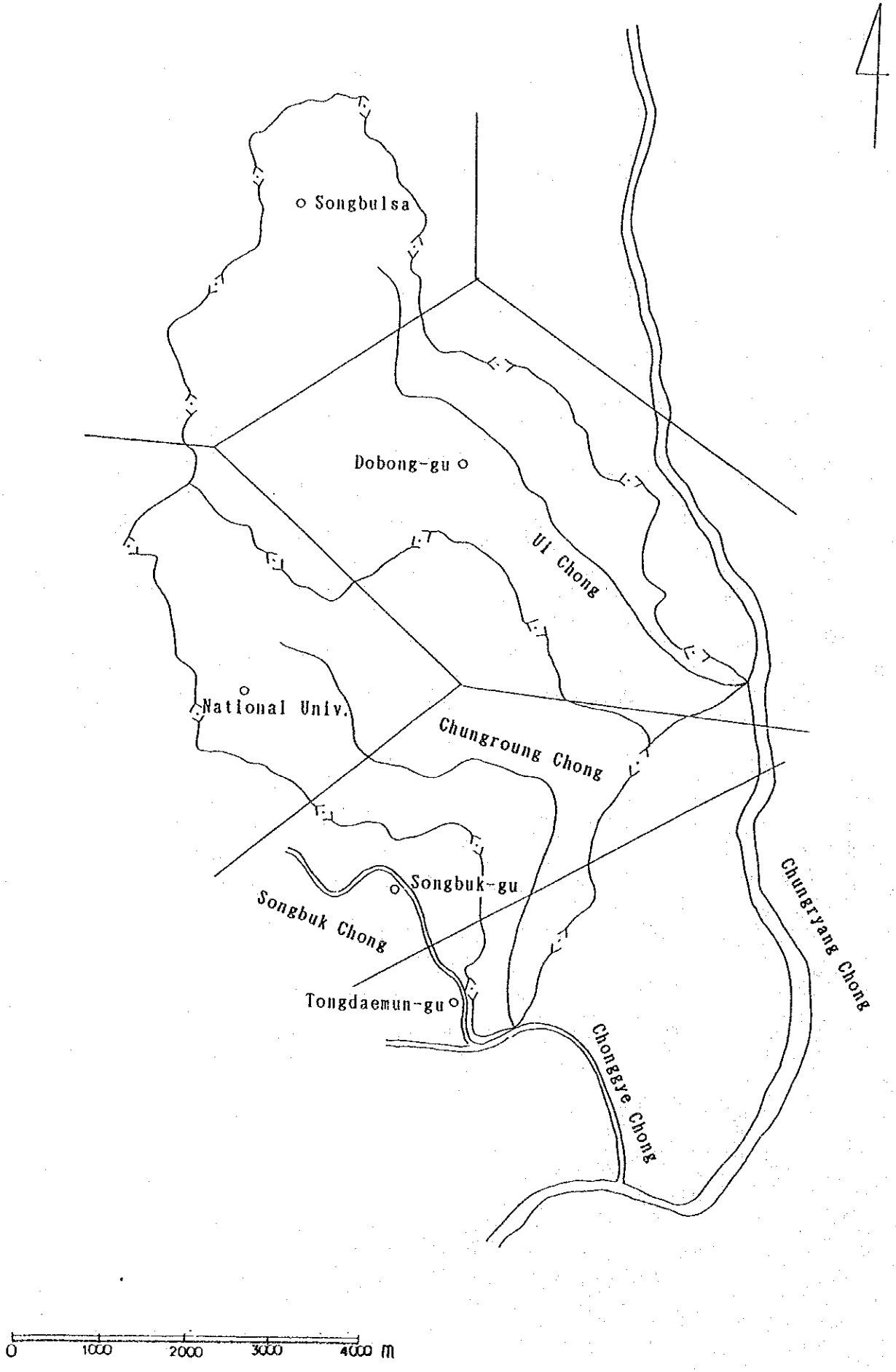


Fig. 2.2-2 Thiessen Polygon Map (2)

Table 2.2-1　　Areal Rainfall

面積雨量

９０年１月

日時	安養川	良才川	貞陵川	牛耳川
1	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0
5	0.7	1.8	0.0	0.0
6	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0
9	3.6	0.0	0.0	0.0
10	8.6	10.8	0.0	0.0
11	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0
17	0.3	0.0	0.0	0.0
18	1.1	0.6	0.0	0.0
19	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0
21	1.5	2.5	0.0	0.0
22	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0
29	7.1	5.0	0.0	0.0
30	1.1	4.0	0.0	0.0
31	1.9	8.5	0.0	0.0
合計	25.9	33.0	0.0	0.0

９０年２月

日時	安養川	良才川	貞陵川	牛耳川
1	0.2	1.2	0.8	1.3
2	0.0	0.0	0.8	1.3
3	0.0	0.0	1.2	1.8
4	0.1	0.0	0.0	0.0
5	0.1	0.0	0.0	0.0
6	0.1	0.0	0.2	0.3
7	0.2	0.0	0.0	0.0
8	0.2	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0
10	9.7	11.8	17.5	19.5
11	0.1	0.8	0.3	0.5
12	0.1	0.0	0.2	0.3
13	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0
15	2.3	3.4	3.8	3.3
16	1.5	0.0	0.0	0.0
17	0.6	0.0	0.0	0.0
18	12.2	18.5	26.3	27.5
19	4.7	6.5	6.4	8.9
20	0.7	0.0	0.0	0.0
21	2.0	0.0	0.0	0.0
22	10.9	7.3	11.0	12.0
23	4.0	4.6	3.2	2.8
24	0.1	0.0	0.3	0.3
25	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0
27	0.1	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0
	49.7	54.0	72.1	79.4

９０年３月

日時	安養川	良才川	貞陵川	牛耳川
1	0.0	0.0	0.0	0.0
2	0.3	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0
11	25.7	33.1	25.7	25.0
12	9.9	7.0	7.7	6.3
13	0.0	1.6	0.0	0.0
14	5.5	3.3	4.0	4.0
15	0.0	0.0	0.0	0.0
16	0.4	0.0	0.0	0.0
17	1.9	4.3	1.0	0.0
18	0.1	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0
22	0.8	0.0	0.0	0.0
23	2.1	2.4	3.5	3.3
24	1.8	1.4	1.8	1.3
25	0.0	0.0	0.0	0.0
26	0.9	0.0	0.0	0.0
27	4.3	1.6	1.0	1.5
28	16.0	25.3	19.7	19.5
29	5.8	4.4	5.5	4.8
30	0.2	0.5	0.7	0.8
31	0.0	0.0	0.0	0.0
	75.4	84.8	70.5	66.3

９０年４月

日時	安養川	良才川	貞陵川	牛耳川
1	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0
6	0.9	0.0	0.0	0.0
7	10.5	15.3	17.2	17.3
8	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0
11	2.9	5.1	0.0	0.0
12	39.0	45.8	57.0	59.3
13	1.3	2.9	2.1	2.4
14	7.2	6.3	7.7	8.3
15	0.2	0.5	0.8	0.5
16	1.0	0.5	0.3	0.5
17	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0
22	3.5	3.0	3.4	3.6
23	2.1	2.5	3.0	3.0
24	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0
27	0.0	1.0	0.0	0.0
28	13.4	12.6	5.4	4.7
29	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0
	81.8	95.4	96.9	99.4

９０年５月

日時	安養川	良才川	貞陵川	牛耳川
1	13.2	14.0	7.2	8.1
2	11.1	8.3	8.6	7.7
3	6.1	7.4	8.2	8.8
4	0.1	0.4	0.5	0.5
5	0.0	0.0	0.0	0.0
6	0.1	0.0	0.0	0.0
7	9.0	10.1	5.4	4.9
8	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0
10	6.6	13.0	6.0	7.3
11	1.5	2.1	7.5	7.0
12	0.8	0.0	0.0	0.0
13	15.2	14.4	15.7	14.1
14	0.1	0.3	0.8	0.5
15	0.0	0.1	0.0	0.0
16	0.0	11.3	0.0	0.0
17	7.6	11.8	8.6	8.2
18	9.6	3.9	8.7	10.3
19	2.1	1.8	1.8	2.3
20	3.4	5.9	1.9	1.7
21	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0
24	5.2	0.3	0.0	0.0
25	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0
30	2.1	0.1	0.0	0.0
31	15.9	13.1	14.3	11.0
	109.5	118.0	95.3	92.0

９０年６月

日時	安養川	良才川	貞陵川	牛耳川
1	0.5	0.3	0.2	0.0
2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0
7	3.6	0.0	0.0	0.0
8	19.5	31.0	40.8	43.5
9	9.2	4.3	3.2	4.9
10	0.8	0.8	0.0	0.0
11	0.1	0.1	0.0	0.0
12	0.2	0.3	0.3	0.0
13	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0
15	6.4	48.0	49.5	50.3
16	0.0	0.0	0.2	0.3
17	0.3	0.0	0.0	0.0
18	32.4	27.1	45.7	56.8
19	55.7	44.4	46.0	48.5
20	35.4	32.6	19.7	22.5
21	76.0	82.6	102.7	109.5
22	0.3	0.1	0.0	0.0
23	8.3	3.0	3.3	5.0
24	63.0	78.8	124.8	141.0
25	71.4	84.4	84.3	89.0
26	19.8	19.0	18.3	19.8
27	1.9	1.3	0.5	0.8
28	3.0	0.0	4.0	0.0
29	6.2	4.5	2.3	3.5
30	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0
	413.8	462.4	545.9	595.1

９０年７月

日時	安養川	良才川	貞陵川	牛耳川
1	0.0	0.0	0.0	0.0
2	11.0	9.7	13.9	20.3
3	1.2	2.8	2.0	3.4
4	0.0	0.0	0.2	0.0
5	0.6	0.7	0.4	0.0
6	1.5	0.9	2.9	4.2
7	18.7	18.6	25.6	27.8
8	3.0	0.1	4.5	4.5
9	1.8	0.0	0.1	0.0
10	20.2	3.0	8.0	9.5
11	28.0	49.5	31.4	45.4
12	3.8	7.7	5.5	4.5
13	3.8	0.1	0.6	1.3
14	35.1	36.5	33.6	41.1
15	15.9	7.5	13.1	8.5
16	15.0	15.8	18.3	8.1
17	85.4	59.8	110.7	108.6
18	43.4	57.3	67.3	29.5
19	0.9	1.5	7.4	6.0
20	2.8	4.7	40.6	57.2
21	6.9	2.6	14.2	29.9
22	1.6	0.1	3.6	7.9
23	2.7	2.1	4.5	28.7
24	37.6	33.1	43.1	59.8
25	30.6	40.1	11.9	6.0
26	2.6	3.1	7.1	4.4
27	0.0	0.1	0.0	0.0
28	0.0	0.0	0.1	0.3
29	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0
	374.0	357.3	470.9	516.9

９０年８月

日時	安養川	良才川	貞陵川	牛耳川
1	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0
8	8.5	6.1	3.8	2.6
9	8.2	4.2	1.1	11.7
10	9.1	7.3	3.4	0.9
11	2.9	0.1	0.0	0.0
12	0.3	0.0	0.0	0.0
13	2.8	0.0	0.0	23.8
14	11.8	21.5	16.3	12.3
15	0.0	0.0	0.0	0.0
16	4.9	2.5	3.4	15.2
17	6.1	8.2	10.8	10.0
18	0.0	0.0	0.0	0.3
19	3.5	3.1	3.0	5.7
20	23.9	54.0	17.4	17.8
21	63.0	86.2	59.4	88.5
22	4.1	4.5	1.9	6.8
23	0.0	0.0	0.2	0.5
24	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0
30	5.8	0.7	3.0	5.2
31	72.5	68.8	54.4	61.5
	227.4	267.0	178.1	262.7

９０年９月

日時	安養川	良才川	貞陵川	牛耳川
1	46.3	52.5	58.0	63.0
2	3.7	10.8	13.7	18.0
3	0.5	0.0	0.6	0.2
4	1.1	0.1	3.3	0.1
5	0.0	0.2	0.0	0.0
6	0.0	0.0	0.0	0.0
7	0.1	0.0	0.0	0.0
8	23.0	22.7	68.4	107.5
9	39.2	61.3	90.5	62.2
10	202.3	168.8	187.6	161.7
11	234.6	223.3	205.4	118.8
12	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0
14	0.1	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0
23	2.2	4.2	7.8	4.5
24	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0
	653.0	644.0	635.4	536.0

９０年１１月

日時	安養川	良才川	貞陵川	牛耳川
1	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.9	0.1	2.1	2.7
5	2.0	1.4	2.3	0.4
6	10.7	0.4	10.5	8.6
7	2.0	0.0	0.0	0.0
8	0.1	0.0	0.2	0.6
9	0.7	0.1	0.9	1.9
10	0.3	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0
17	0.2	0.0	1.3	2.3
18	0.8	0.0	1.0	1.0
19	14.8	3.4	5.4	13.4
20	4.0	0.0	0.0	0.0
21	0.1	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0
25	2.0	0.1	1.1	1.6
26	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0
30	0.6	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0
	39.2	5.6	24.9	32.3

９１年１月

日時	安養川	良才川	貞陵川	牛耳川
1	0.6	0.0	0.6	1.0
2	0.0	0.0	0.0	0.0
3	0.1	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0
6	0.1	0.0	0.0	0.0
7	0.1	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0
16	1.3	0.1	0.2	2.4
17	0.2	0.0	0.0	0.3
18	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0
21	0.2	0.0	0.0	0.0
22	2.0	0.1	0.6	1.3
23	0.7	0.0	0.0	0.3
24	2.2	2.4	0.0	0.0
25	0.1	0.0	0.0	0.0
26	0.3	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0
28	0.3	0.1	0.2	0.0
29	0.4	0.0	0.2	0.0
30	0.2	0.0	0.0	0.0
31	1.1	0.0	0.0	0.0
	10.0	2.7	1.9	5.3

９１年３月

日時	安養川	良才川	貞陵川	牛耳川
1	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0
7	0.6	0.1	0.0	0.0
8	11.8	0.5	3.5	0.1
9	6.3	0.3	4.8	0.2
10	4.9	0.4	8.0	2.8
11	3.4	0.0	5.1	11.1
12	0.0	0.0	0.0	8.1
13	0.0	0.0	0.0	1.5
14	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0
16	0.3	0.0	0.9	1.0
17	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0
19	0.2	0.0	0.2	0.6
20	0.2	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0
26	5.6	0.1	6.3	8.1
27	3.8	0.1	2.9	0.4
28	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0
	37.0	1.6	31.7	33.9

９０年１０月

日時	安養川	良才川	貞陵川	牛耳川
1	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.0	0.0	2.1	0.2
5	0.0	0.0	0.2	0.0
6	0.0	0.0	5.8	0.7
7	0.0	0.0	0.0	0.0
8	0.0	0.0	0.2	0.0
9	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0
17	0.0	0.0	1.1	0.1
18	0.0	0.0	0.6	0.1
19	0.0	0.0	3.6	0.4
20	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0
24	0.4	0.0	0.0	0.0
25	0.8	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0
	1.2	0.0	13.6	1.6

９０年１２月

日時	安養川	良才川	貞陵川	牛耳川
1	5.3	0.3	4.9	6.0
2	0.0	0.0	0.0	0.0
3	0.1	0.0	0.0	0.0
4	0.3	0.1	0.0	2.4
5	0.1	0.0	0.0	3.3
6	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.3
12	0.0	0.0	0.0	0.0
13	0.2	0.0	0.4	0.0
14	0.1	0.0	1.1	2.2
15	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0
21	0.7	0.1	0.2	1.2
22	0.5	0.1	0.0	0.3
23	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0
25	2.4	0.2	0.0	0.0
26	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0
31	0.0	0.0	0.9	0.7
	9.7	0.7	7.5	16.5

９１年２月

日時	安養川	良才川	貞陵川	牛耳川
1	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0
3	0.1	0.0	0.0	0.0
4	0.2	1.9	0.0	0.3
5	0.1	0.0	0.0	0.0
6	0.1	0.0	0.0	0.3
7	0.9	0.0	3.6	3.4
8	0.2	0.0	0.0	1.8
9	0.1	0.0	0.0	3.3
10	1.6	0.1	1.1	2.2
11	0.3	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0
14	0.3	0.0	0.0	0.0
15	7.1	0.6	6.6	8.9
16	2.6	0.0	0.0	0.3
17	0.0	0.0	0.0	0.3
18	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0
20	0.4	1.2	0.0	0.0
21	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0
24	0.2	0.1	0.0	0.0
25	0.2	0.0	0.0	0.3
26	0.0	0.0	0.0	0.3
27	2.7	0.2	1.3	3.2
28	1.0	0.0	0.9	1.6
29	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0
	18.2	4.2	13.4	26.2

９１年４月

日時	安養川	良才川	貞陵川	牛耳川
1	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0
5	0.0	0.0	1.3	0.0
6	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0
12	11.1	0.1	12.6	11.9
13	2.9	0.0	1.5	0.0
14	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0
17	17.6	1.1	18.6	18.9
18	7.6	0.1	4.0	0.1
19	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0
28	0.3	0.0	0.2	1.2
29	0.2	0.0	0.2	0.0
30	0.2	0.1	1.3	1.0
31	0.0	0.0	0.0	0.0
	40.0	1.5	39.7	33.2

９１年５月

日時	安養川	良才川	貞陵川	牛耳川
1	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0
6	2.9	0.2	5.6	5.9
7	2.6	0.2	2.6	3.3
8	0.2	0.0	0.5	0.0
9	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0
15	1.3	0.1	0.1	0.3
16	0.3	0.0	0.1	0.5
17	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0
23	1.9	0.0	0.0	0.0
24	17.6	0.9	5.5	9.5
25	32.6	39.8	39.1	54.3
26	20.1	30.1	25.6	22.7
27	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0
31	0.1	0.0	0.0	0.0
	79.7	71.3	79.1	96.6

９１年７月

日時	安養川	良才川	貞陵川	牛耳川
1	1.0	0.0	2.6	1.5
2	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0
4	4.2	0.3	1.7	0.2
5	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0
7	14.3	1.6	17.5	32.4
8	0.0	0.0	0.0	0.0
9	0.1	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0
14	0.7	0.2	0.0	0.0
15	9.5	0.7	15.3	19.8
16	0.1	0.0	7.9	1.2
17	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0
	29.8	2.8	44.9	55.1

９１年６月

日時	安養川	良才川	貞陵川	牛耳川
1	0.3	0.0	0.4	0.4
2	0.1	0.0	0.9	0.5
3	0.1	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0
7	0.5	0.0	0.0	0.0
8	1.4	2.4	0.9	0.7
9	5.1	2.9	7.4	7.9
10	3.5	0.1	1.9	3.8
11	18.4	24.7	15.3	23.7
12	4.9	1.8	0.0	0.0
13	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	1.5
16	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.3
21	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0
23	0.0	0.0	6.8	2.9
24	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0
26	0.8	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0
29	19.7	1.9	10.9	17.8
30	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0
	54.9	33.9	44.5	59.5

2.3 Characteristics of Rainfall in 1990

The rainfall data measured by the Seoul central observatory from 1907 to 1991 are shown in Table 2.3-1.

The monthly average rainfall ratios are shown below.

Month	Rainfall	Ratio
January	22	1.7
February	22	1.7
March	45	3.5
April	81	6.4
May	86	6.7
June	138	10.8
July	368	28.9
August	256	20.1
September	141	11.1
October	48	3.8
November	42	3.3
December	25	2.0

The above record describs that 70% of yearly rainfall is fallen between June and September.

In addition, it is understood by the rainfall record of the year 1990 that we had uncommonly large rainfall in 1990.

The rainfall analysis data of the year 1990 calculated with the Iwai method are shown below.

T年	e	0.1031e	3.2745 + 0.1031e	X + 628.9080	X
200	1.8215	0.1878	3.4623	2899.35	2270.4
100	1.6450	0.1696	3.4441	2780.35	2151.4
75	1.5672	0.1616	3.4361	2729.61	2100.7
50	1.4520	0.1497	3.4242	2655.83	2026.9
30	1.2967	0.1337	3.4082	2559.76	1930.9
20	1.1630	0.1199	3.3944	2479.70	1850.8
10	0.9062	0.0934	3.3679	2332.92	1704.0
7	0.7547	0.0778	3.3523	2250.61	1621.7
5	0.5951	0.0614	3.3359	2167.21	1538.3
3	0.3045	0.0314	3.3059	2022.55	1393.6
2	0.0000	0.0000	3.2745	1881.48	1252.6

$Log(x+628.908)=3.2745+0.1031*e$

x:daily rainfall

e:normal fluent to N year of probability year

When x equal to 2,318mm, e equal to 1.890.

Probability year is judged to be over 260 years by Table-4.

Table 2.3-1 Rainfall Record of Seoul Obsevatory

ソウル測候所降雨記録

	1	2	3	4	5	6	7	8	9	10	11	12	合計
1907	11.1	5.7	28.4	144.0	131.2	49.5	157.6	181.1	27.8	46.8	54.4	25.2	862.8
1908	18.2	29.1	12.4	17.0	71.3	107.1	530.3	160.5	65.3	35.3	14.4	5.4	1066.3
1909	7.4	7.9	26.7	106.8	46.2	90.9	160.0	216.1	78.2	28.1	23.7	35.0	827.0
1910	21.6	1.2	32.9	36.8	1.7	183.3	377.8	184.3	79.6	14.1	78.3	9.1	1020.9
1911	37.6	11.7	88.7	92.0	59.5	86.7	275.8	72.3	194.0	33.5	97.4	17.8	1067.0
1912	2.7	65.3	20.1	80.9	88.8	100.1	391.5	234.0	27.5	68.9	32.5	17.0	1129.3
1913	26.4	7.3	9.8	125.4	58.6	138.8	326.1	131.9	19.5	25.4	33.8	14.5	917.5
1914	93.6	9.5	226.9	76.8	54.5	137.3	289.1	145.3	77.9	78.4	56.0	17.3	1262.6
1915	45.3	37.6	22.2	63.0	159.4	136.4	464.3	423.6	128.9	40.9	47.3	9.4	1578.3
1916	53.2	19.2	5.1	218.1	127.0	334.7	303.8	133.3	397.1	20.0	83.5	15.3	1710.3
1917	14.0	4.7	8.1	31.1	52.0	72.0	223.9	299.7	195.4	25.8	22.6	32.4	981.7
1918	5.7	30.0	30.4	52.8	100.9	157.3	237.2	375.9	52.6	15.8	64.3	9.4	1132.3
1919	19.2	7.7	10.6	58.3	125.5	203.2	266.2	248.8	113.5	64.6	30.7	28.0	1176.3
1920	37.1	12.0	18.5	47.3	93.8	160.7	491.3	745.9	49.6	12.4	48.7	29.8	1747.1
1921	14.5	36.0	19.6	72.5	87.6	131.4	325.6	109.0	93.0	28.2	17.5	35.7	970.6
1922	20.3	81.2	59.3	28.0	59.8	103.0	445.8	547.6	130.5	38.4	31.7	16.5	1562.1
1923	32.7	14.9	63.8	114.3	44.6	113.1	270.0	246.8	159.5	59.5	63.0	27.5	1209.7
1924	14.0	76.2	19.6	95.3	82.0	126.4	431.0	13.3	81.5	34.3	45.1	15.5	1014.2
1925	5.8	17.5	41.8	28.1	190.6	124.3	832.9	421.1	160.1	30.0	69.9	38.5	1960.6
1926	27.2	9.4	11.8	82.4	101.2	34.3	874.7	344.7	175.5	109.0	29.4	21.9	1821.5
1927	70.5	1.9	58.7	118.6	118.2	44.6	366.8	303.9	40.6	76.6	22.6	59.5	1282.5
1928	59.5	8.2	25.4	26.1	56.0	119.4	192.0	229.1	231.2	25.9	66.4	16.1	1055.3
1929	28.1	4.9	12.9	95.3	44.2	158.4	306.9	264.8	73.6	12.9	18.5	104.0	1124.5
1930	2.4	49.1	92.3	101.5	114.2	58.6	830.8	175.4	62.8	102.5	47.2	7.3	1644.1
1931	35.6	36.9	34.7	105.3	175.8	133.7	231.6	443.6	53.8	14.0	50.1	79.0	1394.1
1932	5.8	20.6	28.1	28.5	97.2	80.2	214.2	274.5	64.1	68.7	24.8	33.4	940.1
1933	6.4	18.6	17.2	54.3	171.7	198.7	396.7	223.1	204.9	40.2	32.5	31.0	1395.3
1934	5.3	18.0	48.9	83.5	82.1	166.4	345.9	177.2	261.2	17.5	53.0	34.4	1233.4
1935	11.6	4.2	12.4	66.3	90.6	170.6	528.2	116.7	85.3	43.2	63.3	5.0	1197.4
1936	4.5	18.2	26.6	142.9	27.1	65.1	210.0	667.6	253.0	3.5	44.2	67.1	1529.8
1937	15.8	35.2	37.1	147.7	68.1	72.4	249.7	156.9	184.6	46.3	18.6	21.2	1053.6
1938	13.9	21.2	94.4	6.6	135.6	110.1	199.6	201.7	128.5	98.9	22.5	26.3	1059.3
1939	12.3	7.4	20.5	59.0	105.5	109.1	87.6	49.0	45.3	69.3	62.1	12.6	639.7
1940	7.4	45.5	16.8	60.5	79.5	94.8	1345.2	69.7	313.5	20.2	35.7	47.3	2136.1
1941	24.1	8.7	82.9	49.5	180.7	139.7	174.3	255.7	30.1	67.3	67.5	13.2	1093.7
1942	10.4	9.5	112.4	64.3	27.2	61.3	154.5	338.4	277.0	35.8	32.3	7.9	1131.0
1943	2.4	14.6	41.2	29.9	46.3	107.9	125.0	36.8	113.6	85.1	30.8	13.0	646.6
1944	4.0	12.4	28.4	93.6	73.2	125.3	273.2	214.2	163.0	19.9	64.8	17.1	1089.1
1945	2.2	3.2	121.9	39.4	109.4	317.7	479.6	208.8	183.1	63.3	3.5	29.6	1561.7
1946	25.9	12.6	60.9	37.7	70.8	538.8	177.9	259.4	128.8	74.9	1.2	17.0	1405.9
1947	26.3	4.4	56.5	80.2	44.0	118.6	610.1	320.5	120.7	10.6	30.3	74.1	1496.3
1948	82.9	12.3	51.6	36.2	44.8	358.5	323.8	309.2	141.9	54.0	15.6	50.5	1481.3
1949	25.7	20.8	15.6	37.9	87.6	40.4	141.5	95.1	102.7	41.7	14.3	10.4	633.7
1950	97.0	11.4	9.0	41.5	37.4	109.9	222.4	85.6					614.2
1951													0.0
1952													0.0
1953	2.6	4.1	112.1	47.4	86.4	198.6	360.9	403.3	8.7	84.0	43.8	30.3	1382.2
1954	14.0	111.3	4.9	59.4	61.5	229.9	587.5	209.0	53.2	45.1	19.6	40.4	1435.8
1955	12.3	9.6	15.7	55.0	80.7	316.5	397.5	60.0	187.9	26.7	56.3	12.6	1230.8
1956	6.3	26.6	139.3	65.9	72.4	417.5	523.8	47.2	346.0	29.7	16.1	10.3	1701.1
1957	43.1	14.7	16.7	105.9	60.5	32.7	473.8	286.5	4.5	83.6	20.5	76.8	1219.3
1958	55.0	7.7	25.6	162.3	23.8	39.3	383.8	194.2	243.1	120.1	49.6	41.2	1325.7
1959	3.9	58.0	163.6	114.7	91.2	70.8	323.1	283.0	142.9	57.6	27.9	34.1	1370.8
1960	4.6	4.0	113.6	19.0	135.4	295.9	313.2	138.1	63.5	7.9	76.5	15.7	1187.4
1961	18.0	8.8	40.8	123.6	102.1	77.7	267.8	360.6	295.1	48.6	57.8	45.6	1446.5
1962	1.2	25.7	18.5	91.6	12.5	110.3	180.0	193.2	236.4	36.8	52.2	27.8	986.2
1963	13.3	2.6	57.3	221.1	186.7	383.7	513.6	126.5	50.1	32.1	26.8	12.8	1626.6
1964	20.3	27.1	37.3	338.5	83.6	107.7	509.2	216.5	382.7	40.4	25.4	5.2	1793.9
1965	19.1	2.4	16.8	10.4	11.6	23.8	631.6	319.4	27.0	63.7	85.0	5.5	1216.3
1966	9.7	29.4	90.5	35.7	37.1	179.8	897.7	272.8	302.8	74.9	81.6	6.8	2018.8
1967	24.8	54.6	88.2	93.1	59.8	135.3	283.3	261.8	158.1	26.5	53.3	9.6	1248.9
1968	11.3	12.5	56.7	45.2	53.4	41.1	412.4	362.8	126.3	101.8	54.2	11.1	1288.8
1969	62.2	59.2	13.7	219.3	255.2	31.8	345.9	455.1	230.0	18.4	28.4	17.6	1736.8
1970	5.9	49.2	12.7	7.5	84.0	249.8	425.6	192.0	465.1	153.1	42.2	21.1	1708.2
1971	18.0	25.5	15.9	53.2	100.5	131.6	513.7	211.2	157.4	12.5	11.9	14.9	1266.3
1972	73.7	32.1	58.1	22.6	66.3	25.8	192.3	829.3	151.9	78.0	72.5	2.3	1604.9
1973	47.7	8.0	9.1	104.1	68.3	112.0	191.0	208.2	37.5	25.1	23.8	8.0	843.8
1974	6.0	11.9	11.4	141.4	166.3	56.3	274.7	355.1	107.6	30.9	7.9	13.2	1182.7
1975	10.6	3.5	53.6	102.5	68.1	45.7	408.1	89.2	169.3	19.4	30.8	21.9	1022.7
1976	0.3	93.6	3.9	49.2	37.1	33.0	166.1	333.8	35.0	32.7	1.5	24.2	816.4
1977	0.6	0.2	28.8	189.6	62.6	42.0	393.5	123.6	57.5	15.0	56.1	44.9	1014.4
1978	5.1	18.9	61.8	8.1	24.2	368.5	303.4	311.1	102.5	33.0	7.2	28.3	1273.1
1979	7.4	45.0	62.5	139.5	111.2	347.7	185.6	194.2	237.8	3.5	0.0	0.0	1334.4
1980	28.0	5.0	32.8	216.7	90.3	118.8	259.2	331.5	58.3	44.9	10.6	46.3	1242.4
1981	21.0	12.0	55.4	55.4	80.8	109.1	463.8	192.9	129.0	34.5	46.9	16.0	1216.8
1982	26.0	2.9	46.0	8.1	134.6	15.7	195.5	255.8	4.8	48.5	164.8	48.6	949.3
1983	11.1	11.7	67.5	113.4	69.0	27.4	398.6	132.2	253.4	82.2	28.7	9.9	1205.1
1984	10.7	15.2	11.4	41.8	35.2	105.5	260.9	330.9	348.1	21.4	35.5	23.2	1239.8
1985	10.7	14.9	57.8	69.0	177.4	85.4	185.2	438.9	171.7	177.8	82.4	0.0	1471.2
1986	11.7	8.2	44.3	20.6	71.5	117.1	351.8	232.9	101.0	79.6	39.3	31.9	1109.9
1987	43.4	36.2	34.2	55.3	126.6	130.3	651.2	521.8	61.1	21.9	66.8	2.6	1751.4
過去平均	22.1	22.1	44.8	80.5	86.0	138.0	368.2	255.5	141.3	47.6	41.9	25.1	1273.2
1990	92.2	64.8	92.3	94.2	122.8	497.2	486.5	283.5	570.1	0.0	44.5	0.0	2318.1

Table 2.3-2 Normal Fluent to N Probability Year

$$\frac{100}{W(\%)} = N \rightarrow e$$

N (年)	e	N (年)	e	N (年)	e	N (年)	e	N (年)	e
2	0.0000	37	1.3622	72	1.5560	107	1.6629	260	1.8847
3	0.3045	38	1.3702	73	1.5597	108	1.6654	270	1.8936
4	0.4769	39	1.3782	74	1.5635	109	1.6678	280	1.9022
5	0.5951	40	1.3860	75	1.5672	110	1.6701	290	1.9105
6	0.6858	41	1.3932	76	1.5709	111	1.6725	300	1.9184
7	0.7547	42	1.4008	77	1.5745	112	1.6749	310	1.9260
8	0.8134	43	1.4079	78	1.5780	113	1.6772	320	1.9335
9	0.8634	44	1.4145	79	1.5815	114	1.6795	330	1.9407
10	0.9062	45	1.4213	80	1.5849	115	1.6818	340	1.9476
11	0.9442	46	1.4276	81	1.5883	116	1.6841	350	1.9542
12	0.9780	47	1.4342	82	1.5917	117	1.6863	360	1.9606
13	1.0084	48	1.4404	83	1.5950	118	1.6885	370	1.9672
14	1.0361	49	1.4464	84	1.5982	119	1.6907	380	1.9733
15	1.0614	50	1.4520	85	1.6014	120	1.6929	390	1.9792
16	1.0848	51	1.4578	86	1.6046	125	1.7034	400	1.9850
17	1.1065	52	1.4634	87	1.6077	130	1.7135	410	1.9906
18	1.1263	53	1.4693	88	1.6108	135	1.7232	420	1.9961
19	1.1455	54	1.4746	89	1.6138	140	1.7324	430	2.0014
20	1.1630	55	1.4798	90	1.6168	145	1.7414	440	2.0067
21	1.1798	56	1.4849	91	1.6198	150	1.7499	450	2.0118
22	1.1955	57	1.4901	92	1.6228	155	1.7582	460	2.0166
23	1.2102	58	1.4952	93	1.6257	160	1.7662	470	2.0213
24	1.2246	59	1.4999	94	1.6285	165	1.7739	480	2.0260
25	1.2380	60	1.5047	95	1.6314	170	1.7814	490	2.0305
26	1.2509	61	1.5094	96	1.6342	175	1.7885	500	2.0350
27	1.2639	62	1.5141	97	1.6369	180	1.7955	550	2.0565
28	1.2749	63	1.5180	98	1.6396	185	1.8023	600	2.0757
29	1.2861	64	1.5231	99	1.6423	190	1.8089	650	2.0931
30	1.2967	65	1.5274	100	1.6450	195	1.8153	700	2.1094
31	1.3069	66	1.5317	101	1.6476	200	1.8215	750	2.1242
32	1.3170	67	1.5359	102	1.6502	210	1.8332	800	2.1375
33	1.3270	68	1.5400	103	1.6528	220	1.8446	850	2.1506
34	1.3359	69	1.5441	104	1.6554	230	1.8554	900	2.1630
35	1.3453	70	1.5481	105	1.6579	240	1.8656	950	2.1750
36	1.3537	71	1.5521	106	1.6604	250	1.8753	1000	2.1850

2.4 Rainfall Record of Dawnpour in September 1990

The downpour on September 10 and 11 in 1990 greatly damaged the Seoul Metropolitan. The rainfall record measured at the new rainfall recorders at that time are shown below.

Table 2.4-1 Rainfall Record in September 1990

Station name	Daily (mm)	Maximum of 24 hours (mm)	Maximum of 1 h. (mm)
Kookmin Univ.	255.0	310.0(Sep.10 12:30 to 11 12:30)	40.0:11 7:30
Tokjang Primary School	377.0	443.0(Sep.10 15:00 to 11 15:00)	67.0:11 21:10
Seoul National Univ.	252.0	291.5(Sep.10 15:00 to 11 15:00)	39.5:11 21:10
Anyang Middle School	255.5	290.0(Sep.10 18:50 to 11 18:30)	48.0:11 7:30
Songbulsa	165.0	190.5(Sep.10 11:20 to 11 11:20)	20.5:11 7:30
Average	260.9	305.0	

cf: Assume that an end of daily rainfall is 9 PM.

The probability analysis result of the above rainfall record using the past rain record is as follows.

Table 2.4-2 Day Rainfall at Seoul Observatory

年 月 日	日雨量(mm)	年 月 日	日雨量(mm)
1972,08,18	273.2	1964,09,13	126.0
1920,08,02	354.7	1974,08,03	124.8
1915,08,22	254.7	1969,05,04	122.3
1940,07,05	234.9	1955,06,24	122.2
1966,07,15	226.3	1977,07,03	120.4
1925,07,17	220.7	1923,08,01	119.2
1956,06,22	219.9	1929,08,16	118.1
1930,07,04	208.6	1946,06,26	117.2
1978,06,25	204.0	1938,09,03	115.5
1933,07,28	189.5	1948,09,08	114.9
1931,08,19	188.5	1936,08,11	112.6
1971,07,16	185.0	1937,04,31	110.2
1916,09,10	175.3	1932,08,29	108.0
1963,06,22	169.2	1961,09,01	103.1
1912,07,18	165.5	1928,08,29	102.9
1942,08,05	165.4	1959,07,01	101.9
1970,09,17	164.8	1975,07,25	100.0
1947,07,23	159.4	1927,07,14	97,0
1935,07,22	155.0	1967,07,20	96.2
1910,07,06	153.5	1934,09,04	96.0
1957,07,07	153.2	1941,08,10	94.3
1914,03,06	153.1	1924,07,23	92.2
1918,08,16	150.6	1979,09,02	92.0
1922,08,22	150.4	1976,08,14	88.0
1926,07,16	150.1	1917,09,03	87.6
1968,08,23	149.3	1950,07,05	76.6
1919,07,06	147.9	1962,09,06	74.7
1945,07,15	147.1	1944,08,11	69.2
1958,07,01	145.3	1913,08,18	68.5
1965,07,20	144.9	1973,04,23	60.0
1908,07,21	140.9	1949,09,16	58.5
1981,07,01	137.0	1939,06,07	54.6
1960,06,28	135.3	1909,04,18	54.1
1980,08,13	131.0	1943,07,13	48.3
1921,07,06	128.5	1911,04,24	47.9
1954,07,28	126.0		

Table2.4-3 Probability Analysis Result by Iwai Method

T 年	e	0.1947e	2.2278 + 0.1947e	X + 40.3650	X
200	1.8215	0.3546	2.5824	382.30	341.9
100	1.6450	0.3203	2.5481	353.26	312.9
75	1.5672	0.3051	2.5329	341.11	300.7
50	1.4520	0.2827	2.5105	323.97	283.6
30	1.2967	0.2525	2.4803	302.20	261.8
20	1.1630	0.2264	2.4542	284.58	244.2
10	0.9062	0.1764	2.4042	253.63	213.3
7	0.7547	0.1469	2.3747	236.97	196.6
5	0.5951	0.1159	2.3437	220.65	180.3
3	0.3045	0.0593	2.2871	193.69	153.3
2	0.0000	0.0000	2.2278	168.97	128.6

Log(x+40.365)=2.2278+0.1947*e

x:rainfall per day(mm) e:Normal fluent to probability year N

if x=255.0mm then e=1.246

x=377.0mm e=2.017

x=252.0mm e=1.223

x=255.5mm e=1.249

x=165.0mm e=0.435

Rainfall probability is shown below according Table-4.

Kookmin Univ. (255.0mm) : 1/ 26

Tokjang Primary School (377.0mm) : 1/460

Seoul National Univ. (252.0mm) : 1/ 24

Anyang Middle School (255.5mm) : 1/ 26

Songbulsa (165.0mm) : 1/ 4

2.5 Rainfall Record

Rainfall records are represented in Table

Table 2-5-1 Rainfall Records of Existing Stations

1990年
1月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ソウル大	安養中	徳荘校
1																			
2																			
3																			
4																			
5									2.0				3.5	3.5					
6																			
7																			
8																			
9									4.5		20.0	4.1							
10									14.5	20.0		13.5	21.0	22.0					
11																			
12																			
13																			
14																			
15																			
16																			
17						2.5													
18									2.5	3.2		0.9	2.0	0.5					
19																			
20																			
21												10.0	1.8	8.0					
22																			
23																			
24																			
25																			
26																			
27																			
28																			
29						11.5			11.5	13.7	10.0	0.3	10.0	10.0					
30									2.5			5.1	1.1	14.7					
31						1.5			1.0			11.4	1.5	32.5					
合計	0.0	0.0	0.0	0.0	0.0	15.5	0.0	0.0	38.5	36.9	30.0	45.3	40.9	91.2	0.0	0.0	0.0	0.0	0.0

2月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ソウル大	安養中	徳荘校
1		2.5				1.0	0.5	0.5	0.5					3.8					
2		2.5																	
3		3.5																	
4						0.5													
5						0.5													
6		0.5				1.0													
7						1.5													
8						1.5													
9																			
10	13.5	21.5	17.5		2.0	14.0	14.0	14.0	13.0	16.1	18.4	14.0		19.0					
11		0.5	0.5			0.5	1.0	1.0						1.0					
12		0.5								0.8									
13																			
14																			
15	5.0	5.0	1.5	3.5	1.0	3.0	5.0	5.0	2.5		5.0	3.5		3.5					
16					5.0					6.5		0.3							
17					5.0														
18	24.0	26.0	29.0	17.0	7.0	16.0	22.0	20.0	10.5	10.8	13.5	10.9	12.0	20.0					
19	1.5	5.7	12.0	3.0			7.0	7.0	2.5	17.7	4.5	5.1	5.0	7.0					
20					5.0	0.5													
21				6.6	9.0														
22	9.0	12.5	11.5	5.0	9.0	9.5	2.0	2.0	10.5	12.7	17.0	12.5	11.0	14.0					
23	4.0	4.0	1.5	2.4	3.0	2.5	4.5	4.5	3.5	6.5	4.5	5.8	4.0	5.5					
24	0.5	0.5		0.5															
25																			
26																			
27				0.5															
28																			
29																			
30																			
31																			
合計	57.5	85.2	73.5	38.5	46.0	52.0	56.0	54.0	43.0	71.1	62.9	52.1	32.0	73.8	0.0	0.0	0.0	0.0	0.0

3月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ソウル大	安養中	徳荘校
1																			
2				2.0															
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11	27.0	31.5	18.5	30.0	35.5	26.5	30.0	31.5	23.5	3.1	18.0	25.7	43.5	27.5					
12	10.5	12.5		6.0		9.5	11.5	10.5	8.5	36.4	11.0	7.4		6.0					
13														6.5					
14	4.0	4.5	3.5	5.0	4.2	4.0	3.5	3.5	5.0	7.4	6.4	6.0	6.0						
15																			
16				3.0															
17	3.0				3.4	3.5	6.5	6.5		3.5	3.0	2.0		4.0					
18											0.4								
19																			
20																			
21																			
22				6.0															
23	4.0	6.5			5.5	4.5	2.0	7.5		0.9	1.5	4.0							
24	3.0	2.5				1.0	2.0	1.0		5.1	4.0	4.0		2.5					
25																			
26				7.0															
27		0.5	2.5	17.0	14.0	1.0	0.5	5.0			2.5			1.0					
28	20.0	20.0	19.0	2.0	17.8	17.5	31.0	23.0		20.7	23.5	23.3	23.0	24.0					
29	7.0	4.0	5.5	0.5	3.4	4.0	3.0	3.5		20.0	7.5	5.3	6.0	5.0					
30	0.5	1.0	0.5				0.5	1.5		0.5		1.0							
31																			
合計	79.0	83.0	49.5	78.5	83.8	71.5	90.5	93.5	37.0	97.6	77.8	78.7	78.5	76.5	0.0	0.0	0.0	0.0	0.0

4月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ソウル大	安養中	徳荘校
1																			
2																			
3																			
4																			
5																			
6					6.8														
7	17.0	13.0	21.5	11.5	9.0	2.5	15.0	15.0	11.0	6.6	14.5	12.5	16.0	15.0					
8																			
9																			
10																			
11					23.3			20.5											
12	52.5	64.5	54.0	54.0	20.0	38.5	53.0	42.0	41.5	42.1	43.0	32.0	41.0	47.0					
13	1.5	2.5	2.3		7.0		4.5	6.0	0.5	2.5				1.0					
14	6.5	6.0	10.5	7.5	2.0	4.0	6.0		5.5	3.8	13.5	12.0	9.0	10.0					
15	1.5	0.5	0.5	0.5				2.0	0.5		0.5								
16		0.5	0.5					1.0		5.4	1.5	1.0		1.0					
17																			
18																			
19																			
20																			
21																			
22	3.0	3.5	3.7	4.5	4.2	3.5	4.0	3.0	3.5	4.2	3.5	2.5	2.0	3.0					
23	3.0	2.5	3.5	2.5	2.5	3.5	3.5	3.5	2.5		1.0	2.0	3.0						
24																			
25																			
26																			
27								4.0											
28	7.0	5.5	3.8	13.5	14.0	10.0	19.5	3.0	23.5	9.8	20.0	16.0		28.0					
29																			
30																			
31																			
合計	92.0	98.5	100.3	94.0	88.8	62.0	105.5	100.0	88.5	74.4	97.5	78.0	71.0	105.0	0.0	0.0	0.0	0.0	0.0

5月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ソル大	安養中	鶴荘校
1	5.5	8.0	8.2		17.0	13.0	15.5	11.0	15.0	11.7	14.0	20.0	15.0	14.5					
2	10.5	8.0	7.3	22.0	8.0	6.5	10.5	7.0	5.5	14.1	12.5	12.0	8.5	7.0					
3	7.0	7.0	10.6	8.0	2.0	7.0	9.0	8.5	7.0	6.7	7.5	6.0	4.5	7.5					
4	0.5	0.5	0.5			0.5	0.5	1.0	0.5										
5																			
6					1.0														
7	6.5	7.5	2.2	6.0	2.2	3.0	19.0	4.5	8.0	8.5	22.0	11.0	11.0	6.0					
8																			
9																			
10	3.5	3.0	11.5	15.0	12.0	17.5	32.0	19.0	6.0		1.0		1.0						
11	8.5	12.0	1.9					1.0	1.5	2.5	1.0	1.0	6.0	1.5					
12						6.5													
13	19.0	17.0	11.1	13.0	26.0	21.0	28.0		27.0	12.2	5.0	4.0	13.0	16.5					
14	1.5	1.0				0.5	0.5							0.5					
15							0.5												
16							2.0	43.0											
17	9.5	7.5	8.8	9.0	8.0	7.0	17.0	14.0	8.0	2.7	12.0	6.0	8.0	8.0					
18	5.5	8.0	12.6	7.0	10.0	8.0		4.0	10.5	17.3	8.0	8.5	7.5	4.0					
19	1.0	1.0	3.5	3.0	6.5	3.0		7.0				4.0							
20	2.5	1.5	1.8				7.0		6.5		10.0		10.5	6.0					
21																			
22																			
23																			
24										13.7	16.0	11.0	1.0						
25																			
26																			
27																			
28																			
29																			
30					16.0		0.5				0.5								
31	21.0	22.0		18.0	3.2	15.5	20.5		17.0	19.5	21.0	17.0	16.0	16.0					
合計	102.0	104.0	80.0	101.0	111.9	109.0	162.5	120.0	112.5	108.9	130.5	100.5	102.0	87.5	0.0	0.0	0.0	0.0	0.0

6月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ソル大	安養中	鶴荘校
1	0.5								1.0	1.5	0.5		1.0						
2																			
3																			
4																			
5																			
6																			
7					29.0														
8	35.5	40.0	47.0			31.5	38.5	32.5	32.0	15.6	27.0	25.0	25.0	28.0					
9		5.2	4.5	34.5		6.5	1.5	8.0	6.0	15.9	5.0	3.0	2.5	5.0					
10										4.0	0.5	0.5	1.0	2.0					
11							0.5			1.1									
12	1.0			1.0			0.5						0.5						
13																			
14																			
15	48.0	61.5	39.0	1.5	8.0	2.5	57.5	58.5	1.5	4.8	7.5	13.5	12.0	64.0					
16		0.5																	
17					2.0														
18	23.5	47.0	66.5	53.0	56.0	47.5	31.0	30.5	37.0	14.9	14.0	16.0	21.0	26.0					
19	41.0	39.5	57.5	63.5		43.0	54.5	58.0	57.5	62.9	81.0	73.0	65.0						
20	14.0	25.0	20.0	23.5	113.0	22.0	22.5	28.0	40.0	23.9	24.0	20.0	17.0	63.0	113.5	127.5	127.5	114.5	94.5
21	89.0	100.0	119.0	87.5		72.0	90.5	105.0	82.5	120.0	86.0	62.0	98.0	37.0		0.5	0.5		0.5
22					2.0		0.5								11.0	1.5	1.5		2.5
23		3.5	6.5		59.0		5.0	5.0	1.5	4.6			1.0	1.0	102.5	105.0	69.0	46.5	24.0
24	92.5	124.0	158.0	87.0	63.0	71.0	106.0	82.5	71.5	58.6	54.5	49.0	49.0	77.5	99.0	89.5	62.0	69.5	74.0
25	75.0	87.0	91.0	93.0	37.0	78.0	95.0	79.0	76.5	69.9	69.0	67.0	81.0	82.5	61.0	45.0	44.5	33.5	33.0
26	15.5	13.5	26.0	20.0	6.0	21.0	13.0	18.0	19.5	20.0	24.5	15.0	32.0	13.0	10.5	8.0	7.5	8.0	9.5
27		0.5	1.0				1.0			4.0	6.0	2.0	3.0	1.0					0.5
28	12.0				8.0							16.0			9.0	7.0	9.5	12.0	11.5
29		7.0		13.0		11.0			2.0	9.3	14.0			18.0					
30																			
31																			
合計	447.5	554.2	636.0	477.5	383.0	406.0	517.5	505.0	428.5	431.0	413.5	362.0	409.0	418.0	406.5	384.0	322.0	284.0	250.0

7月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ソウル大	安養中	徳荘校
1																			
2		10.0	17.0	10.0	13.0	11.0	8.5	6.0	7.0	10.0	8.5	2.5	11.0	16.0	22.5	19.0	18.5	13.0	11.5
3		2.0	3.5	2.0		1.5	3.5	4.0		3.5	3.5	0.5	2.0	4.5	3.5	2.0	0.5	0.5	1.5
4		0.5																	
5					3.0		0.5						1.0			1.0	0.5	1.5	0.5
6	17.5	1.0	0.5	5.0	3.0	5.5	2.0		2.5		1.0				6.5	2.0	0.5		0.5
7		27.0	29.0	19.0	15.0	19.0	27.5		20.5	13.0	8.0	3.5	13.0	8.0	27.0	29.0	32.0	23.5	16.0
8	5.0	6.5	13.0	5.0		5.0			9.0	6.0	6.0			11.0					
9	1.5				27.0														
10		0.5	2.5	2.5	17.0	5.0	1.5	16.0	2.5		37.0				13.0	17.5	42.5	35.0	47.0
11	43.5	30.5	37.5	43.0		32.0	52.0	80.0	43.0	54.0	25.0	47.6	45.0	66.0	51.5	27.5	16.0	12.5	10.5
12	10.0	8.0	13.0	6.0		5.5	9.0	8.0	6.5	7.0	9.0	10.0	7.0	8.0					
13				30.5	3.0										2.0	1.5	3.0	2.0	2.5
14	27.5	32.0	36.0	.	28.0	28.5	28.0	31.0	39.0	57.0	51.0	10.6	45.0	44.0	44.5	35.5	38.0	38.0	39.5
15	7.0	4.5	12.0	3.5	26.0	2.0	2.0	1.5	8.5	25.5	9.5		13.0	8.5	5.5	21.5	32.0	21.0	15.0
16	30.5	38.0	15.5	40.5		44.5	30.5	35.5	39.5	12.5	4.0	4.0		9.5	4.0	1.0	3.5	3.5	3.0
17	60.0	85.5	70.0	59.0	51.0	62.0	59.5	64.0	55.0	60.5	129.0	76.6	55.0	70.0	127.0	155.5	110.0	112.0	126.5
18	92.5	138.0	83.0	100.5	61.0	109.5	62.5	47.5	75.0	59.0	22.0	74.0	57.0	66.0		0.5	0.5	0.5	0.5
19	13.5	7.5	3.0	0.5			2.0	8.0	0.5		0.5				7.5	7.5	0.5	0.5	5.5
20	28.0	28.0	58.0	6.5	5.0	6.5	5.5	14.5	7.5	1.0			3.0	1.5	58.0	47.5	2.0		
21	8.5	8.5	33.5	5.5	4.0	9.0	1.5	9.5	5.5	13.5	10.5	1.0	2.0	3.0	29.5	13.5	6.5	3.5	14.0
22	0.5	0.5		1.0		0.5				0.5	2.0			1.5	12.5	8.0	4.5	2.5	3.0
23	6.5	7.0	8.0	6.0	5.0	5.5		4.5	5.5	3.0	2.0	0.5	4.0	3.0	43.0	1.0	0.5	0.5	
24	51.0	83.0	72.0	48.0	27.0	63.5	30.5	50.0	53.5	39.0	30.5	26.5	35.0	52.5	57.5		98.0		
25	20.5	22.5	17.0	30.0	44.0	30.5	28.5	35.0	66.0	56.0	55.0	33.4	54.0	57.0			8.0		
26	13.0	12.0	12.5	1.5		1.5	1.0	5.0	0.5	8.5	6.5	13.5	5.0	8.0			1.5		
27								1.0											
28			1.0											1.5					
29																			
30																			
31																			
合計	436.5	553.0	537.5	425.5	332.0	448.0	356.0	421.0	447.0	429.5	420.5	304.2	352.0	439.5	515.0	391.0	419.0	270.0	297.0

8月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ソウル大	安養中	徳荘校
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8	7.0	6.0	7.5			11.5	8.0	19.0		20.0	10.5	4.0	3.0				41.5		
9	6.5	0.5	2.5	9.5	5.0	14.0	6.5	6.0	14.0	5.0	5.0		2.0	2.0	18.0		27.0		
10		9.0	2.5	21.0	13.0	10.5	1.0	11.0	19.5	9.5	23.0	3.4	13.0	20.5					
11				23.0				1.0				15.5							
12												4.6							
13															39.5		23.5		
14	24.0	29.0	30.0		15.0	19.0	24.0	11.0	27.5	32.5	23.0		22.0	13.0	3.0		3.0		
15																			
16	4.5	4.5	10.0	6.5	5.0	5.5	5.0	4.0	5.0	2.0	0.5			4.0	19.5		22.5		
17	15.0	15.5	29.0	11.0	7.0	11.5	16.0	17.0	14.5	12.5	11.0			11.0					
18															0.5				
19	4.5	5.5	5.0	4.0	2.0	4.0	3.5	2.0	2.0	1.5			3.0	1.0	6.5		18.5		
20	41.0	33.5	16.0	12.0	27.0		60.0	62.5	31.5	44.0	38.0	17.0	51.0	30.0	20.0		59.5		
21	92.5	104.5	108.0	100.5	80.0	88.0	94.5	109.5	112.0	88.0	83.5	76.0	81.0	69.5	84.5		55.0		
22		4.0	4.0	4.0	4.0	5.0	6.0		6.0	6.0	3.5	5.0	4.0	4.0	9.0		9.5		
23			1.5																
24																			
25																			
26																			
27																			
28																			
29																			
30															8.0	7.0	9.5	12.0	25.5
31	55.0	39.0	59.0	67.0	55.0	63.0	73.0	96.0	70.5	87.0	38.0	106.0	60.0	84.0	63.0	65.0	85.0	68.0	80.5
合計	250.0	251.0	275.0	258.5	213.0	232.0	297.5	339.0	302.5	308.0	236.0	231.5	239.0	239.0	271.5	72.0	354.5	80.0	106.0

９月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ｿﾙ大	安養中	鏡荘校
1	45.5	74.0	74.5	68.0	52.0	57.0	51.0	50.0	66.0	45.0	74.0	40.0	55.0	71.0	58.0	42.5	30.0	21.5	35.5
2	10.5	16.0	21.0	6.5	2.0	3.0	12.5	10.0	4.5	5.0	6.0		10.0	8.0	17.0	10.0	4.0	2.0	1.5
3	1.5	0.5	0.5	0.5					0.5	1.0	1.0	4.0		1.0		0.5			
4	14.0	3.5							2.0	4.0						2.0	0.5		3.0
5							0.5												
6																			
7																	0.5		
8							1.0	9.0					44.0	9.0	165.5	160.5	93.0	32.5	48.5
9	112.0	160.0	177.5	76.5	72.0	82.0	100.0	11.0	97.0	28.0	25.0	49.0	34.0	103.0	0.5	1.5	1.0	0.5	
10	110.0	143.0	143.0	131.0	124.0	118.0	158.0	165.0	59.5	206.0	274.0	227.5	166.0	196.0	165.0	255.0	252.0	255.5	377.0
11	216.0	303.0	226.0	227.0	214.0	226.0	203.0	245.0	407.0	478.0	315.0	382.0	252.0	308.0	55.5	119.0	114.5	102.0	
12																			
13																			0.5
14																			
15																			
16																			
17																			
18																			
19																			
20																			
21																			
22																			
23	12.0	12.5	7.0				9.0			4.0	5.5	5.0		7.0	3.0	3.5	2.5	2.5	4.5
24																			
25																			
26																			
27																			
28																			
29																			
30																			
31																			
合計	521.5	712.5	649.5	509.5	464.0	486.0	535.0	490.0	636.5	771.0	700.5	707.5	561.0	703.0	464.5	594.5	498.0	416.5	470.5

１０月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ｿﾙ大	安養中	鏡荘校
1																			
2																			
3																			
4																5.0			
5																0.5			
6																13.5			
7																			
8																0.5			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																2.5			
18																1.5			
19																8.5			
20																			
21																			
22																			
23																			
24																	3.5		
25																		4.5	
26																			
27																			
28																			
29																			
30																			
31																			
合計	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.0	3.5	4.5	0.0

１１月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ソウル大	安養中	徳壮校
1																			
2																			
3																			
4					3.0										4.0	5.0	3.5		2.5
5	4.7	5.0							4.5	3.0		8.0	3.0		0.5	0.5		2.5	0.5
6	15.3	10.0			12.0				22.0	16.0	19.0	8.0		13.0	13.0	13.5	18.0		11.0
7																	0.5	11.5	
8					1.5										1.0	0.5			
9	2.0	1.0									2.0	3.0			3.0	1.0	2.0		2.0
10																		1.5	
11																			
12																			
13																			
14																			
15																			
16																			
17					1.0										3.5	3.0			1.5
18	3.5				1.0				1.5		3.0	2.0		2.0	1.5	1.5	1.0		1.0
19	16.5								21.5	17.0	29.5	30.0	5.0	28.0	21.5	9.0	24.0	1.5	29.0
20									0.5	1.5	0.5			1.0				22.0	
21																		0.5	
22																			
23																			
24																			
25	2.5								4.5		3.0			3.0	2.5	2.0	2.5	2.5	3.5
26																			
27																			
28																			
29																			
30					9.0														
31																			
合計	44.5	16.0	0.0	0.0	27.5	0.0	0.0	0.0	54.5	37.5	57.0	51.0	8.0	47.0	50.5	36.0	51.5	42.0	51.0

１２月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ソウル大	安養中	徳壮校
1					3.0					9.0	12.5	12.0		8.0	9.0	11.5	2.0	11.5	6.0
2																			
3																			1.0
4															4.0			0.5	2.0
5															5.5				0.5
6																			
7																			
8																			
9																			
10																			
11															0.5				
12																			
13					1.4											1.0		0.5	
14											1.0				3.5	2.5			0.5
15																			
16																			
17																			
18																			
19																			
20																			
21					2.0							5.0		2.5	2.0	0.5		0.5	2.0
22					0.6									1.0	0.5			1.5	2.0
23																			
24																			
25					4.0					4.0				6.0				7.5	4.5
26																			
27																			
28																			
29																			
30																			
31															1.0	2.0			
合計	0.0	0.0	0.0	0.0	11.0	0.0	0.0	0.0	0.0	13.0	13.5	17.0	0.0	17.5	26.0	17.5	2.0	22.0	18.5

年雨量	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ソウル大	安養中	徳壮校
	2030.5	2457.4	2401.3	1983.0	1761.0	1882.0	2120.5	2122.5	2188.5	2378.9	2239.7	2027.8	1893.4	2298.0	1734.0	1527.0	1650.5	1119.0	1193.0

91　1月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ｿｳﾙ大	安養中	徳荘校
1					0.5						8.0				1.5	1.5		0.5	
2																			
3					1.5									2.5					
4																			
5											0.5								
6					1.0														
7					1.0									3.0					
8																			
9																			
10																			
11																			
12																			
13																			
14					0.5														
15																			
16					1.0				2.5	5.0				2.5	4.0	0.5	2.0		1.0
17															0.5			1.0	0.5
18																			
19																			
20																			
21					2.2						1.0								
22					0.7				2.0	8.0	3.0			4.0	2.0	1.5	4.5		2.0
23					3.0										0.5			2.5	0.5
24					6.5				3.5	1.0	7.0	7.0	5.0	7.0			0.5		1.0
25																		0.5	0.5
26																		2.0	
27																			
28									0.5							0.5	0.5		2.0
29																0.5	0.5	1.5	0.5
30											3.0						0.5		
31											17.5								
合計	0.0	0.0	0.0	0.0	17.9	0.0	0.0	0.0	8.5	14.0	40.0	7.0	5.0	19.0	8.5	4.5	8.5	8.0	8.0

2月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ｿｳﾙ大	安養中	徳荘校
1											0.5								
2																			
3					2.1														
4													4.0	3.0	0.5		0.5		0.5
5																		0.5	
6															0.5			0.5	
7					3.4				1.5		1.5	2.0			5.0	8.5	1.0		1.5
8															3.0			1.0	
9															5.5			0.5	
10					2.3	2.5			1.5		2.0	4.0		4.0	3.5	2.5	3.5	0.5	2.5
11											2.0							0.5	1.0
12																			
13																			
14					4.0														
15					10.0	6.5			13.0		13.5			20.0	13.5	15.5	15.0		13.5
16															0.5		3.5	13.0	
17															0.5				
18																			
19																			
20					4.0				0.5				2.5	4.3					
21														3.5					
22																			
23																			
24																			2.0
25															0.5				1.5
26															0.5				
27					5.8	4.0			2.5		3.5			4.0	5.0	3.0	5.0	2.0	5.5
28						1.0			2.5		3.0				2.5	2.0		2.0	
29																			
30																			
31																			
	0.0	0.0	0.0	0.0	31.6	14.0	0.0	0.0	21.5	0.0	26.0	6.0	6.5	38.8	41.0	31.5	28.5	20.5	28.0

3月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ｿﾝﾑ大	安養中	德壯校
1																			
2																			
3																			
4																			
5																			
6																			
7					5.0														2.5
8		10.5			26.0	12.0			13.0	15.0	14.5	4.0		25.0			8.5	16.0	10.0
9		13.0				9.0			13.5		1.5					1.0	8.0	9.0	10.5
10		8.5			8.0				3.0	3.5		7.0		9.5	3.5	12.0	13.5	1.5	12.0
11									6.0	4.5	11.0			0.5	17.5	12.0		8.0	
12															13.5				
13															2.5				
14																			
15																			
16					1.1	0.5			0.5		1.0			1.0	1.5	2.0	0.5		
17																			
18																			
19					0.8										1.0	0.5	0.5		0.5
20										1.0	2.0								
21																			
22																			
23																			
24																			
25																			
26		5.5			13.1	6.0			6.5					8.0	12.5	10.5	15.0	9.5	
27		8.0			1.0	4.5			5.5	12.0	14.5	7.0		9.0	0.5	0.5	1.0	0.5	
28																			
29																			
30																			
31																			
	0.0	45.5	0.0	0.0	55.0	32.0	0.0	0.0	48.0	36.0	44.5	18.0	0.0	53.0	52.5	38.5	47.0	44.5	35.5

4月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ｿﾝﾑ大	安養中	德壯校
1																			
2																			
3																			
4																			
5	14.5																		
6																			
7																			
8																			
9																			
10																			
11																			
12		12.0			14.8	12.5			10.5	18.0	16.0	7.0		14.3	18.0	20.0	15.5	17.0	
13		4.5				3.0			4.0		21.0	13.0		3.0			0.5		
14																			
15																			
16																			
17	19.0	17.0			29.2	14.0			17.5	19.0	23.0	12.0		21.0	29.0	26.0		30.0	30.0
18	7.0	10.0				11.5			13.5	12.5	33.0	30.0		12.0					
19																			
20																			
21																			
22																			
23																			
24																			
25																			
26																			
27																			
28					2.0										2.0	0.5		0.5	0.5
29	1.8					1.5			1.0					1.0					
30	1.4	1.0			1.5	0.5								3.0	1.5	2.0			1.0
31																			
	43.7	44.5	0.0	0.0	47.5	43.0	0.0	0.0	46.5	49.5	93.0	62.0	0.0	54.3	50.5	48.5	16.0	47.5	31.5

5月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ｿｳﾙ大	安養中	慶祉校
1																			
2																			
3																			
4																			
5																			
6	4.8	7.0	6.0		4.6	4.0			5.0	4.5		3.5		7.5	6.0	4.5		3.5	3.5
7	2.6	1.5	1.0		3.2	2.0			2.0	4.0		6.5		5.5	4.5	4.0		3.5	6.0
8	1.8	1.0				1.0			1.0					1.0					
9																			
10																			
11																			
12																			
13																			
14																			
15			1.0		1.1				1.5	0.5	4.5			0.5				1.5	4.5
16			0.5						1.5						0.5				1.0
17																			
18																			
19																			
20																			
21																			
22																			
23																		11.0	
24		3.0	4.5		5.0	1.5		6.0	8.5	12.0	11.0	13.0		8.0	12.5	9.0		69.5	14.0
25	34.5	29.0	35.0	38.0	28.0	26.0	37.0	37.0	38.5	42.0	43.0	56.5	40.0	48.0	66.0	49.5		3.5	81.0
26	32.0	38.5	49.0	26.0	29.7	23.5	24.0	23.0	30.5	52.0	37.3	18.0	38.0	50.0	9.0	6.0			5.0
27																			
28																			
29																			
30																			
31												1.0						0.5	
	75.7	80.0	97.0	64.0	71.6	58.0	61.0	66.0	88.5	115.0	95.8	98.5	78.0	120.5	98.5	73.0	0.0	93.0	115.0

6月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ｿｳﾙ大	安養中	慶祉校
1											1.8				0.5	1.0		1.0	0.5
2	2.0	2.0	0.5			1.5								0.5	0.5				0.5
3										1.5				1.0					
4																			
5																			
6																			
7																		3.0	
8													5.0		1.0	2.0		4.5	4.5
9		11.5	12.5			5.5		7.0	10.5	13.5	8.6	6.5	5.0	6.5	5.5	4.0		2.0	4.5
10															6.0	4.5		19.0	3.0
11	10.0	8.0	25.2	26.0		21.5		37.5	23.0	43.0	27.0	25.5	46.0	39.0	23.5	19.0			28.0
12						1.0			1.0	44.0	4.1	2.5	4.0						
13																			
14																			
15															2.5				
16																			
17																			
18																			
19																			
20															0.5				
21																			
22																			
23															3.5	16.0			
24																			
25																			
26																		4.5	0.5
27																			
28																			
29															27.5	25.5		76.0	65.0
30																			
31																			
	12.0	21.5	38.2	26.0	0.0	29.5	0.0	44.5	34.5	102.0	41.5	34.5	60.0	47.0	71.0	72.0	0.0	110.0	106.5

7月

日時	東大門	城北	道峰	陽川	九老	永登浦	瑞草	江南	光明	安養	軍浦	儀旺	果川	城南	成佛寺	国民大	ｿｳﾙ大	安養中	徳泉校
1															2.0	6.0		5.0	1.5
2																			
3																			
4																4.0		17.5	11.5
5																			
6																			
7															50.5	41.0		50.5	54.5
8																			
9																			1.0
10																			
11																			
12																			
13																			
14																			7.0
15															30.0	36.0		42.0	22.5
16															0.5	18.5		0.5	
17																			
18																			
19																			
20																			
21																			
22																			
23																			
24																			
25																			
26																			
27																			
28																			
29																			
30																			
31																			
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	83.0	105.5	0.0	115.5	98.0

Chapter 3 Discharge Analysis

3.1 Location of Observation Stations

The self registering water gauges were installed to grasp a flow-regime for the purpose of a river purification facility design.

Table 3.1-1 Observation Stations Table

[River] Observation Station	Location	Basin (km^2)	Instru-ment	Start
[Anyang Chong]				
Yanghwa Bridge	Yomchang-dong, Kangso-gu	284.14	W-021-Z	Nov. 19 '90
Omok Bridge	Yangpyong-dong 2, Yongdungpo-gu	264.55	W-021-Z	Nov. 19 '90
Shinjong Bridge	Muullae-dong, Yongdungpo-gu	41.83	W-021-Z	Nov. 19 '90
Okum Bridge	Shinjong-dong, Yongdungpo-gu	212.29	W-021-Z	Nov. 19 '90
Anyang Bridge	Kuro-dong, Kuro-gu	153.60	W-021-Z	Nov. 19 '90
Kia Grand Bridge	Kuro-dong, Kuro-gu	126.38	W-021-Z	Nov. 19 '90
[Yangjae Chong]				
Taechi Bridge	Taechi-dong, Kangnam-gu	59.12	W-021-Z	Nov. 12 '90
Yongdong 2nd Bridge	Poi-dong, Socho-gu	51.47	W-021-Z	Oct. 19 '91
Yoi Bridge	Yangjae-dong, Socho-gu	12.18	W-021-Z	Nov. 12 '91
Umyon Bridge	Yangjae-dong, Socho-gu	36.35	W-021-Z	Nov. 12 '91
[Chungroung Chong]				
Chegi Bridge	Chegi-dong, Tongdaemun-gu	19.40	W-021-Z	Oct. 17 '90
Chongnam Bridge	Hoegi-dong, Tongdaemun-gu	17.92	W-021-Z	Oct. 17 '90
Cover Ending	Chongam-dong, Songbuk-gu	10.03	W-021-Z	Oct. 17 '90
[Ui Bridge]				
Changwolg Bridge	Chagui-dong, Songbuk-gu	26.18	W-021-Z	Sep. 27 '27
Ui Bridge	Sangmun-dong, Tobong-gu	16.86	W-021-Z	Sep. 27 '27

3.2 Hydrograph of Water Level and Discharge (H-Q Curve)

H-Q curves were drawn by discharge observation data. H-Q curve are generally calculated by method of least squares.

Primarily, a curve must be assumed. Assume that the relationship between a water level and a discharge is represented by two dimension formula.

$$Q = a^2 \left(H + \frac{b}{a} \right)^2$$

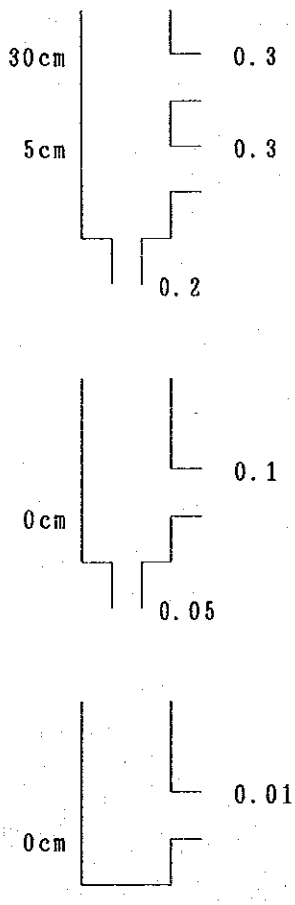
The data of the year 1991 were the result of the discharge observation from May 1991 till June 1991. The H-Q curves were drawn with only this survey data, then water level was converted to the discharge.

However it is noticeable that the data not to have been measured due to the adjacent constructions, flood and so on were supplemented by the estimation.

The figures of the tank models to be used for estimation.

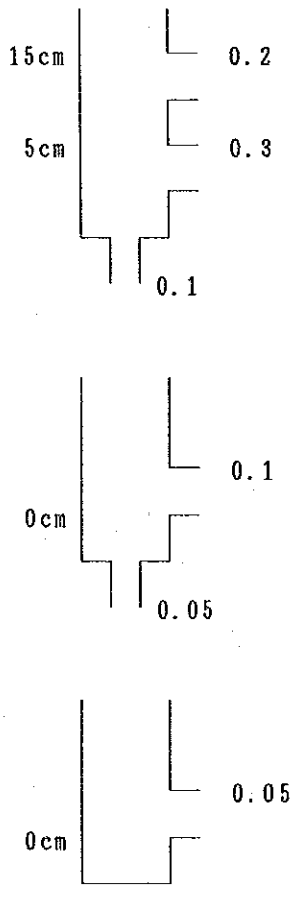
Anyang Chong

Storage height 40cm



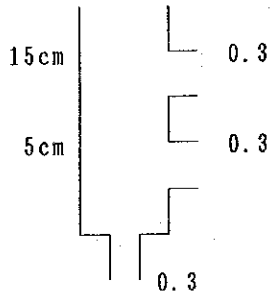
Yangjae Chong

Storage height 30cm

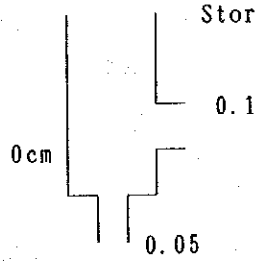


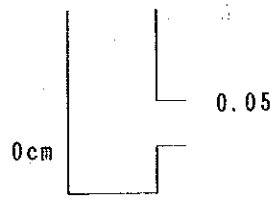
Ui Chong

Storage height 20cm



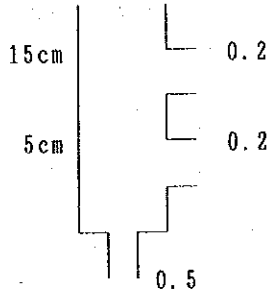
Storage height 5cm



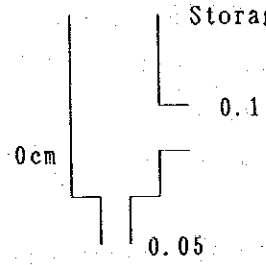


Chungroung Chong

Storage height 10cm



Storage height 5cm



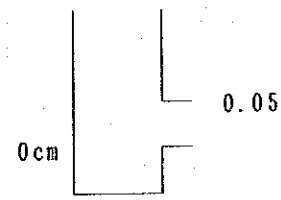


Table 3.2-1　　H - Q Data of Anyang St.1

	楊花橋		S T. 1	資料数N	56	
資料番号	H		Q	H2	√Q	H√Q
1	2.518	2.550	0.11	6.503	0.332	0.847
2	2.513	2.545	0.11	6.477	0.332	0.845
3	2.513	2.545	0.12	6.477	0.346	0.881
4	2.533	2.565	0.12	6.579	0.346	0.887
5	2.518	2.550	0.13	6.503	0.361	0.921
6	2.513	2.545	0.13	6.477	0.361	0.919
7	2.538	2.570	0.13	6.605	0.361	0.928
8	2.533	2.565	0.13	6.579	0.361	0.926
9	2.533	2.565	0.14	6.579	0.374	0.959
10	2.518	2.550	0.15	6.503	0.387	0.987
11	2.538	2.570	0.15	6.605	0.387	0.995
12	2.563	2.595	0.16	6.734	0.400	1.038
13	2.568	2.600	0.17	6.760	0.412	1.071
14	2.563	2.595	0.18	6.734	0.424	1.100
15	2.538	2.570	0.18	6.605	0.424	1.090
16	2.618	2.650	0.19	7.023	0.436	1.155
17	2.613	2.645	0.19	6.996	0.436	1.153
18	2.643	2.675	0.20	7.156	0.447	1.196
19	2.613	2.645	0.21	6.996	0.458	1.211
20	2.638	2.670	0.21	7.129	0.458	1.223
21	2.643	2.675	0.23	7.156	0.480	1.284
22	2.618	2.650	0.23	7.023	0.480	1.272
23	2.648	2.680	0.24	7.182	0.490	1.313
24	2.643	2.675	0.25	7.156	0.500	1.338
25	2.648	2.680	0.25	7.182	0.500	1.340
26	2.653	2.685	0.26	7.209	0.510	1.369
27	2.648	2.680	0.28	7.182	0.529	1.418
28	2.703	2.735	1.90	7.480	1.378	3.769
29	2.763	2.795	2.00	7.812	1.414	3.952
30	2.748	2.780	2.00	7.728	1.414	3.931
31	2.758	2.790	2.10	7.784	1.449	4.043
32	2.748	2.780	2.20	7.728	1.483	4.123
33	2.763	2.795	2.30	7.812	1.517	4.240
34	2.768	2.800	2.50	7.840	1.581	4.427
35	2.798	2.830	3.22	8.009	1.794	5.077
36	2.818	2.850	4.20	8.123	2.049	5.840
37	2.818	2.850	4.30	8.123	2.074	5.911
38	2.818	2.850	4.50	8.123	2.121	6.045
39	2.898	2.930	4.75	8.585	2.179	6.384
40	3.098	3.130	6.45	9.797	2.540	7.950
41	2.998	3.030	6.50	9.181	2.550	7.727
42	3.098	3.130	6.80	9.797	2.608	8.163
43	3.098	3.130	7.00	9.797	2.646	8.282
44	3.500	3.532	18.56	12.475	4.308	15.216
45	3.998	4.030	34.80	16.241	5.899	23.773
46	3.988	4.020	35.10	16.160	5.925	23.819
47	3.998	4.030	35.10	16.241	5.925	23.878
48	3.998	4.030	36.50	16.241	6.042	24.349
49	4.498	4.530	55.80	20.521	7.470	33.839
50	4.968	5.000	75.30	25.000	8.678	43.390
51	4.998	5.030	80.90	25.301	8.994	45.240
52		3.202	6.39	10.253	2.528	8.095
53		3.332	7.09	11.102	2.663	8.873
54		3.192	6.69	10.189	2.587	8.258
55		3.062	3.70	9.376	1.924	5.891
56		3.150	6.49	9.923	2.548	8.026
合計	149.265	166.835	469.990	516.852	107.620	392.177

A= [n (H√Q) - (H) * (√Q)] / [n (H^2) - (H) ^2] 3.6106939

B= [(H2) * (√Q) - (H) * (H√Q)] / [n (H2) - (H) ^2]　　-8.835180

A^2=　　13.037110

B/A=　　-2.446948

Q=A^2 (H+B/A) ^2= $13.037110 \times (H - 2.446948)^2$

Table 3.2-2　　H - Q Data of Anyang St.2

地点名：	梧木橋		ＳＴ．２	資料数N	47	
資料番号	H		Q	H2	√Q	H√Q
1	3.746	3.846	2.20	14.792	1.483	5.704
2	3.746	3.846	2.00	14.792	1.414	5.438
3	3.751	3.851	2.10	14.830	1.449	5.580
4	3.751	3.851	2.08	14.830	1.442	5.553
5	3.751	3.851	2.20	14.830	1.483	5.711
6	3.781	3.881	3.30	15.062	1.817	7.052
7	3.781	3.881	3.10	15.062	1.761	6.834
8	3.781	3.881	3.30	15.062	1.817	7.052
9	3.781	3.881	3.50	15.062	1.871	7.261
10	3.836	3.936	4.10	15.492	2.025	7.970
11	3.836	3.936	4.20	15.492	2.049	8.065
12	3.836	3.936	4.10	15.492	2.025	7.970
13	3.831	3.931	4.20	15.453	2.049	8.055
14	3.851	3.951	4.50	15.610	2.121	8.380
15	3.851	3.951	4.80	15.610	2.191	8.657
16	3.851	3.951	4.70	15.610	2.168	8.566
17	3.861	3.961	4.50	15.690	2.121	8.401
18	3.861	3.961	4.80	15.690	2.191	8.679
19	3.896	3.996	5.30	15.968	2.302	9.199
20	3.901	4.001	5.20	16.008	2.280	9.122
21	3.901	4.001	5.40	16.008	2.324	9.298
22	3.901	4.001	5.30	16.008	2.302	9.210
23	4.001	4.101	5.80	16.818	2.408	9.875
24	4.001	4.101	5.50	16.818	2.345	9.617
25	4.001	4.101	5.70	16.818	2.387	9.789
26	4.081	4.181	14.80	17.481	3.847	16.084
27	4.081	4.181	16.50	17.481	4.062	16.983
28	4.081	4.181	14.00	17.481	3.742	15.645
29	4.181	4.281	18.50	18.327	4.301	18.413
30	4.181	4.281	17.90	18.327	4.231	18.113
31	4.181	4.281	17.50	18.327	4.183	17.907
32	4.236	4.336	19.40	18.801	4.405	19.100
33	4.236	4.336	20.00	18.801	4.472	19.391
34	4.236	4.336	19.80	18.801	4.450	19.295
35	4.296	4.396	22.20	19.325	4.712	20.714
36	4.296	4.396	23.50	19.325	4.848	21.312
37	4.301	4.401	21.50	19.369	4.637	20.407
38	5.001	5.101	84.50	26.020	9.192	46.888
39	5.501	5.601	148.20	31.371	12.174	68.187
40	6.001	6.101	226.20	37.222	15.040	91.759
42	6.451	6.551	309.10	42.916	17.581	115.173
43		3.841	1.96	14.753	1.400	5.377
44		3.851	3.49	14.830	1.868	7.194
45		3.851	3.43	14.830	1.852	7.132
46		3.851	3.26	14.830	1.806	6.955
47		3.881	5.38	15.062	2.319	9.000
合計	169.426	192.801	1113.000	822.587	164.947	778.067

A= [n (H√Q) - (H) * (√Q)] / [n (H^2) - (H) ^2] 3.2008322

B= [(H2) * (√Q) - (H) * (H√Q)] / [n (H2) - (H) ^2]　　-9.620780

A^2=　　10.245327

B/A=　　-3.005712

Q=A^2 (H+B/A) ^2= $10.245327\times(H-3.005712)^2$

Table 3.2-3　　H - Q Data of Anyang St.3

新亭橋		ＳＴ．３	資料数N	26	
H		Q	H２	√Q	H√Q
4.869	4.833	0.91	23.358	0.954	4.611
5.199	5.163	3.15	26.657	1.775	9.164
5.119	5.083	4.03	25.837	2.007	10.202
5.259	5.223	5.67	27.280	2.381	12.436
5.199	5.163	7.94	26.657	2.818	14.549
6.212	6.176	46.20	38.143	6.797	41.978
6.199	6.163	48.40	37.983	6.957	42.876
6.219	6.183	52.70	38.229	7.259	44.882
6.214	6.178	60.40	38.168	7.772	48.015
6.278	6.242	62.30	38.963	7.893	49.268
6.199	6.163	63.70	37.983	7.981	49.187
6.283	6.247	63.90	39.025	7.994	49.939
6.199	6.163	70.50	37.983	8.396	51.745
6.249	6.213	74.90	38.601	8.654	53.767
6.310	6.274	76.50	39.363	8.746	54.872
6.379	6.343	79.90	40.234	8.939	56.700
6.419	6.383	80.30	40.743	8.961	57.198
6.419	6.383	87.10	40.743	9.333	59.573
6.379	6.343	87.30	40.234	9.343	59.263
6.379	6.343	88.00	40.234	9.381	59.504
6.399	6.363	89.00	40.488	9.434	60.029
6.401	6.365	93.60	40.513	9.675	61.581
	4.648	0.06	21.604	0.245	1.139
	4.618	0.04	21.326	0.200	0.924
	4.658	0.10	21.697	0.316	1.472
	4.658	0.10	21.697	0.316	1.472
	0	0.00	0.000	0.000	0.000
132.782	150.572	1246.70	883.743	154.527	956.346

A= [n (H√Q) - (H) * (√Q)] / [n (H^2) - (H) ^2] 5.2311872

B= [(H2) * (√Q) - (H) * (H√Q)] / [n (H2) - (H) ^2]　　-24.35166

A^2=　　27.365320

B/A=　　-4.655093

Q=A^2 (H+-B/A) ^2= $27.365320 \times (H-4.655093)^2$

Table 3.2-4　　H - Q Data of Anyang St.4

地点名： オグム橋			ST. 4	資料数N	57	
資料番号	H		Q	H2	√Q	H√Q
1	4.295	4.489	4.34	20.151	2.083	9.351
2	4.435	4.629	5.73	21.428	2.394	11.082
3	4.755	4.949	7.14	24.493	2.672	13.224
4	4.395	4.589	8.03	21.059	2.834	13.005
5	4.275	4.469	8.60	19.972	2.933	13.108
6	4.455	4.649	10.77	21.613	3.282	15.258
7	4.745	4.939	17.60	24.394	4.195	20.719
8	6.525	6.719	58.19	45.145	7.628	51.253
9	6.030	6.224	62.45	38.738	7.903	49.188
10	5.837	6.031	62.64	36.373	7.914	47.729
11	6.535	6.729	72.98	45.279	8.543	57.486
12	6.355	6.549	75.26	42.889	8.675	56.813
13	6.425	6.619	79.79	43.811	8.933	59.128
14	6.695	6.889	79.82	47.458	8.934	61.546
15	5.933	6.127	82.65	37.540	9.091	55.701
16	5.969	6.163	83.04	37.983	9.112	56.157
17	5.885	6.079	83.41	36.954	9.133	55.520
18	6.250	6.444	87.47	41.525	9.352	60.264
19	6.285	6.479	89.99	41.977	9.486	61.460
20	6.705	6.899	99.69	47.596	9.984	68.880
21	6.625	6.819	103.89	46.499	10.193	69.506
22	6.395	6.589	104.41	43.415	10.218	67.326
23	6.665	6.859	105.37	47.046	10.265	70.408
24	6.615	6.809	105.92	46.362	10.292	70.078
25	6.585	6.779	106.34	45.955	10.312	69.905
26	7.055	7.249	106.43	52.548	10.317	74.788
27	6.625	6.819	108.40	46.499	10.411	70.993
28	7.055	7.249	111.68	52.548	10.568	76.607
29	6.075	6.269	114.25	39.300	10.689	67.009
30	6.375	6.569	119.03	43.152	10.910	71.668
31	6.615	6.809	120.23	46.362	10.965	74.661
32	7.035	7.229	121.17	52.258	11.008	79.577
33	6.415	6.609	122.39	43.679	11.063	73.115
34	7.075	7.269	123.06	52.838	11.093	80.635
35	6.395	6.589	123.10	43.415	11.095	73.105
36	7.045	7.239	129.11	52.403	11.362	82.250
37	6.655	6.849	141.51	46.909	11.896	81.476
38	6.695	6.889	150.57	47.458	12.271	84.535
39	6.665	6.859	150.58	47.046	12.271	84.167
41	6.795	6.989	153.61	48.846	12.394	86.622
42	6.725	6.919	154.11	47.873	12.414	85.892
43	6.705	6.899	157.36	47.596	12.544	86.541
44	6.835	7.029	157.39	49.407	12.546	88.186
45	7.035	7.229	168.29	52.258	12.973	93.782
46	6.795	6.989	170.39	48.846	13.053	91.227
47	6.825	7.019	172.03	49.266	13.116	92.061
48	6.825	7.019	173.84	49.266	13.185	92.546
49	6.795	6.989	178.93	48.846	13.376	93.485
50	6.645	6.839	179.29	46.772	13.390	91.574
51	7.055	7.249	190.58	52.548	13.805	100.072
52	6.615	6.809	191.77	46.362	13.848	94.291
53	7.045	7.239	229.37	52.403	15.145	109.635
54		4.414	1.56	19.483	1.249	5.513
55		4.544	5.96	20.648	2.441	11.092
56		4.484	3.56	20.106	1.887	8.461
57		4.484	2.93	20.106	1.712	7.677
58		0	0.00	0.000	0.000	0.000
合計	334.849	363.057	5790.57	2360.298	533.710	3582.554

A= [n (H√Q) - (H) * (√Q)] / [n (H^2) - (H) ^2] 3.8283663

B= [(H2) * (√Q) - (H) * (H√Q)] / [n (H2) - (H) ^2]　　-15.02114

A^2=　　14.656388

B/A=　　-3.923643

Q=A^2 (H+-B/A) ^2= $14.656388 \times (H - 3.923643)^2$

Table 3.2-5　　H - Q Data of Anyang St.5

地点名：	安養橋		ＳＴ．５	資料数N	15	
資料番号	H		Q	H2	√Q	H√Q
1	5.285	5.299	3.98	28.079	1.995	10.572
2	5.365	5.379	8.46	28.934	2.909	15.648
3	5.365	5.379	9.09	28.934	3.015	16.218
4	7.255	7.269	118.30	52.838	10.877	79.065
5	7.235	7.249	135.80	52.548	11.653	84.473
6	7.695	7.709	173.00	59.429	13.153	101.396
7	7.745	7.759	186.90	60.202	13.671	106.073
8	7.755	7.769	195.70	60.357	13.989	108.681
9	7.805	7.819	206.30	61.137	14.363	112.304
10	7.795	7.809	208.70	60.980	14.446	112.809
11	7.785	7.799	222.50	60.824	14.916	116.330
12		5.234	2.37	27.395	1.539	8.055
13		5.304	4.60	28.132	2.145	11.377
14		5.254	2.83	27.605	1.682	8.837
15		5.264	3.07	27.710	1.752	9.223
16		0		0.000	0.000	0.000
合計	77.085	98.295	1481.60	665.104	122.105	901.061

A= [n (H√Q) - (H) * (√Q)] / [n (H^2) - (H) ^2] 4.8103915

B= [(H2) * (√Q) - (H) * (H√Q)] / [n (H2) - (H) ^2]　　-23.38216

A^2=　　23.139867

B/A=　　-4.860760

Q=A^2 (H+-B/A) ^2= $23.139867 \times (H - 4.86076)^2$

Table 3.2-6　　H - Q Data of Anyang St.6

地点名：　安陽大橋　　S T. 6　資料数N：　85

資料番号	H		Q	H2	√Q	H√Q
1	10.145	10.142	3.45	102.860	1.860	18.854
2	10.166	10.162	6.90	103.256	2.627	26.596
3	10.206	10.202	14.40	104.081	3.795	38.717
4	10.556	10.552	33.80	111.345	5.814	61.349
5	10.556	10.552	34.90	111.345	5.908	62.341
6	10.586	10.582	41.70	111.979	6.458	68.339
7	10.586	10.582	40.90	111.979	6.395	67.672
8	10.586	10.582	68.50	111.979	8.276	87.577
9	10.686	10.682	73.60	114.105	8.579	91.641
10	10.686	10.682	70.50	114.105	8.396	89.686
11	10.686	10.682	49.90	114.105	7.064	75.458
12	10.686	10.682	69.60	114.105	8.343	89.120
13	10.694	10.690	55.70	114.276	7.463	79.779
14	10.706	10.702	81.50	114.533	9.033	96.671
15	10.716	10.712	72.80	114.747	8.532	91.395
16	10.716	10.712	65.30	114.747	8.081	86.564
17	10.716	10.712	56.50	114.747	7.523	80.586
18	10.716	10.712	59.30	114.747	7.701	82.493
19	10.726	10.722	59.30	114.961	7.701	82.570
20	10.726	10.722	82.20	114.961	9.066	97.206
21	10.726	10.722	80.30	114.961	8.961	96.080
22	10.726	10.722	56.60	114.961	7.523	80.662
23	10.728	10.724	65.50	115.004	8.093	86.789
24	10.759	10.755	73.80	115.670	8.591	92.396
25	10.766	10.762	67.00	115.821	8.185	88.087
26	10.766	10.762	78.00	115.821	8.832	95.050
27	10.766	10.762	83.10	115.821	9.116	98.106
28	10.766	10.762	81.30	115.821	9.017	97.041
29	10.766	10.762	91.80	115.821	9.581	103.111
30	10.766	10.762	84.50	115.821	9.192	98.924
31	10.796	10.792	54.60	116.467	7.389	79.742
32	10.796	10.792	58.00	116.467	7.616	82.192
33	10.796	10.792	84.30	116.467	9.182	99.092
34	10.826	10.822	96.80	117.116	9.839	106.569
35	10.837	10.833	94.00	117.354	9.695	105.025
36	10.866	10.862	103.50	117.983	10.173	110.499
37	10.866	10.862	100.80	117.983	10.040	109.054
38	10.866	10.862	81.40	117.983	9.022	97.997
39	10.866	10.862	92.60	117.983	9.623	104.525
40	10.866	10.862	98.00	117.983	9.899	107.523
41	10.866	10.862	101.60	117.983	10.080	109.489
42	10.910	10.906	105.50	118.941	10.271	112.015
43	10.927	10.923	78.40	119.312	8.854	96.712
44	10.946	10.942	108.30	119.727	10.407	113.873
45	10.946	10.942	99.70	119.727	9.985	109.256
46	10.946	10.942	107.90	119.727	10.387	113.655
47	10.976	10.972	109.70	120.385	10.474	114.921
48	10.976	10.972	111.70	120.385	10.569	115.963
49	10.976	10.972	81.40	120.385	9.022	98.989
50	10.976	10.972	109.40	120.385	10.459	114.756
51	10.976	10.972	97.30	120.385	9.864	108.228
52	10.976	10.972	98.50	120.385	9.925	108.897
53	11.000	10.996	106.50	120.912	10.320	113.479
54	11.001	10.997	113.20	120.934	10.640	117.008
55	11.006	11.002	114.80	121.044	10.714	117.875
56	11.006	11.002	122.10	121.044	11.050	121.572
57	11.006	11.002	106.90	121.044	10.339	113.750
58	11.006	11.002	116.60	121.044	10.798	118.800
59	11.006	11.002	117.90	121.044	10.858	119.460
60	11.006	11.002	97.70	121.044	9.884	108.744
61	11.006	11.002	106.40	121.044	10.315	113.485
62	11.006	11.002	103.80	121.044	10.188	111.978
63	11.008	11.004	97.70	121.088	9.884	108.764
64	11.013	11.009	114.30	121.198	10.691	117.697
65	11.027	11.023	106.80	121.507	10.334	113.912
66	11.027	11.023	109.60	121.507	10.469	115.400
67	11.046	11.042	123.10	121.926	11.095	122.511
68	11.046	11.042	116.80	121.926	10.807	119.331
69	11.046	11.042	121.20	121.926	11.009	121.581
70	11.062	11.058	133.50	122.279	11.554	127.764
71	11.082	11.078	124.60	122.722	11.162	123.653
72	11.086	11.082	128.90	122.811	11.353	125.814
73	11.105	11.101	113.30	123.232	10.644	118.159
74	11.106	11.102	120.60	123.254	10.982	121.922
75	11.106	11.102	106.80	123.254	10.334	114.728
76	11.106	11.102	113.30	123.254	10.644	118.170
77	11.107	11.103	128.90	123.277	11.353	126.052
78	11.246	11.242	175.40	126.383	13.244	148.889
79	11.246	11.242	149.20	126.383	12.215	137.321
80	11.246	11.242	169.50	126.383	13.019	146.360
81	11.296	11.292	179.70	127.509	13.405	151.369
82		10.123	2.46	102.475	1.568	15.873
83		10.153	5.05	103.083	2.247	22.814
84		10.133	3.45	102.678	1.857	18.817
85		10.133	3.67	102.678	1.916	19.415
合計	880.217	920.435	7429.59	9972.939	765.353	8342.192

A= [n (H√Q) - (H) * (√Q)] / [n (H^2) - (H) ^2] 9.2715195

B= [(H2) * (√Q) - (H) * (H√Q)] / [n (H2) - (H) ^2]　　-91.39494

A^2=　85.962928

B/A=　-9.857494

Q=A^2 (H+B/A) ^2=　$85.962928\times(H-9.857494)^2$

Table 3.2-7 H - Q Data of Yangjae St.1

地点名：	大橋橋		ST. 1	資料数N	79	
資料番号	H		Q	H2	√Q	H√Q
1	4.945	5.799	0.62	33.628	0.787	4.564
2	4.955	5.809	0.44	33.744	0.663	3.851
3	4.965	5.819	0.60	33.861	0.775	4.510
4	4.975	5.829	1.39	33.977	1.179	6.872
5	5.085	5.939	2.28	35.272	1.510	8.968
6	5.585	6.439	74.43	41.461	8.627	55.549
7	5.608	6.462	79.37	41.757	8.909	57.570
8	5.615	6.469	72.05	41.848	8.488	54.909
9	5.641	6.495	86.88	42.185	9.321	60.540
10	5.652	6.506	69.95	42.328	8.363	54.410
11	5.665	6.519	83.65	42.497	9.146	59.623
12	5.673	6.527	82.26	42.602	9.070	59.200
13	5.680	6.534	82.34	42.693	9.074	59.290
14	5.690	6.544	98.69	42.824	9.934	65.008
15	5.698	6.552	80.53	42.929	8.974	58.798
16	5.700	6.554	80.58	42.955	8.977	58.835
17	5.713	6.567	73.20	43.125	8.556	56.187
18	5.724	6.578	92.21	43.270	9.603	63.169
19	5.735	6.589	86.41	43.415	9.402	61.950
20	5.743	6.597	78.41	43.520	8.855	58.416
21	5.743	6.597	87.32	43.520	9.344	61.642
22	5.743	6.597	75.56	43.520	8.692	57.341
23	5.743	6.597	78.44	43.520	8.856	58.423
24	5.747	6.601	88.50	43.573	9.407	62.096
25	5.747	6.601	97.60	43.573	9.879	65.211
26	5.747	6.601	59.96	43.573	7.744	51.118
27	5.747	6.601	93.13	43.573	9.650	63.700
28	5.750	6.604	63.78	43.613	7.986	52.740
29	5.750	6.604	95.29	43.613	9.762	64.468
30	5.750	6.604	87.62	43.613	9.361	61.820
31	5.750	6.604	70.25	43.613	8.381	55.348
32	5.750	6.604	83.41	43.613	7.963	52.588
33	5.755	6.609	86.92	43.679	9.323	61.616
34	5.766	6.62	103.60	43.824	10.178	67.378
35	5.774	6.628	81.52	43.930	9.029	59.844
36	5.785	6.639	76.99	44.076	8.774	58.251
37	5.789	6.643	76.99	44.129	8.774	58.286
38	5.794	6.648	86.02	44.196	9.275	61.660
39	5.799	6.653	72.77	44.262	8.531	56.757
40	5.815	6.669	78.44	44.476	8.856	59.061
41	5.823	6.677	85.22	44.582	9.232	61.642
42	5.853	6.707	95.82	44.984	9.789	65.655
43	5.864	6.718	103.32	45.132	10.165	68.288
44	5.871	6.725	95.93	45.226	9.794	65.865
45	5.885	6.739	93.12	45.414	9.650	65.031
46	5.885	6.739	78.44	45.414	8.857	59.687
47	5.885	6.739	80.64	45.414	8.980	60.516
48	5.885	6.739	93.24	45.414	9.656	65.072
49	5.885	6.739	66.13	45.414	8.132	54.802
50	5.893	6.747	98.44	45.522	9.921	66.937
51	5.905	6.759	87.74	45.684	9.367	63.312
52	5.905	6.759	78.59	45.684	8.865	59.919
53	5.905	6.759	97.69	45.684	9.884	66.806
54	5.905	6.759	104.21	45.684	10.209	69.003
55	5.905	6.759	86.43	45.684	9.297	62.838
56	5.905	6.759	97.63	45.684	9.881	66.786
57	5.911	6.765	104.25	45.765	10.210	69.071
58	5.916	6.77	116.33	45.833	10.785	73.014
59	5.919	6.773	94.70	45.874	9.731	65.908
60	5.931	6.785	99.40	46.036	9.970	67.646
61	5.935	6.789	110.04	46.091	10.490	71.217
62	5.945	6.799	102.01	46.226	10.100	68.670
63	5.946	6.8	117.31	46.240	10.831	73.651
64	5.954	6.808	72.70	46.349	8.527	58.052
65	5.954	6.808	95.27	46.349	9.761	66.453
66	5.954	6.808	100.00	46.349	10.000	68.080
67	5.954	6.808	85.82	46.349	9.264	63.069
68	5.954	6.808	128.58	46.349	11.339	77.196
69	5.955	6.809	128.58	46.362	11.339	77.207
70	5.955	6.809	117.55	46.362	10.842	73.823
71	5.955	6.809	100.33	46.362	10.016	68.199
72	5.955	6.809	105.46	46.362	10.269	69.922
73	5.955	6.809	117.55	46.362	10.842	73.823
74		6.029	3.28	36.349	1.811	10.919
75		5.859	2.23	34.328	1.493	8.747
76		5.809	1.01	33.744	1.005	5.838
77		5.869	1.07	34.445	1.034	6.069
78		5.939	1.78	35.272	1.334	7.923
79		5.839	0.92	34.094	0.959	5.600
合計	420.498	518.184	6101.075	3405.852	653.609	4353.823

A= {n (H√Q) - (H) * (√Q) } / {n (H^2) - (H) ^2} 9.6088552

B= { (H2) * (√Q) - (H) * (H√Q) } / {n (H2) - (H) ^2} -54.75374

A^2= 92.330098

B/A= -5.698259

Q=A^2 (H+B/A) ^2= $92.330098 \times (H-5.698259)^2$

Table 3.2-8　　H - Q Data of Yangjae St.2

地点名：	永東2橋		ST. 2	資料数N	42	
資料番号	H		Q	H2	√Q	H√Q
1	10.462		0.69	109.453	0.831	8.694
2	11.502		8.28	132.296	2.877	33.091
3	11.278		10.91	127.193	3.302	37.240
4	11.361		12.02	129.072	3.467	39.389
5	11.322		12.27	128.188	3.503	39.661
6	11.342		12.47	128.641	3.531	40.049
7	11.162		14.87	124.590	3.856	43.041
8	11.267		15.00	126.945	3.873	43.637
9	11.152		15.91	124.367	3.989	44.485
10	11.261		15.97	126.810	3.996	44.999
11	11.456		17.39	131.240	4.170	47.772
12	11.352		17.84	128.868	4.223	47.939
13	11.342		20.17	128.641	4.491	50.937
14	11.342		20.45	128.641	4.522	51.289
15	11.356		20.83	128.959	4.564	51.829
16	11.363		21.47	129.118	4.633	52.645
17	11.472		21.87	131.607	4.676	53.643
18	11.356		23.47	128.959	4.844	55.008
19	11.492		24.27	132.066	4.927	56.621
20	11.642		25.07	135.536	5.007	58.291
21	11.442		25.61	130.919	5.060	57.897
22	11.672		26.40	136.236	5.138	59.971
23	11.472		26.52	131.607	5.150	59.081
24	11.606		26.80	134.699	5.177	60.084
25	11.415		30.05	130.302	5.482	62.577
26	11.490		30.64	132.020	5.535	63.597
27	11.502		32.06	132.296	5.662	65.124
28	11.652		33.36	135.769	5.776	67.302
29	11.472		33.43	131.607	5.782	66.331
30	11.482		34.53	131.836	5.876	67.468
31	11.632		35.72	135.303	5.976	69.513
32	11.472		36.91	131.607	6.076	69.704
33	11.512		36.97	132.526	6.080	69.993
34	11.423		37.07	130.485	6.089	69.555
35	11.522		37.63	132.756	6.134	70.676
36	11.502		37.81	132.296	6.149	70.726
37	11.624		40.30	135.117	6.348	73.789
38	11.920		42.21	142.086	6.497	77.444
39	11.572		43.67	133.911	6.608	76.468
40	12.002		45.12	144.048	6.717	80.617
41	11.612		45.94	134.839	6.778	78.706
42	11.672		46.50	136.236	6.819	79.591
43				0.000	0.000	0.000
44				0.000	0.000	0.000
45				0.000	0.000	0.000
46				0.000	0.000	0.000
47				0.000	0.000	0.000
合計	480.952	0.000	1116.452	5509.691	210.191	2416.474

A= [n (H√Q) - (H) * (√Q)] / [n (H^2) - (H) ^2] 4.3399658

B= [(H2) * (√Q) - (H) * (H√Q)] / [n (H2) - (H) ^2]　　-44.69343

A^2=　　18.835303

B/A=　　-10.29810

Q=A^2 (H+-B/A) ^2= $18.835303 \times (H-10.2981)^2$

Table 3.2-9　　H - Q Data of Yangjae St.3

地点名：	如意橋		ST. 3	資料数N	58	
資料番号	H		Q	H2	√Q	H√Q
1	15.447	15.447	0.110	238.610	0.332	5.128
2	15.107	15.107	0.120	228.221	0.346	5.227
3	15.477	15.477	1.380	239.538	1.175	18.185
4	15.497	15.497	1.520	240.157	1.233	19.108
5	15.397	15.397	5.299	237.068	2.302	35.444
6	15.397	15.397	5.963	237.068	2.442	37.599
7	15.447	15.447	6.458	238.610	2.541	39.251
8	15.637	15.637	6.493	244.516	2.548	39.843
9	15.447	15.447	6.497	238.610	2.549	39.374
10	15.637	15.637	6.717	244.516	2.592	40.531
11	15.667	15.667	7.397	245.455	2.720	42.614
12	15.457	15.457	7.404	238.919	2.721	42.058
13	15.667	15.667	7.563	245.455	2.750	43.084
14	15.717	15.717	8.296	247.024	2.880	45.265
15	15.717	15.717	8.492	247.024	2.914	45.799
16	15.577	15.577	8.549	242.643	2.924	45.547
17	15.477	15.477	8.631	239.538	2.938	45.471
18	15.497	15.497	8.637	240.157	2.939	45.546
19	15.497	15.497	8.943	240.157	2.990	46.336
20	15.497	15.497	9.056	240.157	3.009	46.630
21	15.797	15.797	9.595	249.545	3.098	48.939
22	15.517	15.517	9.990	240.777	3.161	49.049
23	15.537	15.537	10.005	241.398	3.163	49.144
24	15.817	15.817	10.060	250.177	3.172	50.172
25	15.797	15.797	10.142	249.545	3.185	50.313
26	15.527	15.527	10.195	241.088	3.193	49.578
27	15.547	15.547	10.226	241.709	3.198	49.719
28	15.817	15.817	10.336	250.177	3.215	50.852
29	15.837	15.837	10.550	250.811	3.248	51.439
30	15.537	15.537	10.622	241.398	3.259	50.635
31	15.537	15.537	10.667	241.398	3.266	50.744
32	15.617	15.617	10.973	243.891	3.313	51.739
33	15.537	15.537	11.029	241.398	3.321	51.598
34	15.567	15.567	11.223	242.331	3.350	52.149
35	15.837	15.837	11.361	250.811	3.371	53.387
36	15.847	15.847	11.369	251.127	3.372	53.436
37	15.597	15.597	11.459	243.266	3.385	52.796
38	15.557	15.557	11.465	242.020	3.386	52.676
39	15.617	15.617	11.967	243.891	3.459	54.019
40	15.567	15.567	12.295	242.331	3.506	54.578
41	15.847	15.847	12.425	251.127	3.525	55.861
42	15.617	15.617	12.738	243.891	3.569	55.737
43	15.597	15.597	13.238	243.266	3.638	56.742
44	15.577	15.577	13.332	242.643	3.651	56.872
45	15.617	15.617	13.816	243.891	3.717	58.048
46	15.577	15.577	13.845	242.643	3.721	57.962
47	15.637	15.637	14.456	244.516	3.802	59.452
48	15.667	15.667	15.563	245.455	3.945	61.806
49	15.647	15.647	16.003	244.829	4.000	62.588
50	15.717	15.717	17.341	247.024	4.164	65.446
51	15.797	15.797	19.964	249.545	4.468	70.581
52	15.817	15.817	21.044	250.177	4.587	72.553
53	15.837	15.837	21.825	250.811	4.672	73.990
54	15.847	15.847	23.361	251.127	4.833	76.589
55		15.379	0.320	236.514	0.566	8.705
56		15.339	0.090	235.285	0.300	4.602
57		15.319	0.060	234.672	0.245	3.753
58		15.309	0.050	234.365	0.224	3.429
59		0	0.000	0.000	0.000	0.000
合計	843.068	904.414	568.525	14104.313	170.093	2659.718

A= [n (H√Q) - (H) * (√Q)] / [n (H2) - (H) ^2] =5.0210654

B= [(H2) * (√Q) - (H) * (H√Q)] / [n (H2) - (H) ^2]　　-75.36256

A^2=　　25.211098

B/A=　　-15.00927

Q=A^2 (H+-B/A) ^2= $25.211098 \times (H-15.00927)^2$

Table 3.2-10　H - Q Data of Yangjae St.4

地点名：	牛眠橋		ＳＴ．４	資料数N	26	
資料番号	H		Q	H２	√Q	H√Q
1	15.217	0.000	0.00	0.000	0.000	0.000
2	15.317	0.000	0.00	0.000	0.000	0.000
3	14.797	15.780	8.50	249.008	2.915	45.999
4	14.537	15.520	8.94	240.870	2.990	46.405
5	14.837	15.820	10.10	250.272	3.178	50.276
6	14.847	15.830	10.40	250.589	3.225	51.052
7	15.147	0.000	0.00	0.000	0.000	0.000
8	15.017	16.000	14.50	256.000	3.808	60.928
9	15.017	16.000	15.80	256.000	3.975	63.600
10	14.987	15.970	16.10	255.041	4.012	64.072
11	15.057	16.040	16.60	257.282	4.074	65.347
12	14.997	15.980	16.70	255.360	4.087	65.310
13	15.057	16.040	17.00	257.282	4.123	66.133
14	15.107	16.090	17.10	258.888	4.135	66.532
15	15.107	16.090	17.50	258.888	4.183	67.304
16	15.087	16.070	17.50	258.245	4.183	67.221
17	15.037	16.020	17.70	256.640	4.207	67.396
18	15.017	16.000	17.90	256.000	4.231	67.696
19	15.087	16.070	18.10	258.245	4.254	68.362
20	15.107	16.090	19.10	258.888	4.370	70.313
21	15.077	16.060	19.50	257.924	4.416	70.921
22	15.197	16.180	20.90	261.792	4.572	73.975
23	15.137	16.120	24.10	259.854	4.909	79.133
24	15.867	0.000	0.00	0.000	0.000	0.000
25	15.887	0.000	0.00	0.000	0.000	0.000
26	15.907	0.000	0.00	0.000	0.000	0.000
27	15.357	16.340	31.30	266.996	5.595	91.422
28	16.017	0.000	0.00	0.000	0.000	0.000
29	15.437	16.420	41.00	269.616	6.403	105.137
30	15.537	16.520	41.20	272.910	6.419	106.042
31	15.537	16.520	42.50	272.910	6.519	107.694
32	15.417	16.400	43.90	268.960	6.626	108.666
33	15.537	16.520	48.50	272.910	6.964	115.045
34		0.000	0.00	0.000	0.000	0.000
35		0.000	0.00	0.000	0.000	0.000
36		0.000	0.00	0.000	0.000	0.000
37		0.000	0.00	0.000	0.000	0.000
38		0.000	0.00	0.000	0.000	0.000
合計	502.291	418.490	572.44	6737.370	118.373	1911.981

A= [n (H√Q) - (H) * (√Q)] / [n (H^2) - (H) ^2] 4.5996208

B= [(H2) * (√Q) - (H) * (H√Q)] / [n (H2) - (H) ^2]　　-69.48162

A^2=　　21.156511

B/A=　　-15.10594

Q=A^2 (H+-B/A) ^2= $21.156511 \times (H-15.10594)^2$

Table 3.2-11　H - Q Data of Ui St.1

地点名： 長月橋			ST. 1	資料数N	58	
資料番号	H		Q	H2	√Q	H√Q
1	16.411	16.355	0.03	267.486	0.173	2.829
2	16.741	16.685	17.20	278.389	4.147	69.193
3	16.761	16.705	18.30	279.057	4.278	71.464
4	16.761	16.705	18.33	279.057	4.281	71.514
5	16.761	16.705	19.43	279.057	4.408	73.636
6	16.781	16.725	21.30	279.726	4.615	77.186
7	16.821	16.765	22.00	281.065	4.690	78.628
8	16.761	16.705	22.30	279.057	4.722	78.881
9	16.781	16.725	22.32	279.726	4.724	79.009
10	16.781	16.725	22.63	279.726	4.757	79.561
11	16.781	16.725	23.17	279.726	4.814	80.514
12	16.781	16.725	23.90	279.726	4.889	81.769
13	16.821	16.765	24.20	281.065	4.919	82.467
14	16.781	16.725	24.54	279.726	4.954	82.856
15	16.821	16.765	24.60	281.065	4.960	83.154
16	16.781	16.725	24.90	279.726	4.990	83.458
17	16.781	16.725	26.30	279.726	5.128	85.766
18	16.821	16.765	26.90	281.065	5.187	86.960
19	16.821	16.765	27.00	281.065	5.196	87.111
20	16.821	16.765	27.20	281.065	5.215	87.429
21	16.781	16.725	27.60	279.726	5.254	87.873
22	16.781	16.725	29.60	279.726	5.441	91.001
23	16.831	16.775	30.20	281.401	5.495	92.179
24	16.831	16.775	31.10	281.401	5.577	93.554
25	16.911	16.855	31.90	284.091	5.648	95.197
26	16.861	16.805	32.20	282.408	5.675	95.368
27	16.831	16.775	34.70	281.401	5.891	98.822
28	16.921	16.865	35.33	284.428	5.944	100.246
29	16.831	16.775	36.10	281.401	6.008	100.784
30	16.921	16.865	42.73	284.428	6.537	110.247
31	16.921	16.865	45.93	284.428	6.777	114.294
32	17.061	17.005	46.13	289.170	6.792	115.498
33	17.231	17.175	49.26	294.981	7.018	120.534
34	17.061	17.005	51.87	289.170	7.202	122.470
35	17.061	17.005	56.40	289.170	7.510	127.708
36	17.231	17.175	58.12	294.981	7.623	130.925
37	17.261	17.205	58.82	296.012	7.669	131.945
38	17.411	17.355	63.59	301.196	7.974	138.389
39	17.231	17.175	64.79	294.981	8.049	138.242
40	17.331	17.275	65.40	298.426	8.087	139.703
41	17.331	17.275	68.60	298.426	8.283	143.089
42	17.441	17.385	68.99	302.238	8.306	144.400
43	17.261	17.205	69.51	296.012	8.337	143.438
44	17.381	17.325	70.29	300.156	8.384	145.253
45	17.381	17.325	76.89	300.156	8.769	151.923
46	17.411	17.355	79.51	301.196	8.917	154.755
47	17.381	17.325	81.99	300.156	9.055	156.878
48	17.381	17.325	81.99	300.156	9.055	156.878
49	17.441	17.385	82.34	302.238	9.074	157.751
50	17.261	17.205	85.01	296.012	9.220	158.630
51	17.411	17.355	90.83	301.196	9.530	165.393
52	17.331	17.275	100.02	298.426	10.001	172.767
53	17.441	17.385	116.05	302.238	10.773	187.289
54		16.495	0.35	272.085	0.592	9.765
55		16.395	0.08	268.796	0.283	4.640
56		16.445	0.05	270.438	0.224	3.684
57		16.395	0.12	268.796	0.346	5.673
58		16.417	0.08	269.518	0.283	4.646
合計	901.523	980.702	2400.99	16587.466	342.650	5835.216

A= [n (H√Q) - (H) * (√Q)] / [n (H^2) - (H) ^2] 8.1081068

B= [(H2) * (√Q) - (H) * (H√Q)] / [n (H2) - (H) ^2]　　-131.1894

A^2=　　65.741396

B/A=　　-16.18003

Q=A^2 (H+-B/A) ^2= $65.741396 \times (H - 16.18003)^2$

Table 3.2-12　H - Q Data of Ui St.2

地点名：	牛耳橋		ST. 2	資料数N	65	
資料番号	H		Q	H2	√Q	H√Q
1	27.531	27.528	0.02	757.791	0.141	3.881
2	27.691	27.688	2.73	766.625	1.653	45.768
3	27.691	27.688	3.15	766.625	1.776	49.174
4	27.691	27.688	3.30	766.625	1.817	50.309
5	27.691	27.688	3.71	766.625	1.925	53.299
6	27.741	27.738	4.50	769.397	2.122	58.860
7	27.691	27.688	4.56	766.625	2.136	59.142
8	27.691	27.688	4.81	766.625	2.192	60.692
9	27.741	27.738	4.83	769.397	2.198	60.968
10	27.711	27.708	5.03	767.733	2.243	62.149
11	27.741	27.738	5.17	769.397	2.274	63.076
12	27.741	27.738	5.21	769.397	2.283	63.326
13	27.741	27.738	5.26	769.397	2.294	63.631
14	27.711	27.708	5.58	767.733	2.361	65.419
15	27.691	27.688	5.71	766.625	2.390	66.174
16	27.691	27.688	5.81	766.625	2.411	66.756
17	27.741	27.738	5.87	769.397	2.423	67.209
18	27.711	27.708	5.94	767.733	2.438	67.552
19	27.761	27.758	6.00	770.507	2.449	67.979
20	27.751	27.748	6.58	769.952	2.566	71.201
21	27.761	27.758	6.87	770.507	2.620	72.726
22	27.771	27.768	6.99	771.062	2.643	73.391
23	27.761	27.758	7.30	770.507	2.703	75.030
24	27.761	27.758	7.43	770.507	2.727	75.696
25	27.771	27.768	7.52	771.062	2.742	76.140
26	27.761	27.758	7.79	770.507	2.791	77.473
27	27.761	27.758	7.81	770.507	2.794	77.556
28	27.801	27.798	8.71	772.729	2.951	82.032
29	27.801	27.798	9.04	772.729	3.007	83.589
30	27.801	27.798	10.00	772.729	3.162	87.897
31	27.861	27.858	10.28	776.068	3.207	89.341
32	27.851	27.848	10.69	775.511	3.270	91.063
33	27.841	27.838	10.84	774.954	3.293	91.671
34	27.811	27.808	11.00	773.285	3.316	92.211
35	27.841	27.838	11.13	774.954	3.336	92.868
36	27.861	27.858	11.50	776.068	3.391	94.466
37	27.971	27.968	11.66	782.209	3.415	95.511
38	27.971	27.968	12.43	782.209	3.526	98.615
39	27.981	27.978	13.04	782.768	3.611	101.029
40	27.971	27.968	13.12	782.209	3.622	101.300
41	27.991	27.988	13.49	783.328	3.673	102.800
42	27.981	27.978	14.15	782.768	3.762	105.253
43	28.021	28.018	16.21	785.008	4.027	112.828
44	28.011	28.008	16.22	784.448	4.027	112.788
45	27.971	27.968	16.27	782.209	4.034	112.823
46	28.051	28.048	18.46	786.690	4.297	120.522
47	28.101	28.098	18.92	789.498	4.349	122.198
48	28.041	28.038	19.50	786.129	4.416	123.816
49	28.031	28.028	19.85	785.569	4.455	124.865
50	28.051	28.048	20.58	786.690	4.536	127.226
51	28.101	28.098	20.61	789.498	4.540	127.565
52	28.111	28.108	21.79	790.060	4.668	131.208
53	28.101	28.098	22.00	789.498	4.690	131.780
54	28.141	28.138	23.75	791.747	4.873	137.116
55	28.191	28.188	28.12	794.563	5.303	149.481
56	28.241	28.238	30.31	797.385	5.506	155.478
57	28.331	28.328	34.85	802.476	5.903	167.220
58	28.421	28.418	43.77	807.583	6.616	188.013
59	28.431	28.428	47.80	808.151	6.914	196.551
60	28.441	28.438	48.82	808.720	6.987	198.696
61		27.588	0.28	761.098	0.529	14.594
62		27.518	0.07	757.240	0.265	7.292
63		27.518	0.03	757.240	0.173	4.761
64		27.508	0.01	756.690	0.100	2.751
65		27.538	0.04	758.341	0.200	5.508
合計	1673.620	1811.110	784.84	50466.539	203.062	5679.303

A= [n (H√Q) - (H) * (√Q)] / [n (H^2) - (H) ^2] 6.7463843

B= [(H2) * (√Q) - (H) * (H√Q)] / [n (H2) - (H) ^2]　　-184.8520

A^2=　　45.513701

B/A=　　-27.40016

Q=A^2 (H+B/A) ^2= $45.513701 \times (H-27.40016)^2$

Table 3.2-13　H - Q Data of Chungroung St.1

地点名：	祭基橋		ST. 1	資料数N	48	
資料番号	H		Q	H2	√Q	H√Q
1	13.191	13.218	0.71	174.716	0.843	11.143
2	13.510	13.537	8.99	183.250	2.998	40.584
3	13.491	13.518	9.17	182.736	3.028	40.933
4	13.531	13.558	9.25	183.819	3.041	41.230
5	13.511	13.538	9.37	183.277	3.061	41.440
6	13.491	13.518	9.57	182.736	3.094	41.825
7	13.511	13.538	9.74	183.277	3.121	42.252
8	13.491	13.518	9.93	182.736	3.151	42.595
9	13.611	13.638	13.53	185.995	3.678	50.161
10	13.861	13.888	14.26	192.877	3.776	52.441
11	13.651	13.678	15.07	187.088	3.882	53.098
12	13.571	13.598	15.69	184.906	3.961	53.862
13	13.511	13.538	17.50	183.277	4.183	56.629
14	13.671	13.698	17.91	187.635	4.232	57.970
15	13.971	13.998	21.25	195.944	4.610	64.531
16	13.691	13.718	22.40	188.184	4.733	64.927
17	13.751	13.778	22.66	189.833	4.760	65.583
18	13.741	13.768	22.92	189.558	4.787	65.907
19	13.871	13.898	23.60	193.154	4.858	67.516
20	13.351	13.378	23.86	178.971	4.885	65.352
21	13.711	13.738	23.98	188.733	4.897	67.275
22	13.811	13.838	24.01	191.490	4.900	67.806
23	14.011	14.038	26.14	197.065	5.113	71.776
24	13.891	13.918	26.96	193.711	5.192	72.262
25	13.871	13.898	27.98	193.154	5.290	73.520
26	14.081	14.108	28.80	199.036	5.367	75.718
27	13.941	13.968	32.81	195.105	5.728	80.009
28	14.201	14.228	34.93	202.436	5.910	84.087
29	13.741	13.768	36.24	189.558	6.020	82.883
30	14.141	14.168	43.75	200.732	6.614	93.707
31	14.261	14.288	45.35	204.147	6.734	96.215
32	14.081	14.108	46.05	199.036	6.786	95.737
33	14.081	14.108	47.60	199.036	6.899	97.331
34	13.991	14.018	49.00	196.504	7.000	98.126
35	14.071	14.098	50.37	198.754	7.097	100.054
36	14.271	14.298	51.52	204.433	7.178	102.631
37	14.011	14.038	52.16	197.065	7.222	101.382
38	14.241	14.268	55.26	203.576	7.434	106.068
39	14.261	14.288	55.97	204.147	7.481	106.889
40	14.301	14.328	60.36	205.292	7.769	111.314
41	14.391	14.418	61.70	207.879	7.855	113.253
42	14.341	14.368	63.00	206.439	7.937	114.039
43	14.371	14.398	64.46	207.302	8.029	115.602
44	14.331	14.358	64.52	206.152	8.032	115.323
45	14.371	14.398	69.26	207.302	8.322	119.820
46		13.082	0.03	171.139	0.173	2.263
47		12.972	0.01	168.273	0.071	0.921
48		13.137	0.01	172.581	0.110	1.445
49				0.000	0.000	0.000
50				0.000	0.000	0.000
				0.000		0.000
				0.000		0.000
				0.000		0.000
				0.000		0.000
				0.000		0.000
合計	624.754	665.160	1439.61	9224.046	241.842	3387.435

A= [n (H√Q) - (H) * (√Q)] / [n (H^2) - (H) ^2] 5.4783555

B= [(H2) * (√Q) - (H) * (H√Q)] / [n (H2) - (H) ^2]　　-70.87793

A^2=　30.012379

B/A=　-12.93781

Q=A^2 (H+-B/A) ^2= $30.012379 \times (H-12.93781)^2$

Table 3.2-14　　H - Q Data of Chungroung St.2

地点名： [illegible]			ST. 2	資料数N	88	
資料番号	H		Q	H2	√Q	H√Q
1	15.854	16.092	0.29	258.952	0.539	8.674
2	15.984	16.222	2.02	263.153	1.421	23.051
3	15.984	16.222	2.18	263.153	1.478	23.976
4	16.184	16.422	6.47	269.682	2.543	41.761
5	16.234	16.472	6.55	271.327	2.560	42.168
6	16.244	16.482	8.23	271.656	2.869	47.287
7	16.254	16.492	8.36	271.986	2.891	47.678
8	16.250	16.488	8.65	271.854	2.941	48.491
9	16.384	16.622	15.53	276.291	3.941	65.507
10	16.484	16.722	15.56	279.625	3.945	65.968
11	16.414	16.652	15.58	277.289	3.947	65.725
12	16.534	16.772	17.93	281.300	4.235	71.029
13	16.534	16.772	18.78	281.300	4.333	72.673
14	16.554	16.792	19.35	281.971	4.399	73.868
15	16.524	16.762	19.42	280.965	4.406	73.853
16	16.482	16.720	19.90	279.558	4.461	74.588
17	16.534	16.772	20.14	281.300	4.488	75.273
18	16.534	16.772	20.33	281.300	4.509	75.625
19	16.554	16.792	20.38	281.971	4.514	75.799
20	16.534	16.772	20.48	281.300	4.526	75.910
21	16.554	16.792	20.59	281.971	4.538	76.202
22	16.534	16.772	20.73	281.300	4.553	76.363
23	16.534	16.772	20.88	281.300	4.570	76.648
24	16.544	16.782	21.44	281.636	4.631	77.717
25	16.554	16.792	21.48	281.971	4.635	77.831
26	16.544	16.782	22.19	281.636	4.710	79.043
27	16.584	16.822	22.50	282.980	4.743	79.787
28	16.604	16.842	22.80	283.653	4.775	80.421
29	16.464	16.702	24.48	278.957	4.948	82.641
30	16.594	16.832	24.81	283.316	4.981	83.840
31	16.634	16.872	25.43	284.664	5.043	85.085
32	16.604	16.842	25.84	283.653	5.083	85.608
33	16.654	16.892	26.96	285.340	5.192	87.703
34	16.664	16.902	27.33	285.678	5.227	88.347
35	16.644	16.882	28.44	285.002	5.333	90.032
36	16.674	16.912	29.28	286.016	5.411	91.511
37	16.694	16.932	30.52	286.693	5.525	93.549
38	16.724	16.962	32.63	287.709	5.712	96.887
39	16.744	16.982	32.79	288.388	5.726	97.239
40	16.684	16.922	32.90	286.354	5.736	97.055
41	16.694	16.932	32.97	286.693	5.742	97.224
42	16.754	16.992	34.20	288.728	5.848	99.369
43	16.784	17.022	35.86	289.748	5.988	101.928
44	16.744	16.982	36.20	288.388	6.017	102.181
45	16.734	16.972	36.33	288.049	6.027	102.290
46	16.804	17.042	37.70	290.430	6.140	104.638
47	16.654	16.892	38.95	285.340	6.241	105.423
48	16.794	17.032	39.67	290.089	6.299	107.285
49	16.784	17.022	39.73	289.748	6.303	107.290
50	16.824	17.062	40.21	291.112	6.341	108.190
51	16.884	17.122	40.37	293.163	6.354	108.793
52	16.824	17.062	40.49	291.112	6.363	108.566
53	16.884	17.122	41.13	293.163	6.413	109.803
54	16.844	17.082	42.21	291.795	6.497	110.982
55	16.884	17.122	43.40	293.163	6.587	112.783
56	16.864	17.102	44.26	292.478	6.653	113.780
57	16.924	17.162	45.23	294.534	6.725	115.414
58	16.984	17.222	45.58	296.597	6.752	116.283
59	16.724	16.962	46.11	287.709	6.791	115.189
60	16.924	17.162	47.59	294.534	6.898	118.383
61	16.944	17.182	48.61	295.221	6.972	119.793
62	16.964	17.202	48.98	295.909	6.998	120.380
63	16.984	17.222	49.25	296.597	7.018	120.864
64	16.954	17.192	49.40	295.565	7.028	120.835
65	16.944	17.182	50.59	295.221	7.113	122.216
66	16.974	17.212	51.38	296.253	7.168	123.376
67	16.964	17.202	53.50	295.909	7.314	125.815
68	16.984	17.222	54.68	296.597	7.395	127.357
69	17.014	17.252	55.06	297.632	7.421	128.027
70	17.034	17.272	55.41	298.322	7.444	128.573
71	16.954	17.202	55.70	295.909	7.463	128.379
72	16.934	17.172	56.27	294.878	7.501	128.807
73	17.084	17.322	58.00	300.052	7.616	131.924
74	17.014	17.252	58.16	297.632	7.626	131.564
75	17.124	17.362	60.13	301.439	7.754	134.625
76	17.308	17.546	60.48	307.862	7.777	136.455
77	17.094	17.332	60.71	300.398	7.792	135.051
78	17.084	17.322	61.75	300.052	7.858	136.116
79	17.134	17.372	62.69	301.786	7.916	137.551
80	17.124	17.362	65.70	301.439	8.106	140.736
81	17.164	17.402	66.71	302.830	8.167	142.122
82	17.134	17.372	69.15	301.786	8.316	144.466
83	17.154	17.392	72.14	302.482	8.493	147.710
84		16.094	0.08	259.017	0.283	4.555
85		16.104	0.01	259.339	0.100	1.610
86		16.184	0.02	261.922	0.141	2.282
87		16.104	0.01	259.339	0.100	1.610
88		16.104	0.04	259.339	0.200	3.221
合計	1387.670	1488.014	2912.94	25171.450	472.079	8044.227

A= [n (H√Q) - [H] * (√Q)] / [n (H^2) - (H) ^2] 6.0223963

B= [(H2) * (√Q) - (H) * (H√Q)] / [n (H2) - (H) ^2]　　-96.46967

A^2=　　36.269257

B/A=　　-16.01848

Q=A^2 (H+B/A) ^2= 36.269257×(H-16.01848)^2

Table 3.2-15　H - Q Data of Chungroung St.3

地点名：	覆蓋終点		ＳＴ．３	資料数N	62	
資料番号	H		Q	H2	√Q	H√Q
1	25.217	25.216	0.45	635.847	0.671	16.920
2	25.217	25.216	1.14	635.847	1.066	26.880
3	25.197	25.196	1.32	634.838	1.150	28.975
4	25.207	25.206	2.01	635.342	1.418	35.742
5	25.217	25.216	2.12	635.847	1.457	36.740
6	25.277	25.276	2.16	638.876	1.469	37.130
7	25.277	25.276	2.17	638.876	1.473	37.232
8	25.277	25.276	2.19	638.876	1.480	37.408
9	25.347	25.346	2.79	642.420	1.671	42.353
10	25.307	25.306	2.79	640.394	1.671	42.286
11	25.347	25.346	2.80	642.420	1.673	42.404
12	25.357	25.356	2.81	642.927	1.676	42.497
13	25.307	25.306	2.90	640.394	1.703	43.096
14	25.307	25.306	2.91	640.394	1.707	43.197
15	25.397	25.396	3.32	644.957	1.821	46.246
16	25.357	25.356	3.33	642.927	1.824	46.249
17	25.357	25.356	3.67	642.927	1.916	48.582
18	25.357	25.356	3.68	642.927	1.918	48.633
19	25.347	25.346	3.69	642.420	1.920	48.664
20	25.397	25.396	3.92	644.957	1.980	50.284
21	25.397	25.396	3.94	644.957	1.986	50.436
22	25.497	25.496	4.25	650.046	2.060	52.522
23	25.457	25.456	4.57	648.008	2.139	54.450
24	25.497	25.496	4.74	650.046	2.176	55.479
25	25.457	25.456	4.77	648.008	2.185	55.621
26	25.357	25.356	5.41	642.927	2.326	58.978
27	25.277	25.276	5.92	638.876	2.432	61.471
28	25.277	25.276	6.32	638.876	2.514	63.544
29	25.277	25.276	6.50	638.876	2.549	64.429
30	25.357	25.356	6.61	642.927	2.571	65.190
31	25.487	25.486	6.91	649.536	2.628	66.977
32	25.347	25.346	7.66	642.420	2.767	70.132
33	25.347	25.346	8.24	642.420	2.870	72.743
34	25.357	25.356	8.63	642.927	2.938	74.496
35	25.477	25.476	8.95	649.027	2.992	76.224
36	25.397	25.396	9.42	644.957	3.070	77.966
37	25.607	25.606	10.18	655.667	3.190	81.683
38	25.397	25.396	10.55	644.957	3.249	82.512
39	25.607	25.606	10.85	655.667	3.294	84.346
40	25.457	25.456	11.68	648.008	3.418	87.009
41	25.457	25.456	12.55	648.008	3.543	90.191
42	25.497	25.496	12.60	650.046	3.549	90.485
43	25.627	25.626	12.76	656.692	3.572	91.536
44	25.537	25.536	12.92	652.087	3.594	91.776
45	25.597	25.596	13.26	655.155	3.642	93.221
46	25.557	25.556	13.51	653.109	3.675	93.918
47	25.497	25.496	13.65	650.046	3.694	94.182
48	25.647	25.646	14.03	657.717	3.745	96.044
49	25.557	25.556	14.85	653.109	3.854	98.493
50	25.617	25.616	15.09	656.179	3.885	99.518
51	25.557	25.556	15.61	653.109	3.951	100.972
52	25.767	25.766	19.13	663.887	4.374	112.700
53	25.837	25.836	22.56	667.499	4.749	122.695
54	25.857	25.856	23.12	668.533	4.808	124.316
55	25.817	25.816	23.89	666.466	4.888	126.189
56	25.837	25.836	26.05	667.499	5.104	131.867
57	25.867	25.866	28.01	669.050	5.293	136.909
58		25.211	0.23	635.595	0.480	12.101
59		25.201	0.19	635.090	0.436	10.988
60		25.201	0.14	635.090	0.374	9.425
61		25.191	0.19	634.586	0.436	10.983
62		25.176	0.10	633.831	0.316	7.956
合計	1450.529	1576.452	492.69	40085.929	156.980	4004.191

A= [n (H√Q) - (H) * (√Q)] / [n (H^2) - (H) ^2] 6.2231346

B= [(H2) * (√Q) - (H) * (H√Q)] / [n (H2) - (H) ^2]　　-155.7015

A^2=　　38.727405

B/A=　　-25.01978

Q=A^2 (H+-B/A) ^2= $38.727405 \times (H-25.01978)^2$

Table 3.2-16 Low Water Discharge of Anyang St.1

地点名：	楊花橋	S T . 1	資料数N	5	
資料番号	H	Q	H 2	√Q	H√Q
1	3.202	6.39	10.253	2.528	8.095
2	3.332	7.09	11.102	2.663	8.873
3	3.192	6.69	10.189	2.587	8.258
4	3.062	3.70	9.376	1.924	5.891
5	3.150	6.49	9.923	2.548	8.026
6	0.000	0.00	0	0	0
7	0.000	0.00	0	0	0
8	0.000	0.00	0	0	0
9	0.000	0.00	0	0	0
10	0.000	0.00	0	0	0
合計	15.938	30.36	50.843	12.25	39.143

A= [n (H√Q) - (H) * (√Q)] / [n (H^2) - (H) ^2] 2.4313882

B= [(H2) * (√Q) - (H) * (H√Q)] / [n (H2) - (H) ^2] -5.300293

A^2= 5.9116486

B/A= -2.179945

$Q = 5.9116486 \times (H - 2.179945)^2$

Table 3.2-17　Low Water Discharge of Anyang St.2

地点名：	梧木橋	S T． 2	資料数N	5	
資料番号	H	Q	H 2	√Q	H√Q
1	3.841	1.96	14.753	1.4	5.377
2	3.851	3.49	14.83	1.868	7.194
3	3.851	3.43	14.83	1.852	7.132
4	3.851	3.26	14.83	1.806	6.955
5	3.881	5.38	15.062	2.319	9
6	0.000	0.00	0	0	0
7	0.000	0.00	0	0	0
8	0.000	0.00	0	0	0
9	0.000	0.00	0	0	0
10	0.000	0.00	0	0	0
合計	19.275	17.52	74.305	9.245	35.658

A= [n〔H√Q〕-〔H〕*〔√Q〕] / [n〔H^2〕-〔H〕^2] -148.2000

B= [〔H2〕*〔√Q〕-〔H〕*〔H√Q〕] / [n〔H2〕-〔H〕^2]　573.16000

A^2=　21963.240

B/A=　-3.867476

$$Q = 21963.24 \times (H - 3.867476)^2$$

Table 3.2-18 Low Water Discharge of Anyang St.3

地点名： 新亭橋	S T . 3		資料数N	5	
資料番号	H	Q	H 2	√Q	H√Q
1	4.648	0.06	21.604	0.245	1.139
2	4.618	0.04	21.326	0.2	0.924
3	4.658	0.10	21.697	0.316	1.472
4	4.658	0.10	21.697	0.316	1.472
5	4.833	0.91	23.358	0.954	4.611
6	0.000	0.00	0	0	0
7	0.000	0.00	0	0	0
8	0.000	0.00	0	0	0
9	0.000	0.00	0	0	0
10	0.000	0.00	0	0	0
合計	23.415	1.21	109.682	2.031	9.618

A= [n〔H√Q〕 - 〔H〕 *〔√Q〕] / [n〔H^2〕 - 〔H〕 ^2] 3.6145153

B= [〔H2〕 *〔√Q〕 - 〔H〕 *〔H√Q〕] / [n〔H2〕 - 〔H〕 ^2] -16.52057

A^2= 13.064720

B/A= -4.570619

$$Q = 13.06472 \times (H - 4.570619)^2$$

Table 3.2-19　Low Water Discharge of Anyang St.4

地点名：	梧金橋	S T． 4	資料数N	5	
資料番号	H	Q	H 2	√Q	H√Q
1	4.414	1.56	19.483	1.249	5.513
2	4.544	5.96	20.648	2.441	11.092
3	4.484	3.56	20.106	1.887	8.461
4	4.484	2.93	20.106	1.712	7.677
5	4.489	4.34	20.151	2.083	9.351
6	0.000	0.00	0	0	0
7	0.000	0.00	0	0	0
8	0.000	0.00	0	0	0
9	0.000	0.00	0	0	0
10	0.000	0.00	0	0	0
合計	22.415	18.35	100.494	9.372	42.094

A= [n〔H√Q〕-〔H〕*〔√Q〕] / [n〔H^2〕-〔H〕^2]　10.499536

B= [〔H2〕*〔√Q〕-〔H〕*〔H√Q〕] / [n〔H2〕-〔H〕^2]　-45.19502

A^2=　110.24027

B/A=　-4.304477

$$Q = 110.24027 \times (H - 4.304477)^2$$

Table 3.2-20　Low Water Discharge of Anyang St.5

地点名：	安養橋	ＳＴ．５	資料数Ｎ	5	
資料番号	H	Q	H２	√Q	H√Q
1	5.234	2.37	27.395	1.539	8.055
2	5.304	4.60	28.132	2.145	11.377
3	5.254	2.83	27.605	1.682	8.837
4	5.264	3.07	27.71	1.752	9.223
5	5.299	3.98	28.079	1.995	10.572
6	0.000	0.00	0	0	0
7	0.000	0.00	0	0	0
8	0.000	0.00	0	0	0
9	0.000	0.00	0	0	0
10	0.000	0.00	0	0	0
合計	26.355	16.85	138.921	9.113	48.064

A= [n〔H√Q〕-〔H〕*〔√Q〕] / [n〔H^2〕-〔H〕^2]　7.7409749

B= [〔H2〕*〔√Q〕-〔H〕*〔H√Q〕] / [n〔H2〕-〔H〕^2]　-38.98007

A^2=　59.922693

B/A=　-5.035551

$$Q = 59.922693 \times (H - 5.035551)^2$$

Table 3.2-21 Low Water Discharge of Anyang St.6

地点名：	起亜大橋 S T. 6		資料数N	4	
資料番号	H	Q	H 2	√Q	H√Q
1	10.123	2.46	102.475	1.568	15.873
2	10.153	5.05	103.083	2.247	22.814
3	10.133	3.45	102.678	1.857	18.817
4	10.133	3.67	102.678	1.916	19.415
5	0.000	0.00	0	0	0
6	0.000	0.00	0	0	0
7	0.000	0.00	0	0	0
8	0.000	0.00	0	0	0
9	0.000	0.00	0	0	0
10	0.000	0.00	0	0	0
合計	40.542	14.63	410.914	7.588	76.919

A= [n (H√Q) - (H) * (√Q)] / [n (H^2) - (H) ^2] 19.366726

B= [(H2) * (√Q) - (H) * (H√Q)] / [n (H2) - (H) ^2] -194.3944

A^2= 375.07008

B/A= -10.03754

$Q = 375.07008 \times (H - 10.03754)^2$

Table 3.2-22　Low Water Discharge of Yangjae St.1

地点名：	大侍橋	S T . 1	資料数N	7	
資料番号	H	Q	H 2	√Q	H√Q
1	6.029	3.28	36.349	1.811	10.919
2	5.859	2.23	34.328	1.493	8.747
3	5.809	1.01	33.744	1.005	5.838
4	5.869	1.07	34.445	1.034	6.069
5	5.939	1.78	35.272	1.334	7.923
6	5.839	0.92	34.094	0.959	5.6
7	5.799	0.62	33.628	0.787	4.564
8	0.000	0.00	0	0	0
9	0.000	0.00	0	0	0
10	0.000	0.00	0	0	0
合計	41.143	10.91	241.86	8.423	49.66

A= [n〔H√Q〕 - 〔H〕 * 〔√Q〕] / [n〔H^2〕 - 〔H〕 ^2] 3.9206985

B= [〔H2〕 * 〔√Q〕 - 〔H〕 * 〔H√Q〕] / [n〔H2〕 - 〔H〕 ^2]　　-21.84089

A^2=　　15.371876

B/A=　　-5.570665

$Q = 15.371876 \times (H - 5.570665)^2$

Table 3.2-23 Low Water Discharge of Yangjae St.2

地点名：	永東二橋	ＳＴ．２	資料数Ｎ	7	
資料番号	H	Q	H２	√Q	H√Q
1	6.029	3.28	36.349	1.811	10.919
2	5.859	2.23	34.328	1.493	8.747
3	5.809	1.01	33.744	1.005	5.838
4	5.869	1.07	34.445	1.034	6.069
5	5.939	1.78	35.272	1.334	7.923
6	5.839	0.92	34.094	0.959	5.6
7	5.799	0.62	33.628	0.787	4.564
8	0.000	0.00	0	0	0
9	0.000	0.00	0	0	0
10	0.000	0.00	0	0	0
合計	41.143	10.91	241.86	8.423	49.66

A= [n〔H√Q〕－〔H〕＊〔√Q〕] / [n〔H^2〕－〔H〕^2] 3.9206985

B= [〔H2〕＊〔√Q〕－〔H〕＊〔H√Q〕] / [n〔H2〕－〔H〕^2] -21.84089

A^2= 15.371876

B/A= -5.570665

$Q = 15.371876 \times (H - 5.570665)^2$

Table 3.2-24 Low Water Discharge of Yangjae St.3

地点名：	如意橋	S T . 3	資料数N	4	
資料番号	H	Q	H 2	√Q	H√Q
1	15.379	0.32	236.514	0.566	8.705
2	15.339	0.09	235.285	0.3	4.602
3	15.319	0.06	234.672	0.245	3.753
4	15.309	0.05	234.365	0.224	3.429
5	0.000	0.00	0	0	0
6	0.000	0.00	0	0	0
7	0.000	0.00	0	0	0
8	0.000	0.00	0	0	0
9	0.000	0.00	0	0	0
10	0.000	0.00	0	0	0
合計	61.346	0.52	940.836	1.335	20.489

A= [n (H√Q) - (H) * (√Q)] / [n (H^2) - (H) ^2] 4.8103223

B= [(H2) * (√Q) - (H) * (H√Q)] / [n (H2) - (H) ^2] -73.43975

A^2= 23.139201

B/A= -15.26711

$$Q = 23.139201 \times (H - 15.26711)^2$$

Table 3.2-25 Low Water Discharge of Yangjae St.4

地点名： 牛眠橋	S T . 4		資料数N	5	
資料番号	H	Q	H 2	√Q	H√Q
1	16.138	1.97	260.435	1.404	22.658
2	15.988	0.76	255.616	0.872	13.942
3	15.988	0.77	255.616	0.877	14.021
4	16.058	1.03	257.859	1.015	16.299
5	15.998	0.67	255.936	0.819	13.102
6	0.000	0.00	0	0	0
7	0.000	0.00	0	0	0
8	0.000	0.00	0	0	0
9	0.000	0.00	0	0	0
10	0.000	0.00	0	0	0
合計	80.17	5.2	1285.462	4.987	80.022

A= [n (H√Q) - (H) * (√Q)] / [n (H^2) - (H) ^2] 3.7263871

B= [(H2) * (√Q) - (H) * (H√Q)] / [n (H2) - (H) ^2] -58.75149

A^2= 13.885961

B/A= -15.76634

$Q=13.885961\times(H-15.76634)^2$

Table 3.2-26　Low Water Discharge of Ui St.1

地点名：	長月橋	S T． 1	資料数N	5	
資料番号	H	Q	H 2	√Q	H√Q
1	16.495	0.350	272.085	0.592	9.765
2	16.395	0.080	268.796	0.283	4.64
3	16.445	0.050	270.438	0.224	3.684
4	16.395	0.120	268.796	0.346	5.673
5	16.417	0.080	269.518	0.283	4.646
6	0.000	0.000	0	0	0
7	0.000	0.000	0	0	0
8	0.000	0.000	0	0	0
9	0.000	0.000	0	0	0
10	0.000	0.000	0	0	0
合計	82.147	0.68	1349.633	1.728	28.408

A= [n〔H√Q〕 - 〔H〕 * 〔√Q〕] / [n〔H^2〕 - 〔H〕 ^2]　2.5425673

B= [〔H2〕 * 〔√Q〕 - 〔H〕 * 〔H√Q〕] / [n〔H2〕 - 〔H〕 ^2]　　-41.42725

A^2=　　6.4646485

B/A=　　-16.29347

$Q=6.4646485\times(H-16.29347)^2$

Table 3.2-27　Low Water Discharge of Ui St.2

地点名：	牛耳橋	S T． 2	資料数N	6	
資料番号	H	Q	H 2	√Q	H√Q
1	27.588	0.280	761.098	0.529	14.594
2	27.518	0.070	757.24	0.265	7.292
3	27.518	0.030	757.24	0.173	4.761
4	27.508	0.010	756.69	0.1	2.751
5	27.538	0.040	758.341	0.2	5.508
6	27.528	0.020	757.791	0.141	3.881
7	0.000	0.000	0	0	0
8	0.000	0.000	0	0	0
9	0.000	0.000	0	0	0
10	0.000	0.000	0	0	0
合計	165.198	0.45	4548.4	1.408	38.787

A= [n〔H√Q〕－〔H〕＊〔√Q〕] / [n〔H^2〕－〔H〕^2]　5.9249855

B= [〔H2〕＊〔√Q〕－〔H〕＊〔H√Q〕] / [n〔H2〕－〔H〕^2]　-162.8979

A^2=　35.105454

B/A=　-27.49339

$Q=35.105454\times(H-27.49339)^2$

Table 3.2-28 Low Water Discharge of Chungroung St.1

地点名：	祭基橋	ＳＴ．１	資料数Ｎ	4	
資料番号	H	Q	H２	√Q	H√Q
1	13.082	0.030	171.139	0.173	2.263
2	12.972	0.005	168.273	0.071	0.921
3	13.137	0.012	172.581	0.11	1.445
4	13.218	0.710	174.716	0.843	11.143
5	0.000	0.000	0	0	0
6	0.000	0.000	0	0	0
7	0.000	0.000	0	0	0
8	0.000	0.000	0	0	0
9	0.000	0.000	0	0	0
10	0.000	0.000	0	0	0
合計	52.409	0.757	686.709	1.197	15.772

A= [n〔H√Q〕－〔H〕＊〔√Q〕] / [n〔H^2〕－〔H〕^2] 2.6705068

B= [〔H2〕＊〔√Q〕－〔H〕＊〔H√Q〕] / [n〔H2〕－〔H〕^2] -34.69039

A^2= 7.1316068

B/A= -12.99019

$Q = 7.1316068 \times (H - 12.99019)^2$

Table 3.2-29　Low Water Discharge of Chungroung St.2

地点名：	鐘岩橋	ＳＴ．２	資料数Ｎ	6	
資料番号	H	Q	H２	√Ｑ	H√Ｑ
1	16.094	0.080	259.017	0.283	4.555
2	16.104	0.004	259.339	0.063	1.015
3	16.184	0.020	261.922	0.141	2.282
4	16.104	0.010	259.339	0.1	1.61
5	16.104	0.040	259.339	0.2	3.221
6	16.092	0.290	258.952	0.539	8.674
7	0.000	0.000	0	0	0
8	0.000	0.000	0	0	0
9	0.000	0.000	0	0	0
10	0.000	0.000	0	0	0
合計	96.682	0.444	1557.908	1.326	21.357

A= [n〔H√Q〕－〔H〕＊〔√Q〕] / [n〔H^2〕－〔H〕^2] -1.500463

B= [〔H2〕＊〔√Q〕－〔H〕＊〔H√Q〕] / [n〔H2〕－〔H〕^2]　　24.398960

A^2=　　2.2513892

B/A=　　-16.26095

$$Q=2.2513892\times(H-16.26095)^2$$

Table 3.2-30　Low Water Discharge of Chungroung St.3

地点名：	覆蓋終点　ＳＴ．　3		資料数Ｎ	6	
資料番号	H	Q	H 2	√Q	H√Q
1	25.211	0.230	635.595	0.48	12.101
2	25.201	0.190	635.09	0.436	10.988
3	25.201	0.140	635.09	0.374	9.425
4	25.191	0.190	634.586	0.436	10.983
5	25.176	0.100	633.831	0.316	7.956
6	25.216	0.470	635.847	0.686	17.298
7	0.000	0.000	0	0	0
8	0.000	0.000	0	0	0
9	0.000	0.000	0	0	0
10	0.000	0.000	0	0	0
合計	151.196	1.32	3810.039	2.728	68.751

A= [n〔H√Q〕 - 〔H〕 * 〔√Q〕] / [n〔H^2〕 - 〔H〕^2]　12.084821

B= [〔H2〕 * 〔√Q〕 - 〔H〕 * 〔H√Q〕] / [n〔H2〕 - 〔H〕^2]　　-304.0747

A^2=　　146.04290

B/A=　　-25.16171

$$Q = 146.0429 \times (H - 25.16171)^2$$