

# SUCCES 防災調節池

厳密計算法

出力例  
2016年3月

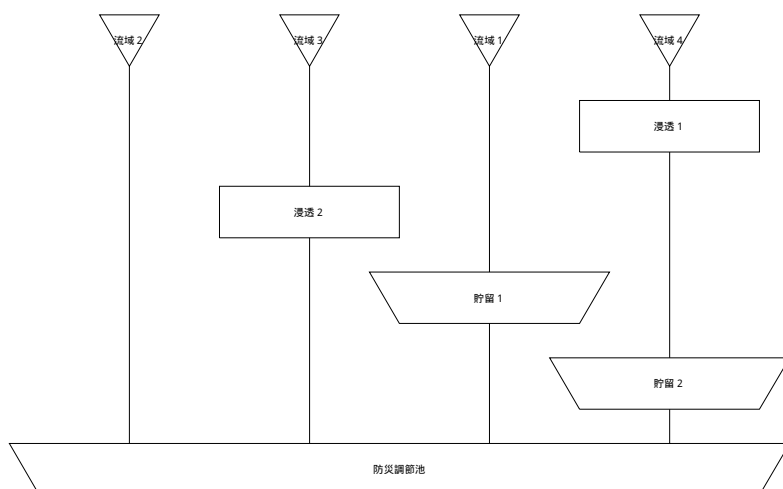
# 目次

|                      |    |
|----------------------|----|
| 1 系統・系統図             | 1  |
| 2 流域の設計計算            | 1  |
| 2-1 流域1              | 1  |
| 2-1-1 設計条件           | 1  |
| 2-1-2 洪水到達時間         | 2  |
| 2-1-3 降雨強度および流量の計算   | 6  |
| 2-1-4 降雨波形およびハイドログラフ | 7  |
| 2-2 流域2              | 10 |
| 2-2-1 設計条件           | 10 |
| 2-2-2 降雨強度および流量の計算   | 10 |
| 2-2-3 降雨波形およびハイドログラフ | 13 |
| 2-3 流域3              | 17 |
| 2-3-1 設計条件           | 17 |
| 2-3-2 降雨強度および流量の計算   | 17 |
| 2-3-3 降雨波形およびハイドログラフ | 20 |
| 2-4 流域4              | 24 |
| 2-4-1 設計条件           | 24 |
| 2-4-2 洪水到達時間         | 24 |
| 2-4-3 降雨強度および流量の計算   | 28 |
| 2-4-4 降雨波形およびハイドログラフ | 29 |
| 3 浸透施設の設計計算          | 32 |
| 3-1 浸透2              | 32 |
| 3-2 浸透1              | 37 |
| 4 貯留施設の設計計算          | 41 |
| 4-1 貯留1              | 41 |
| 4-1-1 設計条件           | 41 |
| 4-1-2 貯留施設形状         | 41 |
| 4-1-3 放流施設           | 42 |
| 4-1-4 設計堆積土砂量        | 43 |
| 4-1-5 洪水調節計算結果       | 44 |
| 4-2 貯留2              | 49 |
| 4-2-1 設計条件           | 49 |
| 4-2-2 貯留施設形状         | 49 |
| 4-2-3 放流施設           | 50 |
| 4-2-4 洪水調節計算結果       | 51 |
| 4-3 防災調節池            | 56 |
| 4-3-1 流入量合成計算        | 56 |
| 4-3-2 設計条件           | 61 |
| 4-3-3 貯留施設形状         | 61 |
| 4-3-4 放流施設           | 63 |
| 4-3-5 設計堆積土砂量        | 64 |
| 4-3-6 洪水調節計算結果       | 65 |
| 5 計算結果一覧             | 74 |

## 1 系統・系統図

| 名称    | 種別   | 下流施設名称 | 遅れ時間<br>(min) |
|-------|------|--------|---------------|
| 流域 1  | 流域   | 貯留 1   | 0             |
| 流域 2  | 流域   | 防災調節池  | 20            |
| 流域 3  | 流域   | 浸透 2   |               |
| 流域 4  | 流域   | 浸透 1   |               |
| 浸透 1  | 浸透施設 | 貯留 2   | 0             |
| 浸透 2  | 浸透施設 | 防災調節池  | 0             |
| 貯留 1  | 貯留施設 | 防災調節池  | 0             |
| 貯留 2  | 貯留施設 | 防災調節池  | 0             |
| 防災調節池 | 貯留施設 |        |               |

## 系統図



## 2 流域の設計計算

## 2-1 流域 1

## 2-1-1 設計条件

降雨強度式

君島型

$$r = \frac{2590.000}{t^{3.000 / 4.000} + 12.9000}$$

0 t 1440

(tの単位：分)

降雨継続時間 24 時間 0 分

計算単位時間 20 分

流出係数

|            |               |
|------------|---------------|
| 流出係数<br>fr | 集水面積<br>A(ha) |
| 0.840      | 247.900       |

降雨波形タイプ 後方集中

## 2-1-2 洪水到達時間

## (1) 等流速法

$$t_c = t_1 + t_2$$

ここに、

t<sub>c</sub> : 洪水到達時間 (min)t<sub>1</sub> : 流入時間 (min)t<sub>2</sub> : 流下時間 (min)

流入時間は 7 min とする。

流速をKraven式により想定し、流下時間を次式により求める。

$$t_2 = \frac{L}{v} \times \frac{1}{60}$$

ここに、

t<sub>2</sub> : 流下時間 (min)

L : 流路延長 (m)

v : 流速 (m/s)

|         |           |                   |             |
|---------|-----------|-------------------|-------------|
|         | H/L 1/100 | 1/100 > H/L 1/200 | 1/200 > H/L |
| v (m/s) | 3.5       | 3.0               | 2.1         |

流下時間は以下ようになる。

| 区間 | L<br>(m) | H<br>(m) | H/L     | v<br>(m/s) | t2<br>(min) |
|----|----------|----------|---------|------------|-------------|
| 1  | 1000     | 2.3      | 0.00230 | 2.1        | 7.94        |
| 2  | 750      | 5.5      | 0.00733 | 3.0        | 4.17        |
| 3  | 990      | 17.2     | 0.01737 | 3.5        | 4.71        |
| 計  |          |          |         |            | 16.82       |

したがって、洪水到達時間は以下ようになる。

$$\begin{aligned} t_c &= t_1 + t_2 \\ &= 7.00 + 16.82 \\ &= 23.82 \text{ (min)} \end{aligned}$$

## (2) Kinematic wave理論に基づく式 (角屋式)

$$t_c = C \cdot A^{0.22} \cdot r_e^{-0.35}$$

ここに、

$t_c$  : 洪水到達時間 (min)

$C$  : 流域の土地利用状態等で決まる定数 (本設計での採用値  $C = 60$ )  
(開発前  $C=180$  開発後  $C=60$ )

$A$  : 流域面積 ( $\text{km}^2$ )

$r_e$  : 有効降雨強度 (mm/hr)

有効降雨強度を以下により求める。

$$r_e = f \cdot r$$

ここに、

$f$  : 流出係数

$r$  : 降雨強度 (mm/hr)

洪水到達時間 (min)は以下のようになる。

$$t_c = 60 \times 2.47900^{0.22} \times \left( 0.84 \times \frac{2590.000}{t^{3.000 / 4.000} + 12.9000} \right)^{-0.35}$$

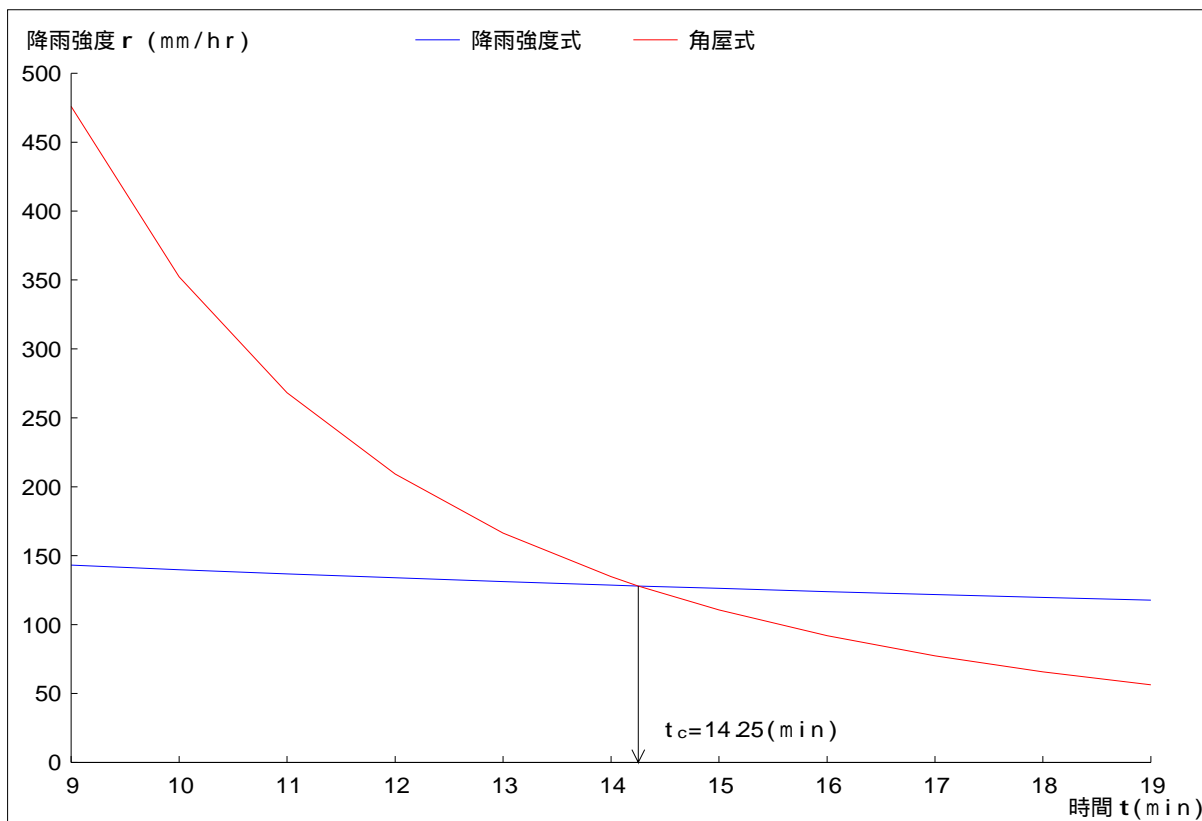
$t$ を仮定し、右辺に代入する。計算結果として与えられる左辺の $t_c$ と一致するまで試算を繰り返す。

| 計算回数 | $t$<br>(min) | $t_c$<br>(min) |
|------|--------------|----------------|
| 1    | 10.00        | 13.82          |
| 2    | 13.82        | 14.21          |
| 3    | 14.21        | 14.25          |
| 4    | 14.25        | 14.25          |

したがって、洪水到達時間は

$$t_c = 14.25 \text{ (min)}$$

## 降雨強度式と角屋式の関係



## (3) 土研式

$$t_c = 2.40 \times 10^{-4} \times \left( \frac{L}{\sqrt{S}} \right)^{0.7}$$

ここに、

$t_c$  : 洪水到達時間 (hr)

$L$  : 河道延長 (m)

$S$  : 河道勾配

ここで、土研式の適用にあたっては、その範囲であるかどうかを確認する。

$$\frac{L}{\sqrt{S}} = 4 \times 10^3 \sim 4 \times 10^5 \text{ (土研式の適用範囲)}$$

$$\left( \frac{L}{\sqrt{S}} \right) = \frac{2740}{\sqrt{0.00909}} = 2.87 \times 10^4$$

よって、土研式の適用範囲内である。

したがって、洪水到達時間は以下ようになる。

$$\begin{aligned} t_c &= 2.40 \times 10^{-4} \times \left( \frac{2740}{\sqrt{0.00909}} \right)^{0.7} \\ &= 0.317 \text{ (hr)} \\ &= 19.02 \text{ (min)} \end{aligned}$$

## (4) 計算結果

各計算手法による計算結果は次のようになる。

| 計算手法  | 洪水到達時間<br>$t_c(\text{min})$ |
|-------|-----------------------------|
| 等流流速法 | 23.82                       |
| 角屋式   | 14.25                       |
| 土研式   | 19.02                       |

以上より、洪水到達時間を 20 min とする。

## 2-1-3 降雨強度および流量の計算

計算単位時間  $t = 20$  (min)流出係数  $fr = 0.84$ 集水面積  $A = 247.900$  (ha)

| n  | 時間                       | 降雨強度式   | $n \cdot r$<br>(mm/hr) | 降雨強度   | 流量  |
|----|--------------------------|---|------------------------|--|---|
|    | $t = n \cdot t$<br>(min) | $r = \frac{2590.000}{t^{3.000/4.000} + 12.9000}$<br>(mm/hr) |                        | $I_n = n \cdot r_{n-1} \cdot r_{n-1}$<br>(mm/hr) | $Q = \frac{1}{360} \cdot fr \cdot I_n \cdot A$<br>(m <sup>3</sup> /s) |
| 1  | 20                       |   | 115.845                | 115.845  | 67.009  |
| 2  | 40                       |   | 89.914                 | 179.827  | 37.009  |
| 3  | 60                       |   | 75.163                 | 225.490  | 26.413  |
| 4  | 80                       |   | 65.322                 | 261.289  | 20.707  |
| 5  | 100                      |   | 58.172                 | 290.862  | 17.106  |
| 6  | 120                      |   | 52.689                 | 316.133  | 14.617  |
| 7  | 140                      |   | 48.321                 | 338.245  | 12.790  |
| 8  | 160                      |   | 44.742                 | 357.937  | 11.390  |
| 9  | 180                      |   | 41.746                 | 375.712  | 10.282  |
| 10 | 200                      |   | 39.193                 | 391.932  | 9.382   |
| 11 | 220                      |   | 36.987                 | 406.862  | 8.636   |
| 12 | 240                      |   | 35.059                 | 420.705  | 8.008   |
| 13 | 260                      |   | 33.355                 | 433.620  | 7.471   |
| 14 | 280                      |   | 31.838                 | 445.733  | 7.006   |
| 15 | 300                      |   | 30.476                 | 457.143  | 6.600   |
| 16 | 320                      |   | 29.246                 | 467.935  | 6.242   |
| 17 | 340                      |   | 28.128                 | 478.177  | 5.924   |
| 18 | 360                      |   | 27.107                 | 487.928  | 5.640   |
| 19 | 380                      |   | 26.170                 | 497.235  | 5.384   |
| 20 | 400                      |   | 25.307                 | 506.143  | 5.152   |
| 21 | 420                      |   | 24.509                 | 514.685  | 4.941   |
| 22 | 440                      |   | 23.768                 | 522.894  | 4.749   |
| 23 | 460                      |   | 23.078                 | 530.798  | 4.572   |
| 24 | 480                      |   | 22.434                 | 538.420  | 4.409   |
| 25 | 500                      |   | 21.831                 | 545.782  | 4.258   |
| 26 | 520                      |   | 21.265                 | 552.902  | 4.119   |
| 27 | 540                      |   | 20.733                 | 559.799  | 3.989   |
| 28 | 560                      |   | 20.232                 | 566.485  | 3.868   |
| 29 | 580                      |   | 19.758                 | 572.977  | 3.755   |
| 30 | 600                      |   | 19.309                 | 579.285  | 3.649   |
| 31 | 620                      |   | 18.885                 | 585.421  | 3.549   |
| 32 | 640                      |   | 18.481                 | 591.395  | 3.456   |
| 33 | 660                      |   | 18.097                 | 597.216  | 3.367   |
| 34 | 680                      |   | 17.732                 | 602.893  | 3.284   |
| 35 | 700                      |   | 17.384                 | 608.434  | 3.205   |
| 36 | 720                      |   | 17.051                 | 613.845  | 3.130   |
| 37 | 740                      |   | 16.733                 | 619.133  | 3.059   |
| 38 | 760                      |   | 16.429                 | 624.305  | 2.992   |
| 39 | 780                      |   | 16.138                 | 629.366  | 2.927   |
| 40 | 800                      |   | 15.858                 | 634.321  | 2.866   |
| 41 | 820                      |   | 15.590                 | 639.176  | 2.808   |
| 42 | 840                      |   | 15.332                 | 643.934  | 2.752   |
| 43 | 860                      |   | 15.084                 | 648.599  | 2.699   |
| 44 | 880                      |   | 14.845                 | 653.176  | 2.648   |
| 45 | 900                      |   | 14.615                 | 657.669  | 2.599   |
| 46 | 920                      |   | 14.393                 | 662.081  | 2.552   |
| 47 | 940                      |   | 14.179                 | 666.414  | 2.507   |
| 48 | 960                      |   | 13.972                 | 670.673  | 2.463   |
| 49 | 980                      |   | 13.773                 | 674.860  | 2.422   |



| n  | 時間<br>t = n · t<br>(min) | 降雨強度式   |        | n · r<br>(mm/hr) | 降雨強度<br>$I_n = n \cdot r_{n-(n-1)} \cdot r_{n-1}$<br>(mm/hr) | 流量<br>$Q = \frac{1}{360} \cdot fr \cdot I_n \cdot A$<br>(m <sup>3</sup> /s) |
|----|--------------------------|---|--------|------------------|--|---|
|    |                          | $r = \frac{2590.000}{t^{3.000/4.000} + 12.9000}$<br>(mm/hr) |        |                  |  |   |
| 50 | 1000                     |   | 13.580 | 678.978          | 4.118  | 2.382   |
| 51 | 1020                     |   | 13.393 | 683.028          | 4.051  | 2.343   |
| 52 | 1040                     |   | 13.212 | 687.015          | 3.986  | 2.306   |
| 53 | 1060                     |   | 13.037 | 690.939          | 3.924  | 2.270   |
| 54 | 1080                     |   | 12.867 | 694.803          | 3.864  | 2.235   |
| 55 | 1100                     |   | 12.702 | 698.610          | 3.806  | 2.202   |
| 56 | 1120                     |   | 12.542 | 702.361          | 3.751  | 2.169   |
| 57 | 1140                     |   | 12.387 | 706.057          | 3.696  | 2.138   |
| 58 | 1160                     |   | 12.236 | 709.701          | 3.644  | 2.108   |
| 59 | 1180                     |   | 12.090 | 713.294          | 3.593  | 2.078   |
| 60 | 1200                     |   | 11.947 | 716.838          | 3.544  | 2.050   |
| 61 | 1220                     |   | 11.809 | 720.335          | 3.496  | 2.022   |
| 62 | 1240                     |   | 11.674 | 723.785          | 3.450  | 1.996   |
| 63 | 1260                     |   | 11.543 | 727.190          | 3.405  | 1.970   |
| 64 | 1280                     |   | 11.415 | 730.552          | 3.362  | 1.945   |
| 65 | 1300                     |   | 11.290 | 733.872          | 3.320  | 1.920   |
| 66 | 1320                     |   | 11.169 | 737.150          | 3.278  | 1.896   |
| 67 | 1340                     |   | 11.051 | 740.388          | 3.238  | 1.873   |
| 68 | 1360                     |   | 10.935 | 743.588          | 3.200  | 1.851   |
| 69 | 1380                     |   | 10.822 | 746.750          | 3.162  | 1.829   |
| 70 | 1400                     |   | 10.712 | 749.875          | 3.125  | 1.808   |
| 71 | 1420                     |   | 10.605 | 752.964          | 3.089  | 1.787   |
| 72 | 1440                     |   | 10.500 | 756.018          | 3.054  | 1.767   |

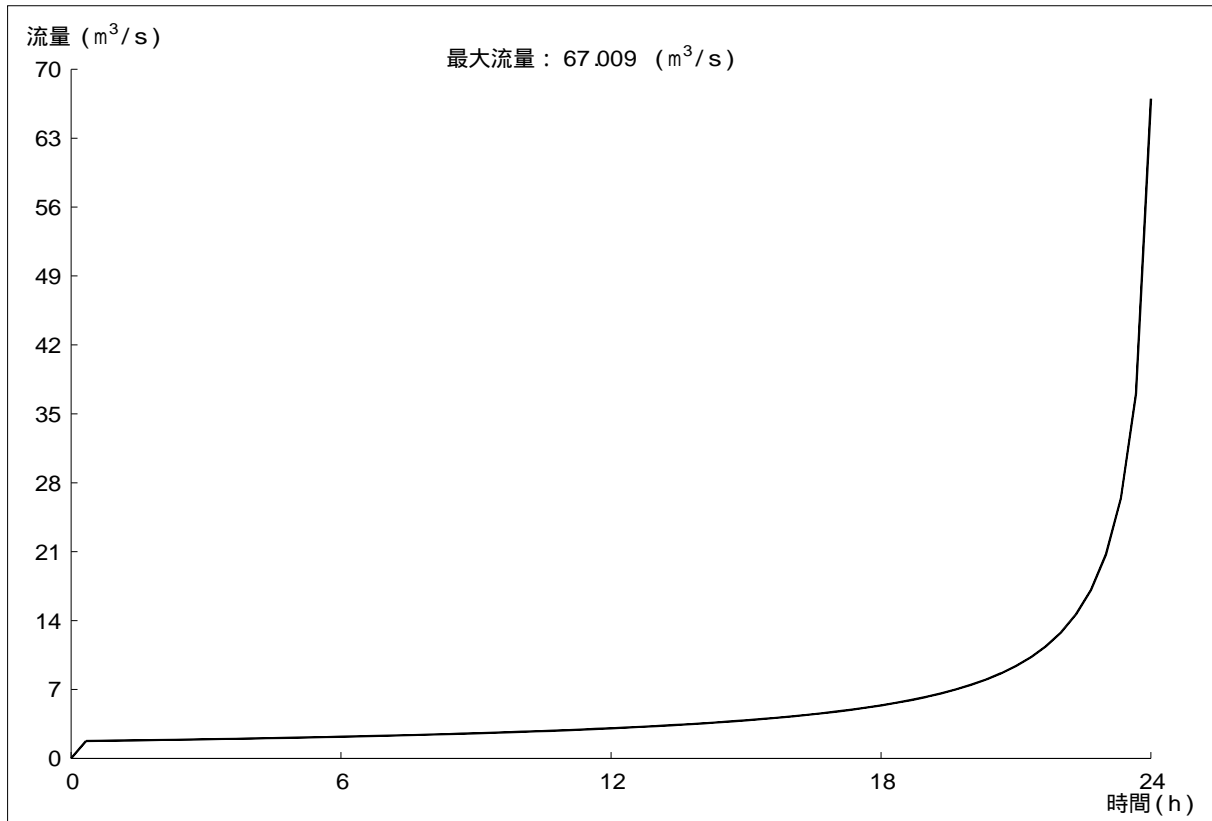
## 2-1-4 降雨波形およびハイドログラフ

降雨強度および流量を後方集中型に整列する。

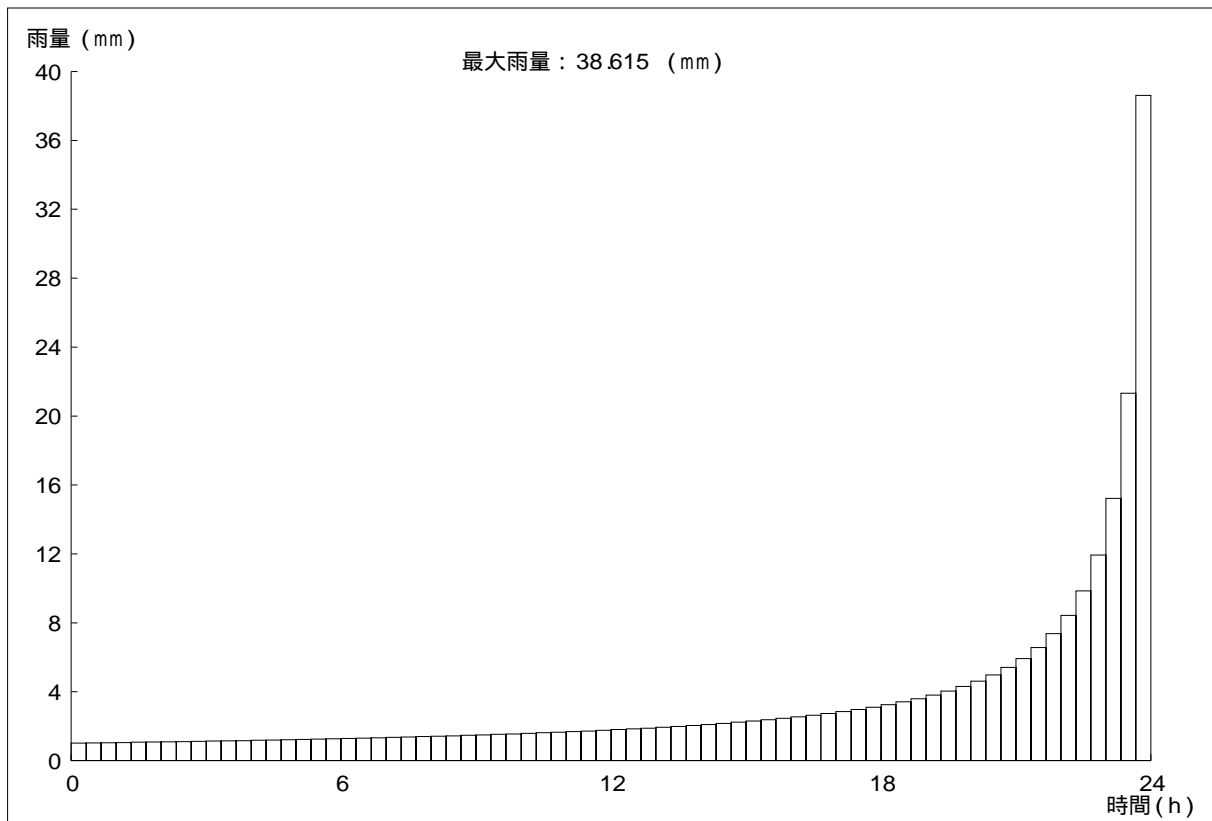
| 時間<br>(時：分) | 降雨強度<br>I(mm/hr) | 降雨量<br>R(mm) | 流量<br>Q(m <sup>3</sup> /s) |
|-------------|------------------|--------------|----------------------------|
| 0:00        | 0.000            | 0.000        | 0.000                      |
| 0:20        | 3.054            | 1.018        | 1.767                      |
| 0:40        | 3.089            | 1.030        | 1.787                      |
| 1:00        | 3.125            | 1.042        | 1.808                      |
| 1:20        | 3.162            | 1.054        | 1.829                      |
| 1:40        | 3.200            | 1.067        | 1.851                      |
| 2:00        | 3.238            | 1.079        | 1.873                      |
| 2:20        | 3.278            | 1.093        | 1.896                      |
| 2:40        | 3.320            | 1.107        | 1.920                      |
| 3:00        | 3.362            | 1.121        | 1.945                      |
| 3:20        | 3.405            | 1.135        | 1.970                      |
| 3:40        | 3.450            | 1.150        | 1.996                      |
| 4:00        | 3.496            | 1.165        | 2.022                      |
| 4:20        | 3.544            | 1.181        | 2.050                      |
| 4:40        | 3.593            | 1.198        | 2.078                      |
| 5:00        | 3.644            | 1.215        | 2.108                      |
| 5:20        | 3.696            | 1.232        | 2.138                      |
| 5:40        | 3.751            | 1.250        | 2.169                      |
| 6:00        | 3.806            | 1.269        | 2.202                      |
| 6:20        | 3.864            | 1.288        | 2.235                      |
| 6:40        | 3.924            | 1.308        | 2.270                      |
| 7:00        | 3.986            | 1.329        | 2.306                      |
| 7:20        | 4.051            | 1.350        | 2.343                      |
| 7:40        | 4.118            | 1.373        | 2.382                      |
| 8:00        | 4.187            | 1.396        | 2.422                      |

| 時間<br>(時:分) | 降雨強度<br>I(mm/hr) | 降雨量<br>R(mm) | 流量<br>Q(m <sup>3</sup> /s) |
|-------------|------------------|--------------|----------------------------|
| 8:20        | 4.259            | 1.420        | 2.463                      |
| 8:40        | 4.334            | 1.445        | 2.507                      |
| 9:00        | 4.412            | 1.471        | 2.552                      |
| 9:20        | 4.493            | 1.498        | 2.599                      |
| 9:40        | 4.577            | 1.526        | 2.648                      |
| 10:00       | 4.666            | 1.555        | 2.699                      |
| 10:20       | 4.758            | 1.586        | 2.752                      |
| 10:40       | 4.854            | 1.618        | 2.808                      |
| 11:00       | 4.955            | 1.652        | 2.866                      |
| 11:20       | 5.061            | 1.687        | 2.927                      |
| 11:40       | 5.172            | 1.724        | 2.992                      |
| 12:00       | 5.289            | 1.763        | 3.059                      |
| 12:20       | 5.411            | 1.804        | 3.130                      |
| 12:40       | 5.541            | 1.847        | 3.205                      |
| 13:00       | 5.677            | 1.892        | 3.284                      |
| 13:20       | 5.821            | 1.940        | 3.367                      |
| 13:40       | 5.974            | 1.991        | 3.456                      |
| 14:00       | 6.136            | 2.045        | 3.549                      |
| 14:20       | 6.308            | 2.103        | 3.649                      |
| 14:40       | 6.491            | 2.164        | 3.755                      |
| 15:00       | 6.687            | 2.229        | 3.868                      |
| 15:20       | 6.896            | 2.299        | 3.989                      |
| 15:40       | 7.121            | 2.374        | 4.119                      |
| 16:00       | 7.362            | 2.454        | 4.258                      |
| 16:20       | 7.622            | 2.541        | 4.409                      |
| 16:40       | 7.904            | 2.635        | 4.572                      |
| 17:00       | 8.209            | 2.736        | 4.749                      |
| 17:20       | 8.543            | 2.848        | 4.941                      |
| 17:40       | 8.907            | 2.969        | 5.152                      |
| 18:00       | 9.308            | 3.103        | 5.384                      |
| 18:20       | 9.750            | 3.250        | 5.640                      |
| 18:40       | 10.242           | 3.414        | 5.924                      |
| 19:00       | 10.792           | 3.597        | 6.242                      |
| 19:20       | 11.410           | 3.803        | 6.600                      |
| 19:40       | 12.112           | 4.037        | 7.006                      |
| 20:00       | 12.915           | 4.305        | 7.471                      |
| 20:20       | 13.844           | 4.615        | 8.008                      |
| 20:40       | 14.930           | 4.977        | 8.636                      |
| 21:00       | 16.219           | 5.406        | 9.382                      |
| 21:20       | 17.775           | 5.925        | 10.282                     |
| 21:40       | 19.692           | 6.564        | 11.390                     |
| 22:00       | 22.112           | 7.371        | 12.790                     |
| 22:20       | 25.271           | 8.424        | 14.617                     |
| 22:40       | 29.574           | 9.858        | 17.106                     |
| 23:00       | 35.799           | 11.933       | 20.707                     |
| 23:20       | 45.663           | 15.221       | 26.413                     |
| 23:40       | 63.982           | 21.327       | 37.009                     |
| 24:00       | 115.845          | 38.615       | 67.009                     |

## ハイドログラフ



## 時間降雨分布



## 2-2 流域 2

## 2-2-1 設計条件

降雨強度式

君島型

$$r = \frac{1100.000}{t^{2.000/3.000} + 6.5000}$$

0 t 1440

(tの単位:分)

降雨継続時間

24 時間 0 分

計算単位時間

10 分

流出係数

| 流出係数  | 集水面積<br>(ha) |
|-------|--------------|
| 0.860 | 54.000       |
| 0.900 | 74.000       |

流域全体の流出係数(加重平均値)

流出係数(fr) 0.88

集水面積(A) 128.000 (ha)

降雨波形タイプ

後方集中

## 2-2-2 降雨強度および流量の計算

計算単位時間 t = 10 (min)

流出係数 fr = 0.88

集水面積 A = 128.000 (ha)

| n  | 時間<br>t = n · t<br>(min) | 降雨強度式<br>$r = \frac{1100.000}{t^{2.000/3.000} + 6.5000}$<br>(mm/hr) | n · r<br>(mm/hr) | 降雨強度<br>$I_n = n \cdot r_n - (n-1) \cdot r_{n-1}$<br>(mm/hr) | 流量<br>$Q = \frac{1}{360} \cdot fr \cdot I_n \cdot A$<br>(m <sup>3</sup> /s) |
|----|--------------------------|---|------------------|--|---|
| 1  | 10                       | 98.729  | 98.729           | 98.729   | 30.891  |
| 2  | 20                       | 79.319  | 158.638          | 59.909   | 18.745  |
| 3  | 30                       | 68.091  | 204.272          | 45.635   | 14.279  |
| 4  | 40                       | 60.453  | 241.810          | 37.538   | 11.745  |
| 5  | 50                       | 54.802  | 274.012          | 32.202   | 10.076  |
| 6  | 60                       | 50.398  | 302.389          | 28.377   | 8.879   |
| 7  | 70                       | 46.838  | 327.869          | 25.480   | 7.972   |
| 8  | 80                       | 43.884  | 351.068          | 23.199   | 7.259   |
| 9  | 90                       | 41.380  | 372.419          | 21.350   | 6.680   |
| 10 | 100                      | 39.224  | 392.236          | 19.817   | 6.201   |
| 11 | 110                      | 37.342  | 410.758          | 18.523   | 5.795   |
| 12 | 120                      | 35.681  | 428.171          | 17.413   | 5.448   |
| 13 | 130                      | 34.202  | 444.620          | 16.449   | 5.147   |
| 14 | 140                      | 32.873  | 460.224          | 15.604   | 4.882   |
| 15 | 150                      | 31.672  | 475.079          | 14.855   | 4.648   |

| n  | 時間<br>t = n · t<br>(min) | 降雨強度式  |        | n · r<br>(mm/hr) | 降雨強度   |        | 流量<br>$Q = \frac{1}{360} \cdot fr \cdot I_n \cdot A$<br>(m <sup>3</sup> /s) |
|----|--------------------------|--|--------|------------------|--|--------|---|
|    |                          | $r = \frac{1100.000}{t^{2.000/3.000} + 6.5000}$<br>(mm/hr) |        |                  | $I_n = n \cdot r_{n-1} \cdot (n-1)$<br>· r <sub>n-1</sub><br>(mm/hr) |        |   |
| 16 | 160                      |  | 30.579 | 489.266          |  | 14.187 | 4.439   |
| 17 | 170                      |  | 29.580 | 502.853          |  | 13.587 | 4.251   |
| 18 | 180                      |  | 28.661 | 515.897          |  | 13.044 | 4.081   |
| 19 | 190                      |  | 27.813 | 528.447          |  | 12.550 | 3.927   |
| 20 | 200                      |  | 27.027 | 540.547          |  | 12.099 | 3.786   |
| 21 | 210                      |  | 26.297 | 552.232          |  | 11.686 | 3.656   |
| 22 | 220                      |  | 25.615 | 563.537          |  | 11.304 | 3.537   |
| 23 | 230                      |  | 24.978 | 574.488          |  | 10.951 | 3.427   |
| 24 | 240                      |  | 24.380 | 585.112          |  | 10.624 | 3.324   |
| 25 | 250                      |  | 23.817 | 595.431          |  | 10.319 | 3.229   |
| 26 | 260                      |  | 23.287 | 605.466          |  | 10.035 | 3.140   |
| 27 | 270                      |  | 22.786 | 615.234          |  | 9.768  | 3.056   |
| 28 | 280                      |  | 22.313 | 624.753          |  | 9.519  | 2.978   |
| 29 | 290                      |  | 21.863 | 634.036          |  | 9.284  | 2.905   |
| 30 | 300                      |  | 21.437 | 643.099          |  | 9.062  | 2.835   |
| 31 | 310                      |  | 21.031 | 651.952          |  | 8.853  | 2.770   |
| 32 | 320                      |  | 20.644 | 660.608          |  | 8.656  | 2.708   |
| 33 | 330                      |  | 20.275 | 669.076          |  | 8.468  | 2.650   |
| 34 | 340                      |  | 19.923 | 677.366          |  | 8.290  | 2.594   |
| 35 | 350                      |  | 19.585 | 685.487          |  | 8.121  | 2.541   |
| 36 | 360                      |  | 19.262 | 693.448          |  | 7.960  | 2.491   |
| 37 | 370                      |  | 18.953 | 701.255          |  | 7.807  | 2.443   |
| 38 | 380                      |  | 18.656 | 708.915          |  | 7.661  | 2.397   |
| 39 | 390                      |  | 18.370 | 716.436          |  | 7.521  | 2.353   |
| 40 | 400                      |  | 18.096 | 723.823          |  | 7.387  | 2.311   |
| 41 | 410                      |  | 17.831 | 731.081          |  | 7.259  | 2.271   |
| 42 | 420                      |  | 17.577 | 738.217          |  | 7.136  | 2.233   |
| 43 | 430                      |  | 17.331 | 745.235          |  | 7.018  | 2.196   |
| 44 | 440                      |  | 17.094 | 752.139          |  | 6.904  | 2.160   |
| 45 | 450                      |  | 16.865 | 758.935          |  | 6.795  | 2.126   |
| 46 | 460                      |  | 16.644 | 765.625          |  | 6.690  | 2.093   |
| 47 | 470                      |  | 16.430 | 772.214          |  | 6.589  | 2.062   |
| 48 | 480                      |  | 16.223 | 778.706          |  | 6.492  | 2.031   |
| 49 | 490                      |  | 16.023 | 785.105          |  | 6.398  | 2.002   |
| 50 | 500                      |  | 15.828 | 791.412          |  | 6.307  | 1.973   |
| 51 | 510                      |  | 15.640 | 797.632          |  | 6.220  | 1.946   |
| 52 | 520                      |  | 15.457 | 803.767          |  | 6.135  | 1.920   |
| 53 | 530                      |  | 15.280 | 809.820          |  | 6.053  | 1.894   |
| 54 | 540                      |  | 15.107 | 815.793          |  | 5.974  | 1.869   |
| 55 | 550                      |  | 14.940 | 821.690          |  | 5.897  | 1.845   |
| 56 | 560                      |  | 14.777 | 827.512          |  | 5.822  | 1.822   |
| 57 | 570                      |  | 14.619 | 833.263          |  | 5.750  | 1.799   |
| 58 | 580                      |  | 14.465 | 838.943          |  | 5.680  | 1.777   |
| 59 | 590                      |  | 14.314 | 844.555          |  | 5.612  | 1.756   |
| 60 | 600                      |  | 14.168 | 850.101          |  | 5.546  | 1.735   |
| 61 | 610                      |  | 14.026 | 855.582          |  | 5.482  | 1.715   |
| 62 | 620                      |  | 13.887 | 861.002          |  | 5.419  | 1.696   |
| 63 | 630                      |  | 13.752 | 866.361          |  | 5.359  | 1.677   |
| 64 | 640                      |  | 13.620 | 871.660          |  | 5.300  | 1.658   |
| 65 | 650                      |  | 13.491 | 876.902          |  | 5.242  | 1.640   |
| 66 | 660                      |  | 13.365 | 882.088          |  | 5.186  | 1.623   |
| 67 | 670                      |  | 13.242 | 887.220          |  | 5.132  | 1.606   |
| 68 | 680                      |  | 13.122 | 892.299          |  | 5.078  | 1.589   |
| 69 | 690                      |  | 13.005 | 897.325          |  | 5.027  | 1.573   |
| 70 | 700                      |  | 12.890 | 902.301          |  | 4.976  | 1.557   |
| 71 | 710                      |  | 12.778 | 907.228          |  | 4.927  | 1.542   |

| n   | 時間<br>t = n · t<br>(min) | 降雨強度式  |        | n · r<br>(mm/hr) | 降雨強度   |       | 流量<br>$Q = \frac{1}{360} \cdot fr \cdot I_n \cdot A$<br>(m <sup>3</sup> /s) |
|-----|--------------------------|--|--------|------------------|--|-------|---|
|     |                          | $r = \frac{1100.000}{t^{2.000/3.000} + 6.5000}$<br>(mm/hr) |        |                  | $I_n = n \cdot r_n - (n-1) \cdot r_{n-1}$<br>(mm/hr) |       |   |
| 72  | 720                      |  | 12.668 | 912.107          |  | 4.879 | 1.526   |
| 73  | 730                      |  | 12.561 | 916.938          |  | 4.832 | 1.512   |
| 74  | 740                      |  | 12.456 | 921.724          |  | 4.786 | 1.497   |
| 75  | 750                      |  | 12.353 | 926.465          |  | 4.741 | 1.483   |
| 76  | 760                      |  | 12.252 | 931.162          |  | 4.697 | 1.470   |
| 77  | 770                      |  | 12.153 | 935.816          |  | 4.654 | 1.456   |
| 78  | 780                      |  | 12.057 | 940.428          |  | 4.612 | 1.443   |
| 79  | 790                      |  | 11.962 | 944.999          |  | 4.571 | 1.430   |
| 80  | 800                      |  | 11.869 | 949.530          |  | 4.531 | 1.418   |
| 81  | 810                      |  | 11.778 | 954.022          |  | 4.492 | 1.405   |
| 82  | 820                      |  | 11.689 | 958.476          |  | 4.453 | 1.393   |
| 83  | 830                      |  | 11.601 | 962.891          |  | 4.416 | 1.382   |
| 84  | 840                      |  | 11.515 | 967.270          |  | 4.379 | 1.370   |
| 85  | 850                      |  | 11.431 | 971.613          |  | 4.343 | 1.359   |
| 86  | 860                      |  | 11.348 | 975.921          |  | 4.307 | 1.348   |
| 87  | 870                      |  | 11.267 | 980.193          |  | 4.273 | 1.337   |
| 88  | 880                      |  | 11.187 | 984.432          |  | 4.239 | 1.326   |
| 89  | 890                      |  | 11.108 | 988.637          |  | 4.205 | 1.316   |
| 90  | 900                      |  | 11.031 | 992.810          |  | 4.173 | 1.306   |
| 91  | 910                      |  | 10.955 | 996.950          |  | 4.141 | 1.296   |
| 92  | 920                      |  | 10.881 | 1001.059         |  | 4.109 | 1.286   |
| 93  | 930                      |  | 10.808 | 1005.137         |  | 4.078 | 1.276   |
| 94  | 940                      |  | 10.736 | 1009.185         |  | 4.048 | 1.266   |
| 95  | 950                      |  | 10.665 | 1013.203         |  | 4.018 | 1.257   |
| 96  | 960                      |  | 10.596 | 1017.192         |  | 3.989 | 1.248   |
| 97  | 970                      |  | 10.527 | 1021.152         |  | 3.960 | 1.239   |
| 98  | 980                      |  | 10.460 | 1025.083         |  | 3.932 | 1.230   |
| 99  | 990                      |  | 10.394 | 1028.987         |  | 3.904 | 1.221   |
| 100 | 1000                     |  | 10.329 | 1032.864         |  | 3.877 | 1.213   |
| 101 | 1010                     |  | 10.264 | 1036.714         |  | 3.850 | 1.205   |
| 102 | 1020                     |  | 10.201 | 1040.537         |  | 3.823 | 1.196   |
| 103 | 1030                     |  | 10.139 | 1044.335         |  | 3.798 | 1.188   |
| 104 | 1040                     |  | 10.078 | 1048.107         |  | 3.772 | 1.180   |
| 105 | 1050                     |  | 10.018 | 1051.854         |  | 3.747 | 1.172   |
| 106 | 1060                     |  | 9.958  | 1055.576         |  | 3.722 | 1.165   |
| 107 | 1070                     |  | 9.900  | 1059.274         |  | 3.698 | 1.157   |
| 108 | 1080                     |  | 9.842  | 1062.948         |  | 3.674 | 1.150   |
| 109 | 1090                     |  | 9.785  | 1066.599         |  | 3.651 | 1.142   |
| 110 | 1100                     |  | 9.729  | 1070.226         |  | 3.627 | 1.135   |
| 111 | 1110                     |  | 9.674  | 1073.831         |  | 3.605 | 1.128   |
| 112 | 1120                     |  | 9.620  | 1077.413         |  | 3.582 | 1.121   |
| 113 | 1130                     |  | 9.566  | 1080.973         |  | 3.560 | 1.114   |
| 114 | 1140                     |  | 9.513  | 1084.512         |  | 3.538 | 1.107   |
| 115 | 1150                     |  | 9.461  | 1088.028         |  | 3.517 | 1.100   |
| 116 | 1160                     |  | 9.410  | 1091.524         |  | 3.496 | 1.094   |
| 117 | 1170                     |  | 9.359  | 1094.999         |  | 3.475 | 1.087   |
| 118 | 1180                     |  | 9.309  | 1098.454         |  | 3.455 | 1.081   |
| 119 | 1190                     |  | 9.260  | 1101.888         |  | 3.434 | 1.075   |
| 120 | 1200                     |  | 9.211  | 1105.302         |  | 3.414 | 1.068   |
| 121 | 1210                     |  | 9.163  | 1108.697         |  | 3.395 | 1.062   |
| 122 | 1220                     |  | 9.115  | 1112.073         |  | 3.375 | 1.056   |
| 123 | 1230                     |  | 9.069  | 1115.429         |  | 3.356 | 1.050   |
| 124 | 1240                     |  | 9.022  | 1118.766         |  | 3.337 | 1.044   |
| 125 | 1250                     |  | 8.977  | 1122.085         |  | 3.319 | 1.038   |
| 126 | 1260                     |  | 8.932  | 1125.386         |  | 3.301 | 1.033   |
| 127 | 1270                     |  | 8.887  | 1128.668         |  | 3.282 | 1.027   |

| n   | 時間<br>t = n · t<br>(min) | 降雨強度式  |                  | 降雨強度<br>$I_n = n \cdot r_n - (n-1) \cdot r_{n-1}$<br>(mm/hr) | 流量<br>$Q = \frac{1}{360} \cdot fr \cdot I_n \cdot A$<br>(m <sup>3</sup> /s) |
|-----|--------------------------|--|------------------|--|---|
|     |                          | $r = \frac{1100.000}{t^{2.000/3.000} + 6.5000}$<br>(mm/hr) | n · r<br>(mm/hr) |  |   |
| 128 | 1280                     | 8.843  | 1131.933         | 3.265  | 1.021   |
| 129 | 1290                     | 8.800  | 1135.180         | 3.247  | 1.016   |
| 130 | 1300                     | 8.757  | 1138.410         | 3.230  | 1.011   |
| 131 | 1310                     | 8.715  | 1141.622         | 3.213  | 1.005   |
| 132 | 1320                     | 8.673  | 1144.818         | 3.196  | 1.000   |
| 133 | 1330                     | 8.632  | 1147.997         | 3.179  | 0.995   |
| 134 | 1340                     | 8.591  | 1151.159         | 3.162  | 0.990   |
| 135 | 1350                     | 8.550  | 1154.305         | 3.146  | 0.984   |
| 136 | 1360                     | 8.511  | 1157.436         | 3.130  | 0.979   |
| 137 | 1370                     | 8.471  | 1160.550         | 3.114  | 0.974   |
| 138 | 1380                     | 8.432  | 1163.648         | 3.099  | 0.970   |
| 139 | 1390                     | 8.394  | 1166.732         | 3.083  | 0.965   |
| 140 | 1400                     | 8.356  | 1169.799         | 3.068  | 0.960   |
| 141 | 1410                     | 8.318  | 1172.852         | 3.053  | 0.955   |
| 142 | 1420                     | 8.281  | 1175.890         | 3.038  | 0.951   |
| 143 | 1430                     | 8.244  | 1178.913         | 3.023  | 0.946   |
| 144 | 1440                     | 8.208  | 1181.922         | 3.009  | 0.941   |

## 2-2-3 降雨波形およびハイドログラフ

降雨強度および流量を後方集中型に整列する。

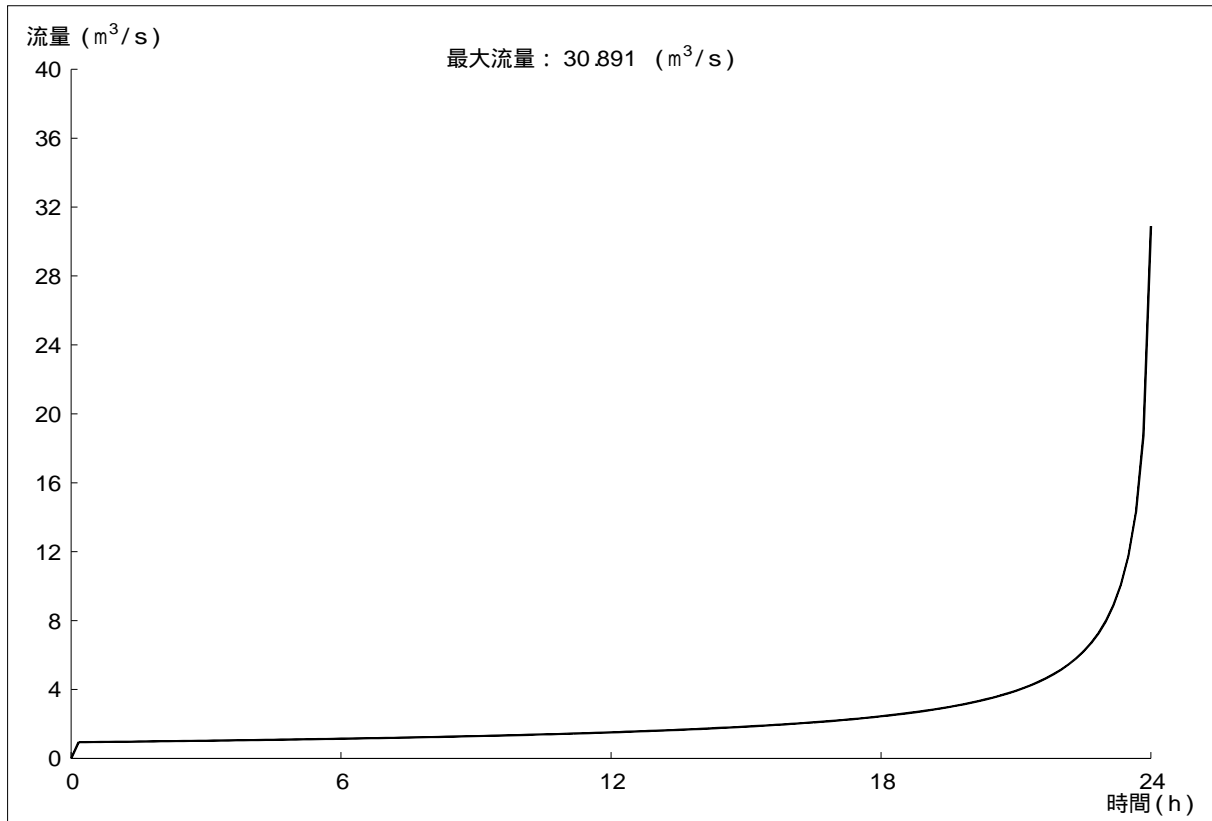
| 時間<br>(時:分) | 降雨強度<br>I(mm/hr) | 降雨量<br>R(mm) | 流量<br>Q(m <sup>3</sup> /s) |
|-------------|------------------|--------------|----------------------------|
| 0:00        | 0.000            | 0.000        | 0.000                      |
| 0:10        | 3.009            | 0.501        | 0.941                      |
| 0:20        | 3.023            | 0.504        | 0.946                      |
| 0:30        | 3.038            | 0.506        | 0.951                      |
| 0:40        | 3.053            | 0.509        | 0.955                      |
| 0:50        | 3.068            | 0.511        | 0.960                      |
| 1:00        | 3.083            | 0.514        | 0.965                      |
| 1:10        | 3.099            | 0.516        | 0.970                      |
| 1:20        | 3.114            | 0.519        | 0.974                      |
| 1:30        | 3.130            | 0.522        | 0.979                      |
| 1:40        | 3.146            | 0.524        | 0.984                      |
| 1:50        | 3.162            | 0.527        | 0.990                      |
| 2:00        | 3.179            | 0.530        | 0.995                      |
| 2:10        | 3.196            | 0.533        | 1.000                      |
| 2:20        | 3.213            | 0.535        | 1.005                      |
| 2:30        | 3.230            | 0.538        | 1.011                      |
| 2:40        | 3.247            | 0.541        | 1.016                      |
| 2:50        | 3.265            | 0.544        | 1.021                      |
| 3:00        | 3.282            | 0.547        | 1.027                      |
| 3:10        | 3.301            | 0.550        | 1.033                      |
| 3:20        | 3.319            | 0.553        | 1.038                      |
| 3:30        | 3.337            | 0.556        | 1.044                      |
| 3:40        | 3.356            | 0.559        | 1.050                      |
| 3:50        | 3.375            | 0.563        | 1.056                      |
| 4:00        | 3.395            | 0.566        | 1.062                      |
| 4:10        | 3.414            | 0.569        | 1.068                      |
| 4:20        | 3.434            | 0.572        | 1.075                      |
| 4:30        | 3.455            | 0.576        | 1.081                      |
| 4:40        | 3.475            | 0.579        | 1.087                      |
| 4:50        | 3.496            | 0.583        | 1.094                      |
| 5:00        | 3.517            | 0.586        | 1.100                      |

| 時間<br>(時:分) | 降雨強度<br>I(mm/hr) | 降雨量<br>R(mm) | 流量<br>Q(m <sup>3</sup> /s) |
|-------------|------------------|--------------|----------------------------|
| 5:10        | 3.538            | 0.590        | 1.107                      |
| 5:20        | 3.560            | 0.593        | 1.114                      |
| 5:30        | 3.582            | 0.597        | 1.121                      |
| 5:40        | 3.605            | 0.601        | 1.128                      |
| 5:50        | 3.627            | 0.605        | 1.135                      |
| 6:00        | 3.651            | 0.608        | 1.142                      |
| 6:10        | 3.674            | 0.612        | 1.150                      |
| 6:20        | 3.698            | 0.616        | 1.157                      |
| 6:30        | 3.722            | 0.620        | 1.165                      |
| 6:40        | 3.747            | 0.624        | 1.172                      |
| 6:50        | 3.772            | 0.629        | 1.180                      |
| 7:00        | 3.798            | 0.633        | 1.188                      |
| 7:10        | 3.823            | 0.637        | 1.196                      |
| 7:20        | 3.850            | 0.642        | 1.205                      |
| 7:30        | 3.877            | 0.646        | 1.213                      |
| 7:40        | 3.904            | 0.651        | 1.221                      |
| 7:50        | 3.932            | 0.655        | 1.230                      |
| 8:00        | 3.960            | 0.660        | 1.239                      |
| 8:10        | 3.989            | 0.665        | 1.248                      |
| 8:20        | 4.018            | 0.670        | 1.257                      |
| 8:30        | 4.048            | 0.675        | 1.266                      |
| 8:40        | 4.078            | 0.680        | 1.276                      |
| 8:50        | 4.109            | 0.685        | 1.286                      |
| 9:00        | 4.141            | 0.690        | 1.296                      |
| 9:10        | 4.173            | 0.695        | 1.306                      |
| 9:20        | 4.205            | 0.701        | 1.316                      |
| 9:30        | 4.239            | 0.706        | 1.326                      |
| 9:40        | 4.273            | 0.712        | 1.337                      |
| 9:50        | 4.307            | 0.718        | 1.348                      |
| 10:00       | 4.343            | 0.724        | 1.359                      |
| 10:10       | 4.379            | 0.730        | 1.370                      |
| 10:20       | 4.416            | 0.736        | 1.382                      |
| 10:30       | 4.453            | 0.742        | 1.393                      |
| 10:40       | 4.492            | 0.749        | 1.405                      |
| 10:50       | 4.531            | 0.755        | 1.418                      |
| 11:00       | 4.571            | 0.762        | 1.430                      |
| 11:10       | 4.612            | 0.769        | 1.443                      |
| 11:20       | 4.654            | 0.776        | 1.456                      |
| 11:30       | 4.697            | 0.783        | 1.470                      |
| 11:40       | 4.741            | 0.790        | 1.483                      |
| 11:50       | 4.786            | 0.798        | 1.497                      |
| 12:00       | 4.832            | 0.805        | 1.512                      |
| 12:10       | 4.879            | 0.813        | 1.526                      |
| 12:20       | 4.927            | 0.821        | 1.542                      |
| 12:30       | 4.976            | 0.829        | 1.557                      |
| 12:40       | 5.027            | 0.838        | 1.573                      |
| 12:50       | 5.078            | 0.846        | 1.589                      |
| 13:00       | 5.132            | 0.855        | 1.606                      |
| 13:10       | 5.186            | 0.864        | 1.623                      |
| 13:20       | 5.242            | 0.874        | 1.640                      |
| 13:30       | 5.300            | 0.883        | 1.658                      |
| 13:40       | 5.359            | 0.893        | 1.677                      |
| 13:50       | 5.419            | 0.903        | 1.696                      |
| 14:00       | 5.482            | 0.914        | 1.715                      |
| 14:10       | 5.546            | 0.924        | 1.735                      |
| 14:20       | 5.612            | 0.935        | 1.756                      |
| 14:30       | 5.680            | 0.947        | 1.777                      |
| 14:40       | 5.750            | 0.958        | 1.799                      |

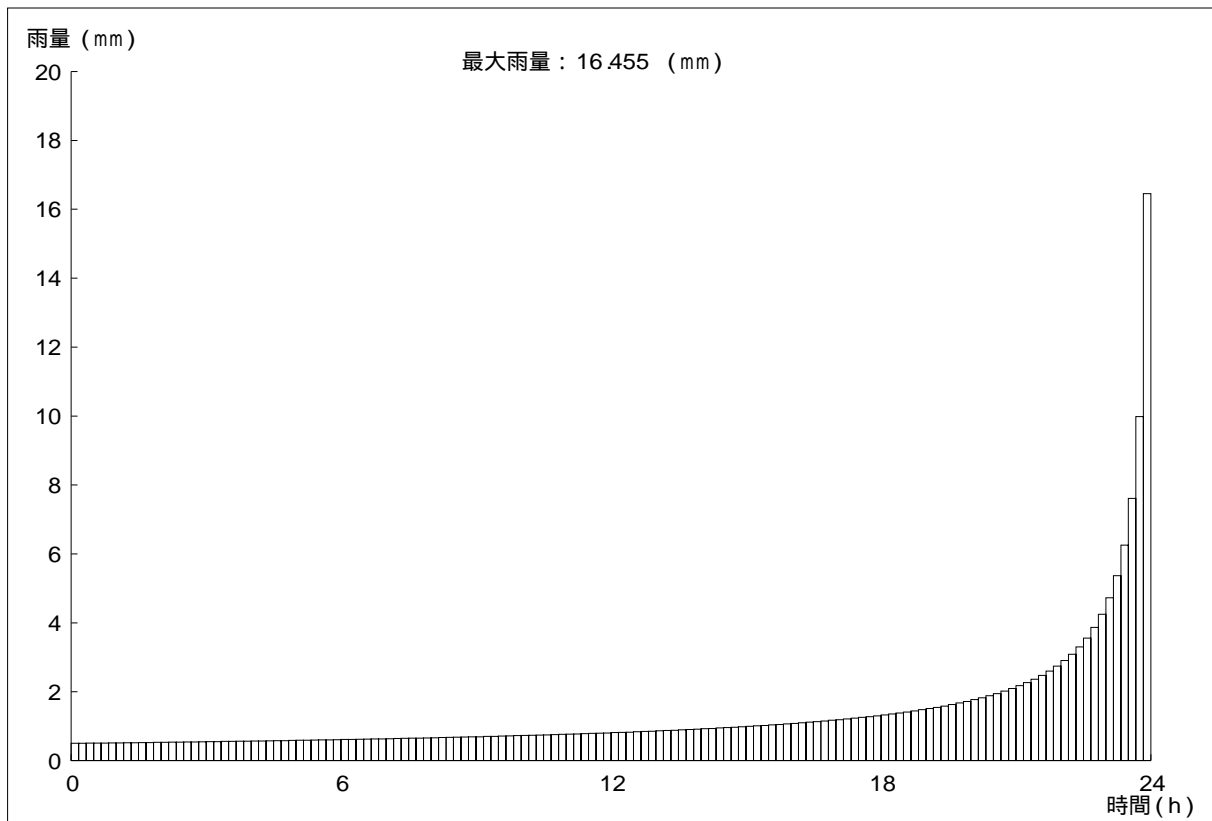


| 時間<br>(時:分) | 降雨強度<br>I(mm/hr) | 降雨量<br>R(mm) | 流量<br>Q(m <sup>3</sup> /s) |
|-------------|------------------|--------------|----------------------------|
| 14:50       | 5.822            | 0.970        | 1.822                      |
| 15:00       | 5.897            | 0.983        | 1.845                      |
| 15:10       | 5.974            | 0.996        | 1.869                      |
| 15:20       | 6.053            | 1.009        | 1.894                      |
| 15:30       | 6.135            | 1.022        | 1.920                      |
| 15:40       | 6.220            | 1.037        | 1.946                      |
| 15:50       | 6.307            | 1.051        | 1.973                      |
| 16:00       | 6.398            | 1.066        | 2.002                      |
| 16:10       | 6.492            | 1.082        | 2.031                      |
| 16:20       | 6.589            | 1.098        | 2.062                      |
| 16:30       | 6.690            | 1.115        | 2.093                      |
| 16:40       | 6.795            | 1.133        | 2.126                      |
| 16:50       | 6.904            | 1.151        | 2.160                      |
| 17:00       | 7.018            | 1.170        | 2.196                      |
| 17:10       | 7.136            | 1.189        | 2.233                      |
| 17:20       | 7.259            | 1.210        | 2.271                      |
| 17:30       | 7.387            | 1.231        | 2.311                      |
| 17:40       | 7.521            | 1.253        | 2.353                      |
| 17:50       | 7.661            | 1.277        | 2.397                      |
| 18:00       | 7.807            | 1.301        | 2.443                      |
| 18:10       | 7.960            | 1.327        | 2.491                      |
| 18:20       | 8.121            | 1.354        | 2.541                      |
| 18:30       | 8.290            | 1.382        | 2.594                      |
| 18:40       | 8.468            | 1.411        | 2.650                      |
| 18:50       | 8.656            | 1.443        | 2.708                      |
| 19:00       | 8.853            | 1.476        | 2.770                      |
| 19:10       | 9.062            | 1.510        | 2.835                      |
| 19:20       | 9.284            | 1.547        | 2.905                      |
| 19:30       | 9.519            | 1.586        | 2.978                      |
| 19:40       | 9.768            | 1.628        | 3.056                      |
| 19:50       | 10.035           | 1.672        | 3.140                      |
| 20:00       | 10.319           | 1.720        | 3.229                      |
| 20:10       | 10.624           | 1.771        | 3.324                      |
| 20:20       | 10.951           | 1.825        | 3.427                      |
| 20:30       | 11.304           | 1.884        | 3.537                      |
| 20:40       | 11.686           | 1.948        | 3.656                      |
| 20:50       | 12.099           | 2.017        | 3.786                      |
| 21:00       | 12.550           | 2.092        | 3.927                      |
| 21:10       | 13.044           | 2.174        | 4.081                      |
| 21:20       | 13.587           | 2.264        | 4.251                      |
| 21:30       | 14.187           | 2.365        | 4.439                      |
| 21:40       | 14.855           | 2.476        | 4.648                      |
| 21:50       | 15.604           | 2.601        | 4.882                      |
| 22:00       | 16.449           | 2.742        | 5.147                      |
| 22:10       | 17.413           | 2.902        | 5.448                      |
| 22:20       | 18.523           | 3.087        | 5.795                      |
| 22:30       | 19.817           | 3.303        | 6.201                      |
| 22:40       | 21.350           | 3.558        | 6.680                      |
| 22:50       | 23.199           | 3.867        | 7.259                      |
| 23:00       | 25.480           | 4.247        | 7.972                      |
| 23:10       | 28.377           | 4.729        | 8.879                      |
| 23:20       | 32.202           | 5.367        | 10.076                     |
| 23:30       | 37.538           | 6.256        | 11.745                     |
| 23:40       | 45.635           | 7.606        | 14.279                     |
| 23:50       | 59.909           | 9.985        | 18.745                     |
| 24:00       | 98.729           | 16.455       | 30.891                     |

## ハイドログラフ



## 時間降雨分布



## 2-3 流域3

## 2-3-1 設計条件

降雨強度式

君島型

$$r = \frac{1100.000}{t^{2.000/3.000} + 6.5000}$$

0 t 1440

(tの単位:分)

降雨継続時間

24 時間 0 分

計算単位時間

10 分

流出係数

| 流出係数<br>fr | 集水面積<br>A(ha) |
|------------|---------------|
| 0.850      | 127.500       |

降雨波形タイプ

後方集中

## 2-3-2 降雨強度および流量の計算

計算単位時間 t = 10 (min)

流出係数 fr = 0.85

集水面積 A = 127.500 (ha)

| n  | 時間<br>t = n · t<br>(min) | 降雨強度式<br>$r = \frac{1100.000}{t^{2.000/3.000} + 6.5000}$<br>(mm/hr) | n · r<br>(mm/hr) | 降雨強度<br>$I_n = n \cdot r_n - (n-1) \cdot r_{n-1}$<br>(mm/hr) | 流量<br>$Q = \frac{1}{360} \cdot fr \cdot I_n \cdot A$<br>(m <sup>3</sup> /s) |
|----|--------------------------|---|------------------|--|---|
| 1  | 10                       | 98.729  | 98.729           | 98.729   | 29.722  |
| 2  | 20                       | 79.319  | 158.638          | 59.909   | 18.035  |
| 3  | 30                       | 68.091  | 204.272          | 45.635   | 13.738  |
| 4  | 40                       | 60.453  | 241.810          | 37.538   | 11.300  |
| 5  | 50                       | 54.802  | 274.012          | 32.202   | 9.694   |
| 6  | 60                       | 50.398  | 302.389          | 28.377   | 8.543   |
| 7  | 70                       | 46.838  | 327.869          | 25.480   | 7.671   |
| 8  | 80                       | 43.884  | 351.068          | 23.199   | 6.984   |
| 9  | 90                       | 41.380  | 372.419          | 21.350   | 6.427   |
| 10 | 100                      | 39.224  | 392.236          | 19.817   | 5.966   |
| 11 | 110                      | 37.342  | 410.758          | 18.523   | 5.576   |
| 12 | 120                      | 35.681  | 428.171          | 17.413   | 5.242   |
| 13 | 130                      | 34.202  | 444.620          | 16.449   | 4.952   |
| 14 | 140                      | 32.873  | 460.224          | 15.604   | 4.697   |
| 15 | 150                      | 31.672  | 475.079          | 14.855   | 4.472   |
| 16 | 160                      | 30.579  | 489.266          | 14.187   | 4.271   |
| 17 | 170                      | 29.580  | 502.853          | 13.587   | 4.090   |
| 18 | 180                      | 28.661  | 515.897          | 13.044   | 3.927   |
| 19 | 190                      | 27.813  | 528.447          | 12.550   | 3.778   |
| 20 | 200                      | 27.027  | 540.547          | 12.099   | 3.642   |
| 21 | 210                      | 26.297  | 552.232          | 11.686   | 3.518   |
| 22 | 220                      | 25.615  | 563.537          | 11.304   | 3.403   |
| 23 | 230                      | 24.978  | 574.488          | 10.951   | 3.297   |

| n  | 時間                 | 降雨強度式  |         | n · r  | 降雨強度   | 流量  |
|----|--------------------|--|---------|--------|--|---|
|    | t = n · t<br>(min) | $r = \frac{1100.000}{t^{2.000/3.000} + 6.5000}$<br>(mm/hr) | (mm/hr) |        | $I_n = n \cdot r_{n-1} \cdot (n-1) \cdot r_{n-1}$<br>(mm/hr) | $Q = \frac{1}{360} \cdot fr \cdot I_n \cdot A$<br>(m <sup>3</sup> /s) |
| 24 | 240                | 24.380   | 585.112 | 10.624 | 3.198  |   |
| 25 | 250                | 23.817   | 595.431 | 10.319 | 3.107  |   |
| 26 | 260                | 23.287   | 605.466 | 10.035 | 3.021  |   |
| 27 | 270                | 22.786   | 615.234 | 9.768  | 2.941  |   |
| 28 | 280                | 22.313   | 624.753 | 9.519  | 2.865  |   |
| 29 | 290                | 21.863   | 634.036 | 9.284  | 2.795  |   |
| 30 | 300                | 21.437   | 643.099 | 9.062  | 2.728  |   |
| 31 | 310                | 21.031   | 651.952 | 8.853  | 2.665  |   |
| 32 | 320                | 20.644   | 660.608 | 8.656  | 2.606  |   |
| 33 | 330                | 20.275   | 669.076 | 8.468  | 2.549  |   |
| 34 | 340                | 19.923   | 677.366 | 8.290  | 2.496  |   |
| 35 | 350                | 19.585   | 685.487 | 8.121  | 2.445  |   |
| 36 | 360                | 19.262   | 693.448 | 7.960  | 2.396  |   |
| 37 | 370                | 18.953   | 701.255 | 7.807  | 2.350  |   |
| 38 | 380                | 18.656   | 708.915 | 7.661  | 2.306  |   |
| 39 | 390                | 18.370   | 716.436 | 7.521  | 2.264  |   |
| 40 | 400                | 18.096   | 723.823 | 7.387  | 2.224  |   |
| 41 | 410                | 17.831   | 731.081 | 7.259  | 2.185  |   |
| 42 | 420                | 17.577   | 738.217 | 7.136  | 2.148  |   |
| 43 | 430                | 17.331   | 745.235 | 7.018  | 2.113  |   |
| 44 | 440                | 17.094   | 752.139 | 6.904  | 2.078  |   |
| 45 | 450                | 16.865   | 758.935 | 6.795  | 2.046  |   |
| 46 | 460                | 16.644   | 765.625 | 6.690  | 2.014  |   |
| 47 | 470                | 16.430   | 772.214 | 6.589  | 1.984  |   |
| 48 | 480                | 16.223   | 778.706 | 6.492  | 1.954  |   |
| 49 | 490                | 16.023   | 785.105 | 6.398  | 1.926  |   |
| 50 | 500                | 15.828   | 791.412 | 6.307  | 1.899  |   |
| 51 | 510                | 15.640   | 797.632 | 6.220  | 1.872  |   |
| 52 | 520                | 15.457   | 803.767 | 6.135  | 1.847  |   |
| 53 | 530                | 15.280   | 809.820 | 6.053  | 1.822  |   |
| 54 | 540                | 15.107   | 815.793 | 5.974  | 1.798  |   |
| 55 | 550                | 14.940   | 821.690 | 5.897  | 1.775  |   |
| 56 | 560                | 14.777   | 827.512 | 5.822  | 1.753  |   |
| 57 | 570                | 14.619   | 833.263 | 5.750  | 1.731  |   |
| 58 | 580                | 14.465   | 838.943 | 5.680  | 1.710  |   |
| 59 | 590                | 14.314   | 844.555 | 5.612  | 1.689  |   |
| 60 | 600                | 14.168   | 850.101 | 5.546  | 1.670  |   |
| 61 | 610                | 14.026   | 855.582 | 5.482  | 1.650  |   |
| 62 | 620                | 13.887   | 861.002 | 5.419  | 1.631  |   |
| 63 | 630                | 13.752   | 866.361 | 5.359  | 1.613  |   |
| 64 | 640                | 13.620   | 871.660 | 5.300  | 1.595  |   |
| 65 | 650                | 13.491   | 876.902 | 5.242  | 1.578  |   |
| 66 | 660                | 13.365   | 882.088 | 5.186  | 1.561  |   |
| 67 | 670                | 13.242   | 887.220 | 5.132  | 1.545  |   |
| 68 | 680                | 13.122   | 892.299 | 5.078  | 1.529  |   |
| 69 | 690                | 13.005   | 897.325 | 5.027  | 1.513  |   |
| 70 | 700                | 12.890   | 902.301 | 4.976  | 1.498  |   |
| 71 | 710                | 12.778   | 907.228 | 4.927  | 1.483  |   |
| 72 | 720                | 12.668   | 912.107 | 4.879  | 1.469  |   |
| 73 | 730                | 12.561   | 916.938 | 4.832  | 1.455  |   |
| 74 | 740                | 12.456   | 921.724 | 4.786  | 1.441  |   |
| 75 | 750                | 12.353   | 926.465 | 4.741  | 1.427  |   |
| 76 | 760                | 12.252   | 931.162 | 4.697  | 1.414  |   |
| 77 | 770                | 12.153   | 935.816 | 4.654  | 1.401  |   |
| 78 | 780                | 12.057   | 940.428 | 4.612  | 1.388  |   |
| 79 | 790                | 11.962   | 944.999 | 4.571  | 1.376  |   |

| n   | 時間<br>t = n · t<br>(min) | 降雨強度式  |        | n · r<br>(mm/hr) | 降雨強度   |       | 流量<br>$Q = \frac{1}{360} \cdot fr \cdot I_n \cdot A$<br>(m <sup>3</sup> /s) |
|-----|--------------------------|--|--------|------------------|--|-------|---|
|     |                          | $r = \frac{1100.000}{t^{2.000/3.000} + 6.5000}$<br>(mm/hr) |        |                  | $I_n = n \cdot r_n - (n-1) \cdot r_{n-1}$<br>(mm/hr) |       |   |
| 80  | 800                      |  | 11.869 | 949.530          |  | 4.531 | 1.364   |
| 81  | 810                      |  | 11.778 | 954.022          |  | 4.492 | 1.352   |
| 82  | 820                      |  | 11.689 | 958.476          |  | 4.453 | 1.341   |
| 83  | 830                      |  | 11.601 | 962.891          |  | 4.416 | 1.329   |
| 84  | 840                      |  | 11.515 | 967.270          |  | 4.379 | 1.318   |
| 85  | 850                      |  | 11.431 | 971.613          |  | 4.343 | 1.307   |
| 86  | 860                      |  | 11.348 | 975.921          |  | 4.307 | 1.297   |
| 87  | 870                      |  | 11.267 | 980.193          |  | 4.273 | 1.286   |
| 88  | 880                      |  | 11.187 | 984.432          |  | 4.239 | 1.276   |
| 89  | 890                      |  | 11.108 | 988.637          |  | 4.205 | 1.266   |
| 90  | 900                      |  | 11.031 | 992.810          |  | 4.173 | 1.256   |
| 91  | 910                      |  | 10.955 | 996.950          |  | 4.141 | 1.246   |
| 92  | 920                      |  | 10.881 | 1001.059         |  | 4.109 | 1.237   |
| 93  | 930                      |  | 10.808 | 1005.137         |  | 4.078 | 1.228   |
| 94  | 940                      |  | 10.736 | 1009.185         |  | 4.048 | 1.219   |
| 95  | 950                      |  | 10.665 | 1013.203         |  | 4.018 | 1.210   |
| 96  | 960                      |  | 10.596 | 1017.192         |  | 3.989 | 1.201   |
| 97  | 970                      |  | 10.527 | 1021.152         |  | 3.960 | 1.192   |
| 98  | 980                      |  | 10.460 | 1025.083         |  | 3.932 | 1.184   |
| 99  | 990                      |  | 10.394 | 1028.987         |  | 3.904 | 1.175   |
| 100 | 1000                     |  | 10.329 | 1032.864         |  | 3.877 | 1.167   |
| 101 | 1010                     |  | 10.264 | 1036.714         |  | 3.850 | 1.159   |
| 102 | 1020                     |  | 10.201 | 1040.537         |  | 3.823 | 1.151   |
| 103 | 1030                     |  | 10.139 | 1044.335         |  | 3.798 | 1.143   |
| 104 | 1040                     |  | 10.078 | 1048.107         |  | 3.772 | 1.136   |
| 105 | 1050                     |  | 10.018 | 1051.854         |  | 3.747 | 1.128   |
| 106 | 1060                     |  | 9.958  | 1055.576         |  | 3.722 | 1.121   |
| 107 | 1070                     |  | 9.900  | 1059.274         |  | 3.698 | 1.113   |
| 108 | 1080                     |  | 9.842  | 1062.948         |  | 3.674 | 1.106   |
| 109 | 1090                     |  | 9.785  | 1066.599         |  | 3.651 | 1.099   |
| 110 | 1100                     |  | 9.729  | 1070.226         |  | 3.627 | 1.092   |
| 111 | 1110                     |  | 9.674  | 1073.831         |  | 3.605 | 1.085   |
| 112 | 1120                     |  | 9.620  | 1077.413         |  | 3.582 | 1.078   |
| 113 | 1130                     |  | 9.566  | 1080.973         |  | 3.560 | 1.072   |
| 114 | 1140                     |  | 9.513  | 1084.512         |  | 3.538 | 1.065   |
| 115 | 1150                     |  | 9.461  | 1088.028         |  | 3.517 | 1.059   |
| 116 | 1160                     |  | 9.410  | 1091.524         |  | 3.496 | 1.052   |
| 117 | 1170                     |  | 9.359  | 1094.999         |  | 3.475 | 1.046   |
| 118 | 1180                     |  | 9.309  | 1098.454         |  | 3.455 | 1.040   |
| 119 | 1190                     |  | 9.260  | 1101.888         |  | 3.434 | 1.034   |
| 120 | 1200                     |  | 9.211  | 1105.302         |  | 3.414 | 1.028   |
| 121 | 1210                     |  | 9.163  | 1108.697         |  | 3.395 | 1.022   |
| 122 | 1220                     |  | 9.115  | 1112.073         |  | 3.375 | 1.016   |
| 123 | 1230                     |  | 9.069  | 1115.429         |  | 3.356 | 1.010   |
| 124 | 1240                     |  | 9.022  | 1118.766         |  | 3.337 | 1.005   |
| 125 | 1250                     |  | 8.977  | 1122.085         |  | 3.319 | 0.999   |
| 126 | 1260                     |  | 8.932  | 1125.386         |  | 3.301 | 0.994   |
| 127 | 1270                     |  | 8.887  | 1128.668         |  | 3.282 | 0.988   |
| 128 | 1280                     |  | 8.843  | 1131.933         |  | 3.265 | 0.983   |
| 129 | 1290                     |  | 8.800  | 1135.180         |  | 3.247 | 0.977   |
| 130 | 1300                     |  | 8.757  | 1138.410         |  | 3.230 | 0.972   |
| 131 | 1310                     |  | 8.715  | 1141.622         |  | 3.213 | 0.967   |
| 132 | 1320                     |  | 8.673  | 1144.818         |  | 3.196 | 0.962   |
| 133 | 1330                     |  | 8.632  | 1147.997         |  | 3.179 | 0.957   |
| 134 | 1340                     |  | 8.591  | 1151.159         |  | 3.162 | 0.952   |
| 135 | 1350                     |  | 8.550  | 1154.305         |  | 3.146 | 0.947   |

| n   | 時間<br>t = n · t<br>(min) | 降雨強度式  |       | n · r<br>(mm/hr) | 降雨強度<br>$I_n = n \cdot r_{n-1} \cdot (n-1)$<br>$\cdot r_{n-1}$<br>(mm/hr) | 流量<br>$Q = \frac{1}{360} \cdot fr \cdot I_n \cdot A$<br>(m <sup>3</sup> /s) |
|-----|--------------------------|--|-------|------------------|---|---|
|     |                          | $r = \frac{1100.000}{t^{2.000/3.000} + 6.5000}$<br>(mm/hr) |       |                  |   |   |
| 136 | 1360                     |  | 8.511 | 1157.436         | 3.130   | 0.942   |
| 137 | 1370                     |  | 8.471 | 1160.550         | 3.114   | 0.938   |
| 138 | 1380                     |  | 8.432 | 1163.648         | 3.099   | 0.933   |
| 139 | 1390                     |  | 8.394 | 1166.732         | 3.083   | 0.928   |
| 140 | 1400                     |  | 8.356 | 1169.799         | 3.068   | 0.924   |
| 141 | 1410                     |  | 8.318 | 1172.852         | 3.053   | 0.919   |
| 142 | 1420                     |  | 8.281 | 1175.890         | 3.038   | 0.915   |
| 143 | 1430                     |  | 8.244 | 1178.913         | 3.023   | 0.910   |
| 144 | 1440                     |  | 8.208 | 1181.922         | 3.009   | 0.906   |

## 2-3-3 降雨波形およびハイドログラフ

降雨強度および流量を後方集中型に整列する。

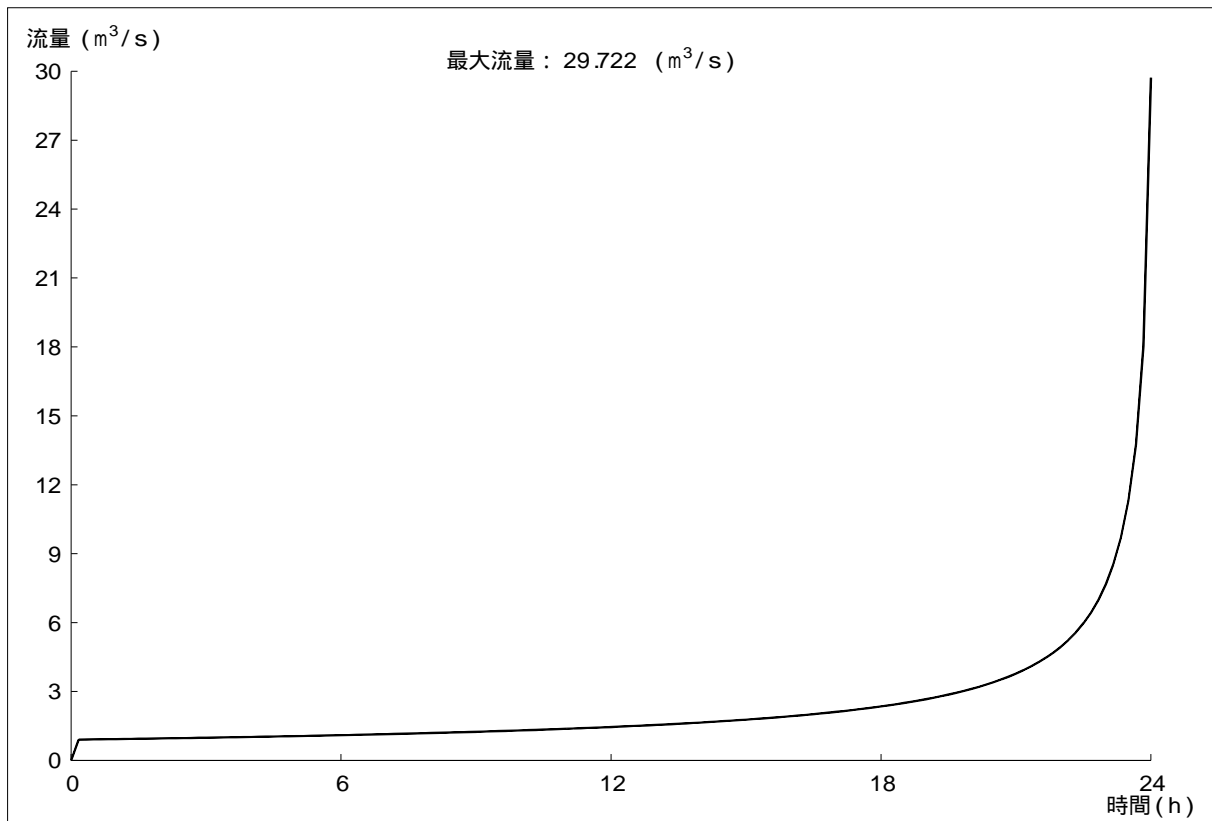
| 時間<br>(時：分) | 降雨強度<br>I(mm/hr) | 降雨量<br>R(mm) | 流量<br>Q(m <sup>3</sup> /s) |
|-------------|------------------|--------------|----------------------------|
| 0:00        | 0.000            | 0.000        | 0.000                      |
| 0:10        | 3.009            | 0.501        | 0.906                      |
| 0:20        | 3.023            | 0.504        | 0.910                      |
| 0:30        | 3.038            | 0.506        | 0.915                      |
| 0:40        | 3.053            | 0.509        | 0.919                      |
| 0:50        | 3.068            | 0.511        | 0.924                      |
| 1:00        | 3.083            | 0.514        | 0.928                      |
| 1:10        | 3.099            | 0.516        | 0.933                      |
| 1:20        | 3.114            | 0.519        | 0.938                      |
| 1:30        | 3.130            | 0.522        | 0.942                      |
| 1:40        | 3.146            | 0.524        | 0.947                      |
| 1:50        | 3.162            | 0.527        | 0.952                      |
| 2:00        | 3.179            | 0.530        | 0.957                      |
| 2:10        | 3.196            | 0.533        | 0.962                      |
| 2:20        | 3.213            | 0.535        | 0.967                      |
| 2:30        | 3.230            | 0.538        | 0.972                      |
| 2:40        | 3.247            | 0.541        | 0.977                      |
| 2:50        | 3.265            | 0.544        | 0.983                      |
| 3:00        | 3.282            | 0.547        | 0.988                      |
| 3:10        | 3.301            | 0.550        | 0.994                      |
| 3:20        | 3.319            | 0.553        | 0.999                      |
| 3:30        | 3.337            | 0.556        | 1.005                      |
| 3:40        | 3.356            | 0.559        | 1.010                      |
| 3:50        | 3.375            | 0.563        | 1.016                      |
| 4:00        | 3.395            | 0.566        | 1.022                      |
| 4:10        | 3.414            | 0.569        | 1.028                      |
| 4:20        | 3.434            | 0.572        | 1.034                      |
| 4:30        | 3.455            | 0.576        | 1.040                      |
| 4:40        | 3.475            | 0.579        | 1.046                      |
| 4:50        | 3.496            | 0.583        | 1.052                      |
| 5:00        | 3.517            | 0.586        | 1.059                      |
| 5:10        | 3.538            | 0.590        | 1.065                      |
| 5:20        | 3.560            | 0.593        | 1.072                      |
| 5:30        | 3.582            | 0.597        | 1.078                      |
| 5:40        | 3.605            | 0.601        | 1.085                      |
| 5:50        | 3.627            | 0.605        | 1.092                      |
| 6:00        | 3.651            | 0.608        | 1.099                      |
| 6:10        | 3.674            | 0.612        | 1.106                      |
| 6:20        | 3.698            | 0.616        | 1.113                      |

| 時間<br>(時:分) | 降雨強度<br>I(mm/hr) | 降雨量<br>R(mm) | 流量<br>Q(m <sup>3</sup> /s) |
|-------------|------------------|--------------|----------------------------|
| 6:30        | 3.722            | 0.620        | 1.121                      |
| 6:40        | 3.747            | 0.624        | 1.128                      |
| 6:50        | 3.772            | 0.629        | 1.136                      |
| 7:00        | 3.798            | 0.633        | 1.143                      |
| 7:10        | 3.823            | 0.637        | 1.151                      |
| 7:20        | 3.850            | 0.642        | 1.159                      |
| 7:30        | 3.877            | 0.646        | 1.167                      |
| 7:40        | 3.904            | 0.651        | 1.175                      |
| 7:50        | 3.932            | 0.655        | 1.184                      |
| 8:00        | 3.960            | 0.660        | 1.192                      |
| 8:10        | 3.989            | 0.665        | 1.201                      |
| 8:20        | 4.018            | 0.670        | 1.210                      |
| 8:30        | 4.048            | 0.675        | 1.219                      |
| 8:40        | 4.078            | 0.680        | 1.228                      |
| 8:50        | 4.109            | 0.685        | 1.237                      |
| 9:00        | 4.141            | 0.690        | 1.246                      |
| 9:10        | 4.173            | 0.695        | 1.256                      |
| 9:20        | 4.205            | 0.701        | 1.266                      |
| 9:30        | 4.239            | 0.706        | 1.276                      |
| 9:40        | 4.273            | 0.712        | 1.286                      |
| 9:50        | 4.307            | 0.718        | 1.297                      |
| 10:00       | 4.343            | 0.724        | 1.307                      |
| 10:10       | 4.379            | 0.730        | 1.318                      |
| 10:20       | 4.416            | 0.736        | 1.329                      |
| 10:30       | 4.453            | 0.742        | 1.341                      |
| 10:40       | 4.492            | 0.749        | 1.352                      |
| 10:50       | 4.531            | 0.755        | 1.364                      |
| 11:00       | 4.571            | 0.762        | 1.376                      |
| 11:10       | 4.612            | 0.769        | 1.388                      |
| 11:20       | 4.654            | 0.776        | 1.401                      |
| 11:30       | 4.697            | 0.783        | 1.414                      |
| 11:40       | 4.741            | 0.790        | 1.427                      |
| 11:50       | 4.786            | 0.798        | 1.441                      |
| 12:00       | 4.832            | 0.805        | 1.455                      |
| 12:10       | 4.879            | 0.813        | 1.469                      |
| 12:20       | 4.927            | 0.821        | 1.483                      |
| 12:30       | 4.976            | 0.829        | 1.498                      |
| 12:40       | 5.027            | 0.838        | 1.513                      |
| 12:50       | 5.078            | 0.846        | 1.529                      |
| 13:00       | 5.132            | 0.855        | 1.545                      |
| 13:10       | 5.186            | 0.864        | 1.561                      |
| 13:20       | 5.242            | 0.874        | 1.578                      |
| 13:30       | 5.300            | 0.883        | 1.595                      |
| 13:40       | 5.359            | 0.893        | 1.613                      |
| 13:50       | 5.419            | 0.903        | 1.631                      |
| 14:00       | 5.482            | 0.914        | 1.650                      |
| 14:10       | 5.546            | 0.924        | 1.670                      |
| 14:20       | 5.612            | 0.935        | 1.689                      |
| 14:30       | 5.680            | 0.947        | 1.710                      |
| 14:40       | 5.750            | 0.958        | 1.731                      |
| 14:50       | 5.822            | 0.970        | 1.753                      |
| 15:00       | 5.897            | 0.983        | 1.775                      |
| 15:10       | 5.974            | 0.996        | 1.798                      |
| 15:20       | 6.053            | 1.009        | 1.822                      |
| 15:30       | 6.135            | 1.022        | 1.847                      |
| 15:40       | 6.220            | 1.037        | 1.872                      |
| 15:50       | 6.307            | 1.051        | 1.899                      |
| 16:00       | 6.398            | 1.066        | 1.926                      |

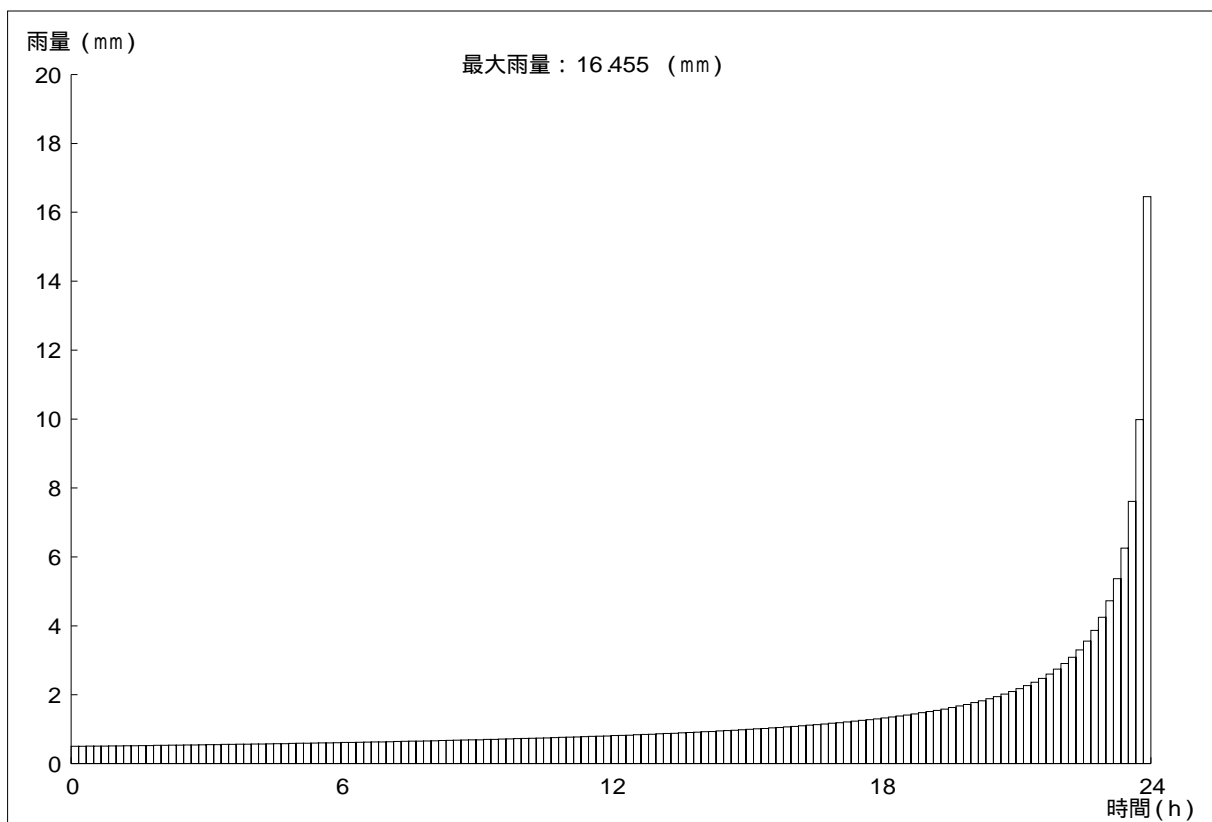
| 時間<br>(時:分) | 降雨強度<br>I(mm/hr) | 降雨量<br>R(mm) | 流量<br>Q(m <sup>3</sup> /s) |
|-------------|------------------|--------------|----------------------------|
| 16:10       | 6.492            | 1.082        | 1.954                      |
| 16:20       | 6.589            | 1.098        | 1.984                      |
| 16:30       | 6.690            | 1.115        | 2.014                      |
| 16:40       | 6.795            | 1.133        | 2.046                      |
| 16:50       | 6.904            | 1.151        | 2.078                      |
| 17:00       | 7.018            | 1.170        | 2.113                      |
| 17:10       | 7.136            | 1.189        | 2.148                      |
| 17:20       | 7.259            | 1.210        | 2.185                      |
| 17:30       | 7.387            | 1.231        | 2.224                      |
| 17:40       | 7.521            | 1.253        | 2.264                      |
| 17:50       | 7.661            | 1.277        | 2.306                      |
| 18:00       | 7.807            | 1.301        | 2.350                      |
| 18:10       | 7.960            | 1.327        | 2.396                      |
| 18:20       | 8.121            | 1.354        | 2.445                      |
| 18:30       | 8.290            | 1.382        | 2.496                      |
| 18:40       | 8.468            | 1.411        | 2.549                      |
| 18:50       | 8.656            | 1.443        | 2.606                      |
| 19:00       | 8.853            | 1.476        | 2.665                      |
| 19:10       | 9.062            | 1.510        | 2.728                      |
| 19:20       | 9.284            | 1.547        | 2.795                      |
| 19:30       | 9.519            | 1.586        | 2.865                      |
| 19:40       | 9.768            | 1.628        | 2.941                      |
| 19:50       | 10.035           | 1.672        | 3.021                      |
| 20:00       | 10.319           | 1.720        | 3.107                      |
| 20:10       | 10.624           | 1.771        | 3.198                      |
| 20:20       | 10.951           | 1.825        | 3.297                      |
| 20:30       | 11.304           | 1.884        | 3.403                      |
| 20:40       | 11.686           | 1.948        | 3.518                      |
| 20:50       | 12.099           | 2.017        | 3.642                      |
| 21:00       | 12.550           | 2.092        | 3.778                      |
| 21:10       | 13.044           | 2.174        | 3.927                      |
| 21:20       | 13.587           | 2.264        | 4.090                      |
| 21:30       | 14.187           | 2.365        | 4.271                      |
| 21:40       | 14.855           | 2.476        | 4.472                      |
| 21:50       | 15.604           | 2.601        | 4.697                      |
| 22:00       | 16.449           | 2.742        | 4.952                      |
| 22:10       | 17.413           | 2.902        | 5.242                      |
| 22:20       | 18.523           | 3.087        | 5.576                      |
| 22:30       | 19.817           | 3.303        | 5.966                      |
| 22:40       | 21.350           | 3.558        | 6.427                      |
| 22:50       | 23.199           | 3.867        | 6.984                      |
| 23:00       | 25.480           | 4.247        | 7.671                      |
| 23:10       | 28.377           | 4.729        | 8.543                      |
| 23:20       | 32.202           | 5.367        | 9.694                      |
| 23:30       | 37.538           | 6.256        | 11.300                     |
| 23:40       | 45.635           | 7.606        | 13.738                     |
| 23:50       | 59.909           | 9.985        | 18.035                     |
| 24:00       | 98.729           | 16.455       | 29.722                     |



## ハイドログラフ



## 時間降雨分布



## 2-4 流域4

## 2-4-1 設計条件

降雨強度式 君島型

$$r = \frac{2590.000}{t^{3.000 / 4.000} + 12.9000}$$

0 t 1440

(tの単位：分)

降雨継続時間 24 時間 0 分

計算単位時間 20 分

流出係数

| 流出係数<br>fr | 集水面積<br>A(ha) |
|------------|---------------|
| 0.860      | 206.400       |

降雨波形タイプ 後方集中

## 2-4-2 洪水到達時間

## (1) 等流速法

$$t_c = t_1 + t_2$$

ここに、

t<sub>c</sub> : 洪水到達時間 (min)t<sub>1</sub> : 流入時間 (min)t<sub>2</sub> : 流下時間 (min)

流入時間は 7 min とする。

流速をKraven式により想定し、流下時間を次式により求める。

$$t_2 = \frac{L}{v} \times \frac{1}{60}$$

ここに、

t<sub>2</sub> : 流下時間 (min)

L : 流路延長 (m)

v : 流速 (m/s)

|         | H/L 1/100 | 1/100 > H/L 1/200 | 1/200 > H/L |
|---------|-----------|-------------------|-------------|
| v (m/s) | 3.5       | 3.0               | 2.1         |

流下時間は以下ようになる。

| 区間 | L<br>(m) | H<br>(m) | H/L     | v<br>(m/s) | t2<br>(min) |
|----|----------|----------|---------|------------|-------------|
| 1  | 1000     | 2.3      | 0.00230 | 2.1        | 7.94        |
| 2  | 750      | 5.5      | 0.00733 | 3.0        | 4.17        |
| 3  | 990      | 17.2     | 0.01737 | 3.5        | 4.71        |
| 計  |          |          |         |            | 16.82       |

したがって、洪水到達時間は以下ようになる。

$$\begin{aligned} t_c &= t_1 + t_2 \\ &= 7.00 + 16.82 \\ &= 23.82 \text{ (min)} \end{aligned}$$

(2) Kinematic wave理論に基づく式 (角屋式)

$$t_c = C \cdot A^{0.22} \cdot r_e^{-0.35}$$

ここに、

$t_c$  : 洪水到達時間 (min)

$C$  : 流域の土地利用状態等で決まる定数 (本設計での採用値  $C = 60$ )  
(開発前  $C=180$  開発後  $C=60$ )

$A$  : 流域面積 ( $\text{km}^2$ )

$r_e$  : 有効降雨強度 (mm/hr)

有効降雨強度を以下により求める。

$$r_e = f \cdot r$$

ここに、

$f$  : 流出係数

$r$  : 降雨強度 (mm/hr)

洪水到達時間 (min)は以下ようになる。

$$t_c = 60 \times 2.47900^{0.22} \times \left( 0.86 \times \frac{2590.000}{t^{3.000 / 4.000} + 12.9000} \right)^{-0.35}$$

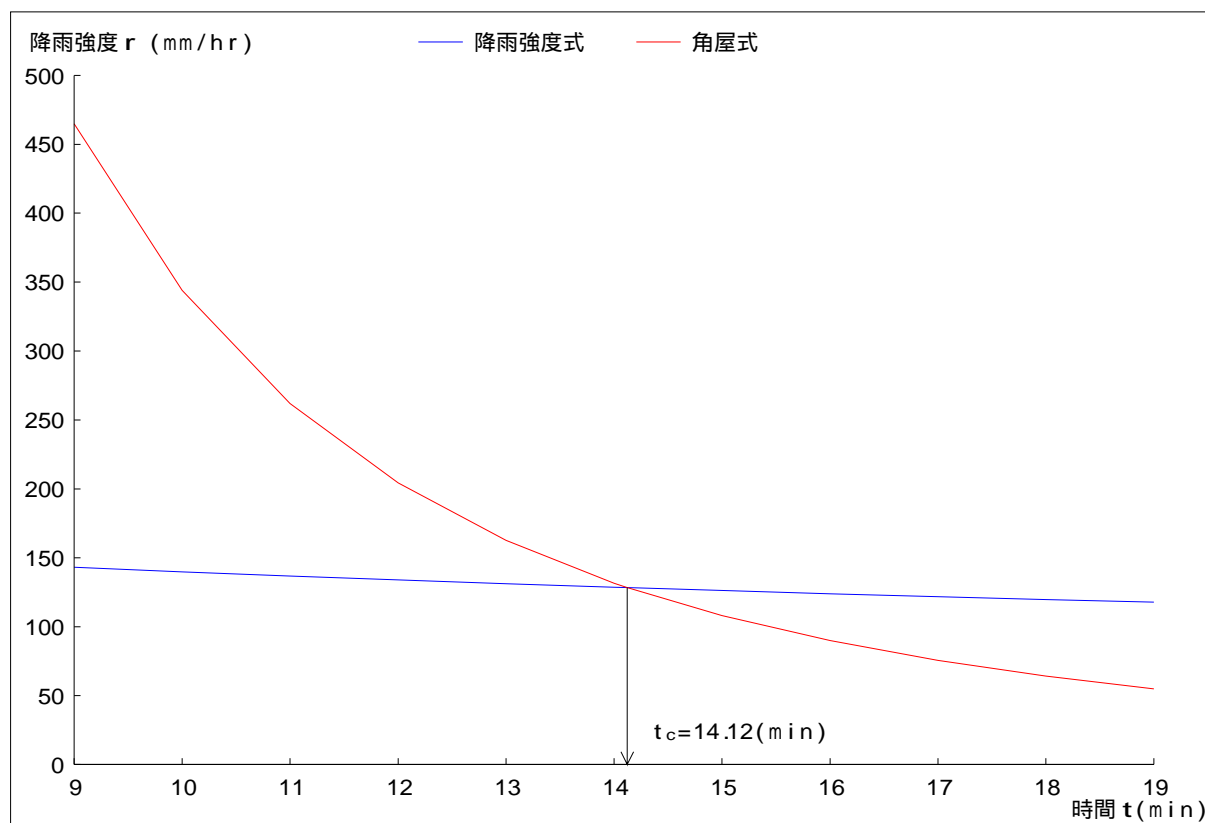
$t$ を仮定し、右辺に代入する。計算結果として与えられる左辺の $t_c$ と一致するまで試算を繰り返す。

| 計算回数 | t (min) | t <sub>c</sub> (min) |
|------|---------|----------------------|
| 1    | 10.00   | 13.70                |
| 2    | 13.70   | 14.08                |
| 3    | 14.08   | 14.12                |
| 4    | 14.12   | 14.12                |

したがって、洪水到達時間は

$$t_c = 14.12 \text{ (min)}$$

### 降雨強度式と角屋式の関係



## (3) 土研式

$$t_c = 2.40 \times 10^{-4} \times \left( \frac{L}{\sqrt{S}} \right)^{0.7}$$

ここに、

$t_c$  : 洪水到達時間 (hr)

$L$  : 河道延長 (m)

$S$  : 河道勾配

ここで、土研式の適用にあたっては、その範囲であるかどうかを確認する。

$$\frac{L}{\sqrt{S}} = 4 \times 10^3 \sim 4 \times 10^5 \text{ (土研式の適用範囲)}$$

$$\left( \frac{L}{\sqrt{S}} \right) = \frac{2740}{\sqrt{0.00909}} = 2.87 \times 10^4$$

よって、土研式の適用範囲内である。

したがって、洪水到達時間は以下ようになる。

$$\begin{aligned} t_c &= 2.40 \times 10^{-4} \times \left( \frac{2740}{\sqrt{0.00909}} \right)^{0.7} \\ &= 0.317 \text{ (hr)} \\ &= 19.02 \text{ (min)} \end{aligned}$$

## (4) 計算結果

各計算手法による計算結果は次のようになる。

| 計算手法  | 洪水到達時間<br>$t_c(\text{min})$ |
|-------|-----------------------------|
| 等流流速法 | 23.82                       |
| 角屋式   | 14.12                       |
| 土研式   | 19.02                       |

以上より、洪水到達時間を 20 min とする。

## 2-4-3 降雨強度および流量の計算

計算単位時間  $t = 20$  (min)流出係数  $fr = 0.86$ 集水面積  $A = 206.400$  (ha)

| n  | 時間                       | 降雨強度式   | $n \cdot r$<br>(mm/hr) | 降雨強度   | 流量  |
|----|--------------------------|---|------------------------|--|---|
|    | $t = n \cdot t$<br>(min) | $r = \frac{2590.000}{t^{3.000/4.000} + 12.9000}$<br>(mm/hr) |                        | $I_n = n \cdot r_{n-1} - (n-1) \cdot r_{n-1}$<br>(mm/hr) | $Q = \frac{1}{360} \cdot fr \cdot I_n \cdot A$<br>(m <sup>3</sup> /s) |
| 1  | 20                       | 115.845   | 115.845                | 115.845  | 57.119  |
| 2  | 40                       | 89.914  | 179.827                | 63.982   | 31.547  |
| 3  | 60                       | 75.163  | 225.490                | 45.663   | 22.515  |
| 4  | 80                       | 65.322  | 261.289                | 35.799   | 17.651  |
| 5  | 100                      | 58.172  | 290.862                | 29.574   | 14.582  |
| 6  | 120                      | 52.689  | 316.133                | 25.271   | 12.460  |
| 7  | 140                      | 48.321  | 338.245                | 22.112   | 10.903  |
| 8  | 160                      | 44.742  | 357.937                | 19.692   | 9.709   |
| 9  | 180                      | 41.746  | 375.712                | 17.775   | 8.764   |
| 10 | 200                      | 39.193  | 391.932                | 16.219   | 7.997   |
| 11 | 220                      | 36.987  | 406.862                | 14.930   | 7.362   |
| 12 | 240                      | 35.059  | 420.705                | 13.844   | 6.826   |
| 13 | 260                      | 33.355  | 433.620                | 12.915   | 6.368   |
| 14 | 280                      | 31.838  | 445.733                | 12.112   | 5.972   |
| 15 | 300                      | 30.476  | 457.143                | 11.410   | 5.626   |
| 16 | 320                      | 29.246  | 467.935                | 10.792   | 5.321   |
| 17 | 340                      | 28.128  | 478.177                | 10.242   | 5.050   |
| 18 | 360                      | 27.107  | 487.928                | 9.750  | 4.808   |
| 19 | 380                      | 26.170  | 497.235                | 9.308  | 4.589   |
| 20 | 400                      | 25.307  | 506.143                | 8.907  | 4.392   |
| 21 | 420                      | 24.509  | 514.685                | 8.543  | 4.212   |
| 22 | 440                      | 23.768  | 522.894                | 8.209  | 4.048   |
| 23 | 460                      | 23.078  | 530.798                | 7.904  | 3.897   |
| 24 | 480                      | 22.434  | 538.420                | 7.622  | 3.758   |
| 25 | 500                      | 21.831  | 545.782                | 7.362  | 3.630   |
| 26 | 520                      | 21.265  | 552.902                | 7.121  | 3.511   |
| 27 | 540                      | 20.733  | 559.799                | 6.896  | 3.400   |
| 28 | 560                      | 20.232  | 566.485                | 6.687  | 3.297   |
| 29 | 580                      | 19.758  | 572.977                | 6.491  | 3.201   |
| 30 | 600                      | 19.309  | 579.285                | 6.308  | 3.110   |
| 31 | 620                      | 18.885  | 585.421                | 6.136  | 3.025   |
| 32 | 640                      | 18.481  | 591.395                | 5.974  | 2.946   |
| 33 | 660                      | 18.097  | 597.216                | 5.821  | 2.870   |
| 34 | 680                      | 17.732  | 602.893                | 5.677  | 2.799   |
| 35 | 700                      | 17.384  | 608.434                | 5.541  | 2.732   |
| 36 | 720                      | 17.051  | 613.845                | 5.411  | 2.668   |
| 37 | 740                      | 16.733  | 619.133                | 5.289  | 2.608   |
| 38 | 760                      | 16.429  | 624.305                | 5.172  | 2.550   |
| 39 | 780                      | 16.138  | 629.366                | 5.061  | 2.495   |
| 40 | 800                      | 15.858  | 634.321                | 4.955  | 2.443   |
| 41 | 820                      | 15.590  | 639.176                | 4.854  | 2.393   |
| 42 | 840                      | 15.332  | 643.934                | 4.758  | 2.346   |
| 43 | 860                      | 15.084  | 648.599                | 4.666  | 2.300   |
| 44 | 880                      | 14.845  | 653.176                | 4.577  | 2.257   |
| 45 | 900                      | 14.615  | 657.669                | 4.493  | 2.215   |
| 46 | 920                      | 14.393  | 662.081                | 4.412  | 2.175   |
| 47 | 940                      | 14.179  | 666.414                | 4.334  | 2.137   |
| 48 | 960                      | 13.972  | 670.673                | 4.259  | 2.100   |
| 49 | 980                      | 13.773  | 674.860                | 4.187  | 2.064   |

| n  | 時間<br>t = n · t<br>(min) | 降雨強度式   |        | n · r<br>(mm/hr) | 降雨強度<br>$I_n = n \cdot r_{n-(n-1)} \cdot r_{n-1}$<br>(mm/hr) | 流量<br>$Q = \frac{1}{360} \cdot fr \cdot I_n \cdot A$<br>(m <sup>3</sup> /s) |
|----|--------------------------|---|--------|------------------|--|---|
|    |                          | $r = \frac{2590.000}{t^{3.000/4.000} + 12.9000}$<br>(mm/hr) |        |                  |  |   |
| 50 | 1000                     |   | 13.580 | 678.978          | 4.118  | 2.030   |
| 51 | 1020                     |   | 13.393 | 683.028          | 4.051  | 1.997   |
| 52 | 1040                     |   | 13.212 | 687.015          | 3.986  | 1.966   |
| 53 | 1060                     |   | 13.037 | 690.939          | 3.924  | 1.935   |
| 54 | 1080                     |   | 12.867 | 694.803          | 3.864  | 1.905   |
| 55 | 1100                     |   | 12.702 | 698.610          | 3.806  | 1.877   |
| 56 | 1120                     |   | 12.542 | 702.361          | 3.751  | 1.849   |
| 57 | 1140                     |   | 12.387 | 706.057          | 3.696  | 1.823   |
| 58 | 1160                     |   | 12.236 | 709.701          | 3.644  | 1.797   |
| 59 | 1180                     |   | 12.090 | 713.294          | 3.593  | 1.772   |
| 60 | 1200                     |   | 11.947 | 716.838          | 3.544  | 1.747   |
| 61 | 1220                     |   | 11.809 | 720.335          | 3.496  | 1.724   |
| 62 | 1240                     |   | 11.674 | 723.785          | 3.450  | 1.701   |
| 63 | 1260                     |   | 11.543 | 727.190          | 3.405  | 1.679   |
| 64 | 1280                     |   | 11.415 | 730.552          | 3.362  | 1.658   |
| 65 | 1300                     |   | 11.290 | 733.872          | 3.320  | 1.637   |
| 66 | 1320                     |   | 11.169 | 737.150          | 3.278  | 1.616   |
| 67 | 1340                     |   | 11.051 | 740.388          | 3.238  | 1.597   |
| 68 | 1360                     |   | 10.935 | 743.588          | 3.200  | 1.578   |
| 69 | 1380                     |   | 10.822 | 746.750          | 3.162  | 1.559   |
| 70 | 1400                     |   | 10.712 | 749.875          | 3.125  | 1.541   |
| 71 | 1420                     |   | 10.605 | 752.964          | 3.089  | 1.523   |
| 72 | 1440                     |   | 10.500 | 756.018          | 3.054  | 1.506   |

## 2-4-4 降雨波形およびハイドログラフ

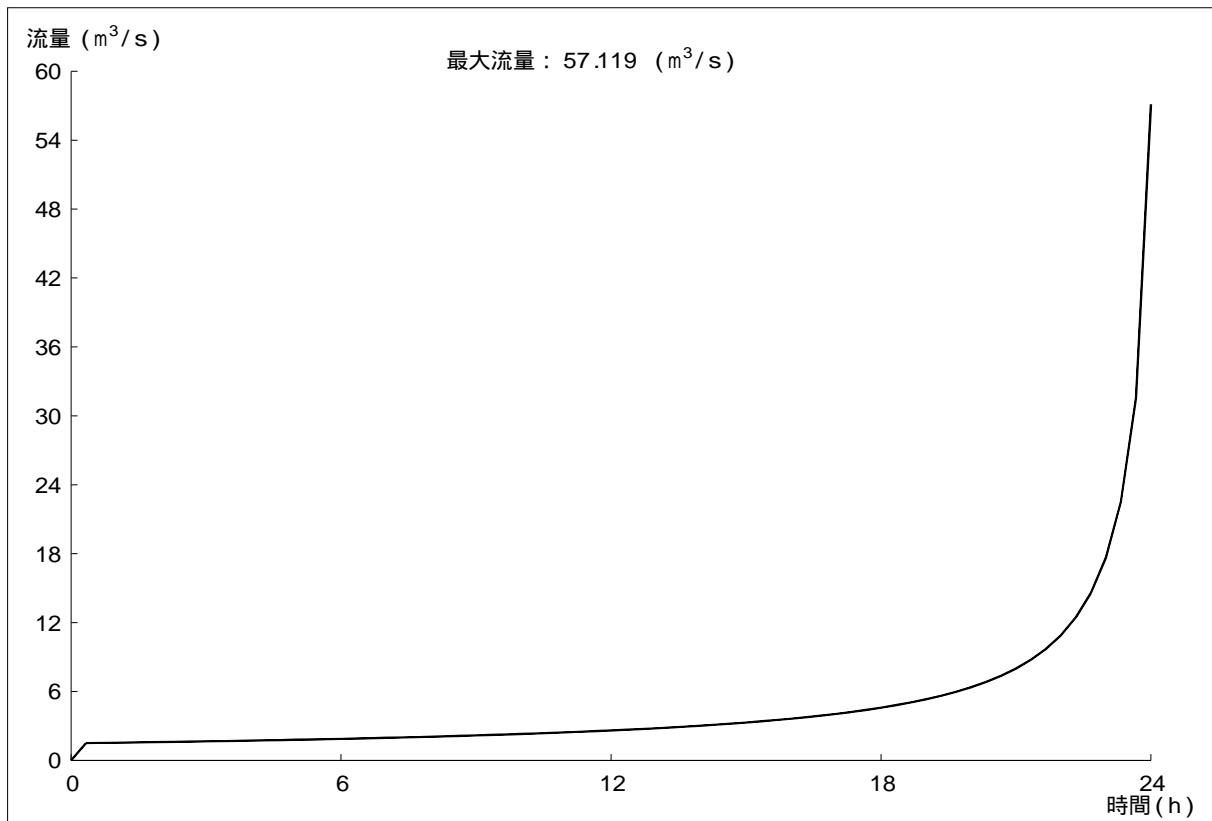
降雨強度および流量を後方集中型に整列する。

| 時間<br>(時：分) | 降雨強度<br>I(mm/hr) | 降雨量<br>R(mm) | 流量<br>Q(m <sup>3</sup> /s) |
|-------------|------------------|--------------|----------------------------|
| 0:00        | 0.000            | 0.000        | 0.000                      |
| 0:20        | 3.054            | 1.018        | 1.506                      |
| 0:40        | 3.089            | 1.030        | 1.523                      |
| 1:00        | 3.125            | 1.042        | 1.541                      |
| 1:20        | 3.162            | 1.054        | 1.559                      |
| 1:40        | 3.200            | 1.067        | 1.578                      |
| 2:00        | 3.238            | 1.079        | 1.597                      |
| 2:20        | 3.278            | 1.093        | 1.616                      |
| 2:40        | 3.320            | 1.107        | 1.637                      |
| 3:00        | 3.362            | 1.121        | 1.658                      |
| 3:20        | 3.405            | 1.135        | 1.679                      |
| 3:40        | 3.450            | 1.150        | 1.701                      |
| 4:00        | 3.496            | 1.165        | 1.724                      |
| 4:20        | 3.544            | 1.181        | 1.747                      |
| 4:40        | 3.593            | 1.198        | 1.772                      |
| 5:00        | 3.644            | 1.215        | 1.797                      |
| 5:20        | 3.696            | 1.232        | 1.823                      |
| 5:40        | 3.751            | 1.250        | 1.849                      |
| 6:00        | 3.806            | 1.269        | 1.877                      |
| 6:20        | 3.864            | 1.288        | 1.905                      |
| 6:40        | 3.924            | 1.308        | 1.935                      |
| 7:00        | 3.986            | 1.329        | 1.966                      |
| 7:20        | 4.051            | 1.350        | 1.997                      |
| 7:40        | 4.118            | 1.373        | 2.030                      |
| 8:00        | 4.187            | 1.396        | 2.064                      |

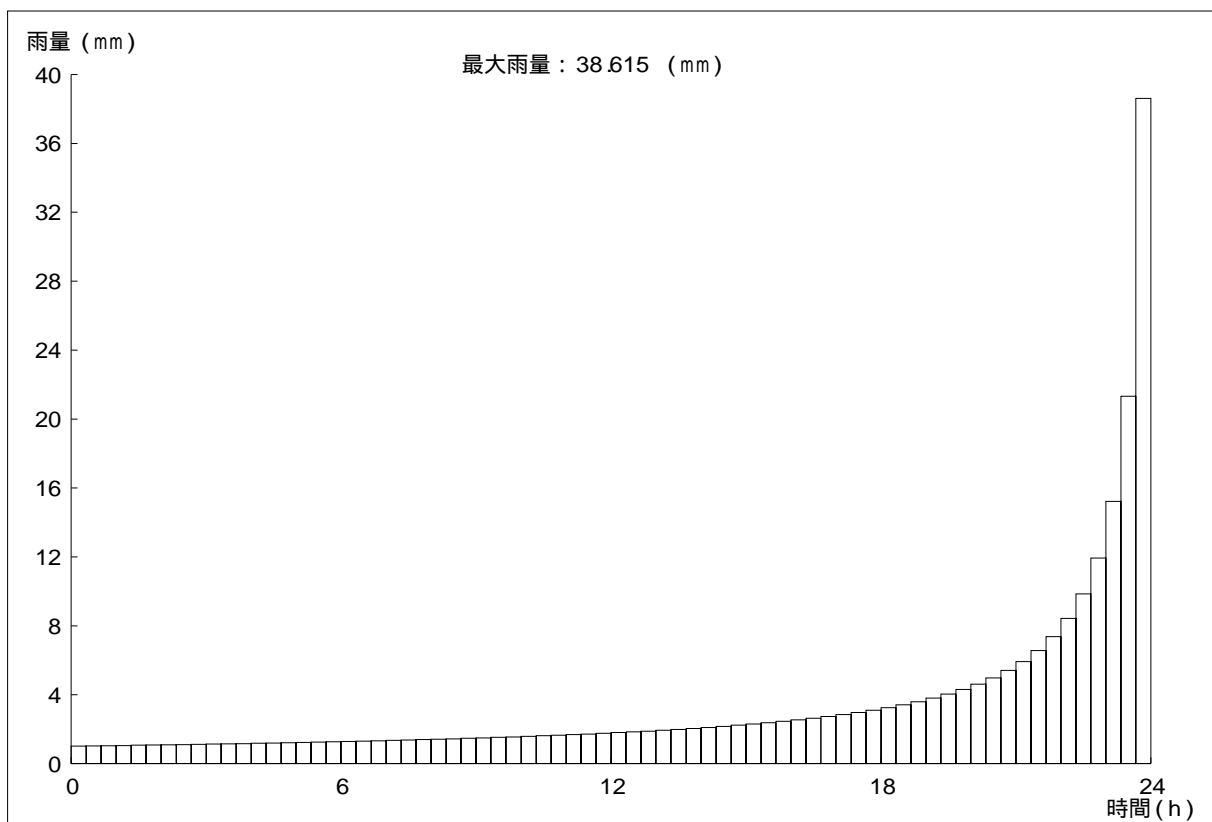
| 時間<br>(時:分) | 降雨強度<br>I(mm/hr) | 降雨量<br>R(mm) | 流量<br>Q(m <sup>3</sup> /s) |
|-------------|------------------|--------------|----------------------------|
| 8:20        | 4.259            | 1.420        | 2.100                      |
| 8:40        | 4.334            | 1.445        | 2.137                      |
| 9:00        | 4.412            | 1.471        | 2.175                      |
| 9:20        | 4.493            | 1.498        | 2.215                      |
| 9:40        | 4.577            | 1.526        | 2.257                      |
| 10:00       | 4.666            | 1.555        | 2.300                      |
| 10:20       | 4.758            | 1.586        | 2.346                      |
| 10:40       | 4.854            | 1.618        | 2.393                      |
| 11:00       | 4.955            | 1.652        | 2.443                      |
| 11:20       | 5.061            | 1.687        | 2.495                      |
| 11:40       | 5.172            | 1.724        | 2.550                      |
| 12:00       | 5.289            | 1.763        | 2.608                      |
| 12:20       | 5.411            | 1.804        | 2.668                      |
| 12:40       | 5.541            | 1.847        | 2.732                      |
| 13:00       | 5.677            | 1.892        | 2.799                      |
| 13:20       | 5.821            | 1.940        | 2.870                      |
| 13:40       | 5.974            | 1.991        | 2.946                      |
| 14:00       | 6.136            | 2.045        | 3.025                      |
| 14:20       | 6.308            | 2.103        | 3.110                      |
| 14:40       | 6.491            | 2.164        | 3.201                      |
| 15:00       | 6.687            | 2.229        | 3.297                      |
| 15:20       | 6.896            | 2.299        | 3.400                      |
| 15:40       | 7.121            | 2.374        | 3.511                      |
| 16:00       | 7.362            | 2.454        | 3.630                      |
| 16:20       | 7.622            | 2.541        | 3.758                      |
| 16:40       | 7.904            | 2.635        | 3.897                      |
| 17:00       | 8.209            | 2.736        | 4.048                      |
| 17:20       | 8.543            | 2.848        | 4.212                      |
| 17:40       | 8.907            | 2.969        | 4.392                      |
| 18:00       | 9.308            | 3.103        | 4.589                      |
| 18:20       | 9.750            | 3.250        | 4.808                      |
| 18:40       | 10.242           | 3.414        | 5.050                      |
| 19:00       | 10.792           | 3.597        | 5.321                      |
| 19:20       | 11.410           | 3.803        | 5.626                      |
| 19:40       | 12.112           | 4.037        | 5.972                      |
| 20:00       | 12.915           | 4.305        | 6.368                      |
| 20:20       | 13.844           | 4.615        | 6.826                      |
| 20:40       | 14.930           | 4.977        | 7.362                      |
| 21:00       | 16.219           | 5.406        | 7.997                      |
| 21:20       | 17.775           | 5.925        | 8.764                      |
| 21:40       | 19.692           | 6.564        | 9.709                      |
| 22:00       | 22.112           | 7.371        | 10.903                     |
| 22:20       | 25.271           | 8.424        | 12.460                     |
| 22:40       | 29.574           | 9.858        | 14.582                     |
| 23:00       | 35.799           | 11.933       | 17.651                     |
| 23:20       | 45.663           | 15.221       | 22.515                     |
| 23:40       | 63.982           | 21.327       | 31.547                     |
| 24:00       | 115.845          | 38.615       | 57.119                     |



## ハイドログラフ



## 時間降雨分布



### 3 浸透施設の設計計算

#### 3-1 浸透 2

|         |            |
|---------|------------|
| 浸透施設名称  | 浸透 2       |
| 浸透量算定方法 | 一定量差し引きモデル |

流出量は次式により求める。

$$Q = Q_n - Q_c$$

ここに、

Q : 流出量 (m<sup>3</sup>/s)

Q<sub>n</sub> : 流入量 (m<sup>3</sup>/s)

Q<sub>c</sub> : 浸透量 (m<sup>3</sup>/s)

ただし、流入量が浸透量を下回る場合は浸透量 = 流入量とする。

浸透量は次式により求める。

$$Q_c = R / 3600$$

ここに、

Q<sub>c</sub> : 浸透量 (m<sup>3</sup>/s)

R : 設計浸透量 (m<sup>3</sup>/hr)

|        | 浸透施設規模<br>R <sub>i</sub> | 単位設計浸透量<br>N <sub>i</sub>   | 設計浸透量<br>R = R <sub>i</sub> · N <sub>i</sub><br>(m <sup>3</sup> /hr) |
|--------|--------------------------|-----------------------------|--|
| 浸透トレンチ | 500 m                    | 0.2600 m <sup>3</sup> /hr/m | 130.0000   |
| 浸透ます   | 200 個                    | 0.5200 m <sup>3</sup> /hr/個 | 104.0000   |
| 合計     |                          |                             | 234.0000   |

したがって次のようになる。

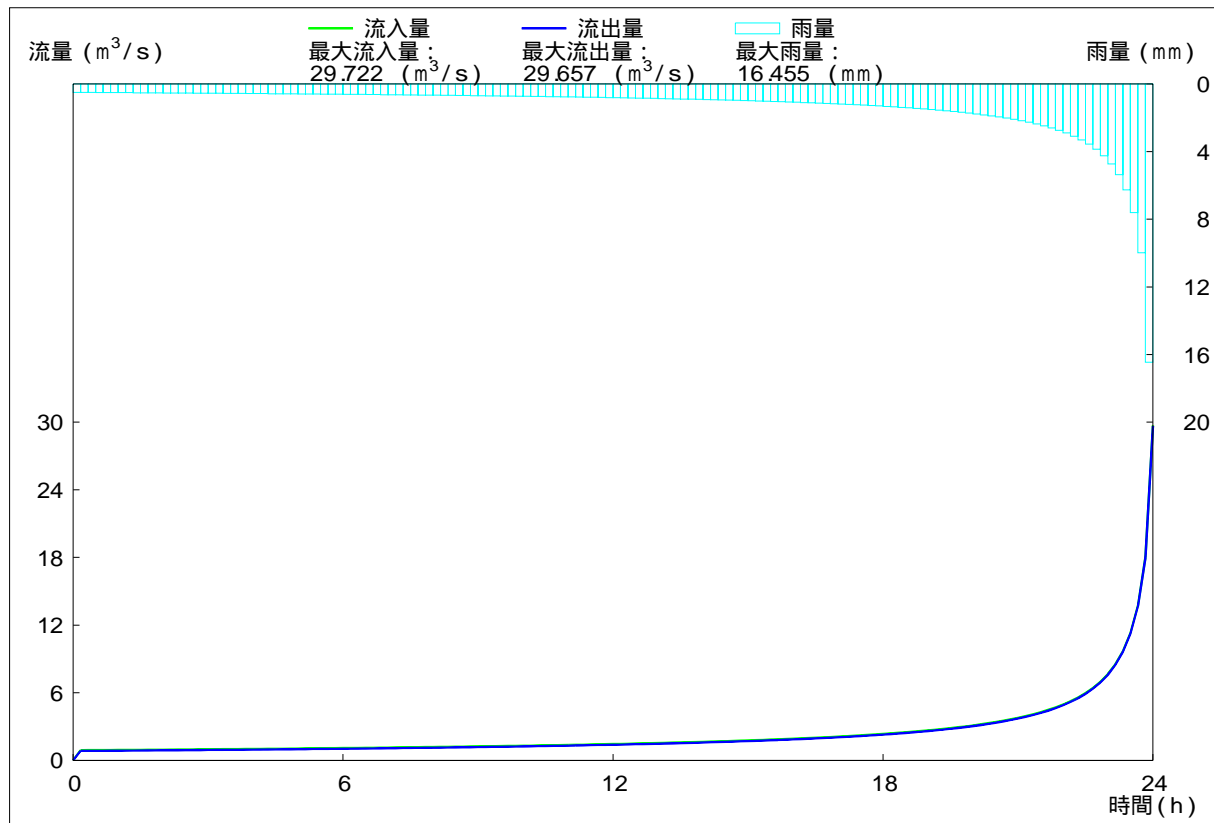
| 時間<br>(時 : 分) | 降雨強度<br>I<br>(mm/hr) | 流入量<br>Q <sub>n</sub><br>(m <sup>3</sup> /s) | 浸透量<br>Q <sub>c</sub><br>(m <sup>3</sup> /s) | 流出量<br>Q<br>(m <sup>3</sup> /s) |
|---------------|----------------------|--|--|---------------------------------|
| 0:00          | 0.0000               | 0.0000                                       | 0.0000                                       | 0.0000                          |
| 0:10          | 3.0090               | 0.9060                                       | 0.0650                                       | 0.8410                          |
| 0:20          | 3.0230               | 0.9100                                       | 0.0650                                       | 0.8450                          |
| 0:30          | 3.0380               | 0.9150                                       | 0.0650                                       | 0.8500                          |
| 0:40          | 3.0530               | 0.9190                                       | 0.0650                                       | 0.8540                          |
| 0:50          | 3.0680               | 0.9240                                       | 0.0650                                       | 0.8590                          |
| 1:00          | 3.0830               | 0.9280                                       | 0.0650                                       | 0.8630                          |
| 1:10          | 3.0990               | 0.9330                                       | 0.0650                                       | 0.8680                          |
| 1:20          | 3.1140               | 0.9380                                       | 0.0650                                       | 0.8730                          |
| 1:30          | 3.1300               | 0.9420                                       | 0.0650                                       | 0.8770                          |
| 1:40          | 3.1460               | 0.9470                                       | 0.0650                                       | 0.8820                          |
| 1:50          | 3.1620               | 0.9520                                       | 0.0650                                       | 0.8870                          |
| 2:00          | 3.1790               | 0.9570                                       | 0.0650                                       | 0.8920                          |
| 2:10          | 3.1960               | 0.9620                                       | 0.0650                                       | 0.8970                          |

| 時間<br>(時:分) | 降雨強度<br>I<br>(mm/hr) | 流入量<br>Qn<br>(m <sup>3</sup> /s) | 浸透量<br>Qc<br>(m <sup>3</sup> /s) | 流出量<br>Q<br>(m <sup>3</sup> /s) |
|-------------|----------------------|----------------------------------|----------------------------------|---------------------------------|
| 2:20        | 3.2130               | 0.9670                           | 0.0650                           | 0.9020                          |
| 2:30        | 3.2300               | 0.9720                           | 0.0650                           | 0.9070                          |
| 2:40        | 3.2470               | 0.9770                           | 0.0650                           | 0.9120                          |
| 2:50        | 3.2650               | 0.9830                           | 0.0650                           | 0.9180                          |
| 3:00        | 3.2820               | 0.9880                           | 0.0650                           | 0.9230                          |
| 3:10        | 3.3010               | 0.9940                           | 0.0650                           | 0.9290                          |
| 3:20        | 3.3190               | 0.9990                           | 0.0650                           | 0.9340                          |
| 3:30        | 3.3370               | 1.0050                           | 0.0650                           | 0.9400                          |
| 3:40        | 3.3560               | 1.0100                           | 0.0650                           | 0.9450                          |
| 3:50        | 3.3750               | 1.0160                           | 0.0650                           | 0.9510                          |
| 4:00        | 3.3950               | 1.0220                           | 0.0650                           | 0.9570                          |
| 4:10        | 3.4140               | 1.0280                           | 0.0650                           | 0.9630                          |
| 4:20        | 3.4340               | 1.0340                           | 0.0650                           | 0.9690                          |
| 4:30        | 3.4550               | 1.0400                           | 0.0650                           | 0.9750                          |
| 4:40        | 3.4750               | 1.0460                           | 0.0650                           | 0.9810                          |
| 4:50        | 3.4960               | 1.0520                           | 0.0650                           | 0.9870                          |
| 5:00        | 3.5170               | 1.0590                           | 0.0650                           | 0.9940                          |
| 5:10        | 3.5380               | 1.0650                           | 0.0650                           | 1.0000                          |
| 5:20        | 3.5600               | 1.0720                           | 0.0650                           | 1.0070                          |
| 5:30        | 3.5820               | 1.0780                           | 0.0650                           | 1.0130                          |
| 5:40        | 3.6050               | 1.0850                           | 0.0650                           | 1.0200                          |
| 5:50        | 3.6270               | 1.0920                           | 0.0650                           | 1.0270                          |
| 6:00        | 3.6510               | 1.0990                           | 0.0650                           | 1.0340                          |
| 6:10        | 3.6740               | 1.1060                           | 0.0650                           | 1.0410                          |
| 6:20        | 3.6980               | 1.1130                           | 0.0650                           | 1.0480                          |
| 6:30        | 3.7220               | 1.1210                           | 0.0650                           | 1.0560                          |
| 6:40        | 3.7470               | 1.1280                           | 0.0650                           | 1.0630                          |
| 6:50        | 3.7720               | 1.1360                           | 0.0650                           | 1.0710                          |
| 7:00        | 3.7980               | 1.1430                           | 0.0650                           | 1.0780                          |
| 7:10        | 3.8230               | 1.1510                           | 0.0650                           | 1.0860                          |
| 7:20        | 3.8500               | 1.1590                           | 0.0650                           | 1.0940                          |
| 7:30        | 3.8770               | 1.1670                           | 0.0650                           | 1.1020                          |
| 7:40        | 3.9040               | 1.1750                           | 0.0650                           | 1.1100                          |
| 7:50        | 3.9320               | 1.1840                           | 0.0650                           | 1.1190                          |
| 8:00        | 3.9600               | 1.1920                           | 0.0650                           | 1.1270                          |
| 8:10        | 3.9890               | 1.2010                           | 0.0650                           | 1.1360                          |
| 8:20        | 4.0180               | 1.2100                           | 0.0650                           | 1.1450                          |
| 8:30        | 4.0480               | 1.2190                           | 0.0650                           | 1.1540                          |
| 8:40        | 4.0780               | 1.2280                           | 0.0650                           | 1.1630                          |
| 8:50        | 4.1090               | 1.2370                           | 0.0650                           | 1.1720                          |
| 9:00        | 4.1410               | 1.2460                           | 0.0650                           | 1.1810                          |
| 9:10        | 4.1730               | 1.2560                           | 0.0650                           | 1.1910                          |
| 9:20        | 4.2050               | 1.2660                           | 0.0650                           | 1.2010                          |
| 9:30        | 4.2390               | 1.2760                           | 0.0650                           | 1.2110                          |
| 9:40        | 4.2730               | 1.2860                           | 0.0650                           | 1.2210                          |
| 9:50        | 4.3070               | 1.2970                           | 0.0650                           | 1.2320                          |
| 10:00       | 4.3430               | 1.3070                           | 0.0650                           | 1.2420                          |
| 10:10       | 4.3790               | 1.3180                           | 0.0650                           | 1.2530                          |
| 10:20       | 4.4160               | 1.3290                           | 0.0650                           | 1.2640                          |
| 10:30       | 4.4530               | 1.3410                           | 0.0650                           | 1.2760                          |
| 10:40       | 4.4920               | 1.3520                           | 0.0650                           | 1.2870                          |
| 10:50       | 4.5310               | 1.3640                           | 0.0650                           | 1.2990                          |
| 11:00       | 4.5710               | 1.3760                           | 0.0650                           | 1.3110                          |
| 11:10       | 4.6120               | 1.3880                           | 0.0650                           | 1.3230                          |
| 11:20       | 4.6540               | 1.4010                           | 0.0650                           | 1.3360                          |
| 11:30       | 4.6970               | 1.4140                           | 0.0650                           | 1.3490                          |
| 11:40       | 4.7410               | 1.4270                           | 0.0650                           | 1.3620                          |

| 時間<br>(時:分) | 降雨強度<br>I<br>(mm/hr) | 流入量<br>Qn<br>(m <sup>3</sup> /s) | 浸透量<br>Qc<br>(m <sup>3</sup> /s) | 流出量<br>Q<br>(m <sup>3</sup> /s) |
|-------------|----------------------|----------------------------------|----------------------------------|---------------------------------|
| 11:50       | 4.7860               | 1.4410                           | 0.0650                           | 1.3760                          |
| 12:00       | 4.8320               | 1.4550                           | 0.0650                           | 1.3900                          |
| 12:10       | 4.8790               | 1.4690                           | 0.0650                           | 1.4040                          |
| 12:20       | 4.9270               | 1.4830                           | 0.0650                           | 1.4180                          |
| 12:30       | 4.9760               | 1.4980                           | 0.0650                           | 1.4330                          |
| 12:40       | 5.0270               | 1.5130                           | 0.0650                           | 1.4480                          |
| 12:50       | 5.0780               | 1.5290                           | 0.0650                           | 1.4640                          |
| 13:00       | 5.1320               | 1.5450                           | 0.0650                           | 1.4800                          |
| 13:10       | 5.1860               | 1.5610                           | 0.0650                           | 1.4960                          |
| 13:20       | 5.2420               | 1.5780                           | 0.0650                           | 1.5130                          |
| 13:30       | 5.3000               | 1.5950                           | 0.0650                           | 1.5300                          |
| 13:40       | 5.3590               | 1.6130                           | 0.0650                           | 1.5480                          |
| 13:50       | 5.4190               | 1.6310                           | 0.0650                           | 1.5660                          |
| 14:00       | 5.4820               | 1.6500                           | 0.0650                           | 1.5850                          |
| 14:10       | 5.5460               | 1.6700                           | 0.0650                           | 1.6050                          |
| 14:20       | 5.6120               | 1.6890                           | 0.0650                           | 1.6240                          |
| 14:30       | 5.6800               | 1.7100                           | 0.0650                           | 1.6450                          |
| 14:40       | 5.7500               | 1.7310                           | 0.0650                           | 1.6660                          |
| 14:50       | 5.8220               | 1.7530                           | 0.0650                           | 1.6880                          |
| 15:00       | 5.8970               | 1.7750                           | 0.0650                           | 1.7100                          |
| 15:10       | 5.9740               | 1.7980                           | 0.0650                           | 1.7330                          |
| 15:20       | 6.0530               | 1.8220                           | 0.0650                           | 1.7570                          |
| 15:30       | 6.1350               | 1.8470                           | 0.0650                           | 1.7820                          |
| 15:40       | 6.2200               | 1.8720                           | 0.0650                           | 1.8070                          |
| 15:50       | 6.3070               | 1.8990                           | 0.0650                           | 1.8340                          |
| 16:00       | 6.3980               | 1.9260                           | 0.0650                           | 1.8610                          |
| 16:10       | 6.4920               | 1.9540                           | 0.0650                           | 1.8890                          |
| 16:20       | 6.5890               | 1.9840                           | 0.0650                           | 1.9190                          |
| 16:30       | 6.6900               | 2.0140                           | 0.0650                           | 1.9490                          |
| 16:40       | 6.7950               | 2.0460                           | 0.0650                           | 1.9810                          |
| 16:50       | 6.9040               | 2.0780                           | 0.0650                           | 2.0130                          |
| 17:00       | 7.0180               | 2.1130                           | 0.0650                           | 2.0480                          |
| 17:10       | 7.1360               | 2.1480                           | 0.0650                           | 2.0830                          |
| 17:20       | 7.2590               | 2.1850                           | 0.0650                           | 2.1200                          |
| 17:30       | 7.3870               | 2.2240                           | 0.0650                           | 2.1590                          |
| 17:40       | 7.5210               | 2.2640                           | 0.0650                           | 2.1990                          |
| 17:50       | 7.6610               | 2.3060                           | 0.0650                           | 2.2410                          |
| 18:00       | 7.8070               | 2.3500                           | 0.0650                           | 2.2850                          |
| 18:10       | 7.9600               | 2.3960                           | 0.0650                           | 2.3310                          |
| 18:20       | 8.1210               | 2.4450                           | 0.0650                           | 2.3800                          |
| 18:30       | 8.2900               | 2.4960                           | 0.0650                           | 2.4310                          |
| 18:40       | 8.4680               | 2.5490                           | 0.0650                           | 2.4840                          |
| 18:50       | 8.6560               | 2.6060                           | 0.0650                           | 2.5410                          |
| 19:00       | 8.8530               | 2.6650                           | 0.0650                           | 2.6000                          |
| 19:10       | 9.0620               | 2.7280                           | 0.0650                           | 2.6630                          |
| 19:20       | 9.2840               | 2.7950                           | 0.0650                           | 2.7300                          |
| 19:30       | 9.5190               | 2.8650                           | 0.0650                           | 2.8000                          |
| 19:40       | 9.7680               | 2.9410                           | 0.0650                           | 2.8760                          |
| 19:50       | 10.0350              | 3.0210                           | 0.0650                           | 2.9560                          |
| 20:00       | 10.3190              | 3.1070                           | 0.0650                           | 3.0420                          |
| 20:10       | 10.6240              | 3.1980                           | 0.0650                           | 3.1330                          |
| 20:20       | 10.9510              | 3.2970                           | 0.0650                           | 3.2320                          |
| 20:30       | 11.3040              | 3.4030                           | 0.0650                           | 3.3380                          |
| 20:40       | 11.6860              | 3.5180                           | 0.0650                           | 3.4530                          |
| 20:50       | 12.0990              | 3.6420                           | 0.0650                           | 3.5770                          |
| 21:00       | 12.5500              | 3.7780                           | 0.0650                           | 3.7130                          |
| 21:10       | 13.0440              | 3.9270                           | 0.0650                           | 3.8620                          |

| 時間<br>(時:分) | 降雨強度<br>I<br>(mm/hr) | 流入量<br>Qn<br>(m <sup>3</sup> /s) | 浸透量<br>Qc<br>(m <sup>3</sup> /s) | 流出量<br>Q<br>(m <sup>3</sup> /s) |
|-------------|----------------------|----------------------------------|----------------------------------|---------------------------------|
| 21:20       | 13.5870              | 4.0900                           | 0.0650                           | 4.0250                          |
| 21:30       | 14.1870              | 4.2710                           | 0.0650                           | 4.2060                          |
| 21:40       | 14.8550              | 4.4720                           | 0.0650                           | 4.4070                          |
| 21:50       | 15.6040              | 4.6970                           | 0.0650                           | 4.6320                          |
| 22:00       | 16.4490              | 4.9520                           | 0.0650                           | 4.8870                          |
| 22:10       | 17.4130              | 5.2420                           | 0.0650                           | 5.1770                          |
| 22:20       | 18.5230              | 5.5760                           | 0.0650                           | 5.5110                          |
| 22:30       | 19.8170              | 5.9660                           | 0.0650                           | 5.9010                          |
| 22:40       | 21.3500              | 6.4270                           | 0.0650                           | 6.3620                          |
| 22:50       | 23.1990              | 6.9840                           | 0.0650                           | 6.9190                          |
| 23:00       | 25.4800              | 7.6710                           | 0.0650                           | 7.6060                          |
| 23:10       | 28.3770              | 8.5430                           | 0.0650                           | 8.4780                          |
| 23:20       | 32.2020              | 9.6940                           | 0.0650                           | 9.6290                          |
| 23:30       | 37.5380              | 11.3000                          | 0.0650                           | 11.2350                         |
| 23:40       | 45.6350              | 13.7380                          | 0.0650                           | 13.6730                         |
| 23:50       | 59.9090              | 18.0350                          | 0.0650                           | 17.9700                         |
| 24:00       | 98.7290              | 29.7220                          | 0.0650                           | 29.6570                         |

## ハイドログラフ (流入と流出) と時間降雨分布



## 3-2 浸透 1

|         |         |
|---------|---------|
| 浸透施設名称  | 浸透 1    |
| 浸透量算定方法 | 有効降雨モデル |

流出量は次式により求める。

$$Q = 1 / 360 \times I_c \cdot A$$

ここに、

- Q : 流出量 (m<sup>3</sup>/s)  
 I<sub>c</sub> : 浸透を考慮した有効降雨強度 (mm/hr)  
 A : 集水面積 (ha)

浸透を考慮した有効降雨強度は次式により求める。

$$I_c = f \cdot I - F_c$$

ここに、

- I<sub>c</sub> : 浸透を考慮した有効降雨強度 (mm/20min)  
 f : 流出係数  
 I : 降雨強度 (mm/20min)  
 F<sub>c</sub> : 浸透強度 (mm/20min)  
 ただし、有効降雨強度(f・I)が浸透強度(F<sub>c</sub>)を下回る場合はI<sub>c</sub>=0とする。

浸透強度は次式により求める。

$$F_c = R / A / 10$$

ここに、

- F<sub>c</sub> : 浸透強度 (mm/hr)  
 R : 設計浸透量 (m<sup>3</sup>/hr)  
 A : 集水面積 (ha)

したがって次のようになる。

|        | 浸透施設規模<br>R <sub>i</sub> | 単位設計浸透量<br>N <sub>i</sub>                | 設計浸透量<br>R = R <sub>i</sub> ・N <sub>i</sub><br>(m <sup>3</sup> /hr) |
|--------|--------------------------|--|---|
| 浸透トレンチ | 900 m                    | 0.2600 m <sup>3</sup> /hr/m              | 234.0000  |
| 浸透ます   | 100 個                    | 0.5200 m <sup>3</sup> /hr/個              | 52.0000   |
| 透水性舗装  | 5000 m <sup>2</sup>      | 0.0050 m <sup>3</sup> /hr/m <sup>2</sup> | 25.0000   |
| 合計     |                          |  | 311.0000  |

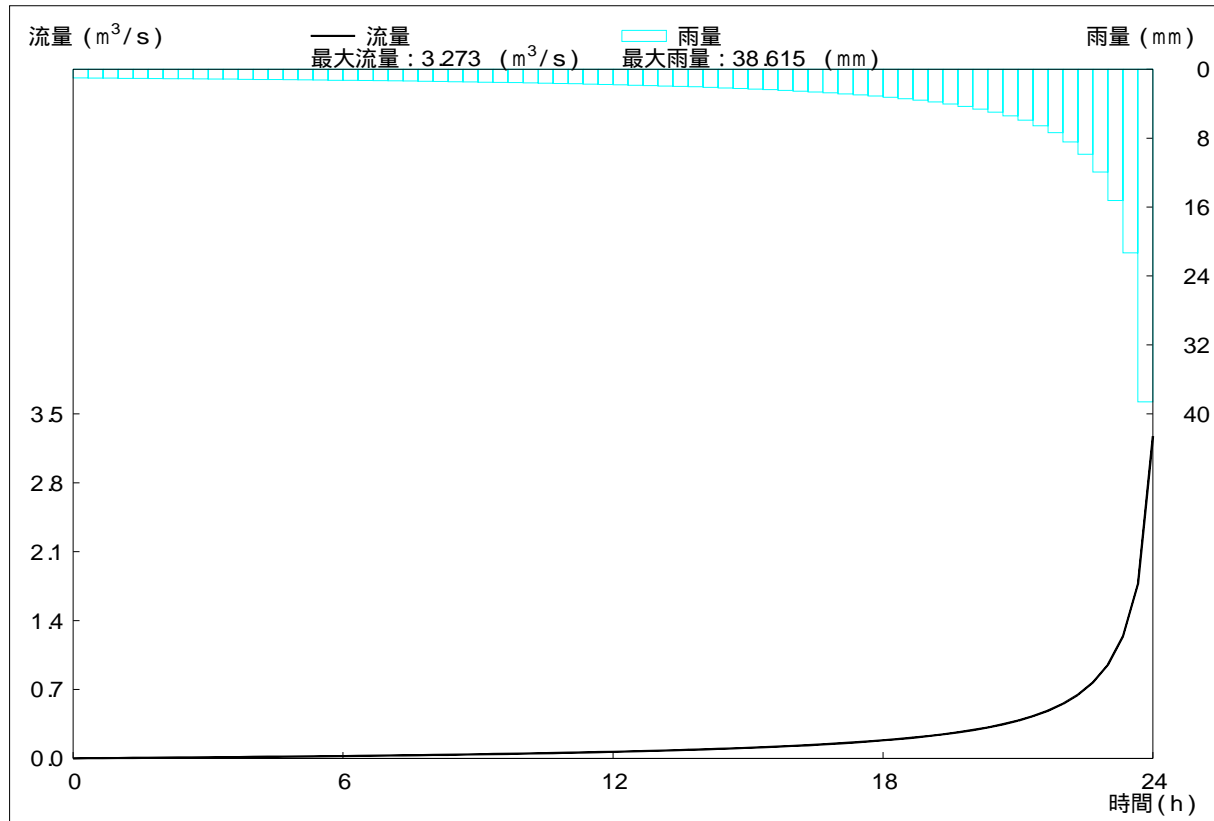
$$\begin{aligned}
 F_c &= R / A / 10 \\
 &= 311.0000 / 11.600 / 10 \\
 &= 2.6810 \text{ (mm/hr)} \\
 &= 0.8937 \text{ (mm/20min)}
 \end{aligned}$$

| 時間<br>(時：分) | 降雨強度<br>I<br>(mm/20min) | 有効降雨強度<br>f・I<br>(mm/20min) | 浸透を考慮<br>した有効降<br>雨強度 I <sub>c</sub><br>(mm/20min) | 流出量<br>Q<br>(m <sup>3</sup> /s) |
|-------------|-------------------------|-----------------------------|--|---------------------------------|
| 0:00        | 0.0000                  | 0.0000                      | 0.0000   | 0.0000                          |
| 0:20        | 1.0180                  | 0.9162                      | 0.0225   | 0.0022                          |
| 0:40        | 1.0297                  | 0.9267                      | 0.0330   | 0.0032                          |
| 1:00        | 1.0417                  | 0.9375                      | 0.0438   | 0.0042                          |
| 1:20        | 1.0540                  | 0.9486                      | 0.0549   | 0.0053                          |
| 1:40        | 1.0667                  | 0.9600                      | 0.0663   | 0.0064                          |
| 2:00        | 1.0793                  | 0.9714                      | 0.0777   | 0.0075                          |
| 2:20        | 1.0927                  | 0.9834                      | 0.0897   | 0.0087                          |
| 2:40        | 1.1067                  | 0.9960                      | 0.1023   | 0.0099                          |
| 3:00        | 1.1207                  | 1.0086                      | 0.1149   | 0.0111                          |
| 3:20        | 1.1350                  | 1.0215                      | 0.1278   | 0.0124                          |
| 3:40        | 1.1500                  | 1.0350                      | 0.1413   | 0.0137                          |
| 4:00        | 1.1653                  | 1.0488                      | 0.1551   | 0.0150                          |
| 4:20        | 1.1813                  | 1.0632                      | 0.1695   | 0.0164                          |
| 4:40        | 1.1977                  | 1.0779                      | 0.1842   | 0.0178                          |
| 5:00        | 1.2147                  | 1.0932                      | 0.1995   | 0.0193                          |
| 5:20        | 1.2320                  | 1.1088                      | 0.2151   | 0.0208                          |
| 5:40        | 1.2503                  | 1.1253                      | 0.2316   | 0.0224                          |
| 6:00        | 1.2687                  | 1.1418                      | 0.2481   | 0.0240                          |
| 6:20        | 1.2880                  | 1.1592                      | 0.2655   | 0.0257                          |
| 6:40        | 1.3080                  | 1.1772                      | 0.2835   | 0.0274                          |
| 7:00        | 1.3287                  | 1.1958                      | 0.3021   | 0.0292                          |
| 7:20        | 1.3503                  | 1.2153                      | 0.3216   | 0.0311                          |
| 7:40        | 1.3727                  | 1.2354                      | 0.3417   | 0.0330                          |
| 8:00        | 1.3957                  | 1.2561                      | 0.3624   | 0.0350                          |
| 8:20        | 1.4197                  | 1.2777                      | 0.3840   | 0.0371                          |
| 8:40        | 1.4447                  | 1.3002                      | 0.4065   | 0.0393                          |
| 9:00        | 1.4707                  | 1.3236                      | 0.4299   | 0.0416                          |
| 9:20        | 1.4977                  | 1.3479                      | 0.4542   | 0.0439                          |
| 9:40        | 1.5257                  | 1.3731                      | 0.4794   | 0.0463                          |
| 10:00       | 1.5553                  | 1.3998                      | 0.5061   | 0.0489                          |
| 10:20       | 1.5860                  | 1.4274                      | 0.5337   | 0.0516                          |
| 10:40       | 1.6180                  | 1.4562                      | 0.5625   | 0.0544                          |
| 11:00       | 1.6517                  | 1.4865                      | 0.5928   | 0.0573                          |
| 11:20       | 1.6870                  | 1.5183                      | 0.6246   | 0.0604                          |
| 11:40       | 1.7240                  | 1.5516                      | 0.6579   | 0.0636                          |
| 12:00       | 1.7630                  | 1.5867                      | 0.6930   | 0.0670                          |
| 12:20       | 1.8037                  | 1.6233                      | 0.7296   | 0.0705                          |
| 12:40       | 1.8470                  | 1.6623                      | 0.7686   | 0.0743                          |
| 13:00       | 1.8923                  | 1.7031                      | 0.8094   | 0.0782                          |
| 13:20       | 1.9403                  | 1.7463                      | 0.8526   | 0.0824                          |
| 13:40       | 1.9913                  | 1.7922                      | 0.8985   | 0.0869                          |
| 14:00       | 2.0453                  | 1.8408                      | 0.9471   | 0.0916                          |
| 14:20       | 2.1027                  | 1.8924                      | 0.9987   | 0.0965                          |
| 14:40       | 2.1637                  | 1.9473                      | 1.0536   | 0.1019                          |
| 15:00       | 2.2290                  | 2.0061                      | 1.1124   | 0.1075                          |
| 15:20       | 2.2987                  | 2.0688                      | 1.1751   | 0.1136                          |
| 15:40       | 2.3737                  | 2.1363                      | 1.2426   | 0.1201                          |
| 16:00       | 2.4540                  | 2.2086                      | 1.3149   | 0.1271                          |

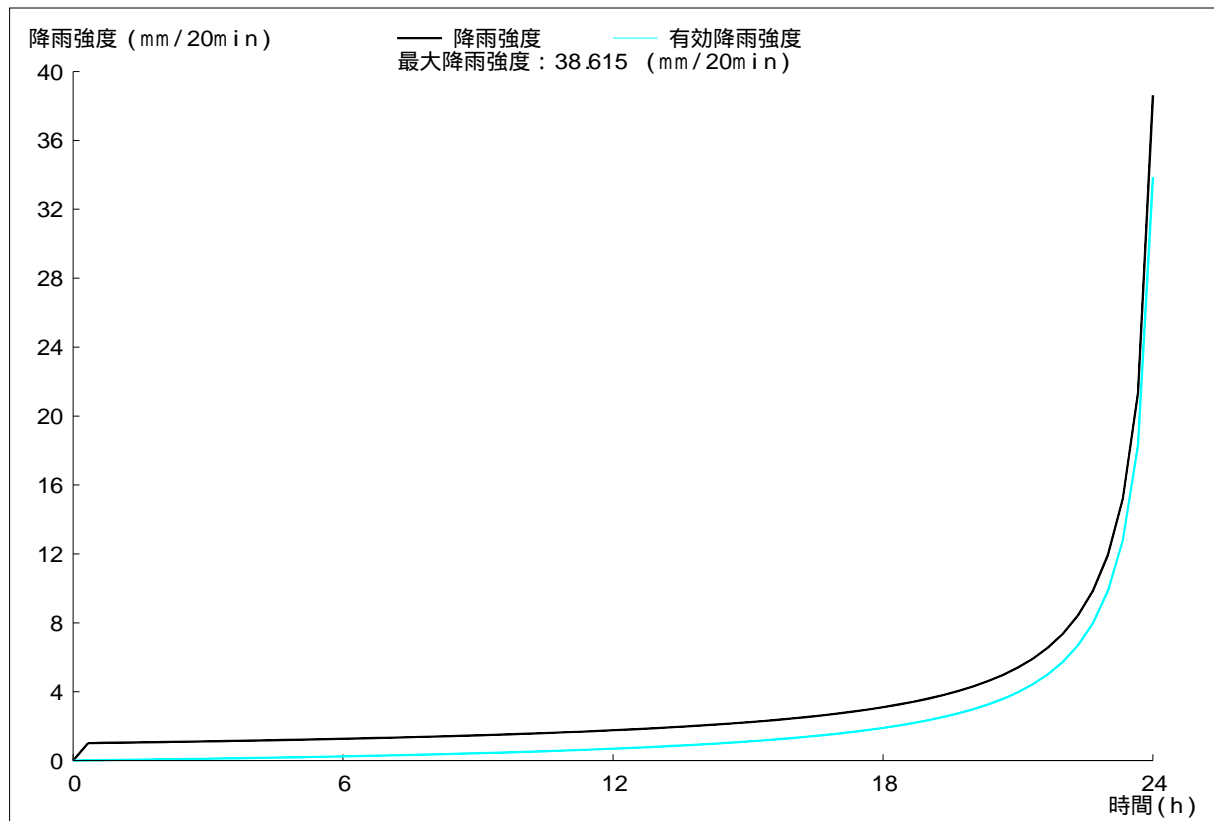


| 時間<br>(時：分) | 降雨強度<br>I<br>(mm/20min) | 有効降雨強度<br>f・I<br>(mm/20min) | 浸透を考慮<br>した有効降<br>雨強度 I <sub>c</sub><br>(mm/20min) | 流出量<br>Q<br>(m <sup>3</sup> /s) |
|-------------|-------------------------|-----------------------------|--|---------------------------------|
| 16:20       | 2.5407                  | 2.2866                      | 1.3929   | 0.1346                          |
| 16:40       | 2.6347                  | 2.3712                      | 1.4775   | 0.1428                          |
| 17:00       | 2.7363                  | 2.4627                      | 1.5690   | 0.1517                          |
| 17:20       | 2.8477                  | 2.5629                      | 1.6692   | 0.1614                          |
| 17:40       | 2.9690                  | 2.6721                      | 1.7784   | 0.1719                          |
| 18:00       | 3.1027                  | 2.7924                      | 1.8987   | 0.1835                          |
| 18:20       | 3.2500                  | 2.9250                      | 2.0313   | 0.1964                          |
| 18:40       | 3.4140                  | 3.0726                      | 2.1789   | 0.2106                          |
| 19:00       | 3.5973                  | 3.2376                      | 2.3439   | 0.2266                          |
| 19:20       | 3.8033                  | 3.4230                      | 2.5293   | 0.2445                          |
| 19:40       | 4.0373                  | 3.6336                      | 2.7399   | 0.2649                          |
| 20:00       | 4.3050                  | 3.8745                      | 2.9808   | 0.2881                          |
| 20:20       | 4.6147                  | 4.1532                      | 3.2595   | 0.3151                          |
| 20:40       | 4.9767                  | 4.4790                      | 3.5853   | 0.3466                          |
| 21:00       | 5.4063                  | 4.8657                      | 3.9720   | 0.3840                          |
| 21:20       | 5.9250                  | 5.3325                      | 4.4388   | 0.4291                          |
| 21:40       | 6.5640                  | 5.9076                      | 5.0139   | 0.4847                          |
| 22:00       | 7.3707                  | 6.6336                      | 5.7399   | 0.5549                          |
| 22:20       | 8.4237                  | 7.5813                      | 6.6876   | 0.6465                          |
| 22:40       | 9.8580                  | 8.8722                      | 7.9785   | 0.7713                          |
| 23:00       | 11.9330                 | 10.7397                     | 9.8460   | 0.9518                          |
| 23:20       | 15.2210                 | 13.6989                     | 12.8052  | 1.2378                          |
| 23:40       | 21.3273                 | 19.1946                     | 18.3009  | 1.7691                          |
| 24:00       | 38.6150                 | 34.7535                     | 33.8598  | 3.2731                          |

### ハイドログラフ（流出）と時間降雨分布



### 浸透を考慮した有効降雨強度と降雨強度



## 4 貯留施設の設計計算

## 4-1 貯留 1

|        |      |
|--------|------|
| 貯留施設名称 | 貯留 1 |
| 流入ハイドロ | 流域 1 |
| 上流施設   |      |

## 4-1-1 設計条件

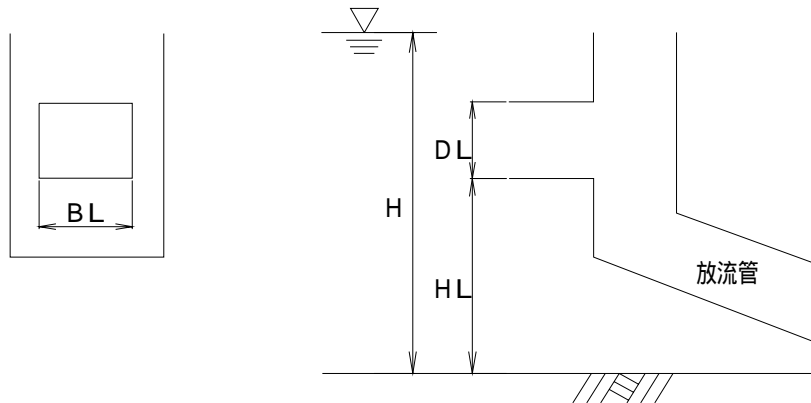
|            |     |        |
|------------|-----|--------|
| 最大制限水深     | (m) | 10.000 |
| 池底の標高      | (m) | 0.000  |
| 収束計算上の時間間隔 | (s) | 5      |
| 計算開始水深     | (m) | 0.000  |
| 計算終了水深     | (m) | 0.100  |

## 4-1-2 貯留施設形状

| No. | 水深<br>(m) | 容量<br>(m <sup>3</sup> ) |
|-----|-----------|-------------------------|
| 1   | 0.000     | 0.000                   |
| 2   | 2.000     | 158.000                 |
| 3   | 2.010     | 251.800                 |
| 4   | 3.000     | 19863.800               |
| 5   | 3.010     | 20177.900               |
| 6   | 4.000     | 64025.200               |
| 7   | 5.000     | 111865.200              |
| 8   | 6.000     | 162200.200              |
| 9   | 7.000     | 215345.200              |
| 10  | 8.000     | 271390.200              |
| 11  | 9.000     | 330165.200              |
| 12  | 10.000    | 391770.200              |

## 4-1-3 放流施設

種類： 放流管(1)



| 高さ<br>HL (m) | オリフィス<br>幅 BL (m) | オリフィス<br>高さ DL (m) | 流量係数<br>C | 流量係数<br>1.7~1.8 |
|--------------|-------------------|--------------------|-----------|-----------------|
| 0.000        | 0.900             | 0.900              | 0.600     | 1.800           |

$$1) H = HL + 1.2 \cdot DL$$

$$Q = 1.7 \sim 1.8 \cdot BL \cdot (H - HL)^{3/2}$$

$$2) HL + 1.2 \cdot DL < H < HL + 1.8 \cdot DL$$

1) と 3) を 直線補完

$$3) HL + 1.8 \cdot DL \leq H$$

$$Q = C \cdot DL \cdot BL \cdot \sqrt{2g \cdot (H - HL - 0.5 \cdot DL)}$$

ここに、

Q : 放流量 (m<sup>3</sup>/s)

C : 流量係数 ベルマウス有 0.85 ~ 0.90

ベルマウス無 0.6

g : 重力加速度(=9.8) (m/s<sup>2</sup>)

## 4-1-4 設計堆積土砂量

設計堆積土砂量は次式により各年の設計堆積土砂量を求め、その最大値を累計する。

$$l_j = l \times \left[ a_j + \sum_{i=1}^{j-1} \left\{ (1/2)^i \times a_{(j-i)} \right\} \right]$$

ただし、 $j = 1$  の時  $l_1 = l \times a_1$

ここに、

$l_j$  :  $j$ 年目の堆積土砂量 ( $m^3$ ) ( $j = 2 \sim N+1$ )

$l$  : 設計値 ( $m^3/ha \cdot 年$ )

$N$  : おおむね工事終了までの年数 (年)

$a_j$  :  $j$ 年目の工事工区面積 (ha)

したがって次のようになる。

|     | 工事工区面積<br>$a_j$ (ha) | 設計堆積土砂量<br>$l_j$ ( $m^3$ ) |
|-----|----------------------|----------------------------|
| 1年目 | 30.000               | 4500.000                   |
| 2年目 | 50.000               | 9750.000                   |
| 3年目 | 20.000               | 7875.000                   |
| 4年目 | 0                    | 3937.500                   |

| 設計堆積年数<br>$N$ (年) | 設計堆積土砂量<br>$V$ ( $m^3$ ) |
|-------------------|--------------------------|
| 1                 | 9750.000                 |
| 2                 | 17625.000                |
| 3                 | 21562.500                |

## 4-1-5 洪水調節計算結果

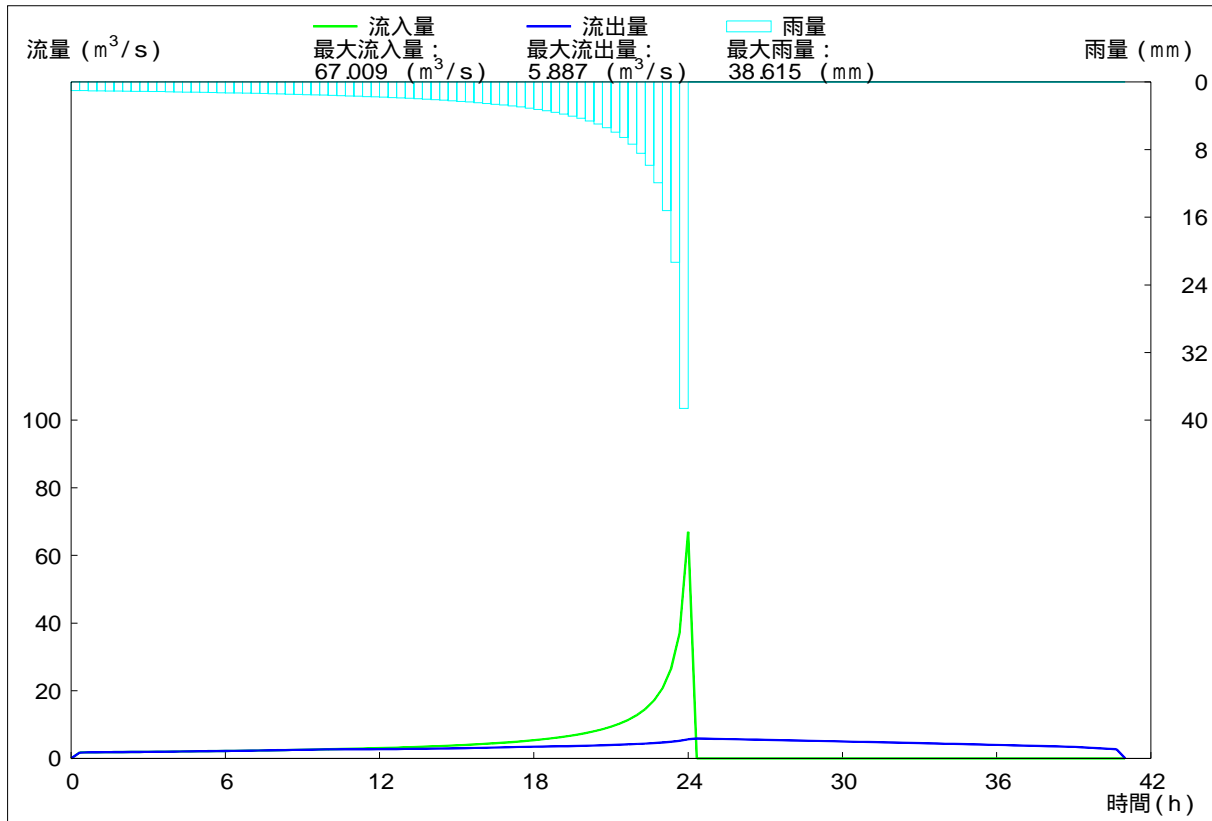
| 時間<br>(時:分) | 雨量<br>R(mm) | 流入量<br>I(m <sup>3</sup> /s) | 流出量<br>Q(m <sup>3</sup> /s) | 水位<br>H(m) | 貯水量<br>V(m <sup>3</sup> ) |
|-------------|-------------|-----------------------------|-----------------------------|------------|---------------------------|
| 0:00        | 0.0000      | 0.000                       | 0.000                       | 0.000      | 0.000                     |
| 0:20        | 1.0180      | 1.767                       | 1.720                       | 1.041      | 82.206                    |
| 0:40        | 1.0300      | 1.787                       | 1.786                       | 1.067      | 84.323                    |
| 1:00        | 1.0420      | 1.808                       | 1.807                       | 1.076      | 84.982                    |
| 1:20        | 1.0540      | 1.829                       | 1.828                       | 1.090      | 86.099                    |
| 1:40        | 1.0670      | 1.851                       | 1.849                       | 1.113      | 87.937                    |
| 2:00        | 1.0790      | 1.873                       | 1.871                       | 1.136      | 89.780                    |
| 2:20        | 1.0930      | 1.896                       | 1.894                       | 1.161      | 91.702                    |
| 2:40        | 1.1070      | 1.920                       | 1.918                       | 1.186      | 93.707                    |
| 3:00        | 1.1210      | 1.945                       | 1.943                       | 1.213      | 95.796                    |
| 3:20        | 1.1350      | 1.970                       | 1.968                       | 1.239      | 97.891                    |
| 3:40        | 1.1500      | 1.996                       | 1.994                       | 1.267      | 100.064                   |
| 4:00        | 1.1650      | 2.022                       | 2.020                       | 1.294      | 102.242                   |
| 4:20        | 1.1810      | 2.050                       | 2.048                       | 1.324      | 104.577                   |
| 4:40        | 1.1980      | 2.078                       | 2.076                       | 1.353      | 106.923                   |
| 5:00        | 1.2150      | 2.108                       | 2.106                       | 1.385      | 109.426                   |
| 5:20        | 1.2320      | 2.138                       | 2.136                       | 1.417      | 111.940                   |
| 5:40        | 1.2500      | 2.169                       | 2.167                       | 1.450      | 114.531                   |
| 6:00        | 1.2690      | 2.202                       | 2.200                       | 1.485      | 117.285                   |
| 6:20        | 1.2880      | 2.235                       | 2.233                       | 1.520      | 120.050                   |
| 6:40        | 1.3080      | 2.270                       | 2.268                       | 1.557      | 122.971                   |
| 7:00        | 1.3290      | 2.306                       | 2.303                       | 1.595      | 125.982                   |
| 7:20        | 1.3500      | 2.343                       | 2.341                       | 1.633      | 129.032                   |
| 7:40        | 1.3730      | 2.382                       | 2.379                       | 1.673      | 132.160                   |
| 8:00        | 1.3960      | 2.422                       | 2.419                       | 1.714      | 135.426                   |
| 8:20        | 1.4200      | 2.463                       | 2.460                       | 1.757      | 138.830                   |
| 8:40        | 1.4450      | 2.507                       | 2.504                       | 1.804      | 142.535                   |
| 9:00        | 1.4710      | 2.552                       | 2.549                       | 1.853      | 146.404                   |
| 9:20        | 1.4980      | 2.599                       | 2.596                       | 1.905      | 150.511                   |
| 9:40        | 1.5260      | 2.648                       | 2.644                       | 1.960      | 154.874                   |
| 10:00       | 1.5550      | 2.699                       | 2.679                       | 2.000      | 162.590                   |
| 10:20       | 1.5860      | 2.752                       | 2.684                       | 2.006      | 215.790                   |
| 10:40       | 1.6180      | 2.808                       | 2.691                       | 2.014      | 326.622                   |
| 11:00       | 1.6520      | 2.866                       | 2.698                       | 2.022      | 498.082                   |
| 11:20       | 1.6870      | 2.927                       | 2.708                       | 2.034      | 730.454                   |
| 11:40       | 1.7240      | 2.992                       | 2.721                       | 2.049      | 1024.801                  |
| 12:00       | 1.7630      | 3.059                       | 2.736                       | 2.067      | 1381.570                  |
| 12:20       | 1.8040      | 3.130                       | 2.754                       | 2.088      | 1801.256                  |
| 12:40       | 1.8470      | 3.205                       | 2.774                       | 2.113      | 2285.542                  |
| 13:00       | 1.8920      | 3.284                       | 2.797                       | 2.140      | 2836.091                  |
| 13:20       | 1.9400      | 3.367                       | 2.823                       | 2.172      | 3454.558                  |
| 13:40       | 1.9910      | 3.456                       | 2.852                       | 2.206      | 4143.775                  |
| 14:00       | 2.0450      | 3.549                       | 2.883                       | 2.245      | 4906.510                  |
| 14:20       | 2.1030      | 3.649                       | 2.916                       | 2.287      | 5746.106                  |
| 14:40       | 2.1640      | 3.755                       | 2.953                       | 2.334      | 6667.008                  |
| 15:00       | 2.2290      | 3.868                       | 2.993                       | 2.385      | 7673.583                  |
| 15:20       | 2.2990      | 3.989                       | 3.035                       | 2.440      | 8771.298                  |
| 15:40       | 2.3740      | 4.119                       | 3.081                       | 2.500      | 9966.689                  |
| 16:00       | 2.4540      | 4.258                       | 3.130                       | 2.566      | 11266.737                 |
| 16:20       | 2.5410      | 4.409                       | 3.182                       | 2.637      | 12680.062                 |
| 16:40       | 2.6350      | 4.572                       | 3.238                       | 2.715      | 14216.848                 |
| 17:00       | 2.7360      | 4.749                       | 3.298                       | 2.799      | 15888.240                 |
| 17:20       | 2.8480      | 4.941                       | 3.362                       | 2.891      | 17706.908                 |
| 17:40       | 2.9690      | 5.152                       | 3.430                       | 2.991      | 19688.215                 |
| 18:00       | 3.1030      | 5.384                       | 3.468                       | 3.048      | 21868.707                 |
| 18:20       | 3.2500      | 5.640                       | 3.505                       | 3.103      | 24299.811                 |
| 18:40       | 3.4140      | 5.924                       | 3.545                       | 3.164      | 27008.978                 |

| 時間<br>(時:分) | 雨量<br>R(mm) | 流入量<br>I(m <sup>3</sup> /s) | 流出量<br>Q(m <sup>3</sup> /s) | 水位<br>H(m) | 貯水量<br>V(m <sup>3</sup> ) |
|-------------|-------------|-----------------------------|-----------------------------|------------|---------------------------|
| 19:00       | 3.5970      | 6.242                       | 3.589                       | 3.232      | 30028.734                 |
| 19:20       | 3.8030      | 6.600                       | 3.638                       | 3.308      | 33398.344                 |
| 19:40       | 4.0370      | 7.006                       | 3.691                       | 3.394      | 37164.936                 |
| 20:00       | 4.3050      | 7.471                       | 3.751                       | 3.489      | 41386.388                 |
| 20:20       | 4.6150      | 8.008                       | 3.816                       | 3.596      | 46134.196                 |
| 20:40       | 4.9770      | 8.636                       | 3.889                       | 3.717      | 51498.097                 |
| 21:00       | 5.4060      | 9.382                       | 3.970                       | 3.855      | 57594.222                 |
| 21:20       | 5.9250      | 10.282                      | 4.061                       | 4.011      | 64574.977                 |
| 21:40       | 6.5640      | 11.390                      | 4.156                       | 4.180      | 72649.717                 |
| 22:00       | 7.3710      | 12.790                      | 4.264                       | 4.378      | 82107.267                 |
| 22:20       | 8.4240      | 14.617                      | 4.390                       | 4.613      | 93360.719                 |
| 22:40       | 9.8580      | 17.106                      | 4.538                       | 4.899      | 107039.954                |
| 23:00       | 11.9330     | 20.707                      | 4.711                       | 5.245      | 124180.329                |
| 23:20       | 15.2210     | 26.413                      | 4.926                       | 5.692      | 146675.264                |
| 23:40       | 21.3270     | 37.009                      | 5.208                       | 6.310      | 178654.937                |
| 24:00       | 38.6150     | 67.009                      | 5.649                       | 7.343      | 234572.811                |
| 24:20       | 0.0000      | 0.000                       | 5.887                       | 7.936      | 267798.206                |
| 24:40       | 0.0000      | 0.000                       | 5.837                       | 7.810      | 260763.664                |
| 25:00       | 0.0000      | 0.000                       | 5.788                       | 7.686      | 253788.596                |
| 25:20       | 0.0000      | 0.000                       | 5.738                       | 7.563      | 246873.002                |
| 25:40       | 0.0000      | 0.000                       | 5.689                       | 7.440      | 240016.881                |
| 26:00       | 0.0000      | 0.000                       | 5.639                       | 7.319      | 233220.233                |
| 26:20       | 0.0000      | 0.000                       | 5.590                       | 7.199      | 226483.059                |
| 26:40       | 0.0000      | 0.000                       | 5.540                       | 7.080      | 219805.359                |
| 27:00       | 0.0000      | 0.000                       | 5.490                       | 6.959      | 213187.306                |
| 27:20       | 0.0000      | 0.000                       | 5.437                       | 6.836      | 206631.237                |
| 27:40       | 0.0000      | 0.000                       | 5.385                       | 6.714      | 200137.887                |
| 28:00       | 0.0000      | 0.000                       | 5.333                       | 6.593      | 193707.256                |
| 28:20       | 0.0000      | 0.000                       | 5.280                       | 6.473      | 187339.344                |
| 28:40       | 0.0000      | 0.000                       | 5.228                       | 6.354      | 181034.151                |
| 29:00       | 0.0000      | 0.000                       | 5.176                       | 6.237      | 174791.677                |
| 29:20       | 0.0000      | 0.000                       | 5.124                       | 6.121      | 168611.922                |
| 29:40       | 0.0000      | 0.000                       | 5.071                       | 6.006      | 162494.885                |
| 30:00       | 0.0000      | 0.000                       | 5.016                       | 5.886      | 156442.153                |
| 30:20       | 0.0000      | 0.000                       | 4.961                       | 5.767      | 150455.637                |
| 30:40       | 0.0000      | 0.000                       | 4.906                       | 5.649      | 144535.341                |
| 31:00       | 0.0000      | 0.000                       | 4.851                       | 5.533      | 138681.266                |
| 31:20       | 0.0000      | 0.000                       | 4.796                       | 5.418      | 132893.411                |
| 31:40       | 0.0000      | 0.000                       | 4.740                       | 5.304      | 127171.776                |
| 32:00       | 0.0000      | 0.000                       | 4.685                       | 5.192      | 121516.361                |
| 32:20       | 0.0000      | 0.000                       | 4.630                       | 5.081      | 115927.167                |
| 32:40       | 0.0000      | 0.000                       | 4.574                       | 4.969      | 110404.315                |
| 33:00       | 0.0000      | 0.000                       | 4.516                       | 4.855      | 104950.206                |
| 33:20       | 0.0000      | 0.000                       | 4.458                       | 4.743      | 99565.770                 |
| 33:40       | 0.0000      | 0.000                       | 4.400                       | 4.632      | 94251.009                 |
| 34:00       | 0.0000      | 0.000                       | 4.342                       | 4.522      | 89005.921                 |
| 34:20       | 0.0000      | 0.000                       | 4.284                       | 4.414      | 83830.507                 |
| 34:40       | 0.0000      | 0.000                       | 4.226                       | 4.307      | 78724.767                 |
| 35:00       | 0.0000      | 0.000                       | 4.168                       | 4.202      | 73688.701                 |
| 35:20       | 0.0000      | 0.000                       | 4.110                       | 4.098      | 68722.309                 |
| 35:40       | 0.0000      | 0.000                       | 4.051                       | 3.995      | 63825.595                 |
| 36:00       | 0.0000      | 0.000                       | 3.989                       | 3.887      | 59001.572                 |
| 36:20       | 0.0000      | 0.000                       | 3.926                       | 3.779      | 54252.807                 |
| 36:40       | 0.0000      | 0.000                       | 3.863                       | 3.674      | 49579.300                 |
| 37:00       | 0.0000      | 0.000                       | 3.801                       | 3.570      | 44981.051                 |
| 37:20       | 0.0000      | 0.000                       | 3.738                       | 3.468      | 40458.061                 |
| 37:40       | 0.0000      | 0.000                       | 3.675                       | 3.367      | 36010.328                 |
| 38:00       | 0.0000      | 0.000                       | 3.612                       | 3.269      | 31637.854                 |

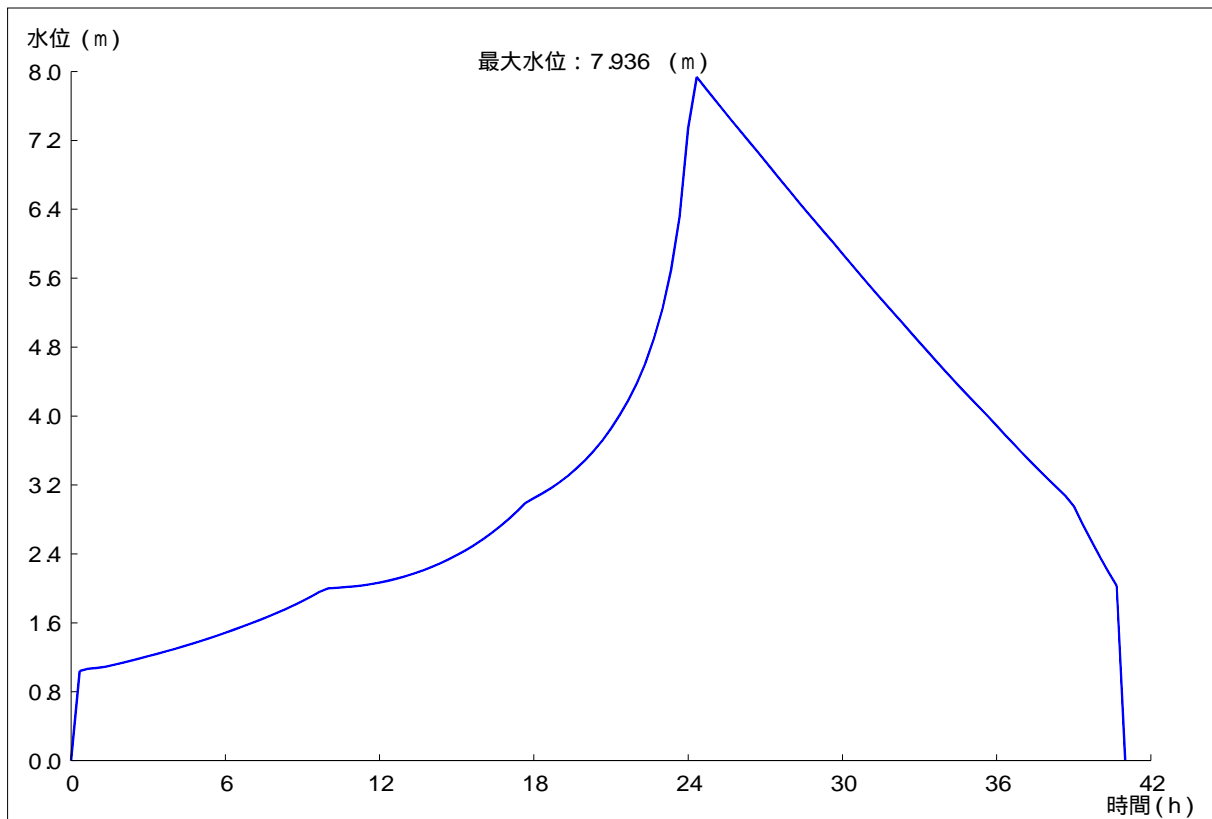
| 時間<br>(時:分) | 雨量<br>R(mm) | 流入量<br>I(m <sup>3</sup> /s) | 流出量<br>Q(m <sup>3</sup> /s) | 水位<br>H(m) | 貯水量<br>V(m <sup>3</sup> ) |
|-------------|-------------|-----------------------------|-----------------------------|------------|---------------------------|
| 38:20       | 0.0000      | 0.000                       | 3.550                       | 3.172      | 27340.638                 |
| 38:40       | 0.0000      | 0.000                       | 3.487                       | 3.076      | 23118.680                 |
| 39:00       | 0.0000      | 0.000                       | 3.405                       | 2.955      | 18974.759                 |
| 39:20       | 0.0000      | 0.000                       | 3.265                       | 2.753      | 14972.308                 |
| 39:40       | 0.0000      | 0.000                       | 3.125                       | 2.560      | 11138.115                 |
| 40:00       | 0.0000      | 0.000                       | 2.985                       | 2.374      | 7472.179                  |
| 40:20       | 0.0000      | 0.000                       | 2.845                       | 2.198      | 3974.500                  |
| 40:40       | 0.0000      | 0.000                       | 2.704                       | 2.030      | 645.079                   |
| 41:00       | 0.0000      | 0.000                       | 0.001                       | 0.008      | 0.644                     |



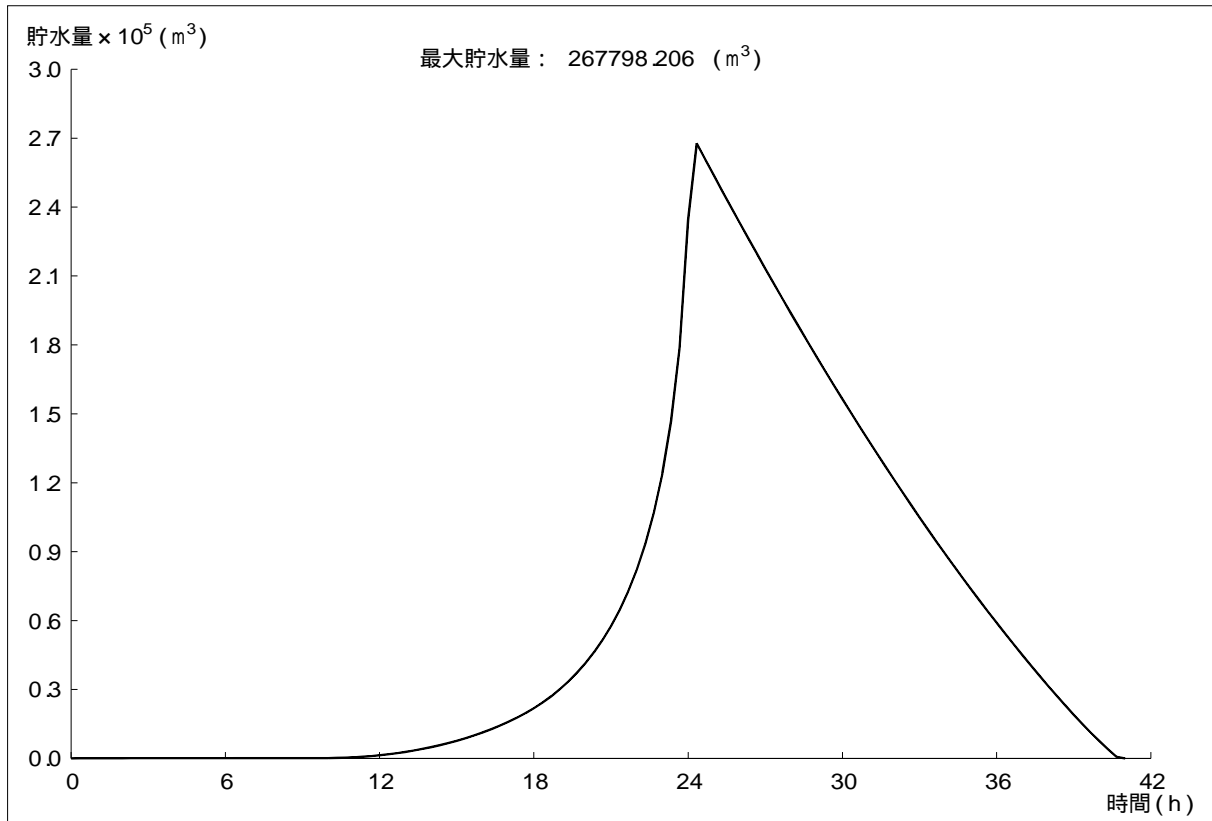
### ハイドログラフ（流入と流出）と時間降雨分布



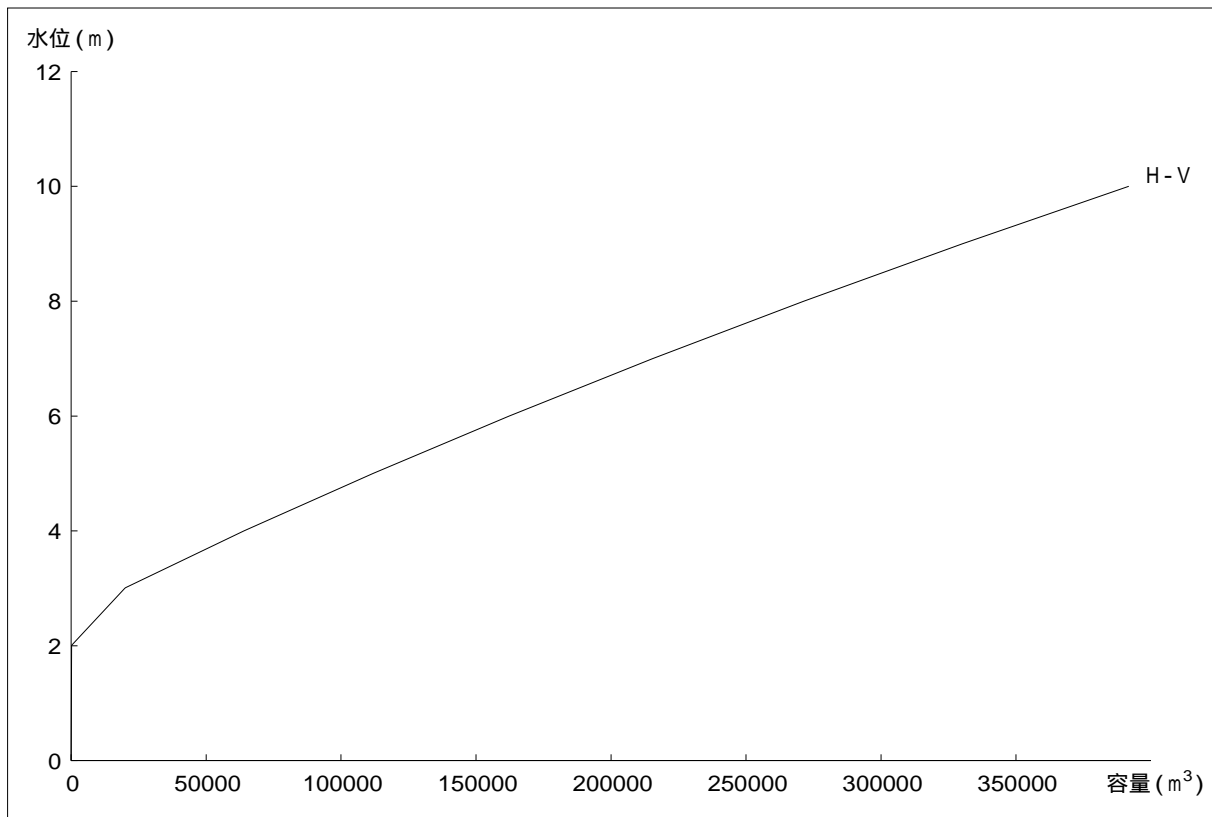
### 水位



## 貯水量



## 水位容量曲線



## 4-2 貯留 2

|        |      |
|--------|------|
| 貯留施設名称 | 貯留 2 |
| 流入ハイドロ |      |
| 上流施設   | 浸透 1 |

## 4-2-1 設計条件

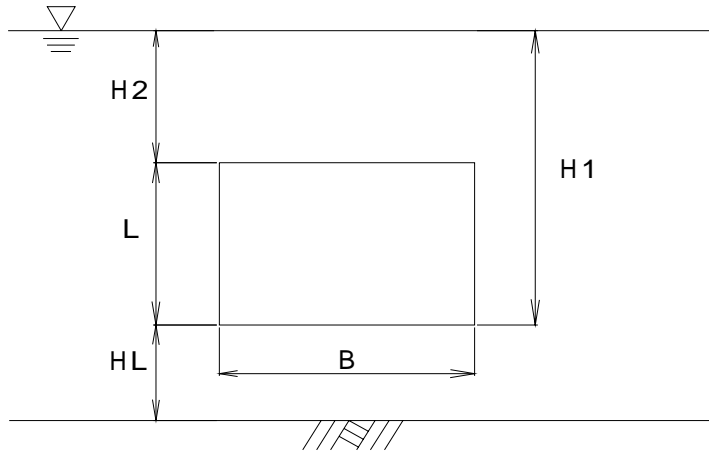
|            |     |        |
|------------|-----|--------|
| 最大制限水深     | (m) | 10.000 |
| 池底の標高      | (m) | 0.000  |
| 収束計算上の時間間隔 | (s) | 5      |
| 計算開始水深     | (m) | 0.000  |
| 計算終了水深     | (m) | 0.100  |

## 4-2-2 貯留施設形状

| No. | 水深<br>(m) | 水面積<br>(m <sup>2</sup> ) | 容量<br>(m <sup>3</sup> ) |
|-----|-----------|--------------------------|-------------------------|
| 1   | 0.000     | 0.000                    | 0.000                   |
| 2   | 2.000     | 25.000                   | 50.000                  |
| 3   | 3.000     | 4800.000                 | 4850.000                |
| 4   | 8.000     | 6500.000                 | 37350.000               |
| 5   | 10.000    | 7200.000                 | 51750.000               |

## 4-2-3 放流施設

種類： 大型オリフィス(矩形)



| 高さ<br>HL (m) | オリフィス<br>幅 B (m) | オリフィス<br>高さ L (m) | 流量係数<br>C1 | 堰の流量係数<br>C2 |
|--------------|------------------|-------------------|------------|--------------|
| 2.000        | 0.500            | 0.500             | 0.600      | 1.800        |

1) 水面がオリフィス外の場合

$$Q = \frac{2}{3} \cdot C1 \cdot \sqrt{2g} \cdot B \cdot (H1^{3/2} - H2^{3/2})$$

2) 水面がオリフィス内の場合

$$Q = C2 \cdot B \cdot H1^{3/2}$$

ここに、

Q : 放流量 (m<sup>3</sup>/s)g : 重力加速度(=9.8) (m/s<sup>2</sup>)

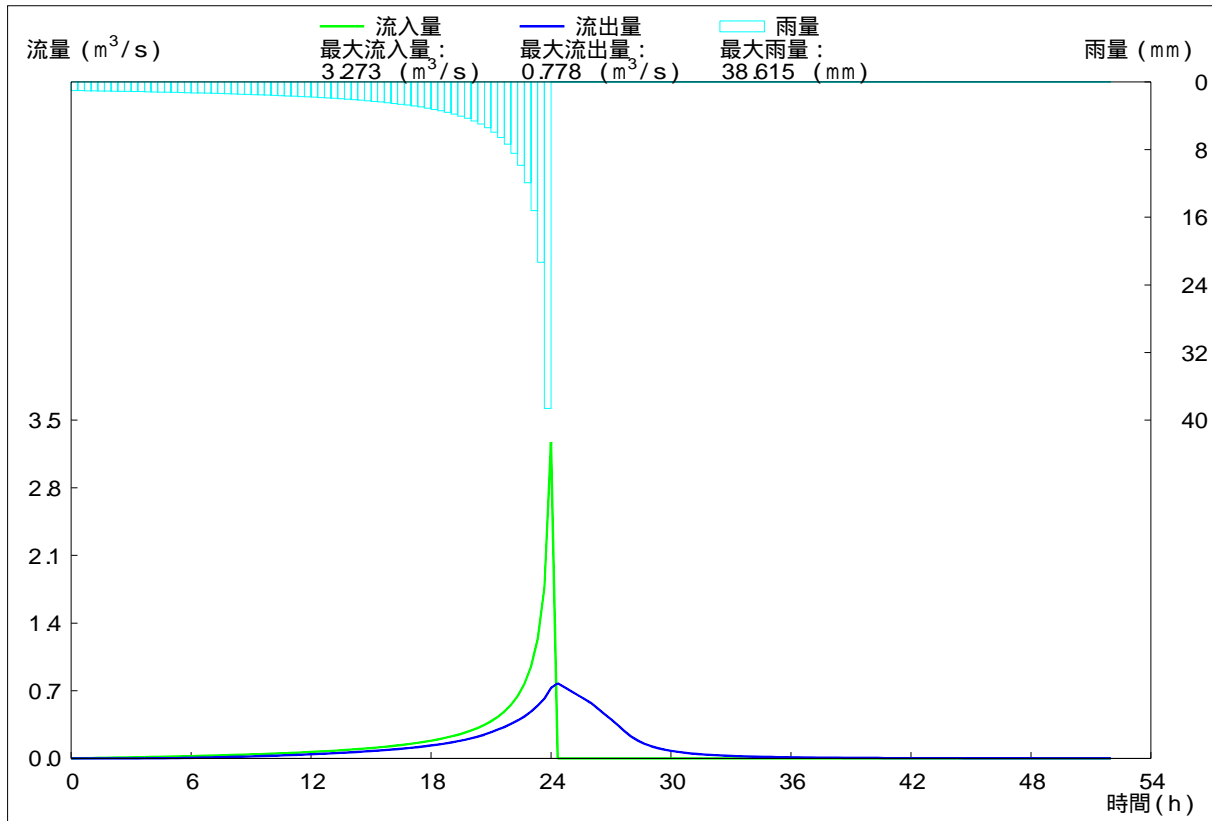
## 4-2-4 洪水調節計算結果

| 時間<br>(時:分) | 雨量<br>R(mm) | 流入量<br>I(m <sup>3</sup> /s) | 流出量<br>Q(m <sup>3</sup> /s) | 水位<br>H(m) | 水面積<br>A(m <sup>2</sup> ) | 貯水量<br>V(m <sup>3</sup> ) |
|-------------|-------------|-----------------------------|-----------------------------|------------|---------------------------|---------------------------|
| 0:00        | 0.0000      | 0.000                       | 0.000                       | 0.000      | 0.000                     | 0.000                     |
| 0:20        | 1.0180      | 0.002                       | 0.000                       | 0.053      | 25.000                    | 1.320                     |
| 0:40        | 1.0300      | 0.003                       | 0.000                       | 0.182      | 25.000                    | 4.560                     |
| 1:00        | 1.0420      | 0.004                       | 0.000                       | 0.360      | 25.000                    | 9.000                     |
| 1:20        | 1.0540      | 0.005                       | 0.000                       | 0.588      | 25.000                    | 14.700                    |
| 1:40        | 1.0670      | 0.006                       | 0.000                       | 0.869      | 25.000                    | 21.720                    |
| 2:00        | 1.0790      | 0.008                       | 0.000                       | 1.202      | 25.000                    | 30.060                    |
| 2:20        | 1.0930      | 0.009                       | 0.000                       | 1.591      | 25.000                    | 39.780                    |
| 2:40        | 1.1070      | 0.010                       | 0.000                       | 2.000      | 4800.000                  | 50.940                    |
| 3:00        | 1.1210      | 0.011                       | 0.000                       | 2.003      | 4800.000                  | 63.472                    |
| 3:20        | 1.1350      | 0.012                       | 0.000                       | 2.006      | 4800.000                  | 77.272                    |
| 3:40        | 1.1500      | 0.014                       | 0.001                       | 2.009      | 4800.000                  | 92.265                    |
| 4:00        | 1.1650      | 0.015                       | 0.001                       | 2.012      | 4800.000                  | 108.326                   |
| 4:20        | 1.1810      | 0.016                       | 0.002                       | 2.016      | 4800.000                  | 125.390                   |
| 4:40        | 1.1980      | 0.018                       | 0.002                       | 2.019      | 4800.000                  | 143.392                   |
| 5:00        | 1.2150      | 0.019                       | 0.003                       | 2.023      | 4800.000                  | 162.265                   |
| 5:20        | 1.2320      | 0.021                       | 0.004                       | 2.027      | 4800.000                  | 181.943                   |
| 5:40        | 1.2500      | 0.022                       | 0.005                       | 2.032      | 4800.000                  | 202.359                   |
| 6:00        | 1.2690      | 0.024                       | 0.006                       | 2.036      | 4800.000                  | 223.447                   |
| 6:20        | 1.2880      | 0.026                       | 0.007                       | 2.041      | 4800.000                  | 245.141                   |
| 6:40        | 1.3080      | 0.027                       | 0.009                       | 2.045      | 4800.000                  | 267.380                   |
| 7:00        | 1.3290      | 0.029                       | 0.010                       | 2.050      | 4800.000                  | 290.105                   |
| 7:20        | 1.3500      | 0.031                       | 0.012                       | 2.055      | 4800.000                  | 313.315                   |
| 7:40        | 1.3730      | 0.033                       | 0.013                       | 2.060      | 4800.000                  | 336.953                   |
| 8:00        | 1.3960      | 0.035                       | 0.015                       | 2.065      | 4800.000                  | 360.965                   |
| 8:20        | 1.4200      | 0.037                       | 0.017                       | 2.070      | 4800.000                  | 385.358                   |
| 8:40        | 1.4450      | 0.039                       | 0.018                       | 2.075      | 4800.000                  | 410.138                   |
| 9:00        | 1.4710      | 0.042                       | 0.020                       | 2.080      | 4800.000                  | 435.308                   |
| 9:20        | 1.4980      | 0.044                       | 0.023                       | 2.086      | 4800.000                  | 460.815                   |
| 9:40        | 1.5260      | 0.046                       | 0.025                       | 2.091      | 4800.000                  | 486.609                   |
| 10:00       | 1.5550      | 0.049                       | 0.027                       | 2.096      | 4800.000                  | 512.761                   |
| 10:20       | 1.5860      | 0.052                       | 0.029                       | 2.102      | 4800.000                  | 539.330                   |
| 10:40       | 1.6180      | 0.054                       | 0.032                       | 2.108      | 4800.000                  | 566.313                   |
| 11:00       | 1.6520      | 0.057                       | 0.034                       | 2.113      | 4800.000                  | 593.707                   |
| 11:20       | 1.6870      | 0.060                       | 0.037                       | 2.119      | 4800.000                  | 621.564                   |
| 11:40       | 1.7240      | 0.064                       | 0.040                       | 2.125      | 4800.000                  | 649.926                   |
| 12:00       | 1.7630      | 0.067                       | 0.043                       | 2.131      | 4800.000                  | 678.833                   |
| 12:20       | 1.8040      | 0.071                       | 0.046                       | 2.137      | 4800.000                  | 708.313                   |
| 12:40       | 1.8470      | 0.074                       | 0.049                       | 2.143      | 4800.000                  | 738.449                   |
| 13:00       | 1.8920      | 0.078                       | 0.052                       | 2.150      | 4800.000                  | 769.306                   |
| 13:20       | 1.9400      | 0.082                       | 0.056                       | 2.156      | 4800.000                  | 800.942                   |
| 13:40       | 1.9910      | 0.087                       | 0.059                       | 2.163      | 4800.000                  | 833.514                   |
| 14:00       | 2.0450      | 0.092                       | 0.063                       | 2.170      | 4800.000                  | 867.095                   |
| 14:20       | 2.1030      | 0.097                       | 0.067                       | 2.177      | 4800.000                  | 901.689                   |
| 14:40       | 2.1640      | 0.102                       | 0.072                       | 2.185      | 4800.000                  | 937.464                   |
| 15:00       | 2.2290      | 0.107                       | 0.076                       | 2.193      | 4800.000                  | 974.550                   |
| 15:20       | 2.2990      | 0.114                       | 0.081                       | 2.201      | 4800.000                  | 1013.061                  |
| 15:40       | 2.3740      | 0.120                       | 0.086                       | 2.209      | 4800.000                  | 1053.187                  |
| 16:00       | 2.4540      | 0.127                       | 0.091                       | 2.218      | 4800.000                  | 1095.087                  |
| 16:20       | 2.5410      | 0.135                       | 0.097                       | 2.227      | 4800.000                  | 1138.936                  |
| 16:40       | 2.6350      | 0.143                       | 0.103                       | 2.236      | 4800.000                  | 1184.983                  |
| 17:00       | 2.7360      | 0.152                       | 0.110                       | 2.247      | 4800.000                  | 1233.529                  |
| 17:20       | 2.8480      | 0.161                       | 0.117                       | 2.257      | 4800.000                  | 1284.867                  |
| 17:40       | 2.9690      | 0.172                       | 0.125                       | 2.269      | 4800.000                  | 1339.276                  |
| 18:00       | 3.1030      | 0.183                       | 0.134                       | 2.281      | 4800.000                  | 1397.131                  |
| 18:20       | 3.2500      | 0.196                       | 0.143                       | 2.294      | 4800.000                  | 1458.989                  |
| 18:40       | 3.4140      | 0.211                       | 0.153                       | 2.307      | 4800.000                  | 1525.384                  |

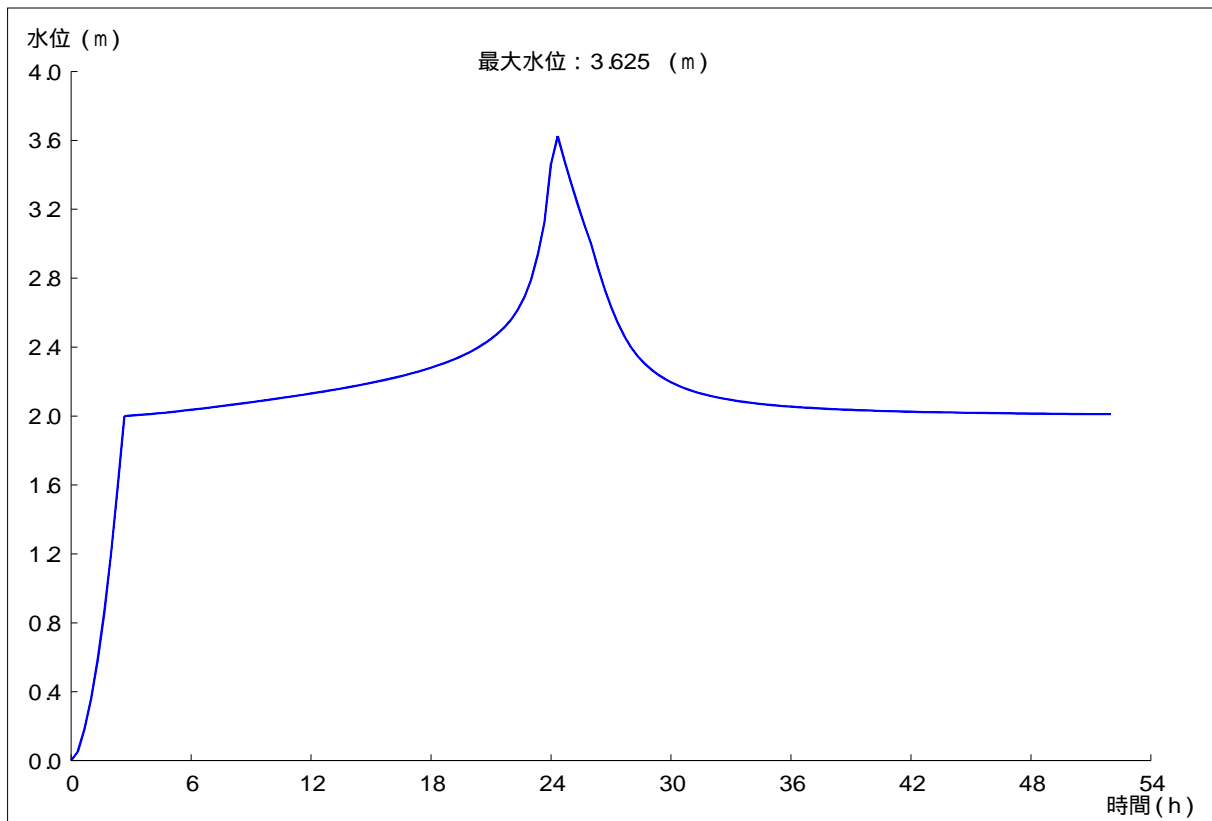
| 時間<br>(時:分) | 雨量<br>R(mm) | 流入量<br>I(m <sup>3</sup> /s) | 流出量<br>Q(m <sup>3</sup> /s) | 水位<br>H(m) | 水面積<br>A(m <sup>2</sup> ) | 貯水量<br>V(m <sup>3</sup> ) |
|-------------|-------------|-----------------------------|-----------------------------|------------|---------------------------|---------------------------|
| 19:00       | 3.5970      | 0.227                       | 0.165                       | 2.322      | 4800.000                  | 1596.996                  |
| 19:20       | 3.8030      | 0.244                       | 0.177                       | 2.338      | 4800.000                  | 1674.654                  |
| 19:40       | 4.0370      | 0.265                       | 0.191                       | 2.356      | 4800.000                  | 1759.364                  |
| 20:00       | 4.3050      | 0.288                       | 0.207                       | 2.375      | 4800.000                  | 1852.350                  |
| 20:20       | 4.6150      | 0.315                       | 0.225                       | 2.397      | 4800.000                  | 1955.224                  |
| 20:40       | 4.9770      | 0.347                       | 0.246                       | 2.421      | 4800.000                  | 2070.073                  |
| 21:00       | 5.4060      | 0.384                       | 0.270                       | 2.448      | 4800.000                  | 2199.549                  |
| 21:20       | 5.9250      | 0.429                       | 0.298                       | 2.479      | 4800.000                  | 2347.268                  |
| 21:40       | 6.5640      | 0.485                       | 0.325                       | 2.515      | 4800.000                  | 2520.843                  |
| 22:00       | 7.3710      | 0.555                       | 0.358                       | 2.559      | 4800.000                  | 2734.937                  |
| 22:20       | 8.4240      | 0.646                       | 0.393                       | 2.616      | 4800.000                  | 3005.853                  |
| 22:40       | 9.8580      | 0.771                       | 0.434                       | 2.690      | 4800.000                  | 3360.988                  |
| 23:00       | 11.9330     | 0.952                       | 0.484                       | 2.791      | 4800.000                  | 3845.177                  |
| 23:20       | 15.2210     | 1.238                       | 0.547                       | 2.936      | 4800.000                  | 4542.178                  |
| 23:40       | 21.3270     | 1.769                       | 0.618                       | 3.123      | 6500.000                  | 5647.108                  |
| 24:00       | 38.6150     | 3.273                       | 0.731                       | 3.465      | 6500.000                  | 7869.746                  |
| 24:20       | 0.0000      | 0.000                       | 0.778                       | 3.625      | 6500.000                  | 8910.683                  |
| 24:40       | 0.0000      | 0.000                       | 0.737                       | 3.485      | 6500.000                  | 8002.131                  |
| 25:00       | 0.0000      | 0.000                       | 0.696                       | 3.353      | 6500.000                  | 7142.599                  |
| 25:20       | 0.0000      | 0.000                       | 0.655                       | 3.228      | 6500.000                  | 6332.133                  |
| 25:40       | 0.0000      | 0.000                       | 0.614                       | 3.111      | 6500.000                  | 5570.793                  |
| 26:00       | 0.0000      | 0.000                       | 0.573                       | 3.001      | 6500.000                  | 4858.663                  |
| 26:20       | 0.0000      | 0.000                       | 0.517                       | 2.866      | 4800.000                  | 4204.404                  |
| 26:40       | 0.0000      | 0.000                       | 0.461                       | 2.743      | 4800.000                  | 3617.311                  |
| 27:00       | 0.0000      | 0.000                       | 0.404                       | 2.635      | 4800.000                  | 3098.059                  |
| 27:20       | 0.0000      | 0.000                       | 0.345                       | 2.541      | 4800.000                  | 2648.147                  |
| 27:40       | 0.0000      | 0.000                       | 0.283                       | 2.463      | 4800.000                  | 2270.294                  |
| 28:00       | 0.0000      | 0.000                       | 0.227                       | 2.399      | 4800.000                  | 1965.895                  |
| 28:20       | 0.0000      | 0.000                       | 0.185                       | 2.348      | 4800.000                  | 1720.059                  |
| 28:40       | 0.0000      | 0.000                       | 0.152                       | 2.306      | 4800.000                  | 1518.673                  |
| 29:00       | 0.0000      | 0.000                       | 0.127                       | 2.271      | 4800.000                  | 1351.633                  |
| 29:20       | 0.0000      | 0.000                       | 0.107                       | 2.242      | 4800.000                  | 1211.551                  |
| 29:40       | 0.0000      | 0.000                       | 0.091                       | 2.217      | 4800.000                  | 1092.923                  |
| 30:00       | 0.0000      | 0.000                       | 0.078                       | 2.196      | 4800.000                  | 991.582                   |
| 30:20       | 0.0000      | 0.000                       | 0.068                       | 2.178      | 4800.000                  | 904.325                   |
| 30:40       | 0.0000      | 0.000                       | 0.059                       | 2.162      | 4800.000                  | 828.658                   |
| 31:00       | 0.0000      | 0.000                       | 0.051                       | 2.148      | 4800.000                  | 762.616                   |
| 31:20       | 0.0000      | 0.000                       | 0.045                       | 2.136      | 4800.000                  | 704.633                   |
| 31:40       | 0.0000      | 0.000                       | 0.040                       | 2.126      | 4800.000                  | 653.449                   |
| 32:00       | 0.0000      | 0.000                       | 0.036                       | 2.116      | 4800.000                  | 608.042                   |
| 32:20       | 0.0000      | 0.000                       | 0.032                       | 2.108      | 4800.000                  | 567.573                   |
| 32:40       | 0.0000      | 0.000                       | 0.029                       | 2.100      | 4800.000                  | 531.352                   |
| 33:00       | 0.0000      | 0.000                       | 0.026                       | 2.094      | 4800.000                  | 498.805                   |
| 33:20       | 0.0000      | 0.000                       | 0.023                       | 2.087      | 4800.000                  | 469.450                   |
| 33:40       | 0.0000      | 0.000                       | 0.021                       | 2.082      | 4800.000                  | 442.884                   |
| 34:00       | 0.0000      | 0.000                       | 0.019                       | 2.077      | 4800.000                  | 418.764                   |
| 34:20       | 0.0000      | 0.000                       | 0.017                       | 2.072      | 4800.000                  | 396.799                   |
| 34:40       | 0.0000      | 0.000                       | 0.016                       | 2.068      | 4800.000                  | 376.740                   |
| 35:00       | 0.0000      | 0.000                       | 0.015                       | 2.064      | 4800.000                  | 358.371                   |
| 35:20       | 0.0000      | 0.000                       | 0.013                       | 2.061      | 4800.000                  | 341.510                   |
| 35:40       | 0.0000      | 0.000                       | 0.012                       | 2.057      | 4800.000                  | 325.994                   |
| 36:00       | 0.0000      | 0.000                       | 0.011                       | 2.055      | 4800.000                  | 311.685                   |
| 36:20       | 0.0000      | 0.000                       | 0.011                       | 2.052      | 4800.000                  | 298.461                   |
| 36:40       | 0.0000      | 0.000                       | 0.010                       | 2.049      | 4800.000                  | 286.214                   |
| 37:00       | 0.0000      | 0.000                       | 0.009                       | 2.047      | 4800.000                  | 274.851                   |
| 37:20       | 0.0000      | 0.000                       | 0.008                       | 2.045      | 4800.000                  | 264.289                   |
| 37:40       | 0.0000      | 0.000                       | 0.008                       | 2.043      | 4800.000                  | 254.453                   |
| 38:00       | 0.0000      | 0.000                       | 0.007                       | 2.041      | 4800.000                  | 245.280                   |

| 時間<br>(時:分) | 雨量<br>R(mm) | 流入量<br>I(m <sup>3</sup> /s) | 流出量<br>Q(m <sup>3</sup> /s) | 水位<br>H(m) | 水面積<br>A(m <sup>2</sup> ) | 貯水量<br>V(m <sup>3</sup> ) |
|-------------|-------------|-----------------------------|-----------------------------|------------|---------------------------|---------------------------|
| 38:20       | 0.0000      | 0.000                       | 0.007                       | 2.039      | 4800.000                  | 236.710                   |
| 38:40       | 0.0000      | 0.000                       | 0.006                       | 2.037      | 4800.000                  | 228.693                   |
| 39:00       | 0.0000      | 0.000                       | 0.006                       | 2.036      | 4800.000                  | 221.181                   |
| 39:20       | 0.0000      | 0.000                       | 0.006                       | 2.034      | 4800.000                  | 214.133                   |
| 39:40       | 0.0000      | 0.000                       | 0.005                       | 2.033      | 4800.000                  | 207.511                   |
| 40:00       | 0.0000      | 0.000                       | 0.005                       | 2.032      | 4800.000                  | 201.282                   |
| 40:20       | 0.0000      | 0.000                       | 0.005                       | 2.030      | 4800.000                  | 195.416                   |
| 40:40       | 0.0000      | 0.000                       | 0.004                       | 2.029      | 4800.000                  | 189.884                   |
| 41:00       | 0.0000      | 0.000                       | 0.004                       | 2.028      | 4800.000                  | 184.662                   |
| 41:20       | 0.0000      | 0.000                       | 0.004                       | 2.027      | 4800.000                  | 179.727                   |
| 41:40       | 0.0000      | 0.000                       | 0.004                       | 2.026      | 4800.000                  | 175.058                   |
| 42:00       | 0.0000      | 0.000                       | 0.004                       | 2.025      | 4800.000                  | 170.637                   |
| 42:20       | 0.0000      | 0.000                       | 0.003                       | 2.024      | 4800.000                  | 166.446                   |
| 42:40       | 0.0000      | 0.000                       | 0.003                       | 2.023      | 4800.000                  | 162.470                   |
| 43:00       | 0.0000      | 0.000                       | 0.003                       | 2.023      | 4800.000                  | 158.695                   |
| 43:20       | 0.0000      | 0.000                       | 0.003                       | 2.022      | 4800.000                  | 155.106                   |
| 43:40       | 0.0000      | 0.000                       | 0.003                       | 2.021      | 4800.000                  | 151.692                   |
| 44:00       | 0.0000      | 0.000                       | 0.003                       | 2.021      | 4800.000                  | 148.441                   |
| 44:20       | 0.0000      | 0.000                       | 0.003                       | 2.020      | 4800.000                  | 145.345                   |
| 44:40       | 0.0000      | 0.000                       | 0.002                       | 2.019      | 4800.000                  | 142.391                   |
| 45:00       | 0.0000      | 0.000                       | 0.002                       | 2.019      | 4800.000                  | 139.574                   |
| 45:20       | 0.0000      | 0.000                       | 0.002                       | 2.018      | 4800.000                  | 136.883                   |
| 45:40       | 0.0000      | 0.000                       | 0.002                       | 2.018      | 4800.000                  | 134.311                   |
| 46:00       | 0.0000      | 0.000                       | 0.002                       | 2.017      | 4800.000                  | 131.852                   |
| 46:20       | 0.0000      | 0.000                       | 0.002                       | 2.017      | 4800.000                  | 129.499                   |
| 46:40       | 0.0000      | 0.000                       | 0.002                       | 2.016      | 4800.000                  | 127.246                   |
| 47:00       | 0.0000      | 0.000                       | 0.002                       | 2.016      | 4800.000                  | 125.088                   |
| 47:20       | 0.0000      | 0.000                       | 0.002                       | 2.015      | 4800.000                  | 123.018                   |
| 47:40       | 0.0000      | 0.000                       | 0.002                       | 2.015      | 4800.000                  | 121.033                   |
| 48:00       | 0.0000      | 0.000                       | 0.002                       | 2.014      | 4800.000                  | 119.128                   |
| 48:20       | 0.0000      | 0.000                       | 0.001                       | 2.014      | 4800.000                  | 117.299                   |
| 48:40       | 0.0000      | 0.000                       | 0.001                       | 2.014      | 4800.000                  | 115.541                   |
| 49:00       | 0.0000      | 0.000                       | 0.001                       | 2.013      | 4800.000                  | 113.851                   |
| 49:20       | 0.0000      | 0.000                       | 0.001                       | 2.013      | 4800.000                  | 112.226                   |
| 49:40       | 0.0000      | 0.000                       | 0.001                       | 2.013      | 4800.000                  | 110.662                   |
| 50:00       | 0.0000      | 0.000                       | 0.001                       | 2.012      | 4800.000                  | 109.156                   |
| 50:20       | 0.0000      | 0.000                       | 0.001                       | 2.012      | 4800.000                  | 107.706                   |
| 50:40       | 0.0000      | 0.000                       | 0.001                       | 2.012      | 4800.000                  | 106.308                   |
| 51:00       | 0.0000      | 0.000                       | 0.001                       | 2.011      | 4800.000                  | 104.961                   |
| 51:20       | 0.0000      | 0.000                       | 0.001                       | 2.011      | 4800.000                  | 103.661                   |
| 51:40       | 0.0000      | 0.000                       | 0.001                       | 2.011      | 4800.000                  | 102.407                   |
| 52:00       | 0.0000      | 0.000                       | 0.001                       | 2.011      | 4800.000                  | 101.196                   |

ハイドログラフ (流入と流出) と時間降雨分布

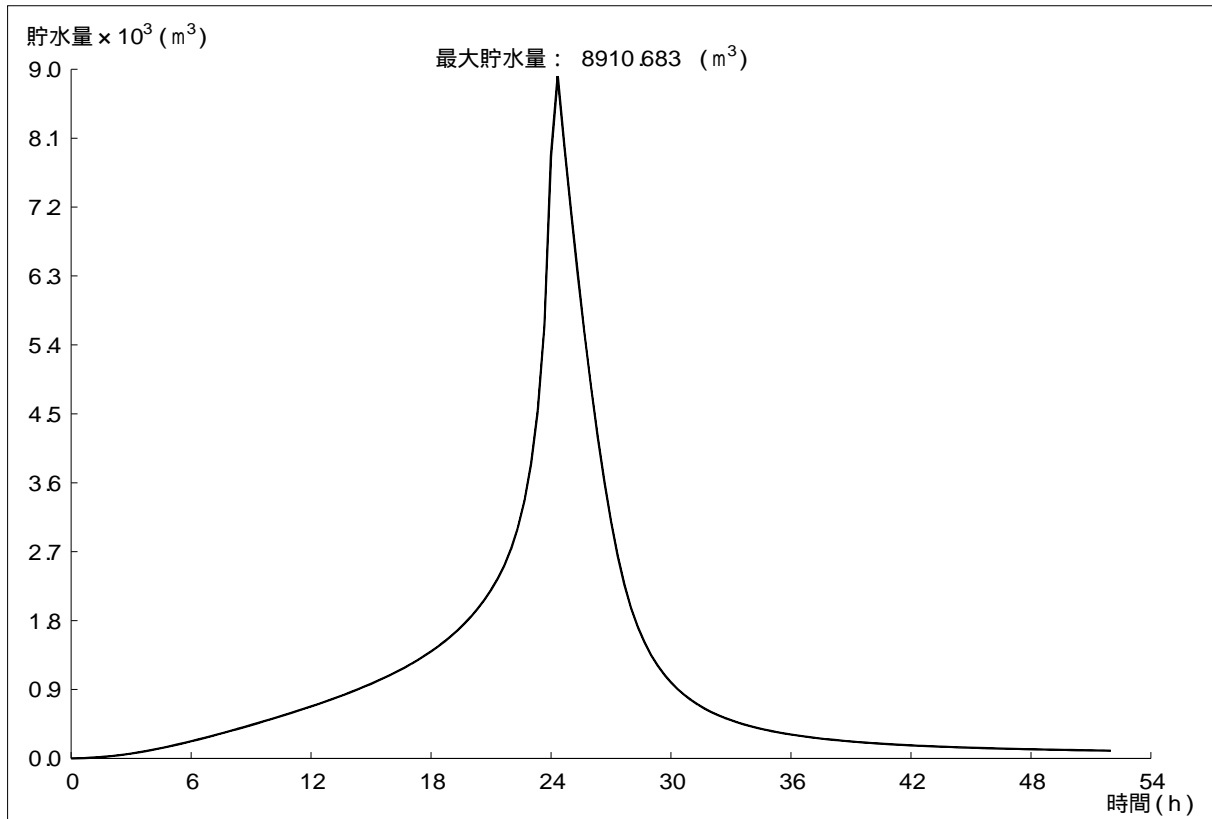


水位

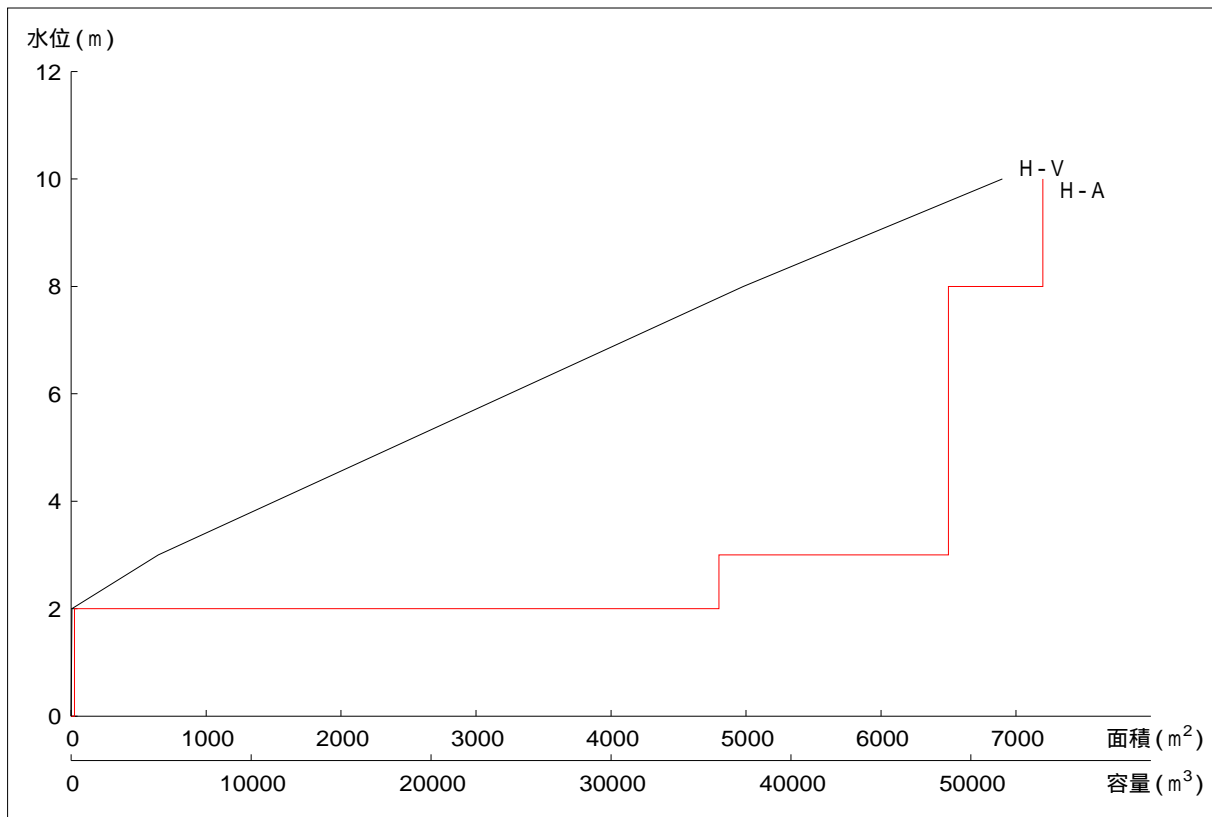




## 貯水量



## 水位容量曲線



## 4-3 防災調節池

|        |                      |
|--------|----------------------|
| 貯留施設名称 | 防災調節池                |
| 流入ハイドロ | 流域 2                 |
| 上流施設   | 浸透 2<br>貯留 1<br>貯留 2 |

## 4-3-1 流入量合成計算

| 時間<br>(時：分) | 流域 2<br>(m <sup>3</sup> /s) | 浸透 2<br>(m <sup>3</sup> /s) | 貯留 1<br>(m <sup>3</sup> /s) | 貯留 2<br>(m <sup>3</sup> /s) | 合計<br>(m <sup>3</sup> /s) |
|-------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|---------------------------|
| 0:00        | 0.000                       | 0.000                       | 0.000                       | 0.000                       | 0.000                     |
| 0:10        | 0.000                       | 0.841                       | 0.860                       | 0.000                       | 1.701                     |
| 0:20        | 0.000                       | 0.845                       | 1.720                       | 0.000                       | 2.565                     |
| 0:30        | 0.941                       | 0.850                       | 1.753                       | 0.000                       | 3.544                     |
| 0:40        | 0.946                       | 0.854                       | 1.786                       | 0.000                       | 3.586                     |
| 0:50        | 0.951                       | 0.859                       | 1.797                       | 0.000                       | 3.607                     |
| 1:00        | 0.955                       | 0.863                       | 1.807                       | 0.000                       | 3.625                     |
| 1:10        | 0.960                       | 0.868                       | 1.818                       | 0.000                       | 3.646                     |
| 1:20        | 0.965                       | 0.873                       | 1.828                       | 0.000                       | 3.666                     |
| 1:30        | 0.970                       | 0.877                       | 1.839                       | 0.000                       | 3.686                     |
| 1:40        | 0.974                       | 0.882                       | 1.849                       | 0.000                       | 3.705                     |
| 1:50        | 0.979                       | 0.887                       | 1.860                       | 0.000                       | 3.726                     |
| 2:00        | 0.984                       | 0.892                       | 1.871                       | 0.000                       | 3.747                     |
| 2:10        | 0.990                       | 0.897                       | 1.883                       | 0.000                       | 3.770                     |
| 2:20        | 0.995                       | 0.902                       | 1.894                       | 0.000                       | 3.791                     |
| 2:30        | 1.000                       | 0.907                       | 1.906                       | 0.000                       | 3.813                     |
| 2:40        | 1.005                       | 0.912                       | 1.918                       | 0.000                       | 3.835                     |
| 2:50        | 1.011                       | 0.918                       | 1.931                       | 0.000                       | 3.860                     |
| 3:00        | 1.016                       | 0.923                       | 1.943                       | 0.000                       | 3.882                     |
| 3:10        | 1.021                       | 0.929                       | 1.956                       | 0.000                       | 3.906                     |
| 3:20        | 1.027                       | 0.934                       | 1.968                       | 0.000                       | 3.929                     |
| 3:30        | 1.033                       | 0.940                       | 1.981                       | 0.001                       | 3.955                     |
| 3:40        | 1.038                       | 0.945                       | 1.994                       | 0.001                       | 3.978                     |
| 3:50        | 1.044                       | 0.951                       | 2.007                       | 0.001                       | 4.003                     |
| 4:00        | 1.050                       | 0.957                       | 2.020                       | 0.001                       | 4.028                     |
| 4:10        | 1.056                       | 0.963                       | 2.034                       | 0.002                       | 4.055                     |
| 4:20        | 1.062                       | 0.969                       | 2.048                       | 0.002                       | 4.081                     |
| 4:30        | 1.068                       | 0.975                       | 2.062                       | 0.002                       | 4.107                     |
| 4:40        | 1.075                       | 0.981                       | 2.076                       | 0.002                       | 4.134                     |
| 4:50        | 1.081                       | 0.987                       | 2.091                       | 0.003                       | 4.162                     |
| 5:00        | 1.087                       | 0.994                       | 2.106                       | 0.003                       | 4.190                     |
| 5:10        | 1.094                       | 1.000                       | 2.121                       | 0.004                       | 4.219                     |
| 5:20        | 1.100                       | 1.007                       | 2.136                       | 0.004                       | 4.247                     |
| 5:30        | 1.107                       | 1.013                       | 2.152                       | 0.005                       | 4.276                     |
| 5:40        | 1.114                       | 1.020                       | 2.167                       | 0.005                       | 4.306                     |
| 5:50        | 1.121                       | 1.027                       | 2.184                       | 0.006                       | 4.337                     |
| 6:00        | 1.128                       | 1.034                       | 2.200                       | 0.006                       | 4.368                     |
| 6:10        | 1.135                       | 1.041                       | 2.217                       | 0.007                       | 4.399                     |
| 6:20        | 1.142                       | 1.048                       | 2.233                       | 0.007                       | 4.430                     |
| 6:30        | 1.150                       | 1.056                       | 2.251                       | 0.008                       | 4.465                     |
| 6:40        | 1.157                       | 1.063                       | 2.268                       | 0.009                       | 4.497                     |
| 6:50        | 1.165                       | 1.071                       | 2.286                       | 0.010                       | 4.531                     |
| 7:00        | 1.172                       | 1.078                       | 2.303                       | 0.010                       | 4.563                     |
| 7:10        | 1.180                       | 1.086                       | 2.322                       | 0.011                       | 4.599                     |
| 7:20        | 1.188                       | 1.094                       | 2.341                       | 0.012                       | 4.635                     |

| 時間<br>(時:分) | 流域2<br>(m <sup>3</sup> /s) | 浸透2<br>(m <sup>3</sup> /s) | 貯留1<br>(m <sup>3</sup> /s) | 貯留2<br>(m <sup>3</sup> /s) | 合計<br>(m <sup>3</sup> /s) |
|-------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|
| 7:30        | 1.196                      | 1.102                      | 2.360                      | 0.013                      | 4.671                     |
| 7:40        | 1.205                      | 1.110                      | 2.379                      | 0.013                      | 4.707                     |
| 7:50        | 1.213                      | 1.119                      | 2.399                      | 0.014                      | 4.745                     |
| 8:00        | 1.221                      | 1.127                      | 2.419                      | 0.015                      | 4.782                     |
| 8:10        | 1.230                      | 1.136                      | 2.440                      | 0.016                      | 4.822                     |
| 8:20        | 1.239                      | 1.145                      | 2.460                      | 0.017                      | 4.861                     |
| 8:30        | 1.248                      | 1.154                      | 2.482                      | 0.018                      | 4.902                     |
| 8:40        | 1.257                      | 1.163                      | 2.504                      | 0.018                      | 4.942                     |
| 8:50        | 1.266                      | 1.172                      | 2.527                      | 0.019                      | 4.984                     |
| 9:00        | 1.276                      | 1.181                      | 2.549                      | 0.020                      | 5.026                     |
| 9:10        | 1.286                      | 1.191                      | 2.573                      | 0.022                      | 5.071                     |
| 9:20        | 1.296                      | 1.201                      | 2.596                      | 0.023                      | 5.116                     |
| 9:30        | 1.306                      | 1.211                      | 2.620                      | 0.024                      | 5.161                     |
| 9:40        | 1.316                      | 1.221                      | 2.644                      | 0.025                      | 5.206                     |
| 9:50        | 1.326                      | 1.232                      | 2.662                      | 0.026                      | 5.246                     |
| 10:00       | 1.337                      | 1.242                      | 2.679                      | 0.027                      | 5.285                     |
| 10:10       | 1.348                      | 1.253                      | 2.682                      | 0.028                      | 5.311                     |
| 10:20       | 1.359                      | 1.264                      | 2.684                      | 0.029                      | 5.336                     |
| 10:30       | 1.370                      | 1.276                      | 2.688                      | 0.031                      | 5.364                     |
| 10:40       | 1.382                      | 1.287                      | 2.691                      | 0.032                      | 5.392                     |
| 10:50       | 1.393                      | 1.299                      | 2.695                      | 0.033                      | 5.420                     |
| 11:00       | 1.405                      | 1.311                      | 2.698                      | 0.034                      | 5.448                     |
| 11:10       | 1.418                      | 1.323                      | 2.703                      | 0.036                      | 5.480                     |
| 11:20       | 1.430                      | 1.336                      | 2.708                      | 0.037                      | 5.511                     |
| 11:30       | 1.443                      | 1.349                      | 2.715                      | 0.039                      | 5.545                     |
| 11:40       | 1.456                      | 1.362                      | 2.721                      | 0.040                      | 5.579                     |
| 11:50       | 1.470                      | 1.376                      | 2.729                      | 0.042                      | 5.616                     |
| 12:00       | 1.483                      | 1.390                      | 2.736                      | 0.043                      | 5.652                     |
| 12:10       | 1.497                      | 1.404                      | 2.745                      | 0.045                      | 5.691                     |
| 12:20       | 1.512                      | 1.418                      | 2.754                      | 0.046                      | 5.730                     |
| 12:30       | 1.526                      | 1.433                      | 2.764                      | 0.048                      | 5.771                     |
| 12:40       | 1.542                      | 1.448                      | 2.774                      | 0.049                      | 5.813                     |
| 12:50       | 1.557                      | 1.464                      | 2.786                      | 0.051                      | 5.857                     |
| 13:00       | 1.573                      | 1.480                      | 2.797                      | 0.052                      | 5.902                     |
| 13:10       | 1.589                      | 1.496                      | 2.810                      | 0.054                      | 5.949                     |
| 13:20       | 1.606                      | 1.513                      | 2.823                      | 0.056                      | 5.998                     |
| 13:30       | 1.623                      | 1.530                      | 2.838                      | 0.058                      | 6.048                     |
| 13:40       | 1.640                      | 1.548                      | 2.852                      | 0.059                      | 6.099                     |
| 13:50       | 1.658                      | 1.566                      | 2.868                      | 0.061                      | 6.153                     |
| 14:00       | 1.677                      | 1.585                      | 2.883                      | 0.063                      | 6.208                     |
| 14:10       | 1.696                      | 1.605                      | 2.900                      | 0.065                      | 6.266                     |
| 14:20       | 1.715                      | 1.624                      | 2.916                      | 0.067                      | 6.322                     |
| 14:30       | 1.735                      | 1.645                      | 2.935                      | 0.070                      | 6.384                     |
| 14:40       | 1.756                      | 1.666                      | 2.953                      | 0.072                      | 6.447                     |
| 14:50       | 1.777                      | 1.688                      | 2.973                      | 0.074                      | 6.512                     |
| 15:00       | 1.799                      | 1.710                      | 2.993                      | 0.076                      | 6.578                     |
| 15:10       | 1.822                      | 1.733                      | 3.014                      | 0.079                      | 6.648                     |
| 15:20       | 1.845                      | 1.757                      | 3.035                      | 0.081                      | 6.718                     |
| 15:30       | 1.869                      | 1.782                      | 3.058                      | 0.084                      | 6.793                     |
| 15:40       | 1.894                      | 1.807                      | 3.081                      | 0.086                      | 6.868                     |
| 15:50       | 1.920                      | 1.834                      | 3.106                      | 0.089                      | 6.948                     |
| 16:00       | 1.946                      | 1.861                      | 3.130                      | 0.091                      | 7.028                     |
| 16:10       | 1.973                      | 1.889                      | 3.156                      | 0.094                      | 7.112                     |
| 16:20       | 2.002                      | 1.919                      | 3.182                      | 0.097                      | 7.200                     |
| 16:30       | 2.031                      | 1.949                      | 3.210                      | 0.100                      | 7.290                     |
| 16:40       | 2.062                      | 1.981                      | 3.238                      | 0.103                      | 7.384                     |
| 16:50       | 2.093                      | 2.013                      | 3.268                      | 0.107                      | 7.481                     |
| 17:00       | 2.126                      | 2.048                      | 3.298                      | 0.110                      | 7.582                     |

| 時間<br>(時:分) | 流域2<br>(m <sup>3</sup> /s) | 浸透2<br>(m <sup>3</sup> /s) | 貯留1<br>(m <sup>3</sup> /s) | 貯留2<br>(m <sup>3</sup> /s) | 合計<br>(m <sup>3</sup> /s) |
|-------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|
| 17:10       | 2.160                      | 2.083                      | 3.330                      | 0.114                      | 7.687                     |
| 17:20       | 2.196                      | 2.120                      | 3.362                      | 0.117                      | 7.795                     |
| 17:30       | 2.233                      | 2.159                      | 3.396                      | 0.121                      | 7.909                     |
| 17:40       | 2.271                      | 2.199                      | 3.430                      | 0.125                      | 8.025                     |
| 17:50       | 2.311                      | 2.241                      | 3.449                      | 0.130                      | 8.131                     |
| 18:00       | 2.353                      | 2.285                      | 3.468                      | 0.134                      | 8.240                     |
| 18:10       | 2.397                      | 2.331                      | 3.487                      | 0.139                      | 8.353                     |
| 18:20       | 2.443                      | 2.380                      | 3.505                      | 0.143                      | 8.471                     |
| 18:30       | 2.491                      | 2.431                      | 3.525                      | 0.148                      | 8.595                     |
| 18:40       | 2.541                      | 2.484                      | 3.545                      | 0.153                      | 8.723                     |
| 18:50       | 2.594                      | 2.541                      | 3.567                      | 0.159                      | 8.861                     |
| 19:00       | 2.650                      | 2.600                      | 3.589                      | 0.165                      | 9.004                     |
| 19:10       | 2.708                      | 2.663                      | 3.614                      | 0.171                      | 9.156                     |
| 19:20       | 2.770                      | 2.730                      | 3.638                      | 0.177                      | 9.315                     |
| 19:30       | 2.835                      | 2.800                      | 3.665                      | 0.184                      | 9.484                     |
| 19:40       | 2.905                      | 2.876                      | 3.691                      | 0.191                      | 9.663                     |
| 19:50       | 2.978                      | 2.956                      | 3.721                      | 0.199                      | 9.854                     |
| 20:00       | 3.056                      | 3.042                      | 3.751                      | 0.207                      | 10.056                    |
| 20:10       | 3.140                      | 3.133                      | 3.784                      | 0.216                      | 10.273                    |
| 20:20       | 3.229                      | 3.232                      | 3.816                      | 0.225                      | 10.502                    |
| 20:30       | 3.324                      | 3.338                      | 3.853                      | 0.236                      | 10.750                    |
| 20:40       | 3.427                      | 3.453                      | 3.889                      | 0.246                      | 11.015                    |
| 20:50       | 3.537                      | 3.577                      | 3.930                      | 0.258                      | 11.302                    |
| 21:00       | 3.656                      | 3.713                      | 3.970                      | 0.270                      | 11.609                    |
| 21:10       | 3.786                      | 3.862                      | 4.016                      | 0.284                      | 11.948                    |
| 21:20       | 3.927                      | 4.025                      | 4.061                      | 0.298                      | 12.311                    |
| 21:30       | 4.081                      | 4.206                      | 4.109                      | 0.312                      | 12.707                    |
| 21:40       | 4.251                      | 4.407                      | 4.156                      | 0.325                      | 13.139                    |
| 21:50       | 4.439                      | 4.632                      | 4.210                      | 0.342                      | 13.623                    |
| 22:00       | 4.648                      | 4.887                      | 4.264                      | 0.358                      | 14.157                    |
| 22:10       | 4.882                      | 5.177                      | 4.327                      | 0.376                      | 14.762                    |
| 22:20       | 5.147                      | 5.511                      | 4.390                      | 0.393                      | 15.441                    |
| 22:30       | 5.448                      | 5.901                      | 4.464                      | 0.414                      | 16.227                    |
| 22:40       | 5.795                      | 6.362                      | 4.538                      | 0.434                      | 17.129                    |
| 22:50       | 6.201                      | 6.919                      | 4.625                      | 0.459                      | 18.204                    |
| 23:00       | 6.680                      | 7.606                      | 4.711                      | 0.484                      | 19.481                    |
| 23:10       | 7.259                      | 8.478                      | 4.819                      | 0.516                      | 21.071                    |
| 23:20       | 7.972                      | 9.629                      | 4.926                      | 0.547                      | 23.074                    |
| 23:30       | 8.879                      | 11.235                     | 5.067                      | 0.583                      | 25.764                    |
| 23:40       | 10.076                     | 13.673                     | 5.208                      | 0.618                      | 29.575                    |
| 23:50       | 11.745                     | 17.970                     | 5.429                      | 0.675                      | 35.818                    |
| 24:00       | 14.279                     | 29.657                     | 5.649                      | 0.731                      | 50.316                    |
| 24:10       | 18.745                     | 0.000                      | 5.768                      | 0.755                      | 25.268                    |
| 24:20       | 30.891                     | 0.000                      | 5.887                      | 0.778                      | 37.556                    |
| 24:30       | 0.000                      | 0.000                      | 5.862                      | 0.758                      | 6.620                     |
| 24:40       | 0.000                      | 0.000                      | 5.837                      | 0.737                      | 6.574                     |
| 24:50       | 0.000                      | 0.000                      | 5.813                      | 0.717                      | 6.529                     |
| 25:00       | 0.000                      | 0.000                      | 5.788                      | 0.696                      | 6.484                     |
| 25:10       | 0.000                      | 0.000                      | 5.763                      | 0.676                      | 6.439                     |
| 25:20       | 0.000                      | 0.000                      | 5.738                      | 0.655                      | 6.393                     |
| 25:30       | 0.000                      | 0.000                      | 5.714                      | 0.635                      | 6.348                     |
| 25:40       | 0.000                      | 0.000                      | 5.689                      | 0.614                      | 6.303                     |
| 25:50       | 0.000                      | 0.000                      | 5.664                      | 0.594                      | 6.258                     |
| 26:00       | 0.000                      | 0.000                      | 5.639                      | 0.573                      | 6.212                     |
| 26:10       | 0.000                      | 0.000                      | 5.615                      | 0.545                      | 6.160                     |
| 26:20       | 0.000                      | 0.000                      | 5.590                      | 0.517                      | 6.107                     |
| 26:30       | 0.000                      | 0.000                      | 5.565                      | 0.489                      | 6.054                     |
| 26:40       | 0.000                      | 0.000                      | 5.540                      | 0.461                      | 6.001                     |

| 時間<br>(時:分) | 流域2<br>(m <sup>3</sup> /s) | 浸透2<br>(m <sup>3</sup> /s) | 貯留1<br>(m <sup>3</sup> /s) | 貯留2<br>(m <sup>3</sup> /s) | 合計<br>(m <sup>3</sup> /s) |
|-------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|
| 26:50       | 0.000                      | 0.000                      | 5.515                      | 0.433                      | 5.948                     |
| 27:00       | 0.000                      | 0.000                      | 5.490                      | 0.404                      | 5.894                     |
| 27:10       | 0.000                      | 0.000                      | 5.464                      | 0.375                      | 5.838                     |
| 27:20       | 0.000                      | 0.000                      | 5.437                      | 0.345                      | 5.782                     |
| 27:30       | 0.000                      | 0.000                      | 5.411                      | 0.314                      | 5.725                     |
| 27:40       | 0.000                      | 0.000                      | 5.385                      | 0.283                      | 5.668                     |
| 27:50       | 0.000                      | 0.000                      | 5.359                      | 0.255                      | 5.614                     |
| 28:00       | 0.000                      | 0.000                      | 5.333                      | 0.227                      | 5.560                     |
| 28:10       | 0.000                      | 0.000                      | 5.307                      | 0.206                      | 5.513                     |
| 28:20       | 0.000                      | 0.000                      | 5.280                      | 0.185                      | 5.465                     |
| 28:30       | 0.000                      | 0.000                      | 5.254                      | 0.169                      | 5.423                     |
| 28:40       | 0.000                      | 0.000                      | 5.228                      | 0.152                      | 5.380                     |
| 28:50       | 0.000                      | 0.000                      | 5.202                      | 0.140                      | 5.342                     |
| 29:00       | 0.000                      | 0.000                      | 5.176                      | 0.127                      | 5.303                     |
| 29:10       | 0.000                      | 0.000                      | 5.150                      | 0.117                      | 5.267                     |
| 29:20       | 0.000                      | 0.000                      | 5.124                      | 0.107                      | 5.231                     |
| 29:30       | 0.000                      | 0.000                      | 5.098                      | 0.099                      | 5.197                     |
| 29:40       | 0.000                      | 0.000                      | 5.071                      | 0.091                      | 5.162                     |
| 29:50       | 0.000                      | 0.000                      | 5.044                      | 0.085                      | 5.128                     |
| 30:00       | 0.000                      | 0.000                      | 5.016                      | 0.078                      | 5.094                     |
| 30:10       | 0.000                      | 0.000                      | 4.989                      | 0.073                      | 5.062                     |
| 30:20       | 0.000                      | 0.000                      | 4.961                      | 0.068                      | 5.029                     |
| 30:30       | 0.000                      | 0.000                      | 4.934                      | 0.064                      | 4.997                     |
| 30:40       | 0.000                      | 0.000                      | 4.906                      | 0.059                      | 4.965                     |
| 30:50       | 0.000                      | 0.000                      | 4.879                      | 0.055                      | 4.934                     |
| 31:00       | 0.000                      | 0.000                      | 4.851                      | 0.051                      | 4.902                     |
| 31:10       | 0.000                      | 0.000                      | 4.824                      | 0.048                      | 4.872                     |
| 31:20       | 0.000                      | 0.000                      | 4.796                      | 0.045                      | 4.841                     |
| 31:30       | 0.000                      | 0.000                      | 4.768                      | 0.043                      | 4.811                     |
| 31:40       | 0.000                      | 0.000                      | 4.740                      | 0.040                      | 4.780                     |
| 31:50       | 0.000                      | 0.000                      | 4.713                      | 0.038                      | 4.751                     |
| 32:00       | 0.000                      | 0.000                      | 4.685                      | 0.036                      | 4.721                     |
| 32:10       | 0.000                      | 0.000                      | 4.658                      | 0.034                      | 4.692                     |
| 32:20       | 0.000                      | 0.000                      | 4.630                      | 0.032                      | 4.662                     |
| 32:30       | 0.000                      | 0.000                      | 4.602                      | 0.031                      | 4.633                     |
| 32:40       | 0.000                      | 0.000                      | 4.574                      | 0.029                      | 4.603                     |
| 32:50       | 0.000                      | 0.000                      | 4.545                      | 0.028                      | 4.573                     |
| 33:00       | 0.000                      | 0.000                      | 4.516                      | 0.026                      | 4.542                     |
| 33:10       | 0.000                      | 0.000                      | 4.487                      | 0.025                      | 4.512                     |
| 33:20       | 0.000                      | 0.000                      | 4.458                      | 0.023                      | 4.481                     |
| 33:30       | 0.000                      | 0.000                      | 4.429                      | 0.022                      | 4.451                     |
| 33:40       | 0.000                      | 0.000                      | 4.400                      | 0.021                      | 4.421                     |
| 33:50       | 0.000                      | 0.000                      | 4.371                      | 0.020                      | 4.391                     |
| 34:00       | 0.000                      | 0.000                      | 4.342                      | 0.019                      | 4.361                     |
| 34:10       | 0.000                      | 0.000                      | 4.313                      | 0.018                      | 4.331                     |
| 34:20       | 0.000                      | 0.000                      | 4.284                      | 0.017                      | 4.301                     |
| 34:30       | 0.000                      | 0.000                      | 4.255                      | 0.017                      | 4.272                     |
| 34:40       | 0.000                      | 0.000                      | 4.226                      | 0.016                      | 4.242                     |
| 34:50       | 0.000                      | 0.000                      | 4.197                      | 0.016                      | 4.213                     |
| 35:00       | 0.000                      | 0.000                      | 4.168                      | 0.015                      | 4.183                     |
| 35:10       | 0.000                      | 0.000                      | 4.139                      | 0.014                      | 4.153                     |
| 35:20       | 0.000                      | 0.000                      | 4.110                      | 0.013                      | 4.123                     |
| 35:30       | 0.000                      | 0.000                      | 4.081                      | 0.013                      | 4.093                     |
| 35:40       | 0.000                      | 0.000                      | 4.051                      | 0.012                      | 4.063                     |
| 35:50       | 0.000                      | 0.000                      | 4.020                      | 0.012                      | 4.032                     |
| 36:00       | 0.000                      | 0.000                      | 3.989                      | 0.011                      | 4.000                     |
| 36:10       | 0.000                      | 0.000                      | 3.958                      | 0.011                      | 3.969                     |
| 36:20       | 0.000                      | 0.000                      | 3.926                      | 0.011                      | 3.937                     |

| 時間<br>(時:分) | 流域2<br>(m <sup>3</sup> /s) | 浸透2<br>(m <sup>3</sup> /s) | 貯留1<br>(m <sup>3</sup> /s) | 貯留2<br>(m <sup>3</sup> /s) | 合計<br>(m <sup>3</sup> /s) |
|-------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|
| 36:30       | 0.000                      | 0.000                      | 3.895                      | 0.011                      | 3.905                     |
| 36:40       | 0.000                      | 0.000                      | 3.863                      | 0.010                      | 3.873                     |
| 36:50       | 0.000                      | 0.000                      | 3.832                      | 0.010                      | 3.842                     |
| 37:00       | 0.000                      | 0.000                      | 3.801                      | 0.009                      | 3.810                     |
| 37:10       | 0.000                      | 0.000                      | 3.770                      | 0.009                      | 3.778                     |
| 37:20       | 0.000                      | 0.000                      | 3.738                      | 0.008                      | 3.746                     |
| 37:30       | 0.000                      | 0.000                      | 3.707                      | 0.008                      | 3.715                     |
| 37:40       | 0.000                      | 0.000                      | 3.675                      | 0.008                      | 3.683                     |
| 37:50       | 0.000                      | 0.000                      | 3.644                      | 0.008                      | 3.651                     |
| 38:00       | 0.000                      | 0.000                      | 3.612                      | 0.007                      | 3.619                     |
| 38:10       | 0.000                      | 0.000                      | 3.581                      | 0.007                      | 3.588                     |
| 38:20       | 0.000                      | 0.000                      | 3.550                      | 0.007                      | 3.557                     |
| 38:30       | 0.000                      | 0.000                      | 3.519                      | 0.007                      | 3.525                     |
| 38:40       | 0.000                      | 0.000                      | 3.487                      | 0.006                      | 3.493                     |
| 38:50       | 0.000                      | 0.000                      | 3.446                      | 0.006                      | 3.452                     |
| 39:00       | 0.000                      | 0.000                      | 3.405                      | 0.006                      | 3.411                     |
| 39:10       | 0.000                      | 0.000                      | 3.335                      | 0.006                      | 3.341                     |
| 39:20       | 0.000                      | 0.000                      | 3.265                      | 0.006                      | 3.271                     |
| 39:30       | 0.000                      | 0.000                      | 3.195                      | 0.006                      | 3.201                     |
| 39:40       | 0.000                      | 0.000                      | 3.125                      | 0.005                      | 3.130                     |
| 39:50       | 0.000                      | 0.000                      | 3.055                      | 0.005                      | 3.060                     |
| 40:00       | 0.000                      | 0.000                      | 2.985                      | 0.005                      | 2.990                     |
| 40:10       | 0.000                      | 0.000                      | 2.915                      | 0.005                      | 2.920                     |
| 40:20       | 0.000                      | 0.000                      | 2.845                      | 0.005                      | 2.850                     |
| 40:30       | 0.000                      | 0.000                      | 2.775                      | 0.005                      | 2.779                     |
| 40:40       | 0.000                      | 0.000                      | 2.704                      | 0.004                      | 2.708                     |
| 40:50       | 0.000                      | 0.000                      | 1.353                      | 0.004                      | 1.357                     |
| 41:00       | 0.000                      | 0.000                      | 0.001                      | 0.004                      | 0.005                     |
| 41:10       | 0.000                      | 0.000                      | 0.000                      | 0.004                      | 0.004                     |
| 41:20       | 0.000                      | 0.000                      | 0.000                      | 0.004                      | 0.004                     |
| 41:30       | 0.000                      | 0.000                      | 0.000                      | 0.004                      | 0.004                     |
| 41:40       | 0.000                      | 0.000                      | 0.000                      | 0.004                      | 0.004                     |
| 41:50       | 0.000                      | 0.000                      | 0.000                      | 0.004                      | 0.004                     |
| 42:00       | 0.000                      | 0.000                      | 0.000                      | 0.004                      | 0.004                     |
| 42:10       | 0.000                      | 0.000                      | 0.000                      | 0.004                      | 0.004                     |
| 42:20       | 0.000                      | 0.000                      | 0.000                      | 0.003                      | 0.003                     |
| 42:30       | 0.000                      | 0.000                      | 0.000                      | 0.003                      | 0.003                     |
| 42:40       | 0.000                      | 0.000                      | 0.000                      | 0.003                      | 0.003                     |
| 42:50       | 0.000                      | 0.000                      | 0.000                      | 0.003                      | 0.003                     |
| 43:00       | 0.000                      | 0.000                      | 0.000                      | 0.003                      | 0.003                     |
| 43:10       | 0.000                      | 0.000                      | 0.000                      | 0.003                      | 0.003                     |
| 43:20       | 0.000                      | 0.000                      | 0.000                      | 0.003                      | 0.003                     |
| 43:30       | 0.000                      | 0.000                      | 0.000                      | 0.003                      | 0.003                     |
| 43:40       | 0.000                      | 0.000                      | 0.000                      | 0.003                      | 0.003                     |
| 43:50       | 0.000                      | 0.000                      | 0.000                      | 0.003                      | 0.003                     |
| 44:00       | 0.000                      | 0.000                      | 0.000                      | 0.003                      | 0.003                     |
| 44:10       | 0.000                      | 0.000                      | 0.000                      | 0.003                      | 0.003                     |
| 44:20       | 0.000                      | 0.000                      | 0.000                      | 0.003                      | 0.003                     |
| 44:30       | 0.000                      | 0.000                      | 0.000                      | 0.003                      | 0.003                     |
| 44:40       | 0.000                      | 0.000                      | 0.000                      | 0.002                      | 0.002                     |
| 44:50       | 0.000                      | 0.000                      | 0.000                      | 0.002                      | 0.002                     |
| 45:00       | 0.000                      | 0.000                      | 0.000                      | 0.002                      | 0.002                     |
| 45:10       | 0.000                      | 0.000                      | 0.000                      | 0.002                      | 0.002                     |
| 45:20       | 0.000                      | 0.000                      | 0.000                      | 0.002                      | 0.002                     |
| 45:30       | 0.000                      | 0.000                      | 0.000                      | 0.002                      | 0.002                     |
| 45:40       | 0.000                      | 0.000                      | 0.000                      | 0.002                      | 0.002                     |
| 45:50       | 0.000                      | 0.000                      | 0.000                      | 0.002                      | 0.002                     |
| 46:00       | 0.000                      | 0.000                      | 0.000                      | 0.002                      | 0.002                     |

| 時間<br>(時：分) | 流域 2<br>(m <sup>3</sup> /s) | 浸透 2<br>(m <sup>3</sup> /s) | 貯留 1<br>(m <sup>3</sup> /s) | 貯留 2<br>(m <sup>3</sup> /s) | 合計<br>(m <sup>3</sup> /s) |
|-------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|---------------------------|
| 46:10       | 0.000                       | 0.000                       | 0.000                       | 0.002                       | 0.002                     |
| 46:20       | 0.000                       | 0.000                       | 0.000                       | 0.002                       | 0.002                     |
| 46:30       | 0.000                       | 0.000                       | 0.000                       | 0.002                       | 0.002                     |
| 46:40       | 0.000                       | 0.000                       | 0.000                       | 0.002                       | 0.002                     |
| 46:50       | 0.000                       | 0.000                       | 0.000                       | 0.002                       | 0.002                     |
| 47:00       | 0.000                       | 0.000                       | 0.000                       | 0.002                       | 0.002                     |
| 47:10       | 0.000                       | 0.000                       | 0.000                       | 0.002                       | 0.002                     |
| 47:20       | 0.000                       | 0.000                       | 0.000                       | 0.002                       | 0.002                     |
| 47:30       | 0.000                       | 0.000                       | 0.000                       | 0.002                       | 0.002                     |
| 47:40       | 0.000                       | 0.000                       | 0.000                       | 0.002                       | 0.002                     |
| 47:50       | 0.000                       | 0.000                       | 0.000                       | 0.002                       | 0.002                     |
| 48:00       | 0.000                       | 0.000                       | 0.000                       | 0.002                       | 0.002                     |
| 48:10       | 0.000                       | 0.000                       | 0.000                       | 0.002                       | 0.002                     |
| 48:20       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 48:30       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 48:40       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 48:50       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 49:00       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 49:10       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 49:20       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 49:30       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 49:40       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 49:50       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 50:00       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 50:10       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 50:20       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 50:30       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 50:40       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 50:50       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 51:00       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 51:10       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 51:20       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 51:30       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 51:40       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 51:50       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |
| 52:00       | 0.000                       | 0.000                       | 0.000                       | 0.001                       | 0.001                     |

## 4-3-2 設計条件

|            |     |        |
|------------|-----|--------|
| 最大制限水深     | (m) | 10.000 |
| 池底の標高      | (m) | 0.000  |
| 収束計算上の時間間隔 | (s) | 5      |
| 計算開始水深     | (m) | 0.000  |
| 計算終了水深     | (m) | 0.100  |

## 4-3-3 貯留施設形状

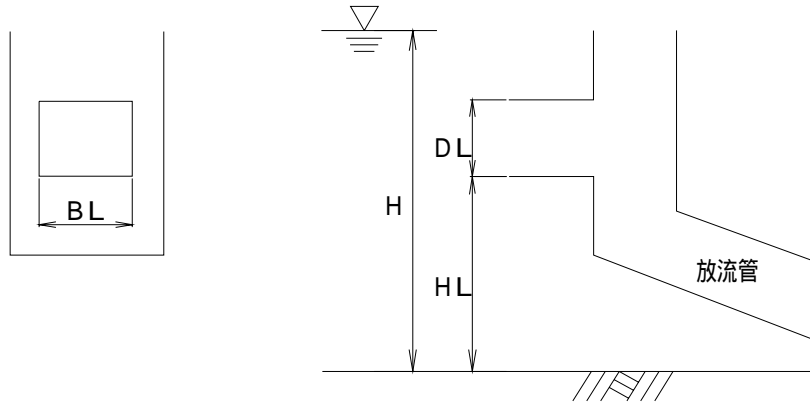
| No. | 水深<br>(m) | 容量<br>(m <sup>3</sup> ) |
|-----|-----------|-------------------------|
| 1   | 0.000     | 0.000                   |
| 2   | 2.000     | 158.000                 |
| 3   | 2.010     | 251.800                 |
| 4   | 3.000     | 19863.800               |

| No. | 水深<br>(m) | 容量<br>(m <sup>3</sup> ) |
|-----|-----------|-------------------------|
| 5   | 3.010     | 20177.900               |
| 6   | 4.000     | 64025.200               |
| 7   | 5.000     | 111865.200              |
| 8   | 6.000     | 162200.200              |
| 9   | 7.000     | 215345.200              |
| 10  | 8.000     | 271390.200              |
| 11  | 9.000     | 330165.200              |
| 12  | 10.000    | 391770.200              |



## 4-3-4 放流施設

種類： 放流管(1)



| 高さ<br>HL (m) | オリフィス<br>幅 BL (m) | オリフィス<br>高さ DL (m) | 流量係数<br>C | 流量係数<br>1.7~1.8 |
|--------------|-------------------|--------------------|-----------|-----------------|
| 0.000        | 0.900             | 0.900              | 0.600     | 1.800           |

$$1) H = HL + 1.2 \cdot DL$$

$$Q = 1.7 \sim 1.8 \cdot BL \cdot (H - HL)^{3/2}$$

$$2) HL + 1.2 \cdot DL < H < HL + 1.8 \cdot DL$$

1) と 3) を 直線補完

$$3) HL + 1.8 \cdot DL \leq H$$

$$Q = C \cdot DL \cdot BL \cdot \sqrt{2g \cdot (H - HL - 0.5 \cdot DL)}$$

ここに、

Q : 放流量 (m<sup>3</sup>/s)

C : 流量係数 ベルマウス有 0.85 ~ 0.90

ベルマウス無 0.6

g : 重力加速度(=9.8) (m/s<sup>2</sup>)

## 4-3-5 設計堆積土砂量

設計堆積土砂量は次式により各年の設計堆積土砂量を求め、その最大値を累計する。

$$l_j = l \times \left[ a_j + \sum_{i=1}^{j-1} \left\{ (1/2)^i \times a_{(j-i)} \right\} \right]$$

ただし、 $j = 1$  の時  $l_1 = l \times a_1$

ここに、

$l_j$  :  $j$ 年目の堆積土砂量 ( $m^3$ ) ( $j = 2 \sim N+1$ )

$l$  : 設計値 ( $m^3/ha \cdot 年$ )

$N$  : おおむね工事終了までの年数 (年)

$a_j$  :  $j$ 年目の工事工区面積 (ha)

したがって次のようになる。

|     | 工事工区面積<br>$a_j$ (ha) | 設計堆積土砂量<br>$l_j$ ( $m^3$ ) |
|-----|----------------------|----------------------------|
| 1年目 | 30.000               | 4500.000                   |
| 2年目 | 50.000               | 9750.000                   |
| 3年目 | 20.000               | 7875.000                   |
| 4年目 | 0                    | 3937.500                   |

| 設計堆積年数<br>$N$ (年) | 設計堆積土砂量<br>$V$ ( $m^3$ ) |
|-------------------|--------------------------|
| 1                 | 9750.000                 |
| 2                 | 17625.000                |
| 3                 | 21562.500                |

## 4-3-6 洪水調節計算結果

| 時間<br>(時:分:秒) | 流入量<br>I(m <sup>3</sup> /s) | 流出量<br>Q(m <sup>3</sup> /s) | 水位<br>H(m) | 貯水量<br>V(m <sup>3</sup> ) |
|---------------|-----------------------------|-----------------------------|------------|---------------------------|
| 0:00          | 0.000                       | 0.000                       | 0.000      | 0.000                     |
| 0:10          | 1.701                       | 1.607                       | 0.994      | 78.562                    |
| 0:20          | 2.565                       | 2.446                       | 1.743      | 137.678                   |
| 0:30          | 3.544                       | 2.693                       | 2.016      | 378.494                   |
| 0:40          | 3.586                       | 2.715                       | 2.042      | 895.093                   |
| 0:50          | 3.607                       | 2.738                       | 2.069      | 1417.006                  |
| 1:00          | 3.625                       | 2.760                       | 2.095      | 1937.273                  |
| 1:10          | 3.646                       | 2.782                       | 2.121      | 2456.044                  |
| 1:20          | 3.666                       | 2.803                       | 2.147      | 2974.049                  |
| 1:30          | 3.686                       | 2.825                       | 2.174      | 3491.110                  |
| 1:40          | 3.705                       | 2.846                       | 2.200      | 4007.051                  |
| 1:50          | 3.726                       | 2.867                       | 2.226      | 4522.442                  |
| 2:00          | 3.747                       | 2.888                       | 2.252      | 5037.830                  |
| 2:10          | 3.769                       | 2.909                       | 2.278      | 5553.751                  |
| 2:20          | 3.791                       | 2.929                       | 2.304      | 6070.428                  |
| 2:30          | 3.813                       | 2.950                       | 2.330      | 6587.782                  |
| 2:40          | 3.835                       | 2.970                       | 2.356      | 7106.031                  |
| 2:50          | 3.860                       | 2.991                       | 2.382      | 7625.981                  |
| 3:00          | 3.882                       | 3.011                       | 2.409      | 8147.819                  |
| 3:10          | 3.905                       | 3.031                       | 2.435      | 8671.289                  |
| 3:20          | 3.929                       | 3.052                       | 2.462      | 9196.731                  |
| 3:30          | 3.954                       | 3.072                       | 2.488      | 9724.773                  |
| 3:40          | 3.978                       | 3.092                       | 2.515      | 10255.432                 |
| 3:50          | 4.003                       | 3.112                       | 2.542      | 10788.581                 |
| 4:00          | 4.028                       | 3.132                       | 2.569      | 11324.686                 |
| 4:10          | 4.054                       | 3.152                       | 2.596      | 11864.205                 |
| 4:20          | 4.081                       | 3.172                       | 2.624      | 12407.581                 |
| 4:30          | 4.107                       | 3.192                       | 2.651      | 12954.656                 |
| 4:40          | 4.134                       | 3.212                       | 2.679      | 13505.576                 |
| 4:50          | 4.162                       | 3.232                       | 2.707      | 14060.776                 |
| 5:00          | 4.190                       | 3.253                       | 2.735      | 14620.684                 |
| 5:10          | 4.218                       | 3.273                       | 2.764      | 15185.571                 |
| 5:20          | 4.247                       | 3.293                       | 2.793      | 15755.405                 |
| 5:30          | 4.276                       | 3.314                       | 2.822      | 16330.304                 |
| 5:40          | 4.306                       | 3.334                       | 2.851      | 16910.682                 |
| 5:50          | 4.337                       | 3.354                       | 2.881      | 17497.094                 |
| 6:00          | 4.368                       | 3.375                       | 2.910      | 18089.784                 |
| 6:10          | 4.399                       | 3.396                       | 2.941      | 18688.697                 |
| 6:20          | 4.430                       | 3.416                       | 2.971      | 19293.782                 |
| 6:30          | 4.465                       | 3.437                       | 3.001      | 19906.041                 |
| 6:40          | 4.497                       | 3.448                       | 3.018      | 20528.815                 |
| 6:50          | 4.531                       | 3.458                       | 3.032      | 21165.590                 |
| 7:00          | 4.563                       | 3.467                       | 3.047      | 21816.326                 |
| 7:10          | 4.599                       | 3.477                       | 3.062      | 22481.513                 |
| 7:20          | 4.635                       | 3.488                       | 3.077      | 23162.232                 |
| 7:30          | 4.670                       | 3.498                       | 3.093      | 23858.211                 |
| 7:40          | 4.707                       | 3.509                       | 3.109      | 24569.484                 |
| 7:50          | 4.745                       | 3.519                       | 3.126      | 25296.679                 |
| 8:00          | 4.782                       | 3.530                       | 3.142      | 26039.823                 |
| 8:10          | 4.822                       | 3.542                       | 3.159      | 26799.245                 |
| 8:20          | 4.861                       | 3.553                       | 3.177      | 27575.569                 |
| 8:30          | 4.902                       | 3.565                       | 3.195      | 28368.967                 |
| 8:40          | 4.942                       | 3.577                       | 3.213      | 29179.609                 |
| 8:50          | 4.984                       | 3.589                       | 3.232      | 30007.669                 |
| 9:00          | 5.026                       | 3.601                       | 3.251      | 30853.615                 |
| 9:10          | 5.071                       | 3.614                       | 3.271      | 31718.364                 |
| 9:20          | 5.116                       | 3.626                       | 3.291      | 32602.525                 |

| 時間<br>(時:分:秒) | 流入量<br>I(m <sup>3</sup> /s) | 流出量<br>Q(m <sup>3</sup> /s) | 水位<br>H(m) | 貯水量<br>V(m <sup>3</sup> ) |
|---------------|-----------------------------|-----------------------------|------------|---------------------------|
| 9:30          | 5.161                       | 3.639                       | 3.311      | 33505.957                 |
| 9:40          | 5.206                       | 3.653                       | 3.332      | 34428.522                 |
| 9:50          | 5.245                       | 3.666                       | 3.353      | 35368.440                 |
| 10:00         | 5.285                       | 3.680                       | 3.375      | 36323.952                 |
| 10:10         | 5.311                       | 3.693                       | 3.396      | 37290.766                 |
| 10:20         | 5.336                       | 3.707                       | 3.418      | 38264.642                 |
| 10:30         | 5.364                       | 3.721                       | 3.441      | 39246.298                 |
| 10:40         | 5.392                       | 3.735                       | 3.463      | 40236.445                 |
| 10:50         | 5.420                       | 3.749                       | 3.485      | 41234.893                 |
| 11:00         | 5.448                       | 3.763                       | 3.508      | 42241.755                 |
| 11:10         | 5.479                       | 3.777                       | 3.531      | 43258.187                 |
| 11:20         | 5.511                       | 3.791                       | 3.554      | 44285.037                 |
| 11:30         | 5.545                       | 3.805                       | 3.578      | 45322.997                 |
| 11:40         | 5.579                       | 3.820                       | 3.601      | 46372.756                 |
| 11:50         | 5.616                       | 3.834                       | 3.625      | 47435.146                 |
| 12:00         | 5.652                       | 3.849                       | 3.650      | 48510.693                 |
| 12:10         | 5.691                       | 3.864                       | 3.674      | 49599.773                 |
| 12:20         | 5.730                       | 3.878                       | 3.699      | 50703.355                 |
| 12:30         | 5.771                       | 3.893                       | 3.724      | 51821.954                 |
| 12:40         | 5.813                       | 3.909                       | 3.750      | 52956.381                 |
| 12:50         | 5.857                       | 3.924                       | 3.776      | 54107.591                 |
| 13:00         | 5.902                       | 3.940                       | 3.802      | 55276.232                 |
| 13:10         | 5.949                       | 3.955                       | 3.829      | 56463.098                 |
| 13:20         | 5.998                       | 3.971                       | 3.856      | 57669.280                 |
| 13:30         | 6.048                       | 3.987                       | 3.884      | 58895.559                 |
| 13:40         | 6.099                       | 4.004                       | 3.912      | 60142.413                 |
| 13:50         | 6.152                       | 4.020                       | 3.941      | 61410.767                 |
| 14:00         | 6.208                       | 4.037                       | 3.970      | 62701.841                 |
| 14:10         | 6.266                       | 4.054                       | 4.000      | 64016.695                 |
| 14:20         | 6.322                       | 4.070                       | 4.028      | 65355.861                 |
| 14:30         | 6.384                       | 4.086                       | 4.056      | 66720.934                 |
| 14:40         | 6.447                       | 4.102                       | 4.085      | 68113.710                 |
| 14:50         | 6.512                       | 4.119                       | 4.115      | 69534.931                 |
| 15:00         | 6.578                       | 4.136                       | 4.145      | 70985.333                 |
| 15:10         | 6.647                       | 4.153                       | 4.176      | 72466.099                 |
| 15:20         | 6.718                       | 4.171                       | 4.208      | 73978.406                 |
| 15:30         | 6.793                       | 4.189                       | 4.240      | 75523.575                 |
| 15:40         | 6.868                       | 4.207                       | 4.273      | 77102.916                 |
| 15:50         | 6.948                       | 4.226                       | 4.307      | 78717.889                 |
| 16:00         | 7.028                       | 4.245                       | 4.342      | 80369.640                 |
| 16:10         | 7.112                       | 4.264                       | 4.377      | 82059.167                 |
| 16:20         | 7.200                       | 4.283                       | 4.413      | 83788.655                 |
| 16:30         | 7.290                       | 4.303                       | 4.450      | 85559.681                 |
| 16:40         | 7.384                       | 4.324                       | 4.488      | 87373.816                 |
| 16:50         | 7.481                       | 4.344                       | 4.527      | 89232.771                 |
| 17:00         | 7.582                       | 4.366                       | 4.567      | 91138.549                 |
| 17:10         | 7.686                       | 4.387                       | 4.608      | 93093.292                 |
| 17:20         | 7.795                       | 4.409                       | 4.650      | 95098.833                 |
| 17:30         | 7.909                       | 4.432                       | 4.693      | 97157.747                 |
| 17:40         | 8.025                       | 4.455                       | 4.737      | 99271.992                 |
| 17:50         | 8.130                       | 4.478                       | 4.782      | 101438.736                |
| 18:00         | 8.240                       | 4.502                       | 4.828      | 103655.772                |
| 18:10         | 8.353                       | 4.526                       | 4.876      | 105925.095                |
| 18:20         | 8.471                       | 4.551                       | 4.924      | 108248.990                |
| 18:30         | 8.595                       | 4.577                       | 4.974      | 110630.481                |
| 18:40         | 8.723                       | 4.602                       | 5.024      | 113072.367                |
| 18:50         | 8.861                       | 4.627                       | 5.074      | 115579.122                |
| 19:00         | 9.004                       | 4.652                       | 5.125      | 118155.023                |

| 時間<br>(時:分:秒) | 流入量<br>I(m <sup>3</sup> /s) | 流出量<br>Q(m <sup>3</sup> /s) | 水位<br>H(m) | 貯水量<br>V(m <sup>3</sup> ) |
|---------------|-----------------------------|-----------------------------|------------|---------------------------|
| 19:10         | 9.155                       | 4.678                       | 5.178      | 120803.783                |
| 19:20         | 9.315                       | 4.705                       | 5.232      | 123529.995                |
| 19:30         | 9.483                       | 4.732                       | 5.288      | 126338.382                |
| 19:40         | 9.663                       | 4.760                       | 5.345      | 129234.542                |
| 19:50         | 9.854                       | 4.789                       | 5.404      | 132224.797                |
| 20:00         | 10.056                      | 4.819                       | 5.466      | 135315.439                |
| 20:10         | 10.273                      | 4.849                       | 5.529      | 138513.631                |
| 20:20         | 10.502                      | 4.881                       | 5.595      | 141827.101                |
| 20:30         | 10.750                      | 4.913                       | 5.664      | 145264.745                |
| 20:40         | 11.015                      | 4.946                       | 5.735      | 148836.610                |
| 20:50         | 11.302                      | 4.981                       | 5.808      | 152553.601                |
| 21:00         | 11.609                      | 5.016                       | 5.885      | 156427.773                |
| 21:10         | 11.947                      | 5.053                       | 5.966      | 160473.970                |
| 21:20         | 12.311                      | 5.090                       | 6.047      | 164708.380                |
| 21:30         | 12.707                      | 5.128                       | 6.131      | 169148.279                |
| 21:40         | 13.139                      | 5.168                       | 6.219      | 173813.391                |
| 21:50         | 13.623                      | 5.209                       | 6.311      | 178728.942                |
| 22:00         | 14.157                      | 5.252                       | 6.409      | 183924.545                |
| 22:10         | 14.761                      | 5.298                       | 6.512      | 189435.232                |
| 22:20         | 15.441                      | 5.346                       | 6.623      | 195303.076                |
| 22:30         | 16.227                      | 5.397                       | 6.741      | 201580.763                |
| 22:40         | 17.129                      | 5.451                       | 6.868      | 208333.332                |
| 22:50         | 18.203                      | 5.509                       | 7.005      | 215645.335                |
| 23:00         | 19.481                      | 5.568                       | 7.148      | 223627.747                |
| 23:10         | 21.071                      | 5.633                       | 7.305      | 232433.132                |
| 23:20         | 23.074                      | 5.705                       | 7.481      | 242275.503                |
| 23:30         | 25.764                      | 5.786                       | 7.680      | 253480.078                |
| 23:40         | 29.575                      | 5.878                       | 7.914      | 266583.162                |
| 23:50         | 35.818                      | 5.987                       | 8.191      | 282642.402                |
| 24:00         | 50.316                      | 6.131                       | 8.569      | 304850.005                |
| 24:10         | 25.267                      | 6.251                       | 8.892      | 323805.433                |
| 24:20         | 37.556                      | 6.343                       | 9.141      | 338875.926                |
| 24:30         | 6.620                       | 6.399                       | 9.294      | 348300.473                |
| 24:40         | 6.574                       | 6.399                       | 9.296      | 348419.030                |
| 24:50         | 6.529                       | 6.400                       | 9.298      | 348510.069                |
| 25:00         | 6.484                       | 6.400                       | 9.299      | 348573.835                |
| 25:10         | 6.439                       | 6.401                       | 9.299      | 348610.275                |
| 25:11:00      | 6.434                       | 6.401                       | 9.299      | 348612.411                |
| 25:12:00      | 6.429                       | 6.401                       | 9.299      | 348614.274                |
| 25:13:00      | 6.425                       | 6.401                       | 9.299      | 348615.863                |
| 25:14:00      | 6.420                       | 6.401                       | 9.300      | 348617.179                |
| 25:15:00      | 6.416                       | 6.401                       | 9.300      | 348618.221                |
| 25:16:00      | 6.411                       | 6.401                       | 9.300      | 348618.990                |
| 25:17:00      | 6.407                       | 6.401                       | 9.300      | 348619.485                |
| 25:18:00      | 6.402                       | 6.401                       | 9.300      | 348619.708                |
| 25:19:00      | 6.398                       | 6.401                       | 9.300      | 348619.657                |
| 25:20         | 6.393                       | 6.401                       | 9.300      | 348619.334                |
| 25:21:00      | 6.388                       | 6.401                       | 9.300      | 348618.739                |
| 25:22:00      | 6.384                       | 6.401                       | 9.300      | 348617.875                |
| 25:23:00      | 6.380                       | 6.401                       | 9.300      | 348616.741                |
| 25:24:00      | 6.375                       | 6.401                       | 9.299      | 348615.337                |
| 25:25:00      | 6.370                       | 6.401                       | 9.299      | 348613.664                |
| 25:26:00      | 6.366                       | 6.401                       | 9.299      | 348611.721                |
| 25:27:00      | 6.361                       | 6.401                       | 9.299      | 348609.509                |
| 25:28:00      | 6.357                       | 6.401                       | 9.299      | 348607.028                |
| 25:29:00      | 6.353                       | 6.401                       | 9.299      | 348604.278                |
| 25:30         | 6.348                       | 6.401                       | 9.299      | 348601.259                |
| 25:40         | 6.303                       | 6.400                       | 9.299      | 348556.296                |

| 時間<br>(時:分:秒) | 流入量<br>I(m <sup>3</sup> /s) | 流出量<br>Q(m <sup>3</sup> /s) | 水位<br>H(m) | 貯水量<br>V(m <sup>3</sup> ) |
|---------------|-----------------------------|-----------------------------|------------|---------------------------|
| 25:50         | 6.258                       | 6.400                       | 9.297      | 348484.388                |
| 26:00         | 6.212                       | 6.399                       | 9.296      | 348385.481                |
| 26:10         | 6.160                       | 6.399                       | 9.294      | 348257.573                |
| 26:20         | 6.107                       | 6.398                       | 9.291      | 348098.669                |
| 26:30         | 6.054                       | 6.396                       | 9.288      | 347908.731                |
| 26:40         | 6.001                       | 6.395                       | 9.284      | 347687.716                |
| 26:50         | 5.947                       | 6.394                       | 9.280      | 347435.586                |
| 27:00         | 5.894                       | 6.392                       | 9.276      | 347152.299                |
| 27:10         | 5.838                       | 6.390                       | 9.271      | 346837.217                |
| 27:20         | 5.782                       | 6.388                       | 9.265      | 346489.704                |
| 27:30         | 5.725                       | 6.386                       | 9.259      | 346109.575                |
| 27:40         | 5.668                       | 6.383                       | 9.252      | 345696.646                |
| 27:50         | 5.614                       | 6.381                       | 9.245      | 345251.932                |
| 28:00         | 5.560                       | 6.378                       | 9.237      | 344776.443                |
| 28:10         | 5.513                       | 6.375                       | 9.229      | 344272.237                |
| 28:20         | 5.465                       | 6.372                       | 9.220      | 343741.361                |
| 28:30         | 5.423                       | 6.369                       | 9.211      | 343185.409                |
| 28:40         | 5.380                       | 6.365                       | 9.202      | 342605.966                |
| 28:50         | 5.341                       | 6.362                       | 9.192      | 342004.316                |
| 29:00         | 5.303                       | 6.358                       | 9.182      | 341381.735                |
| 29:10         | 5.267                       | 6.354                       | 9.172      | 340739.048                |
| 29:20         | 5.231                       | 6.350                       | 9.161      | 340077.075                |
| 29:30         | 5.197                       | 6.346                       | 9.150      | 339396.335                |
| 29:40         | 5.162                       | 6.342                       | 9.138      | 338697.346                |
| 29:50         | 5.128                       | 6.338                       | 9.127      | 337980.325                |
| 30:00         | 5.094                       | 6.334                       | 9.115      | 337245.485                |
| 30:10         | 5.061                       | 6.329                       | 9.103      | 336493.342                |
| 30:20         | 5.029                       | 6.325                       | 9.090      | 335724.408                |
| 30:30         | 4.997                       | 6.320                       | 9.077      | 334938.895                |
| 30:40         | 4.965                       | 6.315                       | 9.064      | 334137.013                |
| 30:50         | 4.934                       | 6.310                       | 9.051      | 333318.972                |
| 31:00         | 4.902                       | 6.305                       | 9.038      | 332484.983                |
| 31:10         | 4.872                       | 6.300                       | 9.024      | 331635.404                |
| 31:20         | 4.841                       | 6.295                       | 9.010      | 330770.592                |
| 31:30         | 4.811                       | 6.290                       | 8.995      | 329890.612                |
| 31:40         | 4.780                       | 6.284                       | 8.980      | 328995.629                |
| 31:50         | 4.750                       | 6.278                       | 8.965      | 328086.040                |
| 32:00         | 4.721                       | 6.273                       | 8.949      | 327162.201                |
| 32:10         | 4.691                       | 6.267                       | 8.933      | 326224.169                |
| 32:20         | 4.662                       | 6.261                       | 8.917      | 325272.001                |
| 32:30         | 4.633                       | 6.255                       | 8.900      | 324305.753                |
| 32:40         | 4.603                       | 6.248                       | 8.884      | 323325.483                |
| 32:50         | 4.572                       | 6.242                       | 8.867      | 322330.946                |
| 33:00         | 4.542                       | 6.236                       | 8.850      | 321321.901                |
| 33:10         | 4.511                       | 6.229                       | 8.832      | 320298.407                |
| 33:20         | 4.481                       | 6.223                       | 8.814      | 319260.523                |
| 33:30         | 4.451                       | 6.216                       | 8.797      | 318208.458                |
| 33:40         | 4.421                       | 6.209                       | 8.778      | 317142.418                |
| 33:50         | 4.391                       | 6.202                       | 8.760      | 316062.461                |
| 34:00         | 4.361                       | 6.196                       | 8.741      | 314968.646                |
| 34:10         | 4.331                       | 6.188                       | 8.723      | 313861.028                |
| 34:20         | 4.301                       | 6.181                       | 8.704      | 312739.666                |
| 34:30         | 4.271                       | 6.174                       | 8.684      | 311604.766                |
| 34:40         | 4.242                       | 6.167                       | 8.665      | 310456.536                |
| 34:50         | 4.213                       | 6.159                       | 8.645      | 309295.031                |
| 35:00         | 4.183                       | 6.152                       | 8.625      | 308120.307                |
| 35:10         | 4.153                       | 6.144                       | 8.605      | 306932.271                |
| 35:20         | 4.123                       | 6.137                       | 8.584      | 305730.829                |

| 時間<br>(時:分:秒) | 流入量<br>I(m <sup>3</sup> /s) | 流出量<br>Q(m <sup>3</sup> /s) | 水位<br>H(m) | 貯水量<br>V(m <sup>3</sup> ) |
|---------------|-----------------------------|-----------------------------|------------|---------------------------|
| 35:30         | 4.093                       | 6.129                       | 8.564      | 304516.040                |
| 35:40         | 4.063                       | 6.121                       | 8.543      | 303287.960                |
| 35:50         | 4.032                       | 6.113                       | 8.522      | 302046.197                |
| 36:00         | 4.000                       | 6.105                       | 8.500      | 300790.362                |
| 36:10         | 3.969                       | 6.097                       | 8.479      | 299520.515                |
| 36:20         | 3.937                       | 6.088                       | 8.457      | 298236.716                |
| 36:30         | 3.905                       | 6.080                       | 8.435      | 296938.878                |
| 36:40         | 3.873                       | 6.071                       | 8.412      | 295626.911                |
| 36:50         | 3.841                       | 6.063                       | 8.390      | 294301.027                |
| 37:00         | 3.810                       | 6.054                       | 8.367      | 292961.438                |
| 37:10         | 3.778                       | 6.045                       | 8.344      | 291608.054                |
| 37:20         | 3.746                       | 6.036                       | 8.321      | 290240.788                |
| 37:30         | 3.715                       | 6.027                       | 8.297      | 288859.851                |
| 37:40         | 3.683                       | 6.018                       | 8.274      | 287465.454                |
| 37:50         | 3.651                       | 6.009                       | 8.250      | 286057.508                |
| 38:00         | 3.619                       | 6.000                       | 8.225      | 284635.926                |
| 38:10         | 3.588                       | 5.990                       | 8.201      | 283201.069                |
| 38:20         | 3.557                       | 5.981                       | 8.176      | 281753.298                |
| 38:30         | 3.525                       | 5.971                       | 8.151      | 280292.373                |
| 38:40         | 3.493                       | 5.961                       | 8.126      | 278818.056                |
| 38:50         | 3.452                       | 5.951                       | 8.101      | 277327.713                |
| 39:00         | 3.411                       | 5.941                       | 8.075      | 275818.724                |
| 39:10         | 3.341                       | 5.931                       | 8.049      | 274282.485                |
| 39:20         | 3.271                       | 5.921                       | 8.022      | 272710.438                |
| 39:30         | 3.200                       | 5.910                       | 7.995      | 271102.591                |
| 39:40         | 3.130                       | 5.899                       | 7.966      | 269459.154                |
| 39:50         | 3.060                       | 5.887                       | 7.936      | 267780.546                |
| 40:00         | 2.990                       | 5.875                       | 7.905      | 266067.078                |
| 40:10         | 2.920                       | 5.862                       | 7.874      | 264318.911                |
| 40:20         | 2.850                       | 5.850                       | 7.842      | 262536.206                |
| 40:30         | 2.779                       | 5.837                       | 7.810      | 260718.827                |
| 40:40         | 2.708                       | 5.824                       | 7.777      | 258866.637                |
| 40:50         | 1.357                       | 5.808                       | 7.736      | 256596.197                |
| 41:00         | 0.005                       | 5.786                       | 7.681      | 253526.255                |
| 41:10         | 0.004                       | 5.761                       | 7.619      | 250064.841                |
| 41:20         | 0.004                       | 5.736                       | 7.558      | 246617.984                |
| 41:30         | 0.004                       | 5.712                       | 7.497      | 243185.986                |
| 41:40         | 0.004                       | 5.687                       | 7.436      | 239768.846                |
| 41:50         | 0.004                       | 5.662                       | 7.375      | 236366.563                |
| 42:00         | 0.004                       | 5.637                       | 7.315      | 232979.138                |
| 42:10         | 0.004                       | 5.613                       | 7.254      | 229606.422                |
| 42:20         | 0.003                       | 5.588                       | 7.195      | 226248.264                |
| 42:30         | 0.003                       | 5.563                       | 7.135      | 222904.817                |
| 42:40         | 0.003                       | 5.538                       | 7.075      | 219576.230                |
| 42:50         | 0.003                       | 5.513                       | 7.016      | 216262.504                |
| 43:00         | 0.003                       | 5.488                       | 6.955      | 212963.849                |
| 43:10         | 0.003                       | 5.462                       | 6.893      | 209680.835                |
| 43:20         | 0.003                       | 5.436                       | 6.832      | 206413.491                |
| 43:30         | 0.003                       | 5.409                       | 6.771      | 203161.819                |
| 43:40         | 0.003                       | 5.383                       | 6.710      | 199925.817                |
| 43:50         | 0.003                       | 5.357                       | 6.649      | 196705.487                |
| 44:00         | 0.003                       | 5.331                       | 6.589      | 193500.827                |
| 44:10         | 0.003                       | 5.305                       | 6.529      | 190311.839                |
| 44:20         | 0.003                       | 5.279                       | 6.469      | 187138.521                |
| 44:30         | 0.003                       | 5.253                       | 6.410      | 183980.725                |
| 44:40         | 0.002                       | 5.227                       | 6.351      | 180838.300                |
| 44:50         | 0.002                       | 5.200                       | 6.292      | 177711.399                |
| 45:00         | 0.002                       | 5.174                       | 6.233      | 174600.172                |

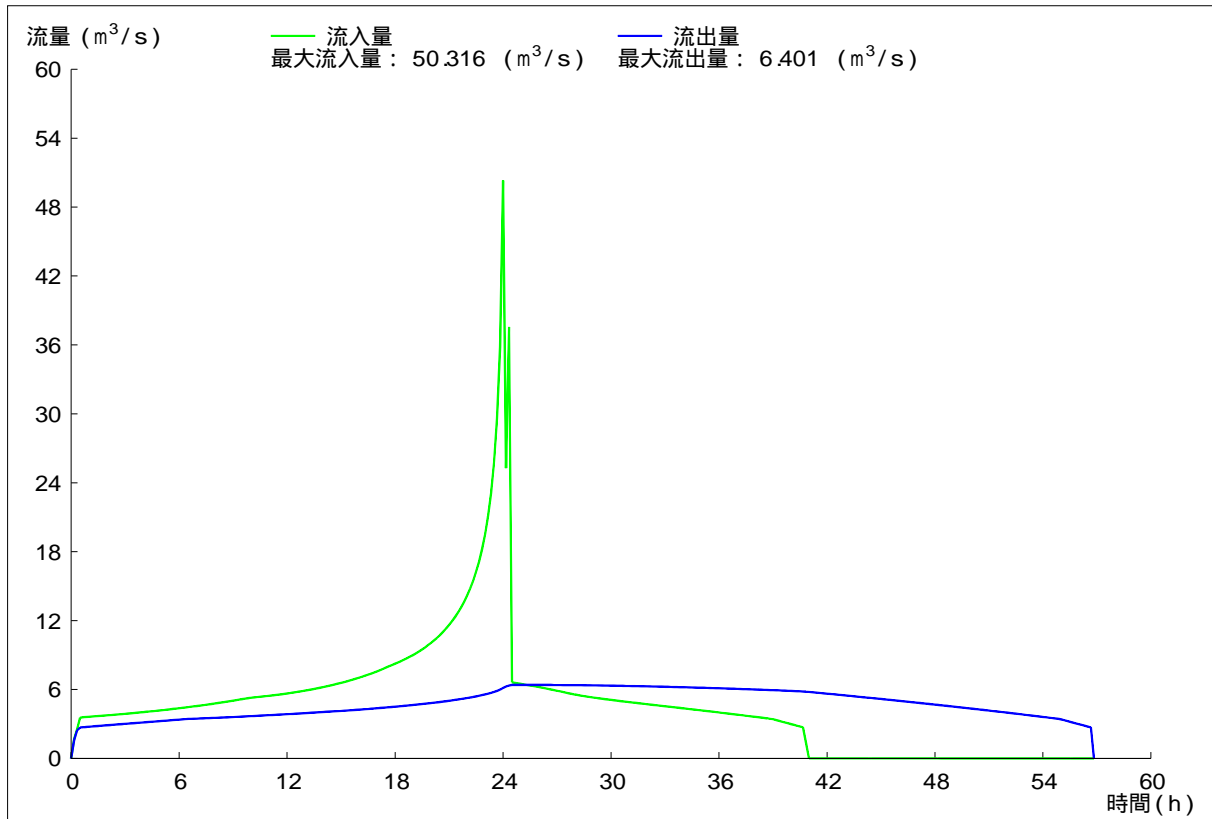


| 時間<br>(時:分:秒) | 流入量<br>I(m <sup>3</sup> /s) | 流出量<br>Q(m <sup>3</sup> /s) | 水位<br>H(m) | 貯水量<br>V(m <sup>3</sup> ) |
|---------------|-----------------------------|-----------------------------|------------|---------------------------|
| 45:10         | 0.002                       | 5.148                       | 6.175      | 171504.619                |
| 45:20         | 0.002                       | 5.122                       | 6.117      | 168424.739                |
| 45:30         | 0.002                       | 5.096                       | 6.059      | 165360.533                |
| 45:40         | 0.002                       | 5.070                       | 6.002      | 162312.000                |
| 45:50         | 0.002                       | 5.042                       | 5.942      | 159279.547                |
| 46:00         | 0.002                       | 5.015                       | 5.882      | 156263.641                |
| 46:10         | 0.002                       | 4.987                       | 5.822      | 153264.285                |
| 46:20         | 0.002                       | 4.960                       | 5.763      | 150281.476                |
| 46:30         | 0.002                       | 4.932                       | 5.704      | 147315.216                |
| 46:40         | 0.002                       | 4.904                       | 5.646      | 144365.505                |
| 46:50         | 0.002                       | 4.877                       | 5.587      | 141432.341                |
| 47:00         | 0.002                       | 4.849                       | 5.529      | 138515.726                |
| 47:10         | 0.002                       | 4.822                       | 5.472      | 135615.660                |
| 47:20         | 0.002                       | 4.794                       | 5.415      | 132732.141                |
| 47:30         | 0.002                       | 4.766                       | 5.358      | 129865.171                |
| 47:40         | 0.002                       | 4.739                       | 5.301      | 127014.748                |
| 47:50         | 0.002                       | 4.711                       | 5.245      | 124180.874                |
| 48:00         | 0.002                       | 4.684                       | 5.189      | 121363.548                |
| 48:10         | 0.002                       | 4.656                       | 5.133      | 118562.620                |
| 48:20         | 0.001                       | 4.629                       | 5.078      | 115777.942                |
| 48:30         | 0.001                       | 4.601                       | 5.023      | 113009.665                |
| 48:40         | 0.001                       | 4.573                       | 4.966      | 110258.087                |
| 48:50         | 0.001                       | 4.544                       | 4.909      | 107523.850                |
| 49:00         | 0.001                       | 4.515                       | 4.852      | 104807.027                |
| 49:10         | 0.001                       | 4.486                       | 4.796      | 102107.618                |
| 49:20         | 0.001                       | 4.456                       | 4.740      | 99425.625                 |
| 49:30         | 0.001                       | 4.427                       | 4.684      | 96761.045                 |
| 49:40         | 0.001                       | 4.398                       | 4.629      | 94113.881                 |
| 49:50         | 0.001                       | 4.369                       | 4.574      | 91484.131                 |
| 50:00         | 0.001                       | 4.340                       | 4.519      | 88871.795                 |
| 50:10         | 0.001                       | 4.311                       | 4.465      | 86276.874                 |
| 50:20         | 0.001                       | 4.282                       | 4.411      | 83699.367                 |
| 50:30         | 0.001                       | 4.253                       | 4.358      | 81139.275                 |
| 50:40         | 0.001                       | 4.224                       | 4.305      | 78596.597                 |
| 50:50         | 0.001                       | 4.195                       | 4.252      | 76071.333                 |
| 51:00         | 0.001                       | 4.166                       | 4.199      | 73563.484                 |
| 51:10         | 0.001                       | 4.137                       | 4.147      | 71073.049                 |
| 51:20         | 0.001                       | 4.108                       | 4.096      | 68600.028                 |
| 51:30         | 0.001                       | 4.079                       | 4.044      | 66144.421                 |
| 51:40         | 0.001                       | 4.050                       | 3.993      | 63706.241                 |
| 51:50         | 0.001                       | 4.018                       | 3.938      | 61286.344                 |
| 52:00         | 0.001                       | 3.987                       | 3.884      | 58885.256                 |
| 52:10         | 0.000                       | 3.956                       | 3.830      | 56502.680                 |
| 52:20         | 0.000                       | 3.924                       | 3.777      | 54138.617                 |
| 52:30         | 0.000                       | 3.893                       | 3.724      | 51793.368                 |
| 52:40         | 0.000                       | 3.862                       | 3.671      | 49466.934                 |
| 52:50         | 0.000                       | 3.830                       | 3.619      | 47159.315                 |
| 53:00         | 0.000                       | 3.799                       | 3.568      | 44870.510                 |
| 53:10         | 0.000                       | 3.768                       | 3.516      | 42600.520                 |
| 53:20         | 0.000                       | 3.736                       | 3.465      | 40349.344                 |
| 53:30         | 0.000                       | 3.705                       | 3.415      | 38116.983                 |
| 53:40         | 0.000                       | 3.674                       | 3.365      | 35903.436                 |
| 53:50         | 0.000                       | 3.642                       | 3.316      | 33708.704                 |
| 54:00         | 0.000                       | 3.611                       | 3.266      | 31532.786                 |
| 54:10         | 0.000                       | 3.579                       | 3.218      | 29375.683                 |
| 54:20         | 0.000                       | 3.548                       | 3.169      | 27237.394                 |
| 54:30         | 0.000                       | 3.517                       | 3.122      | 25117.920                 |
| 54:40         | 0.000                       | 3.485                       | 3.074      | 23017.261                 |

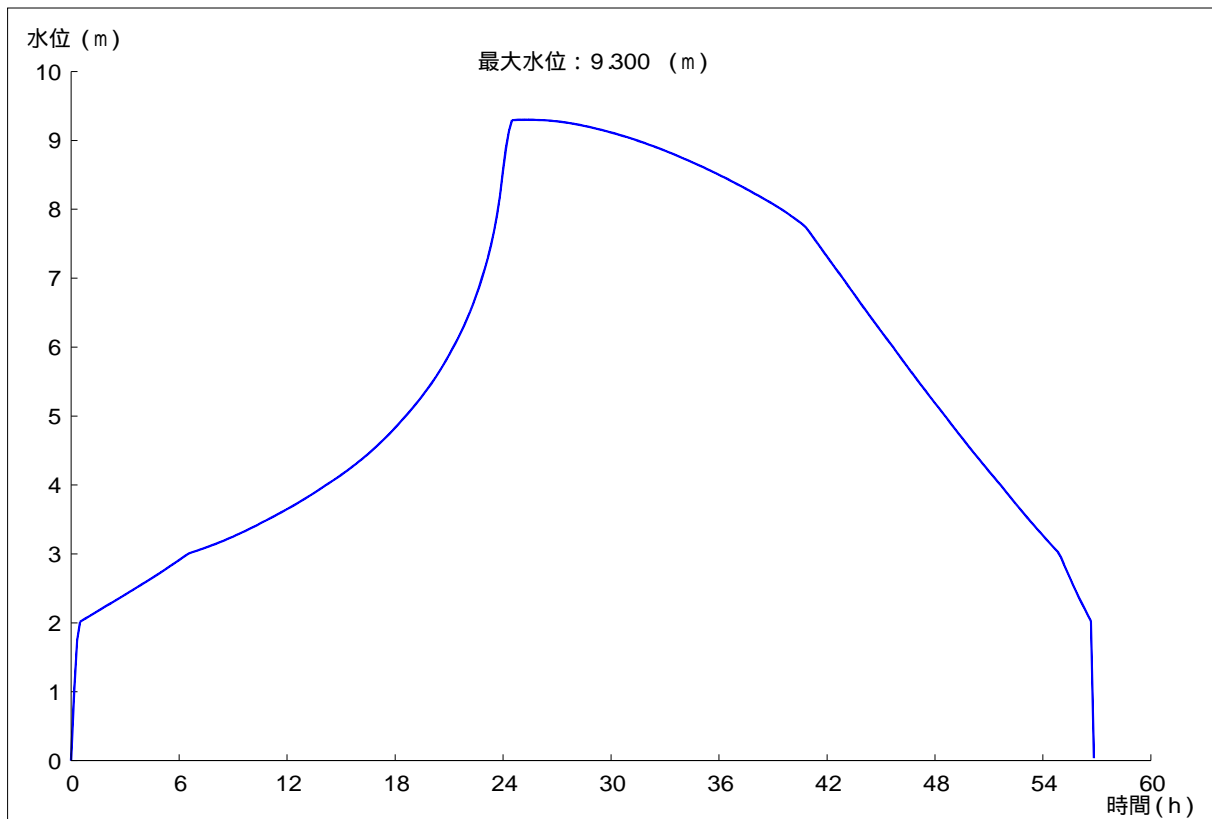


| 時間<br>(時:分:秒) | 流入量<br>I(m <sup>3</sup> /s) | 流出量<br>Q(m <sup>3</sup> /s) | 水位<br>H(m) | 貯水量<br>V(m <sup>3</sup> ) |
|---------------|-----------------------------|-----------------------------|------------|---------------------------|
| 54:50         | 0.000                       | 3.454                       | 3.027      | 20935.416                 |
| 55:00         | 0.000                       | 3.402                       | 2.950      | 18875.737                 |
| 55:10         | 0.000                       | 3.332                       | 2.848      | 16855.519                 |
| 55:20         | 0.000                       | 3.262                       | 2.748      | 14877.365                 |
| 55:30         | 0.000                       | 3.192                       | 2.651      | 12941.276                 |
| 55:40         | 0.000                       | 3.122                       | 2.555      | 11047.251                 |
| 55:50         | 0.000                       | 3.052                       | 2.461      | 9195.290                  |
| 56:00         | 0.000                       | 2.981                       | 2.370      | 7385.394                  |
| 56:10         | 0.000                       | 2.911                       | 2.281      | 5617.562                  |
| 56:20         | 0.000                       | 2.841                       | 2.194      | 3891.795                  |
| 56:30         | 0.000                       | 2.771                       | 2.109      | 2208.091                  |
| 56:40         | 0.000                       | 2.701                       | 2.026      | 566.453                   |
| 56:50         | 0.000                       | 0.011                       | 0.037      | 2.896                     |

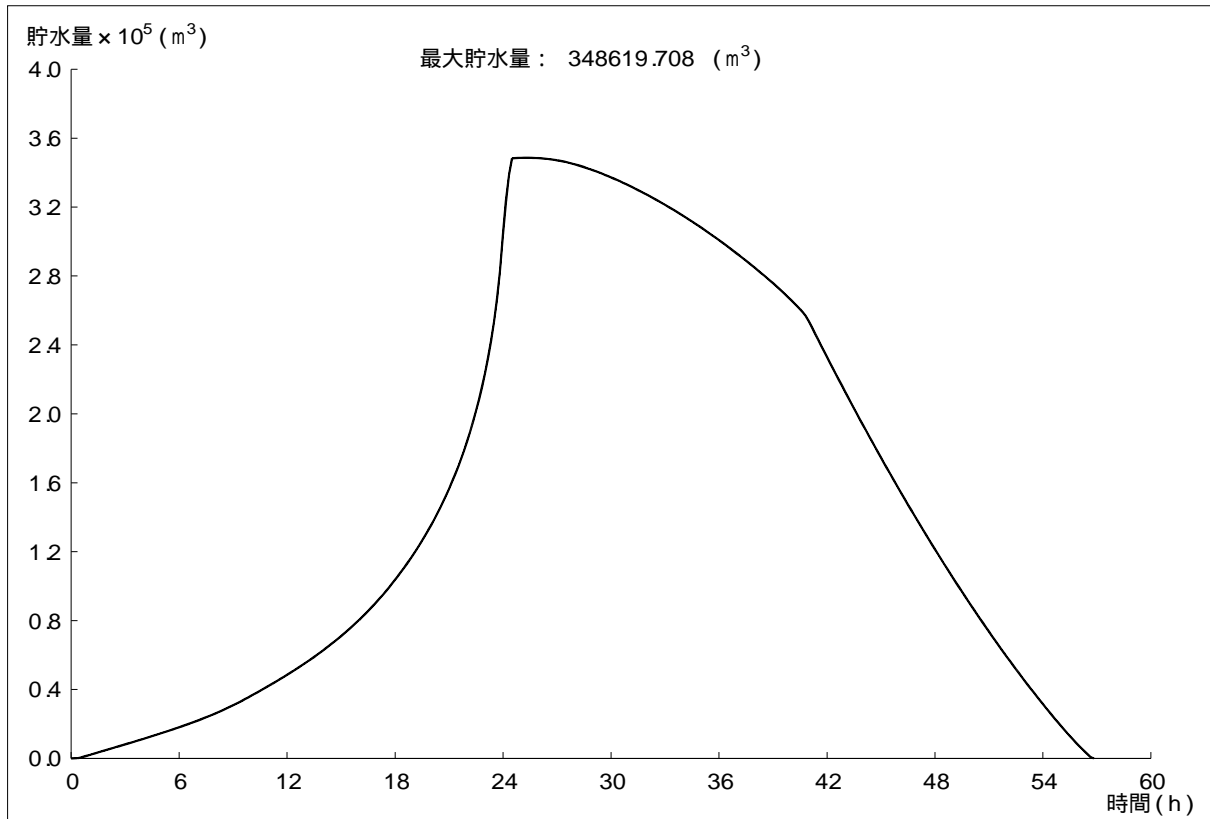
### ハイドログラフ (流入と流出)



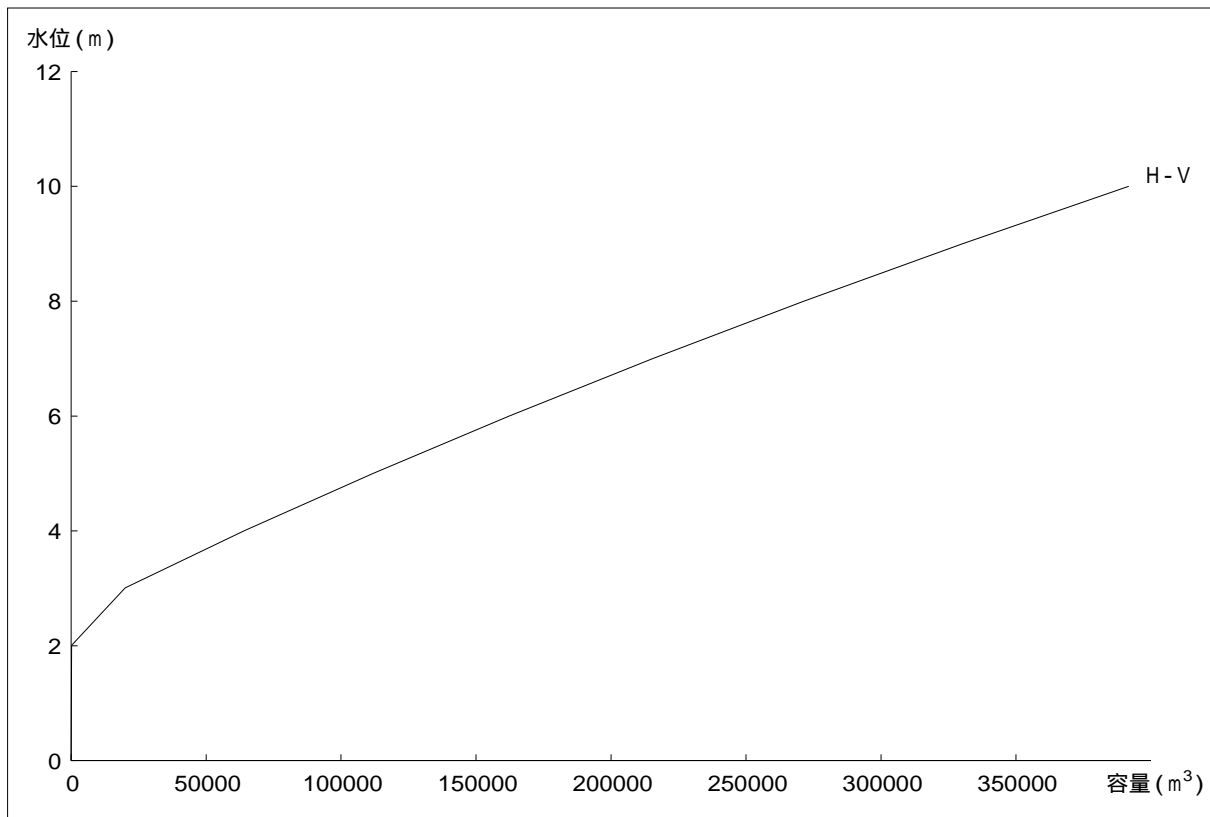
### 水位



貯水量



水位容量曲線



## 5 計算結果一覧

## 貯留 1

|        |                              |
|--------|------------------------------|
| 最大貯水時  | 24時20分                       |
| 最大水位   | 7.936 (m)                    |
| 最大制限水位 | 10.000 (m)                   |
| 水位判定   | OK                           |
| 最大貯水量  | 267798.206 (m <sup>3</sup> ) |
| 最大容量   | 391770.200 (m <sup>3</sup> ) |
| 貯水量判定  | OK                           |
| 最大雨量   | 38.6150 (mm)                 |
| 最大流入量  | 67.009 (m <sup>3</sup> /s)   |
| 最大流出量  | 5.887 (m <sup>3</sup> /s)    |

## 貯留 2

|        |                             |
|--------|-----------------------------|
| 最大貯水時  | 24時20分                      |
| 最大水位   | 3.625 (m)                   |
| 最大制限水位 | 10.000 (m)                  |
| 水位判定   | OK                          |
| 最大水面積  | 6500.000 (m <sup>2</sup> )  |
| 最大貯水量  | 8910.683 (m <sup>3</sup> )  |
| 最大容量   | 51750.000 (m <sup>3</sup> ) |
| 貯水量判定  | OK                          |
| 最大雨量   | 38.6150 (mm)                |
| 最大流入量  | 3.273 (m <sup>3</sup> /s)   |
| 最大流出量  | 0.778 (m <sup>3</sup> /s)   |

## 防災調節池

|        |                              |
|--------|------------------------------|
| 最大貯水時  | 25時18分0秒                     |
| 最大水位   | 9.300 (m)                    |
| 最大制限水位 | 10.000 (m)                   |
| 水位判定   | OK                           |
| 最大貯水量  | 348619.708 (m <sup>3</sup> ) |
| 最大容量   | 391770.200 (m <sup>3</sup> ) |
| 貯水量判定  | OK                           |
| 最大流入量  | 50.316 (m <sup>3</sup> /s)   |
| 最大流出量  | 6.401 (m <sup>3</sup> /s)    |